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Proposed asphalt production plant, Land at Nene Transport (Lincs) Ltd depot, off A17, Sutton Bridge

BS4142:2014+A1:2019 Sound Assessment Report

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On behalf of
Franklin Bros Ltd

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1.0 INTRODUCTION

1.1 Blue Tree Acoustics has been appointed c/o Franklin Bros Ltd to carry out a noise assessment for a proposed asphalt production site on land at the Nene Transport (Lincs) Ltd depot, off A17, Sutton Bridge.

1.2 The development site is located within an established industrial/commercial site off the A17, in Sutton Bridge, within the existing Nene Transport (Lincs) Ltd depot site. Current operation of the site involves transport and logistics use, including loading and movement of HGVs.

1.3 We understand that asphalt production is desirable in the area, and that job creation and local supply of product are both in need around South Holland.

1.4 We understand that the development proposal is to install the Bulldog Plant & Equipment Ltd asphalt production plant as shown in Bulldog Plant & Equipment Ltd's drawing ref. SB/002 Rev IV Alt E dated dated 02/10/2024. This includes various items and processes, such as cold feeders, drum dryer, mixing tower, tanks, hot storage, etc. The proposal is for product to be made only during daytime hours, i.e. not between 2300-0700 hours. The proposal is for product to exit the site from 0500 hours onwards, with electrically heated storage tanks quietly storing product overnight. Product will also be created and exported during the day.

1.5 The proposed development land is currently part of the Nene Transport (Lincs) Ltd storage and distribution Class B8 site, which was granted unrestricted use on 25/03/2019 under application ref. H18-0098-19. The site enjoys unrestricted vehicles movements 24 hours per day. Vehicle movements on the site are therefore part of the character of the area and are already permitted on this land. The decision notice can be found on the SHDC planning portal: https://planning.sholland.gov.uk/OcellaWeb/viewDocument?file=dv_pl_files%5CH18-0098-19%5CODBPDF256194.pdf&module=pl

1.6 The noise impact assessment has included:

a) Inspection of the site and surroundings.

b) Review of plans of the proposed development provided by the Client/Design Team.

c) Background sound monitoring survey undertaken at the proposed development site.

d) Consideration of source sound level data previously collected by others at a similar operation in Derbyshire, and consultation with Bulldog Plant & Equipment Ltd regarding available noise attenuation methods.

e) Consideration of noise impact and sound control measures required to reduce sound impact in accordance with *British Standard 4142:2014+A1:2019 'Methods for rating and assessing industrial and commercial sound'* (BS4142:2014).

1.7 A glossary of technical terminology and parameters used in this report is provided in Appendix 1.

2.0 NOISE SURVEY

2.1 The assessment of sound from industrial and commercial sources (including BS4142 assessment) typically requires quantification and consideration of the following key aspects:

a) Specific sound source – This is the sound source to be assessed.

b) Specific sound level – This is the sound level of the specific sound source at the assessment location, which is typically the nearest noise-sensitive receptor, such as a nearby dwelling. The specific sound level can be derived by direct measurement of the specific sound sources, or from manufacturer's data. Described in terms of L_{Aeq}.

c) Ambient sound level – This is the totally encompassing sound at the assessment location at a given time. This usually comprises many sources, near and far, as well as the specific sound where present. Described in terms of L_{Aeq}.

d) Residual sound level – This is the ambient sound remaining at the assessment location in the absence of the specific sound, e.g. when the specific sound source is turned off or suppressed to such a degree that it does not contribute to the ambient sound. Residual sound levels can be used to correct ambient sound levels as a means of removing the other sound levels from the total, so as to derive the specific sound level. Described in terms of L_{Aeq}.

e) Background sound level – This is the sound pressure level during the quietest times, in the absence of the specific sound source. It is the level exceeded for 90% of the measurement time during the period to be assessed. Described in terms of L_{A90}.

f) Reference time interval – This is the specified interval over which the specific sound is assessed. BS4142 defines this as 1 hour during daytime (0700-2300 hours) and 15 minutes during nighttime (2300-0700 hours).

2.2 Unattended background sound level monitoring was undertaken by Blue Tree Acoustics from Thursday 16/11/2023 into Monday 27/11/2023 at Location 1 (indicated in Figure 1). The measurements were taken at an accessible location near the dwellings at Flint Gate, these being the nearest residential properties to the proposal. Location 1 is therefore considered to be suitably representative of the nearest noise-sensitive receptor.

2.3 Additional unattended background sound level monitoring was undertaken from Thursday 16/11/2023 into Friday 24/11/2023 at Location 2 (also indicated in Figure 1). The measurements were taken at an accessible location near the dwellings at Kenzie Drive.

2.4 The instruments used during the sound surveys were 2no Rion NL-52 Type 1/ Class 1 integrating sound level meters. Each meter was within a valid period of laboratory calibration. Calibration checks were carried out both before and after the measurements, with no variance observed, and all calibration being within 0.1dB of the stated value. A proprietary environmental windshield was fitted to each microphone. The background sound level measurements were made over a series of contiguous 15-minute periods, with each microphone being mounted on a tripod at approximately 1.5m height above local ground level.

2.5 Weather conditions throughout the survey periods were mainly dry and calm, with wind speeds <5m/s. There were a few periods with undesirable weather, and these periods are excluded from the dataset. Archival weather data from a local weather station is presented in Appendix 4.

2.6 The measurement results are detailed in Appendix 2, and are summarised in the tables below.

Table 1: Free-field external sound levels at Location 1

Time period	dB $L_{Aeq,15min}$	dB $L_{Amax,15min}$	dB $L_{A10,15min}$	dB $L_{A90,15min}$
Daytime (0700-2300 hours)	48 - 65 (Average = 58)	58 - 91	51 - 70	34 - 59
Nighttime (2300-0700 hours)	42 - 63 (Average = 54)	56 - 81	46 - 64	25 - 59
Nighttime (0500-0700 hours)	47 - 63 (Average = 58)	58 - 77	52 - 64	35 - 59

a) Representative daytime background sound level: 55dB L_{A90}

b) Representative nighttime background sound level: 37dB L_{A90}

c) Representative 0500-0700 hours background sound level: 53dB L_{A90}

Table 2: Free-field external sound levels at Location 2

Time period	dB $L_{Aeq,15min}$	dB $L_{Amax,15min}$	dB $L_{A10,15min}$	dB $L_{A90,15min}$
Daytime (0700-2300 hours)	44 - 68 (Average = 56)	53 - 93	46 - 72	38 - 56
Nighttime (2300-0700 hours)	40 - 65 (Average = 51)	52 - 83	42 - 68	30 - 56
Nighttime (0500-0700 hours)	49 - 65 (Average = 56)	57 - 83	52 - 68	44 - 56

d) Representative daytime background sound level: 52dB L_{A90}

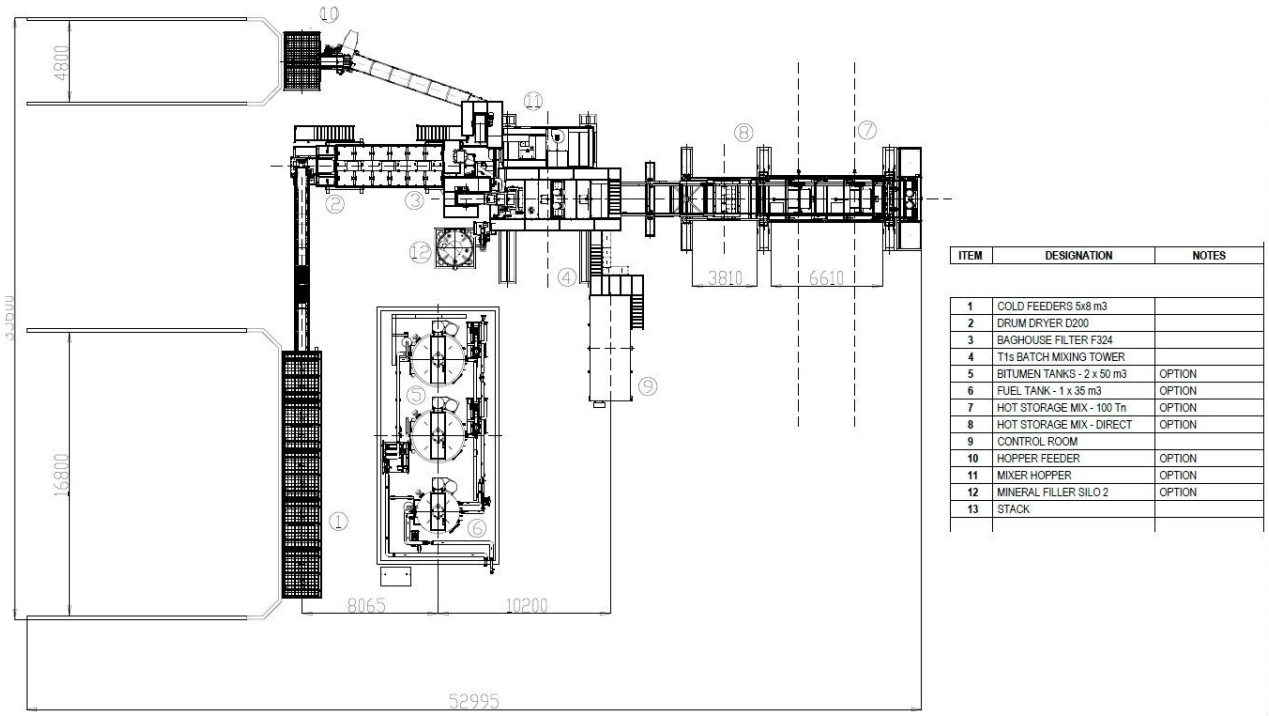
e) Representative nighttime background sound level: 42dB L_{A90}

f) Representative 0500-0700 hours background sound level: 51dB L_{A90}

2.7 The prevailing sound levels were generally contributed to by traffic movements on the A17 and surrounding roads, local transport and HGV events, and distant plant noise.

3.0 NOISE ASSESSMENT

3.1 We understand that the following asphalt production plant installation layout is currently proposed:



ITEM	DESIGNATION	NOTES
1	COLD FEEDERS 5x8 m3	
2	DRUM DRYER D200	
3	BAGHOUSE FILTER F324	
4	T1s BATCH MIXING TOWER	
5	BITUMEN TANKS - 2 x 50 m3	OPTION
6	FUEL TANK - 1 x 35 m3	OPTION
7	HOT STORAGE MIX - 100 Tn	OPTION
8	HOT STORAGE MIX - DIRECT	OPTION
9	CONTROL ROOM	
10	HOPPER FEEDER	OPTION
11	MIXER HOPPER	OPTION
12	MINERAL FILLER SILO 2	OPTION
13	STACK	

3.2 Information from a noise survey undertaken by others, of a similar site in an unattenuated state, has been provided to us, which contains the primary noise source data on which analysis of this site proposal is based. Additional information from the manufacturer Bulldog Plant & Equipment Ltd has also been provided to us. Source sound data representative of vehicle movements and shovel activity within the site has been taken from the database provided in *British Standard 5228-1:2009+A1:2014 'Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 1: Noise'* (BS5228-1).

3.3 For the majority of the night, there will be no noise generated onsite. At the end of the nighttime period (i.e. 0500-0700 hours), the proposal is for product to be taken from site, and therefore there will be some noise generated primarily by vehicle movements onsite between 0500-0700 hours. There will be normal use of the site post-0700 hours until around 1800 hours, with product creation and product export both being possible.

3.4 The primary noise sources are to be attenuated, with the mixing tower having an acoustic steel sandwich panel screening installed, the burner being provided with a silencer, the dryer being

provided with barriering, the exhaust fan being boxed in, and the cold store hoppers being lined with rubber to remove the material on steel impact.

3.5 We understand that the asphalt production process involved is as described below by Bulldog Plant & Equipment Ltd:

"An Asphalt Mixing Plant is designed to manufacture Asphalt from it's raw ingredients through the plant and discharge into lorries/trucks or loading vessels by using a highly efficient process which is environmentally friendly and very safe to the operators and collection drivers alike.

STAGE 1

The raw materials could be delivered to the asphalt manufacturing plant by Land, Sea or Rail, this will include Aggregate, Sand, Bitumen, Fibres and Filler. These materials will be safely stored in appropriate bays, silos and storage tanks ready for processing within the plant.

STAGE 2

The State-of-the-Art control system will have asphalt mixes pre-stored within the data bank of the plant computer and it will call up each ingredient to be processed within the manufacturing plant.

The plant will initially feed sand and aggregates at the required rate into the dryer drum for heating these products and removing any residual moisture to ensure that fuel usage is kept to a minimum.

The dryer is linked to a highly efficient Bag Filter Dust Collection system to remove the super-fine dust particles and collect them for recycling within the plant . The average dust emission into the atmosphere will be 10mg/cu.m and guaranteed to be not more than 20mg/cu.m.

STAGE 3

The Hot and Dry sand and aggregate will then feed into the plant Mixing Section where screening and regrading of the individual sizes will be processed, this ensures that the mix is 100% accurate.

The Aggregates, Sand, filler and Bitumen are then accurately weighed and discharged into the mixer in the correct proportions and the correct temperature, the mixing process will be approximately 25-45 seconds depending upon the mix specification.

STAGE 4

The final finished Asphalt material is then either loaded directly into the truck for direct delivery to the jobsite or the material is stored in mixed material storage hoppers ready for loading as and when required. Material can be stored in these hoppers for up to 24 hours as they are super heat efficient with minimal temperature loss.

The hoppers are totally encapsulated to eliminate any possible odours."

3.6 Based on the above, a CadnaA model has been created, into which source sound levels, locations, vehicle routes, topography data, etc. have been input. The CadnaA acoustic model outputs and details are presented in Appendix 3. The calculated sound levels at the worst-affected dwellings in the regions of Location 1 and Location 2 are set out below.

Table 3: Calculated operational sound levels at nearest noise-sensitive receptor

Description	**dB $L_{Aeq,1hour}$ Daytime (0700-2300 hours)**	**dB $L_{Aeq,15min}$ Nighttime (0500-0700 hours)**
Combination of sources, as experienced at Location 1 area dwellings	56	48
Combination of sources, as experienced at Location 2 area dwellings	52	44

3.7 Other residential properties in the area are situated at greater distances from the development site, and therefore the predicted noise impact upon them will be less.

3.8 The above calculated values are lower than the residual noise levels at both Location 1 and Location 2.

3.9 The following section considers the predicted noise impact with regard to BS4142:2014.

4.0 BS4142:2014+A1:2019 COMMERCIAL/INDUSTRIAL SOUND IMPACT ASSESSMENT

4.1 The most relevant British Standard for assessing sound impact from commercial and industrial premises upon residential property is *British Standard 4142:2014+A1:2019 'Methods for rating and assessing industrial and commercial sound'* (BS4142:2014). This requires the level of sound radiating from the proposed, new, modified or additional source(s) of sound of an industrial and/or commercial nature (in L_{Aeq}) to be compared with the existing Background Sound Level (L_{A90}) at any nearby residential property.

4.2 The scope of BS4142 states:

"1.1 This British Standard describes methods for rating and assessing sound of an industrial and/or commercial nature, which includes:

a) sound from industrial and manufacturing processes;

b) sound from fixed installations which comprise mechanical and electrical plant and equipment;

c) sound from the loading and unloading of goods and materials at industrial and/or commercial premises; and

d) sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from premises or processes, such as that from forklift trucks, or that from train or ship movements on or around an industrial and/or commercial site.

The methods described in this British Standard use outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident.

1.2 This standard is applicable to the determination of the following levels at outdoor locations:

a) rating levels for sources of sound of an industrial and/or commercial nature;

and

b) ambient, background and residual sound levels, for the purposes of:

1) investigating complaints;

2) assessing sound from existing, proposed, new, modified or additional source(s) of sound of an industrial and/or commercial nature; and

3) assessing sound at proposed new dwellings or premises used for residential purposes.

1.3 The determination of noise amounting to a nuisance is beyond the scope of this British Standard.

Sound of an industrial and/or commercial nature does not include sound from the passage of vehicles on public roads and railway systems.

The standard is not intended to be applied to the rating and assessment of sound from:

a) recreational activities, including all forms of motorsport;

b) music and other entertainment;

c) shooting grounds;

d) construction and demolition;

e) domestic animals;

f) people;

g) public address systems for speech; and

h) other sources falling within the scopes of other standards or guidance.

The methodology set out in Clauses 7, 8, and 9 of this standard is not intended to be used to assess the extent of the impact at indoor locations. Internal sound levels can be taken into account as outlined in Clause 11.

The standard is not intended to be applied to the assessment of indoor sound levels.

The standard is not applicable to the assessment of low frequency noise."

4.3 The standard describes various methods for determining whether a correction or corrections should be applied to reflect the prominence of characteristic features in the industrial/commercial specific sound experienced at the assessment location. In subjective assessment, if the industrial/commercial sound has a tonal element that is just perceptible at the receptor, a 2dB penalty can be applied. If the tone is clearly perceptible, a 4dB penalty can be applied. If the tone is highly perceptible, a 6dB penalty can be applied. The standard also describes two objective methods for assessing tonal sound which may apply a penalty of up to 6dB.

4.4 Similarly, a penalty of 3dB can be applied for a sound that has impulsivity that is just perceptible. If the impulsivity is clearly perceptible, a 6dB penalty can be applied. If the impulsivity is highly

perceptible, a 9dB penalty can be applied. The standard also describes an objective method for assessing impulsivity which may apply a penalty of up to 9dB.

4.5 If the sound has clearly identifiable on/off conditions during the reference period and this is readily distinctive against the residual acoustic environment during the reference period, a 3dB penalty for intermittency can be applied. No objective method is given in the standard for assessing intermittency.

4.6 Where characteristic features of the specific sound are neither tonal nor impulsive, nor intermittent, but are readily distinctive against the residual acoustic environment, a 3dB subjective penalty can be applied.

4.7 Therefore, depending on the circumstances, a total penalty of between 0 and 18dB could potentially be applied to allow for characteristic features of the industrial/commercial sound. However, BS4142:2014 does state that, if any single feature is dominant to the exclusion of others, then it may be appropriate to apply a reduced or zero correction for the minor characteristic. Also, the subjective prominence of the character of the specific sound at the noise-sensitive receptor should be considered, and the extent to which such characteristics will attract attention and/or be masked by residual sound at that location.

4.8 The level of the industrial/commercial sound measured or calculated in L_{Aeq} terms, plus any penalty as described above, provides the Rating Level.

4.9 BS4142 states that:

"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. An effective assessment cannot be conducted without an understanding of the reason(s) for the assessment and the context in which the sound occurs/will occur. When making assessments and arriving at decisions, therefore, it is essential to place the sound in context.

Obtain an initial estimate of the impact of the specific sound by subtracting the measured background sound level (…) from the rating level (…).

NOTE 1. More than one assessment might be appropriate.

a) Typically, the greater this difference, the greater the magnitude of the impact.

b) A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.

c) A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.

d) The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.

NOTE 2. 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 following.

1) The absolute level of sound. For a given difference between the rating level and the background sound level, the magnitude of the overall impact might be greater for an acoustic environment where the residual sound level is high than for an acoustic environment where the residual sound level is low.

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

Where residual sound levels are very high, the residual sound might itself result in adverse impacts or significant adverse impacts, and the margin by which the rating level exceeds the background might simply be an indication of the extent to which the specific sound source is likely to make those impacts worse.

2) The character and level of the residual sound compared to the character and level of the specific sound. Consider whether it would be beneficial to compare the frequency spectrum and temporal variation of the specific sound with that of the ambient or residual

sound, to assess the degree to which the specific sound source is likely to be distinguishable and will represent an incongruous sound by comparison to the acoustic environment that would occur in the absence of the specific sound. Any sound parameters, sampling periods and averaging time periods used to undertake character comparisons should reflect the way in which sound of an industrial and/or commercial nature is likely to be perceived and how people react to it.

NOTE 3 Consideration ought to be given to evidence on human response to sound and, in particular, industrial and/or commercial sound where it is available. (…)

3) The sensitivity of the receptor and whether dwellings or other premises used for residential purposes will already incorporate design measures that secure good internal and/or outdoor acoustic conditions, such as:

i) facade insulation treatment;

ii) ventilation and/or cooling that will reduce the need to have windows open so as to provide rapid or purge ventilation; and

iii) acoustic screening."

4.10 BS4142:2014 lists the following information to be reported when assessing sites to the standard.

Table 4: BS4142:2014+A1:2019 – Required information

a) Statement of qualifications, competency, professional memberships and experience directly relevant to the application of this British Standard of all personnel contributing to the assessment:
Richard Watson BEng(Hons) Electroacoustics, Chartered Engineer, Member of the Institute of Acoustics, has undertaken many BS4142 assessments previously. Blue Tree Acoustics is a member of the Association of Noise Consultants (ANC).

b) Source being assessed as follows:	
1) description of the main sound sources and of the specific sound;	Asphalt plant, product creation, storage, and export.
2) hours of operation;	Creation between 0700-1800 hours, export from site between 0500-1800 hours.
3) mode of operation (e.g. continuous, twice a day, only in hot weather);	The site is complex, with various sound-generating items switching on and off through the process. In addition, vehicles will come to site to deliver raw ingredients and to collect batched product.
4) statement of operational rates of the main sound sources (e.g. maximum load setting, 50% max rate, low load setting); and	We understand that the source sound level data is for equipment operating at normal capacity. 3no lorry movements are assumed to take place constantly throughout the assessment period from 0500-1800 hours. The production process is assumed to take place form 0700-1800 hours.
5) description of premises in which the main sound sources are situated (if applicable).	As described in Section 3.0 above and as shown in Figure 2.
c) Subjective impressions, including:	
1) dominance or audibility of the specific sound; and	The specific sound source does not yet exist at the site location.
2) main sources contributing to the residual sound.	The specific sound source does not yet exist at the site location.
d) The existing context (see Clause 4 and Clause 11), including an assessment of the sensitivity of the receptor:	
The sensitive receptor is as described in this report, being the nearest dwellings to the development site. There are other dwellings in the wider area situated at greater distance from the proposed operation. As such, this assessment considers impact at the receptor most exposed to the specific sound source; the impact at more distant dwellings will be less.	

e) Measurement locations, their distance from the specific sound source, the topography of the intervening ground and any reflecting surface other than the ground, including a photograph, or a dimensioned sketch with a north marker. A justification for the choice of measurement locations should also be included.
Data gathered over a number of days is preferred, and thus the logging locations must be secure and accessible. Background sound measurements made at the following locations are taken to be representative of the sound levels at the dwelling locations. Location 1 was selected to be suitably representative of the nearest residential receptor to the development site. This is essentially a free-field location near Flint Gate, and is as marked in Figure 1 of this report. A photograph of measurement Location 1 is presented below. 

Location 2 was selected to be suitably representative of the dwellings to the northwest of the development site, and to give additional information to verify that data from Location 1 was not abnormal. This is essentially a free-field location near Kenzie Drive, and is as marked in Figure 1 of this report. A photograph of measurement Location 2 is presented below.



f) Sound measuring systems, including calibrator or pistonphone used:		
	Location 1	**Location 2**
1) type and/or model;	Class 1/Type 1 sound level meter. Rion NL-52.	Class 1/Type 1 sound level meter. Rion NL-52.
2) manufacturer;	Rion	Rion
3) serial number (S/N); and	01021309	00331824
4) details of the latest verification test including dates.	Calibrated by ANV on 08/11/2023.	Calibrated by CMR Ltd on 25/10/2023.
g) Operational tests:		
1) reference level(s) of calibrator, multi-function calibrator or pistonphone; and	94.0dB Brüel & Kjær 4230 calibrator (S/N 1411221), calibrated by ANV on 08/11/2023.	94.0dB Rion NC-74 calibrator (S/N 34257022), calibrated by CMR Ltd on 24/10/2023.

	Location 1	**Location 2**
2) meter reading(s) before and after measurements with calibrator, multi-function calibrator or pistonphone applied.	93.6dB pre-measurement 93.6dB post-measurement	93.7dB pre-measurement 93.6dB post-measurement
h) Weather conditions, including:		
1) wind speed(s) and direction(s);	Data considered to be <5m/s, as supported by archival data from a local weather station (reproduced in Appendix 4).	
2) presence of conditions likely to lead to temperature inversion (e.g. calm nights with little cloud cover);	Temperature inversion improbable, given the proximity of the assessment location to sound sources.	
3) precipitation;	Periods of significant precipitation are excluded from the dataset.	
4) fog;	None	
5) wet ground;	Occasional	
6) frozen ground or snow coverage;	None	
7) temperature; and	As presented in Appendix 4	
8) cloud cover.	Approximately 50% cloud cover witnessed during equipment installation and collection times.	
i) Dates and times of measurements		
As set out in this report.		
j) Measurement time intervals:		
As set out in this report.		
k) Reference time interval(s).		
1 hour in the daytime. 15 minutes in the nighttime.		

l) Measured sound level(s):	
1) residual sound level(s) and method of determination;	Specific sound source not operational (see below for more information).
2) ambient sound level(s) and method of determination;	Ambient sound levels as measured at Location 1 were 58dB L_{Aeq} during the day, and 54dB L_{Aeq} at nighttime. Ambient sound levels measured at Location 1 are 58dB L_{Aeq} in the period of 0500-0700 hours. Ambient sound levels as measured at Location 2 were 56dB L_{Aeq} during the day, and 51dB L_{Aeq} at nighttime. Ambient sound levels measured at Location 2 are 56dB L_{Aeq} in the period of 0500-0700 hours. See Appendix 2 for more information.
3) specific sound level(s) and method of determination;	It was not possible to determine the specific sound level by measurement at the site location, as the plant does not currently exist in-situ. Manufacturer's source data was provided by the Client, which has been used as the primary data source in this assessment. This data comes from measurements made by others at a similar operation. The greatest predicted daytime specific sound level at the nearest residential property is 56dB $L_{Aeq,1hour}$ between 0700-1800 hours, with all sources operational. This is calculated at window level of the nearest dwellings using CadnaA acoustic modelling software. The greatest predicted nighttime specific sound level at the nearest residential property is 48dB $L_{Aeq,15min}$ between 0500-0700 hours, based on 3no continual lorry movements throughout the period.

4) justification of methods; and	Method follows BS4142 procedure for determining specific sound level where the specific source is not in-situ.
5) details of any corrections applied.	Corrections applied in the calculation for distance, barriers, etc., as per ISO 9613-2:1996, as applied by CadnaA.
m) Background sound level(s) and measurement time interval(s) and, in the case of measurements taken at an equivalent location, the reasons for presuming it to be equivalent:	
15-minute measurements were made at Location 1 and Location 2 as described in this report. The representative background sound level at Location 1 was found to be 55dB L_{A90} during the daytime, and 53dB L_{A90} between 0500-0700 hours. The representative background sound level at Location 2 was found to be 52dB L_{A90} during the daytime, and 51dB L_{A90} between 0500-0700 hours. This data is detailed in Appendix 2.	
n) Rating level(s):	
1) specific sound level(s);	Location 1 area daytime: 56dB L_{Aeq} Location 1 area 0500-0700 hours: 48dB L_{Aeq} Location 2 area daytime: 52dB L_{Aeq} Location 2 area 0500-0700 hours 44dB L_{Aeq}
2) any acoustic features of the specific sound; and	A tone might be audible in the daytime, but this is not evidenced in the source sound data. A +2dB acoustic feature correction for tonality is therefore applied in the daytime. Activity in the period of 0500-0700 hours is essentially vehicle movements, which are similar to the activities already occurring onsite and on the adjacent A17. No perceptible tone is expected from this activity. There may be impulsive activities occasionally, and so a +3dB acoustic feature correction for impulsivity is applied to both daytime activity and 0500-0700 hours activity to be conservative.

3) rating level(s).	Location 1 area daytime: 61dB Location 1 area 0500-0700 hours: 51dB Location 2 area daytime: 57dB Location 2 area 0500-0700 hours 47dB
o) Excess of the rating level(s) over the measured background sound level(s) and the initial estimate of the impacts:	
Location 1 area daytime: +6dB Location 1 area 0500-0700 hours: -2dB Location 2 area daytime: +5dB Location 2 area 0500-0700 hours: -4dB	
p) Conclusions of the assessment after taking context into account:	
-2dB and -4dB would be considered 'low impact' in BS4142 terms. This is desirable. +5dB and +6dB would be considered 'adverse impact' in BS4142 terms, but not 'significant adverse impact'. This is also usually acceptable.	
q) The potential impact of uncertainty:	
BTA measurements have been undertaken in accordance with relevant standards and guidelines to minimise measurement uncertainty. Class 1/Type 1 instruments have been used for all BTA measurements. The BTA-measured sound levels are considered to be accurate. Sound levels were measured at suitable locations representative of neighbouring noise-sensitive receptors (NSRs) over an extended monitoring period. Assumptions are inevitably made in acoustic modelling and in the assigning of source sound pressure level data taken from another site and measured by others, as well as in data from British Standards for point, line, and area sources used in an acoustic model. There is inevitably potential uncertainty in the third-party source sound level data provided for the operational plant, and in the translation of this for use in the CadnaA noise modelling. However, the acoustic model is considered to be sufficiently robust for consideration of the potential impact of the proposed scheme.	

5.0 OTHER CONSIDERATIONS

5.1 Some Local Authorities consider this type of minerals processing to fall within the Government's 'Guidance on the planning for mineral extraction in plan making and the application process' (https://www.gov.uk/guidance/minerals), which is akin to MPS2. The government guidance states:

> *"What are the appropriate noise standards for mineral operators for normal operations?*
>
> *Mineral planning authorities should aim to establish a noise limit, through a planning condition, at the noise-sensitive property that does not exceed the background noise level (L_{A90},1h) by more than 10dB(A) during normal working hours (0700-1900). Where it will be difficult not to exceed the background level by more than 10dB(A) without imposing unreasonable burdens on the mineral operator, the limit set should be as near that level as practicable. In any event, the total noise from the operations should not exceed 55dB(A) L_{Aeq}, 1h (free field). For operations during the evening (1900-2200) the noise limits should not exceed the background noise level (L_{A90},1h) by more than 10dB(A) and should not exceed 55dB(A) L_{Aeq}, 1h (free field). For any operations during the period 22.00 – 07.00 noise limits should be set to reduce to a minimum any adverse impacts, without imposing unreasonable burdens on the mineral operator. In any event the noise limit should not exceed 42dB(A) L_{Aeq},1h (free field) at a noise sensitive property."*

5.2 The operation of the proposed asphalt production plant at this site is expected to normally comply with the above guidance – i.e. daytime specific sound levels of no more than 55dB L_{Aeq}, and not exceeding the background sound level (at least 52dB L_{A90}). Peak hours of operation may exceed the 55dB L_{Aeq} criterion by 1dB at 1no bungalow dwelling. In this context, it can be considered that the predicted daytime operational sound impact is within suitable limits.

5.3 The nighttime vehicle movements resulting in less than +0dB in BS4142 terms is also considered to be an acceptable limit to minimise adverse impacts, but does not strictly meet the 42dB L_{Aeq} limit proposed above. Vehicle movements would not normally be considered to be 'mineral processing' in any case. Additionally, the predicted noise level from vehicle movements is at least 5dB less than the prevailing residual noise experienced at the receptors, which primarily comprises traffic and transportation noise, including that currently experienced from the

application site. As such, the noise generated by the proposed new vehicle movements will be of minimal effect in comparison with the prevailing sound climate.

6.0 MITIGATION

6.1 The acoustic model assumes cladding of the complete mixing tower in composite steel sandwich Kingspan style panels, as per the manufacturer's proposal. The burner is also to be provided with a silencer and the dryer is to be provided with barriering, as per the manufacturer's proposal. The exhaust fan adjacent to the bag filter is also to be enclosed in a composite panel casing. The cold feed hoppers will also be provided with a rubber/plastic lining.

6.2 The processing of material will not occur outside of 0700-1800 hours.

6.3 The collection and removal of product will not occur outside of 0500-1800 hours.

6.4 The site will implement management controls to minimise excessive noise generation, e.g. limiting speeds to 10mph, avoiding unnecessary revving of engines, designing vehicle routes to avoid reversing and use of reversing alarms, ensuring vehicle routes comprise smooth, made-up surfaces.

7.0 SUMMARY AND CONCLUSIONS

7.1 A noise assessment has been carried out c/o Franklin Bros Ltd for a proposed asphalt production site on land at the Nene Transport (Lincs) Ltd depot, off A17, Sutton Bridge.

7.2 The proposal is understood to be for asphalt production and associated activity.

7.3 The results of the assessment show that operation of the proposed plant will generate a sound impact of less than +0dB in BS4142 terms during nighttime. This is considered to be 'low impact' in BS4142 terms.

7.4 The results of the assessment show that the operation of the equipment will generate a sound impact of around +5dB during daytime at the nearest noise-sensitive receptors, when assessed with regard to BS4142:2014. This is considered to be 'adverse impact' in BS4142 terms, but not 'significant adverse impact' – i.e. of less than 'significant adverse impact'.

7.5 It is considered that planning permission can be granted for the asphalt plant operation at this location.

8.0 DISCLAIMER

8.1 This document is limited to addressing the specific acoustic issues contained herein, and its content is based on drawings and information provided to date by our Client/their Design Team.

8.2 All findings, comments, recommendations, etc., in this document are for acoustic purposes only; any and all other considerations and requirements, e.g. structural, airflow, thermal, fire safety, CDM compliance, determination of whether materials are dangerous, hazardous, deleterious, etc. (non-exhaustively), are the responsibility of other such suitably qualified specialists to check and advise on.

8.3 All findings, comments, recommendations, etc., in this document have been prepared with reasonable skill and care by BTA, within the scope of our Client's brief and timescales. Calculations and estimates upon which BTA's findings are elaborated are based on reasonable assumptions and industry practice that, by their nature, involve uncertainties that could cause future onsite results to differ materially from those predicted. BTA does not guarantee or warrant any calculation or estimate made, especially those based on data measured by third parties or information provided by third parties to BTA or otherwise relied upon by third parties. Any third-party information required and/or provided for the purpose of completing this document should not be considered as verified by BTA.

8.4 BTA's work may occasionally involve provision of acoustic performance advice and acoustic design recommendations that others may choose to regard as a "specification" under CDM 2015 (and thus others may occasionally choose to regard BTA to be a "Designer" under CDM 2015). Notwithstanding this, it is always the responsibility of others (Principal Designer) to approve/incorporate into their final design – or not – their final specification selections; although these may be based on BTA's acoustic performance advice, as BTA neither has control over how or whether BTA's acoustic advice is incorporated into the final design by others, nor any power to enforce that any such final specification selections made by others based on BTA's advice are appropriate in any regard beyond their acoustic performance qualities, it also remains the responsibility of others under CDM 2015 to ensure that any ancillary (non-acoustic) considerations in the course of selection, installation, maintenance, etc. of final specifications are advised upon by such relevantly qualified specialists (non-acoustic, and therefore non-BTA), and that any safety precautions identified in the course of their consideration by others are taken by others (the Principal Designer, Designers, Contractors, Client, etc.).

8.5 Products and materials that perform well acoustically tend to be heavier than standard products. Use of these products and materials may increase the weight of the element, and the CDM

Principal Designer, Client, etc. must take care to ensure that this risk is mitigated as far as possible with appropriate changes to their design, and the Client, Principal Contractor, Contractor, Installer, Fitter, etc. must ensure that appropriate and safe lifting and installation techniques, maintenance, etc. are used to reduce any remaining risk. Wherever BTA advises that works such as acoustic barriers are desirable to attenuate noise, care must be taken by the CDM Principal Designer, Client, etc. to ensure that the risks associated with constructing and maintaining bunds, walls, fences, etc. are mitigated as far as possible with appropriate changes to their design, and the Client, Principal Contractor, Contractor, Installer, Fitter, etc. must ensure that appropriate and safe construction and installation techniques, maintenance, etc. are used to reduce any remaining risk.

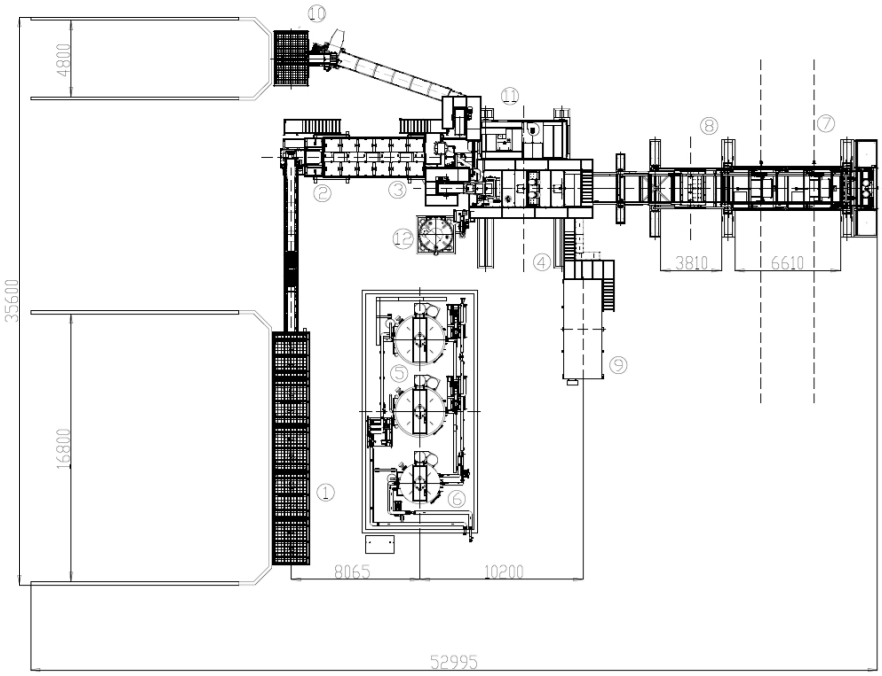
8.6 This document has been prepared for the sole use, benefit, and information of our direct Client for the purposes agreed at the time of their formal instruction, and the information contained herein is the sole property of, and confidential to, our direct Client. The liability of BTA in respect of the information contained herein will not extend to any third party.

FIGURE 1 – SITE AERIAL VIEW AND APPROXIMATE MEASUREMENT LOCATIONS



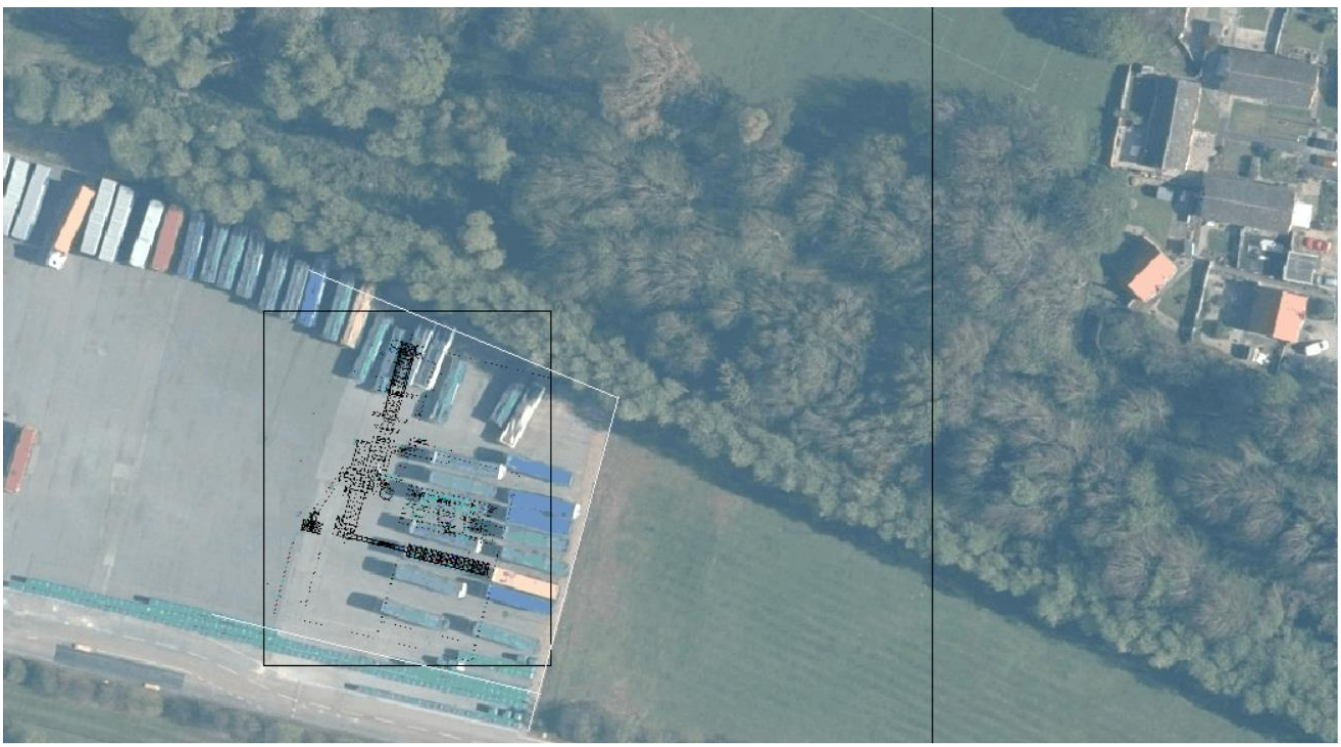
FIGURE 2 – PROPOSED LAYOUT PLAN AND OVERLAY ONTO SITE AERIAL VIEW

Site layout plan and key



ITEM	DESIGNATION	NOTES
1	COLD FEEDERS 5x8 m3	
2	DRUM DRYER D200	
3	BAGHOUSE FILTER F324	
4	T1s BATCH MIXING TOWER	
5	BITUMEN TANKS - 2 x 50 m3	OPTION
6	FUEL TANK - 1 x 35 m3	OPTION
7	HOT STORAGE MIX - 100 Tn	OPTION
8	HOT STORAGE MIX - DIRECT	OPTION
9	CONTROL ROOM	
10	HOPPER FEEDER	OPTION
11	MIXER HOPPER	OPTION
12	MINERAL FILLER SILO 2	OPTION
13	STACK	

Site layout plan overlay onto site aerial view



APPENDIX 1 – TECHNICAL UNITS AND INDICES

a) Sound Pressure Level and the decibel (dB)

A sound wave is a small fluctuation of pressure in air. The human ear responds to these variations in pressure, producing the sensation of hearing. The ear can detect a very wide range of pressure variations. Due to the wide range of pressure variations detectable by the ear, a logarithmic scale is used to convert the values into manageable numbers. The dB (decibel) is the logarithmic unit used to describe sound (or noise) levels. The usual range of sound pressure levels is from 0 dB (threshold of hearing) to 120 dB (threshold of pain).

b) Frequency and Hertz (Hz)

Frequency is a measure of the rate of fluctuation of a sound wave. The unit used is cycles per second, or Hertz (Hz). Sometimes large frequencies are often written as kilohertz (kHz), where 1kHz = 1000Hz.

Young people with normal hearing can hear frequencies in the range 20Hz to 20kHz. However, the upper frequency limit gradually reduces as a person gets older.

As the ear hears some frequencies better than others, the A-weighting scale is used to mimic human hearing. A-weighing applies a correction to the sound level at a given frequency depending on how well the ear hears that frequency.

c) Glossary of Terms

In order to describe noise where the level is continuously varying, a number of other indices, including statistical parameters, are used. The indices used in this report are described below.

L_{Aeq} This is the A-weighted equivalent continuous sound level which is an average of the total sound energy measured over a specified time period. In other words, L_{Aeq} is the level of a continuous noise which has the same total (A-weighted) energy as the real fluctuating noise, measured over the same time period.

L_{Amax} This is the maximum A-weighted sound level that was recorded during the monitoring period.

L_{A90} This is the A-weighted sound level exceeded for 90% of the time period. L_{A90} is used as a measure of background noise.

L_{A10} This is the A-weighted sound level exceeded for 10% of the time period and is often used in the assessment of road traffic noise.

NR Measured noise levels in each octave band are compared to the NR curve reference values. The overall NR value is the lowest NR curve that has not been exceeded.

$D_{nT,w}$ Weighted standardised level difference, a single figure generated by comparing the D_{nT} with a reference curve. The reference curve is shifted in 1dB steps until the sum of adverse deviation of the test curve, compared to the reference curve, is as large as possible, but no more than 32.0 dB. The value of the shifted reference curve at 500Hz is taken as the $D_{nT,w}$. N.B. As $D_{nT,w}$ for airborne transmission represents a level difference, an improvement generates a larger figure – used in airborne tests.

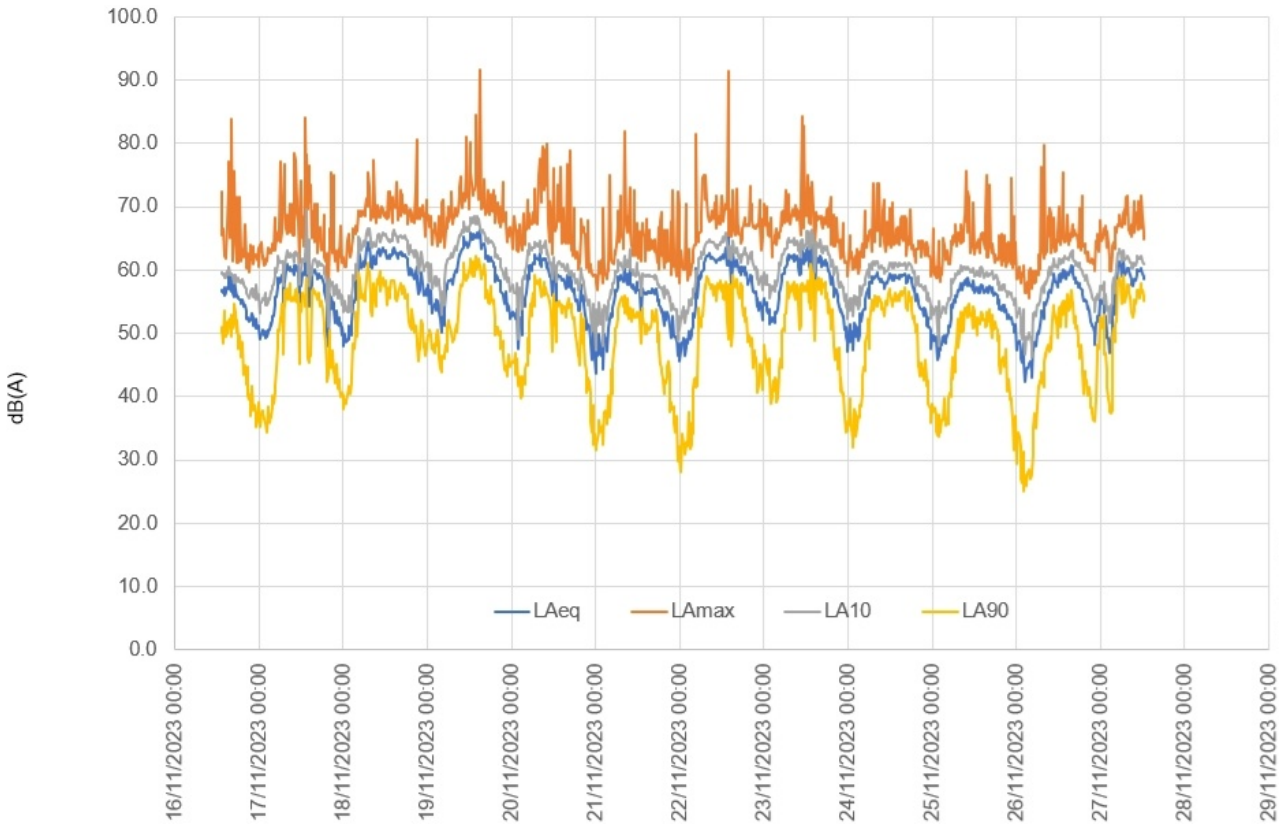
R_w Similar to the $D_{nT,w}$ term, but a measure of the airborne sound insulation performance of a separating element, when tested in laboratory conditions. As such the build is essentially perfect, and has no flanking noise routes. $D_{nT,w}$ values measured onsite will always be of a significantly lower value than the R_w value for a structure.

APPENDIX 2 – NOISE SURVEY DATA

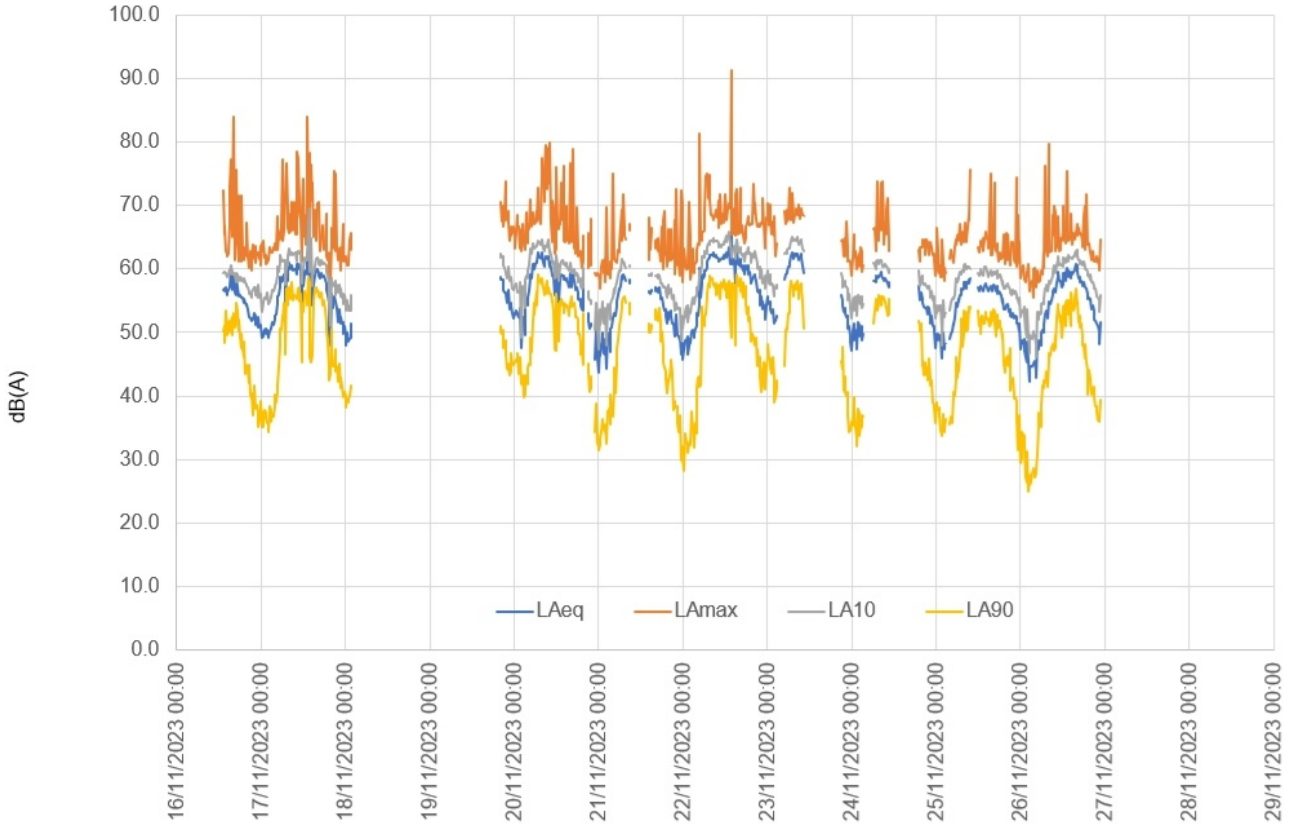
Thursday 16/11/2023 into Monday 27/11/2023

Location 1 – Near residential properties at Flint Gate, Sutton Bridge

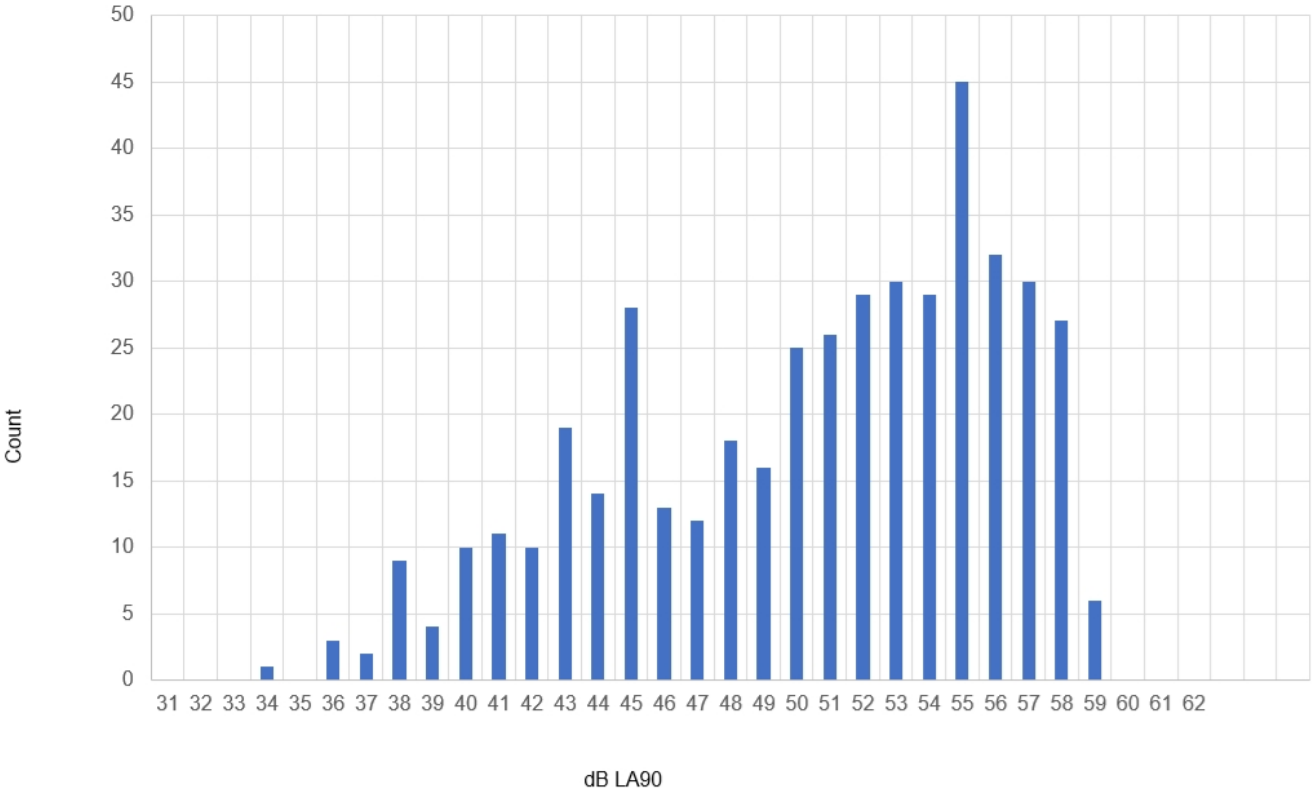
Rion NL-52 sound level meter (S/N 01021309). All values dB(A), free-field, 15-minute duration.



Location 1 – Near residential properties at Flint Gate, Sutton Bridge (adverse weather data periods excluded)

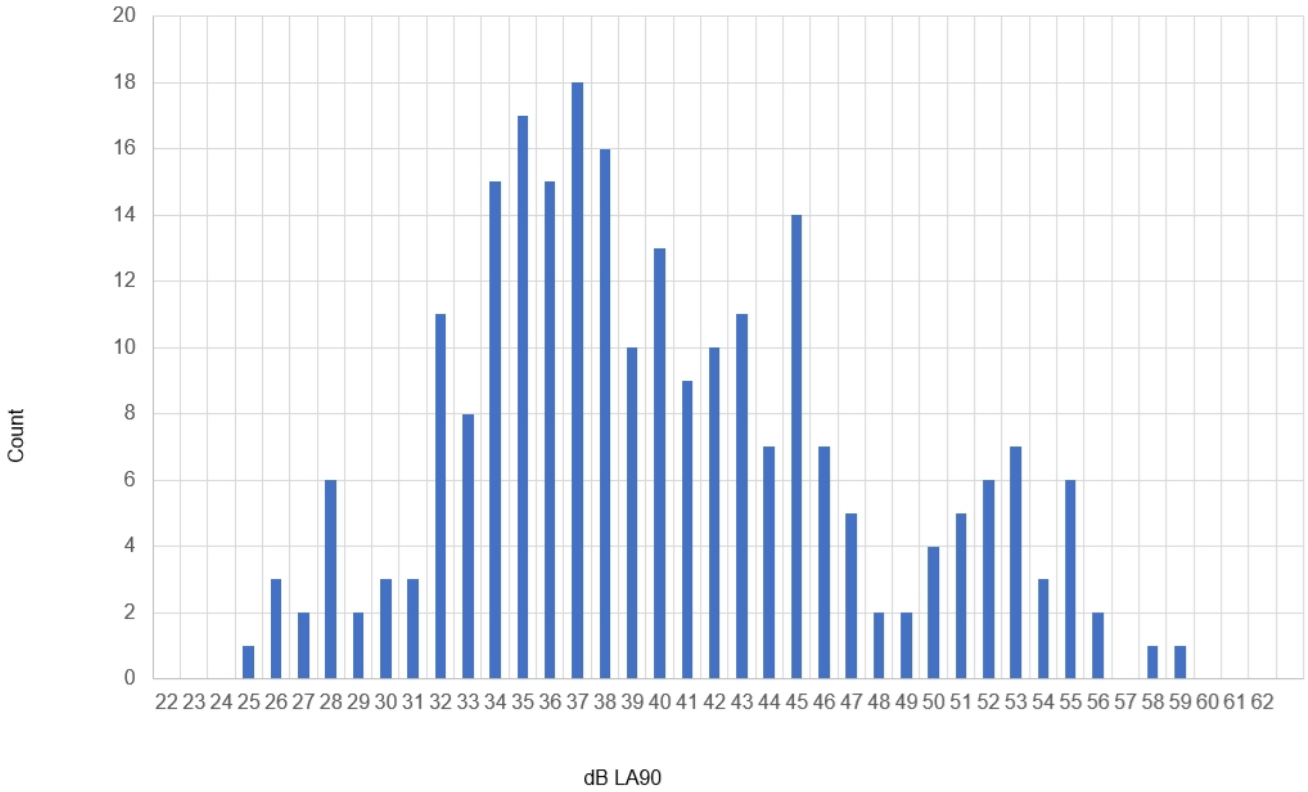


Location 1 – Daytime representative free-field background L_{A90} analysis – 0700-2300 hours (adverse weather data periods excluded)



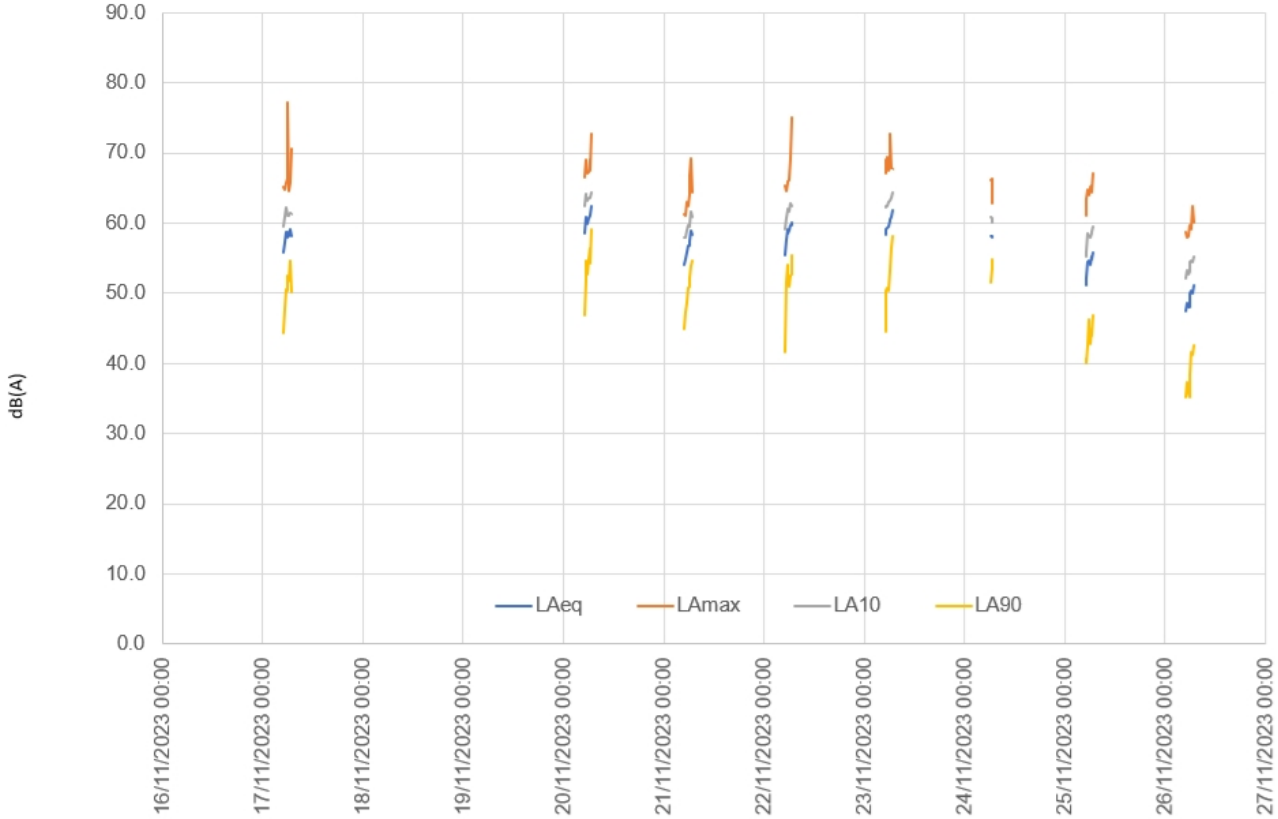
Representative background sound level = 55dB L_{A90}

Location 1 – Nighttime representative free-field background L_{A90} analysis – 2300-0700 hours (adverse weather data periods excluded)

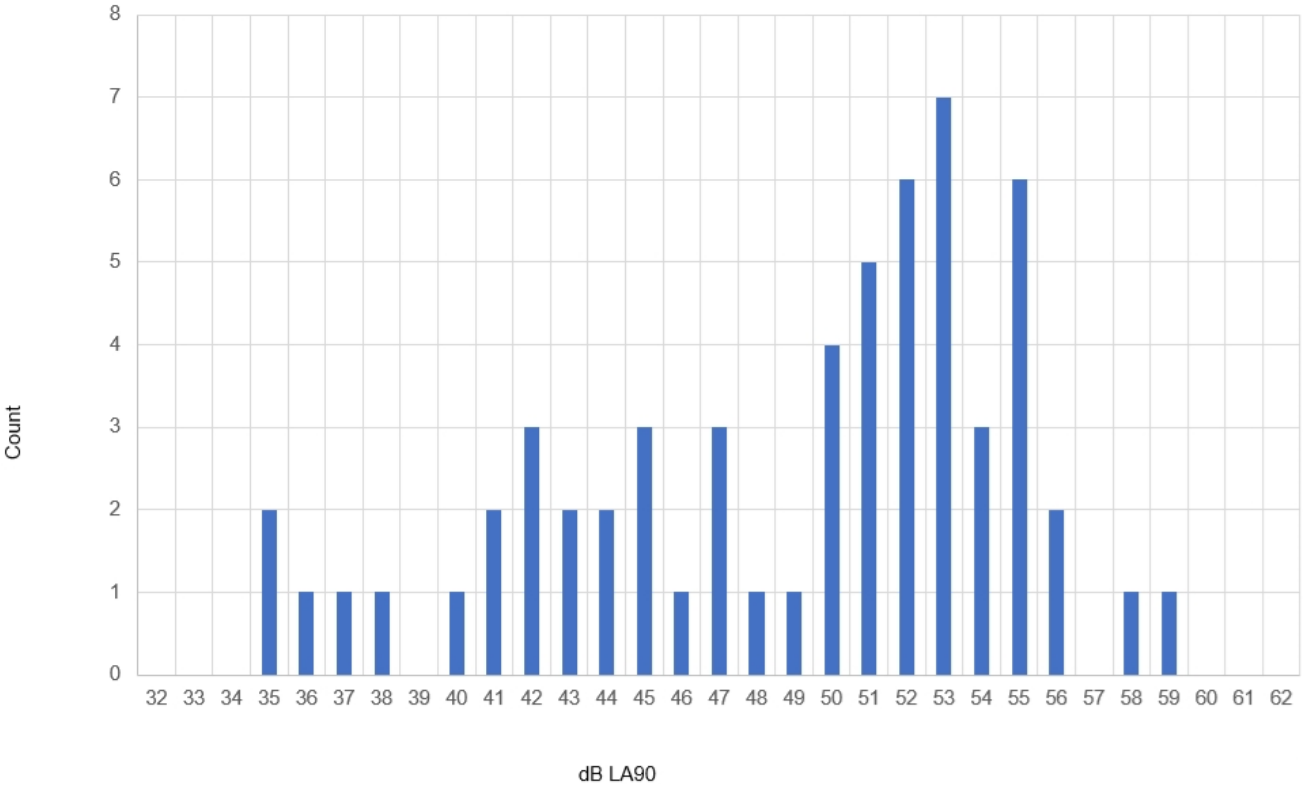


Representative background sound level = 37dB L_{A90}

Location 1 – Near residential properties at Flint Gate, Sutton Bridge – 0500-0700 hours data (adverse weather data periods excluded)



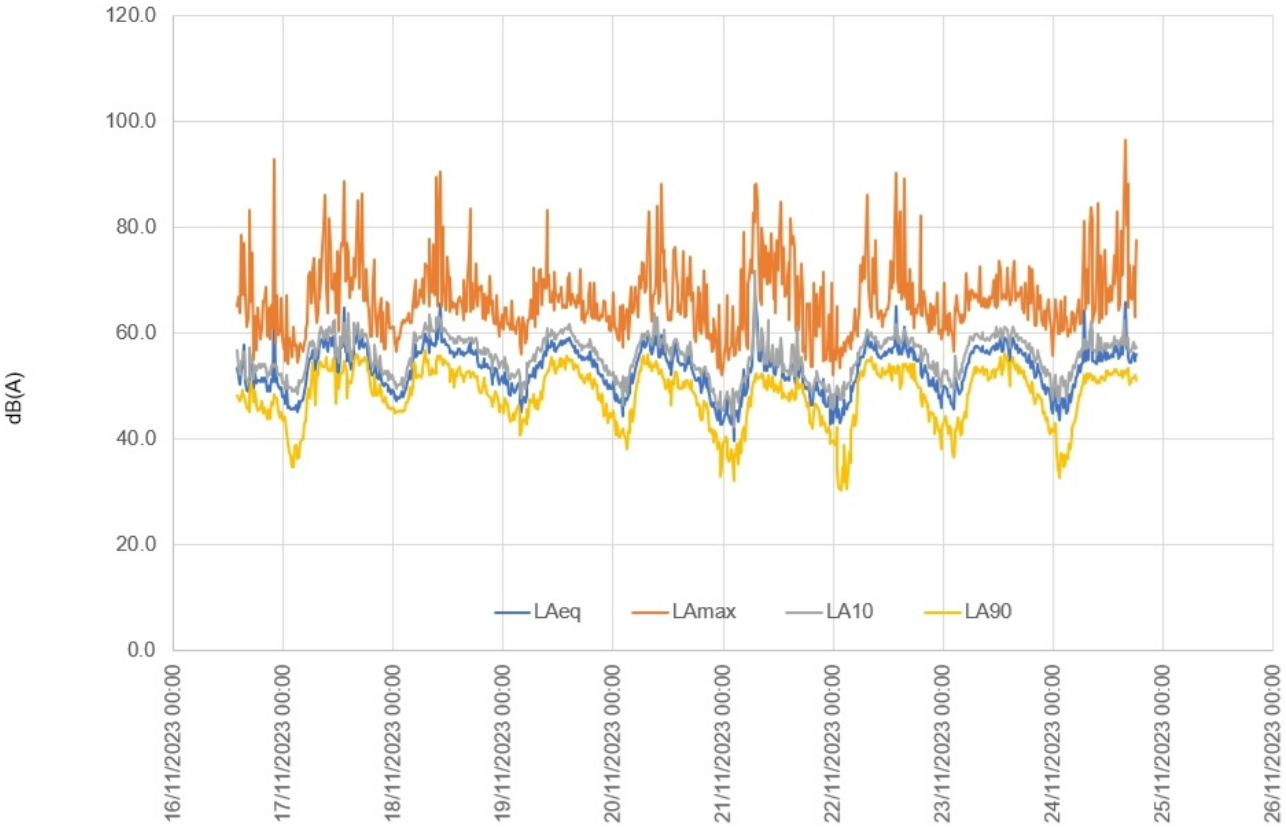
Location 1 – Nighttime representative free-field background L_{A90} analysis – 0500-0700 hours data (adverse weather data periods excluded)



Representative background sound level = 53dB L_{A90}

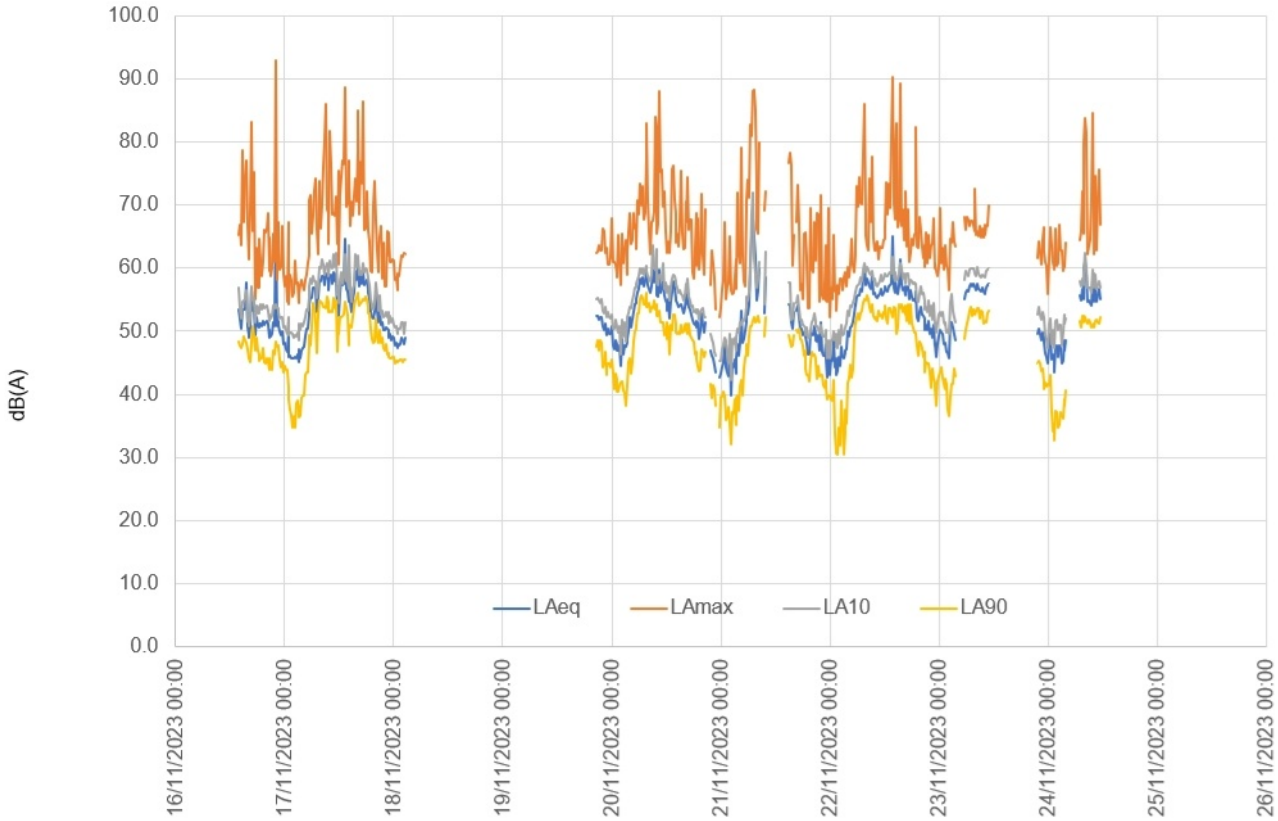
Location 2 – Near residential properties at Kenzie Drive, Sutton Bridge

Rion NL-52 sound level meter (S/N 00331824). All values dB(A), free-field, 15-minute duration.

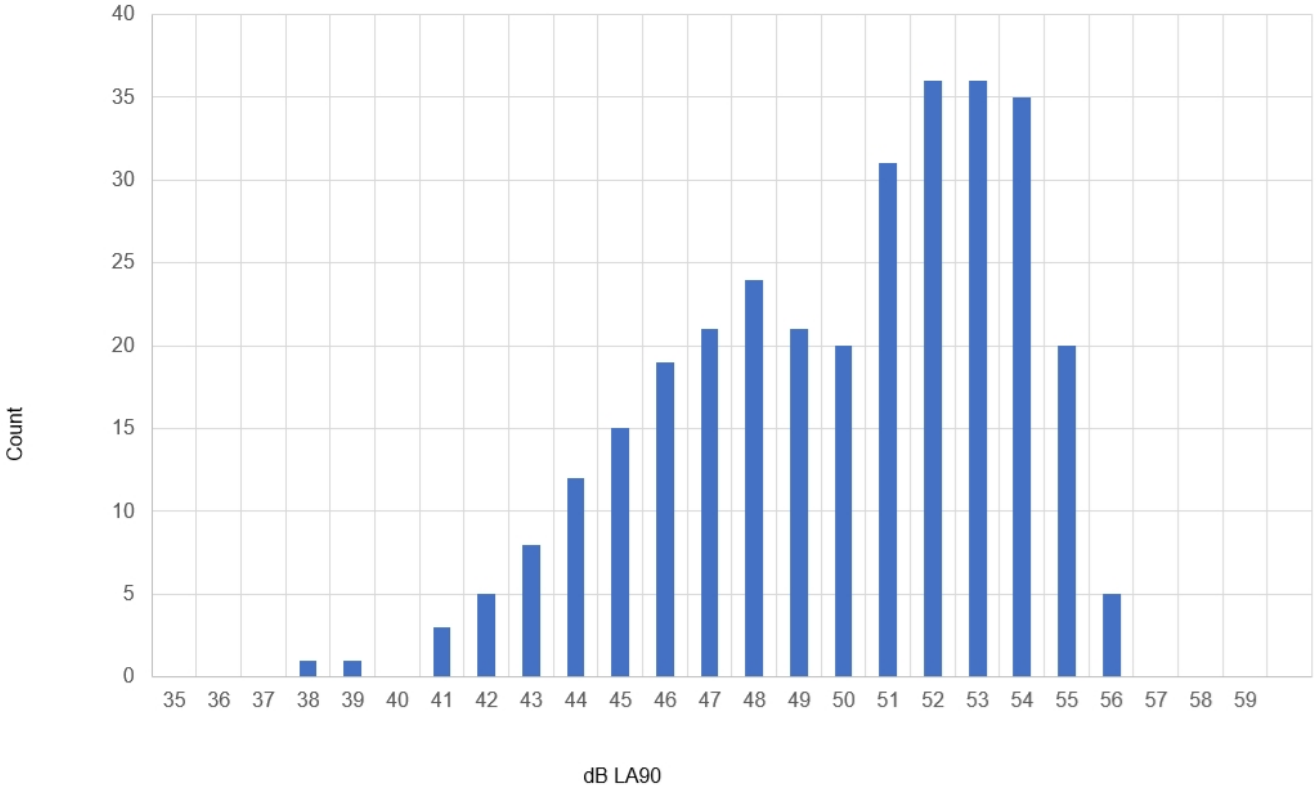


This sound level meter's memory was filled to capacity after 8no days of logging rather than the anticipated 11no days of logging. The instrument was still powered on by collection time, and it was calibrated correctly before being switched off.

Location 2 – Near residential properties at Kenzie Drive, Sutton Bridge (adverse weather data periods excluded)

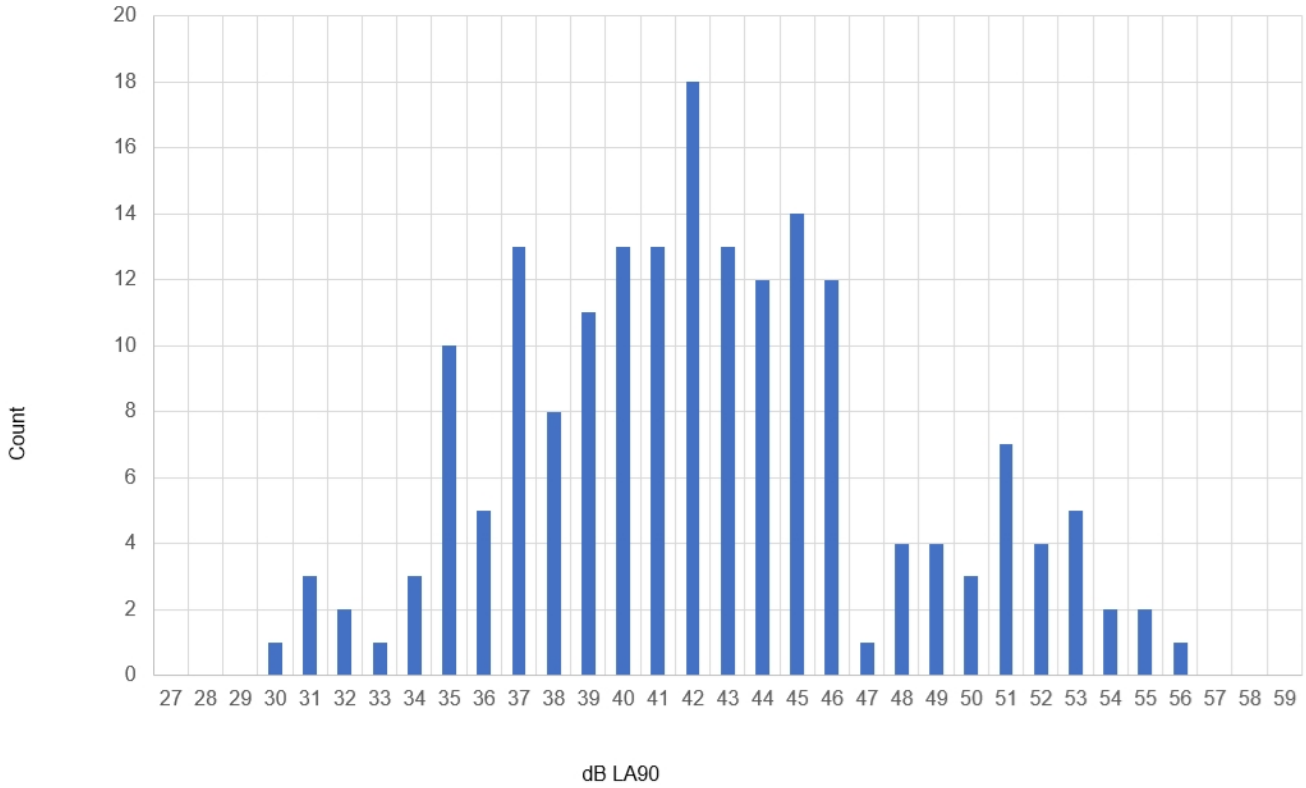


Location 2 – Daytime representative free-field background L_{A90} analysis – 0700-2300 hours (adverse weather data periods excluded)



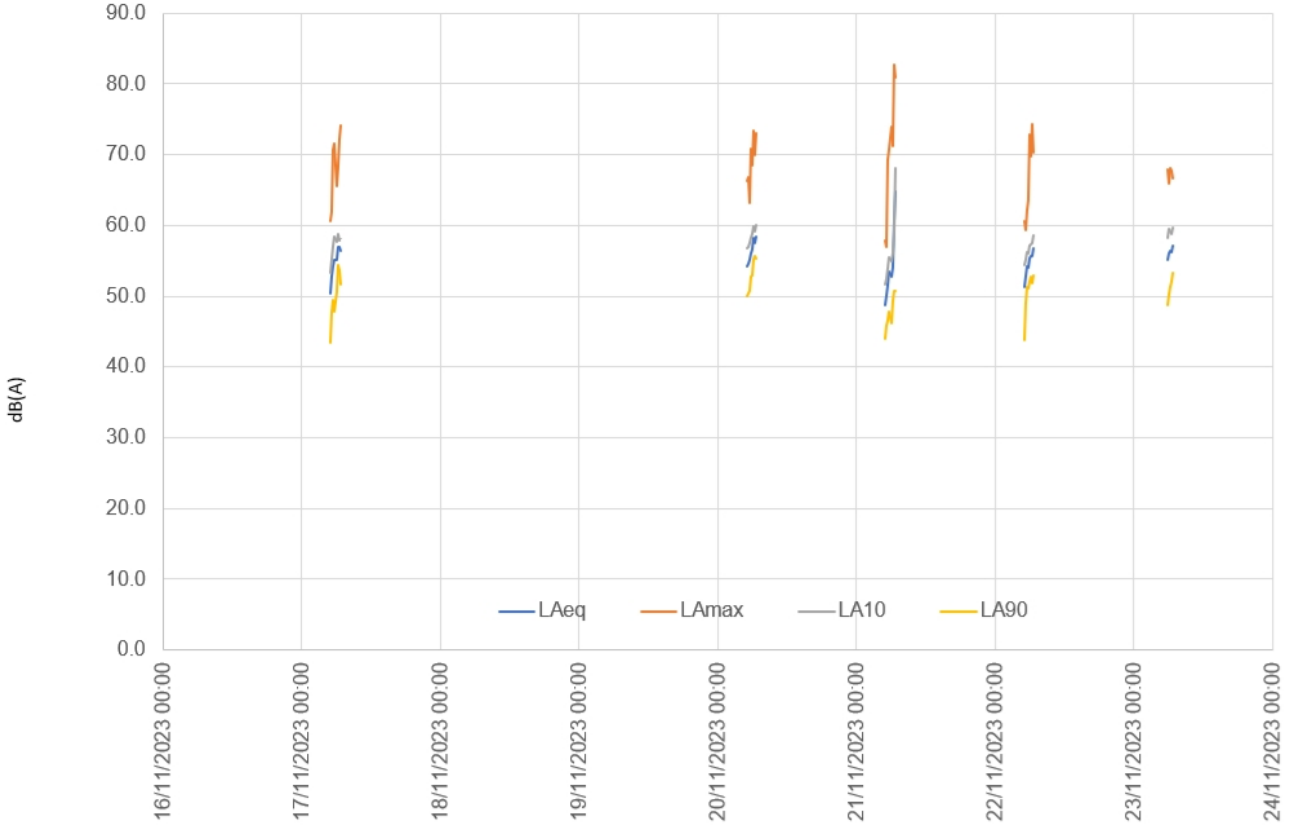
Representative background sound level = 52dB L_{A90}

Location 2 – Nighttime representative free-field background L_{A90} analysis – 2300-0700 hours (adverse weather data periods excluded)

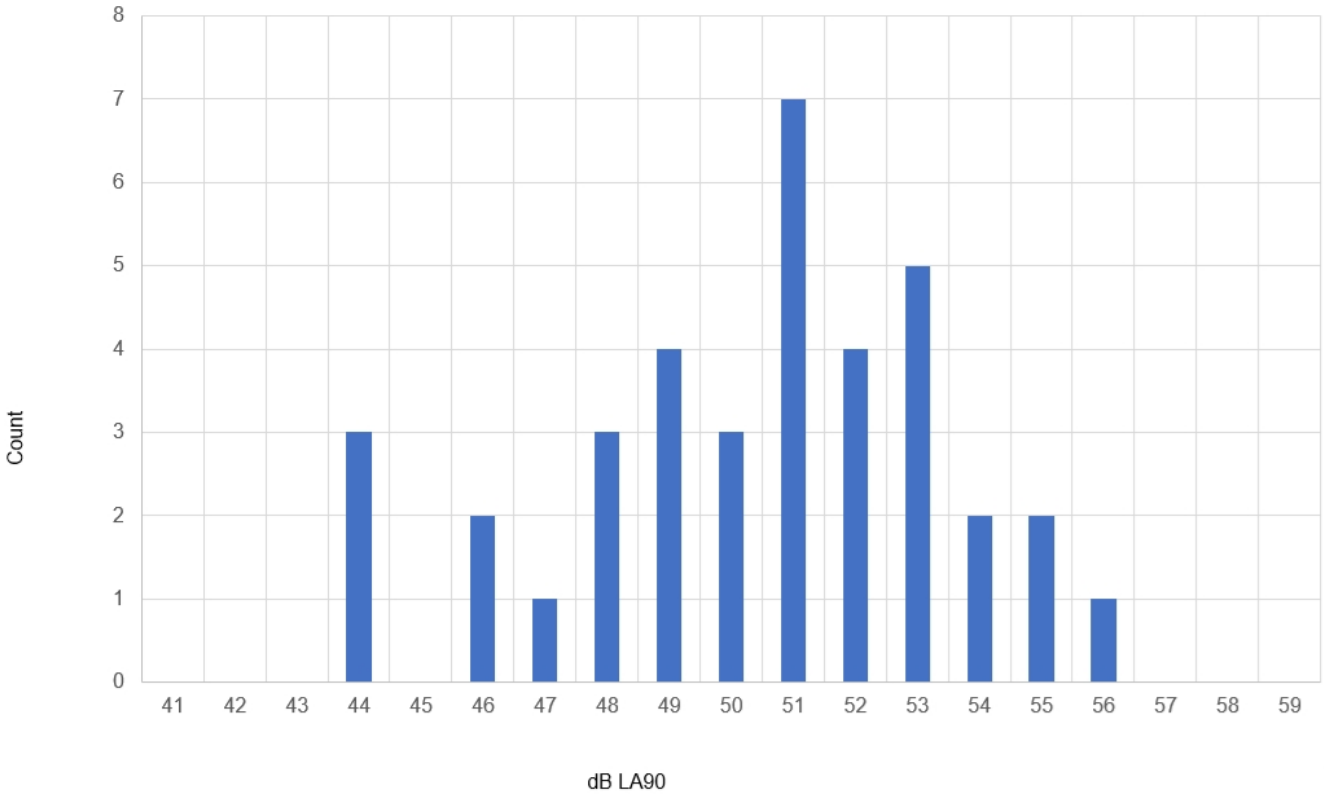


Representative background sound level = 42dB L_{A90}

Location 2 – Near residential properties at Kenzie Drive, Sutton Bridge – 0500-0700 hours data (adverse weather data periods excluded)



Location 2 – Nighttime representative free-field background L_{A90} analysis – 0500-0700 hours data (adverse weather data periods excluded)

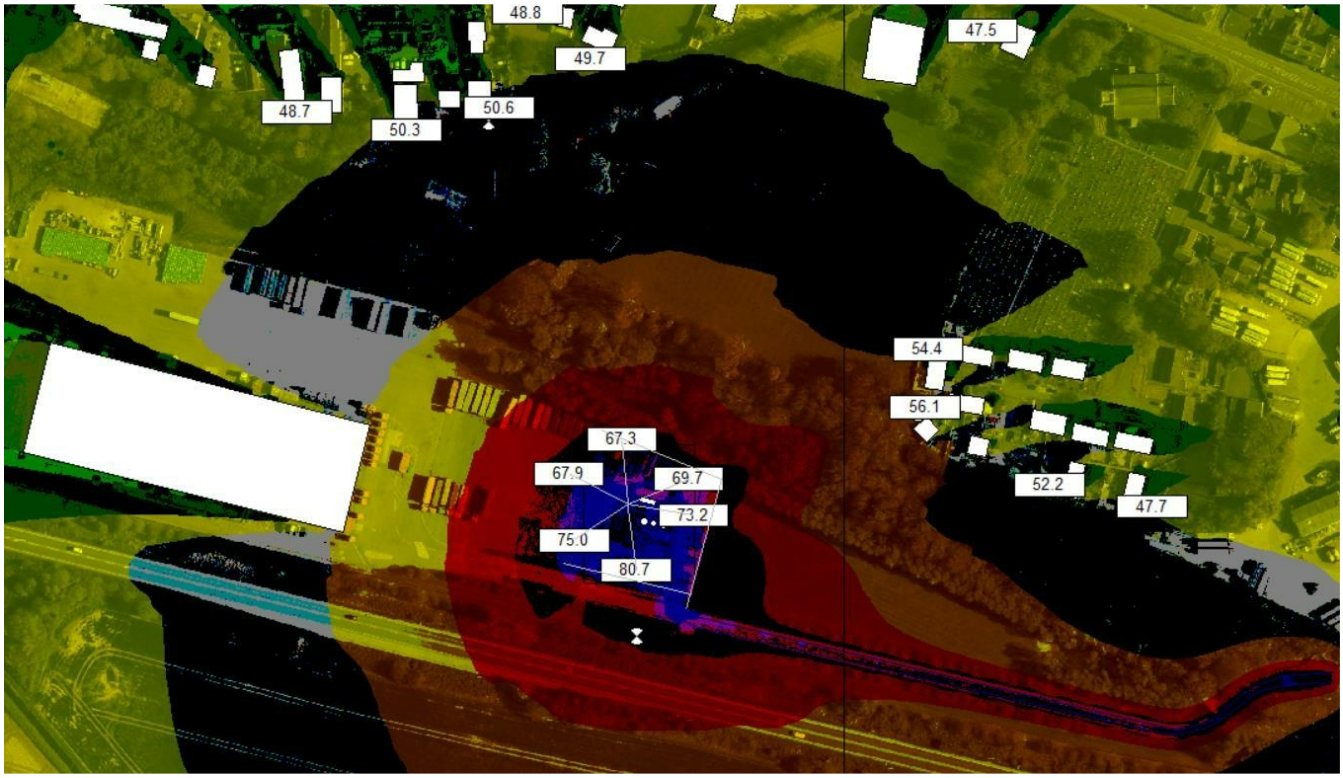


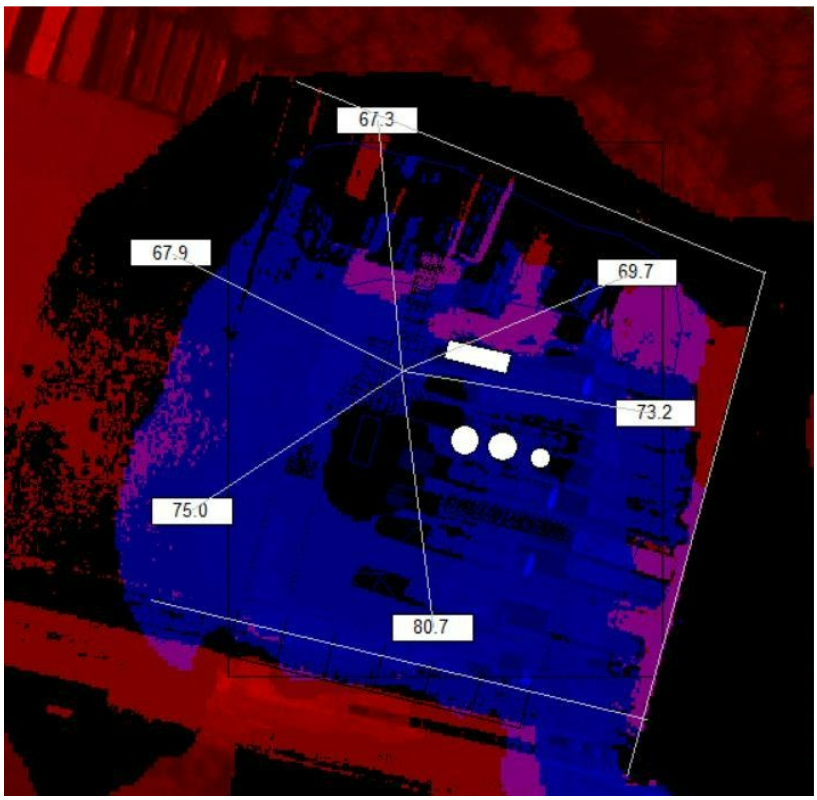
Representative background sound level = 51dB L_{A90}

APPENDIX 3 – ACOUSTIC MODEL PLOTS OF PREDICTED SOUND LEVELS

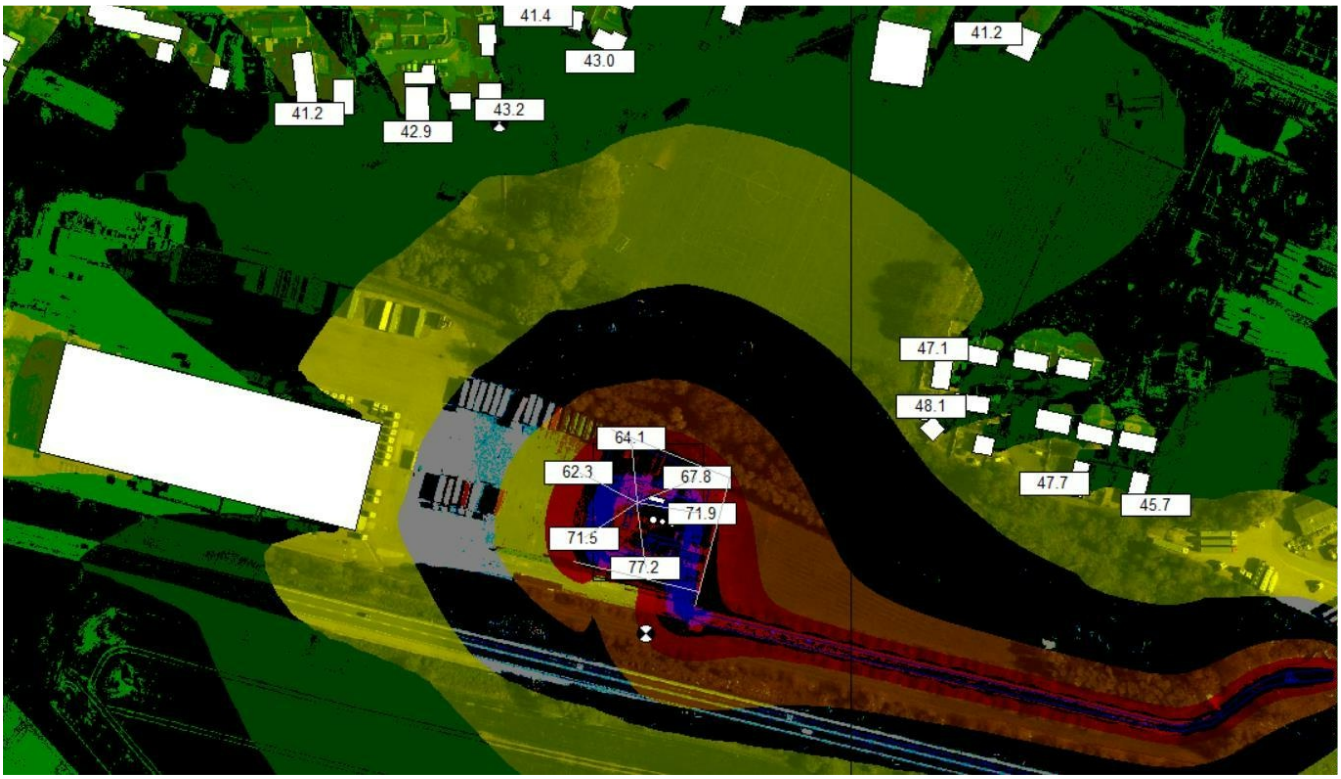
The following model plots show dB L_{Aeq} plotted at 1.5m height above local ground level, which is window-height for the closest dwellings (bungalows) situated to the east of the site.

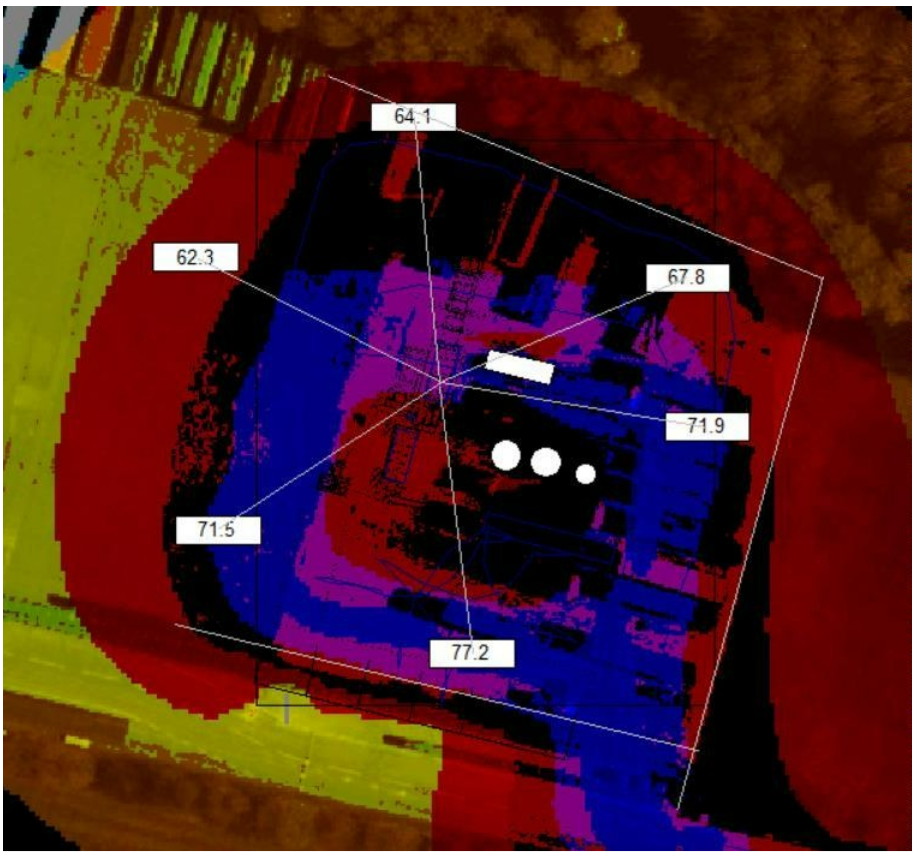
Daytime 0700-1800 hours





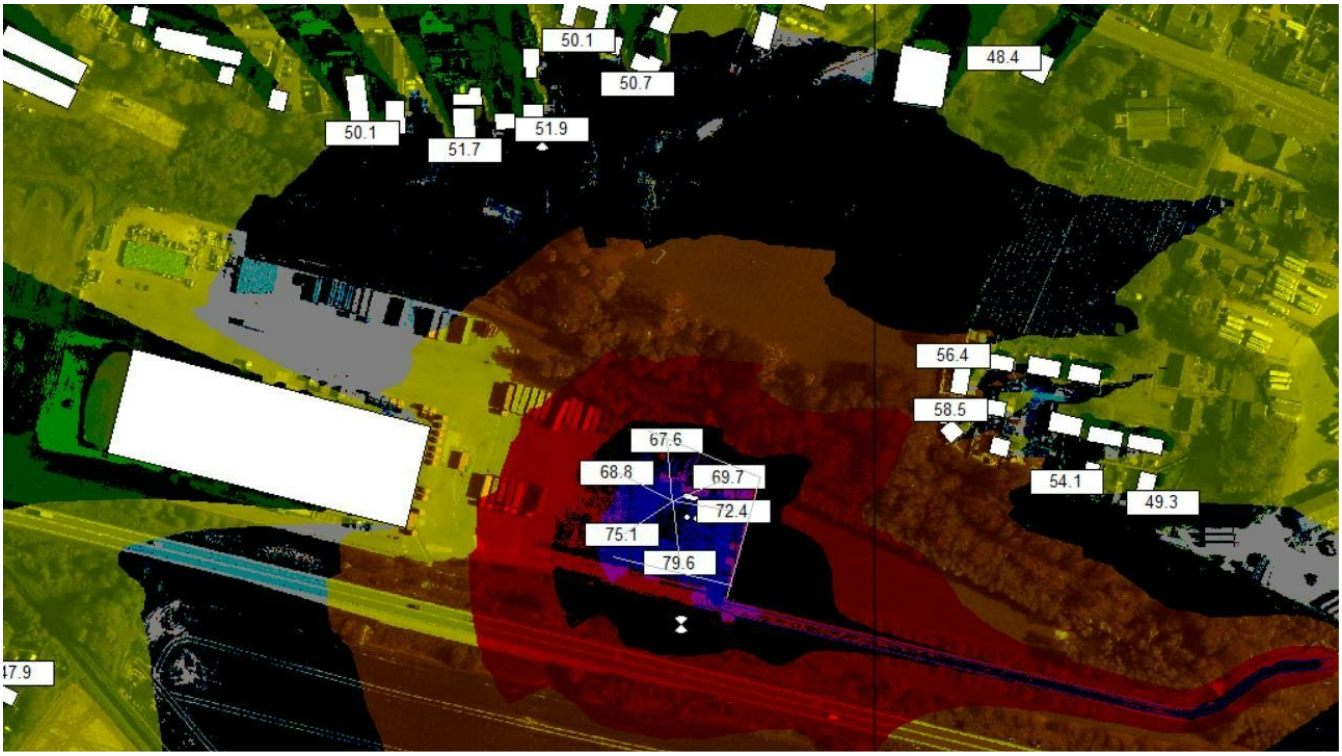
Nighttime 0500-0700 hours



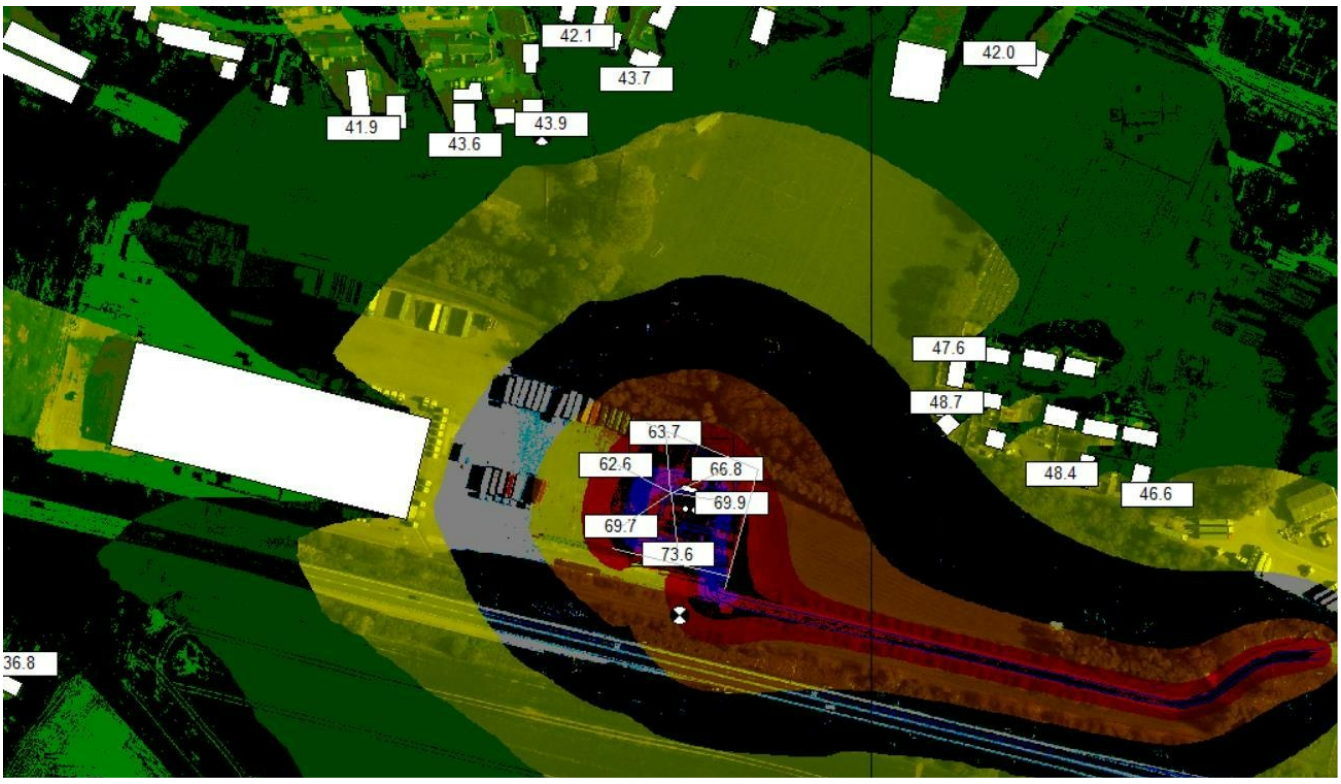


The following model plots show dB L_{Aeq} plotted at 3.0m height above local ground level, as dwellings at Location 2 are of 2-storey height.

Daytime 0700-1800 hours



Nighttime 0500-0700 hours

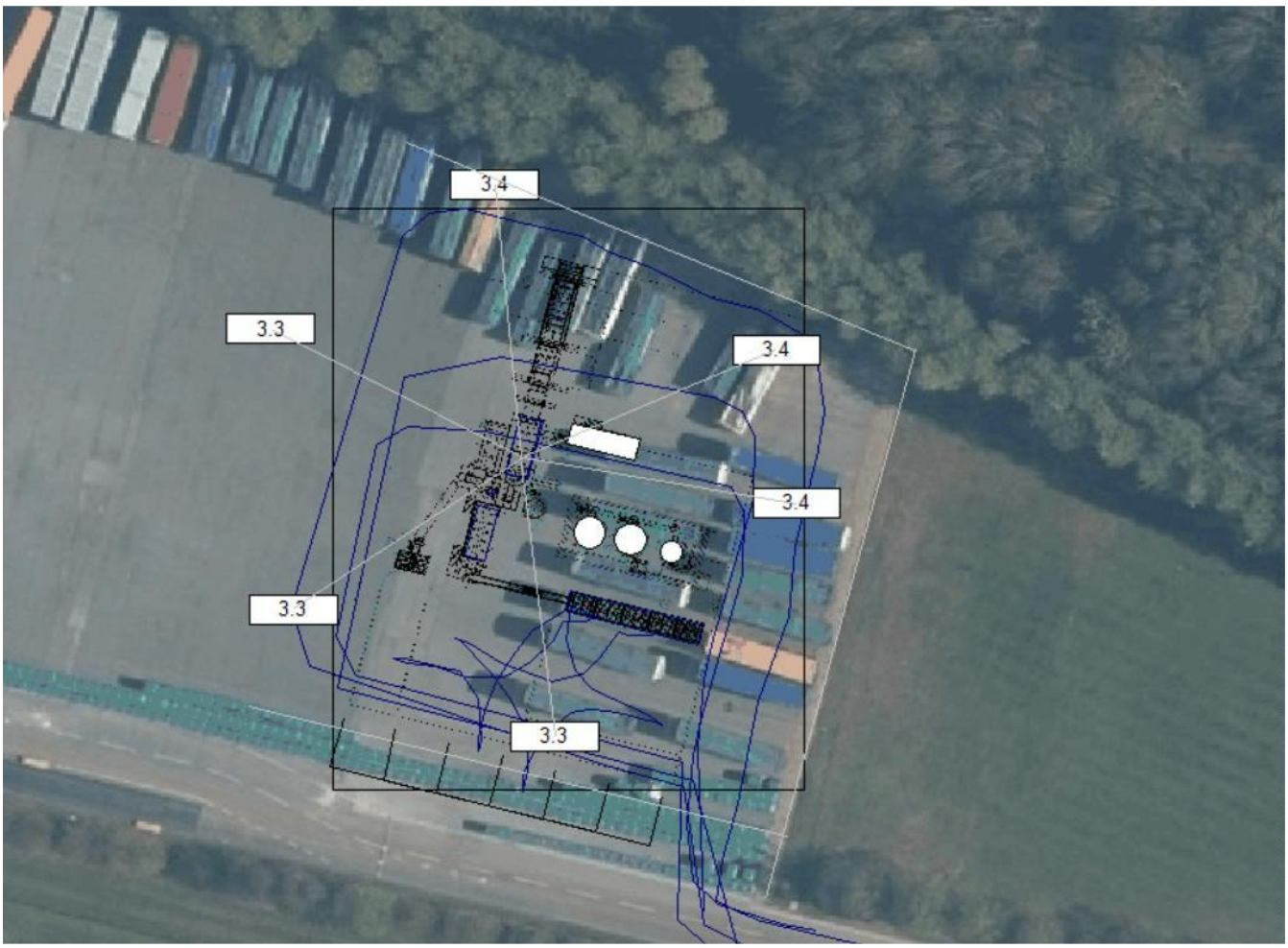


Source sound level data assumed in acoustic model

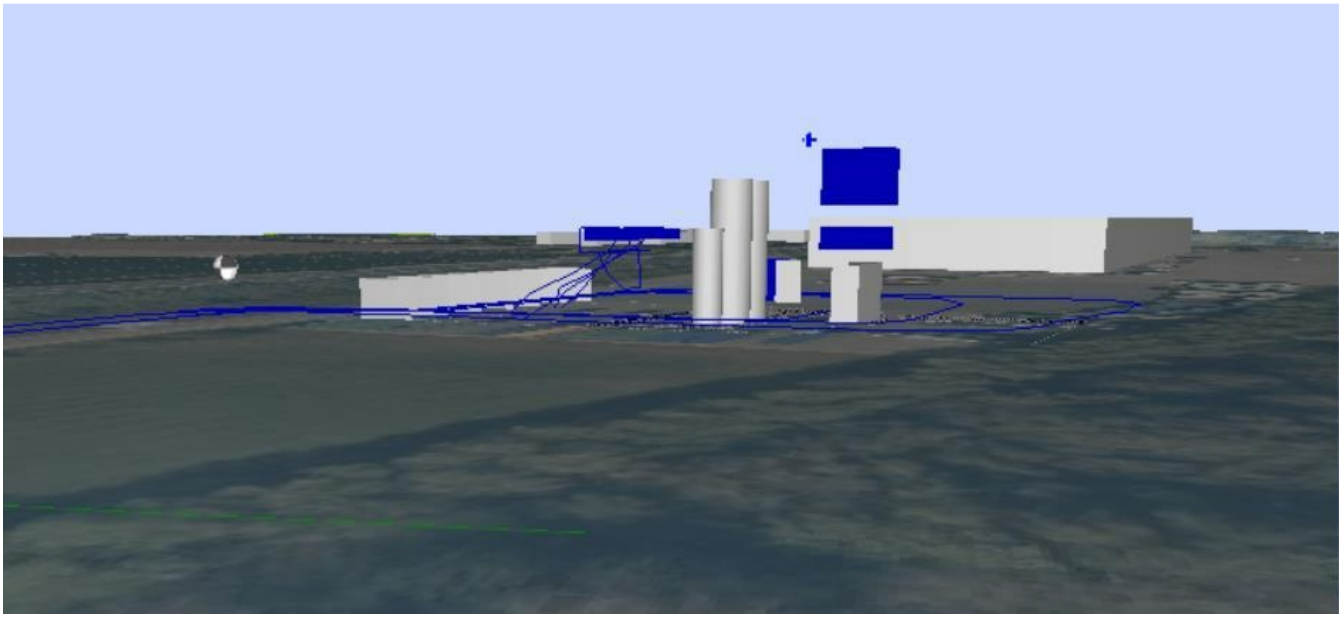
Name	ID	Type	Oktave Spectrum (dB)										
			Weight.	31.5	63	125	250	500	1000	2000	4000	8000	A	lin
burner	burner	Lw		94.0	99.0	98.0	98.0	100.0	91.0	87.0	82.0	73.0	99.0	105.4
shovel	shovel	Lw		0.0	107.0	111.0	104.0	97.0	97.0	94.0	89.0	88.0	102.8	113.3
dryer	dyer	Lw		82.0	83.0	88.0	95.0	96.0	85.0	81.0	79.0	70.0	94.7	99.4
top level of plant	topplant	Lw		87.0	90.0	88.0	87.0	86.0	80.0	80.0	77.0	63.0	87.6	95.2
feed dryer	feeddryer	Lw		91.0	86.0	86.0	93.0	95.0	84.0	80.0	78.0	71.0	93.6	98.8
mixer	mixer	Lw		88.0	89.0	87.0	88.0	86.0	81.0	80.0	75.0	65.0	87.7	95.1
cold feed	coldfeed	Lw		81.0	80.0	80.0	83.0	80.0	74.0	70.0	66.0	57.0	80.9	88.2
lorry	lorry	Lw		0.0	96.0	101.0	101.0	101.0	97.0	96.0	91.0	89.0	103.1	107.2

The lorry and shovel activity are defined in the acoustic model as a series of line sources, the burner is defined as a point source, and the remaining elements are defined as plane sources.

Plan image of acoustic model sound sources

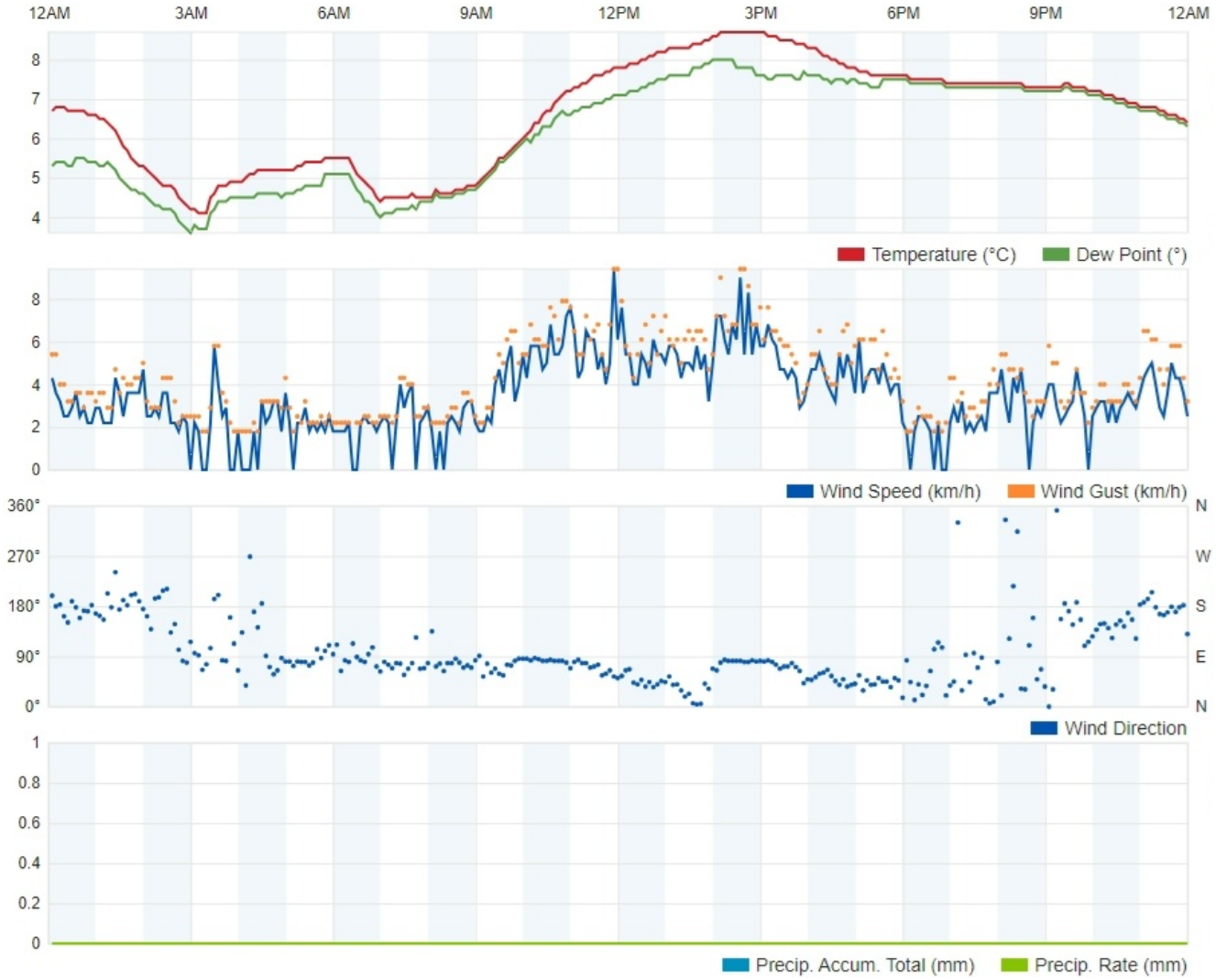


3D view of acoustic model sound sources

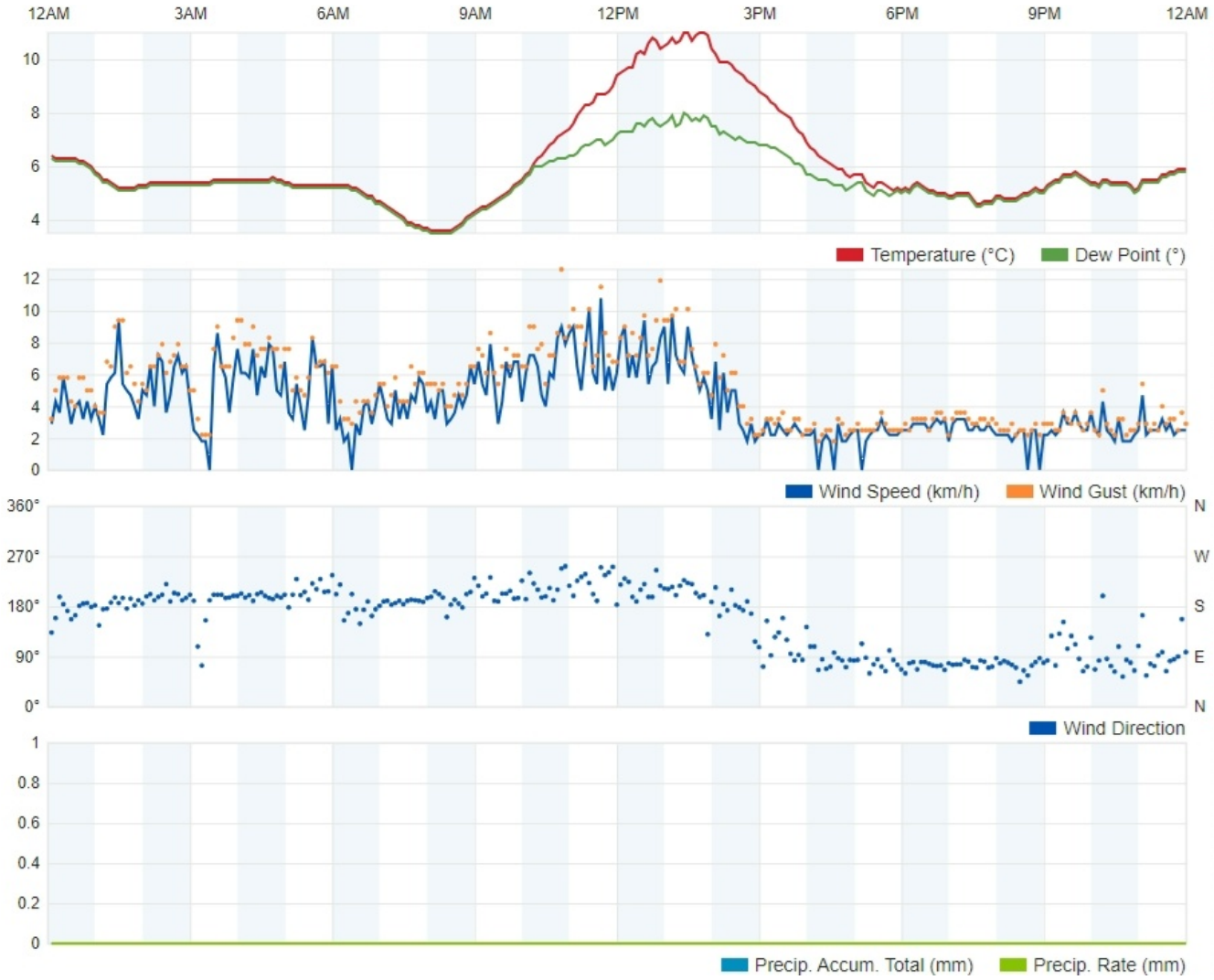


APPENDIX 4 – WEATHER DATA

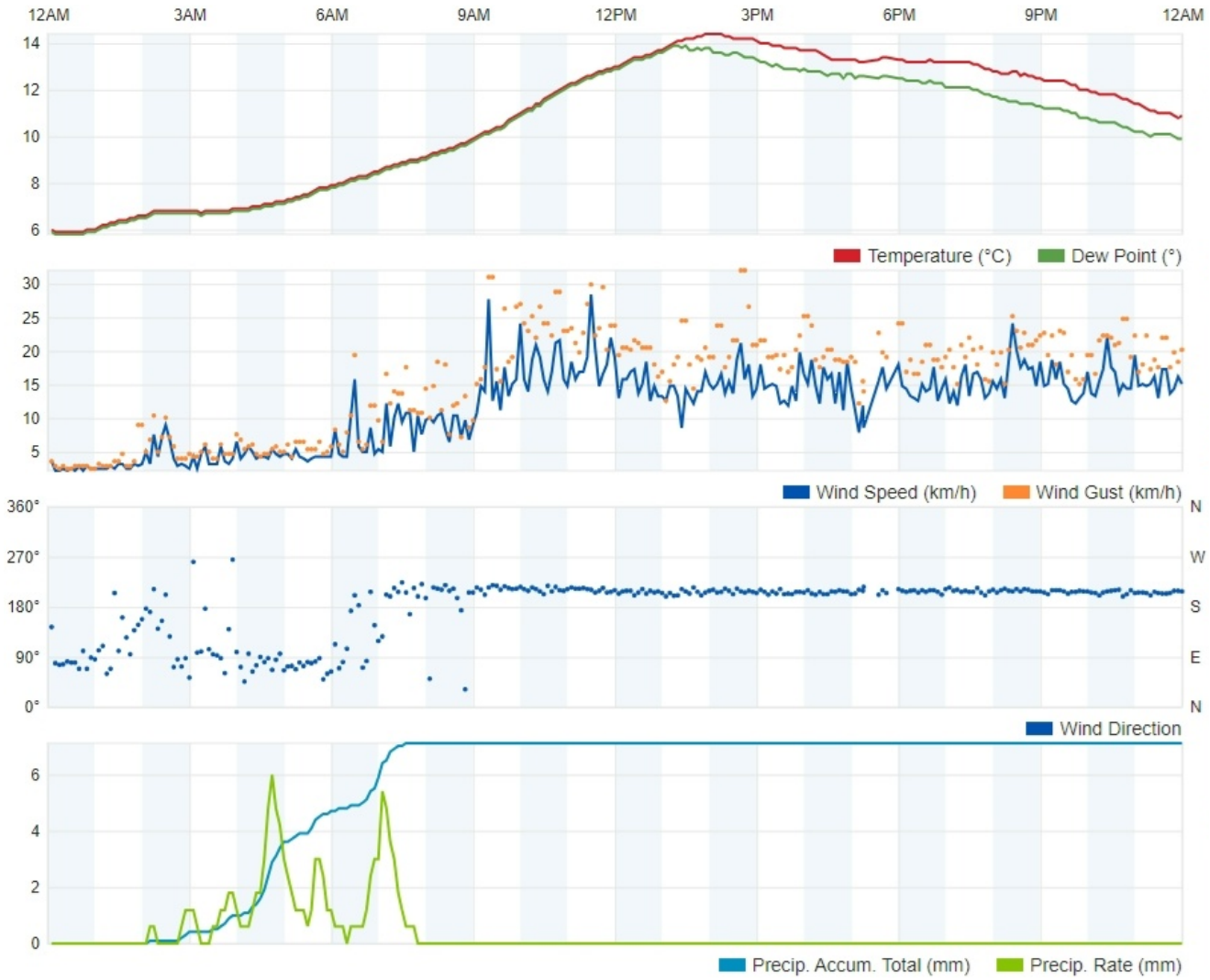
Thursday 16/11/2023



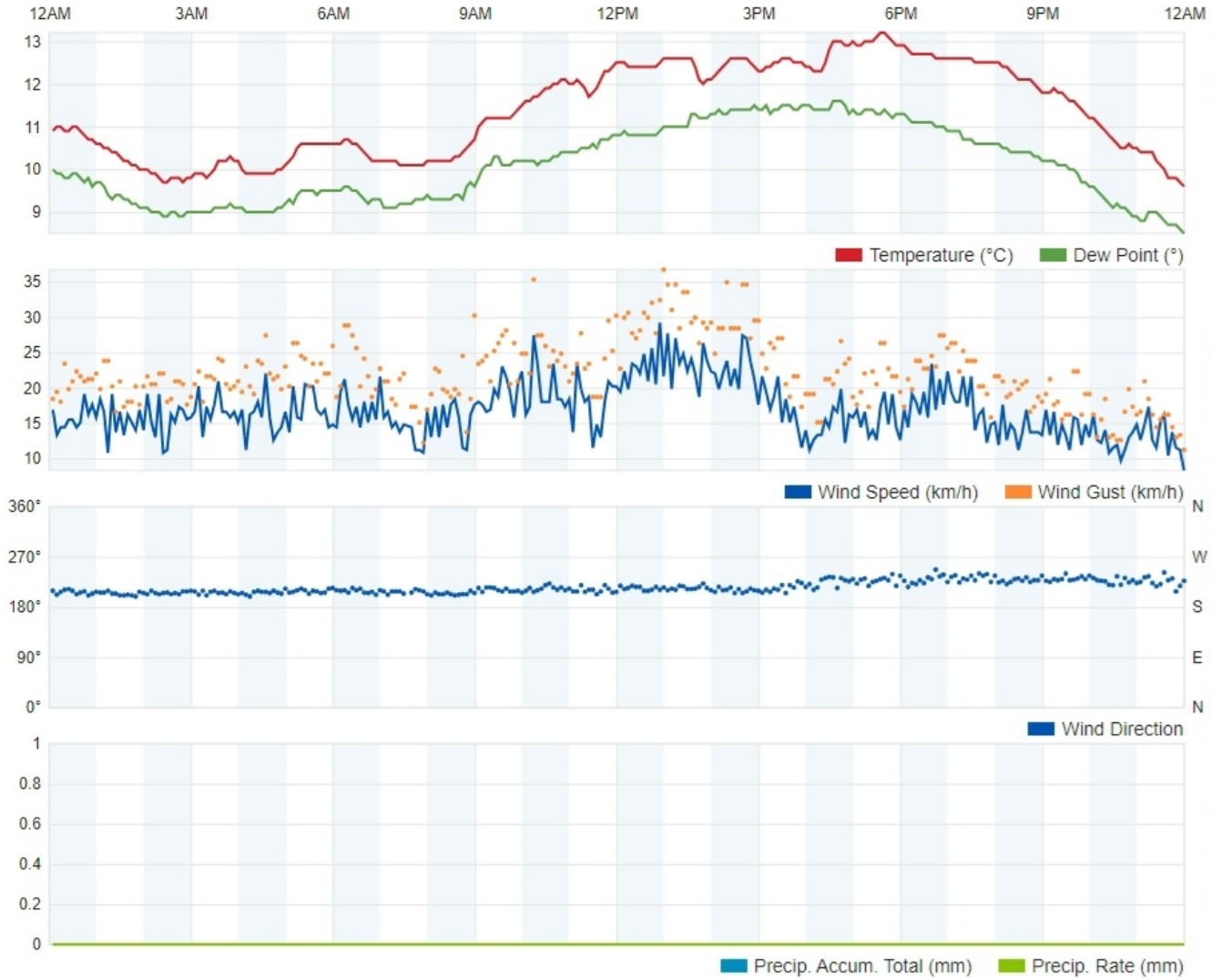
Friday 17/11/2023



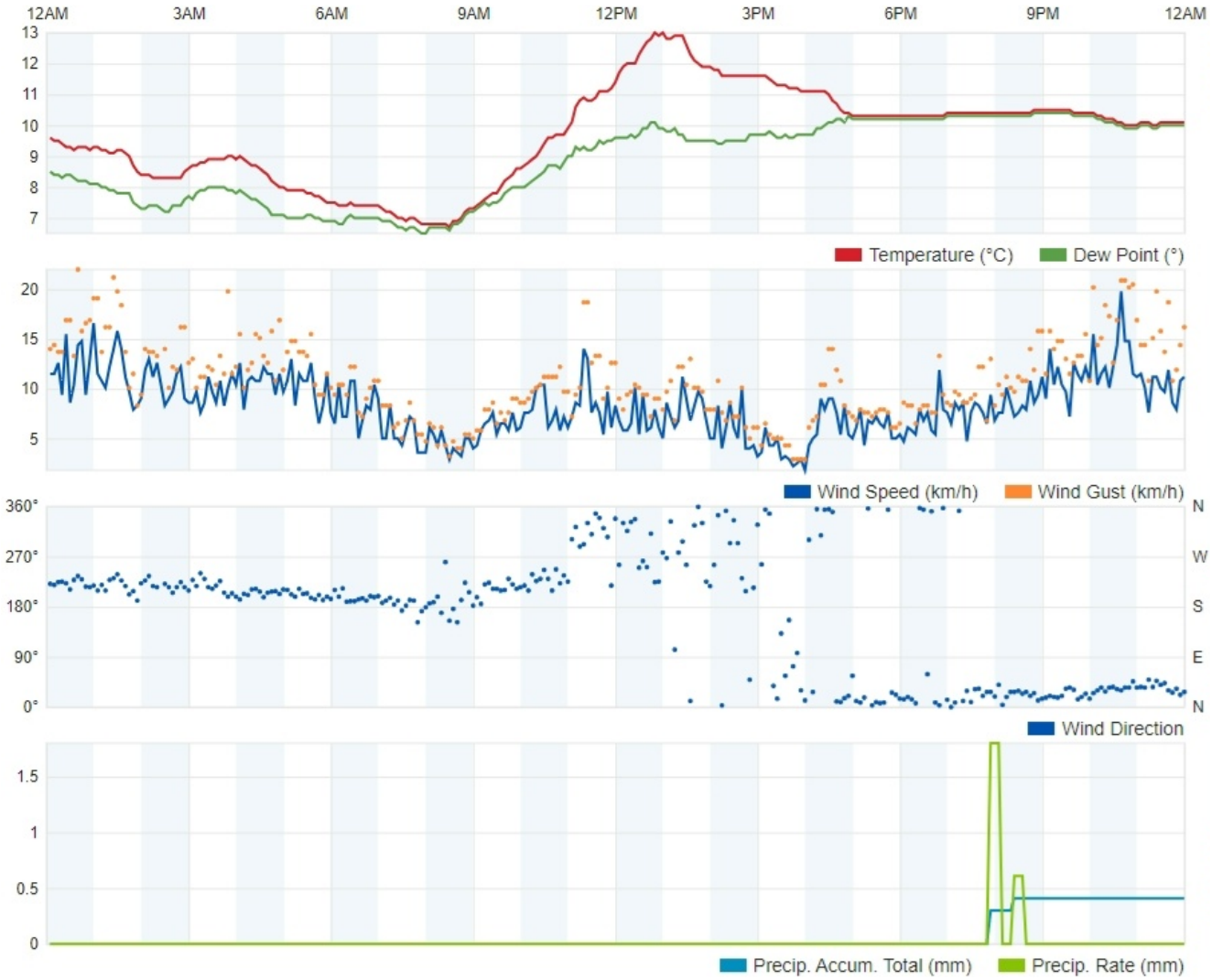
Saturday 18/11/2023



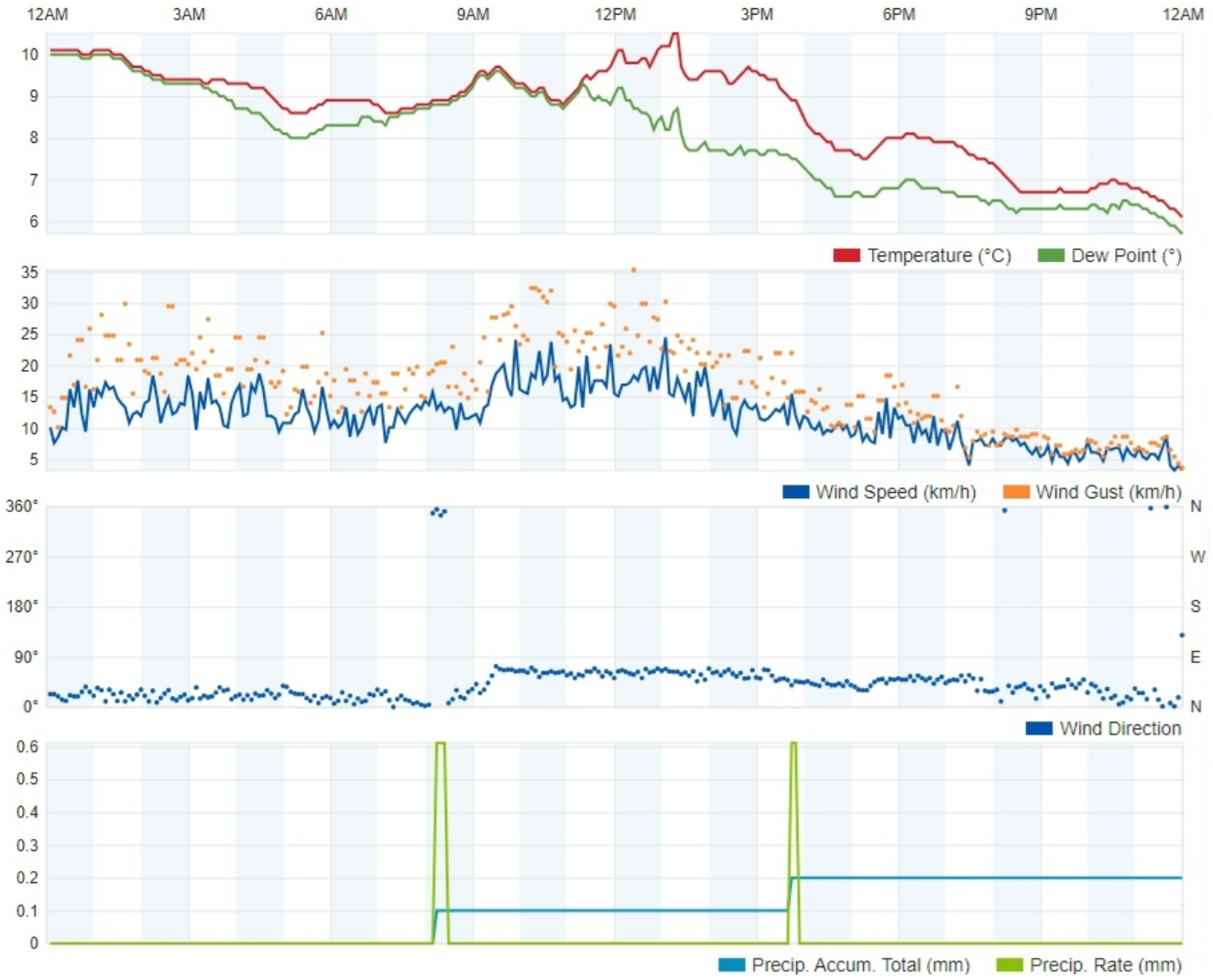
Sunday 19/11/2023



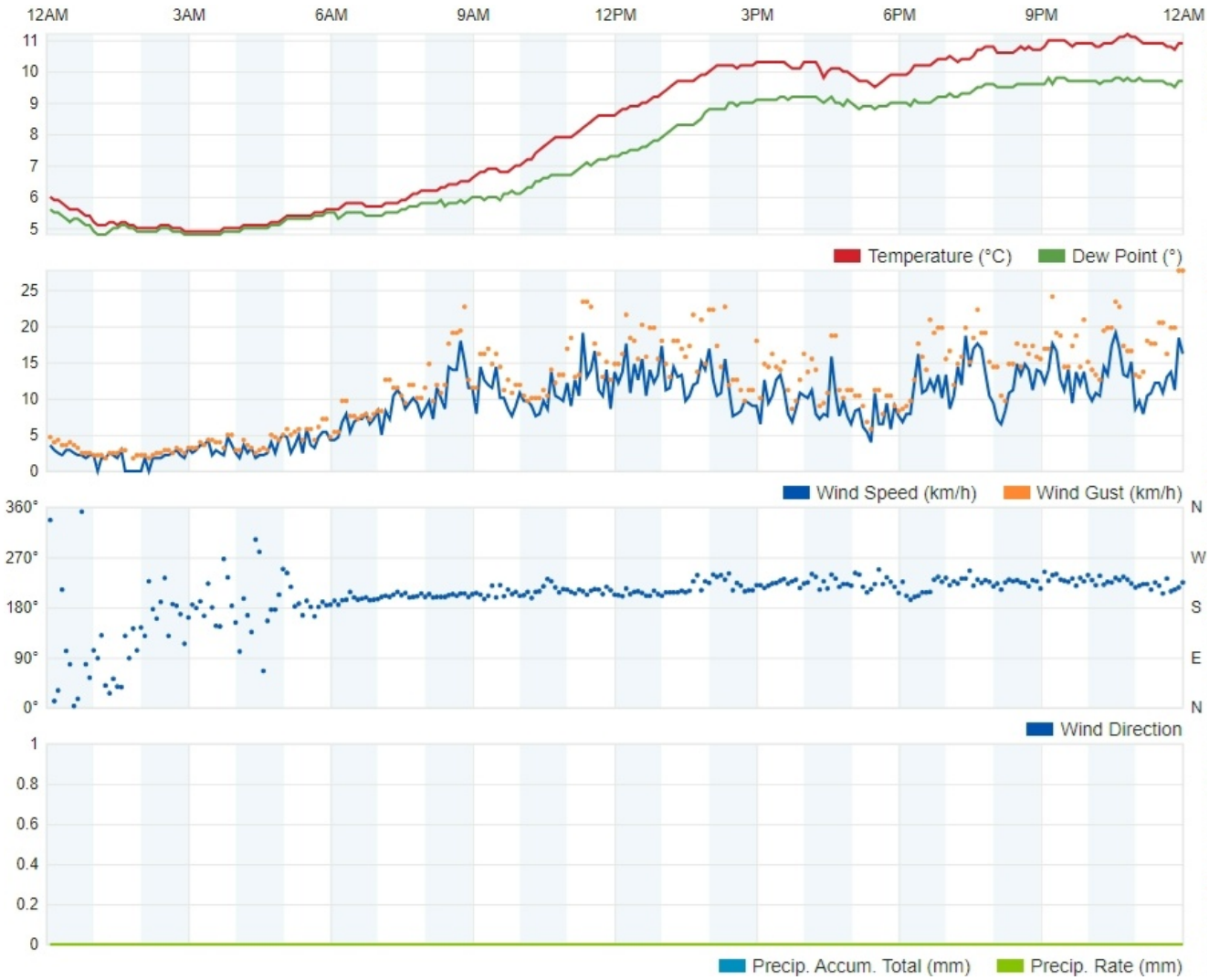
Monday 20/11/2023



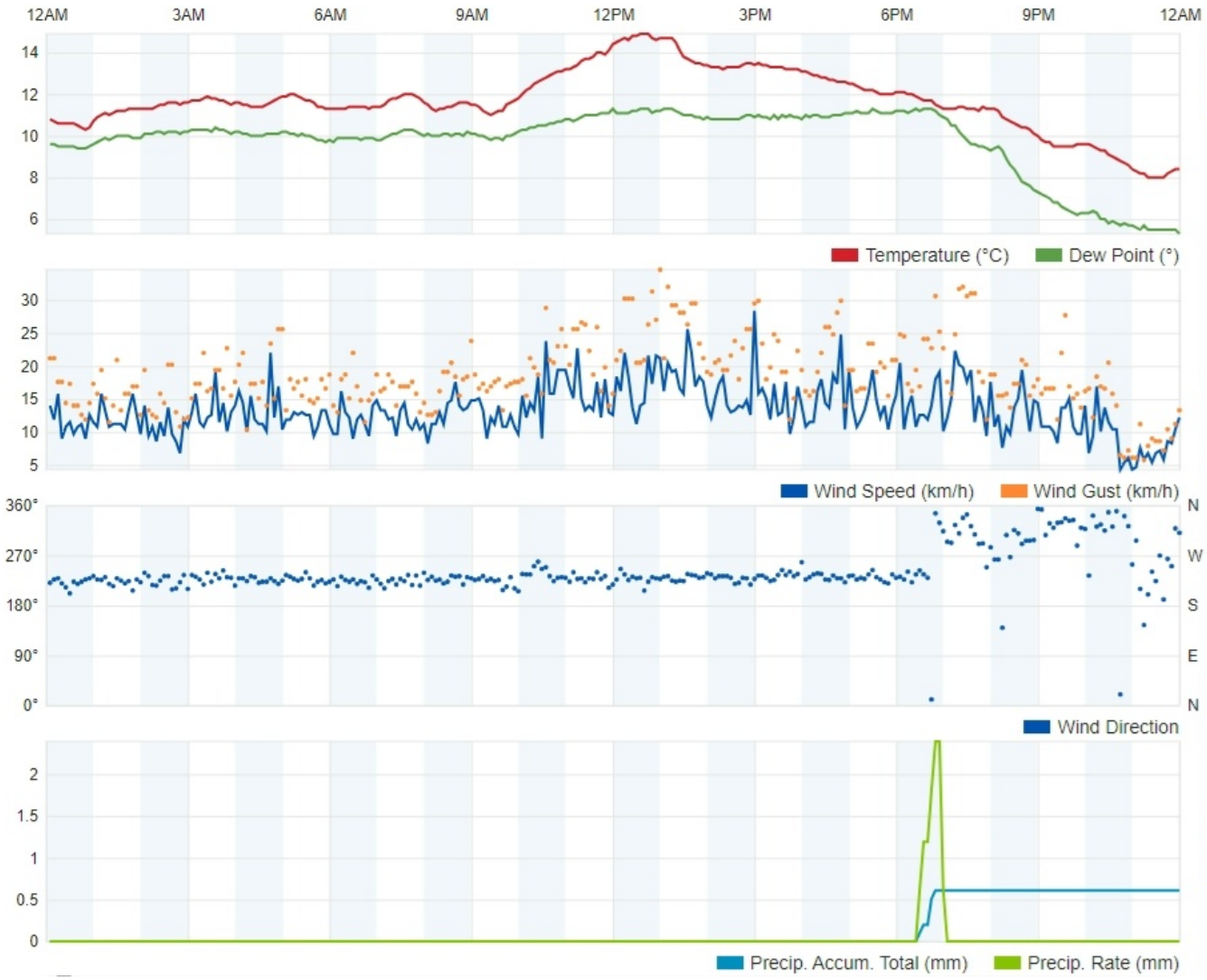
Tuesday 21/11/2023



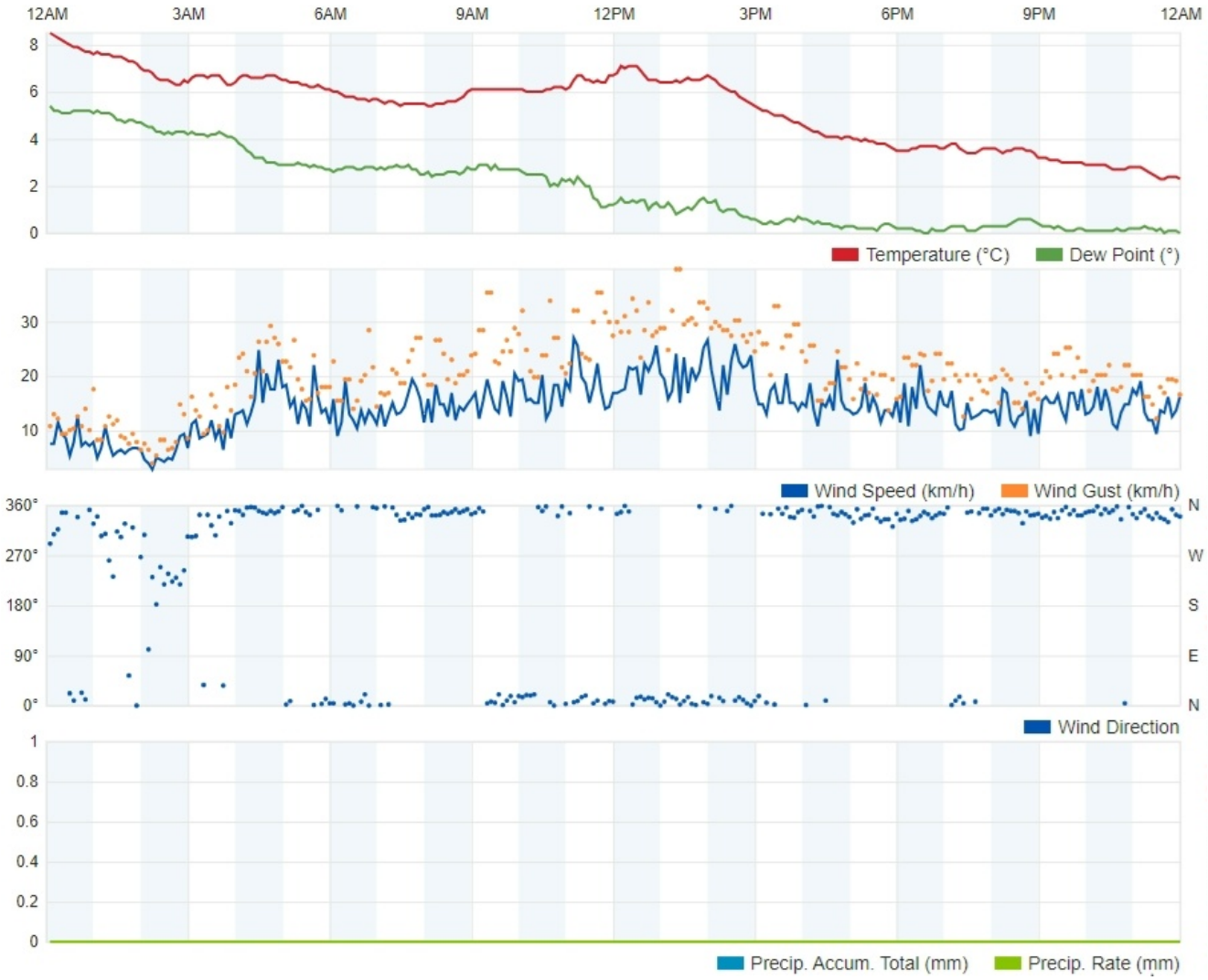
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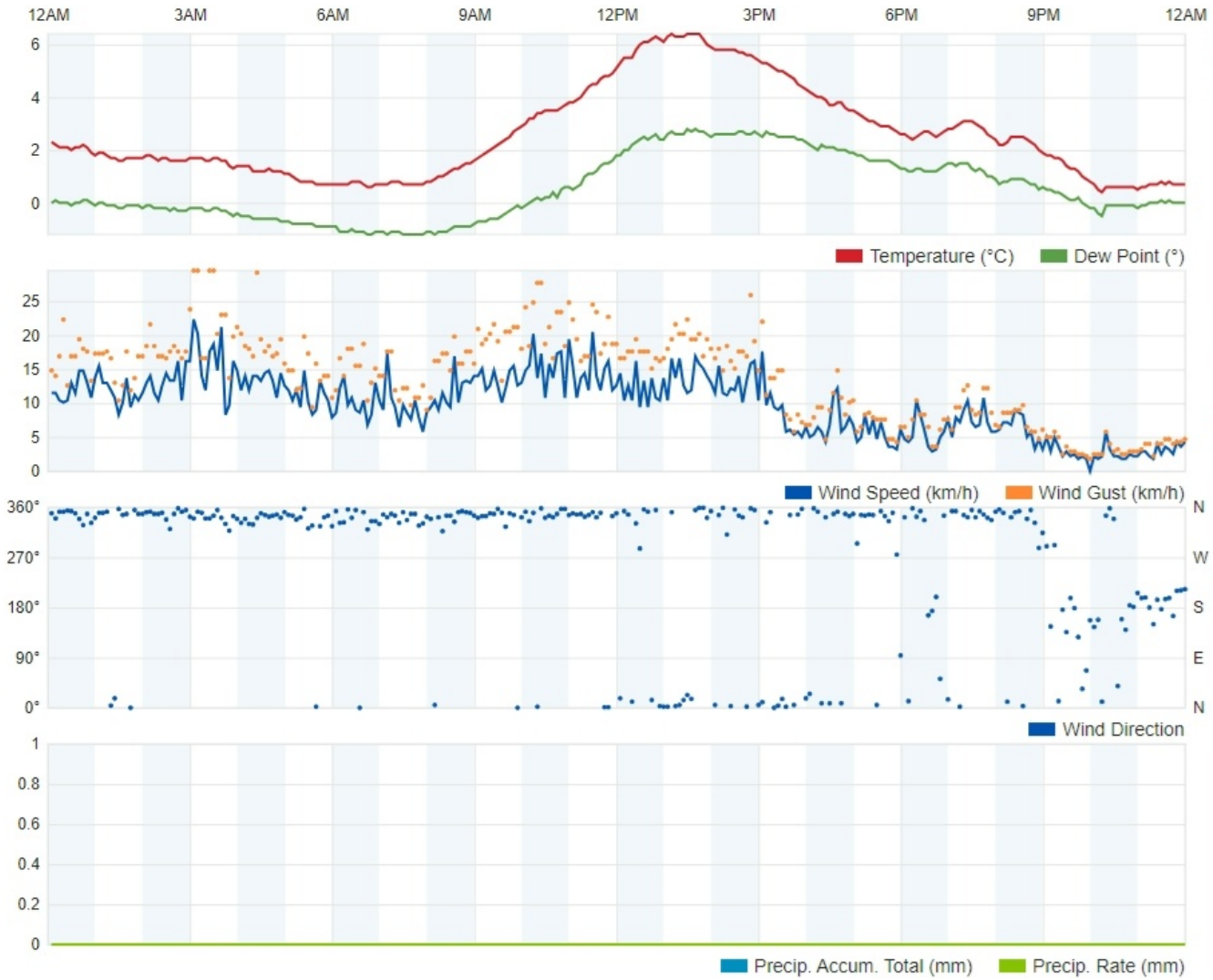
Thursday 23/11/2023



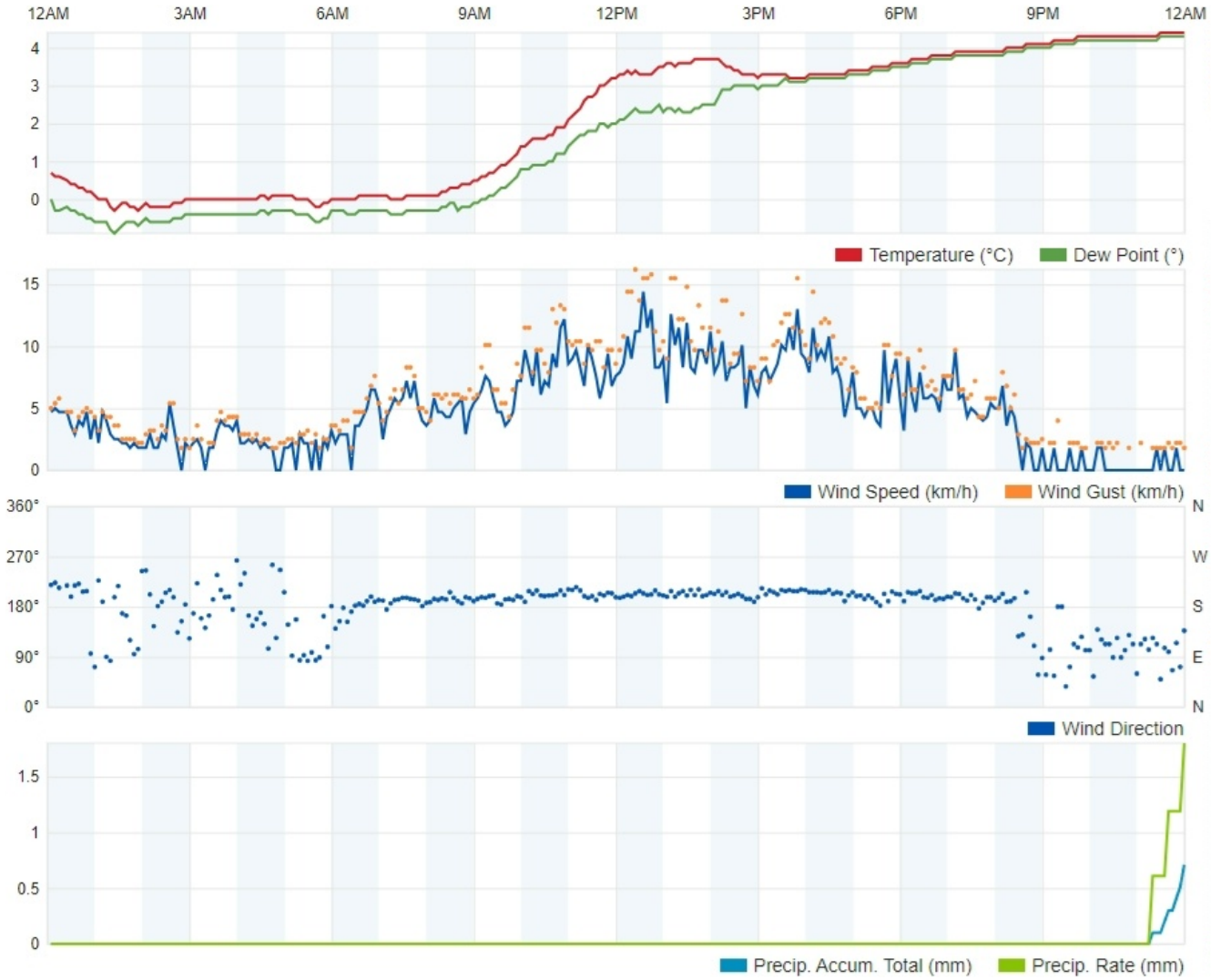
Friday 24/11/2023



Saturday 25/11/2023



Sunday 26/11/2023



Monday 27/11/2023

