



REPORT REFERENCE:

SA – 6682 / Rev 5

EHO Comments

ENVIRONMENTAL NOISE IMPACT ASSESSMENT

Permitted Development

British Standard 8233: 2014

British Standard 4142: 2014

British Standard 6472 & 7385

CLIENT:

Rivendale Homes

SITE:

Bampton House

Hursley Road

Chandlers Ford

SURVEY DATES:

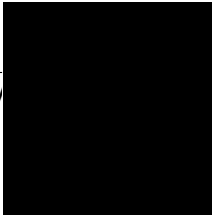
11th - 15th December 2020

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8th – 10th June 2021

&

13th – 19th October 2021

Report By	
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1 EXECUTIVE SUMMARY

1.1 Update Status

Following a meeting with the Rivendale Homes Planning Consultant, ourselves and the Planning Office and EHO representing Eastleigh Borough Council, then following updates have been agreed to be added to this report to allow the planning department to make a suitable decision of this application for accommodation at this premises.

1.1.1 Additional Vibration Measurements

It was agreed that we would take additional vibration measurements in the centre of the existing concrete slab on the ground and first floor in order to ascertain if the centre of the slab is experiencing vibration levels that could be of concern or not and if these levels are still within the parameters of the British Standards associated with vibration.

1.1.2 Tannoy Noise

Further calculations are to be carried out from the octave band data recorded at 1.0m from the tannoy announcer and calculate this back to the proposed nearest affected residential window and calculate a BS 8233: 2014 noise break in calculation and evaluate this against an NR 25 dB criteria, which would be a worst case scenario for a bedrooms.

1.1.3 Photograph Trickle Vents

It was agreed that we would photograph the existing trickle vents in order to demonstrate the physical state of these as requested by the EHO. However, it should be noted that we are not, and nor do we claim to be, any type of structural or building surveyor and that we are simply delivering what the EHO has asked for.

1.1.4 Building Regulation Approved Document E

Initially, the EHO requested a full RIBA Stage 4 acoustic analysis of the proposed internal structures to demonstrate that what was designed would achieve the minimum requirement of Building Regulations Approved Document E. However, the development is not anywhere near RIBA Stage 4 as the project is at planning stage and not RIBA Stage 4 (Detailed Design). Therefore it was agreed that Rivendale Homes would submit a statement saying they are committed to achieving compliance with Building Regulations Approved Document E at RIBA Stage 4 and would accept a planning condition to that effect. This is standard practice.

1.1.5 Plant Noise from Canton House

The noise from this facility is causing a problem to the proposed development and it was suggested by Stuart Wedgebury (EHO at the time at Eastleigh Borough Council) that a Grampian Planning Condition could be used in this instance and this has been carried forward through the various revisions of this report and not contested. It was therefore agreed that we would undertake a detailed acoustic design of remedial works to demonstrate that it is physically possible to install remedial acoustic works to the plant installed at Canton House, that will ensure resultant noise levels can be achieved at the proposed development. Initially the EHO requested a 1/3rd Octave analysis of this noise source, however, all manufacturers data, acoustic enclosure data and acoustic attenuator data is supplied and published in 1/1 octave band. Therefore our assessment is carried out in the 1/1 octave bands.

1.2 Instruction

Sound Advice Acoustics Ltd have been instructed by Rivendale Homes to undertake a background noise survey in order to establish the suitability, of the existing un-used office space, for a permitted development application to residential units under the current General Permitted Development Order (GDPO) 2020. The calculation process within British Standard 8233: 2014 is to be adopted to determine the impact of existing commercial noise sources on the proposed accommodation scheme at Bampton House, Hursley Road, Chandlers Ford. In addition, assessments to BS 4142: 2014 are also to be undertaken.

1.3 Scope of Report

The measurements will be undertaken in accordance with ISO 1996 – Part 2: 2017 to determine the existing background noise levels and calculations undertaken to British Standard 8233: 2014 will be used to determine the impact of existing commercial noise on the internal environment climate within the proposed residential dwellings. This report aims to establish the following:

- Existing background noise levels within the area;
- Assess the potential internal noise levels on the proposed rooms;
- Assess the suitability of the existing windows and ventilation;
- Assess any commercial surrounding noise sources.
- Address the Concerns from the recent EHO Responses.

1.4 Additional Measurements

In order to address the above matters, further measurements were made on the site between 8th – 10th June 2021 and include for both noise and vibration.

Noise levels were recorded on the southern corner of the existing building at first floor level in order to capture background noise levels not being influenced by the local Chinese Takeaway extract as well as operational noise levels of the Tannoy announcements & Patron noise from the railway station.

Vibration levels were recorded at two locations within the ground floor of the existing building with the transducers located on the solid concrete internal ground sub base floor as close to the foundations as possible. These positions are considered to be the worst case for vibrations levels being experienced within the existing building. It must be noted that vibration levels are not required to be considered for a permitted development of this type. However, the council have made several references to vibration within their comments and therefore these measurements and associated assessments have been carried out in order to address their concerns.

1.5 Summary of Results

A background noise survey was undertaken from the 11th to the 15th December 2020 at one position at the site in order to establish the underlying background noise levels. Overall results are detailed and tabulated below.

Assessment Position	Date Start	Date Finish	Daytime LAeq	Night Time LAeq
Position 1	11/12/2020	15/12/2020	59.2	55.6

Assessment Position	Date Start	Date Finish	Daytime LA90
Position 1	11/12/2020	15/12/2020	55.0

An additional background noise survey was undertaken from the 8th to the 10th June 2021 at one position at the site in order to establish the underlying background noise levels and associated source levels potentially linked to the train station tannoy system and patron noise. Overall results are detailed and tabulated below.

Assessment Position	Date Start	Date Finish	Daytime LAeq	Night Time LAeq
Position 2	08/06/2021	10/06/2021	60.7	51.8

Assessment Position	Date Start	Date Finish	Daytime LA90
Position 2	08/06/2021	10/06/2021	48.0

It should be noted that no commuter trains stop at this station during night hours and therefore only daytime assessments apply.

1.6 Summary of Vibration

1.6.1 11th – 15th December 2020 – External Pos.1

Please note that Permitted Development Rights do not include Vibration Analysis and therefore technically, the following is not applicable to this application. However, in order to appease Eastleigh Borough Council and allay any concerns, the following have been carried out.

The following vibration levels have been assessed over a typical period between 11th - 15th December 2020. The following table summarises these results:-

Time Period	Vibration Dose Value m/s ^{1.75}			Peak Particle Velocity mm/s
	L	T	V	Resultant Vector
11th December 2020 – 5 Hr	0.03	0.034	0.039	.450mm/s
12th December 2020 – 16 Hr	0.03	0.034	0.038	.350mm/s
13th December 2020 – 16 Hr	0.028	0.034	0.037	1.35mm/s
14th December 2020 – 16 Hr	0.027	0.034	0.038	.875mm/s
15th December 2020 – 3 Hr	0.027	0.034	0.041	1.13mm/s
11th - 12th December 2020 – 8 Hr	0.026	0.029	0.032	.350mm/s
12th - 13th December 2020 – 8 Hr	0.026	0.03	0.033	.450mm/s
13th - 14th December 2020 – 8 Hr	0.025	0.03	0.032	1.00mm/s
14th - 15th December 2020 – 8 Hr	0.025	0.03	0.033	.650mm/s

Table 3 Summary of daily VDV and PPV

The vibration results indicate that vibration dose values (vdv) at the measurement locations are below 0.2 – 0.4 for daytime and night time periods. These values are below the range associated with ‘low probability of adverse comment’.

The maximum peak particle velocity recorded was found to be 1.35 mm/s at position 1. In accordance with the guidance in BS7385, this value is below the limit at which cosmetic damage to building is likely.

The results of this vibration survey indicate that in accordance with the advice given in the appropriate standards, there is likely to be no concern of adverse comments from future occupants of their properties and no concern of cosmetic damage to buildings arising from vibration at this measurement location.

1.6.2 8th – 10th June 2021 – Internal Pos.2

The following vibration levels have been assessed over a typical period between 8th – 10th June 2021. The following table summarises these results:-

Time Period	Vibration Dose Value m/s ^{1.75}			Peak Particle Velocity mm/s
	L	T	V	Resultant Vector
8 th June 2021 – 8 Hr	0.031	0.035	0.034	.325mm/s
9 th June 2021 – 16 Hr	0.027	0.031	0.029	.300mm/s
10 th June 2021 – 10 Hr	0.030	0.035	0.035	.350mm/s
8 th June 2021 – 8 Hr	0.026	0.031	0.030	.375mm/s
9 th June 2021 – 8 Hr	0.030	0.036	0.035	.475mm/s
Table 4 Summary of daily VDV and PPV				

1.6.3 8th – 10th June 2021 – Internal Pos.3

The following vibration levels have been assessed over a typical period between 8th – 10th June 2021. The following table summarises these results:-

Time Period	Vibration Dose Value m/s ^{1.75}			Peak Particle Velocity mm/s
	L	T	V	Resultant Vector
8 th June 2021 – 8 Hr	0.038	0.035	0.045	.375mm/s
9 th June 2021 – 16 Hr	0.032	0.030	0.034	.350mm/s
10 th June 2021 – 10 Hr	0.037	0.035	0.044	.400mm/s
8 th June 2021 – 8 Hr	0.031	0.031	0.035	.350mm/s
9 th June 2021 – 8 Hr	0.036	0.036	0.045	.450mm/s
Table 4 Summary of daily VDV and PPV				

The vibration results indicate that vibration dose values (vdv) at the measurement locations are below 0.2 – 0.4 for daytime and night time periods. These values are below the range associated with ‘low probability of adverse comment’.

The maximum peak particle velocity recorded was found to be 0.475 mm/s at position 2 and 0.450 mm/s at position 3. In accordance with the guidance in BS7385, this value is below the limit at which cosmetic damage to building is likely.

Further measurements were recorded in the centre of the slab between 13th – 19th October 2021 as requested by Eastleigh Borough Council representative from Environmental Health. These are detailed below:-

1.6.4 Centre Slab Ground Floor

Time Period	Vibration Dose Value m/s ^{1.75}			Peak Particle Velocity mm/s
	L	T	V	Resultant Vector
13 th October 2021 – 11 Hr	0.035	0.037	0.048	.500mm/s
14 th October 2021 – 16 Hr	0.035	0.037	0.049	.525mm/s
15 th October 2021 – 16 Hr	0.034	0.037	0.045	.450mm/s
16 th October 2021 – 16 Hr	0.034	0.037	0.043	.350mm/s
17 th October 2021 – 16 Hr	0.035	0.037	0.042	.500mm/s
18 th October 2021 – 16 Hr	0.034	0.04	0.046	.350mm/s
13 th – 14 th October 2021 – 8 Hr	0.03	0.031	0.033	.400mm/s
14 th – 15 th October 2021 – 8 Hr	0.03	0.031	0.033	.375mm/s
15 th – 16 th October 2021 – 8 Hr	0.029	0.031	0.032	.375mm/s
16 th – 17 th October 2021 – 8 Hr	0.029	0.032	0.032	.350mm/s
17 th – 18 th October 2021 – 8 Hr	0.029	0.032	0.033	.450mm/s
18 th – 19 th October 2021 – 8 Hr	0.029	0.035	0.034	.475mm/s
Summary of daily VDV and PPV				

1.6.5 Centre Slab First Floor

Time Period	Vibration Dose Value m/s ^{1.75}			Peak Particle Velocity mm/s
	L	T	V	Resultant Vector
13 th October 2021 – 11 Hr	0.027	0.036	0.035	.325mm/s
14 th October 2021 – 16 Hr	0.026	0.036	0.035	.350mm/s
15 th October 2021 – 16 Hr	0.026	0.036	0.036	.325mm/s
16 th October 2021 – 16 Hr	0.026	0.036	0.035	.350mm/s
17 th October 2021 – 16 Hr	0.026	0.036	0.035	.350mm/s
18 th October 2021 – 16 Hr	0.026	0.036	0.035	.350mm/s
13 th – 14 th October 2021 – 8 Hr	0.023	0.031	0.03	.325mm/s
14 th – 15 th October 2021 – 8 Hr	0.022	0.031	0.03	.350mm/s
15 th – 16 th October 2021 – 8 Hr	0.022	0.031	0.03	.350mm/s
16 th – 17 th October 2021 – 8 Hr	0.022	0.031	0.03	.350mm/s
17 th – 18 th October 2021 – 8 Hr	0.022	0.031	0.03	.350mm/s
18 th – 19 th October 2021 – 8 Hr	0.022	0.031	0.03	.350mm/s
Summary of daily VDV and PPV				

The results of this vibration survey indicate that in accordance with the advice given in the appropriate standards, there is likely to be no concern of adverse comments from future occupants of their properties and no concern of cosmetic damage to buildings arising from vibration at this measurement location.

1.7 Glazing & Ventilation Specification

The development can maintain its existing glazing and ventilation, which ensures the internal noise levels, are acceptable in terms of the assessment to British Standard 8233: 2014.

The calculations within this report demonstrate compliance with both the BS 8233 criteria of $L_{Aeq\ 16\ HOUR}$ 35 dB and the councils suggested criteria of $L_{Aeq\ 16\ HOUR}$ 30 dB, following the proposed remedial works to the Kitchen Extract System associated with Canton House.

1.8 WHO Guidelines for Community Noise

The development does not propose external living areas and therefore an assessment to the World Health Organisation's 'Guidelines for Community Noise' has not been carried out.

1.9 BS 4142: 2014

1.9.1 Existing Assessment – Kingfisher House

Rating Level	59 dB	9.1	The acoustic feature correction is added to the specific noise level
Background Noise Level $L_{A90,1 \text{ hour}}$	48 dB	8.1	Modal Background Noise Level (07:00 – 23:00)
Assessment Level	+11 dB	11	The background level is subtracted from the rating level.
Conclusion BS 4142:2014 ^[1]	+10 dB Significant Adverse Effects, +5 dB Adverse Effects, +0 dB Low Impact		
Assessment	+11 dB		
Conclusion	The assessment level is ‘Significant Adverse Impact’		

1.9.2 Post Remedial Works Assessment – Kingfisher House

Rating Level	43 dB	9.1	The acoustic feature correction is added to the specific noise level
Background Noise Level $L_{A90,1 \text{ hour}}$	48 dB	8.1	Modal Background Noise Level (07:00 – 23:00)
Assessment Level	-5 dB	11	The background level is subtracted from the rating level.
Conclusion BS 4142:2014 ^[1]	+10 dB Significant Adverse Effects, +5 dB Adverse Effects, +0 dB Low Impact		
Assessment	-5 dB		
Conclusion	The assessment level is ‘Low Impact’		

It is understood that Rivendale Homes are in the process of selling the premises to third party and that Rivendale Homes will develop the premises on their behalf. Therefore it is recommended that Eastleigh Borough Council’s Planning Department set a ‘A Grampian Style Planning Condition’ which would allow for permitted development rights to be approved subject to Rivendale Homes carrying out satisfactory acoustic remedial works to the noise generating identified plant at the rear of Kingfisher House of which the third party would take responsibility for these works and their acoustic performance. It is further recommended that the third party ensure that the remedial acoustics works mitigate any 1/3rd Octave Band Frequency Spectrum Analysis. These proposed remedial works and required attenuation values, that the third party should achieve, are detailed within this report.

1.10 Conclusion

Levels have been recorded and assessments made in accordance with the relevant standards. Internal criteria's have been set and calculations made in order to determine the minimum construction details required in order to meet the desired level within the proposed residential dwellings and satisfy the local council's requirements.

Based on the calculations and assessments made within this report it is the professional opinion of Sound Advice Acoustics Ltd that the proposed development can demonstrate compliance with the National Planning Policy Framework 2019, NPPF & NPSE and that permitted development rights can be granted.

2 INTRODUCTION

Sound Advice Acoustics Ltd have been instructed by Rivendale Homes to undertake a background noise survey in order to establish the suitability, of the existing un-used office space, for a permitted development application to residential units under the current General Permitted Development Order (GDPO) 2020. The calculation process within British Standard 8233: 2014 is to be adopted to determine the impact of existing commercial noise sources on the proposed accommodation scheme at Bampton House, Hursley Road, Chandlers Ford. In addition, assessments to BS 4142: 2014 are also to be undertaken.

Ambient noise levels were measured between the 11th and 15th December 2020 at position 1, as detailed within this report. This measurement position was selected to determine the resultant noise levels from the commercial noise. Nearfield measurements have been made from the commercial noise sources and calculated back to the facades of the proposed development. Following the comments from Eastleigh Borough Council's Environmental Health Department, further measurements were also recorded on the other side of the building at position 2 on 8th – 10th June 2021.

This report by Sound Advice Acoustics Ltd gives the results of these measurements and an assessment in accordance with government planning guidelines and relevant standards together with mitigation measures if required.

With regards to external ambient noise, environmental noise levels are to be monitored at the site in accordance with British Standard 7445: 2003 'Description and measurement of environmental noise assessments and assessments made in-line with the National Planning Policy Framework 2019.

2.1 Planning Practice Guidance and Noise

March 2014 saw the publication of the Planning Practice Guidance for Noise (PPG-Noise) and this was subsequently updated in December 2014. The Planning Practice Guidance and Noise sets out details of how potential noise impacts should be evaluated.

'Local planning authorities' plan-making and decision taking should take account of the acoustic environment and in doing so consider:

- ✓ *whether or not a significant adverse effect is occurring or likely to occur;*
- ✓ *whether or not an adverse effect is occurring or likely to occur; and*
- ✓ *whether or not a good standard of amenity can be achieved.*

In line with the Explanatory Note of the Noise Policy Statement for England, this would include identifying whether the overall effect of the noise exposure (including the impact during the construction phase wherever applicable) is, or would be, above or below the significant observed adverse effect level and the lowest observed adverse effect level for the given situation. As noise is a complex technical issue, it may be appropriate to seek experienced specialist assistance when applying this policy.'

2.2 National Planning Policy Framework 2019 (NPPF) and Noise Policy Statement for England 2010 (NPSE).

References and evaluations are to be made to the National Planning Policy Framework 2019 (NPPF) and the Noise Policy Statement for England 2010 (NPSE). The purpose of this document is to include all aspects of environmental noise within assessments i.e. environmental noise, neighbour noise and neighbourhood noise. Noise is to be considered alongside other relevant issues relating to the site and should not be considered in isolation, according to the NPSE.

There are several key phrases within the NPSE aims and these are discussed below.

“Significant adverse” and “adverse”

There are two established concepts from toxicology that are currently being applied to noise impacts, for example, by the World Health Organisation. They are:

NOEL – No Observed Effect Level

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

LOAEL – Lowest Observed Adverse Effect Level

This is the level above which adverse effects on health and quality of life can be detected.

Extending these concepts for the purpose of this NPSE leads to the concept of a significant observed adverse effect level.

SOAEL – Significant Observed Adverse Effect Level

This is the level above which significant adverse effects on health and quality of life occur.

It is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times. It is acknowledged that further research is required to increase our understanding of what may constitute a significant adverse impact on health and quality of life from noise. However, not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available.

2.3 British Standard 8233: 2014

Calculations are to be made in accordance with BS 8233: 2014 Sound Insulation and Noise Reduction for Buildings Code of Practice.

BS 8233: 2014 set the following parameters as target levels that should be designed to within rooms such as Living Rooms and Bedrooms.

Indoor ambient noise levels in spaces when they are unoccupied and privacy is also important		
Objective	Typical situations	Design Range $L_{Aeq,t}$ dB
Typical noise levels for acoustic privacy in shared spaces	Living room	35 – 40
NOTE: See Noise control in building services [28] and BS EN ISO 3382.		

Indoor ambient noise levels for dwellings			
Activity	Location	07:00 – 23:00	23:00 – 07:00
Resting	Living Room	35 dB L_{Aeq} 16 HOUR	--
Dining	Dining Room / Area	40 dB L_{Aeq} 16 HOUR	--
Sleeping (daytime resting)	Bedroom	35 dB L_{Aeq} 16 HOUR	30 dB L_{Aeq} 8 HOUR

Calculations and assessments are therefore to be carried out in order to satisfy the above requirements of BS8233: 2014.

2.4 BS 4142: 2014

British Standard 4142: 2014 is to be adopted for the basis of this background noise level assessment. A BS 4142: 2014 noise assessment will be carried out in order to demonstrate the existing acoustic impact the external plant currently has on the proposed residential development and make suitable recommendations in order to demonstrate that these units will not have a significant and demonstrable adverse impact on these premises in accordance with the National Planning Policy Framework, once remedial works are completed. BS 4142: 2014 supersedes the 1997 version and has been developed to move more in-line with the National Planning Policy Framework 2019 (NPPF) and the Noise Policy Statement for England 2010 (NPSE).

Kingfisher House is located to the North West of the proposed change of use for Bampton House and their opening hours are shown below:

The following table demonstrates the recorded and obtained technical noise data from all the commercial plant located at the rear of the Kingfisher House row of shops.

2.4.1 Elite

Day	Opening Hours	
Monday	CLOSED	
Tuesday	09:00	20:00
Wednesday	09:00	17:00
Thursday	09:00	20:00
Friday	09:00	17:00
Saturday	08:00	14:00
Sunday	CLOSED	

2.4.2 Lakewood Beauty

Day	Opening Hours	
Monday	CLOSED	
Tuesday	09:30	20:00
Wednesday	09:30	20:00
Thursday	09:30	20:00
Friday	09:00	18:00
Saturday	09:00	16:00
Sunday	CLOSED	

2.4.3 Adore

Day	Opening Hours	
Monday	16:00	00:00
Tuesday	16:00	00:00
Wednesday	16:00	00:00
Thursday	16:00	00:00
Friday	12:00	00:00
Saturday	12:00	00:00
Sunday	16:00	00:00

It can be seen from the above, that Adore's opening hours are until midnight. However we have been informed that the extract is shut off at 23:00 hrs. Therefore, no night time assessment has been carried out.

2.4.4 Hursley Café

Day	Opening Hours	
Monday	07:00	16:00
Tuesday	07:00	16:00
Wednesday	07:00	16:00
Thursday	07:00	16:00
Friday	07:00	16:00
Saturday	07:00	16:00
Sunday	08:00	16:00

2.4.5 Canton House

Day	Opening Hours			
	Lunchtime		Evening	
Monday	12:00	14:00	17:00	21:30
Tuesday	N/A		17:00	21:00
Wednesday	12:00	14:00	17:00	21:30
Thursday	12:00	14:00	17:00	21:30
Friday	12:00	14:00	17:00	23:00
Saturday	12:00	14:00	17:00	23:00
Sunday	N/A		17:00	21:30

3 SITE LOCATION

Position of Site in Wider Area

The site is located in Chandlers Ford. The dominant noise source is road traffic and railway noise.



3.1 Proposed Development

The proposed development is shown below.



NOTES _____ N ↗

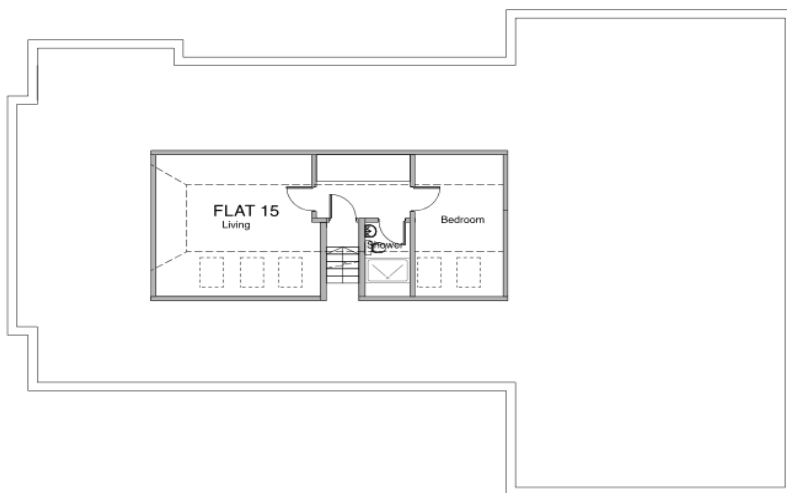


1 FIRST FLOOR PLAN
1:100 @ A3

 61 Cromwell Road Southampton Hampshire, SO15 2JE Tel: 023 8022 2292	
Project Title:	Bampton House Chandler's Ford SO63 2TA
Drawing Title:	Floor Plans - as Proposed - OPT 2
Client:	Riverside Homes
Dwg No:	207025
Scale:	1:100 @ A3
Drawn:	JF
Date:	Oct 2020

Proposed First Floor Plan

NOTES _____ N ↗



1 SECOND FLOOR PLAN
1:100 @ A3

 61 Cromwell Road Southampton Hampshire, SO15 2JE Tel: 023 8022 2292	
Project Title:	Bampton House Chandler's Ford SO63 2TA
Drawing Title:	Floor Plans - as Proposed
Client:	Riverside Homes
Dwg No:	207030
Scale:	1:100 @ A3
Drawn:	JF
Date:	Oct 2020

Proposed Second Floor Plan

4 PROCEDURE

External noise levels were recorded over a typical period and analysis date extrapolated between 07:00 hrs 11th December and 07:00 hrs on 15th December 2020 at one position as detailed within this report.

Position 1 was located at the rear of the site in order to capture the noise levels associated with the background noise levels. Sample measurements were recorded over continuous 15 minute samples and from this data the hourly LAeq daytime values have been evaluated. Sound Pressure Levels were recorded on the following setting along with a full octave band frequency analysis measured simultaneously and between 31.5 Hz and 16.0 kHz.

<u>Daytime 07:00 – 23:00</u>		<u>Night Time 23:00 – 07:00</u>	
L _{Aeq} 1 HOUR dB	L _{A10} 1 HOUR dB	L _{Aeq} 15 MINUTES dB	L _{A10} 15 MINUTES dB
L _{AMAX} 1 HOUR dB	L _{A50} 1 HOUR dB	L _{AMAX} 15 MINUTES dB	L _{A50} 15 MINUTES dB
L _{AMIN} 1 HOUR dB	L _{A90} 1 HOUR dB	L _{AMIN} 15 MINUTES dB	L _{A90} 15 MINUTES dB

Calculations have been made generally in accordance with BS 8233: 2014 ‘Sound Insulation and Reduction of Buildings - Code of Practice’. Recommendations were made for any additional acoustics measures to conform to these standards.

From the downloaded recorded results, the daytime and night time periods were assessed and used within the above calculations as L_{Aeq} 16 HOUR dB levels for daytime and L_{Aeq} 8 HOUR dB levels for night time. These are detailed within this report. All data averaged throughout the day has been done so on a logarithmic basis to give accurate L_{Aeq} 16 Hour dB daytime and L_{Aeq} 8 Hour dB night time noise levels.

Finally, it should be noted that calculations are carried out with façade levels corrected from the recorded noise levels to the calculated façade levels.

5 APPARATUS

The equipment was calibrated using a sound pressure level of 114.0 dB at an octave band centre frequency of 1000Hz with reference to $2 \times 10^{-5} \text{ Nm}^{-2}$ before and after the tests and the equipment set to have no inaccuracy greater than 0.2dB.

All the following equipment was calibrated in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service (UKAS) on the following dates. Calibration schedules are implemented within Sound Advice Acoustics Ltd in accordance with UKAS directive LAB 23.

5.1 Norsonic noise meter - Position 1

Description	Make	Type	Serial No.	Calibration Intervals	Last Calibrated	Next Due Calibration
Integrated Sound Level Meter	Norsonic	140	1402941	2 YEARS	08.07.2020	08.07.2022
12.5mm Microphone (with windshield)	Norsonic	GRAS 40AF	179711	2 YEARS	08.07.2020	08.07.2022
Microphone Pre – Amplifier	Norsonic	1209	30479	2 YEARS	08.07.2020	08.07.2022

Full calibration certificates are available upon request.

6 RESULTS

6.1 11th - 12th December 2020 - Position 1

NOISE LEVEL SUMMARY ASSESSMENT			Octave Band Centre Frequency (Hz)									
Date / Time	LAeq	LAmaz	31.5	63	125	250	500	1.0k	2.0k	4.0k	8.0k	16.0k
DAYTIME 07:00 - 23:00 LAeq 16 HOUR & Corresponding LAmaz 16 HOUR	59.2	79.5	63.6	62.9	56.8	55.8	53.5	55.0	52.8	47.4	45.5	37.2
NIGHT TIME 23:00 - 07:00 LAeq 8 HOUR & Corresponding LAmaz 8 HOUR	50.5	82.2	53.5	52.3	47.6	48.4	45.4	45.2	43.1	40.0	42.4	29.5

6.2 12th - 13th December 2020 - Position 1

NOISE LEVEL SUMMARY ASSESSMENT			Octave Band Centre Frequency (Hz)									
Date / Time	LAeq	LAmaz	31.5	63	125	250	500	1.0k	2.0k	4.0k	8.0k	16.0k
DAYTIME 07:00 - 23:00 LAeq 16 HOUR & Corresponding LAmaz 16 HOUR	56.8	79.4	62.2	61.4	56.0	54.1	51.2	52.7	50.1	44.1	42.8	37.1
NIGHT TIME 23:00 - 07:00 LAeq 8 HOUR & Corresponding LAmaz 8 HOUR	49.1	79.6	51.1	50.6	47.1	45.0	43.5	44.6	40.4	38.1	42.0	30.7

6.3 13th - 14th December 2020 - Position 1

NOISE LEVEL SUMMARY ASSESSMENT			Octave Band Centre Frequency (Hz)									
Date / Time	LAeq	LAmaz	31.5	63	125	250	500	1.0k	2.0k	4.0k	8.0k	16.0k
DAYTIME 07:00 - 23:00 LAeq 16 HOUR & Corresponding LAmaz 16 HOUR	58.7	81.2	61.0	60.5	54.8	53.7	51.8	54.0	52.7	49.3	46.6	39.2
NIGHT TIME 23:00 - 07:00 LAeq 8 HOUR & Corresponding LAmaz 8 HOUR	55.6	84.5	57.0	55.4	49.6	49.0	48.6	50.5	50.0	47.0	43.1	31.1

6.4 14th - 15th December 2020 - Position 1

NOISE LEVEL SUMMARY ASSESSMENT			Octave Band Centre Frequency (Hz)									
Date / Time	LAeq	LAmaz	31.5	63	125	250	500	1.0k	2.0k	4.0k	8.0k	16.0k
DAYTIME 07:00 - 23:00 LAeq 16 HOUR & Corresponding LAmaz 16 HOUR	59.0	78.5	63.3	62.7	56.3	55.2	53.1	55.0	52.5	47.1	45.5	38.2
NIGHT TIME 23:00 - 07:00 LAeq 8 HOUR & Corresponding LAmaz 8 HOUR	55.4	83.7	57.3	55.2	51.2	53.3	50.8	50.3	49.0	44.6	40.9	30.6

7 EXISTING PLANT LEVELS

7.1 Sound Pressure/Sound Power Levels

Measurements were either carried out or manufacturers data used for calculations of all the existing plant at the rear of Kingfisher House. Levels that were taken at the rear of Kingfisher House were taken at 1m from the kitchen extract out of the jet stream.

Premises	Manufacturer	Model Number	Sound Pressure Level Lp dB(A)	Sound Power Level Lw dB(A)
Elite	Daikin	RZASG100M7V1B	59	70
Lakewood Beauty	Panasonic	CU-RE9RKE	48	59
Lakewood Beauty	Panasonic	CU-RE12RKE	50	61
Adore	Kitchen Extract 1	N/A	73	84
Adore	Maxikold	NFR150DL	35	46
Hursley Café	Mitsubishi	SUZ-M71VA	51	62
Hursley Café	Kitchen Extract 2	N/A	76	87
Canton House	Kitchen Extract 3	N/A	82	93

7.2 Inputted Noise Levels

The following noise levels have been inputted in to the 3D acoustic Model in order to calculate the resultant noise levels at the aforementioned assessment position.

Point Source

Close

Edit...

Sync. Graphic

Copy...

Print...

Font...

Help

Name	M. ID	Result. PWL			Lw / Li			Correction		
		Day	Evening	Night	Type	Value	norm.	Day	Evening	Night
		(dBA)	(dBA)	(dBA)			dB(A)	dB(A)	dB(A)	dB(A)
Daikin RZASG100M7V1B		70.0	70.0	70.0	Lw	70		0.0	0.0	0.0
Panasonic CU-RE9RKE		59.0	59.0	59.0	Lw	59		0.0	0.0	0.0
Panasonic CU-RE12RKE		61.0	61.0	61.0	Lw	61		0.0	0.0	0.0
Kitchen Extract 1		84.0	84.0	84.0	Lw	84		0.0	0.0	0.0
Maxkold NFR150DL		46.0	46.0	46.0	Lw	46		0.0	0.0	0.0
Mitsubishi SUZ-M71VA		62.0	62.0	62.0	Lw	62		0.0	0.0	0.0
Kitchen Extract 2		87.0	87.0	87.0	Lw	87		0.0	0.0	0.0
Kitchen Extract 3		93.0	93.0	93.0	Lw	93		0.0	0.0	0.0

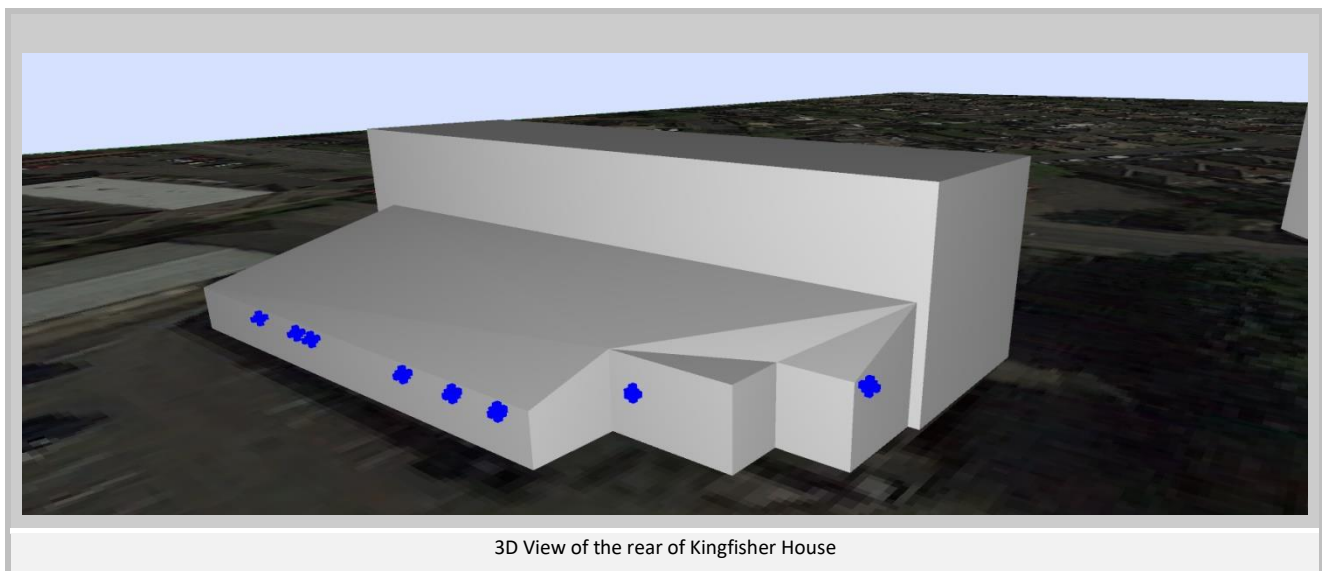
INPUTTED NOISE LEVELS

INPUTTED NOISE LEVELS

7.3 Calculations

During several detailed site inspections, the only identifiable commercial noise source was that of the kitchen inlet and extract fans and AC units from the rear of Kingfisher House, to the North West of Bampton House. No other plant or AC units were identified at the site.

7.4 Calculated Noise levels, Kingfisher House



8 BS4142: 2014 NOISE ASSESSMENT

8.1 Background Noise Levels

The background noise level was established as L_{A90} 55.0 dB for daytime at position 1 at the rear of the development.

Assessment Position	Date Start	Date Finish	Daytime L_{A90}
Position 1 Rear	11/12/2020	15/12/2020	55.0
Position 2 Front	08/06/2021	10/06/2021	48.0

The background noise levels recorded between 8th – 10th June 2021 of L_{A90} 48 dB are more in line with the EHO's concerns about the background noise levels at position 1 being L_{A90} 51 dB. Therefore in order to allay any concerns in relation to this, we will be using the recorded background noise level of L_{A90} 48 dB as a worst case scenario for this location.

8.2 Scope of British Standard 4142: 2014

In the assessment of the existing surrounding commercial premises, consideration has been given to the scope of British Standard 4142: 2014, which in section 1, details applicability of this standard to rating assessing sound of an industrial and/or commercial nature. It is considered appropriate that both the background noise levels and the rating noise levels obtained fall within the scope of British Standard 4142: 2014 by using outdoor sound levels to assess the effect of sound on local residents.

8.3 Terms and Definitions

Symbol	Term	Definition
AP	Assessment Position	Position externally at the façade property under investigation at which the assessment is undertaken which is usually 1m from the 1 st floor bedroom window.
EP	Equivalent Position	Position at which the background noise levels are measured if there is no access to the assessment position or if source under investigation is audible.
$L_s = L_{Aeq, T}$	Specific Level	The average continuous equivalent sound pressure level of the source at the assessment position.
$L_{Ar, Tr}$	Rating Level	The average continuous equivalent sound pressure level of the source at the assessment position with a correction to account for the characteristic features.
$L_r = L_{Aeq, T}$	Residual Level	The average continuous equivalent sound pressure level at the assessment position without the source operating.
$L_{A90, T}$	Background Level	The sound pressure level that is not exceeded 90% of the time at the assessment position.
$L_a = L_{Aeq, T}$	Ambient Level	The totally encompassing sound at the assessment position including the residual and specific noise.

8.4 Assessment Position

The assessment position was established as Bampton House with no new plant proposed.

8.5 Calculations

The specific noise levels are calculated at the assessment position located at the residential property above the site using the calculations detailed within ISO 9613 Part 1 and 2: 1996. These calculations take the manufacturers sound power levels into account for a variety of factors including source directivity, distance, atmospheric absorption, ground absorption and the effects of any barriers and determine the resultant noise levels at the assessment position.

8.6 Equivalent Position

The background noise levels were measured at the equivalent position, chosen as it most represented the closest noise sensitive façade, located within the existing yard area between 07:00 on 11th December and 07:00 on 15th December 2020.

8.6.1 Rating Levels (Character Correction)

It is appropriate to add a character correction where there is a new source that cannot be measured in line with BS4142: 2014. There are 3 methods for approaching this.

- a) Subjective method
- b) Objective method (for tonality)
- c) Reference method

8.7 Subjective Method

The subjective method establishes a rating penalty that is added to the specific noise level if any of the following is present at the assessment position. If a tone is expected to be present a character correction of 0 dB to 6 dB is added depending on how perceptible it is at noise sensitive locations.

BS4142: 2014 – Section 9.2 Subjective Method	Perceptibility to noise sensitive facades	Correction
Tonality Ranging from not tonal to prominently tonal	Not tonal	+0
	Just perceptible	+2
	Clearly perceptible	+4
	Highly perceptible	+6

If the source is expected to be impulsive a character correction of 0 dB to 9 dB is added depending on how perceptible it is at noise sensitive locations.

BS4142: 2014 – Section 9.2 Subjective Method	Perceptibility to noise sensitive facades	Correction
Impulsivity Considering both the rapidity and any overall change in sound levels	Not impulsive	+0
	Just perceptible	+3
	Clearly perceptible	+6
	Highly perceptible	+9

When the sound features are neither tonal nor impulsive, a character correction of +3 is added for the readily distinctive quality against the acoustic environment or for the intermittency of the source.

BS4142:2014 – Section 9.2 Subjective Method	Perceptibility to noise sensitive facades	Correction
Readily Distinctive	Is not present	+0
	Is present	+3
Intermittency	Is not present	+0
	Is present	+3

8.8 Assessment Criterion

The significance of the resulting noise on the residential property depends on the margin by which it exceeds the background noise levels. British Standard 4142: 2014 provides the following guidance within section 11.

Difference	Assessment of Impact
+10 dB	Indication of a significant adverse impact
+5 dB	Indication of an adverse impact
+0 dB	Indication of low impact

8.9 Noise Meter Floor

BS 4142: 2014 suggests that Care is necessary in circumstances where background sound levels are low to ensure that self-generated and electrical noise within the measurement system does not unduly influence reported values, which might be the case if the measured background sound levels are less than 10 dB above the noise floor of the measuring system. The floor of a typical class 1 noise meter is in the region of 14 dB(A) and therefore measurements of less than 24 dB(A) should be assessed with care.

8.10 BS 4142: 2014 Penalties

Whilst BS 4142: 2014 allows receptor assessments to be made to achieve levels equal to prevailing background noise levels, it also ensures that appropriate and more stringent penalties are applied to the specific noise level to ensure the correct level of protection for the local residents.

8.11 Assessments

8.11.1 Daytime (07:00 – 23:00) Existing

Rating Industrial Noise affecting Mixed Industrial and Residential Areas British Standard 4142: 2014 Day Time (07:00 to 23:00)			REAR OF SITE
Source	Operating Times		Source Position
	07:00 to 23:00 7 days per week Worst case scenario		See section 12.4
Assessment Position	Hursley Road, Chandlers Ford		
Background Position	At the assessment position		
Item	Calculation	Clause	Commentary
Specific Noise Level $L_{Aeq,1\text{ hour}}$	54 dB	7	Calculated using ISO 9613:1996 _[3] .
Tonality	+2 dB	8.1	Tonality Characteristic
Impulsivity	+3 dB	8.1	Impulsivity Characteristic
Rating Level	59 dB	9.1	The acoustic feature correction is added to the specific noise level
Background Noise Level $L_{A90,1\text{ hour}}$	48 dB	8.1	Modal Background Noise Level (07:00 – 23:00)
Assessment Level	+11 dB	11	The background level is subtracted from the rating level.
Conclusion BS 4142:2014 _[1]	+10 dB Significant Adverse Effects, +5 dB Adverse Effects, +0 dB Low Impact		
Assessment	+11 dB		
Conclusion	The assessment level is 'Significant Impact'		

It should be noted that the three kitchen extracts and the AC units is the only commercial noise source within the vicinity of the proposed development and only operates during daytime hours. Although Adore are open until 12am, they shut off their kitchen extract at 11pm. Therefore no night time noise assessments have been carried out on this basis.

8.12 Tonal Penalty

A +2 dB penalty has been applied to the specific noise level to allow for any minor tonal elements that may be present from the proposed plant. It should be noted that the calculations made within this report have been done so in octave band centre frequency levels in order to minimise tonal element and therefore applying any more than +2 dB would not be appropriate to this assessment. To safeguard the residents from any possible unwanted noise, this penalty has been applied as an extra layer of acoustic protection.

8.13 Impulsivity Penalty

A +3 dB penalty has been applied to the specific noise level to allow for any minor impulsive elements that may be present from the proposed plant. The impulsive nature of the plant should not be audible at the nearest associated noise sensitive preceptors. To safeguard the residents from any possible unwanted noise, this penalty has been applied as an extra layer of acoustic protection.

8.14 Assessment Conclusion

Based on the above revised assessments, it will be necessary to carry out additional works to some of the plant at the rear of Kingfisher house in order to satisfy the concerns of the council and demonstrate compliance with BS 4142: 2014.

8.15 Recommended Reductions

The following calculations demonstrate the following plant being reduced in operational noise levels with the recommended remedial acoustic works.

Canton House Existing Kitchen Extract Lw 93 dB(A)

Canton House Reduced Kitchen Extract Lw 67 dB(A)

Canton House is by far the noisiest units at the rear of Kingfisher House and the sole contributor to noise levels at the proposed development. Therefore suitable acoustic measures should be introduced to this unit in order to ensure a 20 dB(A) reduction is achieved from the duct termination point. This could be achieved by an inline attenuator directly after the duct penetrates the external building fabric. These are to be specially selected to ensure the fan unit can take the additional backpressure caused by the attenuator. The following demonstrate the specifications for the remedial works that should be implemented.

ACOUSTIC PERFORMANCE (dB) - CENTRE BAND FREQUENCY									Rw dB
Frequency	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	
Attenuator	6	9	13	24	31	31	24	19	Rw 26 dB

Based on the following images, it would be entirely possible to install a discharge attenuator to the Canton House Kitchen Extract vent from the point it exits the building, round the corner and along the rear wall, discharging towards the car park. The fan unit itself is installed internally and would not require any further treatment.





8.16 Silencer - Specifications

Frequency	63	125	250	500	1.0k	2.0k	4.0k	8.0k	Rw dB
Insertion loss dB	6	9	13	24	31	31	24	19	26
Operating Temperature	-12o to + 60o C.								
Location	Internally & externally mountable								
Outer Casing:	Manufactured from not less than 0.8mm thick pre-galvanised sheet steel to BS2989: 1975, Grade Z2, coating type C.								
Inner Lining	Manufactured from not less than 0.71mm galvanised perforated sheet steel with a staggered offset hole pattern.								
Inter Liner	Glass tissue								
Acoustic infill	Inert, fire proof, inorganic, vermin and rot proof, non-hygroscopic mineral fibre not less than 45 kg/m3, packed under not less than 5% compression.								

The resistance to airflow is a function of the face velocity and length. It is not recommended to select the Silencers with a face velocity above 3.5 metres per second without asking advice regarding re-generated self-noise. We can advise on the selections and can perform system analysis to ensure the correct unit is specified.

MAINTENANCE - Silencers are of a passive nature and as such require no routine maintenance or lubrication.

CLEANING - Should the product require routine cleaning we recommend low- pressure air blasting, vacuuming or wiping the exposed surfaces with a damp cloth.

8.17 Calculated Noise Levels Post Remedial Works

The following calculations demonstrate the resultant noise levels at the façade of the proposed development post remedial acoustic works to the Canton House Extract System.

Point Source
✕

Name:

ID:

OK

Cancel

Type: Single band

Frequency (Hz):

☐ Operating Time (min)

Day:

Recreation:

Night:

K0 w/o Ground:

Result. PWL:

Day:

Evening:

Night:

Correction:

☐ normal. A:

PWL

67

☐ TransLoss:

Area (m²):

Attenuation:

Geometry...

Directivity...

Help

INPUTTED NOISE LEVELS



Based on the above calculations, the following assessments can be made:-

8.18 Assessments

8.18.1 Daytime (07:00 – 23:00) Post Remedial Works

Rating Industrial Noise affecting Mixed Industrial and Residential Areas British Standard 4142: 2014 Day Time (07:00 to 23:00)			REAR OF SITE
Source	Operating Times		Source Position
	07:00 to 23:00 7 days per week Worst case scenario		See section 12.4
Assessment Position	Hursley Road, Chandlers Ford		
Background Position	At the assessment position		
Item	Calculation	Clause	Commentary
Specific Noise Level $L_{Aeq,1\text{ hour}}$	38 dB	7	Calculated using ISO 9613:1996 _[3] .
Tonality	+2 dB	8.1	Tonality Characteristic
Impulsivity	+3 dB	8.1	Impulsivity Characteristic
Rating Level	43 dB	9.1	The acoustic feature correction is added to the specific noise level
Background Noise Level $L_{A90,1\text{ hour}}$	48 dB	8.1	Modal Background Noise Level (07:00 – 23:00)
Assessment Level	-5 dB	11	The background level is subtracted from the rating level.
Conclusion BS 4142:2014 _[1]	+10 dB Significant Adverse Effects, +5 dB Adverse Effects, +0 dB Low Impact		
Assessment	-5 dB		
Conclusion	The assessment level is 'Low Impact'		

9 INTERNAL NOISE LEVEL GUIDELINES

9.1 Discussion of Results

It can be seen from the attached graph and downloaded results that the external noise levels have followed the expected path and remained fairly constant throughout the day. The levels then gradually dropped off as the evening progressed and began to rise when morning traffic levels increased.

9.2 Recommendations

For the purpose of this assessment, the corresponding façade levels will be used within the BS 8233: 2014 calculations in order to evaluate the worst case scenario and determine if the existing glazing and ventilation can be maintained..

Therefore, in order to achieve the required noise levels of $L_{Aeq\ 16\ HOUR}$ 35 dB for habitable rooms daytime and $L_{Aeq\ 8\ HOUR}$ 30 dB for Bedroom at night within the proposed, the following additional acoustic measures have been calculated.

Eastleigh Borough Councils Environmental Health Department raised concerns over the criteria of $L_{Aeq\ 16\ HOUR}$ 35 dB for habitable rooms daytime and suggested this should be reduced to $L_{Aeq\ 16\ HOUR}$ 30 dB for habitable rooms daytime based on tonal and impulsive elements that could be present from the Canton House Kitchen Extract at present. Following further remedial acoustic works to the kitchen extract, these elements will be designed out on a frequency basis via the design of the acoustic panels and selected inline attenuator. The penalty corrections have remained in place with our post remedial works assessment as an additional layer of protection, although in reality, these will not be present once the remedial works are completed. Based on this the criteria of $L_{Aeq\ 16\ HOUR}$ 35 dB for habitable rooms daytime can remain unchanged.

It should be noted that the calculations have been made with the proposed windows closed. Additional calculations were made for the top floor due to the influence of sound transmission into the various rooms via the roof / ceiling i.e. an increased impeding façade. Inputted levels into the calculation sheets have been corrected for distance attenuation and free field in accordance with the aforementioned British Standard.

9.3 Existing Plant Levels

9.3.1 Sound Pressure/Sound Power Levels

Measurements were either carried out or manufacturers data used for calculations of all the existing plant at the rear of Kingfisher House. Levels that were taken at the rear of Kingfisher House were taken at 1m from the kitchen extract out of the jet stream.

Premises	Manufacturer	Model Number	Sound Pressure Level Lp dB(A)	Sound Power Level Lw dB(A)
Elite	Daikin	RZASG100M7V1B	59	70
Lakewood Beauty	Panasonic	CU-RE9RKE	48	59
Lakewood Beauty	Panasonic	CU-RE12RKE	50	61
Adore	Kitchen Extract 1	N/A	73	84
Adore	Maxikold	NFR150DL	35	46
Hursley Café	Mitsubishi	SUZ-M71VA	51	62
Hursley Café	Kitchen Extract 2	N/A	76	87
Canton House	Kitchen Extract 3	N/A	82	93

9.3.2 Inputted Noise Levels

The following noise levels have been inputted in to the 3D acoustic Model in order to calculate the resultant noise levels at the aforementioned assessment position.

Point Source

CloseEdit...Sync. GraphicCopy...Print...Font...Help

Name	M. ID	Result. PWL			Lw / Li			Correction		
		Day	Evening	Night	Type	Value	norm.	Day	Evening	Night
		(dBA)	(dBA)	(dBA)			dB(A)	dB(A)	dB(A)	dB(A)
Daikin RZASG100M7V1B		70.0	70.0	70.0	Lw	70		0.0	0.0	0.0
Panasonic CU-RE9RKE		59.0	59.0	59.0	Lw	59		0.0	0.0	0.0
Panasonic CU-RE12RKE		61.0	61.0	61.0	Lw	61		0.0	0.0	0.0
Kitchen Extract 1		84.0	84.0	84.0	Lw	84		0.0	0.0	0.0
Maxkold NFR150DL		46.0	46.0	46.0	Lw	46		0.0	0.0	0.0
Mitsubishi SUZ-M71VA		62.0	62.0	62.0	Lw	62		0.0	0.0	0.0
Kitchen Extract 2		87.0	87.0	87.0	Lw	87		0.0	0.0	0.0
Kitchen Extract 3		93.0	93.0	93.0	Lw	93		0.0	0.0	0.0

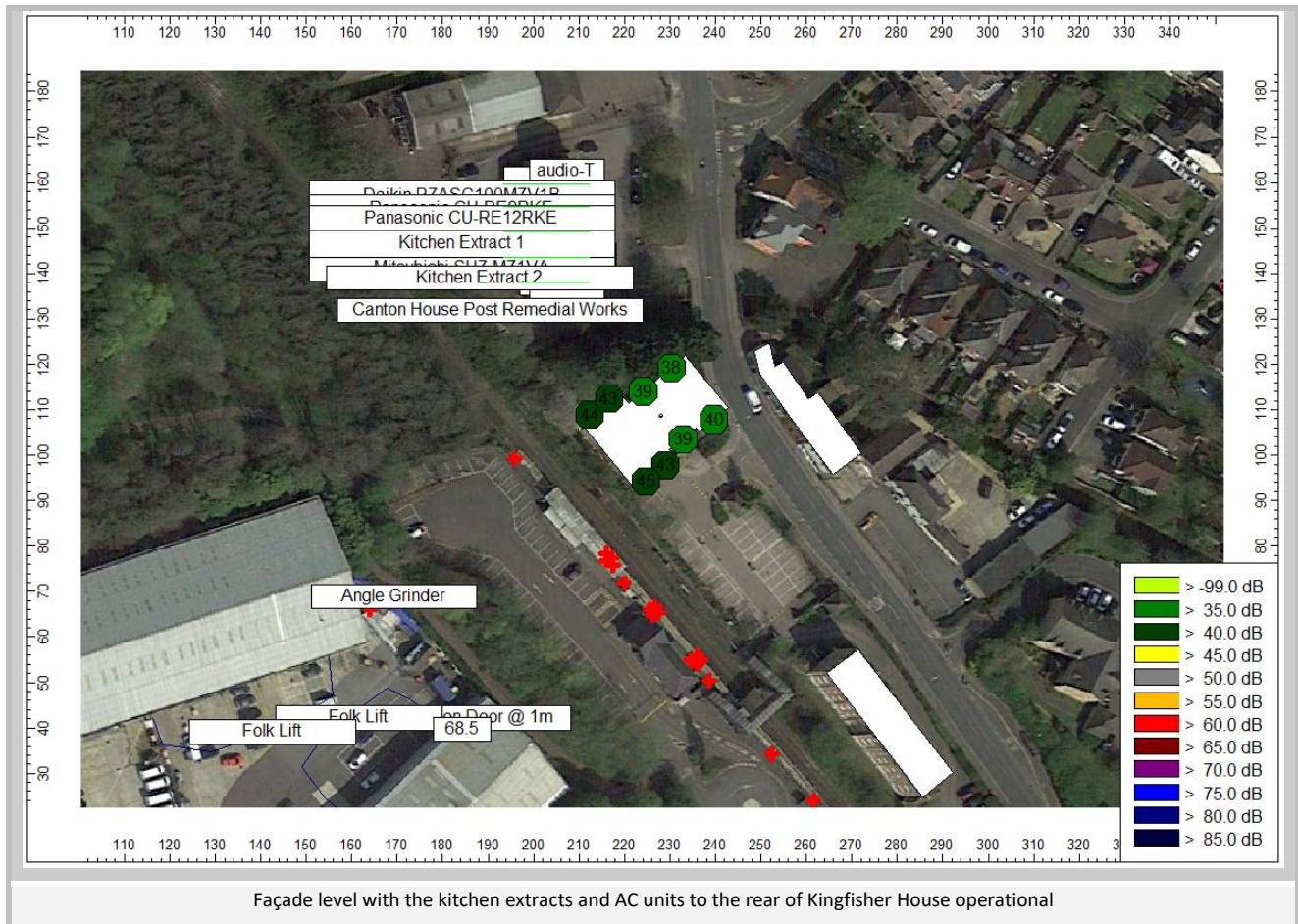
INPUTTED NOISE LEVELS

INPUTTED NOISE LEVELS

In addition, all other noise sources of commercial noise such as tannot announcements, patron noise from the station and commercial noise from the units on the other side of the railway track have also been included for within these calculations.

9.3.3 Calculated Noise levels, All commercial Noise Sources

The following, as previously stated within this report, demonstrates the calculated total commercial noise levels at the proposed development.



The above been matched the spectral data collected from measurement position 1. The following table has been produced to give the resultant spectral data at the assessment location.

NOISE LEVEL SUMMARY ASSESSMENT		Octave Band Centre Frequency (Hz)									
Date / Time	LAeq	31.5	63	125	250	500	1.0k	2.0k	4.0k	8.0k	16.0k
RECORDED @ 59.2 dB(A) DAYTIME 07:00 - 23:00 LAeq 16 HOUR & Corresponding L_{Amax} 16 HOUR	59.2	63.6	62.9	56.8	55.8	53.5	55.0	52.8	47.4	45.5	37.2
Corrected @ 45.0 dB(A) DAYTIME 07:00 - 23:00 LAeq 16 HOUR & Corresponding L_{Amax} 16 HOUR	45.0	49.4	48.7	42.6	41.6	39.3	40.8	38.6	33.2	31.3	23.0

The above values have been inputted into the following BS8233: 2014 calculations. It should also be noted that there is no commercial noise at night and therefore this time period is to be considered suitably acoustically for the permitted development.

9.4 Calculation Procedure to BS 8233: 2014

The following calculations have been carried out in order to determine the required window and ventilation specification in order to meet the requirements of BS 8233: 2014.

9.5 Ground Floor Living Rear

Proposed Window Configuration			4mm / 6 -16mm / 4mm with standard through frame slot vent			
Leqff	The equivalent continuous sound pressure level outside the room elements under consideration					
A0	The reference absorption area of 10m2 and is independent of frequency					
Sf	The total façade area of the room in question					
Swi	The area of the windows in the room					
Sew	The area of the external wall of the room					
Srr	The area of the ceiling of the room (if applicable)					
S	The total area of the elements through which sound enters the room					
Dne	The insulation value of the trickle ventilator (if applicable)					
Rwi	The sound reduction index of the window					
Rew	The sound reduction index of the external wall					
Rrr	The sound reduction index of the ceiling/roof (if applicable)					
A	The equivalent absorption area of the receiving room where A=0.163V/T					
Formula	Leq2=Leqff+10log[A0/S*10^(-Dne/10)+Swi/S*10^(-Rwi/10)+Sew/10*10^(-Rew/10)+Srr/S*10^(-Rrr/10)] +10log(S/A) +3					
	Octave Band Centre Frequency (Hz)					
	125	250	500	1000	2000	4000
Sf	8.9	8.9	8.9	8.9	8.9	8.9
Sr	0	0	0	0	0	0
Swi	2.2	2.2	2.2	2.2	2.2	2.2
Sew	6.7	6.7	6.7	6.7	6.7	6.7
Srr	0	0	0	0	0	0
S	8.9	8.9	8.9	8.9	8.9	8.9
A0	10	10	10	10	10	10
V	39.1	39.1	39.1	39.1	39.1	39.1
T (BS8233)	0.50	0.50	0.50	0.50	0.50	0.50
A	11.0	14.0	16.0	16.0	15.0	14.0
Daytime Leqff	42.6	41.6	39.3	40.8	38.6	33.2
Dne	33.0	32.0	29.0	29.0	31.0	33.0
Rwi	21.0	17.0	25.0	35.0	37.0	31.0
Rew	40.0	44.0	45.0	51.0	56.0	56.0
Rrr	28.0	34.0	40.0	45.0	49.0	49.0
Predicted dB(A) Level Within The Above Room During Daytime Hours (07:00-23:00)			L _{Aeq} 16 HOUR		17.7	dB(A)

9.6 Ground Floor Bedroom Rear

Proposed Window Configuration			4mm / 6 -16mm / 4mm with standard through frame slot vent			
Leqff	The equivalent continuous sound pressure level outside the room elements under consideration					
A0	The reference absorption area of 10m2 and is independent of frequency					
Sf	The total façade area of the room in question					
Swi	The area of the windows in the room					
Sew	The area of the external wall of the room					
Srr	The area of the ceiling of the room (if applicable)					
S	The total area of the elements through which sound enters the room					
Dne	The insulation value of the trickle ventilator (if applicable)					
Rwi	The sound reduction index of the window					
Rew	The sound reduction index of the external wall					
Rrr	The sound reduction index of the ceiling/roof (if applicable)					
A	The equivalent absorption area of the receiving room where A=0.163V/T					
Formula	Leq2=Leqff+10log[A0/S*10^(-Dne/10)+Swi/S*10^(-Rwi/10)+Sew/10*10^(-Rew/10)+Srr/S*10^(-Rrr/10)] +10log(S/A) +3					
	Octave Band Centre Frequency (Hz)					
	125	250	500	1000	2000	4000
Sf	8.9	8.9	8.9	8.9	8.9	8.9
Sr	0	0	0	0	0	0
Swi	1.2	1.2	1.2	1.2	1.2	1.2
Sew	7.7	7.7	7.7	7.7	7.7	7.7
Srr	0	0	0	0	0	0
S	8.9	8.9	8.9	8.9	8.9	8.9
A0	10	10	10	10	10	10
V	24.9	24.9	24.9	24.9	24.9	24.9
T (BS8233)	0.50	0.50	0.50	0.50	0.50	0.50
A	11.0	14.0	16.0	16.0	15.0	14.0
Daytime Leqff	42.6	41.6	39.3	40.8	38.6	33.2
Dne	33.0	32.0	29.0	29.0	31.0	33.0
Rwi	21.0	17.0	25.0	35.0	37.0	31.0
Rew	40.0	44.0	45.0	51.0	56.0	56.0
Rrr	28.0	34.0	40.0	45.0	49.0	49.0
Predicted dB(A) Level Within The Above Room During Daytime Hours (07:00-23:00)			L _{Aeq} 16 HOUR		17.0	dB(A)

9.7 First Floor Living Rear

Proposed Window Configuration			4mm / 6 -16mm / 4mm with standard through frame slot vent			
Leqff	The equivalent continuous sound pressure level outside the room elements under consideration					
A0	The reference absorption area of 10m2 and is independent of frequency					
Sf	The total façade area of the room in question					
Swi	The area of the windows in the room					
Sew	The area of the external wall of the room					
Srr	The area of the ceiling of the room (if applicable)					
S	The total area of the elements through which sound enters the room					
Dne	The insulation value of the trickle ventilator (if applicable)					
Rwi	The sound reduction index of the window					
Rew	The sound reduction index of the external wall					
Rrr	The sound reduction index of the ceiling/roof (if applicable)					
A	The equivalent absorption area of the receiving room where A=0.163V/T					
Formula	Leq2=Leqff+10log[A0/S*10^(-Dne/10)+Swi/S*10^(-Rwi/10)+Sew/10*10^(-Rew/10)+Srr/S*10^(-Rrr/10)] +10log(S/A) +3					
	Octave Band Centre Frequency (Hz)					
	125	250	500	1000	2000	4000
Sf	8.9	8.9	8.9	8.9	8.9	8.9
Sr	11.9	11.9	11.9	11.9	11.9	11.9
Swi	2.2	2.2	2.2	2.2	2.2	2.2
Sew	6.7	6.7	6.7	6.7	6.7	6.7
Srr	11.9	11.9	11.9	11.9	11.9	11.9
S	20.8	20.8	20.8	20.8	20.8	20.8
A0	10	10	10	10	10	10
V	39.1	39.1	39.1	39.1	39.1	39.1
T (BS8233)	0.50	0.50	0.50	0.50	0.50	0.50
A	11.0	14.0	16.0	16.0	15.0	14.0
Daytime Leqff	42.6	41.6	39.3	40.8	38.6	33.2
Dne	33.0	32.0	29.0	29.0	31.0	33.0
Rwi	21.0	17.0	25.0	35.0	37.0	31.0
Rew	40.0	44.0	45.0	51.0	56.0	56.0
Rrr	28.0	34.0	40.0	45.0	49.0	49.0
Predicted dB(A) Level Within The Above Room During Daytime Hours (07:00-23:00)			L _{Aeq} 16 HOUR		20.6	dB(A)

9.8 First Floor Bedroom Rear

Proposed Window Configuration			4mm / 6 -16mm / 4mm with standard through frame slot vent			
Leqff	The equivalent continuous sound pressure level outside the room elements under consideration					
A0	The reference absorption area of 10m2 and is independent of frequency					
Sf	The total façade area of the room in question					
Swi	The area of the windows in the room					
Sew	The area of the external wall of the room					
Srr	The area of the ceiling of the room (if applicable)					
S	The total area of the elements through which sound enters the room					
Dne	The insulation value of the trickle ventilator (if applicable)					
Rwi	The sound reduction index of the window					
Rew	The sound reduction index of the external wall					
Rrr	The sound reduction index of the ceiling/roof (if applicable)					
A	The equivalent absorption area of the receiving room where A=0.163V/T					
Formula	Leq2=Leqff+10log[A0/S*10^(-Dne/10)+Swi/S*10^(-Rwi/10)+Sew/10*10^(-Rew/10)+Srr/S*10^(-Rrr/10)] +10log(S/A) +3					
	Octave Band Centre Frequency (Hz)					
	125	250	500	1000	2000	4000
Sf	8.9	8.9	8.9	8.9	8.9	8.9
Sr	10.4	10.4	10.4	10.4	10.4	10.4
Swi	1.2	1.2	1.2	1.2	1.2	1.2
Sew	7.7	7.7	7.7	7.7	7.7	7.7
Srr	10.4	10.4	10.4	10.4	10.4	10.4
S	19.3	19.3	19.3	19.3	19.3	19.3
A0	10	10	10	10	10	10
V	24.9	24.9	24.9	24.9	24.9	24.9
T (BS8233)	0.50	0.50	0.50	0.50	0.50	0.50
A	11.0	14.0	16.0	16.0	15.0	14.0
Daytime Leqff	42.6	41.6	39.3	40.8	38.6	33.2
Dne	33.0	32.0	29.0	29.0	31.0	33.0
Rwi	21.0	17.0	25.0	35.0	37.0	31.0
Rew	40.0	44.0	45.0	51.0	56.0	56.0
Rrr	28.0	34.0	40.0	45.0	49.0	49.0
Predicted dB(A) Level Within The Above Room During Daytime Hours (07:00-23:00)			L _{Aeq} 16 HOUR		20.0	dB(A)

The calculations within this report demonstrate compliance with both the BS 8233 criteria of $L_{Aeq\ 16\ HOUR}$ 35 dB and the councils suggested criteria of $L_{Aeq\ 16\ HOUR}$ 30 dB, following the proposed remedial works to the Kitchen Extract System associated with Canton House.

9.9 Ventilation (D_{ne})

Octave Band Frequency	125	250	500	1000	2000	4000	D _{n,e,w}
Standard through frame slot vent	33.0	32.0	29.0	29.0	31.0	33.0	30.5

9.10 Glazing (R_{wi})

Octave Band Frequency	125	250	500	1000	2000	4000	R _{w (C:Ctr)}
4mm glass / 6 - 16mm air gap / 4mm glass	21.0	17.0	25.0	35.0	37.0	31.0	29 (-1,-4)

9.11 Walls (Non-Glazed Elements) (R_{ew})

Octave Band Frequency	125	250	500	1000	2000	4000	R _w
Minimum External Wall Attenuation	40.0	44.0	45.0	51.0	56.0	56.0	50.0

9.12 Roof (R_{rr})

Octave Band Frequency	125	250	500	1000	2000	4000	R _w
Minimum Value Pitched Roof	28.0	34.0	40.0	45.0	49.0	49.0	43.0

NOTE:

The above are minimum construction attenuation values and should alternative methods be selected; these should be equal to or greater than the above corresponding values. Calculations carried out have indicated the following specifications should be installed for this site. It should also be noted that the top floor roof should be upgraded with 2 layers of 15mm Soundbloc.

9.13 Glazing & Ventilation Assessment



The development can maintain its existing glazing and ventilation, which ensures the internal noise levels, are compliant and that, with regards to noise, the General Permitted Development Order can be granted.

10 NOISE FROM CHANDLERS FORD RAILWAY STATION

Eastleigh Borough Council have raised concerns in relation potential noise associated with the use of patrons and tannoy announcements from the Chandlers Ford Train Station. It should be noted that train movement noise itself falls outside the scope of a permitted development noise impact assessment. Only tannoy noise and patron noise could be considered.

10.1 Tannoy Noise

There are five high level (4m) tannoy announcement speakers located at the Chandlers Ford train station, generally as detailed below:-



It can be seen that the existing tannoy speaker locations depict 3 speakers being located closer to the existing residential multi-layered flats in Bampton Court and two speakers closer to the proposed permitted development.

Noise levels were recorded at 1.0m from the speaker unit during a standard 45 second pre-recorded announcement. Train levels can vary from day to day but Monday is likely to be one of the busiest where a total of 68 trains pass or stop though this station. Only one announcement is made per train arrival / departure and therefore this attracts an 11 dB(A) time correction in order to evaluate the tannoy specific $L_{Aeq\ 1\ HOUR}$ dB daytime noise level.

	Octave Band Centre Frequency (Hz)								dB(A)
	63	125	250	500	1.0K	2.0K	4.0K	8.0K	
Tannoy Announcement	60.3	52.3	61.9	60.5	56.8	58.2	51.3	38.4	63.6
Sound Power Level Correction	+11	+11	+11	+11	+11	+11	+11	+11	+11
Inputted Sound Power	71.3	63.3	72.9	71.5	67.8	69.2	62.3	49.4	74.6

Spectrum

ID: Tannoy

Name: Tannoy

Source:

Type: Li

Spectrum: Linear

Tot-A: 74.6 Tot-Lin: 78.2

31.5 63 125 250 500 1000 2000 4000 8000

0.0 71.3 63.3 72.9 71.5 67.8 69.2 62.3 49.4

OK Cancel

New Help

INPUTTED TANNOY NOISE LEVELS



CALCULATED FAÇADE LEVELS FROM TANNOYS

10.1.1 Tannoy Noise Calculation into Proposed Residential

The following calculations have been carried out based on all tabboiy speakers being operational at the recorded level and have taken into account the BS 8233: 2014 calculations into the building itself and then analysed these against the NR 25 dB criteria for bedrooms.

10.1.1.1 NR Criteria

The following table demonstrates the NR Criteria for both NR 25 and NR 30, to which the following calculations have been carried out to, to ensure the resultant NR levels are achieved in the rooms adjoining the proposed plant room areas.

NR Criteria	Octave Band Centre Frequency (Hz)								NR
	63	125	250	500	1.0k	2.0k	4.0k	8.0k	
NR 25 Bedrooms	55.2	43.7	35.2	29.2	25.0	21.9	19.5	17.7	25

The following demonstrates the octave band data calculated from the tannoy at the nearest proposed window.

Receiver

Name: Calculated Tannoy Announcement

ID:

Land Use:

(ohne Nutzung)

☒ Determine from Areas of Land Use

Use Standard Values for: Total

Standard Level (dBA):

Day: 0.0

Night: 0.0

Sound Pressure Level (dBA):

Day: 37.9

Night: 37.9

Excess Level (dB):

Day:

Night:

☐ Generate Rays (as Aux.Polygons)

Level Spectrum dB(A):

Typ	31.5	63	125	250	500	1000	2000	4000	8000
Day	-72.2	12.1	8.9	26.3	31.9	31.3	33.7	25.9	8.4
Night	-72.2	12.1	8.9	26.3	31.9	31.3	33.7	25.9	8.4

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Geometry...

Part. Level...

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Help

CALCULATED TANNOY ANNOUNCEMENT

Based on the above calculated façade levels from the tannoy system, the following BS 8233: 2014 calculation has been carried out.

Proposed Window Configuration			4mm / 6 -16mm / 4mm with standard through frame slot vent			
Leqff	The equivalent continuous sound pressure level outside the room elements under consideration					
A0	The reference absorption area of 10m2 and is independent of frequency					
Sf	The total façade area of the room in question					
Swi	The area of the windows in the room					
Sew	The area of the external wall of the room					
Srr	The area of the ceiling of the room (if applicable)					
S	The total area of the elements through which sound enters the room					
Dne	The insulation value of the trickle ventilator (if applicable)					
Rwi	The sound reduction index of the window					
Rew	The sound reduction index of the external wall					
Rrr	The sound reduction index of the ceiling/roof (if applicable)					
A	The equivalent absorption area of the receiving room where A=0.163V/T					
Formula	Leq2=Leqff+10log[A0/S*10^(-Dne/10)+Swi/S*10^(-Rwi/10)+Sew/10*10^(-Rew/10)+Srr/S*10^(-Rrr/10)] +10log(S/A) +3					
	Octave Band Centre Frequency (Hz)					
	125	250	500	1000	2000	4000
Sf	8.9	8.9	8.9	8.9	8.9	8.9
Sr	10.4	10.4	10.4	10.4	10.4	10.4
Swi	1.2	1.2	1.2	1.2	1.2	1.2
Sew	7.7	7.7	7.7	7.7	7.7	7.7
Srr	10.4	10.4	10.4	10.4	10.4	10.4
S	19.3	19.3	19.3	19.3	19.3	19.3
A0	10	10	10	10	10	10
V	24.9	24.9	24.9	24.9	24.9	24.9
T (BS8233)	0.50	0.50	0.50	0.50	0.50	0.50
A	11.0	14.0	16.0	16.0	15.0	14.0
Daytime Leqff	8.9	26.3	31.9	31.3	33.7	25.9
Dne	8.9	26.3	31.9	31.3	33.7	25.9
Rwi	35.7	37.7	36.1	32.1	37.1	38.9
Rew	21.0	17.0	25.0	35.0	37.0	31.0
Rrr	40.0	44.0	45.0	51.0	56.0	56.0
Predicted dB(A) Level Within The Above Room During Daytime Hours (07:00-23:00)			L _{Aeq} 16 HOUR		5.1	
					dB(A)	

	Octave Band Centre Frequency (Hz)					
	125	250	500	1000	2000	4000
Calculated Leq2	-13.8	2.6	1.6	..07	-1.4	-8.8
NR 25	43.7	35.2	29.2	25.0	21.9	19.5

The above table demonstrates the tannoy system will comply with the criteria based on an internal target of NR 25.

10.2 Patron Noise

The resulting internal noise source is calculated in accordance with ISO9613-2:1996. The sound data has been taken on the basis of a distributed noise level of 60dBA (LAeq,T) from 20 conversations with normal voices (ref. 57dBA @ 1m BS8233) distributed internally. Noise levels are calculated based on capacity to show worst case scenario.

A noise level spectrum obtained from real speech recordings of 50% male 50% female voices over 20 languages listed in ITU-T P50 (BS7827:1996) and corrected to 60dBA:

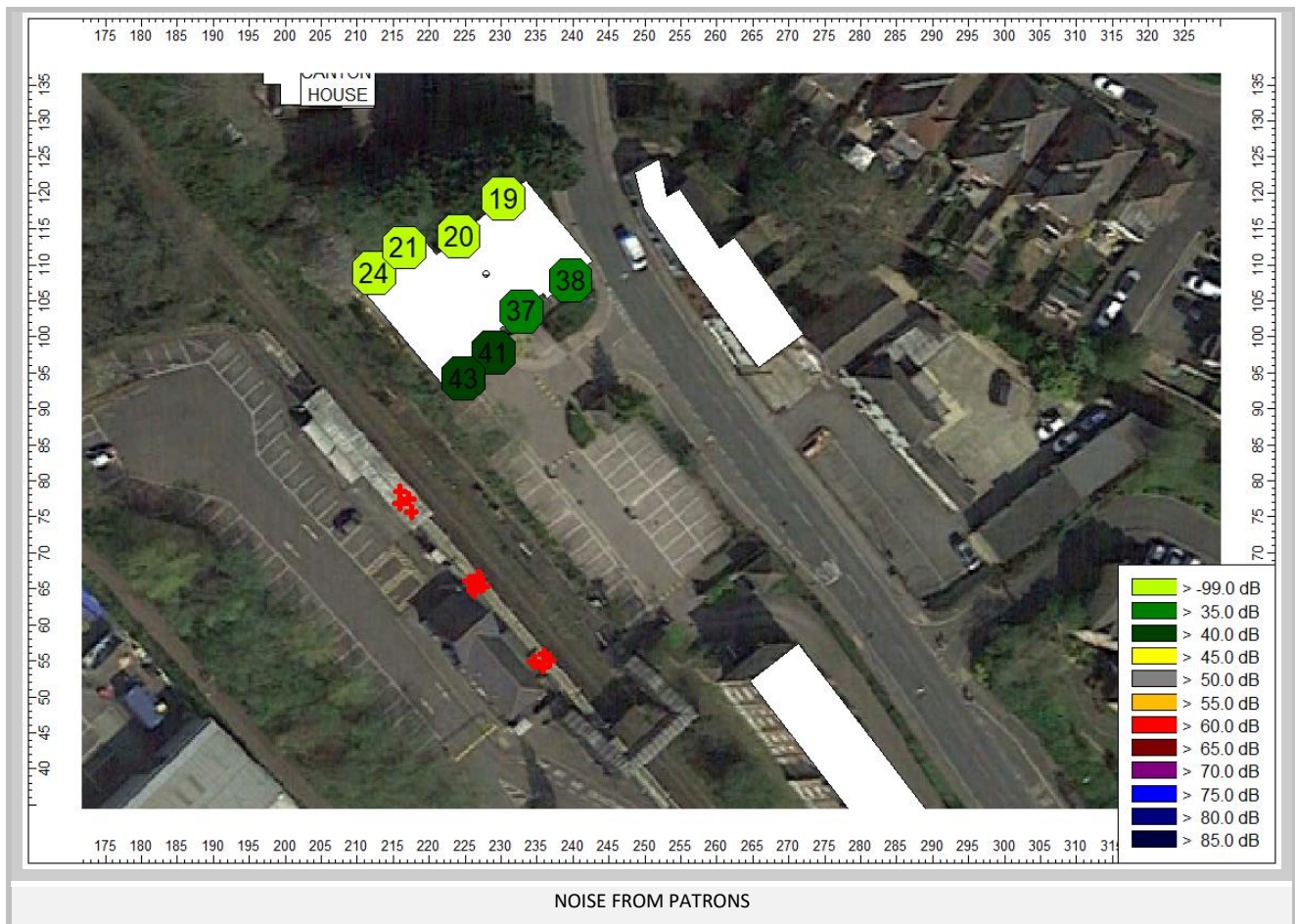
Vocal noise spectrum used for noise breakout calculations (BS7827:1996)	Octave band (Hz) sound pressure level (dB)								
	63	125	250	500	1000	2000	4000	8000	Total
Occupational noise (worst case)	28	45	55	57	52	44	37	31	60

This is further reinforced when assessing the noise impact from raised voices; Sound Advice Acoustics Ltd have used the values indicated in (Handbook of Acoustical Measurements and Noise Control, Harris, Cyril.):

Type of Communication	Noise Levels LAeq, T at 1m (dBA)	
	Male	Female
Casual	53	50
Normal	58	55
Raised	65	62
Loud	75	71
Shout	88	82

Chandlers Ford Train Station is not a busy station and having had office opposite it for some 12 years, noise levels from it are not an issue. Our calculations have been based on 25 people all being on the platform at the same time with 50% of these speaking all at exactly the same time. This is unlikely and a worst case scenario. A resultant noise level of 60 dB(A) has been used per patron.

The following calculates the noise levels from these patrons:-



10.3 Accumulative Impact

The following calculation is the accumulative impact of all the noise sources and concerns from Eastleigh Borough Councils Environmental Health Department. This includes noise from the plant at the rear of Kingfisher House post remedial works, noise from the commercial units on the other side of the railway track, noise from patrons using the station and noise from the tannoy system.



The above calculated noise levels are made with the assumption that the tannoy announcement would be continuous against the background noise level. The calculated noise level from the tannoy system has calculated the proposed residential at 38 dB(A). This combined with the patron noise has increased the accumulative impact on the proposed development to 46 dB(A). It should be noted that there are more tannoy announcement speakers located closer to the neighbouring residential block of flats (Bampton Court) to the east of the site than there are to the proposed permitted development.

11 BUILDING REGULATIONS APPROVED DOCUMENT E

The Building Regulation Part E of schedule 1 states that:

“E1. Dwelling-houses, flats and rooms for residential purposes shall be designed and constructed in such a way that they provide reasonable resistance to sound from other parts of the same building and from other parts of the same building and from adjoining buildings.

This does not apply to:

For purpose built dwellings and dwellings formed by material change of use the Building Regulations Approved Document E2 2003 ‘Resistance to the Passage of Sound’ requires separating structures to adhere to the following requirements as detailed in table 0.1a of the above document.

Dwellings houses and flats – performance standards for separating walls, separating floors and stairs that have a separating function.

11.1 Separating Party Walls and Floors

Table 1a: Dwelling-houses and flats – performance standards for separating walls, separating floors, and stairs that have a separating function

	Airborne Sound Insulation	Impact Sound Insulation
	$D_{nT'w} + C_{tr}$ dB (Minimum values)	$L'_{nT'w}$ dB (Maximum values)
Dwelling-houses and flats Formed by material change of use		
Walls	43	-
Floors and Stairs	43	64

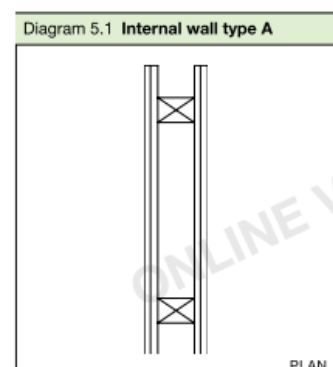
11.2 Internal Walls

As per ADE, any one of the following construction details are suggested for internal walls within dwellings:

Rw 40 dB minimum. Building Regulations Part E suggest that any one of the three following wall details are acceptable to achieve this criteria. One of these three must be selected.

11.2.1 Internal Wall Type A:

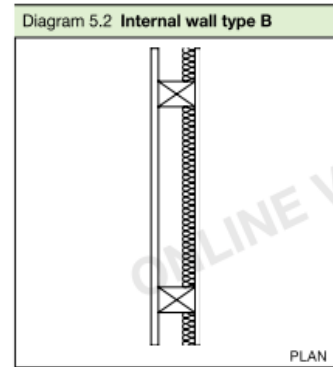
- ✓ Timber or metal frames with plasterboard lining on each side of frame.
- ✓ Each lining to be two or more layers of plasterboard, each sheet of a minimum mass per unit of 10kg/m².
- ✓ Lining Fixed to timber frame with a minimum distance between linings of 75mm, or metal frame with a minimum distance of 45mm.
- ✓ All joints well sealed.



11.2.2 Internal Wall Type B

Timber or metal frames with plasterboard lining each side of the frame and absorbent material.

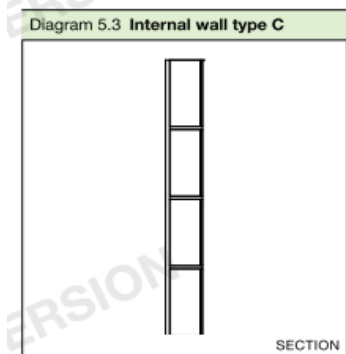
- ✓ Single layer of plasterboard of minimum mass per unit area 10kg/m². Linings fixed to timber frame with a minimum distance between linings of 75mm, or metal frame with a minimum distance between linings of 45mm.
- ✓ An absorbent layer of un-faced mineral wool batts or quilt (minimum thickness 25mm, minimum density 10kg/m³) which may be wire reinforced, suspended in the cavity.



11.2.3 Internal Wall Type C

Concrete Block Wall, Plaster or plasterboard finish on both sides.

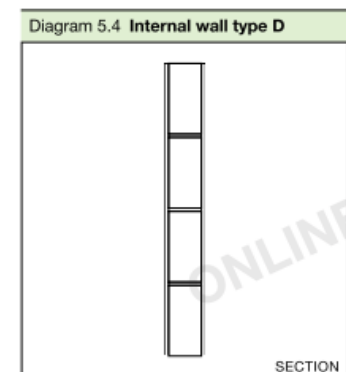
- ✓ Minimum mass per unit area, excluding finish, 120 kg/m².
- ✓ All Joints well sealed.
- ✓ Plaster or Plasterboard finish on both sides.



11.2.4 Internal Wall Type D

Aircrete Block Wall, Plaster or plasterboard finish on both sides.

- ✓ For plaster finish, minimum mass per unit area, including finish, 90 kg/m²
- ✓ For plasterboard finish, minimum mass per unit area, including finish, 75 kg/m²
- ✓ All Joints well sealed.
- ✓ Internal Wall Type D should only be used with the separating walls described in the Approved Document where there is no minimum mass requirement on the internal masonry walls. See guidance in section 2 of Approved Document E.
- ✓ Internal Wall Type D should not be used as a load bearing wall connected to a separating floor, or be rigidly connected to the separating floors described in the Approved Document. See guidance in section 3 of Approved Document E.



11.3 RSJ's & SVP's

Where there are any metal RSJ's or soil pipes (SVP's) these should be wrapped in 45kg/m³ insulation and double boarded with 2 layers of 15mm soundbloc. Alternatively a preparatory Acoustic SVP could be considered if the downpipes do not run vertically through the entire building. The following company supplies suitable products, although other are available on the market.

11.4 Spot Lights

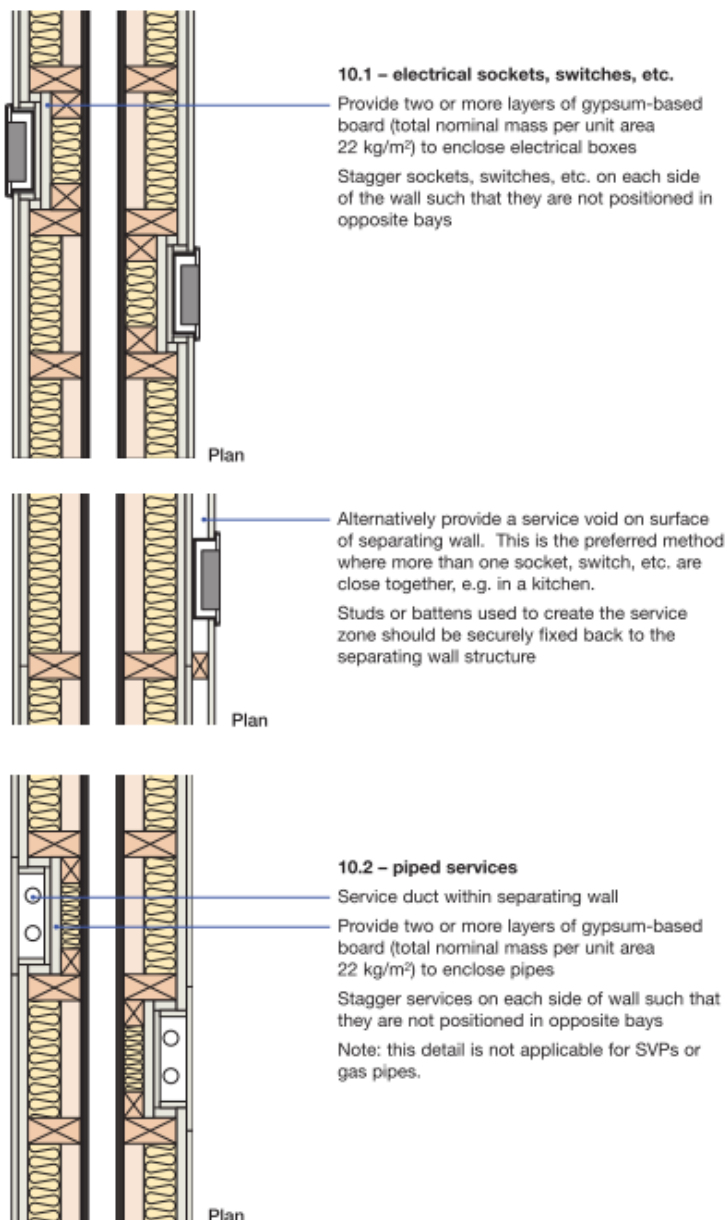
It is highly recommended that any spot lights installed within separating floors between dwellings be fitted with suitable acoustic hoods with the number of spot lights per room limited to 6 for rooms of areas less than 20m².

11.5 Sockets within Separating Walls

Back to back sockets should be avoided within the separating party walls of the apartments as this will reduce the overall wall sound insulation. If sockets are installed within these walls they must be fitted with suitable British Gypsum Acoustic Boxes, or equivalent, in order to maintain the acoustic integrity of the wall itself.

Care should be taken when installing the electrical cables and a minimal diameter hole drilled for the cables to be fed through. Once the cable is installed the hole should be sealed completely around the cable using non setting acoustic mastic in order to maintain the acoustic integrity of the wall.

The following excerpt from the robust detail book gives guidance for services and sockets in the separating wall:



11.6 Conclusion

The existing development is not yet at RIBA Stage 4 as the planning permission is yet to be granted. Therefore, the developer is committed to achieving the above minimum requirements and will accept a planning condition that effect.

12 VIBRATION ASSESSMENT

12.1 Assessment Criteria

Ground borne vibration needs to be assessed with regard to the likelihood of disturbance to humans and damage to building structure. With regard to human disturbance, vibration criteria are specified in terms of Vibration Dose Values (VDV) in accordance with BS 64721. The following table shows the VDV with various degrees of adverse comment, which may be expected in residential buildings.

For residential buildings	Low probability of adverse comment	Adverse comment possible	Adverse comment probable
16 hr day 07:00 to 23:00	0.2 to 0.4	0.4 to 0.8	0.8 to 1.6

Table 1 Vibration Dose Values (given in m/s^{1.75})

The vibration dose reflects the accumulated acceleration vibration value over a given time period, integrated by time on a root mean quad basis, hence the unit m/s^{1.75}.

Human beings have different sensitivity to vibration in different directions, and it is relevant to consider vibration in all three axes together as a resultant value.

In terms of the likelihood of damage to buildings, vibration is measured in peak particle velocity (ppv) mm/s and assessed in accordance with BS 73852. In this particular case, the main sources of vibration are trains and these are considered to cause transient vibration. The BS7385 standard states that for transient vibration, guide values at which cosmetic damage could occur to residential buildings are 15 mm/s at 4 Hz, rising to 20 mm/s at 15 Hz and rising further to 50 mm/s at 40 Hz and above for new buildings. These limits can be reduced by 50% for older buildings.

¹ BS 6472., Evaluation of human exposure to vibration in buildings (1 Hz to 80 Hz)

¹ BS 7385., Evaluation and measurement for vibration in buildings

12.2 Measurements

12.2.1 Instrumentation

Vibration levels were recorded using a two-channel Vibrock V901 seismometer, serial number 1006, which was connected with two tri-axial transducers for measuring peak particle velocity and vibration dose value, simultaneously, at one chosen location. The vibration measuring equipment has a current calibration certificate.

12.2.2 Measurement locations

The site is approximately 8m away from the railway line. Subsequently, one external representative measurement location was selected; together with two internal measurement locations

The external measurement sensors were placed on a large concrete slab, approximately 2m by 5m. Although it was not possible to establish the thickness of this slab, it is considered that this slab would be well adhered to the sub-soil. In addition the internal measurements were made on the solid concrete floor as close to the wall and foundations as possible.

12.2.3 External Measurement Procedure

Ambient ground borne vibration levels were measured continuously at the position 1 from the 11th December 2020 to 15th December 2020.

12.2.4 Internal Measurement Procedure

Ambient ground borne vibration levels were measured continuously at the position 2 from the 8th June 2021 to 10th June 2021.

12.3 Results & Assessment of External Vibration Measurements Position 1

The vibration monitor was set to record ppv and vdv and left unattended for the duration of the survey.

11 th December 2020 – DAYTIME									
Ev 051	Vibration Dose Value						Peak Particle Velocity		
5 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
	0.03	0.034	0.039				.450mm/s	22:48:10	11/12/2020
1 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
Hour 1	0.015	0.017	0.018	0.018	0.02	0.022	.275mm/s	18:08:30	11/12/2020
Hour 2	0.015	0.017	0.018	0.02	0.022	0.024	.300mm/s	19:02:00	11/12/2020
Hour 3	0.015	0.017	0.018	0.021	0.024	0.026	.250mm/s	20:19:10	11/12/2020
Hour 4	0.015	0.017	0.019	0.022	0.025	0.028	.325mm/s	21:47:30	11/12/2020
Hour 5	0.015	0.017	0.022	0.024	0.027	0.03	.450mm/s	22:48:10	11/12/2020

11 th - 12 th December 2020 – DAYTIME & NIGHT TIME									
Ev 052	Vibration Dose Value						Peak Particle Velocity		
8 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
	0.026	0.029	0.032				.350mm/s	06:26:50	12/12/2020
1 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
Hour 1	0.015	0.017	0.019	0.015	0.017	0.019	.300mm/s	23:50:50	11/12/2020
Hour 2	0.015	0.017	0.019	0.018	0.021	0.022	.300mm/s	00:51:10	12/12/2020
Hour 3	0.015	0.017	0.019	0.02	0.023	0.025	.300mm/s	01:03:40	12/12/2020
Hour 4	0.015	0.017	0.019	0.021	0.025	0.027	.325mm/s	02:12:30	12/12/2020
Hour 5	0.015	0.017	0.019	0.023	0.026	0.028	.300mm/s	03:12:50	12/12/2020
Hour 6	0.015	0.017	0.019	0.024	0.027	0.029	.300mm/s	04:19:20	12/12/2020
Hour 7	0.015	0.017	0.019	0.025	0.028	0.031	.300mm/s	05:02:40	12/12/2020
Hour 8	0.015	0.017	0.019	0.026	0.029	0.032	.350mm/s	06:26:50	12/12/2020

12 th December 2020 – DAYTIME									
Ev 053	Vibration Dose Value						Peak Particle Velocity		
16 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
	0.03	0.034	0.038				.350mm/s	14:40:00	12/12/2020
1 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
Hour 1	0.015	0.017	0.018	0.015	0.017	0.018	.250mm/s	07:47:20	12/12/2020
Hour 2	0.015	0.017	0.019	0.018	0.02	0.022	.300mm/s	08:26:40	12/12/2020
Hour 3	0.015	0.017	0.019	0.02	0.022	0.024	.300mm/s	09:18:40	12/12/2020
Hour 4	0.015	0.017	0.019	0.021	0.024	0.026	.300mm/s	10:35:10	12/12/2020
Hour 5	0.015	0.017	0.019	0.022	0.025	0.028	.325mm/s	11:29:20	12/12/2020
Hour 6	0.015	0.017	0.019	0.023	0.027	0.029	.325mm/s	12:05:50	12/12/2020
Hour 7	0.014	0.017	0.019	0.024	0.028	0.031	.300mm/s	13:22:50	12/12/2020
Hour 8	0.014	0.017	0.019	0.025	0.029	0.032	.350mm/s	14:40:00	12/12/2020
Hour 9	0.014	0.017	0.019	0.026	0.029	0.033	.325mm/s	15:18:20	12/12/2020
Hour 10	0.014	0.017	0.019	0.026	0.03	0.033	.300mm/s	16:00:40	12/12/2020
Hour 11	0.014	0.017	0.019	0.027	0.031	0.034	.350mm/s	17:46:40	12/12/2020
Hour 12	0.014	0.017	0.019	0.028	0.032	0.035	.300mm/s	18:08:00	12/12/2020
Hour 13	0.015	0.017	0.019	0.028	0.032	0.036	.325mm/s	19:19:30	12/12/2020
Hour 14	0.015	0.017	0.019	0.029	0.033	0.036	.300mm/s	20:10:00	12/12/2020
Hour 15	0.015	0.017	0.019	0.029	0.034	0.037	.325mm/s	21:58:20	12/12/2020
Hour 16	0.015	0.017	0.019	0.03	0.034	0.038	.300mm/s	22:12:20	12/12/2020

12 th - 13 th December 2020 – DAYTIME & NIGHT TIME									
Ev 054	Vibration Dose Value						Peak Particle Velocity		
8 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
	0.026	0.03	0.033				.450mm/s	06:32:20	13/12/2020
1 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
Hour 1	0.015	0.017	0.019	0.015	0.017	0.019	.200mm/s	23:11:40	12/12/2020
Hour 2	0.015	0.017	0.02	0.018	0.021	0.023	.325mm/s	00:55:20	13/12/2020
Hour 3	0.015	0.018	0.02	0.02	0.023	0.026	.300mm/s	01:00:40	13/12/2020
Hour 4	0.015	0.018	0.02	0.022	0.025	0.028	.300mm/s	02:01:10	13/12/2020
Hour 5	0.015	0.018	0.02	0.023	0.027	0.029	.325mm/s	03:05:10	13/12/2020
Hour 6	0.015	0.018	0.02	0.024	0.028	0.031	.325mm/s	04:49:50	13/12/2020
Hour 7	0.015	0.018	0.02	0.025	0.029	0.032	.300mm/s	05:06:00	13/12/2020
Hour 8	0.015	0.018	0.02	0.026	0.03	0.033	.450mm/s	06:32:20	13/12/2020

13 th December 2020 – DAYTIME									
Ev 055	Vibration Dose Value						Peak Particle Velocity		
16 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
	0.028	0.034	0.037				1.35mm/s	16:30:20	13/12/2020
1 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
Hour 1	0.015	0.017	0.019	0.015	0.017	0.019	1.08mm/s	07:43:50	13/12/2020
Hour 2	0.015	0.017	0.019	0.018	0.02	0.023	1.10mm/s	08:57:30	13/12/2020
Hour 3	0.014	0.017	0.019	0.019	0.022	0.025	.800mm/s	09:47:40	13/12/2020
Hour 4	0.014	0.017	0.019	0.021	0.024	0.027	1.28mm/s	10:10:50	13/12/2020
Hour 5	0.014	0.017	0.019	0.022	0.025	0.028	1.13mm/s	11:05:50	13/12/2020
Hour 6	0.014	0.017	0.019	0.023	0.027	0.03	.225mm/s	12:38:20	13/12/2020
Hour 7	0.014	0.017	0.019	0.024	0.028	0.031	1.18mm/s	13:30:20	13/12/2020
Hour 8	0.014	0.017	0.019	0.024	0.029	0.032	1.03mm/s	14:19:30	13/12/2020
Hour 9	0.014	0.017	0.018	0.025	0.029	0.033	1.00mm/s	15:13:50	13/12/2020
Hour 10	0.014	0.017	0.019	0.026	0.03	0.034	1.35mm/s	16:30:20	13/12/2020
Hour 11	0.014	0.017	0.018	0.026	0.031	0.034	1.30mm/s	17:05:40	13/12/2020
Hour 12	0.013	0.017	0.018	0.027	0.032	0.035	1.15mm/s	18:17:40	13/12/2020
Hour 13	0.013	0.017	0.018	0.027	0.032	0.036	.350mm/s	19:38:20	13/12/2020
Hour 14	0.013	0.017	0.018	0.028	0.033	0.036	.200mm/s	20:20:50	13/12/2020
Hour 15	0.013	0.017	0.018	0.028	0.034	0.037	.400mm/s	21:38:20	13/12/2020
Hour 16	0.013	0.017	0.017	0.028	0.034	0.037	.325mm/s	22:39:00	13/12/2020
13 th - 14 th December 2020 – DAYTIME & NIGHT TIME									
Ev 056	Vibration Dose Value						Peak Particle Velocity		
8 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
	0.025	0.03	0.032				1.00mm/s	02:42:20	14/12/2020
1 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
Hour 1	0.014	0.018	0.018	0.014	0.018	0.018	.300mm/s	23:20:30	13/12/2020
Hour 2	0.014	0.018	0.018	0.017	0.021	0.022	.300mm/s	00:00:50	14/12/2020
Hour 3	0.014	0.018	0.018	0.019	0.023	0.024	.375mm/s	01:49:10	14/12/2020
Hour 4	0.014	0.018	0.018	0.02	0.025	0.026	1.00mm/s	02:42:20	14/12/2020
Hour 5	0.014	0.018	0.018	0.022	0.027	0.027	.675mm/s	03:15:50	14/12/2020
Hour 6	0.015	0.018	0.018	0.023	0.028	0.029	.300mm/s	04:04:40	14/12/2020
Hour 7	0.015	0.018	0.019	0.024	0.029	0.03	.400mm/s	05:35:00	14/12/2020
Hour 8	0.015	0.018	0.021	0.025	0.03	0.032	.475mm/s	06:26:20	14/12/2020

14 th December 2020 – DAYTIME									
Ev 057	Vibration Dose Value						Peak Particle Velocity		
16 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
	0.027	0.034	0.038				.875mm/s	17:28:20	14/12/2020
1 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
Hour 1	0.014	0.017	0.019	0.014	0.017	0.019	.375mm/s	07:36:30	14/12/2020
Hour 2	0.014	0.017	0.02	0.016	0.02	0.023	.400mm/s	08:39:40	14/12/2020
Hour 3	0.014	0.017	0.019	0.018	0.022	0.025	.350mm/s	09:26:50	14/12/2020
Hour 4	0.014	0.017	0.019	0.019	0.024	0.027	.325mm/s	10:24:30	14/12/2020
Hour 5	0.013	0.017	0.019	0.021	0.025	0.029	.550mm/s	11:22:50	14/12/2020
Hour 6	0.013	0.017	0.02	0.022	0.027	0.031	.350mm/s	12:01:40	14/12/2020
Hour 7	0.013	0.017	0.02	0.022	0.028	0.032	.450mm/s	13:37:20	14/12/2020
Hour 8	0.013	0.017	0.019	0.023	0.029	0.033	.400mm/s	14:23:00	14/12/2020
Hour 9	0.013	0.017	0.02	0.024	0.03	0.034	.400mm/s	15:38:10	14/12/2020
Hour 10	0.013	0.017	0.019	0.024	0.03	0.035	.300mm/s	16:20:20	14/12/2020
Hour 11	0.013	0.017	0.018	0.025	0.031	0.036	.875mm/s	17:28:20	14/12/2020
Hour 12	0.013	0.017	0.018	0.025	0.032	0.036	.325mm/s	18:46:20	14/12/2020
Hour 13	0.014	0.017	0.018	0.026	0.032	0.037	.275mm/s	19:26:50	14/12/2020
Hour 14	0.014	0.017	0.018	0.027	0.033	0.037	.175mm/s	20:25:00	14/12/2020
Hour 15	0.014	0.017	0.018	0.027	0.034	0.038	.325mm/s	21:19:10	14/12/2020
Hour 16	0.013	0.017	0.018	0.027	0.034	0.038	.325mm/s	22:48:40	14/12/2020
14 th - 15 th December 2020 – DAYTIME & NIGHT TIME									
Ev 058	Vibration Dose Value						Peak Particle Velocity		
8 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
	0.025	0.03	0.033				.650mm/s	02:02:40	15/12/2020
1 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
Hour 1	0.014	0.018	0.018	0.014	0.018	0.018	.300mm/s	23:30:50	14/12/2020
Hour 2	0.015	0.018	0.021	0.017	0.021	0.024	.450mm/s	00:08:10	15/12/2020
Hour 3	0.015	0.017	0.019	0.019	0.023	0.026	.300mm/s	01:05:10	15/12/2020
Hour 4	0.014	0.017	0.019	0.021	0.025	0.028	.650mm/s	02:02:40	15/12/2020
Hour 5	0.014	0.018	0.021	0.022	0.026	0.03	.350mm/s	03:12:00	15/12/2020
Hour 6	0.014	0.018	0.019	0.023	0.028	0.031	.350mm/s	04:32:40	15/12/2020
Hour 7	0.014	0.017	0.019	0.024	0.029	0.032	.325mm/s	05:33:20	15/12/2020
Hour 8	0.014	0.018	0.02	0.025	0.03	0.033	.475mm/s	06:28:40	15/12/2020

15 th December 2020 – DAYTIME									
Ev 059	Vibration Dose Value						Peak Particle Velocity		
3 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
	0.027	0.034	0.041				1.13mm/s	08:46:40	15/12/2020
1 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
Hour 1	0.013	0.017	0.022	0.013	0.017	0.022	1.05mm/s	07:28:40	15/12/2020
Hour 2	0.013	0.017	0.02	0.016	0.02	0.025	1.13mm/s	08:46:40	15/12/2020
Hour 3	0.013	0.017	0.02	0.018	0.022	0.027	.425mm/s	09:35:50	15/12/2020

The vdv results are summarised in the table below for the daytime and night-time periods.

Time Period	Vibration Dose Value m/s ^{1.75}			Peak Particle Velocity mm/s
	L	T	V	Resultant Vector
11th December 2020 – 5 Hr	0.03	0.034	0.039	.450mm/s
12th December 2020 – 16 Hr	0.03	0.034	0.038	.350mm/s
13th December 2020 – 16 Hr	0.028	0.034	0.037	1.35mm/s
14th December 2020 – 16 Hr	0.027	0.034	0.038	.875mm/s
15th December 2020 – 3 Hr	0.027	0.034	0.041	1.13mm/s
11th - 12th December 2020 – 8 Hr	0.026	0.029	0.032	.350mm/s
12th - 13th December 2020 – 8 Hr	0.026	0.03	0.033	.450mm/s
13th - 14th December 2020 – 8 Hr	0.025	0.03	0.032	1.00mm/s
14th - 15th December 2020 – 8 Hr	0.025	0.03	0.033	.650mm/s

Table 3 Summary of daily VDV and PPV

The above table demonstrates that no detrimental or structural vibration levels have been measured and therefore the probability of neighbouring building damage is low.

12.4 Results & Assessment of Internal Vibration Measurements Position 2

The vibration monitor was set to record ppv and vdv and left unattended for the duration of the survey.

8 th June 2021 – DAYTIME									
Ev 051	Vibration Dose Value						Peak Particle Velocity		
5 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
	0.031	0.035	0.034				.325mm/s	19:06:44	08/06/2021
1 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
Hour 1	0.016	0.017	0.017	0.01	0.011	0.011	.150mm/s	14:48:44	08/06/2021
Hour 2	0.016	0.017	0.017	0.016	0.018	0.018	.300mm/s	15:11:04	08/06/2021
Hour 3	0.016	0.017	0.017	0.019	0.021	0.021	.200mm/s	16:58:24	08/06/2021
Hour 4	0.016	0.017	0.017	0.021	0.023	0.023	.200mm/s	17:02:54	08/06/2021
Hour 5	0.015	0.017	0.017	0.023	0.025	0.025	.300mm/s	18:27:34	08/06/2021
Hour 6	0.015	0.017	0.017	0.024	0.026	0.026	.325mm/s	19:06:44	08/06/2021
Hour 7	0.015	0.017	0.017	0.025	0.028	0.027	.150mm/s	20:00:04	08/06/2021
Hour 8	0.015	0.017	0.017	0.026	0.029	0.028	.150mm/s	21:00:04	08/06/2021

8 th - 9 th June 2021 – NIGHT TIME									
Ev 052	Vibration Dose Value						Peak Particle Velocity		
8 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
	0.027	0.031	0.029				.300mm/s	00:19:30	09/06/2021
1 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
Hour 1	0.016	0.018	0.017	0.016	0.018	0.017	.150mm/s	23:00:40	08/06/2021
Hour 2	0.015	0.018	0.017	0.018	0.022	0.021	.300mm/s	00:19:30	09/06/2021
Hour 3	0.015	0.018	0.017	0.02	0.024	0.023	.300mm/s	01:02:30	09/06/2021
Hour 4	0.016	0.018	0.017	0.022	0.026	0.025	.300mm/s	02:24:10	09/06/2021
Hour 5	0.016	0.018	0.017	0.024	0.028	0.026	.150mm/s	03:00:10	09/06/2021
Hour 6	0.016	0.018	0.017	0.025	0.029	0.027	.175mm/s	04:58:00	09/06/2021
Hour 7	0.016	0.018	0.018	0.026	0.03	0.028	.225mm/s	05:35:10	09/06/2021
Hour 8	0.016	0.018	0.018	0.027	0.031	0.029	.150mm/s	06:00:10	09/06/2021

9 th June 2021 – DAYTIME									
Ev 053	Vibration Dose Value						Peak Particle Velocity		
16 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
	0.03	0.035	0.035				.350mm/s	22:43:20	09/06/2021
1 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
Hour 1	0.015	0.017	0.017	0.015	0.017	0.017	.300mm/s	07:08:30	09/06/2021
Hour 2	0.015	0.017	0.017	0.018	0.021	0.02	.150mm/s	08:00:20	09/06/2021
Hour 3	0.015	0.017	0.017	0.02	0.023	0.023	.300mm/s	09:54:30	09/06/2021
Hour 4	0.015	0.017	0.017	0.021	0.025	0.025	.200mm/s	10:29:50	09/06/2021
Hour 5	0.015	0.017	0.017	0.023	0.026	0.026	.175mm/s	11:30:00	09/06/2021
Hour 6	0.015	0.017	0.017	0.024	0.027	0.027	.225mm/s	12:58:40	09/06/2021
Hour 7	0.015	0.017	0.017	0.025	0.028	0.028	.300mm/s	13:04:00	09/06/2021
Hour 8	0.015	0.018	0.017	0.026	0.03	0.029	.300mm/s	14:31:30	09/06/2021
Hour 9	0.015	0.017	0.018	0.026	0.03	0.03	.325mm/s	15:47:00	09/06/2021
Hour 10	0.015	0.017	0.017	0.027	0.031	0.031	.200mm/s	16:14:50	09/06/2021
Hour 11	0.015	0.017	0.017	0.028	0.032	0.032	.325mm/s	17:16:40	09/06/2021
Hour 12	0.015	0.017	0.017	0.028	0.033	0.033	.175mm/s	18:40:00	09/06/2021
Hour 13	0.015	0.017	0.017	0.029	0.033	0.033	.150mm/s	19:00:10	09/06/2021
Hour 14	0.015	0.017	0.017	0.029	0.034	0.034	.175mm/s	20:33:10	09/06/2021
Hour 15	0.015	0.017	0.017	0.03	0.035	0.034	.200mm/s	21:40:00	09/06/2021
Hour 16	0.015	0.018	0.018	0.03	0.035	0.035	.350mm/s	22:43:20	09/06/2021

9 th – 10 th June 2021 – DAYTIME & NIGHT TIME									
Ev 054	Vibration Dose Value						Peak Particle Velocity		
8 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
	0.026	0.031	0.03				.375mm/s	23:37:30	09/06/2021
1 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
Hour 1	0.015	0.018	0.018	0.015	0.018	0.018	.375mm/s	23:37:30	09/06/2021
Hour 2	0.015	0.018	0.017	0.018	0.022	0.021	.150mm/s	00:00:10	10/06/2021
Hour 3	0.015	0.018	0.017	0.02	0.024	0.023	.150mm/s	01:00:10	10/06/2021
Hour 4	0.015	0.018	0.017	0.021	0.026	0.025	.300mm/s	02:28:30	10/06/2021
Hour 5	0.015	0.018	0.017	0.023	0.028	0.026	.300mm/s	03:03:00	10/06/2021
Hour 6	0.015	0.018	0.017	0.024	0.029	0.028	.150mm/s	04:00:20	10/06/2021
Hour 7	0.015	0.018	0.018	0.025	0.03	0.029	.325mm/s	05:31:40	10/06/2021
Hour 8	0.015	0.018	0.018	0.026	0.031	0.03	.300mm/s	06:00:50	10/06/2021

13 th December 2020 – DAYTIME									
Ev 055	Vibration Dose Value						Peak Particle Velocity		
16 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
	0.03	0.036	0.035				.475mm/s	10:36:50	10/06/2021
1 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
Hour 1	0.015	0.017	0.017	0.015	0.017	0.017	.150mm/s	07:00:40	10/06/2021
Hour 2	0.015	0.018	0.017	0.018	0.021	0.021	.325mm/s	08:01:00	10/06/2021
Hour 3	0.015	0.018	0.017	0.02	0.023	0.023	.225mm/s	09:24:20	10/06/2021
Hour 4	0.015	0.018	0.017	0.021	0.025	0.025	.475mm/s	10:36:50	10/06/2021
Hour 5	0.015	0.018	0.017	0.022	0.026	0.026	.200mm/s	11:08:20	10/06/2021
Hour 6	0.015	0.018	0.017	0.023	0.028	0.027	.150mm/s	12:00:10	10/06/2021
Hour 7	0.014	0.018	0.017	0.024	0.029	0.028	.200mm/s	13:35:10	10/06/2021
Hour 8	0.014	0.018	0.017	0.025	0.03	0.029	.200mm/s	14:35:00	10/06/2021
Hour 9	0.014	0.018	0.017	0.026	0.031	0.03	.150mm/s	15:00:10	10/06/2021
Hour 10	0.014	0.018	0.017	0.026	0.031	0.031	.150mm/s	16:00:10	10/06/2021

The vdv results are summarised in the table below for the daytime and night-time periods.

Time Period	Vibration Dose Value m/s ^{1.75}			Peak Particle Velocity mm/s
	L	T	V	Resultant Vector
8 th June 2021 – 8 Hr	0.031	0.035	0.034	.325mm/s
9 th June 2021 – 16 Hr	0.027	0.031	0.029	.300mm/s
10 th June 2021 – 10 Hr	0.03	0.035	0.035	.350mm/s
8 th June 2021 – 8 Hr	0.026	0.031	0.03	.375mm/s
9 th June 2021 – 8 Hr	0.03	0.036	0.035	.475mm/s

Table 4 Summary of daily VDV and PPV

The above table demonstrates that no detrimental or structural vibration levels have been measured and therefore the probability of neighbouring building damage is low.

12.5 Results & Assessment of Internal Vibration Measurements Position 3

The vibration monitor was set to record ppv and vdv and left unattended for the duration of the survey.

8 th June 2021 – DAYTIME									
Ev 051	Vibration Dose Value						Peak Particle Velocity		
5 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
	0.038	0.035	0.045				.375mm/s	22:50:05	08/06/2021
1 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
Hour 1	0.019	0.017	0.025	0.012	0.011	0.016	.325mm/s	14:50:55	08/06/2021
Hour 2	0.019	0.017	0.024	0.02	0.018	0.025	.325mm/s	15:01:25	08/06/2021
Hour 3	0.019	0.017	0.023	0.023	0.021	0.029	.350mm/s	16:04:15	08/06/2021
Hour 4	0.019	0.017	0.024	0.025	0.023	0.032	.325mm/s	17:44:25	08/06/2021
Hour 5	0.019	0.017	0.023	0.027	0.025	0.034	.350mm/s	18:34:25	08/06/2021
Hour 6	0.019	0.017	0.021	0.028	0.026	0.035	.350mm/s	19:29:15	08/06/2021
Hour 7	0.018	0.017	0.021	0.03	0.027	0.036	.350mm/s	20:33:15	08/06/2021
Hour 8	0.018	0.017	0.021	0.031	0.028	0.037	.325mm/s	21:23:25	08/06/2021

8 th - 9 th June 2021 – NIGHT TIME									
Ev 052	Vibration Dose Value						Peak Particle Velocity		
8 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
	0.032	0.03	0.034				.350mm/s	00:23:00	09/06/2021
1 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
Hour 1	0.019	0.018	0.021	0.019	0.018	0.021	.325mm/s	23:01:40	08/06/2021
Hour 2	0.019	0.018	0.02	0.022	0.021	0.025	.350mm/s	00:23:00	09/06/2021
Hour 3	0.019	0.018	0.02	0.025	0.024	0.027	.350mm/s	01:28:30	09/06/2021
Hour 4	0.019	0.018	0.02	0.027	0.025	0.029	.350mm/s	02:53:50	09/06/2021
Hour 5	0.019	0.018	0.02	0.028	0.027	0.031	.325mm/s	03:01:40	09/06/2021
Hour 6	0.019	0.018	0.02	0.029	0.028	0.032	.350mm/s	04:16:10	09/06/2021
Hour 7	0.019	0.018	0.02	0.031	0.029	0.033	.325mm/s	05:07:30	09/06/2021
Hour 8	0.019	0.018	0.019	0.032	0.03	0.034	.350mm/s	06:04:00	09/06/2021

9 th June 2021 – DAYTIME									
Ev 053	Vibration Dose Value						Peak Particle Velocity		
16 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
	0.037	0.035	0.044				.400mm/s	15:46:20	09/06/2021
1 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
Hour 1	0.018	0.017	0.021	0.018	0.017	0.021	.350mm/s	07:51:50	09/06/2021
Hour 2	0.018	0.017	0.021	0.022	0.021	0.025	.350mm/s	08:02:30	09/06/2021
Hour 3	0.018	0.017	0.021	0.024	0.023	0.028	.350mm/s	09:35:30	09/06/2021
Hour 4	0.018	0.017	0.021	0.026	0.025	0.03	.350mm/s	10:25:20	09/06/2021
Hour 5	0.018	0.017	0.021	0.028	0.026	0.032	.350mm/s	11:31:30	09/06/2021
Hour 6	0.018	0.017	0.02	0.029	0.027	0.033	.350mm/s	12:14:40	09/06/2021
Hour 7	0.018	0.017	0.021	0.03	0.029	0.035	.325mm/s	13:07:50	09/06/2021
Hour 8	0.018	0.017	0.022	0.031	0.03	0.036	.325mm/s	14:04:20	09/06/2021
Hour 9	0.018	0.017	0.022	0.032	0.03	0.037	.400mm/s	15:46:20	09/06/2021
Hour 10	0.018	0.017	0.022	0.033	0.031	0.038	.350mm/s	16:34:00	09/06/2021
Hour 11	0.018	0.017	0.022	0.034	0.032	0.04	.350mm/s	17:10:00	09/06/2021
Hour 12	0.018	0.017	0.023	0.035	0.033	0.041	.325mm/s	18:00:30	09/06/2021
Hour 13	0.018	0.017	0.023	0.035	0.033	0.042	.175mm/s	19:07:30	09/06/2021
Hour 14	0.018	0.017	0.023	0.036	0.034	0.043	.350mm/s	20:04:30	09/06/2021
Hour 15	0.018	0.017	0.023	0.037	0.035	0.044	.325mm/s	21:15:00	09/06/2021
Hour 16	0.018	0.017	0.022	0.037	0.035	0.044	.350mm/s	22:42:40	09/06/2021

9 th – 10 th June 2021 – DAYTIME & NIGHT TIME									
Ev 054	Vibration Dose Value						Peak Particle Velocity		
8 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
	0.031	0.031	0.035				.350mm/s	23:36:40	09/06/2021
1 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
Hour 1	0.018	0.018	0.021	0.018	0.018	0.021	.350mm/s	23:36:40	09/06/2021
Hour 2	0.018	0.018	0.021	0.022	0.022	0.025	.350mm/s	00:25:30	10/06/2021
Hour 3	0.018	0.018	0.021	0.024	0.024	0.027	.350mm/s	01:23:40	10/06/2021
Hour 4	0.018	0.018	0.021	0.026	0.026	0.029	.350mm/s	02:31:50	10/06/2021
Hour 5	0.018	0.018	0.021	0.028	0.027	0.031	.325mm/s	03:22:20	10/06/2021
Hour 6	0.018	0.018	0.021	0.029	0.029	0.033	.325mm/s	04:10:30	10/06/2021
Hour 7	0.018	0.018	0.021	0.03	0.03	0.034	.350mm/s	05:49:40	10/06/2021
Hour 8	0.018	0.018	0.021	0.031	0.031	0.035	.350mm/s	06:18:20	10/06/2021

13 th December 2020 – DAYTIME									
Ev 055	Vibration Dose Value						Peak Particle Velocity		
16 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
	0.036	0.036	0.045				.450mm/s	10:35:30	10/06/2021
1 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
Hour 1	0.018	0.018	0.021	0.018	0.018	0.021	.350mm/s	07:58:30	10/06/2021
Hour 2	0.018	0.018	0.022	0.022	0.021	0.026	.350mm/s	08:12:10	10/06/2021
Hour 3	0.018	0.018	0.022	0.024	0.023	0.029	.325mm/s	09:19:00	10/06/2021
Hour 4	0.018	0.018	0.021	0.026	0.025	0.031	.450mm/s	10:35:30	10/06/2021
Hour 5	0.018	0.018	0.022	0.027	0.027	0.033	.350mm/s	11:24:00	10/06/2021
Hour 6	0.018	0.018	0.022	0.028	0.028	0.034	.350mm/s	12:05:30	10/06/2021
Hour 7	0.018	0.018	0.023	0.03	0.029	0.036	.350mm/s	13:52:20	10/06/2021
Hour 8	0.018	0.018	0.023	0.031	0.03	0.037	.325mm/s	14:05:00	10/06/2021
Hour 9	0.018	0.018	0.024	0.031	0.031	0.039	.350mm/s	15:01:10	10/06/2021
Hour 10	0.018	0.018	0.025	0.032	0.031	0.039	.350mm/s	16:01:10	10/06/2021

The vdv results are summarised in the table below for the daytime and night-time periods.

Time Period	Vibration Dose Value m/s ^{1.75}			Peak Particle Velocity mm/s
	L	T	V	Resultant Vector
8 th June 2021 – 8 Hr	0.038	0.035	0.045	.375mm/s
9th June 2021 – 16 Hr	0.032	0.03	0.034	.350mm/s
10th June 2021 – 10 Hr	0.037	0.035	0.044	.400mm/s
8 th June 2021 – 8 Hr	0.031	0.031	0.035	.350mm/s
9th June 2021 – 8 Hr	0.036	0.036	0.045	.450mm/s

Table 4 Summary of daily VDV and PPV

The above table demonstrates that no detrimental or structural vibration levels have been measured and therefore the probability of neighbouring building damage is low.

12.6 Internal Vibration Measurement in Centre of Slab Ground & First

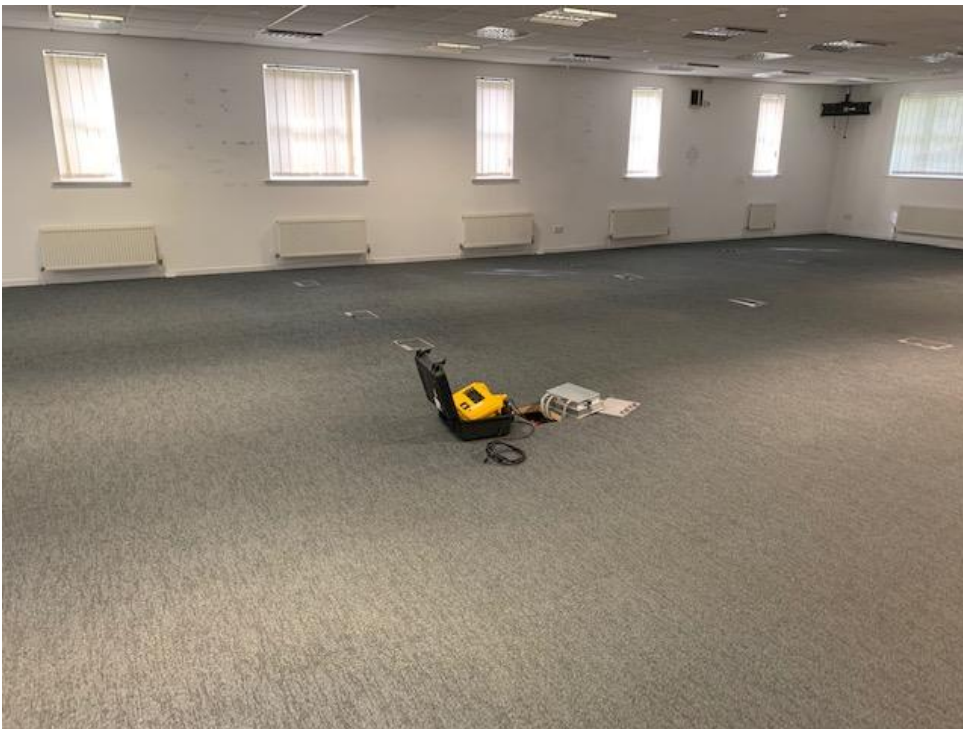
The following levels were recorded in the centre of the ground and first floor slab as requested by the EHO and the following results extrapolated.

The following images demonstrate where the measurements were made as requested:-

12.6.1 Ground Floor



12.6.2 First Floor



12.6.3 Ground Floor Vibration Measurements

The vibration monitor was set to record ppv and vdv and left unattended for the duration of the survey.

13 th October 2021 – DAYTIME									
Ev 051	Vibration Dose Value						Peak Particle Velocity		
11 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
	0.035	0.037	0.048				.500mm/s	22:41:46	13/10/2021
1 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
Hour 1	0.017	0.018	0.025	0.01	0.01	0.014	.325mm/s	12:55:36	13/10/2021
Hour 2	0.017	0.018	0.024	0.018	0.018	0.025	.325mm/s	13:08:16	13/10/2021
Hour 3	0.017	0.018	0.024	0.021	0.022	0.029	.350mm/s	14:29:26	13/10/2021
Hour 4	0.017	0.018	0.024	0.023	0.024	0.032	.350mm/s	15:45:46	13/10/2021
Hour 5	0.017	0.018	0.024	0.025	0.026	0.035	.325mm/s	16:10:06	13/10/2021
Hour 6	0.017	0.018	0.025	0.026	0.027	0.037	.350mm/s	17:30:36	13/10/2021
Hour 7	0.017	0.018	0.024	0.027	0.029	0.038	.325mm/s	18:23:06	13/10/2021
Hour 8	0.017	0.018	0.024	0.029	0.03	0.04	.325mm/s	19:05:06	13/10/2021
Hour 9	0.017	0.018	0.022	0.029	0.031	0.041	.325mm/s	20:12:06	13/10/2021
Hour 10	0.017	0.018	0.023	0.03	0.032	0.042	.350mm/s	21:18:36	13/10/2021
Hour 11	0.017	0.018	0.024	0.031	0.033	0.043	.500mm/s	22:41:46	13/10/2021

13 th – 14 th October 2021 – NIGHT TIME									
Ev 052	Vibration Dose Value						Peak Particle Velocity		
8 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
	0.03	0.031	0.033				.400mm/s	04:56:10	14/10/2021
1 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
Hour 1	0.017	0.018	0.019	0.017	0.018	0.019	.325mm/s	23:08:40	13/10/2021
Hour 2	0.018	0.018	0.019	0.021	0.022	0.023	.325mm/s	00:13:30	14/10/2021
Hour 3	0.018	0.018	0.019	0.023	0.024	0.025	.350mm/s	01:06:20	14/10/2021
Hour 4	0.018	0.018	0.019	0.025	0.026	0.027	.325mm/s	02:04:30	14/10/2021
Hour 5	0.018	0.018	0.019	0.026	0.028	0.029	.350mm/s	03:32:30	14/10/2021
Hour 6	0.018	0.018	0.021	0.028	0.029	0.031	.400mm/s	04:56:10	14/10/2021
Hour 7	0.018	0.019	0.02	0.029	0.03	0.032	.325mm/s	05:16:20	14/10/2021
Hour 8	0.018	0.019	0.02	0.03	0.031	0.033	.350mm/s	06:27:30	14/10/2021

14 th October 2021 – DAYTIME									
Ev 053	Vibration Dose Value						Peak Particle Velocity		
16 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
	0.035	0.037	0.049				.525mm/s	22:41:00	14/10/2021
1 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
Hour 1	0.017	0.018	0.024	0.017	0.018	0.024	.350mm/s	07:10:00	14/10/2021
Hour 2	0.017	0.018	0.024	0.021	0.022	0.029	.350mm/s	08:52:00	14/10/2021
Hour 3	0.017	0.018	0.023	0.023	0.024	0.031	.325mm/s	09:55:40	14/10/2021
Hour 4	0.017	0.018	0.023	0.025	0.026	0.034	.350mm/s	10:16:00	14/10/2021
Hour 5	0.017	0.018	0.024	0.026	0.028	0.036	.325mm/s	11:11:20	14/10/2021
Hour 6	0.017	0.018	0.025	0.027	0.029	0.038	.350mm/s	12:19:40	14/10/2021
Hour 7	0.017	0.018	0.025	0.028	0.03	0.04	.350mm/s	13:05:10	14/10/2021
Hour 8	0.017	0.018	0.025	0.029	0.031	0.041	.350mm/s	14:10:40	14/10/2021
Hour 9	0.017	0.018	0.025	0.03	0.032	0.042	.350mm/s	15:01:10	14/10/2021
Hour 10	0.017	0.018	0.025	0.031	0.033	0.044	.325mm/s	16:13:20	14/10/2021
Hour 11	0.017	0.018	0.025	0.032	0.034	0.045	.350mm/s	17:25:30	14/10/2021
Hour 12	0.017	0.018	0.024	0.032	0.034	0.046	.325mm/s	18:01:10	14/10/2021
Hour 13	0.017	0.018	0.023	0.033	0.035	0.047	.350mm/s	19:39:40	14/10/2021
Hour 14	0.017	0.018	0.023	0.034	0.036	0.047	.325mm/s	20:50:40	14/10/2021
Hour 15	0.017	0.018	0.023	0.034	0.036	0.048	.350mm/s	21:09:40	14/10/2021
Hour 16	0.017	0.018	0.025	0.035	0.037	0.049	.525mm/s	22:41:00	14/10/2021

14 th – 15 th October 2021 – DAYTIME & NIGHT TIME									
Ev 054	Vibration Dose Value						Peak Particle Velocity		
8 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
	0.03	0.031	0.033				.375mm/s	06:56:50	15/10/2021
1 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
Hour 1	0.017	0.018	0.019	0.017	0.018	0.019	.325mm/s	23:10:00	14/10/2021
Hour 2	0.017	0.018	0.019	0.021	0.022	0.023	.350mm/s	00:44:40	15/10/2021
Hour 3	0.017	0.018	0.019	0.023	0.024	0.025	.325mm/s	01:16:10	15/10/2021
Hour 4	0.017	0.018	0.019	0.025	0.026	0.027	.350mm/s	02:32:40	15/10/2021
Hour 5	0.017	0.018	0.019	0.026	0.028	0.029	.325mm/s	03:20:20	15/10/2021
Hour 6	0.017	0.018	0.019	0.028	0.029	0.03	.325mm/s	04:07:20	15/10/2021
Hour 7	0.017	0.018	0.019	0.029	0.03	0.031	.350mm/s	05:03:10	15/10/2021
Hour 8	0.017	0.018	0.02	0.03	0.031	0.033	.375mm/s	06:56:50	15/10/2021

15 th October 2021 – DAYTIME									
Ev 053	Vibration Dose Value						Peak Particle Velocity		
16 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
	0.034	0.037	0.045				.450mm/s	22:43:10	15/10/2021
1 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
Hour 1	0.017	0.018	0.023	0.017	0.018	0.023	.350mm/s	07:10:20	15/10/2021
Hour 2	0.017	0.018	0.023	0.02	0.022	0.027	.325mm/s	08:13:20	15/10/2021
Hour 3	0.017	0.018	0.022	0.023	0.024	0.03	.325mm/s	09:10:30	15/10/2021
Hour 4	0.017	0.018	0.022	0.024	0.026	0.032	.350mm/s	10:04:40	15/10/2021
Hour 5	0.017	0.018	0.022	0.026	0.028	0.034	.350mm/s	11:47:50	15/10/2021
Hour 6	0.017	0.018	0.023	0.027	0.029	0.036	.325mm/s	12:03:30	15/10/2021
Hour 7	0.017	0.018	0.023	0.028	0.03	0.037	.325mm/s	13:03:00	15/10/2021
Hour 8	0.017	0.018	0.023	0.029	0.031	0.038	.350mm/s	14:46:50	15/10/2021
Hour 9	0.017	0.018	0.023	0.03	0.032	0.04	.350mm/s	15:17:10	15/10/2021
Hour 10	0.017	0.018	0.023	0.031	0.033	0.041	.325mm/s	16:50:10	15/10/2021
Hour 11	0.017	0.018	0.023	0.031	0.034	0.042	.325mm/s	17:19:20	15/10/2021
Hour 12	0.017	0.018	0.022	0.032	0.034	0.043	.350mm/s	18:08:00	15/10/2021
Hour 13	0.017	0.018	0.022	0.033	0.035	0.043	.325mm/s	19:29:00	15/10/2021
Hour 14	0.017	0.018	0.021	0.033	0.036	0.044	.325mm/s	20:10:50	15/10/2021
Hour 15	0.017	0.018	0.021	0.034	0.036	0.045	.325mm/s	21:00:30	15/10/2021
Hour 16	0.017	0.018	0.023	0.034	0.037	0.045	.450mm/s	22:43:10	15/10/2021

15 th – 16 th October 2021 – DAYTIME & NIGHT TIME									
Ev 054	Vibration Dose Value						Peak Particle Velocity		
8 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
	0.029	0.031	0.032				.375mm/s	01:01:20	16/10/2021
1 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
Hour 1	0.017	0.018	0.019	0.017	0.018	0.019	.350mm/s	23:22:00	15/10/2021
Hour 2	0.017	0.018	0.019	0.02	0.022	0.022	.325mm/s	00:47:30	16/10/2021
Hour 3	0.017	0.018	0.02	0.023	0.024	0.025	.375mm/s	01:01:20	16/10/2021
Hour 4	0.017	0.019	0.019	0.024	0.026	0.027	.325mm/s	02:44:50	16/10/2021
Hour 5	0.017	0.019	0.019	0.026	0.028	0.029	.350mm/s	03:07:40	16/10/2021
Hour 6	0.017	0.019	0.018	0.027	0.029	0.03	.325mm/s	04:18:20	16/10/2021
Hour 7	0.017	0.019	0.019	0.028	0.03	0.031	.350mm/s	05:05:10	16/10/2021
Hour 8	0.017	0.019	0.019	0.029	0.031	0.032	.350mm/s	06:47:00	16/10/2021

16 th October 2021 – DAYTIME									
Ev 053	Vibration Dose Value						Peak Particle Velocity		
16 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
	0.034	0.037	0.043				.350mm/s	10:42:20	16/10/2021
1 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
Hour 1	0.017	0.018	0.02	0.017	0.018	0.02	.325mm/s	07:09:10	16/10/2021
Hour 2	0.017	0.018	0.021	0.02	0.022	0.024	.225mm/s	08:26:20	16/10/2021
Hour 3	0.017	0.018	0.021	0.022	0.024	0.027	.325mm/s	09:44:40	16/10/2021
Hour 4	0.017	0.018	0.022	0.024	0.026	0.03	.350mm/s	10:42:20	16/10/2021
Hour 5	0.017	0.018	0.022	0.026	0.028	0.032	.325mm/s	11:36:50	16/10/2021
Hour 6	0.017	0.018	0.023	0.027	0.029	0.034	.325mm/s	12:39:50	16/10/2021
Hour 7	0.017	0.018	0.023	0.028	0.03	0.036	.350mm/s	13:56:40	16/10/2021
Hour 8	0.017	0.018	0.022	0.029	0.031	0.037	.325mm/s	14:06:30	16/10/2021
Hour 9	0.017	0.018	0.021	0.03	0.032	0.038	.325mm/s	15:49:30	16/10/2021
Hour 10	0.017	0.018	0.02	0.03	0.033	0.039	.350mm/s	16:25:50	16/10/2021
Hour 11	0.017	0.018	0.021	0.031	0.034	0.04	.350mm/s	17:05:30	16/10/2021
Hour 12	0.017	0.018	0.021	0.032	0.035	0.04	.325mm/s	18:04:50	16/10/2021
Hour 13	0.017	0.018	0.021	0.033	0.035	0.041	.325mm/s	19:22:50	16/10/2021
Hour 14	0.017	0.018	0.02	0.033	0.036	0.042	.325mm/s	20:10:40	16/10/2021
Hour 15	0.017	0.018	0.02	0.034	0.037	0.042	.325mm/s	21:14:30	16/10/2021
Hour 16	0.017	0.018	0.019	0.034	0.037	0.043	.225mm/s	22:18:20	16/10/2021

16 th – 17 th October 2021 – DAYTIME & NIGHT TIME									
Ev 054	Vibration Dose Value						Peak Particle Velocity		
8 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
	0.029	0.032	0.032				.350mm/s	23:33:10	16/10/2021
1 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
Hour 1	0.017	0.018	0.019	0.017	0.018	0.019	.350mm/s	23:33:10	16/10/2021
Hour 2	0.017	0.019	0.019	0.02	0.022	0.022	.325mm/s	00:22:00	17/10/2021
Hour 3	0.017	0.019	0.018	0.023	0.025	0.025	.325mm/s	01:03:10	17/10/2021
Hour 4	0.017	0.019	0.018	0.024	0.026	0.026	.350mm/s	02:04:40	17/10/2021
Hour 5	0.017	0.019	0.018	0.026	0.028	0.028	.350mm/s	03:57:10	17/10/2021
Hour 6	0.017	0.019	0.019	0.027	0.029	0.029	.325mm/s	04:43:50	17/10/2021
Hour 7	0.017	0.019	0.019	0.028	0.03	0.031	.350mm/s	05:15:30	17/10/2021
Hour 8	0.018	0.019	0.019	0.029	0.032	0.032	.350mm/s	06:08:20	17/10/2021

17 th October 2021 – DAYTIME									
Ev 053	Vibration Dose Value						Peak Particle Velocity		
16 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
	0.035	0.037	0.042				.500mm/s	22:59:40	17/10/2021
1 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
Hour 1	0.017	0.018	0.019	0.017	0.018	0.019	.350mm/s	07:32:30	17/10/2021
Hour 2	0.017	0.018	0.02	0.021	0.022	0.023	.350mm/s	08:21:40	17/10/2021
Hour 3	0.017	0.018	0.02	0.023	0.024	0.026	.350mm/s	09:59:00	17/10/2021
Hour 4	0.017	0.018	0.021	0.024	0.026	0.028	.350mm/s	10:41:30	17/10/2021
Hour 5	0.017	0.018	0.02	0.026	0.028	0.03	.350mm/s	11:27:30	17/10/2021
Hour 6	0.017	0.018	0.021	0.027	0.029	0.032	.325mm/s	12:53:10	17/10/2021
Hour 7	0.017	0.018	0.021	0.028	0.03	0.033	.350mm/s	13:33:10	17/10/2021
Hour 8	0.017	0.018	0.022	0.029	0.031	0.035	.350mm/s	14:31:10	17/10/2021
Hour 9	0.017	0.018	0.022	0.03	0.032	0.036	.325mm/s	15:01:00	17/10/2021
Hour 10	0.017	0.018	0.022	0.031	0.033	0.037	.325mm/s	16:59:40	17/10/2021
Hour 11	0.017	0.018	0.022	0.032	0.034	0.038	.325mm/s	17:11:00	17/10/2021
Hour 12	0.017	0.018	0.021	0.032	0.035	0.039	.225mm/s	18:52:50	17/10/2021
Hour 13	0.017	0.018	0.02	0.033	0.035	0.04	.350mm/s	19:20:30	17/10/2021
Hour 14	0.017	0.018	0.019	0.033	0.036	0.041	.325mm/s	20:11:40	17/10/2021
Hour 15	0.017	0.018	0.019	0.034	0.037	0.041	.350mm/s	21:57:30	17/10/2021
Hour 16	0.017	0.018	0.024	0.035	0.037	0.042	.500mm/s	22:59:40	17/10/2021

17 th – 18 th October 2021 – DAYTIME & NIGHT TIME									
Ev 054	Vibration Dose Value						Peak Particle Velocity		
8 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
	0.029	0.032	0.033				.450mm/s	03:11:30	18/10/2021
1 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
Hour 1	0.017	0.019	0.018	0.017	0.019	0.018	.325mm/s	23:24:40	17/10/2021
Hour 2	0.017	0.019	0.018	0.02	0.022	0.022	.325mm/s	00:36:50	18/10/2021
Hour 3	0.017	0.019	0.018	0.023	0.025	0.024	.350mm/s	01:41:30	18/10/2021
Hour 4	0.017	0.019	0.018	0.024	0.027	0.026	.350mm/s	02:35:00	18/10/2021
Hour 5	0.017	0.019	0.021	0.026	0.028	0.029	.450mm/s	03:11:30	18/10/2021
Hour 6	0.017	0.019	0.019	0.027	0.03	0.03	.350mm/s	04:56:40	18/10/2021
Hour 7	0.017	0.019	0.02	0.028	0.031	0.031	.325mm/s	05:08:20	18/10/2021
Hour 8	0.017	0.019	0.022	0.029	0.032	0.033	.425mm/s	06:26:40	18/10/2021

18 th October 2021 – DAYTIME									
Ev 053	Vibration Dose Value						Peak Particle Velocity		
16 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
	0.034	0.04	0.046				.350mm/s	09:24:00	18/10/2021
1 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
Hour 1	0.017	0.019	0.021	0.017	0.019	0.021	.325mm/s	07:41:30	18/10/2021
Hour 2	0.017	0.019	0.021	0.02	0.023	0.025	.325mm/s	08:01:00	18/10/2021
Hour 3	0.017	0.019	0.022	0.022	0.025	0.028	.350mm/s	09:24:00	18/10/2021
Hour 4	0.017	0.019	0.022	0.024	0.027	0.031	.350mm/s	10:00:20	18/10/2021
Hour 5	0.017	0.019	0.021	0.025	0.029	0.032	.325mm/s	11:25:10	18/10/2021
Hour 6	0.017	0.019	0.022	0.027	0.03	0.034	.325mm/s	12:01:20	18/10/2021
Hour 7	0.017	0.02	0.022	0.028	0.032	0.036	.325mm/s	13:49:40	18/10/2021
Hour 8	0.017	0.02	0.022	0.029	0.033	0.037	.350mm/s	14:34:00	18/10/2021
Hour 9	0.017	0.02	0.023	0.03	0.034	0.038	.350mm/s	15:45:20	18/10/2021
Hour 10	0.017	0.02	0.024	0.03	0.035	0.04	.325mm/s	16:02:20	18/10/2021
Hour 11	0.017	0.02	0.024	0.031	0.036	0.041	.350mm/s	17:57:40	18/10/2021
Hour 12	0.017	0.02	0.023	0.032	0.037	0.042	.325mm/s	18:03:10	18/10/2021
Hour 13	0.017	0.02	0.023	0.032	0.037	0.043	.325mm/s	19:12:40	18/10/2021
Hour 14	0.017	0.02	0.023	0.033	0.038	0.044	.350mm/s	20:07:00	18/10/2021
Hour 15	0.017	0.02	0.023	0.034	0.039	0.045	.350mm/s	21:07:30	18/10/2021
Hour 16	0.017	0.02	0.023	0.034	0.04	0.046	.350mm/s	22:09:40	18/10/2021

18 th – 19 th October 2021 – DAYTIME & NIGHT TIME									
Ev 054	Vibration Dose Value						Peak Particle Velocity		
8 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
	0.029	0.035	0.034				.475mm/s	03:40:10	19/10/2021
1 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
Hour 1	0.017	0.02	0.024	0.017	0.02	0.024	.450mm/s	23:16:00	18/10/2021
Hour 2	0.017	0.02	0.018	0.02	0.024	0.026	.350mm/s	00:11:50	19/10/2021
Hour 3	0.017	0.02	0.02	0.022	0.027	0.028	.350mm/s	01:38:50	19/10/2021
Hour 4	0.017	0.021	0.018	0.024	0.029	0.029	.325mm/s	02:01:10	19/10/2021
Hour 5	0.017	0.021	0.02	0.025	0.031	0.031	.475mm/s	03:40:10	19/10/2021
Hour 6	0.017	0.021	0.018	0.027	0.032	0.032	.350mm/s	04:24:40	19/10/2021
Hour 7	0.017	0.021	0.019	0.028	0.034	0.033	.350mm/s	05:39:30	19/10/2021
Hour 8	0.017	0.021	0.019	0.029	0.035	0.034	.325mm/s	06:02:50	19/10/2021

The vdv results are summarised in the table below for the daytime and night-time periods.

Time Period	Vibration Dose Value m/s ^{1.75}			Peak Particle Velocity mm/s
	L	T	V	Resultant Vector
13 th October 2021 – 11 Hr	0.035	0.037	0.048	.500mm/s
14 th October 2021 – 16 Hr	0.035	0.037	0.049	.525mm/s
15 th October 2021 – 16 Hr	0.034	0.037	0.045	.450mm/s
16 th October 2021 – 16 Hr	0.034	0.037	0.043	.350mm/s
17 th October 2021 – 16 Hr	0.035	0.037	0.042	.500mm/s
18 th October 2021 – 16 Hr	0.034	0.04	0.046	.350mm/s
13 th – 14 th October 2021 – 8 Hr	0.03	0.031	0.033	.400mm/s
14 th – 15 th October 2021 – 8 Hr	0.03	0.031	0.033	.375mm/s
15 th – 16 th October 2021 – 8 Hr	0.029	0.031	0.032	.375mm/s
16 th – 17 th October 2021 – 8 Hr	0.029	0.032	0.032	.350mm/s
17 th – 18 th October 2021 – 8 Hr	0.029	0.032	0.033	.450mm/s
18 th – 19 th October 2021 – 8 Hr	0.029	0.035	0.034	.475mm/s
Summary of daily VDV and PPV				

The above table demonstrates that no detrimental or structural vibration levels have been measured and therefore the probability of neighbouring building damage is low.

12.6.4 First Floor Vibration Measurements

The vibration monitor was set to record ppv and vdv and left unattended for the duration of the survey.

13 th October 2021 – DAYTIME									
Ev 051	Vibration Dose Value						Peak Particle Velocity		
11 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
	0.027	0.036	0.035				.325mm/s	14:57:55	13/10/2021
1 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
Hour 1	0.013	0.017	0.017	0.009	0.012	0.011	.150mm/s	12:47:05	13/10/2021
Hour 2	0.013	0.018	0.017	0.014	0.019	0.018	.200mm/s	13:06:05	13/10/2021
Hour 3	0.014	0.018	0.017	0.017	0.022	0.021	.325mm/s	14:57:55	13/10/2021
Hour 4	0.013	0.018	0.017	0.018	0.024	0.023	.200mm/s	15:58:55	13/10/2021
Hour 5	0.013	0.018	0.017	0.019	0.025	0.025	.300mm/s	16:05:25	13/10/2021
Hour 6	0.013	0.018	0.017	0.02	0.027	0.026	.300mm/s	17:09:05	13/10/2021
Hour 7	0.013	0.018	0.017	0.021	0.028	0.027	.150mm/s	18:00:05	13/10/2021
Hour 8	0.013	0.018	0.017	0.022	0.029	0.029	.150mm/s	19:00:05	13/10/2021
Hour 9	0.013	0.017	0.017	0.023	0.03	0.029	.150mm/s	20:00:05	13/10/2021
Hour 10	0.013	0.017	0.017	0.023	0.031	0.03	.150mm/s	21:00:05	13/10/2021
Hour 11	0.013	0.017	0.017	0.024	0.032	0.031	.325mm/s	22:39:25	13/10/2021

13 th – 14 th October 2021 – NIGHT TIME									
Ev 052	Vibration Dose Value						Peak Particle Velocity		
8 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
	0.023	0.031	0.03				.325mm/s	01:12:10	14/10/2021
1 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
Hour 1	0.013	0.018	0.017	0.013	0.018	0.017	.175mm/s	23:43:40	13/10/2021
Hour 2	0.013	0.018	0.017	0.016	0.022	0.021	.200mm/s	00:16:40	14/10/2021
Hour 3	0.013	0.018	0.018	0.018	0.024	0.023	.325mm/s	01:12:10	14/10/2021
Hour 4	0.013	0.018	0.018	0.019	0.026	0.025	.300mm/s	02:05:20	14/10/2021
Hour 5	0.013	0.018	0.018	0.02	0.028	0.026	.150mm/s	03:00:10	14/10/2021
Hour 6	0.014	0.018	0.018	0.021	0.029	0.028	.300mm/s	04:02:00	14/10/2021
Hour 7	0.014	0.018	0.018	0.022	0.03	0.029	.200mm/s	05:43:30	14/10/2021
Hour 8	0.014	0.018	0.018	0.023	0.031	0.03	.200mm/s	06:30:20	14/10/2021

14 th October 2021 – DAYTIME									
Ev 053	Vibration Dose Value						Peak Particle Velocity		
16 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
	0.026	0.036	0.035				.350mm/s	14:07:10	14/10/2021
1 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
Hour 1	0.013	0.018	0.018	0.013	0.018	0.018	.325mm/s	07:28:50	14/10/2021
Hour 2	0.013	0.018	0.018	0.016	0.021	0.021	.200mm/s	08:04:00	14/10/2021
Hour 3	0.013	0.018	0.017	0.017	0.023	0.023	.150mm/s	09:00:10	14/10/2021
Hour 4	0.013	0.018	0.017	0.019	0.025	0.025	.175mm/s	10:53:50	14/10/2021
Hour 5	0.013	0.018	0.018	0.02	0.026	0.026	.225mm/s	11:09:00	14/10/2021
Hour 6	0.013	0.018	0.017	0.021	0.028	0.028	.200mm/s	12:09:10	14/10/2021
Hour 7	0.013	0.018	0.017	0.021	0.029	0.029	.175mm/s	13:27:40	14/10/2021
Hour 8	0.013	0.018	0.017	0.022	0.03	0.03	.350mm/s	14:07:10	14/10/2021
Hour 9	0.013	0.018	0.018	0.023	0.031	0.031	.200mm/s	15:24:20	14/10/2021
Hour 10	0.013	0.018	0.017	0.023	0.032	0.031	.200mm/s	16:07:10	14/10/2021
Hour 11	0.013	0.018	0.017	0.024	0.032	0.032	.200mm/s	17:06:20	14/10/2021
Hour 12	0.013	0.018	0.017	0.025	0.033	0.033	.150mm/s	18:00:10	14/10/2021
Hour 13	0.013	0.018	0.017	0.025	0.034	0.034	.175mm/s	19:52:20	14/10/2021
Hour 14	0.013	0.018	0.017	0.026	0.034	0.034	.325mm/s	20:56:40	14/10/2021
Hour 15	0.013	0.018	0.017	0.026	0.035	0.035	.300mm/s	21:50:10	14/10/2021
Hour 16	0.013	0.018	0.017	0.026	0.036	0.035	.300mm/s	22:14:50	14/10/2021

14 th – 15 th October 2021 – DAYTIME & NIGHT TIME									
Ev 054	Vibration Dose Value						Peak Particle Velocity		
8 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
	0.022	0.031	0.03				.350mm/s	01:23:10	15/10/2021
1 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
Hour 1	0.013	0.018	0.018	0.013	0.018	0.018	.175mm/s	23:06:30	14/10/2021
Hour 2	0.013	0.018	0.018	0.016	0.022	0.021	.150mm/s	00:00:20	15/10/2021
Hour 3	0.013	0.018	0.018	0.017	0.024	0.023	.350mm/s	01:23:10	15/10/2021
Hour 4	0.013	0.018	0.018	0.019	0.026	0.025	.300mm/s	02:15:30	15/10/2021
Hour 5	0.013	0.018	0.018	0.02	0.028	0.027	.150mm/s	03:00:10	15/10/2021
Hour 6	0.013	0.018	0.018	0.021	0.029	0.028	.200mm/s	04:30:20	15/10/2021
Hour 7	0.013	0.018	0.018	0.022	0.03	0.029	.200mm/s	05:40:20	15/10/2021
Hour 8	0.013	0.018	0.018	0.022	0.031	0.03	.350mm/s	06:58:40	15/10/2021

15 th October 2021 – DAYTIME									
Ev 053	Vibration Dose Value						Peak Particle Velocity		
16 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
	0.026	0.036	0.036				.325mm/s	12:05:50	15/10/2021
1 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
Hour 1	0.013	0.018	0.017	0.013	0.018	0.017	.200mm/s	07:50:20	15/10/2021
Hour 2	0.013	0.018	0.018	0.015	0.021	0.021	.200mm/s	08:11:00	15/10/2021
Hour 3	0.013	0.018	0.018	0.017	0.023	0.023	.175mm/s	09:41:00	15/10/2021
Hour 4	0.013	0.018	0.018	0.018	0.025	0.025	.300mm/s	10:06:30	15/10/2021
Hour 5	0.013	0.018	0.018	0.02	0.027	0.027	.300mm/s	11:21:20	15/10/2021
Hour 6	0.013	0.018	0.018	0.02	0.028	0.028	.325mm/s	12:05:50	15/10/2021
Hour 7	0.013	0.018	0.018	0.021	0.029	0.029	.300mm/s	13:42:00	15/10/2021
Hour 8	0.013	0.018	0.018	0.022	0.03	0.03	.300mm/s	14:56:30	15/10/2021
Hour 9	0.013	0.018	0.018	0.023	0.031	0.031	.150mm/s	15:00:10	15/10/2021
Hour 10	0.013	0.018	0.018	0.023	0.032	0.032	.250mm/s	16:48:10	15/10/2021
Hour 11	0.013	0.018	0.018	0.024	0.033	0.033	.175mm/s	17:39:50	15/10/2021
Hour 12	0.013	0.018	0.017	0.024	0.033	0.033	.150mm/s	18:00:10	15/10/2021
Hour 13	0.013	0.018	0.017	0.025	0.034	0.034	.175mm/s	19:12:10	15/10/2021
Hour 14	0.013	0.018	0.017	0.025	0.035	0.034	.150mm/s	20:00:20	15/10/2021
Hour 15	0.013	0.018	0.017	0.026	0.035	0.035	.175mm/s	21:25:50	15/10/2021
Hour 16	0.013	0.018	0.017	0.026	0.036	0.036	.325mm/s	22:40:50	15/10/2021

15 th – 16 th October 2021 – DAYTIME & NIGHT TIME									
Ev 054	Vibration Dose Value						Peak Particle Velocity		
8 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
	0.022	0.031	0.03				.350mm/s	05:31:10	16/10/2021
1 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
Hour 1	0.013	0.018	0.018	0.013	0.018	0.018	.300mm/s	23:12:20	15/10/2021
Hour 2	0.013	0.018	0.018	0.016	0.022	0.021	.300mm/s	00:04:20	16/10/2021
Hour 3	0.013	0.018	0.018	0.017	0.024	0.023	.325mm/s	01:03:00	16/10/2021
Hour 4	0.013	0.018	0.018	0.019	0.026	0.025	.325mm/s	02:30:20	16/10/2021
Hour 5	0.013	0.018	0.018	0.02	0.028	0.027	.300mm/s	03:27:20	16/10/2021
Hour 6	0.013	0.018	0.018	0.021	0.029	0.028	.150mm/s	04:00:10	16/10/2021
Hour 7	0.013	0.018	0.018	0.021	0.03	0.029	.350mm/s	05:31:10	16/10/2021
Hour 8	0.013	0.018	0.018	0.022	0.031	0.03	.175mm/s	06:33:20	16/10/2021

16 th October 2021 – DAYTIME									
Ev 053	Vibration Dose Value						Peak Particle Velocity		
16 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
	0.026	0.036	0.035				.350mm/s	16:49:00	16/10/2021
1 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
Hour 1	0.013	0.018	0.017	0.013	0.018	0.017	.150mm/s	07:00:40	16/10/2021
Hour 2	0.013	0.018	0.017	0.015	0.021	0.021	.150mm/s	08:00:10	16/10/2021
Hour 3	0.013	0.018	0.017	0.017	0.023	0.023	.300mm/s	09:25:00	16/10/2021
Hour 4	0.013	0.018	0.017	0.018	0.025	0.025	.150mm/s	10:00:10	16/10/2021
Hour 5	0.013	0.018	0.017	0.02	0.027	0.026	.300mm/s	11:26:10	16/10/2021
Hour 6	0.013	0.018	0.017	0.02	0.028	0.027	.150mm/s	12:00:10	16/10/2021
Hour 7	0.013	0.018	0.017	0.021	0.029	0.029	.175mm/s	13:17:00	16/10/2021
Hour 8	0.013	0.018	0.017	0.022	0.03	0.03	.150mm/s	14:00:10	16/10/2021
Hour 9	0.013	0.018	0.017	0.023	0.031	0.03	.300mm/s	15:39:50	16/10/2021
Hour 10	0.013	0.018	0.017	0.023	0.032	0.031	.350mm/s	16:49:00	16/10/2021
Hour 11	0.013	0.018	0.017	0.024	0.033	0.032	.200mm/s	17:43:00	16/10/2021
Hour 12	0.013	0.018	0.017	0.024	0.033	0.033	.300mm/s	18:17:00	16/10/2021
Hour 13	0.013	0.018	0.017	0.025	0.034	0.033	.175mm/s	19:53:30	16/10/2021
Hour 14	0.013	0.018	0.017	0.025	0.035	0.034	.300mm/s	20:22:30	16/10/2021
Hour 15	0.013	0.018	0.017	0.026	0.035	0.035	.150mm/s	21:00:10	16/10/2021
Hour 16	0.013	0.018	0.017	0.026	0.036	0.035	.200mm/s	22:06:10	16/10/2021

16 th – 17 th October 2021 – DAYTIME & NIGHT TIME									
Ev 054	Vibration Dose Value						Peak Particle Velocity		
8 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
	0.022	0.031	0.03				.350mm/s	23:33:30	16/10/2021
1 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
Hour 1	0.013	0.018	0.018	0.013	0.018	0.018	.350mm/s	23:33:30	16/10/2021
Hour 2	0.013	0.018	0.018	0.015	0.022	0.021	.150mm/s	00:00:10	17/10/2021
Hour 3	0.013	0.018	0.018	0.017	0.024	0.023	.350mm/s	01:42:40	17/10/2021
Hour 4	0.013	0.018	0.018	0.019	0.026	0.025	.150mm/s	02:00:10	17/10/2021
Hour 5	0.013	0.018	0.018	0.02	0.028	0.027	.150mm/s	03:00:10	17/10/2021
Hour 6	0.013	0.018	0.018	0.021	0.029	0.028	.150mm/s	04:00:10	17/10/2021
Hour 7	0.013	0.018	0.018	0.021	0.03	0.029	.150mm/s	05:00:10	17/10/2021
Hour 8	0.013	0.018	0.018	0.022	0.031	0.03	.150mm/s	06:00:10	17/10/2021

17 th October 2021 – DAYTIME									
Ev 053	Vibration Dose Value						Peak Particle Velocity		
16 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
	0.026	0.036	0.035				.350mm/s	12:06:30	17/10/2021
1 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
Hour 1	0.013	0.017	0.017	0.013	0.017	0.017	.150mm/s	07:00:40	17/10/2021
Hour 2	0.013	0.018	0.017	0.015	0.021	0.02	.200mm/s	08:54:40	17/10/2021
Hour 3	0.013	0.018	0.017	0.017	0.023	0.023	.300mm/s	09:47:30	17/10/2021
Hour 4	0.013	0.018	0.017	0.018	0.025	0.024	.325mm/s	10:11:30	17/10/2021
Hour 5	0.013	0.018	0.017	0.02	0.026	0.026	.200mm/s	11:14:20	17/10/2021
Hour 6	0.013	0.018	0.017	0.02	0.028	0.027	.350mm/s	12:06:30	17/10/2021
Hour 7	0.013	0.018	0.017	0.021	0.029	0.028	.175mm/s	13:16:20	17/10/2021
Hour 8	0.013	0.018	0.017	0.022	0.03	0.029	.200mm/s	14:51:50	17/10/2021
Hour 9	0.013	0.018	0.017	0.023	0.031	0.03	.150mm/s	15:00:10	17/10/2021
Hour 10	0.013	0.018	0.017	0.023	0.032	0.031	.300mm/s	16:41:50	17/10/2021
Hour 11	0.013	0.018	0.017	0.024	0.032	0.032	.150mm/s	17:00:10	17/10/2021
Hour 12	0.013	0.018	0.017	0.024	0.033	0.033	.300mm/s	18:15:00	17/10/2021
Hour 13	0.013	0.018	0.017	0.025	0.034	0.033	.350mm/s	19:36:20	17/10/2021
Hour 14	0.013	0.018	0.017	0.025	0.034	0.034	.150mm/s	20:00:10	17/10/2021
Hour 15	0.013	0.018	0.017	0.026	0.035	0.034	.350mm/s	21:31:10	17/10/2021
Hour 16	0.013	0.018	0.017	0.026	0.036	0.035	.300mm/s	22:57:00	17/10/2021

17 th – 18 th October 2021 – DAYTIME & NIGHT TIME									
Ev 054	Vibration Dose Value						Peak Particle Velocity		
8 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
	0.022	0.031	0.03				.350mm/s	05:17:20	18/10/2021
1 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
Hour 1	0.013	0.018	0.018	0.013	0.018	0.018	.325mm/s	23:04:40	17/10/2021
Hour 2	0.013	0.018	0.018	0.015	0.022	0.021	.300mm/s	00:05:10	18/10/2021
Hour 3	0.013	0.018	0.018	0.017	0.024	0.023	.175mm/s	01:23:00	18/10/2021
Hour 4	0.013	0.018	0.018	0.019	0.026	0.025	.175mm/s	02:31:10	18/10/2021
Hour 5	0.013	0.018	0.018	0.02	0.028	0.027	.200mm/s	03:49:30	18/10/2021
Hour 6	0.013	0.018	0.018	0.021	0.029	0.028	.150mm/s	04:00:10	18/10/2021
Hour 7	0.013	0.018	0.018	0.021	0.03	0.029	.350mm/s	05:17:20	18/10/2021
Hour 8	0.013	0.018	0.018	0.022	0.031	0.03	.250mm/s	06:24:00	18/10/2021

18 th October 2021 – DAYTIME									
Ev 053	Vibration Dose Value						Peak Particle Velocity		
16 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
	0.026	0.036	0.035				.350mm/s	13:26:20	18/10/2021
1 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
Hour 1	0.013	0.018	0.017	0.013	0.018	0.017	.150mm/s	07:00:40	18/10/2021
Hour 2	0.013	0.018	0.017	0.015	0.021	0.021	.175mm/s	08:06:40	18/10/2021
Hour 3	0.013	0.018	0.018	0.017	0.023	0.023	.300mm/s	09:38:20	18/10/2021
Hour 4	0.013	0.018	0.018	0.018	0.025	0.025	.300mm/s	10:03:50	18/10/2021
Hour 5	0.013	0.018	0.018	0.02	0.027	0.027	.250mm/s	11:58:40	18/10/2021
Hour 6	0.013	0.018	0.018	0.02	0.028	0.028	.150mm/s	12:00:10	18/10/2021
Hour 7	0.013	0.018	0.018	0.021	0.029	0.029	.350mm/s	13:26:20	18/10/2021
Hour 8	0.013	0.018	0.018	0.022	0.03	0.03	.150mm/s	14:00:10	18/10/2021
Hour 9	0.013	0.018	0.018	0.023	0.031	0.031	.150mm/s	15:00:10	18/10/2021
Hour 10	0.013	0.018	0.018	0.023	0.032	0.032	.175mm/s	16:37:40	18/10/2021
Hour 11	0.013	0.018	0.018	0.024	0.032	0.032	.200mm/s	17:03:50	18/10/2021
Hour 12	0.013	0.018	0.017	0.024	0.033	0.033	.175mm/s	18:00:30	18/10/2021
Hour 13	0.013	0.018	0.017	0.025	0.034	0.034	.150mm/s	19:00:10	18/10/2021
Hour 14	0.013	0.018	0.017	0.025	0.035	0.034	.150mm/s	20:00:10	18/10/2021
Hour 15	0.013	0.018	0.017	0.026	0.035	0.035	.300mm/s	21:49:20	18/10/2021
Hour 16	0.013	0.018	0.017	0.026	0.036	0.035	.175mm/s	22:51:10	18/10/2021

18 th – 19 th October 2021 – DAYTIME & NIGHT TIME									
Ev 054	Vibration Dose Value						Peak Particle Velocity		
8 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
	0.022	0.031	0.03				.350mm/s	02:06:30	19/10/2021
1 Hour	X	Y	Z	X	Y	Z	Max	Time	Date
Hour 1	0.013	0.018	0.018	0.013	0.018	0.018	.325mm/s	23:24:30	18/10/2021
Hour 2	0.013	0.018	0.018	0.015	0.022	0.021	.200mm/s	00:13:00	19/10/2021
Hour 3	0.013	0.018	0.018	0.017	0.024	0.024	.150mm/s	01:00:10	19/10/2021
Hour 4	0.013	0.018	0.018	0.018	0.026	0.025	.350mm/s	02:06:30	19/10/2021
Hour 5	0.013	0.018	0.018	0.02	0.028	0.027	.150mm/s	03:00:10	19/10/2021
Hour 6	0.013	0.018	0.018	0.021	0.029	0.028	.175mm/s	04:57:20	19/10/2021
Hour 7	0.013	0.018	0.018	0.021	0.03	0.029	.325mm/s	05:12:00	19/10/2021
Hour 8	0.013	0.018	0.018	0.022	0.031	0.03	.300mm/s	06:26:10	19/10/2021

The vdv results are summarised in the table below for the daytime and night-time periods.

Time Period	Vibration Dose Value m/s ^{1.75}			Peak Particle Velocity mm/s
	L	T	V	Resultant Vector
13 th October 2021 – 11 Hr	0.027	0.036	0.035	.325mm/s
14 th October 2021 – 16 Hr	0.026	0.036	0.035	.350mm/s
15 th October 2021 – 16 Hr	0.026	0.036	0.036	.325mm/s
16 th October 2021 – 16 Hr	0.026	0.036	0.035	.350mm/s
17 th October 2021 – 16 Hr	0.026	0.036	0.035	.350mm/s
18 th October 2021 – 16 Hr	0.026	0.036	0.035	.350mm/s
13 th – 14 th October 2021 – 8 Hr	0.023	0.031	0.03	.325mm/s
14 th – 15 th October 2021 – 8 Hr	0.022	0.031	0.03	.350mm/s
15 th – 16 th October 2021 – 8 Hr	0.022	0.031	0.03	.350mm/s
16 th – 17 th October 2021 – 8 Hr	0.022	0.031	0.03	.350mm/s
17 th – 18 th October 2021 – 8 Hr	0.022	0.031	0.03	.350mm/s
18 th – 19 th October 2021 – 8 Hr	0.022	0.031	0.03	.350mm/s
Summary of daily VDV and PPV				

The above table demonstrates that no detrimental or structural vibration levels have been measured and therefore the probability of neighbouring building damage is low.

12.7 Implications

The vibration results indicate that vibration dose values (vdv) at the measurement locations are below 0.2 – 0.4 for daytime and night time periods. These values are below the range associated with ‘low probability of adverse comment’.

The maximum peak particle velocity recorded was found to be 1.35 mm/s at the measurement position 1, in accordance with the guidance in BS7385, this value is below the limit at which cosmetic damage to building is likely.

The maximum peak particle velocity recorded was found to be 0.475 mm/s at position 2 and 0.450 mm/s at position 3. In accordance with the guidance in BS7385, this value is below the limit at which cosmetic damage to building is likely.

12.8 Recommendations

The results of this ambient vibration survey indicate that whilst some vibration events may be perceptible, in accordance with the advice given in the appropriate standards, there is likely to be no concern of adverse comments from future occupants of the proposed housing and no concern of cosmetic damage to new buildings arising from vibration at this measurement location.

13 THE NATIONAL PLANNING POLICY FRAMEWORK 2019 (NPPF)

The National Planning Policy Framework 2019 (NPPF) and assessments to the Noise Policy Statement for England 2010 (NPSE) should be made in conjunction with each other. Paragraphs 180 - 183 of the National Planning Policy Framework 2019 (NPPF) states the following:

Paragraph 180 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.

Paragraph 181 Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications.

Paragraph 182 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.

Paragraph 183 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

The Noise Policy Statement for England gives various levels of effect as detailed within this report.

With the existing glazing / ventilation specifications achieved within this report, the development can be implemented within the guidelines of the aforementioned documents and ensure a conclusion of **NOEL – No Observed Effect Level**. This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.

14 CONCLUSION

14.1 Summary of Results

A background noise survey was undertaken from the 11th to the 15th December 2020 at one position at the site in order to establish the underlying background noise levels. Overall results are detailed and tabulated below.

Assessment Position	Date Start	Date Finish	Daytime LAeq	Night Time LAeq
Position 1	11/12/2020	15/12/2020	59.2	55.6

Assessment Position	Date Start	Date Finish	Daytime LA90
Position 1	11/12/2020	15/12/2020	55.0

An additional background noise survey was undertaken from the 8th to the 10th June 2021 at one position at the site in order to establish the underlying background noise levels and associated source levels potentially linked to the train station tannoy system and patron noise. Overall results are detailed and tabulated below.

Assessment Position	Date Start	Date Finish	Daytime LAeq	Night Time LAeq
Position 2	08/06/2021	10/06/2021	60.7	51.8

Assessment Position	Date Start	Date Finish	Daytime LA90
Position 2	08/06/2021	10/06/2021	48.0

It should be noted that no commuter trains stop at this station during night hours and therefore only daytime assessments apply.

14.2 Summary of Vibration

14.2.1 11th – 15th December 2020 – External Pos.1

Please note that Permitted Development Rights do not include Vibration Analysis and therefore technically, the following is not applicable to this application. However, in order to appease Eastleigh Borough Council and allay any concerns, the following have been carried out.

The following vibration levels have been assessed over a typical period between 11th - 15th December 2020. The following table summarises these results:-

Time Period	Vibration Dose Value m/s ^{1.75}			Peak Particle Velocity mm/s
	L	T	V	Resultant Vector
11th December 2020 – 5 Hr	0.03	0.034	0.039	.450mm/s
12th December 2020 – 16 Hr	0.03	0.034	0.038	.350mm/s
13th December 2020 – 16 Hr	0.028	0.034	0.037	1.35mm/s
14th December 2020 – 16 Hr	0.027	0.034	0.038	.875mm/s
15th December 2020 – 3 Hr	0.027	0.034	0.041	1.13mm/s
11th - 12th December 2020 – 8 Hr	0.026	0.029	0.032	.350mm/s
12th - 13th December 2020 – 8 Hr	0.026	0.03	0.033	.450mm/s
13th - 14th December 2020 – 8 Hr	0.025	0.03	0.032	1.00mm/s
14th - 15th December 2020 – 8 Hr	0.025	0.03	0.033	.650mm/s

Table 3 Summary of daily VDV and PPV

The vibration results indicate that vibration dose values (vdv) at the measurement locations are below 0.2 – 0.4 for daytime and night time periods. These values are below the range associated with ‘low probability of adverse comment’.

The maximum peak particle velocity recorded was found to be 1.35 mm/s at position 1. In accordance with the guidance in BS7385, this value is below the limit at which cosmetic damage to building is likely.

The results of this vibration survey indicate that in accordance with the advice given in the appropriate standards, there is likely to be no concern of adverse comments from future occupants of their properties and no concern of cosmetic damage to buildings arising from vibration at this measurement location.

14.2.2 8th – 10th June 2021 – Internal Pos.2

The following vibration levels have been assessed over a typical period between 8th – 10th June 2021. The following table summarises these results:-

Time Period	Vibration Dose Value m/s ^{1.75}			Peak Particle Velocity mm/s
	L	T	V	Resultant Vector
8 th June 2021 – 8 Hr	0.031	0.035	0.034	.325mm/s
9 th June 2021 – 16 Hr	0.027	0.031	0.029	.300mm/s
10 th June 2021 – 10 Hr	0.030	0.035	0.035	.350mm/s
8 th June 2021 – 8 Hr	0.026	0.031	0.030	.375mm/s
9 th June 2021 – 8 Hr	0.030	0.036	0.035	.475mm/s

Table 4 Summary of daily VDV and PPV

14.2.3 8th – 10th June 2021 – Internal Pos.3

The following vibration levels have been assessed over a typical period between 8th – 10th June 2021. The following table summarises these results:-

Time Period	Vibration Dose Value m/s ^{1.75}			Peak Particle Velocity mm/s
	L	T	V	Resultant Vector
8 th June 2021 – 8 Hr	0.038	0.035	0.045	.375mm/s
9 th June 2021 – 16 Hr	0.032	0.030	0.034	.350mm/s
10 th June 2021 – 10 Hr	0.037	0.035	0.044	.400mm/s
8 th June 2021 – 8 Hr	0.031	0.031	0.035	.350mm/s
9 th June 2021 – 8 Hr	0.036	0.036	0.045	.450mm/s

Table 4 Summary of daily VDV and PPV

The vibration results indicate that vibration dose values (vdv) at the measurement locations are below 0.2 – 0.4 for daytime and night time periods. These values are below the range associated with ‘low probability of adverse comment’.

The maximum peak particle velocity recorded was found to be 0.475 mm/s at position 2 and 0.450 mm/s at position 3. In accordance with the guidance in BS7385, this value is below the limit at which cosmetic damage to building is likely.

Further measurements were recorded in the centre of the slab between 13th – 19th October 2021 as requested by

Eastleigh Borough Council representative from Environmental Health. These are detailed below:-

14.2.4 Centre Slab Ground Floor

Time Period	Vibration Dose Value m/s ^{1.75}			Peak Particle Velocity mm/s
	L	T	V	Resultant Vector
13 th October 2021 – 11 Hr	0.035	0.037	0.048	.500mm/s
14 th October 2021 – 16 Hr	0.035	0.037	0.049	.525mm/s
15 th October 2021 – 16 Hr	0.034	0.037	0.045	.450mm/s
16 th October 2021 – 16 Hr	0.034	0.037	0.043	.350mm/s
17 th October 2021 – 16 Hr	0.035	0.037	0.042	.500mm/s
18 th October 2021 – 16 Hr	0.034	0.04	0.046	.350mm/s
13 th – 14 th October 2021 – 8 Hr	0.03	0.031	0.033	.400mm/s
14 th – 15 th October 2021 – 8 Hr	0.03	0.031	0.033	.375mm/s
15 th – 16 th October 2021 – 8 Hr	0.029	0.031	0.032	.375mm/s
16 th – 17 th October 2021 – 8 Hr	0.029	0.032	0.032	.350mm/s
17 th – 18 th October 2021 – 8 Hr	0.029	0.032	0.033	.450mm/s
18 th – 19 th October 2021 – 8 Hr	0.029	0.035	0.034	.475mm/s
Summary of daily VDV and PPV				

14.2.5 Centre Slab First Floor

Time Period	Vibration Dose Value m/s ^{1.75}			Peak Particle Velocity mm/s
	L	T	V	Resultant Vector

	L	T	V	Resultant Vector
13 th October 2021 – 11 Hr	0.027	0.036	0.035	.325mm/s
14 th October 2021 – 16 Hr	0.026	0.036	0.035	.350mm/s
15 th October 2021 – 16 Hr	0.026	0.036	0.036	.325mm/s
16 th October 2021 – 16 Hr	0.026	0.036	0.035	.350mm/s
17 th October 2021 – 16 Hr	0.026	0.036	0.035	.350mm/s
18 th October 2021 – 16 Hr	0.026	0.036	0.035	.350mm/s
13 th – 14 th October 2021 – 8 Hr	0.023	0.031	0.03	.325mm/s
14 th – 15 th October 2021 – 8 Hr	0.022	0.031	0.03	.350mm/s
15 th – 16 th October 2021 – 8 Hr	0.022	0.031	0.03	.350mm/s
16 th – 17 th October 2021 – 8 Hr	0.022	0.031	0.03	.350mm/s
17 th – 18 th October 2021 – 8 Hr	0.022	0.031	0.03	.350mm/s
18 th – 19 th October 2021 – 8 Hr	0.022	0.031	0.03	.350mm/s
Summary of daily VDV and PPV				

The results of this vibration survey indicate that in accordance with the advice given in the appropriate standards, there is likely to be no concern of adverse comments from future occupants of their properties and no concern of cosmetic damage to buildings arising from vibration at this measurement location.

14.3 Glazing & Ventilation Specification

The development can maintain its existing glazing and ventilation, which ensures the internal noise levels, are acceptable in terms of the assessment to British Standard 8233: 2014.

The calculations within this report demonstrate compliance with both the BS 8233 criteria of $L_{Aeq\ 16\ HOUR}$ 35 dB and the councils suggested criteria of $L_{Aeq\ 16\ HOUR}$ 30 dB, following the proposed remedial works to the Kitchen Extract System associated with Canton House.

14.4 WHO Guidelines for Community Noise

The development does not propose external living areas and therefore an assessment to the World Health Organisation's 'Guidelines for Community Noise' has not been carried out.

14.5 BS 4142: 2014

14.5.1 Existing Assessment – Kingfisher House

Rating Level	59 dB	9.1	The acoustic feature correction is added to the specific noise level
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Background Noise Level $L_{A90,1 \text{ hour}}$	48 dB	8.1	Modal Background Noise Level (07:00 – 23:00)
Assessment Level	+11 dB	11	The background level is subtracted from the rating level.
Conclusion BS 4142:2014 ^[1]	+10 dB Significant Adverse Effects, +5 dB Adverse Effects, +0 dB Low Impact		
Assessment	+11 dB		
Conclusion	The assessment level is ‘Significant Adverse Impact’		

14.5.2 Post Remedial Works Assessment – Kingfisher House

Rating Level	43 dB	9.1	The acoustic feature correction is added to the specific noise level
Background Noise Level $L_{A90,1 \text{ hour}}$	48 dB	8.1	Modal Background Noise Level (07:00 – 23:00)
Assessment Level	-5 dB	11	The background level is subtracted from the rating level.
Conclusion BS 4142:2014 ^[1]	+10 dB Significant Adverse Effects, +5 dB Adverse Effects, +0 dB Low Impact		
Assessment	-5 dB		
Conclusion	The assessment level is ‘Low Impact’		

It is understood that Rivendale Homes are in the process of selling the premises to third party and that Rivendale Homes will develop the premises on their behalf. Therefore it is recommended that Eastleigh Borough Council’s Planning Department set a ‘A Grampian Style Planning Condition’ which would allow for permitted development rights to be approved subject to Rivendale Homes carrying out satisfactory acoustic remedial works to the noise generating identified plant at the rear of Kingfisher House of which the third party would take responsibility for these works and their acoustic performance. It is further recommended that the third party ensure that the remedial acoustics works mitigate any $1/3^{\text{rd}}$ Octave Band Frequency Spectrum Analysis. These proposed remedial works and required attenuation values, that the third party should achieve, are detailed within this report.

14.6 Conclusion

Levels have been recorded and assessments made in accordance with the relevant standards. Internal criteria’s have been set and calculations made in order to determine the minimum construction details required in order to meet the desired level within the proposed residential dwellings and satisfy the local council’s requirements.

Based on the calculations and assessments made within this report it is the professional opinion of Sound Advice Acoustics Ltd that the proposed development can demonstrate compliance with the National Planning Policy Framework 2019, NPPF & NPSE and that permitted development rights can be granted.

15 Photographs of Site

Overall Site View



Front Façade Ground Floor



Front Façade 1st Floor



Rear Façade Ground Floor



Rear Façade 1st Floor



Sample of Trickle Vents throughout the building over both floors









16 APPENDIX A – UNCERTAINTY BUDGET

16.1 Scope

Section 10 of British Standard 4142: 2014 entitled “*Uncertainty*” requires the following:

“Consider the level of uncertainty in the data and associated calculations. Where the level of uncertainty could affect the conclusion, take reasonably practicable steps to reduce the level of uncertainty. Report the level and potential effects of uncertainty.”

Annex B of British Standard 4142: 2014 entitled “consideration of uncertainty and good practice for reducing uncertainty” makes reference to the University of Salford publication entitled “A Good Practice Guide on the Source and Magnitude of Uncertainty arising in the Practical Measurement of Environmental Noise” edition 1a dated May 2007.

16.2 Uncertainty of Measured Values

Ref	Source of Uncertainty Section 10.2 British Standard 4142: 2014	Value dB(A)	Distribution (Divisor)	Uncertainty dB(A)
a	Variability and complexity of sound source	0.50	$\sqrt{2}$	0.35
b	Variability and complexity of residual sound	0.00	$\sqrt{3}$	0.00
c	Residual sound present in specific sound	0.00	$\sqrt{3}$	0.00
d	Background noise position selection	0.10	$\sqrt{3}$	0.06
e	Distance between source and receiver	0.15	$\sqrt{2}$	0.11
f	Number of measurements taken (5 Days)	0.10	$\sqrt{3}$	0.06
g	Measurement time interval variation	0.00	$\sqrt{2}$	0.00
h	Range of times measurements taken	0.10	$\sqrt{3}$	0.06
i	Suitable weather conditions during measurements	0.20	$\sqrt{3}$	0.12
j	Application of British Standard 4142: 2014	0.10	$\sqrt{2}$	0.07
k	Rounding of each measurement	0.05	$\sqrt{3}$	0.03
l	Instrumentation – Calibration	1.20	$\sqrt{3}$	0.69
Reported Expanded Uncertainty (95% confidence, convergence k = 2)				1.61

16.3 Uncertainty in Calculations

Ref	Source of Uncertainty Section 10.2 British Standard 4142: 2014	Value dB(A)	Distribution (Divisor)	Uncertainty dB(A)
a	Impact of measured sound level on calculations	0.00	$\sqrt{2}$	0.00
b	Assumption on sound power level of source	0.00	$\sqrt{3}$	0.00
c	Uncertainty of calculation method (ISO 9613)	0.20	$\sqrt{3}$	0.12
d	Model fit against real world conditions	0.10	$\sqrt{3}$	0.06
e	Error in the calculation process	0.15	$\sqrt{2}$	0.11
Reported Expanded Uncertainty (95% confidence, convergence k = 2)				0.33

16.4 Uncertainty from Other Factors

Ref	Source of Uncertainty Section 10.2 British Standard 4142: 2014	Value dB(A)	Distribution (Divisor)	Uncertainty dB(A)
a	Standing waves or interference patterns	0.15	$\sqrt{3}$	0.09
b	Approximation of sound source to a point source	0.10	$\sqrt{3}$	0.06
c	Maintenance and repair of source over 15 years	0.50	$\sqrt{3}$	0.29
Reported Expanded Uncertainty (95% confidence, convergence k = 2)				0.61

16.5 Combined Reported Expanded Uncertainty

Ref	Source of Uncertainty Section 10.2 British Standard 4142: 2014	Value dB(A)	Distribution (Divisor)	Uncertainty dB(A)
a	Section 7.1.2. Uncertainty of measured values	2.7	$\sqrt{2}$	1.14
b	Section 7.1.3. Uncertainty of calculations	2.7	$\sqrt{2}$	0.23
c	Section 7.1.4. Uncertainty from other factors	2.7	$\sqrt{2}$	0.43
Combined Reported Expanded Uncertainty (95% confidence, convergence k = 2)				2.55

It should be noted that the uncertainty calculations have assumed a Type B uncertainty.

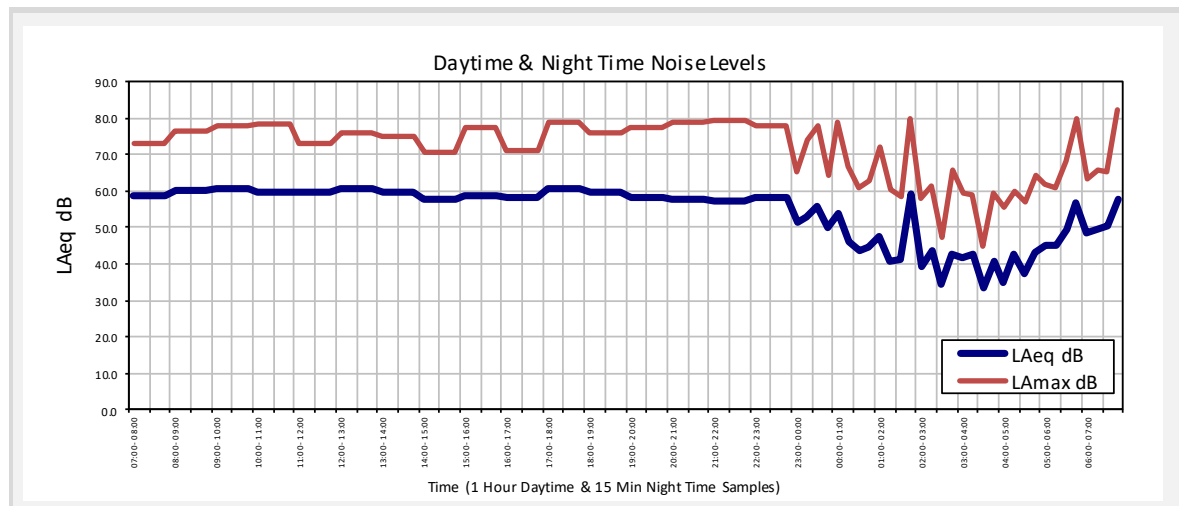
17 APPENDIX B - RESULTS

17.1 11th - 12th December 2020 Position 1

NOISE LEVEL SUMMARY ASSESSMENT												Octave Band Centre Frequency (Hz)					
Date / Time	L _{Aeq}	L _{Amax}	31.5	63	125	250	500	1.0k	2.0k	4.0k	8.0k	16.0k					
DAYTIME 07:00 - 23:00 L_{Aeq} 16 HOUR & Cor r esponding L_{Amax} 16 HOUR	59.2	79.5	63.6	62.9	56.8	55.8	53.5	55.0	52.8	47.4	45.5	37.2					
NIGHT TIME 23:00 - 07:00 L_{Aeq} 8 HOUR & Cor r esponding L_{Amax} 8 HOUR	50.5	82.2	53.5	52.3	47.6	48.4	45.4	45.2	43.1	40.0	42.4	29.5					

DAYTIME NOISE LEVELS 07:00 - 23:00 1 HOUR SAMPLES												Octave Band Centre Frequency (Hz)					
Date / Time	L _{Aeq}	L _{Amax}	31.5	63	125	250	500	1.0 k	2.0 k	4.0 k	8.0 k	16.0 k					
07:00 - 08:00	58.9	73.2	63.5	63.2	55.3	54.9	53.0	55.2	52.5	45.4	40.3	26.1					
08:00 - 09:00	60.2	76.5	63.4	63.8	57.3	55.7	53.9	56.4	53.5	48.4	48.1	40.1					
09:00 - 10:00	60.7	77.8	64.5	63.2	55.0	53.5	52.5	55.4	56.1	49.4	48.1	40.1					
10:00 - 11:00	59.8	78.5	64.6	62.7	57.1	56.2	54.2	55.7	52.9	48.3	47.2	39.8					
11:00 - 12:00	59.8	73.0	64.2	63.3	57.5	56.1	54.3	55.9	53.5	46.8	42.5	31.7					
12:00 - 13:00	60.5	75.9	64.6	63.7	58.4	58.7	55.7	56.3	53.4	48.2	46.1	40.0					
13:00 - 14:00	59.6	75.1	63.6	63.6	58.7	57.8	54.8	55.6	52.7	46.5	42.7	31.0					
14:00 - 15:00	57.8	70.6	62.3	62.5	55.8	53.6	52.1	54.5	51.2	42.9	39.5	30.6					
15:00 - 16:00	58.4	77.5	63.8	63.8	55.9	54.9	53.1	55.0	51.5	44.2	41.7	32.8					
16:00 - 17:00	58.0	71.0	64.6	64.2	53.3	52.1	51.7	54.7	51.3	44.7	44.2	25.3					
17:00 - 18:00	60.7	79.0	63.8	63.9	58.0	56.0	53.8	55.7	54.3	51.5	49.5	41.0					
18:00 - 19:00	59.4	75.7	63.9	62.5	57.6	55.9	53.3	55.3	52.7	47.5	46.9	39.5					
19:00 - 20:00	58.2	77.3	63.2	61.9	57.0	55.7	53.0	54.1	51.2	45.0	44.2	37.7					
20:00 - 21:00	57.8	79.0	62.7	61.0	55.9	55.1	51.7	52.7	51.1	48.2	46.7	35.3					
21:00 - 22:00	57.2	79.5	63.1	61.6	56.5	57.9	53.7	52.4	49.4	42.8	33.5	19.3					
22:00 - 23:00	58.4	77.6	60.8	58.5	55.9	54.9	53.3	52.9	52.2	48.8	45.9	37.9					

NIGHT TIME NOISE LEVELS 23:00 - 07:00 15 MINUTE SAMPLES												Octave Band Centre Frequency (Hz)					
Date / Time	L _{Aeq}	L _{Amax}	31.5	63	125	250	500	1.0 k	2.0 k	4.0 k	8.0 k	16.0 k					
23:00 - 23:15	51.6	65.0	54.1	54.6	49.1	46.2	45.1	48.5	45.5	35.3	24.3	12.3					
23:15 - 23:30	52.9	73.9	61.5	57.5	49.1	47.6	47.1	49.3	46.7	39.8	31.6	17.0					
23:30 - 23:45	55.9	77.6	56.7	57.9	57.2	53.9	49.2	49.1	48.9	47.1	48.7	38.2					
23:45 - 00:00	49.9	64.1	51.3	51.9	42.7	43.1	43.5	46.7	43.9	34.1	24.6	11.7					
00:00 - 00:15	53.7	78.9	50.2	49.8	53.2	56.1	52.3	48.5	42.8	32.4	22.7	11.5					
00:15 - 00:30	46.2	66.7	50.2	47.0	39.1	38.8	38.8	42.9	40.6	31.8	23.8	13.0					
00:30 - 00:45	43.7	60.9	49.0	49.1	38.8	37.7	37.8	40.1	37.9	29.7	20.3	11.2					
00:45 - 01:00	44.4	62.9	48.5	47.5	38.6	35.9	36.5	41.8	38.1	28.1	18.7	10.9					
01:00 - 01:15	47.3	71.8	56.3	51.7	46.0	40.6	43.4	42.7	41.1	34.2	26.2	12.8					
01:15 - 01:30	40.6	60.5	46.2	42.9	36.3	33.7	34.1	37.5	34.4	25.8	18.3	11.0					
01:30 - 01:45	41.0	58.3	44.6	44.4	37.4	34.9	34.2	37.9	34.7	26.2	18.0	10.8					
01:45 - 02:00	59.1	80.0	60.3	57.4	53.1	60.3	56.7	52.5	51.4	47.6	36.8	20.4					
02:00 - 02:15	39.2	57.8	44.3	43.8	35.9	32.7	32.2	36.2	33.0	24.5	17.7	10.7					
02:15 - 02:30	43.4	61.2	43.5	44.6	38.1	36.4	36.4	40.6	37.2	27.4	18.5	10.8					
02:30 - 02:45	34.3	47.4	53.1	46.1	35.9	29.9	29.7	30.0	27.0	22.9	16.2	10.6					
02:45 - 03:00	42.5	65.5	49.1	44.6	36.7	34.3	34.0	39.6	36.9	26.8	17.6	10.7					
03:00 - 03:15	41.8	59.5	45.0	43.5	37.8	34.9	35.2	38.9	35.3	26.9	20.6	10.9					
03:15 - 03:30	42.8	58.7	45.5	48.7	38.2	35.6	35.8	39.8	36.4	27.3	21.0	10.8					
03:30 - 03:45	33.5	44.6	43.5	40.8	35.3	28.4	27.6	29.0	26.6	23.3	19.8	10.8					
03:45 - 04:00	40.7	59.2	45.1	44.1	38.1	33.5	33.4	37.7	34.6	25.8	19.1	10.8					
04:00 - 04:15	34.9	55.6	43.4	40.5	35.3	29.3	28.9	31.1	28.2	23.6	19.0	10.7					
04:15 - 04:30	42.5	60.1	43.4	41.8	35.8	34.9	35.2	39.7	36.1	29.1	20.6	10.8					
04:30 - 04:45	37.2	56.8	47.1	43.0	36.1	32.1	31.1	33.7	30.6	24.1	18.4	10.7					
04:45 - 05:00	43.2	64.2	44.7	42.6	36.9	34.0	34.8	39.8	37.6	29.6	21.6	10.9					
05:00 - 05:15	44.9	61.9	48.3	45.7	38.5	36.5	36.6	40.6	37.7	31.7	39.0	16.5					
05:15 - 05:30	44.9	61.0	47.4	47.4	38.3	37.0	38.1	41.5	38.7	32.0	30.9	12.2					
05:30 - 05:45	49.3	68.1	46.6	46.9	39.1	39.3	40.0	44.9	42.3	39.5	42.5	19.4					
05:45 - 06:00	56.9	79.6	50.6	52.0	40.6	40.9	41.7	46.4	43.7	48.8	55.6	30.3					
06:00 - 06:15	48.4	63.4	61.3	57.7	47.7	43.8	43.7	43.9	41.7	36.5	35.8	18.2					
06:15 - 06:30	49.5	65.9	50.5	50.1	42.8	41.1	41.9	45.7	43.4	39.8	32.5	13.3					
06:30 - 06:45	50.5	65.1	52.4	52.6	43.9	44.0	44.6	47.2	43.7	38.6	33.7	13.8					
06:45 - 07:00	57.6	82.2	56.2	61.2	56.4	53.2	50.1	52.1	50.8	48.7	48.9	43.0					

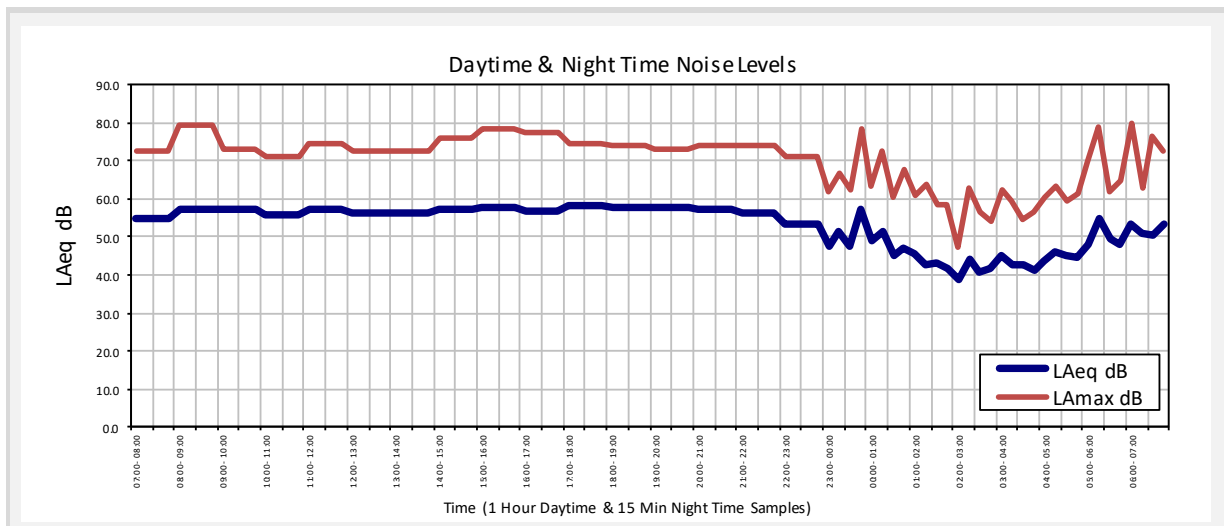


17.2 12th - 13th December 2020 Position 1

NOISE LEVEL SUMMARY ASSESSMENT			Octave Band Centre Frequency (Hz)									
Date / Time	L _{Aeq}	L _{Amax}	31.5	63	125	250	500	1.0k	2.0k	4.0k	8.0k	16.0k
DAYTIME 07:00 - 23:00 L_{Aeq} 16 HOUR & Cor r esponding L_{Amax} 16 HOUR	56.8	79.4	62.2	61.4	56.0	54.1	51.2	52.7	50.1	44.1	42.8	37.1
NIGHT TIME 23:00 - 07:00 L_{Aeq} 8 HOUR & Cor r esponding L_{Amax} 8 HOUR	49.1	79.6	51.1	50.6	47.1	45.0	43.5	44.6	40.4	38.1	42.0	30.7

DAYTIME NOISE LEVELS 07:00 - 23:00 1 HOUR SAMPLES			Octave Band Centre Frequency (Hz)									
Date / Time	L _{Aeq}	L _{Amax}	31.5	63	125	250	500	1.0 k	2.0 k	4.0 k	8.0 k	16.0 k
07:00 - 08:00	54.7	72.7	58.6	58.3	52.7	49.5	48.2	50.1	49.2	43.1	40.9	29.5
08:00 - 09:00	57.1	79.4	61.0	60.1	54.7	53.3	51.0	52.6	50.3	47.1	44.6	39.9
09:00 - 10:00	57.0	73.1	62.3	61.3	53.4	51.1	50.1	53.2	50.7	45.7	43.5	36.8
10:00 - 11:00	55.9	71.2	62.9	61.4	52.3	50.9	49.5	52.6	49.8	41.1	35.1	19.7
11:00 - 12:00	57.3	74.2	64.1	62.2	57.9	53.2	51.1	53.4	50.8	44.7	44.9	40.0
12:00 - 13:00	56.4	72.6	62.9	62.2	55.7	52.6	50.5	52.6	49.7	42.8	42.1	36.0
13:00 - 14:00	56.3	72.5	62.4	62.4	55.1	51.9	50.4	52.6	49.8	43.0	42.0	30.8
14:00 - 15:00	57.2	75.8	61.4	61.9	55.9	56.0	51.8	53.1	50.1	44.3	44.0	39.2
15:00 - 16:00	57.6	78.2	61.9	63.0	57.3	53.7	51.8	53.3	51.1	45.5	44.9	38.1
16:00 - 17:00	56.9	77.2	62.6	62.3	55.0	53.2	51.5	53.2	50.6	41.5	38.5	29.3
17:00 - 18:00	57.9	74.3	63.5	62.3	58.1	55.9	52.8	53.9	50.9	44.2	43.2	39.8
18:00 - 19:00	57.8	74.0	63.5	62.1	57.2	56.2	52.6	53.4	50.8	45.2	44.1	35.7
19:00 - 20:00	57.6	73.1	64.0	62.8	58.2	56.8	53.0	53.6	50.5	41.4	35.5	24.3
20:00 - 21:00	57.2	73.9	60.6	60.2	57.2	56.4	52.7	52.7	49.8	43.9	43.4	39.7
21:00 - 22:00	56.1	74.0	59.6	58.1	55.9	55.3	51.0	51.1	48.8	44.8	44.6	38.3
22:00 - 23:00	53.1	71.2	58.5	58.1	52.6	49.4	46.9	48.8	46.6	41.2	41.0	37.8

NIGHT TIME NOISE LEVELS 23:00 - 07:00 15 MINUTE SAMPLES			Octave Band Centre Frequency (Hz)									
Date / Time	L _{Aeq}	L _{Amax}	31.5	63	125	250	500	1.0 k	2.0 k	4.0 k	8.0 k	16.0 k
23:00 - 23:15	47.4	62.0	51.6	50.6	42.5	41.8	41.0	44.1	41.5	29.7	18.1	10.4
23:15 - 23:30	51.2	66.7	57.5	58.9	54.2	51.2	47.1	46.7	43.6	37.1	32.9	17.7
23:30 - 23:45	47.6	62.4	59.8	53.2	44.7	42.4	41.6	44.6	41.1	30.0	18.4	10.4
23:45 - 00:00	57.2	78.3	57.1	57.7	57.2	54.3	50.7	51.5	49.9	48.3	48.7	45.5
00:00 - 00:15	48.8	63.4	52.0	50.9	46.4	43.3	42.7	46.1	42.0	29.9	17.2	10.3
00:15 - 00:30	51.4	72.6	49.0	52.5	54.2	53.8	50.1	45.3	41.9	30.6	19.0	10.5
00:30 - 00:45	44.9	60.2	44.6	44.5	41.0	40.1	39.5	42.8	36.6	27.4	13.8	10.0
00:45 - 01:00	47.2	67.7	45.8	47.2	41.6	40.4	40.9	44.8	39.7	31.3	15.9	10.2
01:00 - 01:15	45.5	61.0	48.3	48.5	41.9	40.1	40.4	42.8	38.0	29.2	16.3	10.4
01:15 - 01:30	42.8	63.9	44.2	46.6	40.5	39.4	38.2	40.0	35.1	23.6	13.8	10.0
01:30 - 01:45	43.3	58.5	45.1	47.0	44.1	42.2	39.3	40.1	35.0	23.2	13.3	10.1
01:45 - 02:00	41.5	58.4	46.4	47.5	41.3	37.5	37.8	38.4	33.5	23.3	14.3	10.0
02:00 - 02:15	38.7	47.2	43.6	42.8	39.9	35.4	36.2	35.8	27.0	22.0	13.3	10.1
02:15 - 02:30	44.1	63.0	48.7	46.6	40.7	38.6	38.7	41.1	37.3	26.8	13.7	10.0
02:30 - 02:45	40.8	56.7	45.8	43.6	39.7	36.8	38.0	38.2	30.0	20.0	12.8	10.0
02:45 - 03:00	41.6	53.8	47.3	45.5	41.1	37.8	39.0	38.5	31.1	27.5	12.9	10.0
03:00 - 03:15	44.9	62.5	47.2	52.7	49.0	43.9	43.2	40.9	33.7	24.2	13.5	10.0
03:15 - 03:30	42.6	59.6	50.1	50.0	42.0	38.4	38.9	39.8	33.9	22.8	17.8	10.0
03:30 - 03:45	42.7	54.3	47.7	46.2	40.4	38.0	39.3	39.8	33.3	28.1	22.9	10.2
03:45 - 04:00	41.3	56.5	46.8	45.0	39.8	37.0	37.9	37.4	30.4	33.0	22.8	10.3
04:00 - 04:15	43.5	60.4	47.8	46.2	40.8	38.1	39.9	40.9	34.9	22.7	13.8	10.0
04:15 - 04:30	46.1	63.2	48.4	47.4	41.5	39.6	41.9	43.5	37.9	26.9	16.5	10.1
04:30 - 04:45	45.2	59.5	47.9	46.5	41.9	40.2	42.1	42.9	34.3	22.8	17.6	10.4
04:45 - 05:00	44.7	61.3	47.6	47.0	41.7	39.4	41.1	42.3	35.1	23.1	16.1	10.1
05:00 - 05:15	48.1	69.5	48.2	48.3	42.6	40.8	42.8	44.8	38.5	32.4	41.3	18.3
05:15 - 05:30	55.0	78.6	48.8	49.1	42.2	40.4	42.9	44.5	37.4	45.1	54.2	29.3
05:30 - 05:45	49.3	61.7	49.0	49.7	42.8	42.4	45.0	47.2	40.1	29.3	23.6	11.6
05:45 - 06:00	48.0	64.9	51.6	50.1	45.1	43.9	43.8	45.3	38.5	33.6	28.9	11.6
06:00 - 06:15	53.3	79.6	49.4	49.0	43.5	42.2	44.3	46.9	41.2	42.0	51.3	27.9
06:15 - 06:30	50.8	62.8	49.2	50.9	45.0	43.1	45.9	48.1	43.0	37.4	31.4	17.4
06:30 - 06:45	50.5	76.5	49.4	47.6	42.9	42.1	43.4	46.4	42.9	42.6	37.9	24.2
06:45 - 07:00	53.1	72.5	51.2	50.9	45.5	45.2	45.8	48.8	45.0	46.3	40.9	22.8

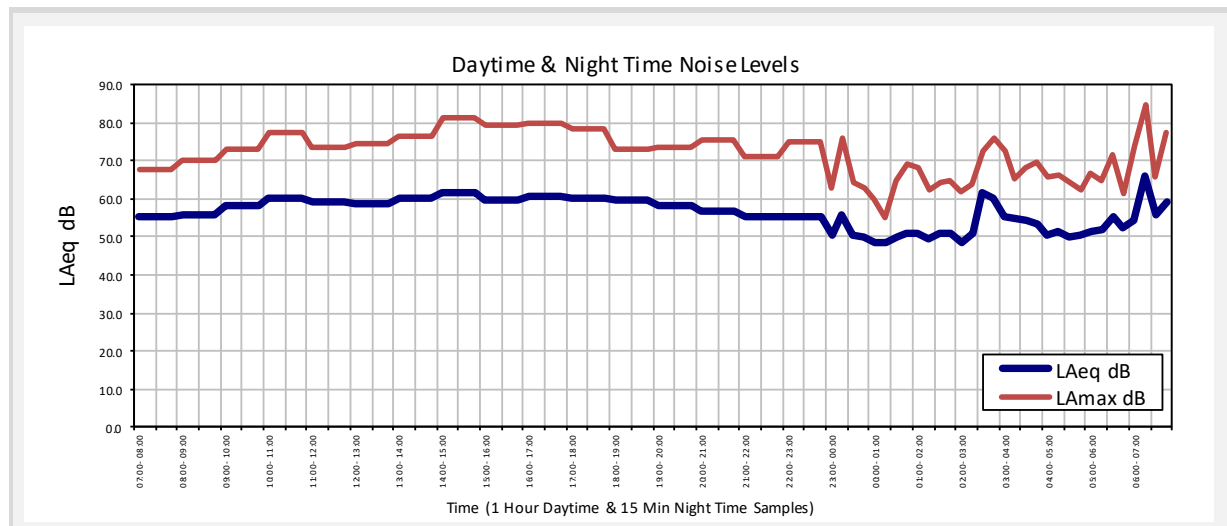


17.3 13th - 14th December 2020 Position 1

NOISE LEVEL SUMMARY ASSESSMENT			Octave Band Centre Frequency (Hz)									
Date / Time	L _{Aeq}	L _{Amax}	31.5	63	125	250	500	1.0k	2.0k	4.0k	8.0k	16.0k
DAYTIME 07:00 - 23:00 L_{Aeq} 16 HOUR & Corresponding L_{Amax} 16 HOUR	58.7	81.2	61.0	60.5	54.8	53.7	51.8	54.0	52.7	49.3	46.6	39.2
NIGHT TIME 23:00 - 07:00 L_{Aeq} 8 HOUR & Corresponding L_{Amax} 8 HOUR	55.6	84.5	57.0	55.4	49.6	49.0	48.6	50.5	50.0	47.0	43.1	31.1

DAYTIME NOISE LEVELS 07:00 - 23:00 1 HOUR SAMPLES			Octave Band Centre Frequency (Hz)									
Date / Time	L _{Aeq}	L _{Amax}	31.5	63	125	250	500	1.0 k	2.0 k	4.0 k	8.0 k	16.0 k
07:00 - 08:00	55.1	67.7	54.1	54.1	45.8	45.5	47.8	50.0	49.1	47.1	42.9	30.3
08:00 - 09:00	55.9	69.8	61.8	58.0	48.4	47.3	48.1	51.2	50.1	47.0	41.8	29.4
09:00 - 10:00	58.4	73.0	61.0	60.4	54.0	51.0	50.5	53.8	52.4	49.4	45.7	34.4
10:00 - 11:00	60.2	77.3	60.8	61.3	54.9	52.2	51.8	55.3	54.6	51.3	47.7	37.0
11:00 - 12:00	59.3	73.4	62.1	61.5	54.2	52.9	51.7	55.1	53.1	49.2	46.6	41.0
12:00 - 13:00	58.4	74.3	62.2	62.0	54.5	51.7	51.0	54.9	52.4	45.7	41.5	31.5
13:00 - 14:00	59.9	76.3	61.8	61.5	56.0	55.1	52.6	55.3	53.6	50.2	48.2	40.8
14:00 - 15:00	61.5	81.2	61.7	62.2	55.9	59.8	56.7	56.5	54.8	50.6	47.8	42.6
15:00 - 16:00	59.4	79.2	62.4	61.2	55.4	53.5	52.3	55.1	53.2	49.3	46.7	35.4
16:00 - 17:00	60.8	79.5	62.5	62.4	55.1	53.8	52.7	55.0	54.9	52.8	50.4	42.0
17:00 - 18:00	60.2	78.3	62.1	61.9	57.1	54.7	53.0	54.9	54.1	51.4	49.0	43.0
18:00 - 19:00	59.4	72.9	61.8	60.9	56.3	54.0	52.3	54.1	53.5	50.4	47.0	36.5
19:00 - 20:00	57.9	73.6	59.9	60.8	57.0	54.9	51.8	53.1	51.6	46.9	45.4	39.3
20:00 - 21:00	56.5	75.5	58.9	58.4	55.0	53.1	50.3	52.0	49.6	45.9	45.8	41.8
21:00 - 22:00	55.1	71.0	58.8	57.3	54.1	51.1	48.2	50.3	49.1	44.7	42.3	32.2
22:00 - 23:00	55.2	75.1	55.8	55.9	52.8	50.8	48.1	49.5	48.8	46.4	46.6	40.3

NIGHT TIME NOISE LEVELS 23:00 - 07:00 15 MINUTE SAMPLES			Octave Band Centre Frequency (Hz)									
Date / Time	L _{Aeq}	L _{Amax}	31.5	63	125	250	500	1.0 k	2.0 k	4.0 k	8.0 k	16.0 k
23:00 - 23:15	50.2	63.0	53.1	50.7	46.4	44.1	42.9	45.9	44.3	39.6	35.2	23.5
23:15 - 23:30	55.5	75.9	57.6	58.9	57.7	52.6	48.3	49.5	50.2	44.9	44.5	36.7
23:30 - 23:45	50.6	64.0	53.4	53.5	44.7	43.7	43.8	46.6	44.7	39.6	34.5	22.4
23:45 - 00:00	50.1	62.9	52.8	48.9	44.5	43.5	43.0	46.1	44.3	39.3	34.4	22.2
00:00 - 00:15	48.4	59.8	51.8	48.6	42.6	40.9	41.1	44.3	42.7	37.3	32.4	20.9
00:15 - 00:30	48.4	55.0	51.3	48.8	43.1	41.9	41.9	44.2	42.5	37.5	32.8	21.3
00:30 - 00:45	50.0	64.8	55.1	50.8	46.0	44.5	43.9	45.8	43.9	38.6	34.1	21.9
00:45 - 01:00	51.0	69.3	53.4	54.5	46.7	45.2	45.4	46.9	44.6	39.3	35.0	22.5
01:00 - 01:15	51.0	68.0	56.5	50.2	45.3	43.8	43.3	45.6	45.2	43.4	35.7	23.1
01:15 - 01:30	49.5	62.5	52.9	48.5	44.8	42.9	43.2	44.7	43.4	40.0	36.8	24.0
01:30 - 01:45	51.1	64.3	58.6	51.4	47.8	45.6	44.6	45.8	44.8	42.5	39.3	26.3
01:45 - 02:00	51.0	64.5	59.4	52.3	48.4	46.6	45.1	45.9	44.5	41.7	38.4	25.5
02:00 - 02:15	48.6	62.0	53.1	48.3	44.7	42.9	42.8	44.2	42.3	38.3	34.4	22.0
02:15 - 02:30	51.0	63.8	56.3	50.0	46.2	44.1	43.8	45.5	45.0	43.0	39.3	26.6
02:30 - 02:45	61.6	72.3	53.6	48.6	45.7	45.3	48.0	52.7	56.2	55.9	53.3	41.8
02:45 - 03:00	60.1	75.9	59.1	54.6	49.2	47.6	48.5	52.0	54.6	53.9	51.3	39.7
03:00 - 03:15	55.3	72.3	49.6	45.6	42.8	40.7	45.5	49.4	50.2	47.4	44.5	32.8
03:15 - 03:30	54.7	65.0	47.6	45.5	39.8	39.7	45.6	49.9	49.6	45.4	41.3	29.7
03:30 - 03:45	54.2	68.2	51.0	47.6	41.7	40.9	45.7	49.6	49.1	44.1	39.2	27.3
03:45 - 04:00	53.3	69.5	53.6	48.1	42.9	41.2	44.9	48.7	48.1	43.2	41.2	27.0
04:00 - 04:15	50.3	65.7	53.8	47.7	41.0	39.7	42.4	45.8	44.9	39.8	38.0	24.1
04:15 - 04:30	51.3	66.2	53.1	51.0	44.3	43.1	44.4	47.4	45.5	40.1	35.0	23.1
04:30 - 04:45	49.7	64.0	52.6	48.4	41.9	40.8	42.7	45.9	43.9	38.2	33.3	21.6
04:45 - 05:00	50.5	62.2	54.0	53.5	45.7	42.5	44.0	46.6	44.5	38.9	35.0	21.7
05:00 - 05:15	51.3	66.6	54.2	51.8	45.4	44.0	45.1	47.6	44.9	39.5	36.0	21.8
05:15 - 05:30	52.0	64.7	57.2	52.0	46.2	46.3	46.2	48.0	45.7	41.0	36.5	21.2
05:30 - 05:45	55.1	71.7	60.7	63.8	54.3	48.7	49.2	50.9	48.7	45.0	38.2	23.3
05:45 - 06:00	52.4	61.2	55.9	54.3	46.6	45.6	46.0	49.1	45.8	40.6	36.2	21.0
06:00 - 06:15	54.4	74.1	64.0	60.5	50.5	48.5	47.9	50.2	47.1	42.7	46.3	25.1
06:15 - 06:30	66.0	84.5	61.4	59.6	55.9	60.7	60.3	60.9	60.4	56.7	47.6	29.2
06:30 - 06:45	55.7	65.6	57.6	57.3	51.4	49.6	49.6	52.5	49.0	42.7	37.8	23.6
06:45 - 07:00	58.9	77.2	62.7	63.0	57.2	55.0	52.4	55.1	52.2	47.0	44.0	34.5

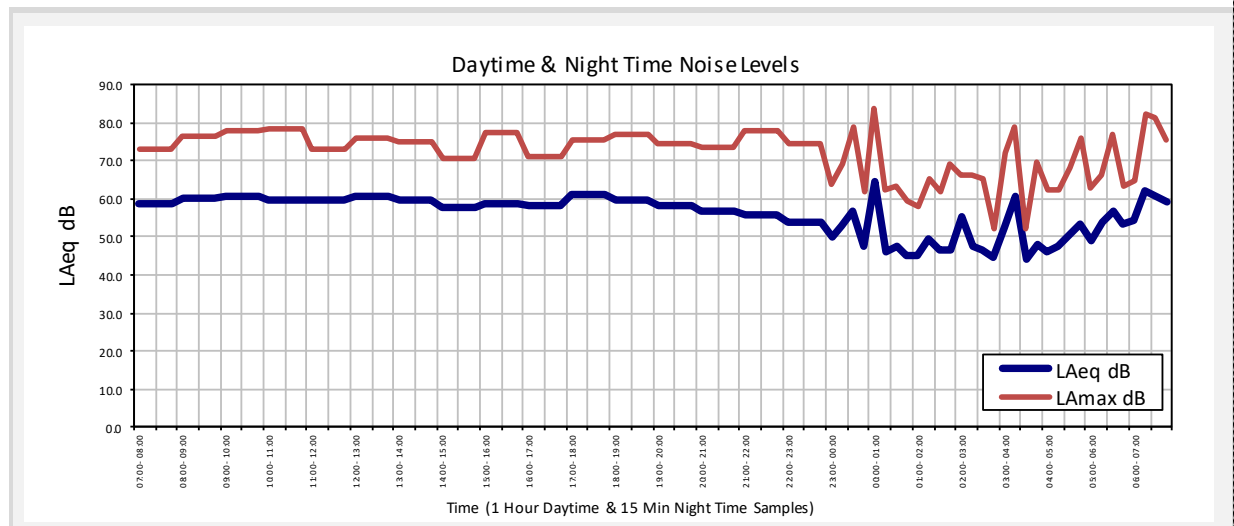


17.4 14th - 15th December 2020 Position 1

NOISE LEVEL SUMMARY ASSESSMENT			Octave Band Centre Frequency (Hz)									
Date / Time	LAeq	LAmx	31.5	63	125	250	500	1.0k	2.0k	4.0k	8.0k	16.0k
DAYTIME 07:00 - 23:00 LAeq 16 HOUR & Corresponding LAmx 16 HOUR	59.0	78.5	63.3	62.7	56.3	55.2	53.1	55.0	52.5	47.1	45.5	38.2
NIGHT TIME 23:00 - 07:00 LAeq 8 HOUR & Corresponding LAmx 8 HOUR	55.4	83.7	57.3	55.2	51.2	53.3	50.8	50.3	49.0	44.6	40.9	30.6

DAYTIME NOISE LEVELS 07:00 - 23:00 1 HOUR SAMPLES			Octave Band Centre Frequency (Hz)									
Date / Time	LAeq	LAmx	31.5	63	125	250	500	1.0 k	2.0 k	4.0 k	8.0 k	16.0 k
07:00 - 08:00	58.9	73.2	63.5	63.2	55.3	54.9	53.0	55.2	52.5	45.4	40.3	26.1
08:00 - 09:00	60.2	76.5	63.4	63.8	57.3	55.7	53.9	56.4	53.5	48.4	48.1	40.1
09:00 - 10:00	60.7	77.8	64.5	63.2	55.0	53.5	52.5	55.4	56.1	49.4	48.1	40.1
10:00 - 11:00	59.8	78.5	64.6	62.7	57.1	56.2	54.2	55.7	52.9	48.3	47.2	39.8
11:00 - 12:00	59.8	73.0	64.2	63.3	57.5	56.1	54.3	55.9	53.5	46.8	42.5	31.7
12:00 - 13:00	60.5	75.9	64.6	63.7	58.4	58.7	55.7	56.3	53.4	48.2	46.1	40.0
13:00 - 14:00	59.6	75.1	63.6	63.6	58.7	57.8	54.8	55.6	52.7	46.5	42.7	31.0
14:00 - 15:00	57.8	70.6	62.3	62.5	55.8	53.6	52.1	54.5	51.2	42.9	39.5	30.6
15:00 - 16:00	58.4	77.5	63.8	63.8	55.9	54.9	53.1	55.0	51.5	44.2	41.7	32.8
16:00 - 17:00	58.0	71.0	64.6	64.2	53.3	52.1	51.7	54.7	51.3	44.7	44.2	25.3
17:00 - 18:00	61.0	75.4	64.7	64.2	57.4	55.7	54.2	56.4	54.7	51.3	48.4	40.5
18:00 - 19:00	59.5	77.0	63.4	62.3	56.8	55.3	52.9	55.6	52.8	47.7	47.0	42.3
19:00 - 20:00	58.1	74.3	61.1	60.6	55.2	55.0	52.0	54.1	51.1	46.3	45.9	39.3
20:00 - 21:00	56.6	73.2	60.6	59.9	55.7	54.7	50.9	52.5	49.3	44.7	44.4	37.4
21:00 - 22:00	55.8	77.8	60.0	59.1	53.5	51.9	49.0	51.7	48.6	44.9	45.6	42.0
22:00 - 23:00	53.9	74.7	58.0	57.5	53.6	49.9	48.3	49.3	47.1	43.7	42.9	32.1

NIGHT TIME NOISE LEVELS 23:00 - 07:00 15 MINUTE SAMPLES			Octave Band Centre Frequency (Hz)									
Date / Time	LAeq	LAmx	31.5	63	125	250	500	1.0 k	2.0 k	4.0 k	8.0 k	16.0 k
23:00 - 23:15	50.1	63.8	53.1	50.9	47.1	45.8	43.7	46.8	44.0	35.3	27.9	15.8
23:15 - 23:30	52.7	68.9	61.8	58.2	51.3	50.9	47.3	48.7	45.9	38.9	32.5	20.0
23:30 - 23:45	56.9	78.6	57.8	57.3	56.6	53.4	50.9	50.2	49.3	48.8	50.3	44.0
23:45 - 00:00	47.3	61.7	51.5	48.1	42.5	42.0	41.6	44.0	40.8	33.3	26.3	14.9
00:00 - 00:15	64.4	83.7	63.2	57.0	57.3	61.7	60.6	58.7	58.3	54.2	44.4	26.9
00:15 - 00:30	46.2	62.1	49.4	46.2	42.4	41.3	40.1	42.7	39.8	32.6	26.0	15.0
00:30 - 00:45	47.3	63.1	50.7	49.8	45.1	46.5	43.9	43.5	39.2	32.2	25.6	14.9
00:45 - 01:00	45.2	59.2	49.8	45.6	40.6	38.8	39.7	42.0	38.5	31.8	25.5	14.7
01:00 - 01:15	44.9	57.9	50.5	46.2	40.5	38.1	39.3	41.6	38.3	31.5	25.2	14.7
01:15 - 01:30	49.4	65.0	50.3	49.5	43.2	41.0	42.6	46.5	43.2	34.7	26.9	15.2
01:30 - 01:45	46.4	61.8	50.9	48.4	41.2	40.2	40.5	43.2	39.8	33.2	26.7	15.1
01:45 - 02:00	46.5	69.0	50.7	49.0	41.2	39.9	41.1	42.9	40.2	33.6	27.6	15.4
02:00 - 02:15	55.1	66.2	51.6	47.4	40.7	40.3	43.1	47.5	50.0	48.9	45.0	33.0
02:15 - 02:30	47.6	66.2	49.5	46.3	39.8	38.4	39.4	42.8	42.1	38.0	35.0	23.8
02:30 - 02:45	46.6	65.2	47.1	45.2	38.6	38.0	39.4	43.0	40.5	35.4	32.2	21.2
02:45 - 03:00	44.8	52.0	47.1	45.6	39.0	37.2	38.9	40.8	38.4	33.7	31.0	20.1
03:00 - 03:15	52.5	72.2	57.6	58.4	54.2	50.5	49.5	46.0	45.8	42.4	33.7	20.1
03:15 - 03:30	60.8	78.8	63.6	58.8	57.3	64.6	59.1	52.6	52.0	47.2	37.0	21.1
03:30 - 03:45	44.0	51.9	49.2	44.4	40.1	37.9	38.4	40.5	37.4	31.9	26.6	16.1
03:45 - 04:00	47.9	69.4	56.1	51.7	44.5	43.0	43.0	44.5	40.8	35.2	29.7	16.5
04:00 - 04:15	45.8	62.4	48.9	45.8	40.7	38.5	40.8	42.7	38.7	32.0	28.5	15.7
04:15 - 04:30	47.6	62.4	48.9	48.1	41.5	40.6	42.4	44.0	40.4	34.7	36.4	17.1
04:30 - 04:45	50.5	68.1	53.5	52.1	46.2	46.3	45.9	46.8	43.0	38.7	31.7	16.5
04:45 - 05:00	53.4	75.9	54.5	51.9	45.5	44.3	45.7	47.7	44.0	41.2	50.3	27.0
05:00 - 05:15	48.8	62.8	49.5	49.8	42.5	41.5	43.7	46.1	41.0	34.4	32.2	16.2
05:15 - 05:30	53.8	66.3	52.2	52.3	45.8	44.1	45.5	49.0	47.9	45.3	41.4	28.4
05:30 - 05:45	56.9	76.8	56.8	56.0	55.8	54.1	50.7	52.2	51.1	45.8	41.0	28.1
05:45 - 06:00	53.1	63.1	56.3	55.5	52.0	48.1	47.0	49.8	46.3	40.2	34.7	21.4
06:00 - 06:15	54.1	64.8	61.6	58.7	50.3	49.2	48.6	50.9	47.1	40.8	35.4	22.1
06:15 - 06:30	62.1	82.3	58.4	56.7	54.8	58.7	57.4	57.1	56.3	51.8	42.2	25.4
06:30 - 06:45	60.7	81.0	63.6	63.2	54.2	54.8	55.0	56.3	55.1	48.8	41.2	29.0
06:45 - 07:00	58.9	75.2	63.1	62.2	58.1	54.4	52.6	54.8	52.7	47.1	45.1	36.3

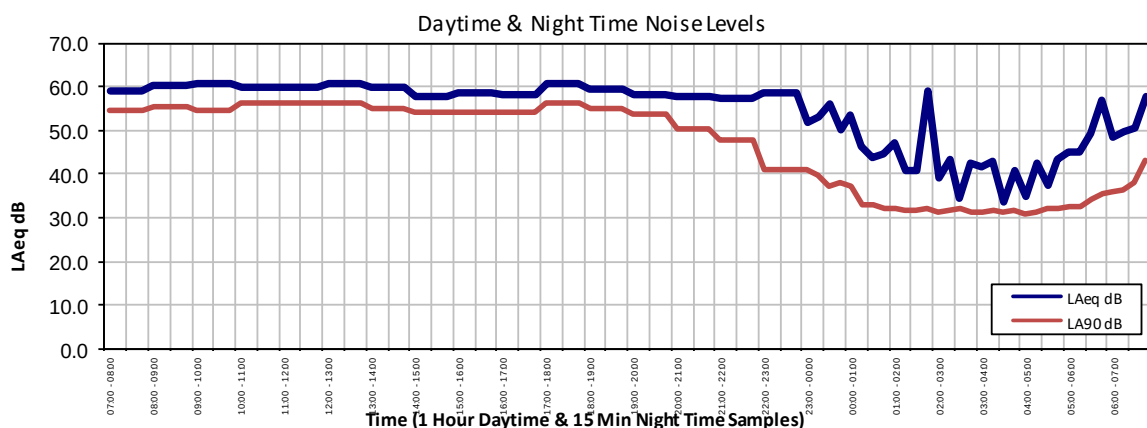


17.5 11th - 12th December 2020 Position 1 Background Noise Level

NOISE LEVEL SUMMARY ASSESSMENT			Octave Band Centre Frequency (Hz)									
Date / Time	LAeq	LA90	31.5	63	125	250	500	1.0k	2.0k	4.0k	8.0k	16.0k
DAYTIME 07:00 - 23:00 LA90 1 HOUR & Cor r esponding LAeq 1 HOUR	60.0	54.0	64.0	64.0	57.0	56.0	53.0	56.0	53.0	48.0	47.0	40.0
NIGHT TIME 23:00 - 07:00 LA90 15 MIN & Cor r esponding LAeq 15 MIN	43.0	32.0	45.0	44.0	39.0	34.0	34.0	40.0	38.0	32.0	18.0	11.0

DAYTIME NOISE LEVELS 07:00 - 23:00 1 HOUR SAMPLES												
Date / Time	LAeq	LA90	31.5	63	125	250	500	1.0 k	2.0 k	4.0 k	8.0 k	16.0 k
07:00 - 08:00	58.9	54.4	63.5	63.2	55.3	54.9	53.0	55.2	52.5	45.4	40.3	26.1
08:00 - 09:00	60.2	55.4	63.4	63.8	57.3	55.7	53.9	56.4	53.5	48.4	48.1	40.1
09:00 - 10:00	60.7	54.5	64.5	63.2	55.0	53.5	52.5	55.4	56.1	49.4	48.1	40.1
10:00 - 11:00	59.8	56.1	64.6	62.7	57.1	56.2	54.2	55.7	52.9	48.3	47.2	39.8
11:00 - 12:00	59.8	56.3	64.2	63.3	57.5	56.1	54.3	55.9	53.5	46.8	42.5	31.7
12:00 - 13:00	60.5	56.2	64.6	63.7	58.4	58.7	55.7	56.3	53.4	48.2	46.1	40.0
13:00 - 14:00	59.6	54.8	63.6	63.6	58.7	57.8	54.8	55.6	52.7	46.5	42.7	31.0
14:00 - 15:00	57.8	53.9	62.3	62.5	55.8	53.6	52.1	54.5	51.2	42.9	39.5	30.6
15:00 - 16:00	58.4	54.3	63.8	63.8	55.9	54.9	53.1	55.0	51.5	44.2	41.7	32.8
16:00 - 17:00	58.0	54.1	64.6	64.2	53.3	52.1	51.7	54.7	51.3	44.7	44.2	25.3
17:00 - 18:00	60.7	56.5	63.8	63.9	58.0	56.0	53.8	55.7	54.3	51.5	49.5	41.0
18:00 - 19:00	59.4	55.0	63.9	62.5	57.6	55.9	53.3	55.3	52.7	47.5	46.9	39.5
19:00 - 20:00	58.2	53.6	63.2	61.9	57.0	55.7	53.0	54.1	51.2	45.0	44.2	37.7
20:00 - 21:00	57.8	50.4	62.7	61.0	55.9	55.1	51.7	52.7	51.1	48.2	46.7	35.3
21:00 - 22:00	57.2	47.8	63.1	61.6	56.5	57.9	53.7	52.4	49.4	42.8	33.5	19.3
22:00 - 23:00	58.4	41.1	60.8	58.5	55.9	54.9	53.3	52.9	52.2	48.8	45.9	37.9

NIGHT TIME NOISE LEVELS 23:00 - 07:00 15 MINUTE SAMPLES												
Date / Time	LAeq	LA90	31.5	63	125	250	500	1.0 k	2.0 k	4.0 k	8.0 k	16.0 k
23:00 - 23:15	51.6	41.2	54.1	54.6	49.1	46.2	45.1	48.5	45.5	35.3	24.3	12.3
23:15 - 23:30	52.9	39.7	61.5	57.5	49.1	47.6	47.1	49.3	46.7	39.8	31.6	17.0
23:30 - 23:45	55.9	37.2	56.7	57.9	57.2	53.9	49.2	49.1	48.9	47.1	48.7	38.2
23:45 - 00:00	49.9	37.9	51.3	51.9	42.7	43.1	43.5	46.7	43.9	34.1	24.6	11.7
00:00 - 00:15	53.7	37.2	50.2	49.8	53.2	56.1	52.3	48.5	42.8	32.4	22.7	11.5
00:15 - 00:30	46.2	33.1	50.2	47.0	39.1	38.8	38.8	42.9	40.6	31.8	23.8	13.0
00:30 - 00:45	43.7	32.9	49.0	49.1	38.8	37.7	37.8	40.1	37.9	29.7	20.3	11.2
00:45 - 01:00	44.4	32.1	48.5	47.5	38.6	35.9	36.5	41.8	38.1	28.1	18.7	10.9
01:00 - 01:15	47.3	32.1	56.3	51.7	46.0	40.6	43.4	42.7	41.1	34.2	26.2	12.8
01:15 - 01:30	40.6	31.8	46.2	42.9	36.3	33.7	34.1	37.5	34.4	25.8	18.3	11.0
01:30 - 01:45	41.0	31.7	44.6	44.4	37.4	34.9	34.2	37.9	34.7	26.2	18.0	10.8
01:45 - 02:00	59.1	32.3	60.3	57.4	53.1	60.3	56.7	52.5	51.4	47.6	36.8	20.4
02:00 - 02:15	39.2	31.2	44.3	43.8	35.9	32.7	32.2	36.2	33.0	24.5	17.7	10.7
02:15 - 02:30	43.4	31.7	43.5	44.6	38.1	36.4	36.4	40.6	37.2	27.4	18.5	10.8
02:30 - 02:45	34.3	32.3	53.1	46.1	35.9	29.9	29.7	30.0	27.0	22.9	16.2	10.6
02:45 - 03:00	42.5	31.3	49.1	44.6	36.7	34.3	34.0	39.6	36.9	26.8	17.6	10.7
03:00 - 03:15	41.8	31.2	45.0	43.5	37.8	34.9	35.2	38.9	35.3	26.9	20.6	10.9
03:15 - 03:30	42.8	31.6	45.5	48.7	38.2	35.6	35.8	39.8	36.4	27.3	21.0	10.8
03:30 - 03:45	33.5	31.1	43.5	40.8	35.3	28.4	27.6	29.0	26.6	23.3	19.8	10.8
03:45 - 04:00	40.7	31.5	45.1	44.1	38.1	33.5	33.4	37.7	34.6	25.8	19.1	10.8
04:00 - 04:15	34.9	31.0	43.4	40.5	35.3	29.3	28.9	31.1	28.2	23.6	19.0	10.7
04:15 - 04:30	42.5	31.2	43.4	41.8	35.8	34.9	35.2	39.7	36.1	29.1	20.6	10.8
04:30 - 04:45	37.2	32.1	47.1	43.0	36.1	32.1	31.1	33.7	30.6	24.1	18.4	10.7
04:45 - 05:00	43.2	32.2	44.7	42.6	36.9	34.0	34.8	39.8	37.6	29.6	21.6	10.9
05:00 - 05:15	44.9	32.6	48.3	45.7	38.5	36.5	36.6	40.6	37.7	31.7	39.0	16.5
05:15 - 05:30	44.9	32.5	47.4	47.4	38.3	37.0	38.1	41.5	38.7	32.0	30.9	12.2
05:30 - 05:45	49.3	34.1	46.6	46.9	39.1	39.3	40.0	44.9	42.3	39.5	42.5	19.4
05:45 - 06:00	56.9	35.6	50.6	52.0	40.6	40.9	41.7	46.4	43.7	48.8	55.6	30.3
06:00 - 06:15	48.4	36.0	61.3	57.7	47.7	43.8	43.7	43.9	41.7	36.5	35.8	18.2
06:15 - 06:30	49.5	36.2	50.5	50.1	42.8	41.1	41.9	45.7	43.4	39.8	32.5	13.3
06:30 - 06:45	50.5	37.9	52.4	52.6	43.9	44.0	44.6	47.2	43.7	38.6	33.7	13.8
06:45 - 07:00	57.6	43.2	56.2	61.2	56.4	53.2	50.1	52.1	50.8	48.7	48.9	43.0

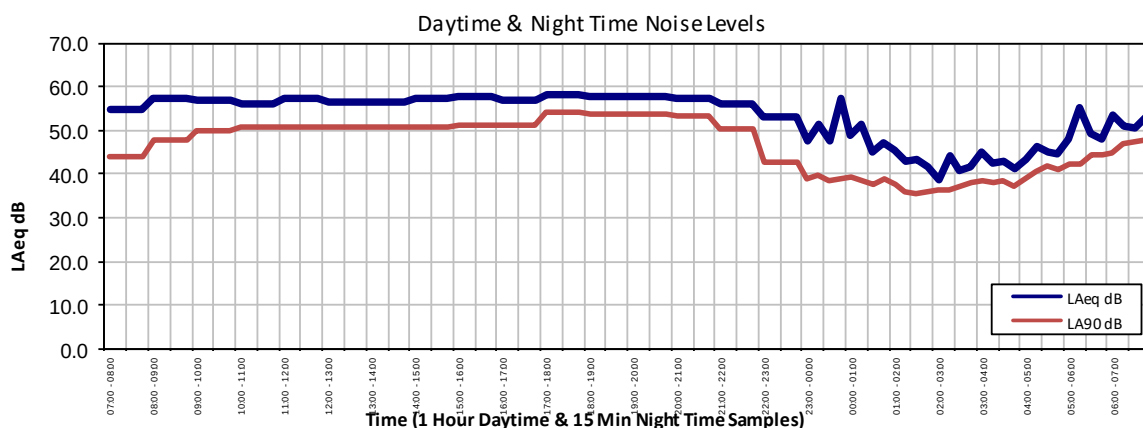


17.6 12th - 13th December 2020 Position 1 Background Noise Level

NOISE LEVEL SUMMARY ASSESSMENT											
Date / Time	LAeq	LA90	Octave Band Centre Frequency (Hz)								
			31.5	63	125	250	500	1.0k	2.0k	4.0k	8.0k 16.0k
DAYTIME 07:00 - 23:00 LA90 1 HOUR & Cor r esponding LAeq 1 HOUR	57.0	51.0	64.0	62.0	53.0	53.0	51.0	53.0	51.0	45.0	45.0 40.0
NIGHT TIME 23:00 - 07:00 LA90 15 MIN & Cor r esponding LAeq 15 MIN	47.0	39.0	49.0	47.0	42.0	42.0	43.0	45.0	35.0	23.0	14.0 10.0

DAYTIME NOISE LEVELS 07:00 - 23:00 1 HOUR SAMPLES											
Date / Time	LAeq	LA90	31.5	63	125	250	500	1.0 k	2.0 k	4.0 k	8.0 k 16.0 k
07:00 - 08:00	54.7	44.1	58.6	58.3	52.7	49.5	48.2	50.1	49.2	43.1	40.9 29.5
08:00 - 09:00	57.1	47.8	61.0	60.1	54.7	53.3	51.0	52.6	50.3	47.1	44.6 39.9
09:00 - 10:00	57.0	49.7	62.3	61.3	53.4	51.1	50.1	53.2	50.7	45.7	43.5 36.8
10:00 - 11:00	55.9	50.9	62.9	61.4	52.3	50.9	49.5	52.6	49.8	41.1	35.1 29.7
11:00 - 12:00	57.3	50.8	64.1	62.2	57.9	53.2	51.1	53.4	50.8	44.7	44.9 40.0
12:00 - 13:00	56.4	50.6	62.9	62.2	55.7	52.6	50.5	52.6	49.7	42.8	42.1 36.0
13:00 - 14:00	56.3	50.7	62.4	62.4	55.1	51.9	50.4	52.6	49.8	43.0	42.0 30.8
14:00 - 15:00	57.2	50.8	61.4	61.9	55.9	56.0	51.8	53.1	50.1	44.3	44.0 39.2
15:00 - 16:00	57.6	51.1	61.9	63.0	57.3	53.7	51.8	53.3	51.1	45.5	44.9 38.1
16:00 - 17:00	56.9	51.3	62.6	62.3	55.0	53.2	51.5	53.2	50.6	41.5	38.5 29.3
17:00 - 18:00	57.9	54.1	63.5	62.3	58.1	55.9	52.8	53.9	50.9	44.2	43.2 39.8
18:00 - 19:00	57.8	53.6	63.5	62.1	57.2	56.2	52.6	53.4	50.8	45.2	44.1 35.7
19:00 - 20:00	57.6	53.6	64.0	62.8	58.2	56.8	53.0	53.6	50.5	41.4	35.5 24.3
20:00 - 21:00	57.2	53.4	60.6	60.2	57.2	56.4	52.7	52.7	49.8	43.9	43.4 39.7
21:00 - 22:00	56.1	50.4	59.6	58.1	55.9	55.3	51.0	51.1	48.8	44.8	44.6 38.3
22:00 - 23:00	53.1	42.5	58.5	58.1	52.6	49.4	46.9	48.8	46.6	41.2	41.0 37.8

NIGHT TIME NOISE LEVELS 23:00 - 07:00 15 MINUTE SAMPLES											
Date / Time	LAeq	LA90	31.5	63	125	250	500	1.0 k	2.0 k	4.0 k	8.0 k 16.0 k
23:00 - 23:15	47.4	39.0	51.6	50.6	42.5	41.8	41.0	44.1	41.5	29.7	18.1 10.4
23:15 - 23:30	51.2	39.6	57.5	58.9	54.2	51.2	47.1	46.7	43.6	37.1	32.9 17.7
23:30 - 23:45	47.6	38.3	59.8	53.2	44.7	42.4	41.6	44.6	41.1	30.0	18.4 10.4
23:45 - 00:00	57.2	39.0	57.1	57.7	57.2	54.3	50.7	51.5	49.9	48.3	48.7 45.5
00:00 - 00:15	48.8	39.4	52.0	50.9	46.4	43.3	42.7	46.1	42.0	29.9	17.2 10.3
00:15 - 00:30	51.4	38.6	49.0	52.5	54.2	53.8	50.1	45.3	41.9	30.6	19.0 10.5
00:30 - 00:45	44.9	37.5	44.6	44.5	41.0	40.1	39.5	42.8	36.6	27.4	13.8 10.0
00:45 - 01:00	47.2	38.8	45.8	47.2	41.6	40.4	40.9	44.8	39.7	31.3	15.9 10.2
01:00 - 01:15	45.5	37.8	48.3	48.5	41.9	40.1	40.4	42.8	38.0	29.2	16.3 10.4
01:15 - 01:30	42.8	35.9	44.2	46.6	40.5	39.4	38.2	40.0	35.1	23.6	13.8 10.0
01:30 - 01:45	43.3	35.7	45.1	47.0	44.1	42.2	39.3	40.1	35.0	23.2	13.3 10.1
01:45 - 02:00	41.5	35.9	46.4	47.5	41.3	37.5	37.8	38.4	33.5	23.3	14.3 10.0
02:00 - 02:15	38.7	36.2	43.6	42.8	39.9	35.4	36.2	35.8	27.0	22.0	13.3 10.1
02:15 - 02:30	44.1	36.4	48.7	46.6	40.7	38.6	38.7	41.1	37.3	26.8	13.7 10.0
02:30 - 02:45	40.8	37.4	45.8	43.6	39.7	36.8	38.0	38.2	30.0	20.0	12.8 10.0
02:45 - 03:00	41.6	38.1	47.3	45.5	41.1	37.8	39.0	38.5	31.1	27.5	12.9 10.0
03:00 - 03:15	44.9	38.5	47.2	52.7	49.0	43.9	43.2	40.9	33.7	24.2	13.5 10.0
03:15 - 03:30	42.6	37.9	50.1	50.0	42.0	38.4	38.9	39.8	33.9	22.8	17.8 10.0
03:30 - 03:45	42.7	38.5	47.7	46.2	40.4	38.0	39.3	39.8	33.3	28.1	22.9 10.2
03:45 - 04:00	41.3	37.0	46.8	45.0	39.8	37.0	37.9	37.4	30.4	33.0	22.8 10.3
04:00 - 04:15	43.5	38.9	47.8	46.2	40.8	38.1	39.9	40.9	34.9	22.7	13.8 10.0
04:15 - 04:30	46.1	40.7	48.4	47.4	41.5	39.6	41.9	43.5	37.9	26.9	16.5 10.1
04:30 - 04:45	45.2	41.7	47.9	46.5	41.9	40.2	42.1	42.9	34.3	22.8	17.6 10.4
04:45 - 05:00	44.7	41.0	47.6	47.0	41.7	39.4	41.1	42.3	35.1	23.1	16.1 10.1
05:00 - 05:15	48.1	42.2	48.2	48.3	42.6	40.8	42.8	44.8	38.5	32.4	14.3 18.3
05:15 - 05:30	55.0	42.2	48.8	49.1	42.2	40.4	42.9	44.5	37.4	45.1	54.2 29.3
05:30 - 05:45	49.3	44.4	49.0	49.7	42.8	42.4	45.0	47.2	40.1	29.3	23.6 11.6
05:45 - 06:00	48.0	44.5	51.6	50.1	45.1	43.9	43.8	45.3	38.5	33.6	28.9 11.6
06:00 - 06:15	53.3	45.0	49.4	49.0	43.5	42.2	44.3	46.9	41.2	42.0	51.3 27.9
06:15 - 06:30	50.8	46.8	49.2	50.9	45.0	43.1	45.9	48.1	43.0	37.4	31.4 17.4
06:30 - 06:45	50.5	47.3	49.4	47.6	42.9	42.1	43.4	46.4	42.9	42.6	37.9 24.2
06:45 - 07:00	53.1	47.7	51.2	50.9	45.5	45.2	45.8	48.8	45.0	46.3	40.9 22.8

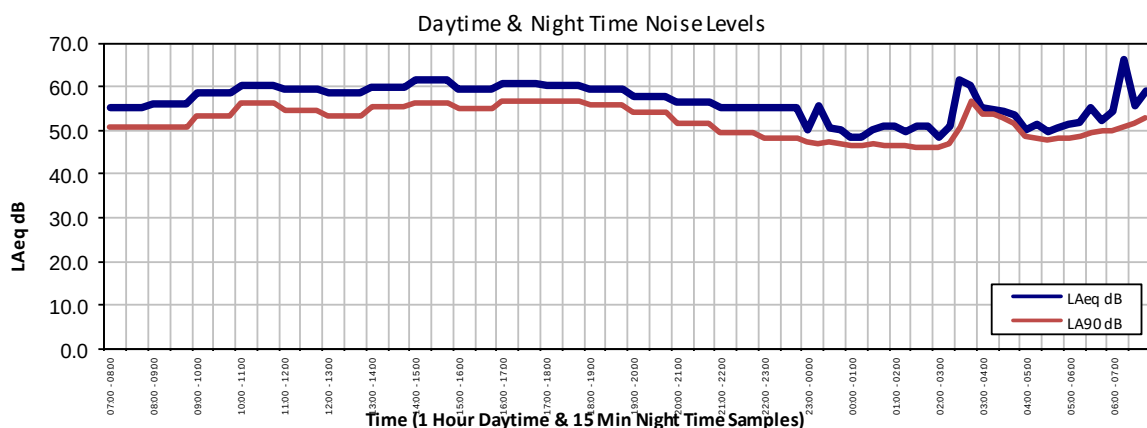


17.7 13th - 14th December 2020 Position 1 Background Noise Level

NOISE LEVEL SUMMARY ASSESSMENT											
Date / Time	Octave Band Centre Frequency (Hz)										
	LAeq	LA90	31.5	63	125	250	500	1.0k	2.0k	4.0k	8.0k 16.0k
DAYTIME 07:00 - 23:00 LA90 1 HOUR & Cor r esponding LAeq 1 HOUR	58.0	51.0	62.0	61.0	54.0	51.0	52.0	55.0	49.0	47.0	47.0 41.0
NIGHT TIME 23:00 - 07:00 LA90 15 MIN & Cor r esponding LAeq 15 MIN	50.0	47.0	53.0	49.0	46.0	44.0	43.0	46.0	45.0	40.0	35.0 22.0

DAYTIME NOISE LEVELS 07:00 - 23:00 1 HOUR SAMPLES											
Date / Time	LAeq	LA90	31.5	63	125	250	500	1.0 k	2.0 k	4.0 k	8.0 k 16.0 k
07:00 - 08:00	55.1	50.7	54.1	54.1	45.8	45.5	47.8	50.0	49.1	47.1	42.9 30.3
08:00 - 09:00	55.9	50.8	61.8	58.0	48.4	47.3	48.1	51.2	50.1	47.0	41.8 29.4
09:00 - 10:00	58.4	53.5	61.0	60.4	54.0	51.0	50.5	53.8	52.4	49.4	45.7 34.4
10:00 - 11:00	60.2	56.1	60.8	61.3	54.9	52.2	51.8	55.3	54.6	51.3	47.7 37.0
11:00 - 12:00	59.3	54.7	62.1	61.5	54.2	52.9	51.7	55.1	53.1	49.2	46.6 41.0
12:00 - 13:00	58.4	53.3	62.2	62.0	54.5	51.7	51.0	54.9	52.4	45.7	41.5 31.5
13:00 - 14:00	59.9	55.3	61.8	61.5	56.0	55.1	52.6	55.3	53.6	50.2	48.2 40.8
14:00 - 15:00	61.5	56.4	61.7	62.2	55.9	59.8	56.7	56.5	54.8	50.6	47.8 42.6
15:00 - 16:00	59.4	54.8	62.4	61.2	55.4	53.5	52.3	55.1	53.2	49.3	46.7 35.4
16:00 - 17:00	60.8	56.8	62.5	62.4	55.1	53.8	52.7	55.0	54.9	52.8	50.4 42.0
17:00 - 18:00	60.2	56.8	62.1	61.9	57.1	54.7	53.0	54.9	54.1	51.4	49.0 43.0
18:00 - 19:00	59.4	55.9	61.8	60.9	56.3	54.0	52.3	54.1	53.5	50.4	47.0 36.5
19:00 - 20:00	57.9	54.0	59.9	60.8	57.0	54.9	51.8	53.1	51.6	46.9	45.4 39.3
20:00 - 21:00	56.5	51.4	58.9	58.4	55.0	53.1	50.3	52.0	49.6	45.9	45.8 41.8
21:00 - 22:00	55.1	49.3	58.8	57.3	54.1	51.1	48.2	50.3	49.1	44.7	42.3 32.2
22:00 - 23:00	55.2	48.3	55.8	55.9	52.8	50.8	48.1	49.5	48.8	46.4	46.6 40.3

NIGHT TIME NOISE LEVELS 23:00 - 07:00 15 MINUTE SAMPLES											
Date / Time	LAeq	LA90	31.5	63	125	250	500	1.0 k	2.0 k	4.0 k	8.0 k 16.0 k
23:00 - 23:15	50.2	47.3	53.1	50.7	46.4	44.1	42.9	45.9	44.3	39.6	35.2 23.5
23:15 - 23:30	55.5	47.1	57.6	58.9	57.7	52.6	48.3	49.5	50.2	44.9	44.5 36.7
23:30 - 23:45	50.6	47.3	53.4	53.5	44.7	43.7	43.8	46.6	44.7	39.6	34.5 22.4
23:45 - 00:00	50.1	46.9	52.8	48.9	44.5	43.5	43.0	46.1	44.3	39.3	34.4 22.2
00:00 - 00:15	48.4	46.4	51.8	48.6	42.6	40.9	41.1	44.3	42.7	37.3	32.4 20.9
00:15 - 00:30	48.4	46.7	51.3	48.8	43.1	41.9	41.9	44.2	42.5	37.5	32.8 21.3
00:30 - 00:45	50.0	46.8	55.1	50.8	46.0	44.5	43.9	45.8	43.9	38.6	34.1 21.9
00:45 - 01:00	51.0	46.6	53.4	54.5	46.7	45.2	45.4	46.9	44.6	39.3	35.0 22.5
01:00 - 01:15	51.0	46.4	56.5	50.2	45.3	43.8	43.3	45.6	45.2	43.4	35.7 23.1
01:15 - 01:30	49.5	46.5	52.9	48.5	44.8	42.9	43.2	44.7	43.4	40.0	36.8 24.0
01:30 - 01:45	51.1	46.1	58.6	51.4	47.8	45.6	44.6	45.8	44.8	42.5	39.3 26.3
01:45 - 02:00	51.0	46.2	59.4	52.3	48.4	46.6	45.1	45.9	44.5	41.7	38.4 25.5
02:00 - 02:15	48.6	45.9	53.1	48.3	44.7	42.9	42.8	44.2	42.3	38.3	34.4 22.0
02:15 - 02:30	51.0	46.8	56.3	50.0	46.2	44.1	43.8	45.5	45.0	43.0	39.3 26.6
02:30 - 02:45	61.6	50.6	53.6	48.6	45.7	45.3	48.0	52.7	56.2	55.9	53.3 41.8
02:45 - 03:00	60.1	56.6	59.1	54.6	49.2	47.6	48.5	52.0	54.6	53.9	51.3 39.7
03:00 - 03:15	55.3	53.5	49.6	45.6	42.8	40.7	45.5	49.4	50.2	47.4	44.5 32.8
03:15 - 03:30	54.7	53.5	47.6	45.5	39.8	39.7	45.6	49.9	49.6	45.4	41.3 29.7
03:30 - 03:45	54.2	52.8	51.0	47.6	41.7	40.9	45.7	49.6	49.1	44.1	39.2 27.3
03:45 - 04:00	53.3	51.4	53.6	48.1	42.9	41.2	44.9	48.7	48.1	43.2	41.2 27.0
04:00 - 04:15	50.3	48.8	53.8	47.7	41.0	39.7	42.4	45.8	44.9	39.8	38.0 24.1
04:15 - 04:30	51.3	48.2	53.1	51.0	44.3	43.1	44.4	47.4	45.5	40.1	35.0 23.1
04:30 - 04:45	49.7	47.8	52.6	48.4	41.9	40.8	42.7	45.9	43.9	38.2	33.3 21.6
04:45 - 05:00	50.5	48.0	54.0	53.5	45.7	42.5	44.0	46.6	44.5	38.9	35.0 21.7
05:00 - 05:15	51.3	48.2	54.2	51.8	45.4	44.0	45.1	47.6	44.9	39.5	36.0 21.8
05:15 - 05:30	52.0	48.5	57.2	52.0	46.2	46.3	46.2	48.0	45.7	41.0	36.5 21.2
05:30 - 05:45	55.1	49.5	60.7	63.8	54.3	48.7	49.2	50.9	48.7	45.0	38.2 23.3
05:45 - 06:00	52.4	49.9	55.9	54.3	46.6	45.6	46.0	49.1	45.8	40.6	36.2 21.0
06:00 - 06:15	54.4	49.9	64.0	60.5	50.5	48.5	47.9	50.2	47.1	42.7	46.3 25.1
06:15 - 06:30	66.0	50.8	61.4	59.6	55.9	60.7	60.3	60.9	60.4	56.7	47.6 29.2
06:30 - 06:45	55.7	51.5	57.6	57.3	51.4	49.6	49.6	52.5	49.0	42.7	37.8 23.6
06:45 - 07:00	58.9	53.0	62.7	63.0	57.2	55.0	52.4	55.1	52.2	47.0	44.0 34.5

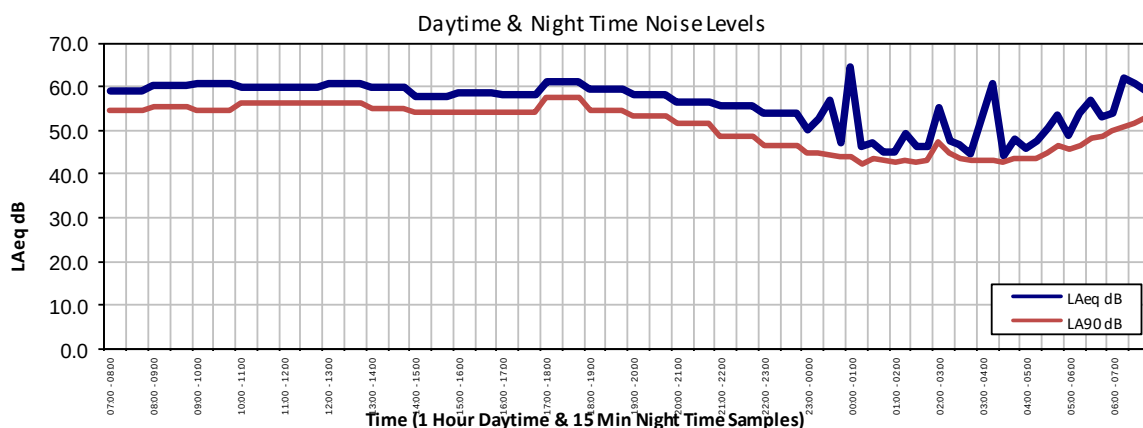


17.8 14th - 15th December 2020 Position 1 Background Noise Level

NOISE LEVEL SUMMARY ASSESSMENT											
Date / Time	Octave Band Centre Frequency (Hz)										
	LAeq	LA90	31.5	63	125	250	500	1.0k	2.0k	4.0k	8.0k 16.0k
DAYTIME 07:00 - 23:00 LA90 1 HOUR & Corresponding LAeq 1 HOUR	60.0	54.0	64.0	64.0	57.0	55.0	54.0	56.0	53.0	45.0	48.0 40.0
NIGHT TIME 23:00 - 07:00 LA90 15 MIN & Corresponding LAeq 15 MIN	47.0	43.0	49.0	46.0	41.0	38.0	39.0	43.0	41.0	35.0	26.0 15.0

DAYTIME NOISE LEVELS 07:00 - 23:00 1 HOUR SAMPLES											
Date / Time	LAeq	LA90	31.5	63	125	250	500	1.0 k	2.0 k	4.0 k	8.0 k 16.0 k
07:00 - 08:00	58.9	54.4	63.5	63.2	55.3	54.9	53.0	55.2	52.5	45.4	40.3 26.1
08:00 - 09:00	60.2	55.4	63.4	63.8	57.3	55.7	53.9	56.4	53.5	48.4	48.1 40.1
09:00 - 10:00	60.7	54.5	64.5	63.2	55.0	53.5	52.5	55.4	56.1	49.4	48.1 40.1
10:00 - 11:00	59.8	56.1	64.6	62.7	57.1	56.2	54.2	55.7	52.9	48.3	47.2 39.8
11:00 - 12:00	59.8	56.3	64.2	63.3	57.5	56.1	54.3	55.9	53.5	46.8	42.5 31.7
12:00 - 13:00	60.5	56.2	64.6	63.7	58.4	58.7	55.7	56.3	53.4	48.2	46.1 40.0
13:00 - 14:00	59.6	54.8	63.6	63.6	58.7	57.8	54.8	55.6	52.7	46.5	42.7 31.0
14:00 - 15:00	57.8	53.9	62.3	62.5	55.8	53.6	52.1	54.5	51.2	42.9	39.5 30.6
15:00 - 16:00	58.4	54.3	63.8	63.8	55.9	54.9	53.1	55.0	51.5	44.2	41.7 32.8
16:00 - 17:00	58.0	54.1	64.6	64.2	53.3	52.1	51.7	54.7	51.3	44.7	44.2 25.3
17:00 - 18:00	61.0	57.5	64.7	64.2	57.4	55.7	54.2	56.4	54.7	51.3	48.4 40.5
18:00 - 19:00	59.5	54.5	63.4	62.3	56.8	55.3	52.9	55.6	52.8	47.7	47.0 42.3
19:00 - 20:00	58.1	53.3	61.1	60.6	55.2	55.0	52.0	54.1	51.1	46.3	45.9 39.3
20:00 - 21:00	56.6	51.5	60.6	59.9	55.7	54.7	50.9	52.5	49.3	44.7	44.4 37.4
21:00 - 22:00	55.8	48.8	60.0	59.1	53.5	51.9	49.0	51.7	48.6	44.9	45.6 42.0
22:00 - 23:00	53.9	46.5	58.0	57.5	53.6	49.9	48.3	49.3	47.1	43.7	42.9 32.1

NIGHT TIME NOISE LEVELS 23:00 - 07:00 15 MINUTE SAMPLES											
Date / Time	LAeq	LA90	31.5	63	125	250	500	1.0 k	2.0 k	4.0 k	8.0 k 16.0 k
23:00 - 23:15	50.1	44.9	53.1	50.9	47.1	45.8	43.7	46.8	44.0	35.3	27.9 15.8
23:15 - 23:30	52.7	45.0	61.8	58.2	51.3	50.9	47.3	48.7	45.9	38.9	32.5 20.0
23:30 - 23:45	56.9	44.4	57.8	57.3	56.6	53.4	50.9	50.2	49.3	48.8	50.3 44.0
23:45 - 00:00	47.3	44.1	51.5	48.1	42.5	42.0	41.6	44.0	40.8	33.3	26.3 14.9
00:00 - 00:15	64.4	44.1	63.2	57.0	57.3	61.7	60.6	58.7	58.3	54.2	44.4 26.9
00:15 - 00:30	46.2	42.1	49.4	46.2	42.4	41.3	40.1	42.7	39.8	32.6	26.0 15.0
00:30 - 00:45	47.3	43.6	50.7	49.8	45.1	46.5	43.9	43.5	39.2	32.2	25.6 14.9
00:45 - 01:00	45.2	43.1	49.8	45.6	40.6	38.8	39.7	42.0	38.5	31.8	25.5 14.7
01:00 - 01:15	44.9	42.9	50.5	46.2	40.5	38.1	39.3	41.6	38.3	31.5	25.2 14.7
01:15 - 01:30	49.4	43.1	50.3	49.5	43.2	41.0	42.6	46.5	43.2	34.7	26.9 15.2
01:30 - 01:45	46.4	42.6	50.9	48.4	41.2	40.2	40.5	43.2	39.8	33.2	26.7 15.1
01:45 - 02:00	46.5	43.1	50.7	49.0	41.2	39.9	41.1	42.9	40.2	33.6	27.6 15.4
02:00 - 02:15	55.1	47.3	51.6	47.4	40.7	40.3	43.1	47.5	50.0	48.9	45.0 33.0
02:15 - 02:30	47.6	44.8	49.5	46.3	39.8	38.4	39.4	42.8	42.1	38.0	35.0 23.8
02:30 - 02:45	46.6	43.5	47.1	45.2	38.6	38.0	39.4	43.0	40.5	35.4	32.2 21.2
02:45 - 03:00	44.8	43.3	47.1	45.6	39.0	37.2	38.9	40.8	38.4	33.7	31.0 20.1
03:00 - 03:15	52.5	43.0	57.6	58.4	54.2	50.5	49.5	46.0	45.8	42.4	33.7 20.1
03:15 - 03:30	60.8	43.0	63.6	58.8	57.3	64.6	59.1	52.6	52.0	47.2	37.0 21.1
03:30 - 03:45	44.0	42.6	49.2	44.4	40.1	37.9	38.4	40.5	37.4	31.9	26.6 16.1
03:45 - 04:00	47.9	43.7	56.1	51.7	44.5	43.0	43.0	44.5	40.8	35.2	29.7 16.5
04:00 - 04:15	45.8	43.4	48.9	45.8	40.7	38.5	40.8	42.7	38.7	32.0	28.5 15.7
04:15 - 04:30	47.6	43.6	48.9	48.1	41.5	40.6	42.4	44.0	40.4	34.7	36.4 17.1
04:30 - 04:45	50.5	45.0	53.5	52.1	46.2	46.3	45.9	46.8	43.0	38.7	31.7 16.5
04:45 - 05:00	53.4	46.3	54.5	51.9	45.5	44.3	45.7	47.7	44.0	41.2	50.3 27.0
05:00 - 05:15	48.8	45.7	49.5	49.8	42.5	41.5	43.7	46.1	41.0	34.4	32.2 16.2
05:15 - 05:30	53.8	46.6	52.2	52.3	45.8	44.1	45.5	49.0	47.9	45.3	41.4 28.4
05:30 - 05:45	56.9	48.3	56.8	56.0	55.8	54.1	50.7	52.2	51.1	45.8	41.0 28.1
05:45 - 06:00	53.1	48.8	56.3	55.5	52.0	48.1	47.0	49.8	46.3	40.2	34.7 21.4
06:00 - 06:15	54.1	49.8	61.6	58.7	50.3	49.2	48.6	50.9	47.1	40.8	35.4 22.1
06:15 - 06:30	62.1	50.8	58.4	56.7	54.8	58.7	57.4	57.1	56.3	51.8	42.2 25.4
06:30 - 06:45	60.7	51.6	63.6	63.2	54.2	54.8	55.0	56.3	55.1	48.8	41.2 29.0
06:45 - 07:00	58.9	52.7	63.1	62.2	58.1	54.4	52.6	54.8	52.7	47.1	45.1 36.3

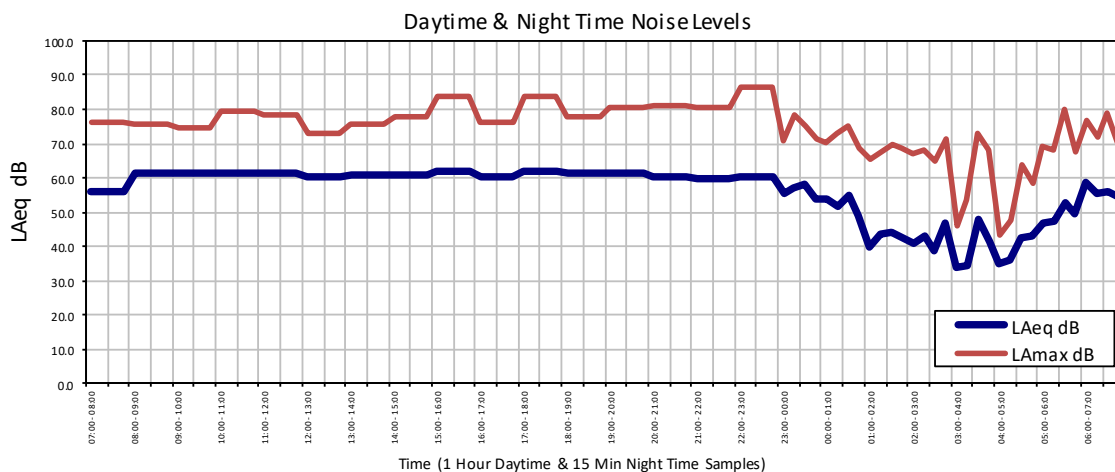


17.9 8th – 9th June 2021 Position 2

NOISE LEVEL SUMMARY ASSESSMENT			Octave Band Centre Frequency (Hz)									
Date / Time	L _{Aeq}	L _{Amax}	31.5	63	125	250	500	1.0k	2.0k	4.0k	8.0k	16.0k
DAYTIME 07:00 - 23:00 L_{Aeq} 16 HOUR & Corresponding L_{Amax} 16 HOUR	60.7	86.4	65.7	67.2	63.2	59.5	54.2	57.4	52.9	45.3	44.1	23.5
NIGHT TIME 23:00 - 07:00 L_{Aeq} 8 HOUR & Corresponding L_{Amax} 8 HOUR	51.8	79.9	57.5	60.9	54.1	50.6	45.8	48.2	44.1	37.4	35.1	11.5

DAYTIME NOISE LEVELS 07:00 - 23:00 1 HOUR SAMPLES			Octave Band Centre Frequency (Hz)									
Date / Time	L _{Aeq}	L _{Amax}	31.5	63	125	250	500	1.0 k	2.0 k	4.0 k	8.0 k	16.0 k
07:00 - 08:00	55.8	76.5	56.9	61.5	58.3	55.8	50.0	52.3	47.8	39.4	34.9	8.0
08:00 - 09:00	61.2	75.8	65.0	68.7	62.5	58.1	54.0	58.2	53.9	45.4	41.4	17.0
09:00 - 10:00	61.5	74.5	66.2	68.6	62.9	58.7	54.6	58.3	53.7	45.4	46.8	26.0
10:00 - 11:00	61.5	79.4	66.5	68.3	62.3	58.5	54.5	58.4	53.7	45.2	45.1	24.6
11:00 - 12:00	61.2	78.6	65.3	67.9	63.0	58.8	54.5	58.2	53.5	44.5	41.7	20.4
12:00 - 13:00	60.4	72.8	66.4	67.4	61.5	57.2	53.3	57.3	52.7	43.8	44.3	22.0
13:00 - 14:00	60.8	75.7	65.4	67.6	61.7	58.6	54.0	57.6	52.8	44.8	45.5	27.7
14:00 - 15:00	60.7	77.8	65.7	68.0	62.3	58.6	54.4	57.6	52.9	44.1	42.0	19.0
15:00 - 16:00	61.7	84.0	66.5	66.8	61.8	57.9	54.3	58.2	55.1	46.5	43.0	20.1
16:00 - 17:00	60.2	76.0	67.3	67.2	62.0	58.4	54.2	56.9	52.0	45.5	43.3	21.1
17:00 - 18:00	61.9	83.9	67.5	68.1	66.6	62.6	56.3	58.0	53.0	45.7	44.6	24.0
18:00 - 19:00	61.5	77.8	66.2	67.0	64.2	60.6	55.6	58.0	53.0	46.9	45.3	20.8
19:00 - 20:00	61.4	80.5	65.9	67.3	64.9	60.7	55.2	57.8	52.9	45.8	44.8	25.8
20:00 - 21:00	60.5	80.8	66.3	66.2	62.9	59.8	54.2	57.0	52.2	44.0	44.4	24.8
21:00 - 22:00	59.5	80.4	64.0	64.9	63.9	58.7	52.5	55.8	51.3	43.7	44.4	26.4
22:00 - 23:00	60.3	86.4	64.0	65.8	65.0	63.2	52.7	55.4	52.1	48.1	44.5	22.1

NIGHT TIME NOISE LEVELS 23:00 - 07:00 15 MINUTE SAMPLES			Octave Band Centre Frequency (Hz)									
Date / Time	L _{Aeq}	L _{Amax}	31.5	63	125	250	500	1.0 k	2.0 k	4.0 k	8.0 k	16.0 k
23:00 - 23:15	55.5	70.9	64.0	63.8	58.2	54.0	47.5	52.1	47.7	38.6	40.1	11.0
23:15 - 23:30	57.3	78.3	56.1	61.5	56.3	53.9	50.7	54.3	50.0	41.4	39.5	16.8
23:30 - 23:45	58.3	75.1	63.5	64.6	63.4	58.7	54.0	53.3	49.6	43.2	42.4	18.4
23:45 - 00:00	53.6	71.3	53.4	55.7	49.1	48.3	45.7	51.3	46.5	35.6	28.7	9.1
00:00 - 00:15	53.8	70.4	63.4	63.0	58.1	53.4	46.7	50.1	45.6	38.3	37.1	13.0
00:15 - 00:30	51.6	72.9	52.2	55.5	49.6	46.8	43.5	49.0	44.6	33.0	25.2	8.4
00:30 - 00:45	54.9	74.9	64.7	66.0	59.8	53.0	46.8	50.5	46.9	40.2	39.9	17.5
00:45 - 01:00	49.0	68.5	57.7	56.4	46.0	44.3	41.0	46.6	41.7	31.1	24.0	8.3
01:00 - 01:15	39.7	65.6	43.3	45.2	39.8	35.1	32.7	37.5	31.1	20.4	15.1	8.1
01:15 - 01:30	43.4	67.7	47.0	49.7	41.1	38.8	36.1	40.6	36.2	27.8	22.5	8.3
01:30 - 01:45	44.3	69.7	45.7	43.6	40.2	39.5	37.0	42.5	36.0	24.2	17.2	8.2
01:45 - 02:00	42.7	68.5	44.4	44.9	40.2	37.2	34.8	40.2	35.7	24.4	16.5	8.1
02:00 - 02:15	41.0	67.1	42.4	43.0	37.0	34.1	33.2	38.6	33.8	23.7	16.4	8.1
02:15 - 02:30	43.1	68.1	46.1	44.9	39.5	38.4	35.0	40.8	35.5	24.9	18.8	8.1
02:30 - 02:45	38.8	65.0	47.6	44.9	40.3	34.5	31.7	35.6	31.9	23.6	17.2	8.1
02:45 - 03:00	47.0	71.3	43.5	46.8	44.9	44.0	40.2	44.4	39.8	28.1	21.3	8.2
03:00 - 03:15	34.0	45.8	42.3	41.8	38.2	32.6	31.3	31.2	19.9	12.3	12.3	8.1
03:15 - 03:30	34.6	53.8	43.3	43.1	38.7	33.7	31.8	31.7	20.9	13.8	12.4	8.1
03:30 - 03:45	48.1	72.8	46.8	57.9	46.1	44.0	43.0	44.6	40.4	35.5	27.6	8.5
03:45 - 04:00	41.5	68.2	45.0	44.9	40.4	37.0	34.4	38.7	34.7	24.6	16.3	8.1
04:00 - 04:15	34.7	43.2	45.0	44.1	38.9	34.1	32.1	31.5	20.4	14.2	12.3	8.1
04:15 - 04:30	36.2	47.6	45.6	45.3	40.0	34.4	33.2	32.6	26.8	16.6	13.1	8.1
04:30 - 04:45	42.6	63.9	47.2	46.4	41.2	36.2	34.2	36.6	38.3	31.3	23.8	8.1
04:45 - 05:00	43.3	58.6	46.3	45.8	40.6	33.5	31.8	30.9	40.0	34.2	28.1	8.2
05:00 - 05:15	47.0	69.4	47.6	48.9	42.8	39.6	41.5	41.8	40.8	36.5	33.6	8.2
05:15 - 05:30	47.3	68.0	46.1	49.6	42.0	41.1	38.4	41.7	36.4	38.7	40.4	8.7
05:30 - 05:45	52.9	79.9	51.1	52.5	49.8	48.6	46.3	50.0	45.5	39.0	34.4	12.6
05:45 - 06:00	49.4	67.8	46.9	48.7	47.4	46.5	40.8	45.0	41.2	41.0	35.8	8.7
06:00 - 06:15	58.6	76.9	63.7	72.6	58.1	60.2	54.3	53.8	49.9	44.3	39.5	12.8
06:15 - 06:30	55.3	72.1	56.8	57.4	58.9	53.6	48.6	52.0	47.7	41.8	37.2	11.3
06:30 - 06:45	55.9	78.9	57.1	64.3	58.1	52.9	49.5	52.7	48.4	40.6	36.6	11.4
06:45 - 07:00	54.3	69.6	64.1	64.6	57.7	52.2	47.1	50.0	46.3	41.5	40.5	14.6

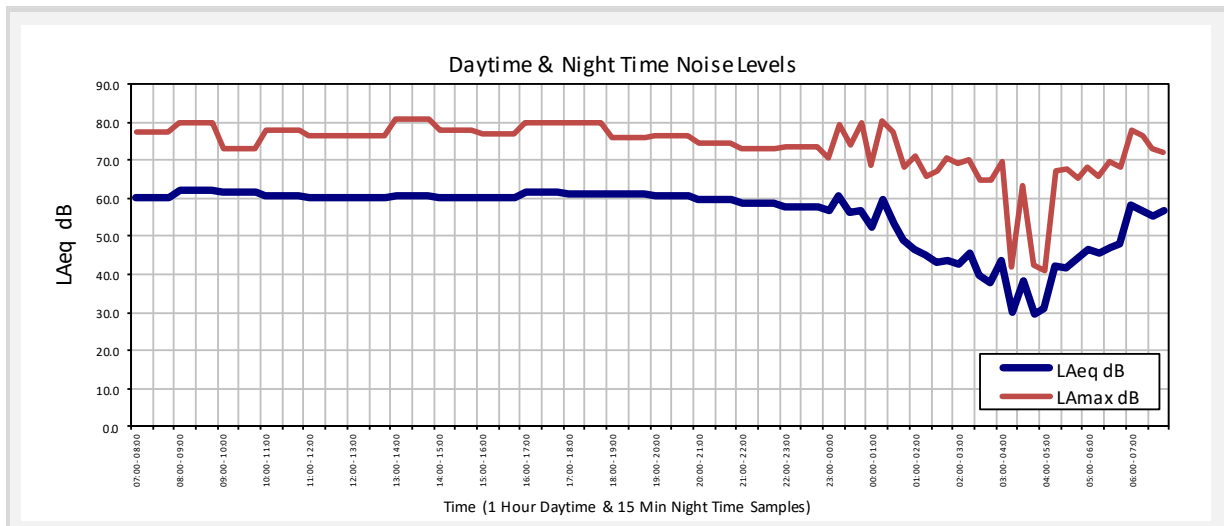


17.10 9th – 10th June 2021 Position 2

NOISE LEVEL SUMMARY ASSESSMENT			Octave Band Centre Frequency (Hz)									
Date / Time	L _{Aeq}	L _{Amax}	31.5	63	125	250	500	1.0k	2.0k	4.0k	8.0k	16.0k
DAYTIME 07:00 - 23:00 L_{Aeq} 16 HOUR & Cor r esponding L_{Amax} 16 HOUR	60.3	81.0	66.1	66.7	62.6	58.6	54.1	57.2	52.5	44.9	44.1	22.6
NIGHT TIME 23:00 - 07:00 L_{Aeq} 8 HOUR & Cor r esponding L_{Amax} 8 HOUR	52.7	80.1	58.9	58.4	55.0	52.2	47.3	48.7	44.6	39.6	40.1	18.4

DAYTIME NOISE LEVELS 07:00 - 23:00 1 HOUR SAMPLES			Octave Band Centre Frequency (Hz)									
Date / Time	L _{Aeq}	L _{Amax}	31.5	63	125	250	500	1.0 k	2.0 k	4.0 k	8.0 k	16.0 k
07:00 - 08:00	60.0	77.2	62.4	65.4	63.1	57.9	53.0	56.5	52.4	45.1	43.0	19.8
08:00 - 09:00	62.0	79.8	65.8	66.5	63.4	60.8	55.5	58.6	54.3	46.3	45.1	23.7
09:00 - 10:00	61.7	73.0	65.2	67.9	62.3	58.0	54.6	58.8	54.4	45.1	41.3	18.3
10:00 - 11:00	60.8	77.6	64.8	66.6	61.4	58.8	53.9	57.4	53.1	45.6	46.2	23.4
11:00 - 12:00	60.2	76.3	65.8	66.3	61.7	58.1	53.8	56.9	52.2	45.0	45.7	24.2
12:00 - 13:00	60.3	76.2	67.3	67.4	62.7	58.9	54.8	56.7	51.7	43.8	45.8	16.7
13:00 - 14:00	60.4	81.0	63.4	68.1	65.6	60.0	54.7	56.6	51.5	44.4	43.7	26.4
14:00 - 15:00	60.3	77.7	67.8	67.2	63.4	58.9	54.2	56.7	52.1	45.6	44.2	22.7
15:00 - 16:00	60.2	76.7	65.8	67.4	63.5	58.5	54.1	56.8	51.9	44.8	42.0	20.9
16:00 - 17:00	61.6	80.0	67.5	67.6	61.8	58.8	56.1	58.4	53.3	47.1	43.6	19.6
17:00 - 18:00	61.0	79.6	68.0	66.6	63.1	60.6	55.3	57.6	52.6	45.2	44.6	23.2
18:00 - 19:00	60.9	76.0	67.9	67.8	62.2	58.6	54.3	57.9	53.0	44.5	41.3	21.2
19:00 - 20:00	60.5	76.4	66.6	66.5	62.1	58.2	53.9	57.6	52.7	43.6	41.5	21.4
20:00 - 21:00	59.5	74.6	64.4	66.1	61.2	56.5	51.9	56.3	51.7	43.5	45.0	23.3
21:00 - 22:00	58.6	73.0	67.1	64.2	59.7	55.9	51.3	55.4	50.8	43.1	45.1	24.8
22:00 - 23:00	57.8	73.6	62.7	64.3	61.4	55.3	50.1	54.3	50.0	42.2	43.5	21.9

NIGHT TIME NOISE LEVELS 23:00 - 07:00 15 MINUTE SAMPLES			Octave Band Centre Frequency (Hz)									
Date / Time	L _{Aeq}	L _{Amax}	31.5	63	125	250	500	1.0 k	2.0 k	4.0 k	8.0 k	16.0 k
23:00 - 23:15	56.6	70.3	62.5	65.4	60.6	55.1	49.6	52.9	48.8	40.5	37.6	13.3
23:15 - 23:30	60.8	79.5	57.1	58.2	60.1	59.8	56.7	56.0	53.0	49.4	44.9	15.2
23:30 - 23:45	56.3	73.7	68.4	64.8	59.9	53.7	47.6	50.3	46.6	44.2	49.0	28.5
23:45 - 00:00	56.8	79.9	54.7	58.0	52.8	51.0	51.3	54.4	48.5	41.2	34.9	10.4
00:00 - 00:15	52.2	68.8	65.7	63.5	55.0	50.2	45.1	48.9	44.3	35.3	33.6	10.3
00:15 - 00:30	59.5	80.1	67.7	64.4	61.8	57.1	53.2	54.7	49.8	47.2	51.1	30.7
00:30 - 00:45	53.3	77.1	49.5	56.6	61.4	49.2	46.2	49.3	44.9	35.6	29.9	9.4
00:45 - 01:00	49.1	68.2	48.4	59.8	51.4	46.1	42.0	46.2	41.5	30.6	22.9	8.7
01:00 - 01:15	46.4	70.9	46.5	50.3	45.8	44.3	40.2	43.5	39.0	28.8	21.4	8.3
01:15 - 01:30	45.2	65.7	47.3	52.7	44.1	40.0	37.4	42.7	38.0	27.3	21.2	8.3
01:30 - 01:45	42.9	66.9	46.1	43.1	39.4	38.1	35.0	40.5	35.5	24.2	18.3	8.4
01:45 - 02:00	43.7	70.5	45.9	42.1	38.1	37.6	34.3	41.1	37.3	25.8	18.8	8.2
02:00 - 02:15	42.5	69.0	43.1	40.8	37.2	36.9	35.0	39.4	36.5	25.6	17.9	8.2
02:15 - 02:30	45.4	69.9	45.7	46.1	41.8	41.1	38.5	42.6	38.1	30.2	25.8	8.7
02:30 - 02:45	39.6	64.5	44.2	44.4	38.1	38.8	33.3	37.3	30.8	19.9	15.6	8.2
02:45 - 03:00	37.7	64.9	41.3	41.0	35.9	32.7	29.8	34.7	31.0	21.6	15.7	8.2
03:00 - 03:15	43.7	69.4	45.3	43.1	41.2	39.0	36.5	41.3	36.2	26.3	20.8	8.3
03:15 - 03:30	30.2	41.7	40.2	37.4	34.2	29.9	26.6	26.9	18.8	13.9	13.2	8.2
03:30 - 03:45	38.4	63.1	41.9	45.2	41.2	33.8	32.1	36.0	29.6	20.7	16.6	8.2
03:45 - 04:00	29.3	42.6	41.3	40.1	34.0	29.4	25.9	25.7	17.7	13.7	14.0	8.2
04:00 - 04:15	31.1	40.8	43.8	40.0	34.7	30.4	28.2	27.9	17.9	13.7	13.4	8.2
04:15 - 04:30	42.3	67.3	44.4	46.6	40.7	37.3	35.4	39.6	35.1	24.6	18.2	8.2
04:30 - 04:45	41.5	67.8	43.8	41.7	37.5	38.3	34.4	38.7	34.6	24.9	18.4	8.2
04:45 - 05:00	44.3	65.2	47.5	46.1	39.0	36.7	34.4	37.6	40.2	34.5	26.3	8.6
05:00 - 05:15	46.3	68.0	50.6	47.9	42.0	39.7	38.4	43.2	39.9	32.0	28.1	8.3
05:15 - 05:30	45.3	65.5	49.0	49.9	42.5	40.4	37.1	41.3	37.6	35.5	32.3	8.4
05:30 - 05:45	47.1	69.8	48.4	49.6	43.9	41.6	40.2	43.7	39.8	35.7	30.1	8.7
05:45 - 06:00	48.1	68.0	49.3	50.4	43.9	42.5	41.0	45.1	41.1	35.0	29.9	8.5
06:00 - 06:15	58.0	77.7	58.0	58.1	57.4	62.7	55.3	52.1	46.7	42.2	37.4	10.6
06:15 - 06:30	56.7	76.2	58.5	61.0	61.7	56.8	50.4	52.6	48.7	42.7	39.6	13.6
06:30 - 06:45	55.4	73.2	56.5	65.2	57.9	51.7	47.8	51.9	47.8	43.2	39.2	12.1
06:45 - 07:00	56.8	72.2	64.6	63.0	58.1	54.9	48.5	52.6	49.0	42.4	46.8	18.8

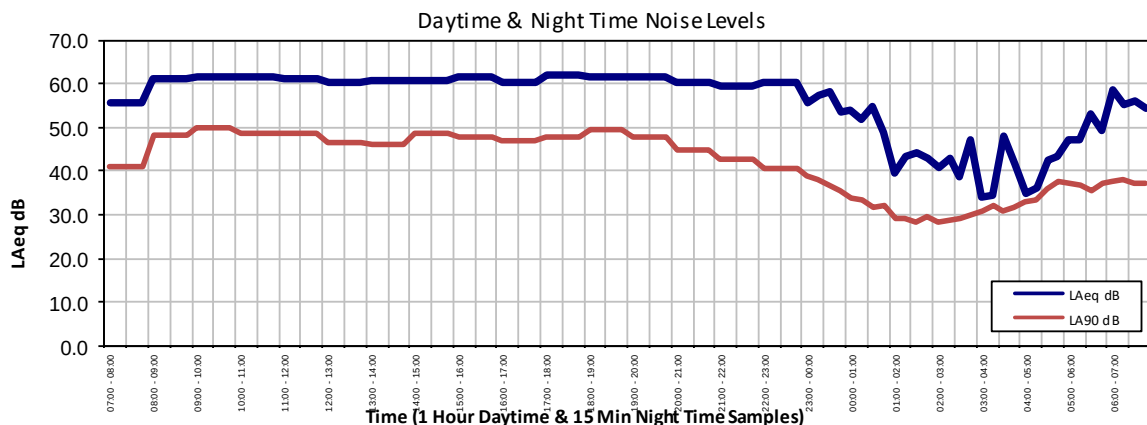


17.11 8th – 9th June 2021 Position 2 Background Noise Level

NOISE LEVEL SUMMARY ASSESSMENT												
Date / Time	Octave Band Centre Frequency (Hz)											
	LAeq	LA90	31.5	63	125	250	500	1.0k	2.0k	4.0k	8.0k	16.0k
DAYTIME 07:00 - 23:00 LA90 1 HOUR & Corr responding LAeq 1 HOUR	61.0	48.0	66.0	68.0	62.0	59.0	54.0	58.0	53.0	44.0	45.0	26.0
NIGHT TIME 23:00 - 07:00 LA90 15 MIN & Corr responding LAeq 15 MIN	51.0	37.0	46.0	45.0	40.0	34.0	32.0	50.0	36.0	24.0	40.0	8.0

DAYTIME NOISE LEVELS 07:00 - 23:00 1 HOUR SAMPLES												
Date / Time	LAeq	LA90	31.5	63	125	250	500	1.0 k	2.0 k	4.0 k	8.0 k	16.0 k
07:00 - 08:00	55.8	41.2	56.9	61.5	58.3	55.8	50.0	52.3	47.8	39.4	34.9	8.0
08:00 - 09:00	61.2	48.4	65.0	68.7	62.5	58.1	54.0	58.2	53.9	45.4	41.4	17.0
09:00 - 10:00	61.5	49.7	66.2	68.6	62.9	58.7	54.6	58.3	53.7	45.4	46.8	26.0
10:00 - 11:00	61.5	48.7	66.5	68.3	62.3	58.5	54.5	58.4	53.7	45.2	45.1	24.6
11:00 - 12:00	61.2	48.8	65.3	67.9	63.0	58.8	54.5	58.2	53.5	44.5	41.7	20.4
12:00 - 13:00	60.4	46.4	66.4	67.4	61.5	57.2	53.3	57.3	52.7	43.8	44.3	22.0
13:00 - 14:00	60.8	46.1	65.4	67.6	61.7	58.6	54.0	57.6	52.8	44.8	45.5	27.7
14:00 - 15:00	60.7	48.8	65.7	68.0	62.3	58.6	54.4	57.6	52.9	44.1	42.0	19.0
15:00 - 16:00	61.7	47.8	66.5	66.8	61.8	57.9	54.3	58.2	55.1	46.5	43.0	20.1
16:00 - 17:00	60.2	46.9	67.3	67.2	62.0	58.4	54.2	56.9	52.0	45.5	43.3	21.1
17:00 - 18:00	61.9	47.9	67.5	68.1	66.6	62.6	56.3	58.0	53.0	45.7	44.6	24.0
18:00 - 19:00	61.5	49.3	66.2	67.0	64.2	60.6	55.6	58.0	53.0	46.9	45.3	20.8
19:00 - 20:00	61.4	47.8	65.9	67.3	64.9	60.7	55.2	57.8	52.9	45.8	44.8	25.8
20:00 - 21:00	60.5	45.0	66.3	66.2	62.9	59.8	54.2	57.0	52.2	44.0	44.4	24.8
21:00 - 22:00	59.5	42.7	64.0	64.9	63.9	58.7	52.5	55.8	51.3	43.7	44.4	26.4
22:00 - 23:00	60.3	40.4	64.0	65.8	65.0	63.2	52.7	55.4	52.1	48.1	44.5	22.1

NIGHT TIME NOISE LEVELS 23:00 - 07:00 15 MINUTE SAMPLES												
Date / Time	LAeq	LA90	31.5	63	125	250	500	1.0 k	2.0 k	4.0 k	8.0 k	16.0 k
23:00 - 23:15	55.5	38.8	64.0	63.8	58.2	54.0	47.5	52.1	47.7	38.6	40.1	11.0
23:15 - 23:30	57.3	38.2	56.1	61.5	56.3	53.9	50.7	54.3	50.0	41.4	39.5	16.8
23:30 - 23:45	58.3	36.7	63.5	64.6	63.4	58.7	54.0	53.3	49.6	43.2	42.4	18.4
23:45 - 00:00	53.6	35.5	53.4	55.7	49.1	48.3	45.7	51.3	46.5	35.6	28.7	9.1
00:00 - 00:15	53.8	33.7	63.4	63.0	58.1	53.4	46.7	50.1	45.6	38.3	37.1	13.0
00:15 - 00:30	51.6	33.4	52.2	55.5	49.6	46.8	43.5	49.0	44.6	33.0	25.2	8.4
00:30 - 00:45	54.9	31.9	64.7	66.0	59.8	53.0	46.8	50.5	46.9	40.2	39.9	17.5
00:45 - 01:00	49.0	32.0	57.7	56.4	46.0	44.3	41.0	46.6	41.7	31.1	24.0	8.3
01:00 - 01:15	39.7	29.2	43.3	45.2	39.8	35.1	32.7	37.5	31.1	20.4	15.1	8.1
01:15 - 01:30	43.4	29.2	47.0	49.7	41.1	38.8	36.1	40.6	36.2	27.8	22.5	8.3
01:30 - 01:45	44.3	28.1	45.7	43.6	40.2	39.5	37.0	42.5	36.0	24.2	17.2	8.2
01:45 - 02:00	42.7	29.6	44.4	44.9	40.2	37.2	34.8	40.2	35.7	24.4	16.5	8.1
02:00 - 02:15	41.0	28.2	42.4	43.0	37.0	34.1	33.2	38.6	33.8	23.7	16.4	8.1
02:15 - 02:30	43.1	28.9	46.1	44.9	39.5	38.4	35.0	40.8	35.5	24.9	18.8	8.1
02:30 - 02:45	38.8	29.3	47.6	44.9	40.3	34.5	31.7	35.6	31.9	23.6	17.2	8.1
02:45 - 03:00	47.0	29.8	43.5	46.8	44.9	44.0	40.2	44.4	39.8	28.1	21.3	8.2
03:00 - 03:15	34.0	30.8	42.3	41.8	38.2	32.6	31.3	31.2	19.9	12.3	12.3	8.1
03:15 - 03:30	34.6	32.3	43.3	43.1	38.7	33.7	31.8	31.7	20.9	13.8	12.4	8.1
03:30 - 03:45	48.1	31.0	46.8	57.9	46.1	44.0	43.0	44.6	40.4	35.5	27.6	8.5
03:45 - 04:00	41.5	31.8	45.0	44.9	40.4	37.0	34.4	38.7	34.7	24.6	16.3	8.1
04:00 - 04:15	34.7	32.8	45.0	44.1	38.9	34.1	32.1	31.5	20.4	14.2	12.3	8.1
04:15 - 04:30	36.2	33.3	45.6	45.3	40.0	34.4	33.2	32.6	26.8	16.6	13.1	8.1
04:30 - 04:45	42.6	36.0	47.2	46.4	41.2	36.2	34.2	36.6	38.3	31.3	23.8	8.1
04:45 - 05:00	43.3	37.6	46.3	45.8	40.6	33.5	31.8	30.9	40.0	34.2	28.1	8.2
05:00 - 05:15	47.0	37.1	47.6	48.9	42.8	39.6	41.5	41.8	40.8	36.5	33.6	8.2
05:15 - 05:30	47.3	36.6	46.1	49.6	42.0	41.1	38.4	41.7	36.4	38.7	40.4	8.7
05:30 - 05:45	52.9	35.4	51.1	52.5	49.8	48.6	46.3	50.0	45.5	39.0	34.4	12.6
05:45 - 06:00	49.4	37.1	46.9	48.7	47.4	46.5	40.8	45.0	41.2	41.0	35.8	8.7
06:00 - 06:15	58.6	37.8	63.7	72.6	58.1	60.2	54.3	53.8	49.9	44.3	39.5	12.8
06:15 - 06:30	55.3	37.9	56.8	57.4	58.9	53.6	48.6	52.0	47.7	41.8	37.2	11.3
06:30 - 06:45	55.9	37.4	57.1	64.3	58.1	52.9	49.5	52.7	48.4	40.6	36.6	11.4
06:45 - 07:00	54.3	37.3	64.1	64.6	57.7	52.2	47.1	50.0	46.3	41.5	40.5	14.6



17.12 9th – 10th June 2021 Position 2 Background Noise Level

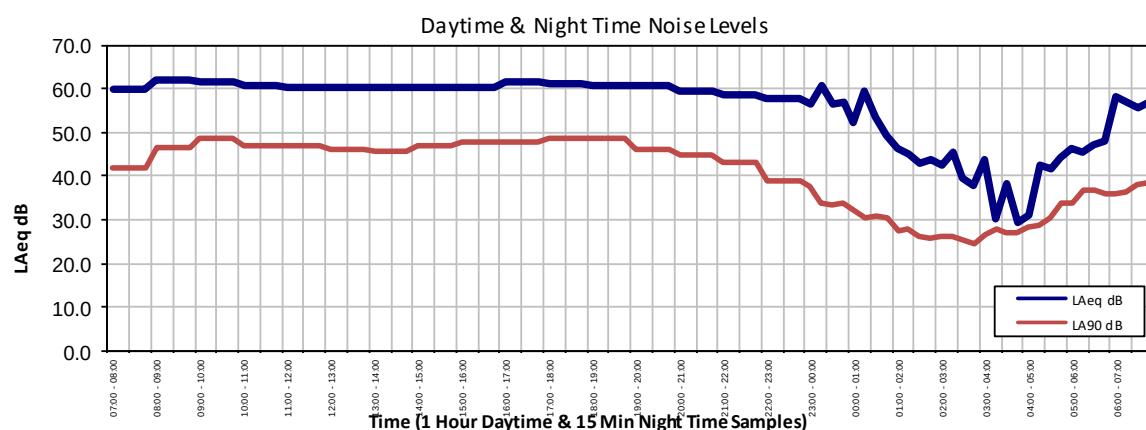
NOISE LEVEL SUMMARY ASSESSMENT					Octave Band Centre Frequency (Hz)							
Date / Time	LAeq	LA90	31.5	63	125	250	500	1.0k	2.0k	4.0k	8.0k	16.0k
DAYTIME 07:00 - 23:00 LA90 1 HOUR & Cor r esponding LAeq 1 HOUR	60.0	47.0	68.0	67.0	63.0	59.0	54.0	57.0	52.0	45.0	45.0	23.0
NIGHT TIME 23:00 - 07:00 LA90 15 MIN & Cor r esponding LAeq 15 MIN	51.0	26.0	44.0	50.0	44.0	40.0	37.0	41.0	49.0	35.0	18.0	8.0

DAYTIME NOISE LEVELS 07:00 - 23:00 1HOUR SAMPLES

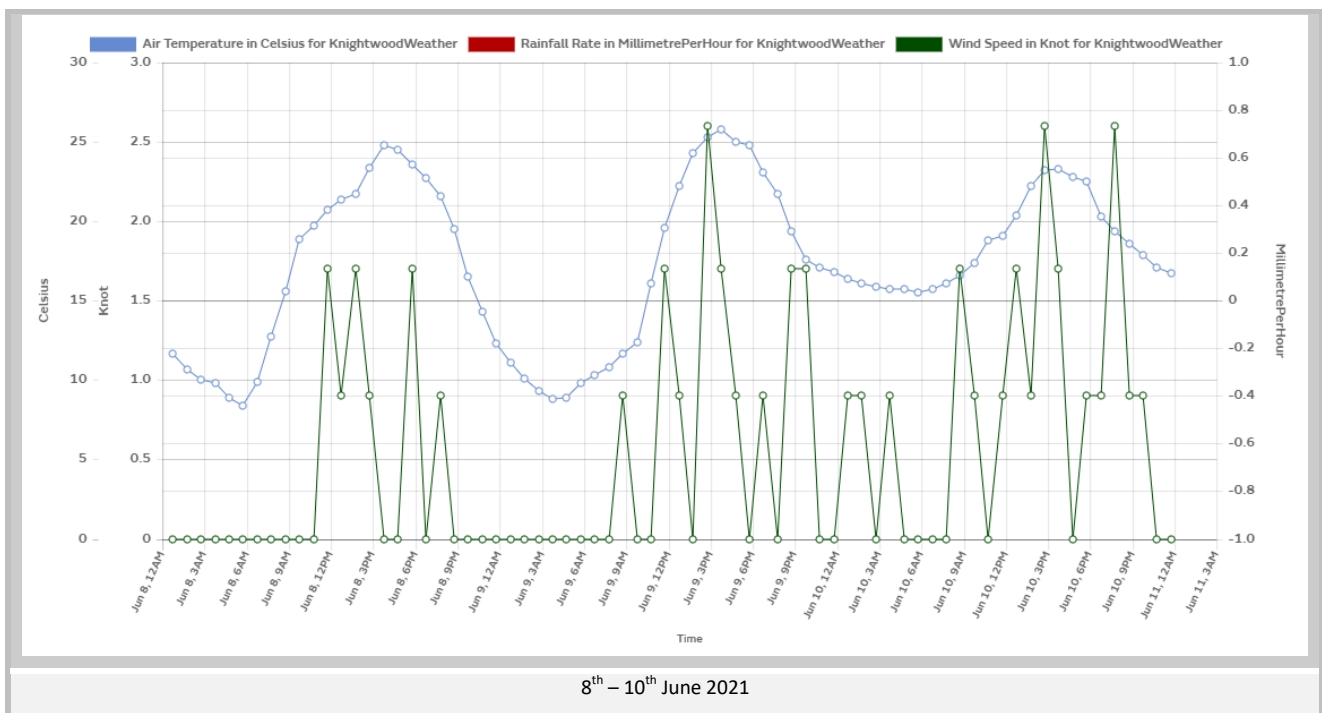
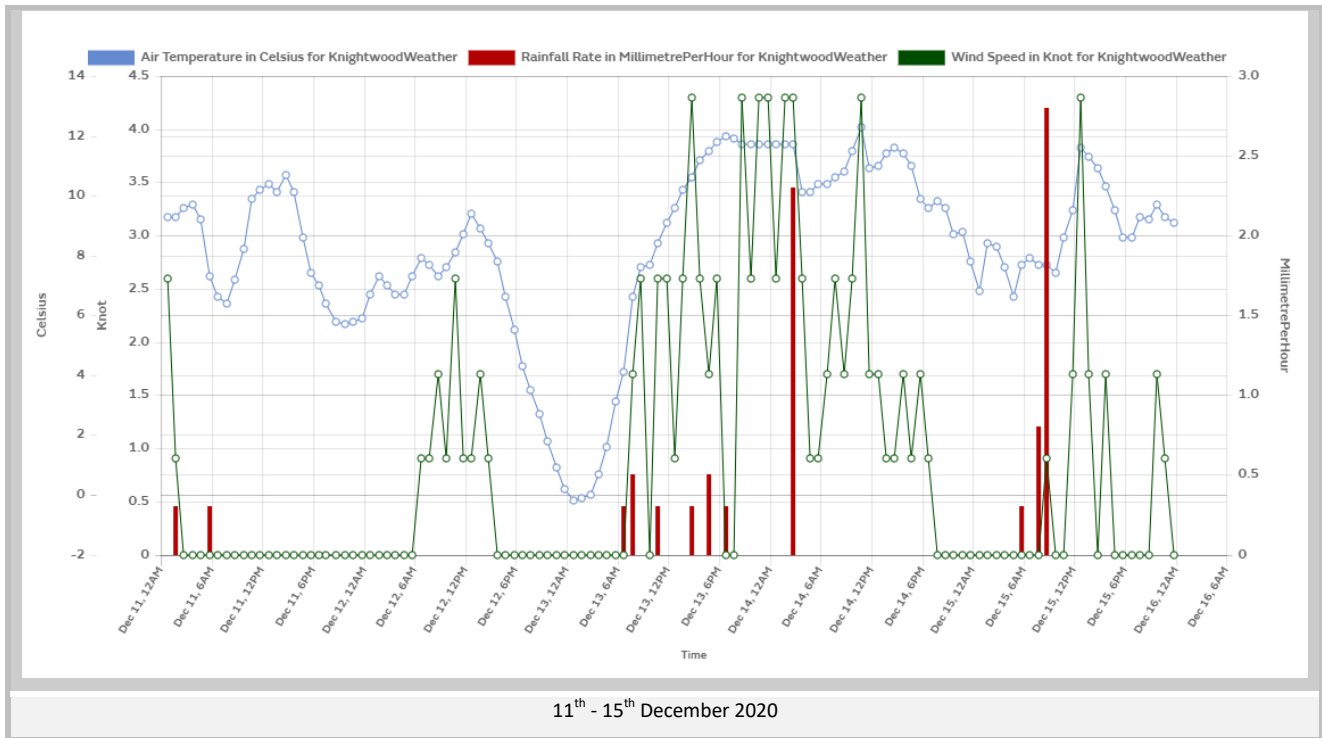
	Date / Time	LAeq	LA90	Octave Band Centre Frequency (Hz)									
				315	63	125	250	500	10 k	2.0 k	4.0 k	8.0 k	16.0 k
	07:00 - 08:00	60.0	42.0	62.4	65.4	63.1	57.9	53.0	56.5	52.4	45.1	43.0	19.8
	08:00 - 09:00	62.0	46.7	65.8	66.5	63.4	60.8	55.5	58.6	54.3	46.3	45.1	23.7
	09:00 - 10:00	61.7	48.4	65.2	67.9	62.3	58.0	54.6	58.8	54.4	45.1	41.3	18.3
	10:00 - 11:00	60.8	47.0	64.8	66.6	61.4	58.8	53.9	57.4	53.1	45.6	46.2	23.4
	11:00 - 12:00	60.2	46.7	65.8	66.3	61.7	58.1	53.8	56.9	52.2	45.0	45.7	24.2
	12:00 - 13:00	60.3	46.0	67.3	67.4	62.7	58.9	54.8	56.7	51.7	43.8	45.8	16.7
	13:00 - 14:00	60.4	45.9	63.4	68.1	65.6	60.0	54.7	56.6	51.5	44.4	43.7	26.4
	14:00 - 15:00	60.3	47.1	67.8	67.2	63.4	58.9	54.2	56.7	52.1	45.6	44.2	22.7
	15:00 - 16:00	60.2	47.8	65.8	67.4	63.5	58.5	54.1	56.8	51.9	44.8	42.0	20.9
	16:00 - 17:00	61.6	47.7	67.5	67.6	61.8	58.8	56.1	58.4	53.3	47.1	43.6	19.6
	17:00 - 18:00	61.0	48.6	68.0	66.6	63.1	60.6	55.3	57.6	52.6	45.2	44.6	23.2
	18:00 - 19:00	60.9	48.7	67.9	67.8	62.2	58.6	54.3	57.9	53.0	44.5	41.3	21.2
	19:00 - 20:00	60.5	46.0	66.6	66.5	62.1	58.2	53.9	57.6	52.7	43.6	41.5	21.4
	20:00 - 21:00	59.5	44.8	64.4	66.1	61.2	56.5	51.9	56.3	51.7	43.5	45.0	23.3
	21:00 - 22:00	58.6	42.9	67.1	64.2	59.7	55.9	51.3	55.4	50.8	43.1	45.1	24.8
	22:00 - 23:00	57.8	38.8	62.7	64.3	61.4	55.3	50.1	54.3	50.0	42.2	43.5	21.9

NIGHT TIME NOISE LEVELS 23:00 - 07:00 15 MINUTE SAMPLES

Date/ Time	LAeq		LA90		Octave Band Centre Frequency (Hz)							
			315	63	125	250	500	10 k	2.0 k	4.0 k	8.0 k	16.0 k
23:00 - 23:15	56.6	37.5	62.5	65.4	60.6	55.1	49.6	52.9	48.8	40.5	37.6	13.3
23:15 - 23:30	60.8	34.0	57.1	58.2	60.1	59.8	56.7	56.0	53.0	49.4	44.9	15.2
23:30 - 23:45	56.3	33.4	68.4	64.8	59.9	53.7	47.6	50.3	46.6	44.2	49.0	28.5
23:45 - 00:00	56.8	33.6	54.7	58.0	52.8	51.0	51.3	54.4	48.5	41.2	34.9	10.4
00:00 - 00:15	52.2	32.3	65.7	63.5	55.0	50.2	45.1	48.9	44.3	35.3	33.6	10.3
00:15 - 00:30	59.5	30.6	67.7	64.4	61.8	57.1	53.2	54.7	49.8	47.2	51.1	30.7
00:30 - 00:45	53.3	30.8	49.5	56.6	61.4	49.2	46.2	49.3	44.9	35.6	29.9	9.4
00:45 - 01:00	49.1	30.4	48.4	59.8	51.4	46.1	42.0	46.2	41.5	30.6	22.9	8.7
01:00 - 01:15	46.4	27.6	46.5	50.3	45.8	44.3	40.2	43.5	39.0	28.8	21.4	8.3
01:15 - 01:30	45.2	28.0	47.3	52.7	44.1	40.0	37.4	42.7	38.0	27.3	21.2	8.3
01:30 - 01:45	42.9	26.2	46.1	43.1	39.4	38.1	35.0	40.5	35.5	24.2	18.3	8.4
01:45 - 02:00	43.7	25.7	45.9	42.1	38.1	37.6	34.3	41.1	37.3	25.8	18.8	8.2
02:00 - 02:15	42.5	26.2	43.1	40.8	37.2	36.9	35.0	39.4	36.5	25.6	17.9	8.2
02:15 - 02:30	45.4	26.1	45.7	46.1	41.8	41.1	38.5	42.6	38.1	30.2	25.8	8.7
02:30 - 02:45	39.6	25.5	44.2	44.4	38.1	38.8	33.3	37.3	30.8	19.9	15.6	8.2
02:45 - 03:00	37.7	24.6	41.3	41.0	35.9	32.7	29.8	34.7	31.0	21.6	15.7	8.2
03:00 - 03:15	43.7	26.6	45.3	43.1	41.2	39.0	36.5	41.3	36.2	26.3	20.8	8.3
03:15 - 03:30	30.2	27.7	40.2	37.4	34.2	29.9	26.6	26.9	18.8	13.9	13.2	8.2
03:30 - 03:45	38.4	26.9	41.9	45.2	41.2	33.8	32.1	36.0	29.6	20.7	16.6	8.2
03:45 - 04:00	29.3	26.9	41.3	40.1	34.0	29.4	25.9	25.7	17.7	13.7	14.0	8.2
04:00 - 04:15	31.1	28.4	43.8	40.0	34.7	30.4	28.2	27.9	17.9	13.7	13.4	8.2
04:15 - 04:30	42.3	28.8	44.4	46.6	40.7	37.3	35.4	39.6	35.1	24.6	18.2	8.2
04:30 - 04:45	41.5	30.6	43.8	41.7	37.5	38.3	34.4	38.7	34.6	24.9	18.4	8.2
04:45 - 05:00	44.3	34.0	47.5	46.1	39.0	36.7	34.4	37.6	40.2	34.5	26.3	8.6
05:00 - 05:15	46.3	33.9	50.6	47.9	42.0	39.7	38.4	43.2	39.9	32.0	28.1	8.3
05:15 - 05:30	45.3	36.6	49.0	49.9	42.5	40.4	37.1	41.3	37.6	35.5	32.3	8.4
05:30 - 05:45	47.1	36.6	48.4	49.6	43.9	41.6	40.2	43.7	39.8	35.7	30.1	8.7
05:45 - 06:00	48.1	35.9	49.3	50.4	43.9	42.5	41.0	45.1	41.1	35.0	29.9	8.5
06:00 - 06:15	58.0	36.1	58.0	58.1	57.4	62.7	55.3	52.1	46.7	42.2	37.4	10.6
06:15 - 06:30	56.7	36.5	58.5	61.0	61.7	56.8	50.4	52.6	48.7	42.7	39.6	13.6
06:30 - 06:45	55.4	37.9	56.5	65.2	57.9	51.7	47.8	51.9	47.8	43.2	39.2	12.1
06:45 - 07:00	56.8	38.6	64.6	63.0	58.1	54.9	48.5	52.6	49.0	42.4	46.8	18.8



18 APPENDIX C - ENVIRONMENTAL CONDITIONS



#END OF REPORT#