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Proposed Materials Recycling Facility Whitley, Coventry

Environmental Permit Noise Impact Assessment

**For:
Clegg Group Limited**

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1 Introduction

1.1 Overview

Environmental Noise Solutions Ltd (ENS) has been commissioned by Clegg Group Limited to undertake a noise impact assessment for a proposed Materials Recycling Facility (MRF) at land at London Road, Whitley, Coventry (hereafter referred to as 'the site').

Planning permission (ref: FMES/2020/0427) for the development was granted by Coventry City Council (CCC) in January 2021, subject to conditions.

This report has been prepared to accompany an application for an Environmental Permit to be submitted to the Environment Agency (EA) for the consented development. This report details the methodology and results of the assessment.

The objectives of the noise impact assessment were to:

- Measure the baseline noise levels in the vicinity of the site during representative periods
- Establish the noise levels associated with the consented MRF
- Assess the potential impact of the proposals with reference to pertinent guidelines

The author of the report is a Member of the Institute of Acoustics (MIOA) and ENS is a specialist acoustic consultancy and a corporate member of the Association of Noise Consultants (organisation number 144).

The report has been prepared for Clegg Group Limited for the sole purpose described above and no extended duty of care to any third party is implied or offered. Third parties referring to the report should consult Clegg Group Limited and ENS as to the extent to which the findings may be appropriate for their use.

A glossary of acoustic terms used in the main body of the text is contained in Appendix A.

1.2 Site Description

The site is located on former allotments at land adjacent to 259 London Road, Coventry, as shown (highlighted in red) in Figure 1.1 overleaf.

Irregular in shape, the site is bound by the Coventry and Solihull Waste Disposal Company (CSWDC) Energy from Waste (EfW) Plant and CCC Household Waste Recycling Centre (HWRC) to the north-west, the CCC Whitley Depot to the south, allotments to the east, and open woodland to the north-east and west.

Figure 1.1: Location of Consented Development



The nearest noise sensitive receptors (NSRs) to the site have been identified as:

- Residential dwellings on Humber Road, circa 250 metres to the north of the site (NSR1)
- Residential dwellings on Whitley Village, circa 150 metres to the south-west of the site (NSR2)
- Residential dwellings on Shortley Road, circa 160 metres to the north-west of the site (NSR3)

During the course of the noise survey, the noise environment in the vicinity of the application site was formed by road traffic on the surrounding road network (in particular the A4114) and existing plant associated with the existing EfW facility.

1.3 Development Proposals

Development proposals are for a main MRF building with associated offices/ancillary spaces, service yard and car parking. The main MRF building will comprise (see Figure 1.2 for development layout):

- Reception Hall (2,400 m²)
- Process Hall (5,400 m²)
- Outfeed Hall (2,400 m²)

Access into the site is taken from London Road to the south, via the existing CCC Whitley Depot.

Figure 1.2: Development Layout



It is understood that 24-hour use of the facility may be required, but that the main use of the site will be between 0600 and 1800 hours, in line with local authority waste collection times.

For reference, Conditions 18 and 20 of CCC Planning Permission ref: FMES/2020/0427 for the development relate to the control of noise as follows:

18. *No loading/unloading shall take place and no HGVs shall enter or exit the site other than between 06:00 hours and 22:00 hours Mondays to Fridays and between 07:00 hours and 13:00 hours on weekends and bank holidays.*

20. *All loading/unloading of recycle materials on HGVs or any other vehicles shall be carried out within building and no recycle materials or waste shall be stored outside the building in the open area.*

2 Assessment Guidance

2.1 Noise and Vibration Management: Environmental Permits

Noise and Vibration Management: Environmental Permits¹, produced by the EA, Scottish Environment Protection Agency (SEPA), Natural Resources Wales and Northern Ireland Environment Agency, was published in July 2021 and replaces the Environment Agency Horizontal Guidance for Noise (H3) parts 1 and 2.

The guidance contains advice on how to carry out noise impact assessments, what should be included in noise management plans, and how the EA will assess noise from certain industrial processes.

With regards to the noise impact assessment, the guidance states that British Standard BS 4142:2014+A1-2019 'Methods for Rating and Assessing Industrial and Commercial Sound' (BS 4142) should be used, and details 4 steps, as follows:

1. Desktop risk assessment (identify potential noise sources and NSRs)
2. Carry out off-site monitoring at the nearest NSRs to establish baseline levels
3. Establish, at the nearest NSRs, the noise levels associated with the development, and assess the impact using BS 4142
4. Demonstrate that the development is using 'best available techniques' (BAT) to minimise noise impact

The guidance provides a description of how noise impact levels relate to BS 4142 descriptors, as summarised in Table 2.1

Table 2.1: Noise Impact Level and BS 4142 Descriptors

Level	Description	BS4142 Descriptor	Action
Unacceptable level of audible or detectable noise	This level of noise means that significant pollution is being, or is likely to be, caused at a receptor (regardless of whether you are taking appropriate measures).	Significant Adverse Impact	You must take further action or you may have to reduce or stop operations. The environment agencies will not issue a permit if you are likely to be operating at this level.
Audible or detectable noise	This level of noise means that noise pollution is being (or is likely to be) caused at a receptor.	Adverse Impact	Your duty is to use appropriate measures to prevent or, where that is not practicable, minimise noise. You are not in breach if you are using appropriate measures. But you will need to rigorously demonstrate that you are using appropriate measures.
No noise, or barely audible or detectable noise	This level of noise means that no action is needed beyond basic appropriate measures or BAT.	Low Impact or No Impact	None

With regards to 'best available techniques' (BAT), the guidance states:

'Operators must prevent significant pollution and also comply with the requirements to use 'appropriate measures' (Waste Framework Directive 2018/851) or 'best available techniques' (BAT) to prevent or minimise noise pollution. For Landfill Directive installations you should interpret this as meaning all reasonable steps must be taken to prevent noise nuisance. In this guidance, appropriate measures and BAT are equivalent and interchangeable.'

¹ Noise and Vibration Management: Environmental Permits. Environment Agency (2021)

2.2 British Standard BS 4142:2014+A1-2019 ‘Methods for Rating and Assessing Industrial and Commercial Sound

BS 4142² describes methods for determining, at the outside of a building, noise levels from factories or industrial premises and a method for assessing whether the noise is likely to give rise to adverse impacts, and states:

The significance of sound of an industrial and/or commercial nature depends upon both the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound occurs. Typically, the greater this difference, the greater the magnitude of the impact. For example:

- *A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context*
- *A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context*
- *The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context*

Adverse impacts include, but are not limited to, annoyance and sleep disturbance. Not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact.

Where the initial estimate of the impact needs to be modified due to the context, take all pertinent factors into consideration, including the absolute level of sound.’

The rating level is described as the specific sound level (the equivalent continuous A-weighted sound pressure level at the assessment position (NSR) produced by the specific sound source over the given reference time interval) plus any adjustment for the characteristic features of the sound. The character correction relates to whether and to what degree the specific sound is assessed to have an element of tonality, impulsivity and/or characteristics that are readily distinctive against the residual acoustic environment.

The background noise level is the A-weighted sound pressure level of the residual noise at the assessment position that is exceeded for 90 percent of a given time interval, T, measured using time weighting ‘F’ and quoted to the nearest whole number of decibels. BS 4142 is clear that it is the typical³ background, rather than the lowest background, which should be used.

² British Standard 4142:2014+A1-2019 Methods for rating and assessing industrial and commercial sound, BSI (2014)

³ The ‘typical’ value is either the ‘modal’ (i.e. most occurring) value or the mean value, whichever is the lowest of the two average data sets

3 Noise Survey and Results

3.1 Overview

In order to determine the baseline noise levels in the vicinity of the site, a long-term noise survey was undertaken on Thursday 23rd September through to Wednesday 29th September 2021, with a supplementary short-term manned survey on Thursday 14th October 2021.

For the purpose of the assessment, the following noise monitoring positions were adopted (see Appendix 2 for approximate monitoring positions):

- MP1 was located in the vicinity of residential dwellings on Humber Road (NSR1)
- MP2 was located in the vicinity of residential dwellings on Whitley Village (NSR2)
- MP3 was located in the vicinity of residential dwellings on Shortley Road (NSR3)

The long-term September noise measurements were undertaken in free field conditions using Rion NL-52 Type 1 integrating sound level meters. Measurements at MP1 and MP3 were undertaken at 3.0 metres above ground level for security reasons, whilst MP2 was 1.2 metres above ground level. A windshield was fitted for all measurements. The measurement system calibration was verified immediately before the commencement of the measurement sessions and again at the end, using a Rion NC-75 calibrator. No drift in calibration level was noted.

The short-term October noise measurements were undertaken using a Bruel & Kjaer 2250 Type 1 integrating sound level meter. The meter was connected to a windshield covered microphone positioned at the locations detailed above. Measurements were taken at a height of 1.5 metres above ground and at 1 metre distance from the façade of the existing building. The measurement system calibration was verified immediately before and after the survey period using a Bruel & Kjaer Type 4231 calibrator. No drift in calibration level was noted.

Equipment calibration details are contained in Table 3.1 for reference.

Table 3.1: Equipment Calibration Details

Item	Serial Number	Certificate	Date of expiration of calibration
Rion NL-52 SLM	00231657	1500289-1	30/04/23
Rion NL-52 SLM	01076306	14015742-1	24/07/22
Rion NL-52 SLM	01021287	00001189-1	19/03/23
Rion NC-75 Calibrator	35270122	00001188-1	18/03/22
Bruel & Kjaer 2250 SLM	3011420	051012-1	23/09/23
Bruel & Kjaer 4231 Calibrator	2438878	048808-2	21/03/22

Measurements consisted of A-weighted broadband parameters including L_{Aeq} , L_{A10} , L_{A90} , and L_{AFmax} together with linear third-octave band data.

Weather conditions throughout the majority of survey were appropriate for monitoring, with dry conditions and wind speeds of generally < 5 m/s. Wind speeds during Monday 27th September through to Wednesday 29th September 2021 were increased to circa 6–8 m/s (see Appendix 4 for weather data). The suitability of the data is discussed in more detail in Section 3.2.

3.2 Summary of Baseline Results

Table 3.1 presents a summary of the long-term noise data for each measurement session, at each measurement position, rounded to the nearest decibel.

Table 3.1: Summary of Long-Term Noise Measurement Data

Position	Date	Time	L _{Aeq, T} (dB)	L _{A90} (15 min) (dB)		Comment
				Range	Typical	
MP1	23/09/21	1101–2300	57	41–52	46	Local and distant road traffic dominant, some distant low-level underlying plant
	24/09/21	0700–2300	58	45–53	48	
	25/09/21	0700–2300	55	41–46	43	
	26/09/21	0700–2300	55	42–49	46	
	27/09/21	0700–2300	60	45–58	51	
	28/09/21	0700–2300	60	45–56	52	
	29/09/21	0700–1131	60	49–55	50	
	23-24/09/21	2300–0700	51	40–51	42	Local and distant road traffic dominant, some distant low-level underlying plant
	24-25/09/21	2300–0700	51	40–46	42	
	25-26/09/21	2300–0700	49	39–44	40	
	26-27/09/21	2300–0700	52	42–52	44	
	27-28/09/21	2300–0700	51	43–50	44	
28-29/09/21	2300–0700	52	41–51	45		
MP2	23/09/21	1142–2300	55	44–54	51	A4114 road traffic dominant
	24/09/21	0700–2300	55	46–57	53	
	25/09/21	0700–2300	52	44–51	49	
	26/09/21	0700–2300	52	43–52	48	
	27/09/21	0700–2300	56	43–60	53	
	28/09/21	0700–2300	58	44–59	55	
	29/09/21	0700–1147	57	51–57	52	
	23-24/09/21	2300–0700	49	40–52	42	A4114 road traffic dominant
	24-25/09/21	2300–0700	46	38–45	39	
	25-26/09/21	2300–0700	45	38–45	39	
	26-27/09/21	2300–0700	50	39–56	41	
	27-28/09/21	2300–0700	49	40–54	42	
28-29/09/21	2300–0700	49	40–53	42		
MP3	23/09/21	1131–2300	54	48–54	51	Fixed plant at existing recycling units, occasional HGV movements
	24/09/21	0700–2300	53	49–54	52	
	25/09/21	0700–2300	51	47–51	49	
	26/09/21	0700–2300	52	48–52	50	
	27/09/21	0700–2300	57	49–65	55	
	28/09/21	0700–2300	58	49–62	55	
	29/09/21	0700–1141	59	51–57	52	
	23-24/09/21	2300–0700	50	47–52	48	Fixed plant at existing recycling units
	24-25/09/21	2300–0700	49	47–49	48	
	25-26/09/21	2300–0700	50	48–49	48	
	26-27/09/21	2300–0700	52	48–55	49	
	27-28/09/21	2300–0700	51	48–53	49	
28-29/09/21	2300–0700	51	48–52	49		

Table 3.2 presents a summary of the short-term noise data for each measurement session, at each measurement position, rounded to the nearest decibel.

Table 3.2: Summary of Short-Term Noise Measurement Data

Position	Date	Time	L _{Aeq, T} (dB)	L _{A90, T} (dB)	Comment
MP1	14/10/21	1003–1015	56	45	Local and distant road traffic dominant, some distant low-level underlying plant
	14/10/21	1043–1104	58	48	
	14/10/21	1342–1357	56	49	
	14/10/21	1357–1412	59	48	
MP2	14/10/21	1118–1133	54	51	A4114 road traffic dominant
	14/10/21	1133–1148	53	50	
	14/10/21	1148–1203	53	50	
	14/10/21	1203–1218	55	50	
	14/10/21	1434–1450	56	52	
MP3	14/10/21	1233–1248	50	48	Fixed plant at existing recycling units, occasional HGV movements
	14/10/21	1248–1303	51	49	
	14/10/21	1303–1318	57	51	
	14/10/21	1318–1333	51	49	

The following table contains the average background noise levels from the long-term monitoring, excluding data from Monday 27th September through to Wednesday 29th September 2021, which appear to have been affected by wind.

Table 3.3: Summary of Typical Background Noise Levels

Position	Daytime	Night Time
MP1	46 dB L _{A90} (15 min)	42 dB L _{A90} (15 min)
MP2	50 dB L _{A90} (15 min)	40 dB L _{A90} (15 min)
MP3	51 dB L _{A90} (15 min)	48 dB L _{A90} (15 min)

3.3 Summary of Source Measurements

In order to determine the noise associated with the proposed development, measurements were undertaken during the daytime on Friday 22nd October 2021 at a comparable operational site (for reference the Tom White Waste (TWW) site at Stonebrook Way, Longford, Coventry).

Site 2 at TWW comprises a large MRF building with reception, processing and dispatch areas. Materials are delivered to the site via wagon and unloaded internally into the reception area, where they are moved via front end loader (FEL) and loaded into a shredder using a 360° grab.

From there the materials are sorted via a series of screens and conveyors, with any unsorted material going to the picking station to be sorted by hand. Finished and sorted material is then baled ready for dispatch via HGV.

Noise measurements were undertaken using a calibrated Bruel & Kjaer 2250 Type 1 integrating sound level meter. External measurements were undertaken in free field conditions, whereas internal measurements are considered reverberant.

Table 3.4 below contains a summary of the source measurement data, rounded to the nearest decibel.

Table 3.4: Summary of Source Noise Measurement Data

Operation	Distance	Duration (mm:ss)	L _{Aeq, T} (dB)	L _{AFMax} (dB)	Comment
Wagon Pass	3 m	00:10	74	78	
HGV Pass	3 m	00:14	73	76	
Site 2 Internal near Grab and FEL	-	02:37	83	98	Reverberant level within Reception Hall
Site 2 Internal near Screens (at ground)	-	01:30	84	91	Reverberant level within Process Hall
Site 2 Internal near Screens (at height)	-	01:46	86	94	Reverberant level within Process Hall
Site 2 Picking Station	-	01:19	73	89	Reverberant level within Picking Station
Site 1 Internal (screen operating)	-	03:11	84	93	Reverberant level within Site 2 Building

The internal reverberant noise levels within the TWW site buildings were circa 84–86 dB(A), and were due to constant plant noise associated with the screens/conveyors, and the use of the FEL and grab for the movement of materials.

No significant external plant was noted during the course of the monitoring. The proposed MRF will include the following items of external fixed plant, which are included in the noise modelling in Section 4 using noise data provided by the supplier:

- FV Stack – sound power level of 93 dB(A)
- Dust Stack – sound power level of 91 dB(A)
- Reception Hall Air-handling unit (AHU1) – sound power level of 77 dB(A)
- Outfeed Hall Air-handling unit (AHU2) – sound power level of 73 dB(A)

4 Noise Assessment

4.1 Noise Modelling

Noise level predictions have been performed using Cadna A (computer aided noise abatement) acoustic modelling software developed by DataKustik. This is a software program specifically developed for the prediction and assessment of environmental noise. The software version used was Cadna A 2021 (build 183.5110).

The model calculates noise levels on horizontal and vertical grids with a user defined spacing of receiver points. From these levels, calculated at thousands of points, contour lines of constant noise levels are generated and printed as noise maps (broadband, A-weighted noise levels).

The model was constructed using topographical survey data and mapping from Ordnance Survey, in conjunction with drawings and information supplied by the client. Noise propagation is calculated in spectral terms according to BS EN ISO 9613-2: 1996, with 2nd order reflections considered and absorption coefficients based on the Cadna A default for brick-built structures (low alpha).

The following assumptions were used in the model:

- Ground absorption set to $G = 0.5$
- Meteorological conditions: Temp. 10 °C, Relative Humidity 70%
- Foliage/woodland areas not considered to provide any reduction
- Reflections: set to two orders of reflection permitted in the model
- Absorption coefficient of buildings set to 0.2

A noise level contour map at 4.5 metres above ground level is contained in Appendix 5. The following table contains a summary of the predicted cumulative resultant plant noise levels at the nearest NSRs.

Table 4.1 – Resultant MRF Noise Levels at NSRs

Receptor	Resultant MRF Noise Level at NSR
NSR1 – Humber Street	38
NSR2 – Whitley Village	40
NSR3 – Shortley Road	40

4.2 Assessment

BS 4142 advises that a rating penalty should be established for a sound based on a subjective assessment of its characteristics. However, the dominant noise sources at the proposed MRF are continuous fixed internal and external plant. Due to the significant separation distances to the nearest NSRs, it is considered that any plant noise is unlikely to be distinguishable against existing noise from road traffic and the neighbouring recycling facility. On this basis, no character penalty is warranted.

With regards to uncertainty in the assessment, it should be noted that:

- Background noise levels have been adopted from long-term noise measurements, excluding periods of unrepresentative weather
- The worst-case measured source data has been used in the model
- External fixed plant calculations are based on manufacturer's noise data
- ISO 9613-2 is a validated method of calculating sound levels

Table 4.2 – Daytime BS4142 Assessment at NSRs

Results	Receptor			Comment
	NSR1	NSR2	NSR3	
Specific sound level	38 dB L_{Aeq} (1 hour)	40 dB L_{Aeq} (1 hour)	40 dB L_{Aeq} (1 hour)	MRF noise level at receptor
Acoustic feature correction	0	0	0	No feature correction warranted
Rating level	38 dB L_{Ar} (1 hour)	40 dB L_{Ar} (1 hour)	40 dB L_{Ar} (1 hour)	Rating level at receptor
Background sound level	46 dB L_{A90} (15 min)	50 dB L_{A90} (15 min)	51 dB L_{A90} (15 min)	Background level at receptor
Excess of rating over background sound level	-8 dB	-10 dB	-11 dB	Indication of a low impact, subject to context

Table 4.3 – Night Time BS4142 Assessment at NSRs

Results	Receptor			Comment
	NSR1	NSR2	NSR3	
Specific sound level	38 dB L_{Aeq} (15 min)	40 dB L_{Aeq} (15 min)	40 dB L_{Aeq} (15 min)	MRF noise level at receptor
Acoustic feature correction	0	0	0	No feature correction warranted
Rating level	38 dB L_{Ar} (15 min)	40 dB L_{Ar} (15 min)	40 dB L_{Ar} (15 min)	Rating level at receptor
Background sound level	42 dB L_{A90} (15 min)	40 dB L_{A90} (15 min)	48 dB L_{A90} (15 min)	Background level at receptor
Excess of rating over background sound level	-4 dB	0 dB	-8 dB	Indication of a low impact, subject to context

The noise rating levels associated with the MRF are at least 8 dB below the existing background noise levels at the nearest NSRs during the daytime, and do not exceed existing background noise levels during the night time. In accordance with BS 4142, this is an indication of a low impact, subject to context.

At these levels, the Noise and Vibration Management: Environmental Permits guidance advises that no action is needed beyond basic appropriate measures or BAT.

In relation to BAT, the following is considered relevant:

- External loading/unloading is prohibited by Condition 20 of Planning Permission ref: FMES/2020/0427
- Night time HGV movements are prohibited by Condition 18 of Planning Permission ref: FMES/2020/0427
- Low-noise plant has been adopted wherever feasible
- Exhaust stacks are to be provided with acoustic enclosures

5 Summary and Conclusions

A noise impact assessment has been performed for a proposed Materials Recycling Facility at land at London Road, Whitley, Coventry.

Noise monitoring was carried out between Thursday 23rd September and Wednesday 29th September 2021, and on Thursday 14th October 2021, to determine the baseline noise levels in the vicinity of the site.

The noise rating levels associated with the MRF are at least 8 dB below the existing background noise levels at the nearest NSRs during the daytime, and do not exceed existing background noise levels by more than 1 dB during the night time. In accordance with BS 4142, this is an indication of a low impact, subject to context.

At these levels, the Noise and Vibration Management: Environmental Permits guidance advises that no action is needed beyond basic appropriate measures or BAT.

Appendix 1 – Abbreviations and Definitions

Sound Pressure Level (L_p)

The basic unit of sound measurement is the sound pressure level. As the pressures to which the human ear responds can range from 20 μPa to 200 Pa, a linear measurement of sound levels would involve many orders of magnitude. Consequently, the pressures are converted to a logarithmic scale and expressed in decibels (dB) as follows:

$$L_p = 20 \log_{10}(p/p_0)$$

Where L_p = sound pressure level in dB; p = rms sound pressure in Pa; and p_0 = reference sound pressure (20 μPa).

A-weighting

A frequency filtering system in a sound level meter, which approximates under defined conditions the frequency response of the human ear. The A-weighted sound pressure level, expressed in dB(A), has been shown to correlate well with subjective response to noise.

Equivalent continuous A-weighted sound pressure level, $L_{Aeq, T}$

The value of the A-weighted sound pressure level in decibels of continuous steady sound that within a specified time interval, T, has the same mean-square sound pressure as a sound that varies with time. $L_{Aeq, 16h}$ (07:00 to 23:00 hours) and $L_{Aeq, 8h}$ (23:00 to 07:00 hours) are used to qualify daytime and night time noise levels.

$L_{A10, T}$

The A-weighted sound pressure level in decibels exceeded for 10% of the measurement period, T. $L_{A10, 18h}$ is the arithmetic mean of the 18 hourly values from 06:00 to 24:00 hours.

$L_{A90, T}$

The A-weighted sound pressure level of the residual noise in decibels exceeded 90% of a given time interval, T. L_{A90} is typically taken as representative of background noise.

L_{AFmax}

The maximum A-weighted noise level recorded during the measurement period. The subscript 'F' denotes fast time weighting, slow time weighting 'S' is also used.

Single Event Level / Sound Exposure Level (SEL or L_{AE})

The energy produced by a discrete noise event averaged over one second, regardless of the event duration. This allows for comparison between different noise events which occur over different lengths of time.

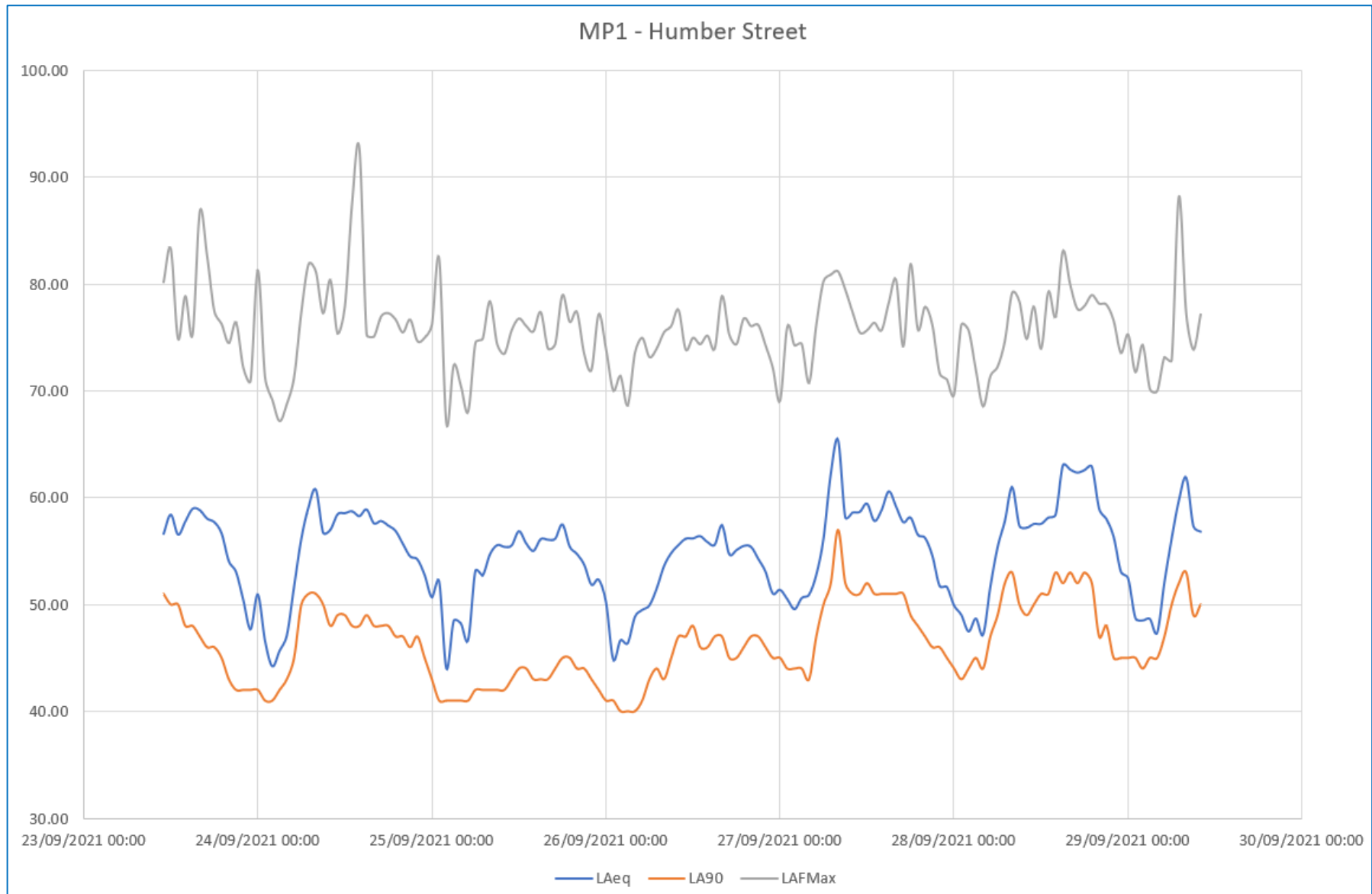
Weighted Sound Reduction Index (R_w)

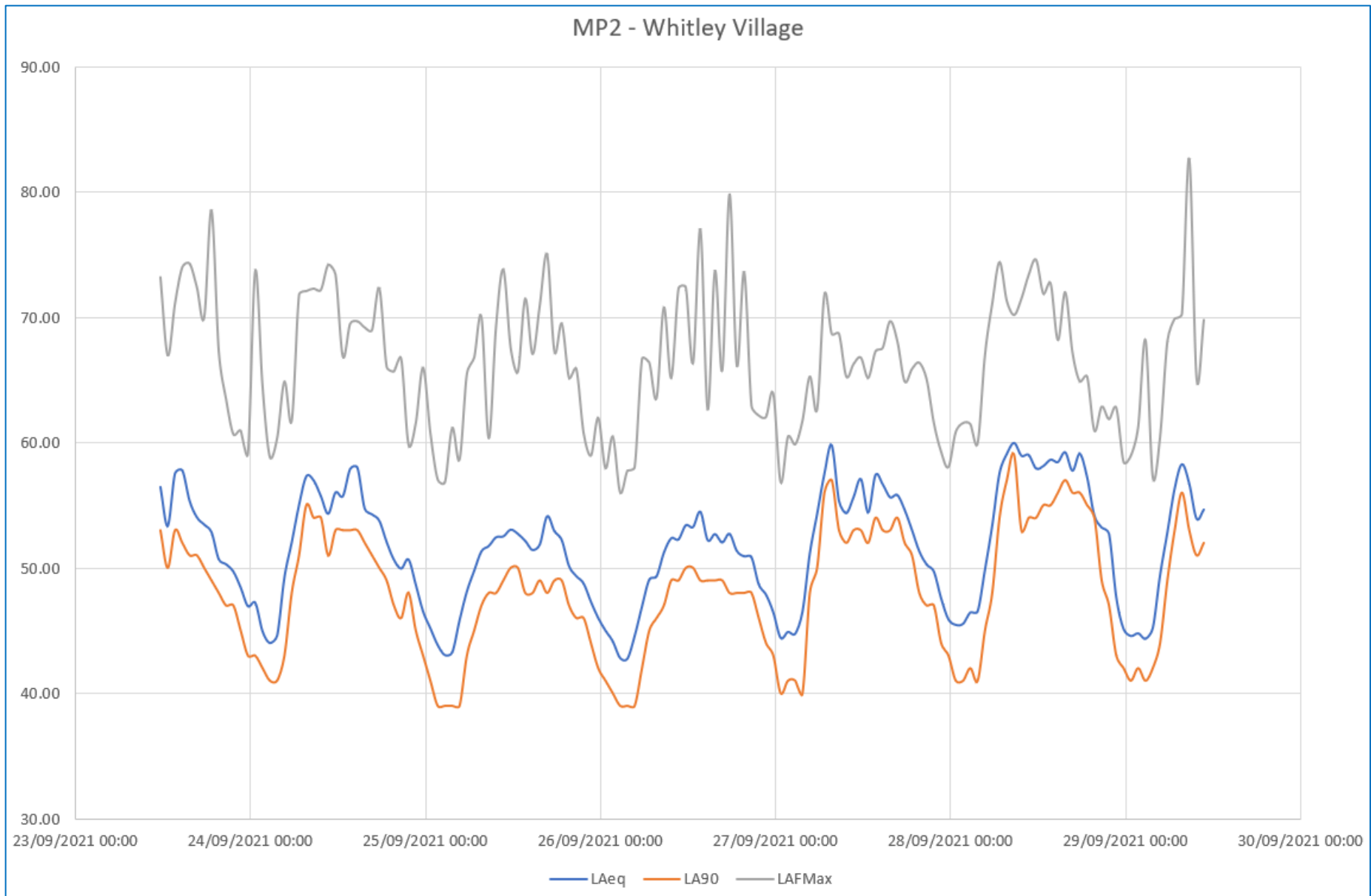
Single number quantity which characterises the airborne sound insulation properties of a material or building element over a defined range of frequencies (R_w is used to characterise the insulation of a material or product that has been measured in a laboratory).

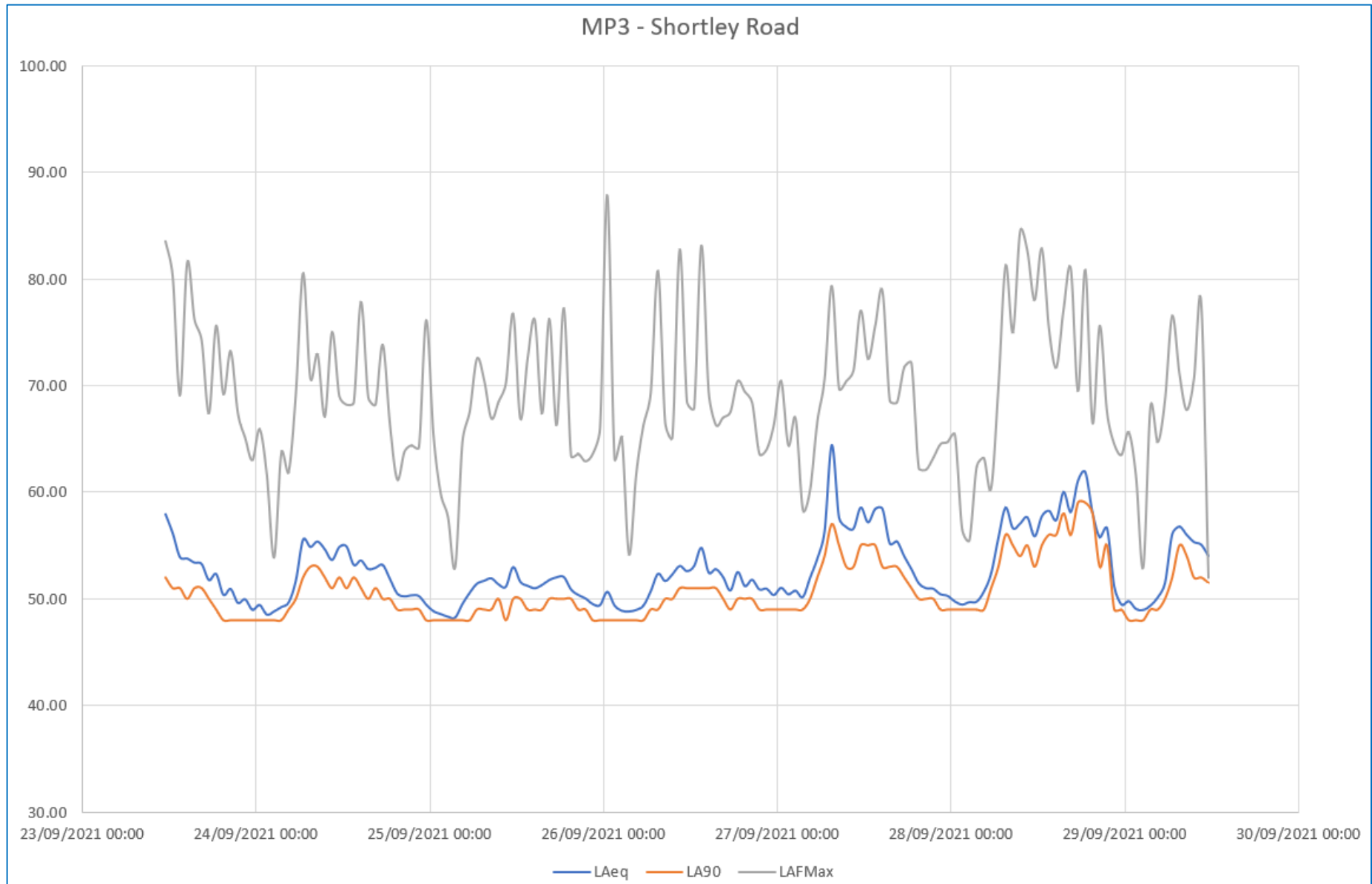
Appendix 2 – Measurement Positions



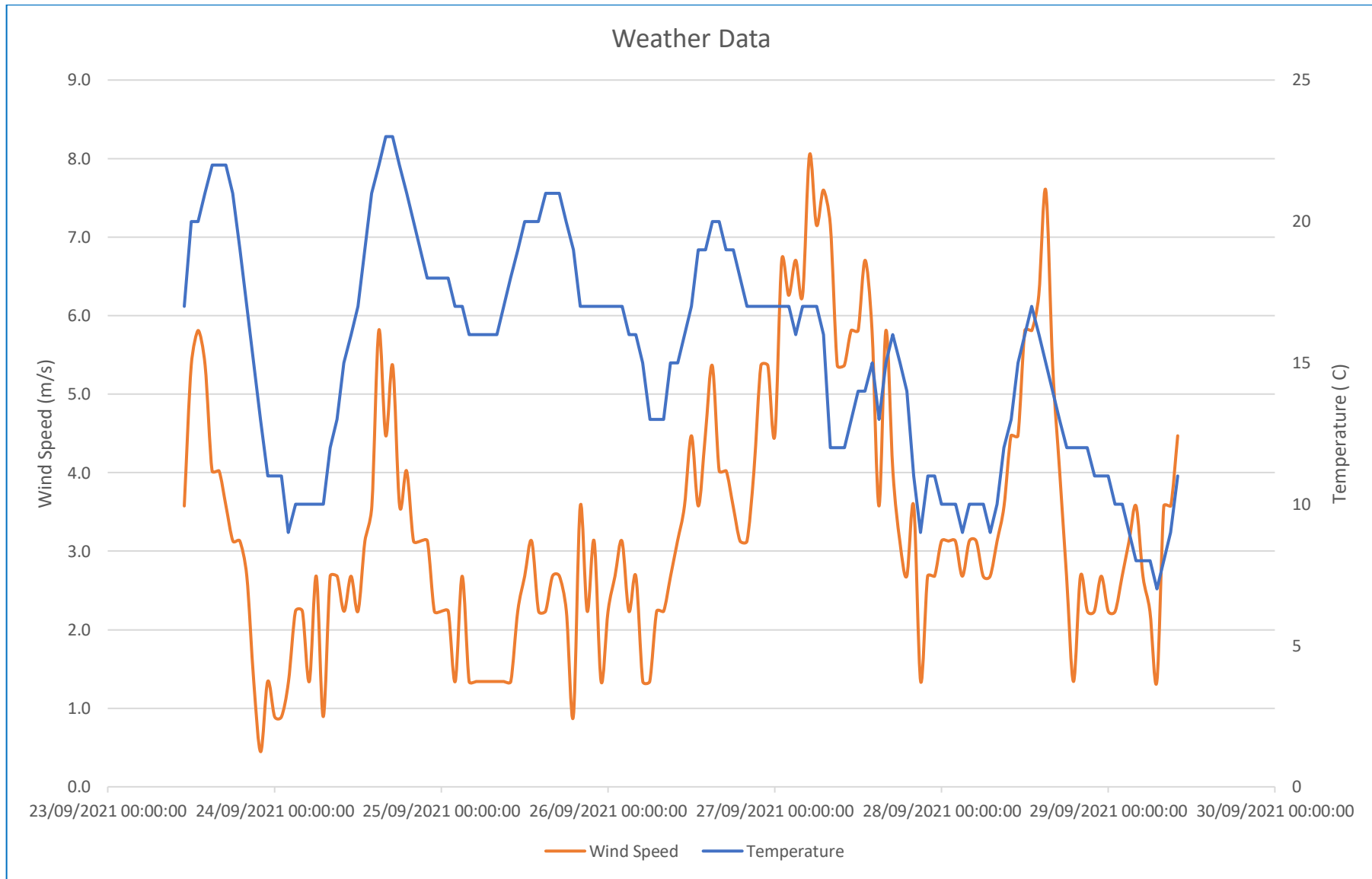
Appendix 3 – Long-Term Noise Monitoring Data







Appendix 4 – Weather Data Summary



Appendix 5 – Noise Contour Plot at 4.5m AGL

