

# Noise Impact Assessment

## New Heating, Ventilation and Air Conditioning System

For Thornton And Ross Ltd

### Quality Management

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# Contents

- 1 Introduction .....4**
- 2 Summary of Relevant Policy, Guidance and Standards.....5**
- 3 Site description .....9**
  - Site Description.....9
  - Noise Sensitive Receptors .....9
  - Description of proposed plant .....10
- 4 Baseline Sound Levels .....13**
  - Monitoring Locations .....14
  - Instrumentation .....14
  - Observations.....14
  - Weather Conditions.....14
  - Noise Measurements Results.....15
  - Representative Ambient and Background Sound Levels.....15
- 5 3D Sound Model .....17**
  - Description of Noise Sources .....17
- 6 Sound Modelling Results.....20**
- 7 Noise Impact Assessment .....21**
  - BS 4142:2014 Assessment .....21
  - Noise Change Assessment .....22
  - Operational Context .....23
  - Summary .....24
  - Conclusion .....25
- 8 Summary and Conclusions .....26**

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## Tables, Figures and Appendices

### Tables

Table 2.1	Indoor ambient noise levels for dwellings guidelines .....	7
Table 4.1	Baseline Sound Survey Instrumentation .....	14
Table 4.2	Long-Term Noise Measurement Results.....	15
Table 4.3	Summary of Background and Ambient Sound Levels (free-field) .....	16
Table 5.1	Modelled Plant.....	18
Table 5.2	Attenuators schedule.....	18
Table 5.3	Attenuated Air Intake and Air Exhaust Sound Power Levels .....	19
Table 6.1	Maximum Specific Sound Levels at NSRs (free-field) .....	20
Table 7.1	BS 4142 Assessment – Daytime .....	21
Table 7.2	BS 4142 Assessment – Night-time .....	22
Table 7.3	Ambient Noise Level Change Assessment.....	23

### Figures

Figure 3.1	Site location and NSRs
Figure 3.2	Proposed plant layout
Figure 4.1	Noise Monitoring Locations
Figure 5.1	Location of plant on site – 3D view (southeast)

### Appendices

Appendix A: Acoustic definitions
Appendix B: National Planning Policy & Guidance
Appendix C: Time History Graph

# 1 Introduction

- 1.1 The Acoustics Team of RPS (RPS) has been commissioned by Thornton And Ross Ltd to provide a noise impact assessment in relation to a new heating, ventilation and air conditioning (HVAC) system at the Thornton And Ross Ltd site located at Manchester Road, Linthwaite, Huddersfield, HD7 5QH. The site is located within the administrative area of Kirklees Council (KC).
- 1.2 Baseline noise conditions at the nearest noise sensitive receptors (NSRs) to the site were established by baseline monitoring undertaken on site between Monday 21<sup>st</sup> June 2021 and Sunday 27<sup>th</sup> June 2021.
- 1.3 The nearest NSRs were identified as the residential/commercial receptors along Manchester Road, which lie approximately 15 m south of the site boundary (approx. 100 m south of proposed HVAC plant) and the residential receptors along Barber Row, which lie approximately 20 m east of the site boundary (approx. 145 m east of proposed HVAC plant).
- 1.4 This assessment has been carried out in accordance with the British Standard (BS) 4142:2014+A1:2019 'Methods for rating and assessing industrial and commercial sound' [i] (BS 4142) methodology, which is the industry standard for assessment of commercial and industrial sound.
- 1.5 RPS is a member of the Association of Noise Consultants (ANC), the representative body for acoustics consultancies, having demonstrated the necessary professional and technical competence. The assessment has been undertaken with integrity, objectivity and honesty in accordance with the Code of Conduct of the Institute of Acoustics (IOA) and ethically, professionally and lawfully in accordance with the Code of Ethics of the ANC.
- 1.6 The technical content of this assessment has been provided by RPS personnel, all of whom are members of the IOA (the UK's professional body for those working in acoustics, noise and vibration) at various grades. This report has been peer reviewed within the RPS team to ensure that it is technically robust and meets the requirements of our Integrated Management System.

## 2 Summary of Relevant Policy, Guidance and Standards

### National Planning Policy Framework

- 2.1 The National Planning Policy Framework (NPPF) [ii] adopted in 2012 in England outlines the Government's planning policies and requirements for the planning system. The NPPF forms a material consideration in planning decisions and hence should be complied with for planning permission to be granted.
- 2.2 Further details on the NPPF can be found in Appendix B.

### Noise Policy Statement for England 2010

- 2.3 The Noise Policy Statement for England (NPSE) [iii] sets out the long-term vision of Government, which aims to promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development.
- 2.4 Further details on the NPSE can be found in Appendix B.

### British Standard 4142:2014+A1:2019 'Methods for rating and assessing industrial and commercial sound'

- 2.5 BS 4142 provides a method for rating industrial and commercial sound and method for assessing resulting impacts upon people. The method is applicable to fixed plant installations, sound from industrial and manufacturing process and other associated activities.
- 2.6 The rating method takes source characteristic into account, such as tonality, impulsivity and intermittency.
- 2.7 An initial estimate of the impact of the specific sound is obtained by subtracting the measured background sound level from the rating level of the specific sound. In the context of the Standard, adverse impacts include, but are not limited to, annoyance and sleep disturbance. Typically, the greater this difference, the greater the magnitude of the impact:
- 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.

2.8 Further details on BS 4142 can be found in Appendix B

## Local Planning Policy

### Kirklees Council (KC): Kirklees Local Plan

2.9 KC's development strategies and planning policies for the area are set out in the Kirklees Local Plan, adopted in February 2019 [iv].

2.10 Policy LP52 of the Local Plan on the Protection of environmental quality mentions the following:

*“Proposals which have the potential to increase pollution from noise, vibration [...] must be accompanied by evidence to show that the impacts have been evaluated and measures have been incorporated to prevent or reduce the pollution, so as to ensure it does not reduce the quality of life and well-being of people to an unacceptable level or have unacceptable impacts on the environment.*

*Such developments which cannot incorporate suitable and sustainable mitigation measures which reduce pollution levels to an acceptable level to protect the quality of life and well-being of people or protect the environment will not be permitted.*

*Where possible, all new development should improve the existing environment.”*

2.11 The Local Plan also refers to the following supporting evidence:

- EU Environmental Noise Directive 2002/49/EC
- Noise Policy Statement of England, March 2010, DEFRA
- Kirklees Noise Design Advice May 2007
- Noise Action Plan: Agglomerations Environmental Noise (England) Regulations 2006 as amended January 2014

### Kirklees Council (KC): Noise Design Advice

2.12 Kirklees Council has developed Noise Design Advice [v] in May 2007 to aid developers in determining what is an acceptable acoustic environment. The Noise Design Advice is currently under review given the advice in the Noise Policy Statement for England.

2.13 With regards to new industrial or commercial use near to residential use the Noise Design Advice documents states:

*“[...] to protect the present and future occupiers of residential properties from your new industrial or commercial noise.*

*Developers should carry out an assessment in accordance with BS4142 to determine the rating level of the new development. It is recommended that during normal daytime hours (0700 to 2300 hours), the BS4142 rating level, measured over 1 hour, should be 5 dB below the background ( $L_{A90}$ ). During the night-time period (2300 to 0700 hours), the BS4142 rating level, measured over 5 minutes should be 5dB below the background ( $L_{A90}$ ).*

*The assessment should be carried out at the site boundary or at the nearest noise sensitive premises, depending on the circumstances. These noise levels are intended to ensure that existing noise sensitive premises and land which may be used for noise sensitive development in future does not become blighted by noise.*

*To aid regeneration, in certain circumstances, a higher rating level may be accepted provided the need is justified. “*

2.14 The justification for the above is stated as:

*“PPG24 states that local planning authorities must ensure that development does not cause an unacceptable degree of disturbance, while at the same time not placing unreasonable restrictions on development and to allow for the creation of jobs and the construction and improvement of essential infrastructure.”*

2.15 The Noise Design Advice also states that the noise levels specified in Table 2.1 should not be exceeded. These should be calculated assuming windows in noise sensitive premises are open for ventilation as in Appendix 1 of the Noise Design Advice document.

**Table 2.1 Indoor ambient noise levels for dwellings guidelines**

Location	Daytime (07:00-23:00)	Night-time (23:00-07:00)
Living room/ Studies	35 dB $L_{Aeq,16hour}$	-
Dining room/area	40 dB $L_{Aeq,16hour}$	-
Bedroom	-	30 dB $L_{Aeq, 8hour}$ 45 dB $L_{A1, 15 minutes}$ 55 dB $L_{Amax, 8hour}$

Location	Daytime (07:00-23:00)	Night-time (23:00-07:00)
Gardens	55 dB $L_{Aeq,16hour}$	-

2.16 The Noise Design Advice document also mentions PPG24 and refers to BS 4142:1997 to consider noise from industrial and commercial developments. It should be noted that PPG24 was withdrawn on the publication of the National Planning Policy Framework<sup>1</sup> (NPPF) in March 2012 and BS 4142:1997 has now been superseded by BS 4142:2014+A1:2019, which will be taken into account for this assessment.

## 3 Site description

### Site Description

- 3.1 The Thornton & Ross site is located at Linthwaite, approximately 5 km to the west of Huddersfield. The approximate site location can be seen in Figure 3.1.
- 3.2 The site is bounded by undeveloped land to the north and west and by commercial and residential units directly to the south. The River Colne flows directly north of the site.
- 3.3 It is understood that the site is used for production of household pharmaceutical products and it operates on a 24/7 basis. There is an existing plant on rooftop level as shown in Figure 3.1.

### Noise Sensitive Receptors

- 3.4 The nearest residential receptors to the site are identified as follows:
  - NSR A: the residential receptors at 1062 to 1088 Manchester Road, HD7 5QQ, which lie approximately 15 m south of the site boundary;
  - NSR B: the residential and commercial receptors at 1028 to 1050 Manchester Road HD7 5QG which lie approximately 15 m southeast of the site boundary, and
  - NSR C: the residential receptors along Barber Row, which lie approximately 20 m east of the site boundary.
- 3.5 Other residential receptors are located directly to the south of Manchester Road and also to the east of the site. However, these receptors are not considered, as these are further away from the site than NSR A, NSR B and NSR C and if noise levels from the new plant are acceptable at the closest receptors, i.e. NSR A, B and C, they should by proxy be acceptable at receptors further away from the site.
- 3.6 The NSRs locations can be seen in Figure 3.1 below.



**Figure 3.1 Site location and NSRs**

- 3.7 With regards to sensitivity, all nearby residential receptors are considered to be of high sensitivity to adverse noise effects, as a cautious approach. The nearby commercial receptors are considered to be of medium sensitivity.

### Description of proposed plant

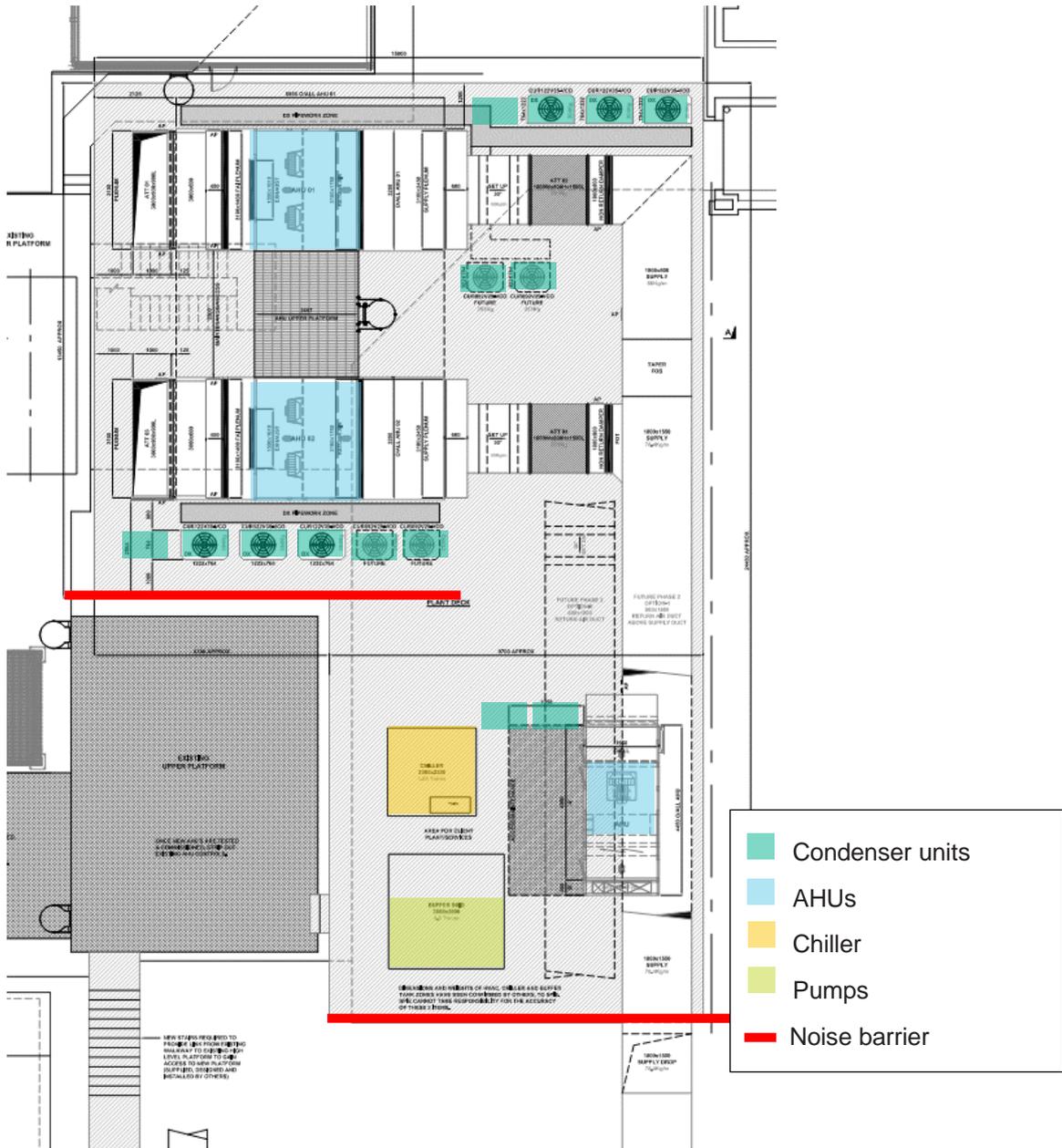
- 3.8 A plant deck is proposed to be erected for a new HVAC plant for the existing site. The plant is proposed to be located in a gantry box on rooftop level at the area indicated in Figure 3.1.
- 3.9 The proposed plant will introduce new noise sources to the local area. Based on the provided information it is understood that the following noise sources are proposed:

- 12 x condenser units (servicing the AHU plant);
- 2 x condenser units (servicing the plantroom);
- 3 x air handling units (AHUs);
- 1 x chiller, and
- 4 pumps.

3.10 The proposed plant layout is shown in Figure 3.2.

3.11 In addition to the above, two 3 m high noise barriers/screens will be installed along the south facing aspects of the plant deck. These have been included in the overall design after an initial analysis indicated that specific sound levels at NSRs would potentially increase with the inclusion of the proposed HVAC plant.

3.12 The barrier locations are indicated in Figure 3.2 below.



**Figure 3.2 Proposed plant layout**

## 4 Baseline Sound Levels

- 4.1 A baseline sound survey was undertaken to establish the baseline conditions at the nearest noise sensitive receptors. One long-term monitor was left on site between Monday 21<sup>st</sup> June and Sunday 27<sup>th</sup> June 2021. The survey included one unattended long-term noise monitoring at location LT1, which is shown in Figure 4.1.



**Figure 4.1 Noise Monitoring Locations**

## Monitoring Locations

- 4.2 Survey location LT1 was located on the southern part of site, which is closest to the NSRs on Manchester Road. The microphone was set up 1.5 m above ground level (AGL), with an environmental windshield.

## Instrumentation

- 4.3 The sound level survey was carried out using a 'Class 1' Rion NL-52 sound level meter (SLM), in accordance with BS 7445-2:1991 [vi]. The SLM was calibrated before use and the calibration checked after use and it was observed that no significant drift occurred during the survey period. Data were logged of the broadband A-weighted sound pressure level in 100 ms samples with the required periods extracted in post-processing.
- 4.4 Details of the instrumentation used during the survey, including calibration, are provided in Table 4.1 below. Calibration certificates of the equipment are available upon request. Calibration of the equipment was carried out before and after measurements with no significant drift ( $< \pm 0.1$  dB) observed.

**Table 4.1 Baseline Sound Survey Instrumentation**

Measurement Location	Make/Model	Serial Number	Calibration Ref/ Calibration Start /Calibration End	Last Calibration Date
SLM	Rion NL-52	00998569	94.0 / 94.0 / 94.1 dB	16/03/2020
Calibrator	Rion NC-74	00110118	-	19/11/2020

## Observations

- 4.5 At location LT1, at the time of setting up and collecting the survey equipment, the following noise sources were noted as effecting the acoustic environment: road traffic movements on the A62 (Manchester Road), some noise from the Thornton and Ross premises and bird calls.

## Weather Conditions

- 4.6 Information on the weather conditions during the noise survey was extracted from Weather Underground historic data and particularly from weather station IHUDE42 (Latitude / Longitude: 53.627° N, 1.845° W) located at approximately 500 m from the Thornton and Ross site (<https://www.wunderground.com/>). Overall, there were some periods of rain which could affect the validity of the results. As such the sound data collected over these periods with excessive wind and

rain have been discounted, so they don't have an adverse effect on the accuracy of results. The periods that were excluded from the data analysis were the following: the period between 06:00 and 12:00 hours on 24<sup>th</sup> June and the period between 00:00 and 12:00 hours on 25<sup>th</sup> June.

## Noise Measurements Results

- 4.7 The results from the long-term noise monitoring are summarized in Table 4.2. As a worst-case approach, the 25<sup>th</sup> percentile of the background noise levels is considered in this assessment. An entire time history graph for location LT1 is provided in Appendix C.

**Table 4.2 Long-Term Noise Measurement Results**

Measurement Location	Daytime (07:00-23:00)		Night-time (23:00-07:00)	
	Average* Residual Sound Levels $L_{Aeq, T}$ (dB)*	25 <sup>th</sup> Percentile Background Sound Levels $L_{A90, 15min}$ (dB)	Average* Residual Sound Levels $L_{Aeq, T}$ (dB)*	25 <sup>th</sup> Percentile Background Sound Levels $L_{A90, 15min}$ (dB)
LT1 (weekdays)	54	45	50	40
LT1 (weekends)	53	43	48	40

Note:  
 All values have been rounded to the nearest whole number, where 0.5 is rounded up.  
 25<sup>th</sup> percentile  $L_{A90, 15min}$  (dB): A-weighted  $L_{90}$  sound pressure level which is exceeded for 25% of the measurement time.  
 \* logarithmic average.

## Representative Ambient and Background Sound Levels

- 4.8 The background noise levels measured at location LT1 are considered representative of the NSRs along Manchester Road, due to the proximity of it to the Manchester Road dwellings. The background noise levels measured at location LT1 are considered representative of the NSRs along Barber Row, due to similar distance from Manchester Road. The representative ambient and background sound levels at the identified noise sensitive receptors are presented in Table 4.3 below.

**Table 4.3 Summary of Background and Ambient Sound Levels (free-field)**

Noise sensitive receptor	Week Period	Residual Sound Levels, dB L <sub>Aeq, T</sub>		Background Sound Levels, dB L <sub>A90, T</sub>	
		Daytime	Night-time	Daytime	Night-time
NSR A: residential receptors at 1062 - 1088 Manchester Road, NSR B: residential and commercial receptors at 1028 - 1050 Manchester Road, NSR C: residential receptors along Barber Row	Weekdays	54	50	45	40
	Weekend	53	48	43	40

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## 5 3D Sound Model

- 5.1 In order to calculate specific sound levels associated with operation of the facility at the NSRs a 3D model has been built using SoundPLAN v8.2 proprietary noise modelling software. This model calculates the contribution from each noise source input as a specified source type (e.g. point, line, area) at selected locations.
- 5.2 The model predicts sound levels under light down-wind conditions based on hemispherical sound propagation with corrections for atmospheric absorption, ground effects, screening and directivity based on the procedure detailed in ISO 9613-2:1996 'Acoustics - Attenuation of sound during propagation outdoors - Part 2: General method of calculation' [vii].
- 5.3 The ground between the site and the receiver locations has been modelled as semi-hard ground with a ground factor of  $G = 0.6$ . Terrain contour data have been entered into the model based on OS land contours. The nearest buildings to the facility and surrounding area have been included in the model.
- 5.4 Specific sound levels have been calculated at ground floor, first floor and second floor levels, 1.5, 4.5 and 7.5 m above local ground level, respectively. The maximum predicted specific sound level per receptor has been used in the assessment. The same noise modelling techniques have been used by RPS on numerous sites in the UK and worldwide and there is a high degree of confidence in the model.

### Description of Noise Sources

- 5.5 Table 5.1 presents the plant items to be installed as part of the proposed development. The indicated sound power levels are based on the information provided by the project team until 29/06/2021 and on the RPS source term library.
- 5.6 The plant items were implemented in the model at the locations shown in Figure 5.1.
- 5.7 Attenuators are proposed to be fitted to the air intake and air exhaust for AHU01 and AHU02. The attenuators' insertion losses performance schedule is given in Table 5.2. The resulting sound power levels for the air intake and air exhaust of AHU01 and AHU02 are given in Table 5.3.
- 5.8 It should be noted that the calculation uncertainty of the sound power levels of the noise sources on site has been reduced by peer review of the measurement data and calculations.

**Table 5.1 Modelled Plant**

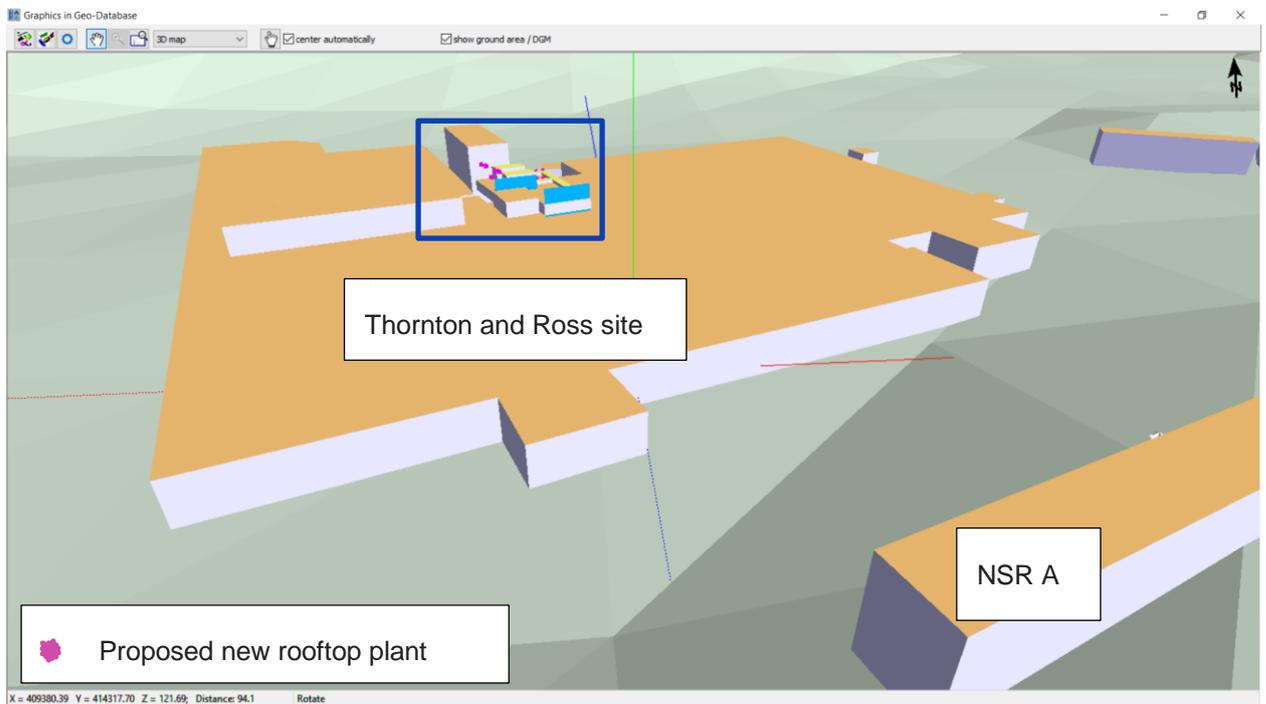
Plant Unit	Modelled Sound Power Level (dBA L <sub>w</sub> )	Number of items	Source height above ground, m	Source type within model	Source
AHU01, Inlet SWL	95	1	13.3 m	Point source	As provided by the design team
AHU01, Outlet SWL	107	1	10.5 m	Point source	As provided by the design team
AHU01 casing	78	1	13 m	Point source	As provided by the design team
AHU02, Inlet SWL	95	1	13.3 m	Point source	As provided by the design team
AHU02, Outlet SWL	107	1	10.5 m	Point source	As provided by the design team
AHU02 casing	78	1	13 m	Point source	As provided by the design team
AHU Fan Intake	70	1	10.1 m	Point source	As provided by the design team
LEV Fan/Filter Unit (Fan discharge)	91	1	10.1	Point source	As provided by the design team
AHU casing	78	1	10.3 m	Point source	Assumed the same as AHU01 and AHU02
Condenser units servicing AHU01 and AHU02	88	8	10.3 m	Point source	Airedale CU122V35-VCO-VO
Condenser units servicing	87	4	10.3 m	Point source	Airedale CUR092V29-VCO-VO
Condenser units servicing plantroom	54	2	10.3 m	Point source	Mitsubishi PUZ-ZM-35
Chiller	95	1	10.7 m	Point source	Tetris 29.4
Pumps	60	4	10 m	Point source	Lowara 50 Hz

**Table 5.2 Attenuators schedule**

Attenuator	System Reference	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
ATT 01 AHU1 Air Inlet	Air inlet	7	10	16	21	28	19	15	10
ATT 06 AHU1 Exhaust Air	Exhaust air	7	10	16	21	28	19	15	10

**Table 5.3 Attenuated Air Intake and Air Exhaust Sound Power Levels**

Plant Unit	Modelled Sound Power Level (dBA L <sub>w</sub> )	Number of items	Source height above ground, m	Source type within model	Source
Attenuated AHU01, Inlet SWL	76	1	13.3 m	Point source	As provided by the design team
Attenuated AHU01, Outlet SWL	87	1	12.95 m	Point source	As provided by the design team



**Figure 5.1 Location of plant on site – 3D view (southeast)**

## 6 Sound Modelling Results

- 6.1 The 3D sound model was used to predict the specific sound levels at NSRs A, B and C.
- 6.2 The proposed plant is expected to operate 24/7 and a worst-case approach of a 100% on-time for all noise sources operating simultaneously has therefore been adopted. As such, the specific noise levels of the daytime and night-time operation are the same and a 'worst case' scenario.
- 6.3 It would likely be the case that for the majority of the time, specific noise levels would be lower, due to reduced demand, particularly during the night-time period when external ambient temperatures are lower.
- 6.4 A summary of the predicted specific sound levels is shown in Table 6.1.

**Table 6.1 Maximum Specific Sound Levels at NSRs (free-field)**

Location / NSR	Specific Sound Level (dB L <sub>Aeq,Tr</sub> )
NSR A: residential receptors at 1062 - 1088 Manchester Road	40
NSR B: residential and commercial receptors at 1028 - 1050 Manchester Road	39
NSR C: residential receptors along Barber Row	40

## 7 Noise Impact Assessment

### BS 4142:2014 Assessment

7.1 With reference to BS 4142, a character correction can be applied to specific sound levels to account for features of the specific sound that may increase the likelihood for adverse effect. In this instance it is not considered appropriate to apply any correction, this is on the basis that:

- Based on provided data the specific sound will not be tonal, or impulsive, whilst fans are included in the design the aerodynamic noise of the airflow acts to mask the tonal aspect of the fan itself;
- Whilst the plant may ramp up according to demand, any 'on periods' would not be readily disincensive;
- The facility already includes similar rooftop plant, as such, the new noise would not be considered incongruous or readily distinctive compared to the residual acoustic environment; and
- Specific sound levels are low, below both the daytime and night-time residual sound levels and background sound levels. As such, the specific sound would likely not be particularly noticeable.

7.2 Consequently, specific sound levels are equal to the Rating Level in this case.

7.3 A BS 4142:2014 assessment for the daytime and night-time period is provided in Table 7.1 and Table 7.2 below, respectively, for the operational noise from the proposed plant. The assessment considers the representative baseline levels of the weekend as a worst-case approach.

**Table 7.1 BS 4142 Assessment – Daytime**

NSR	Specific Sound Level, dB L <sub>Aeq,Tr</sub>	Rating Penalty, dB	Rating Level, dB L <sub>Ar,Tr</sub>	Background Level, dB L <sub>A90,T</sub>	Rating / Background Level Difference, dB
NSR A	40	0	40	43	-3
NSR B	39	0	39	43	-4
NSR C	40	0	40	43	-3

**Table 7.2 BS 4142 Assessment – Night-time**

NSR	Specific Sound Level, dB L <sub>Aeq,Tr</sub>	Rating Penalty, dB	Rating Level, dB L <sub>Ar,Tr</sub>	Background Level, dB L <sub>A90,T</sub>	Rating / Background Level Difference, dB
NSR A	40	0	40	40	0
NSR B	39	0	39	40	-1
NSR C	40	0	40	40	0

7.4 With regards to the rating/background level difference, BS 4142:2014+A1:2019 states:

- 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; and
- 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.

7.5 On the basis of the above, and with reference to Table 7.1 and Table 7.2, it is considered that as Rating Levels do not exceed the representative background sound level during either the daytime or night-time periods, there is a low risk that operation of the proposed HVAC plant would result in adverse impact, significant or otherwise, depending on the context.

7.6 In this instance, it is considered that the context of the noise/situation further reduces the risk for adverse impact during both the daytime and night-time periods, such that adverse impact/effects would be very unlikely, significant, or otherwise, as reasoned below.

### **Noise Change Assessment**

7.7 The ambient sound levels with and without the proposed development in operation are shown in Table 7.3. The results show that sound from the plant would not increase daytime ambient noise levels with night-time ambient noise levels increasing by up to 1 dB.

7.8 A change of 1 dB is considered to be a very marginal increase, and would very likely not be noticeable, particularly as the specific sound is of a similar nature to the existing acoustic environment<sup>1</sup>.

**Table 7.3 Ambient Noise Level Change Assessment**

Location	Baseline residual noise level, dB L <sub>Aeq,T</sub>	Specific sound level, dB L <sub>Aeq,T</sub>	Ambient noise level with site, dB L <sub>Aeq,T</sub>	Noise change, dB
<b>Daytime</b>				
NSR A: residential receptors at 1062 - 1088 Manchester Road	53	40	53	<b>0</b>
NSR B: residential and commercial receptors at 1028 - 1050 Manchester Road	53	39	53	<b>0</b>
NSR C: residential receptors along Barber Row	53	40	53	<b>0</b>
<b>Night-time</b>				
NSR A: residential receptors at 1062 - 1088 Manchester Road	48	40	49	<b>+1</b>
NSR B: residential and commercial receptors at 1028 - 1050 Manchester Road	48	39	48	<b>+1</b>
NSR C: residential receptors along Barber Row	48	40	49	<b>+1</b>

## Operational Context

- 7.9 This assessment above has adopted a worst-case approach, i.e. where all plant has been assumed to be operating at maximum capacity, simultaneously at 100% on-time.
- 7.10 It would likely be the case that for the majority of the time specific noise levels would be lower, due to reduced demand, particularly during the night-time period when external ambient temperatures are lower.
- 7.11 On this basis, Rating Levels more generally would be below the representative background sound level both the daytime and night-time periods, with a corresponding decrease in likelihood for adverse effects.

<sup>1</sup> Generally, a 3 dB change in steady noise is considered to be the minimum discernible change.

- 7.12 Furthermore, the specific noise would not be of a magnitude or character dissimilar to the existing acoustic environment. The Thornton and Ross facility has been operational for a number of decades, with similar noise generating mechanical plant affecting the acoustic environment.
- 7.13 On this basis the specific sound would very likely not be considered intrusive or incongruous compared to the current acoustic environment, if noticeable at all.

## Summary

- 7.14 Highest Rating Levels at NSRs would at times be up to 3 dB below the daytime background sound level and equal to the night-time background sound level, substantially below the level indicative of significant adverse impact, depending on the context. More generally, Rating Levels would be lower, as the plant would not all operate at 100% capacity for 24-hours per day, particularly at night.
- 7.15 Overall ambient noise levels (i.e. noise from all sources) at NSRs would not increase by any more than 1 dB at, a very marginal increase, and likely not noticeable.
- 7.16 The specific noise would likely not be considered intrusive or incongruous compared to the existing acoustic environment. The Thornton and Ross facility has been operational for a number of decades, with similar noise generating mechanical plant affecting the acoustic environment.
- 7.17 As such, with reference to the PPGN, it is considered that operational of the proposed HVAC plant would result in effects below the 'Lowest Observed Adverse Effect Level' (LOAEL), i.e. the noise may at times be heard, when at 100% operation and during otherwise quiet periods, but would not cause any change in behaviour, attitude or other physiological response. The operational noise would not affect the acoustic character of the area or result in a change in the quality of life.
- 7.18 Noise would not be of a magnitude sufficient to result in effects above the 'Significant Observed Adverse Effect Level' (SOAEL).
- 7.19 Consequently, the proposed development would be compliant with national planning policy, i.e. the NPSE and the NPPF.
- 7.20 With regards to local planning policy (Policy LP52 of the KC Local Plan) operation of the proposed development would not increase noise pollution from the Thornton and Ross site overall.
- 7.21 As summarised above, highest Rating Levels at NSRs associated with operation of the proposed plant would not exceed the existing background sound level. More generally, Rating Levels would be lower. On the basis that noise emissions from the existing Thornton Ross site are, to an extent,

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currently affecting the background sound level, then as Rating Levels are no higher than the background sound level, overall site noise levels would remain unchanged<sup>2</sup>.

- 7.22 Furthermore, mitigation has been incorporated within the design with the intention of minimising noise levels at NSRs, such that noise levels would be of a magnitude below the LOAEL, and not reduce the quality of life and/or well-being of residents.
- 7.23 It is acknowledged that Rating Levels would be above the KC 'Noise Design Advice' document, however it is considered that the proposed development is, in a sense not new (the site is operational), and the proposed plant would not increase noise levels from the site as is. Also, it is noted that the design guidance was published prior to the publication of the NPSE, the NPPF and the KC Local Plan.
- 7.24 On this basis, the proposed development would not change the acoustic environment or increase the risk for the NSRs to be 'blighted by noise'.
- 7.25 It should also be noted that operational noise levels would not exceed the KC 'Noise Design Advice' criteria for internal noise levels, assuming windows in noise sensitive premises are open, or external amenity areas.
- 7.26 On the basis of the above the proposed development would be compliant with the aims of the KC 'Noise Design Advice' document, i.e. it would not cause an unacceptable degree of disturbance in terms of noise or increase the risk for NSRs to be 'blighted by noise'.

## Conclusion

- 7.27 Operation of the proposed development would result in noise levels at NSRs of a magnitude below the LOAEL, with significant effect/impacts avoided.
- 7.28 Noise levels from the Thornton and Ross site overall would not increase and operation of the proposed HVAC plant would not reduce the quality of life and/or well-being of residents.
- 7.29 Consequently, the proposed development would be compliant with national policy, i.e. the NPSE and the NPPF, local planning policy, i.e. Policy LP52 of the KC Local Plan and the aims of KC 'Noise Design Advice' document.

<sup>2</sup> Note that the background sound levels are a statistical metric, excluding the loudest 90% of data. As such, operation of the existing site and the proposed HVAC development would likely not increase existing background sound levels.

## 8 Summary and Conclusions

- 8.1 RPS Environment Acoustics team (RPS) was commissioned by Thornton And Ross Ltd to provide a noise assessment of the operational noise levels in relation to a new heating, ventilation and air conditioning (HVAC) system at Thornton And Ross Ltd site located at Manchester Road, Linthwaite, Huddersfield, HD7 5QH. The site is located within the administrative area of Kirklees Council (KC).
- 8.2 Baseline noise conditions at the nearest noise sensitive receptors (NSRs) to the site were established by baseline monitoring undertaken on site between 21<sup>st</sup> June 2021 and 28<sup>th</sup> June 2021.
- 8.3 The nearest NSRs were identified as the residential/commercial receptors along Manchester Road, which lie approximately 15 m south of the site boundary and the residential receptors along Barber Row, which lie approximately 20 m east of the site boundary.
- 8.4 The assessment was carried out in accordance with British Standard (BS) 4142:2014+A1:2019 methodology, which is the industry standard for assessment of commercial and industrial sound.
- 8.5 The BS 4142:2014+A1:2019 assessment, with consideration of the context, indicates that operation of the proposed development would result in noise levels at NSRs of a magnitude below the LOAEL, with significant effect/impacts avoided. Noise levels from the Thornton and Ross site overall would not increase and operation of the proposed HVAC plant would not reduce the quality of life and/or well-being of residents.
- 8.6 Consequently, the proposed development would be compliant with national policy, i.e. the 'Noise Policy Statement for England' (NPSE), the 'National Planning Policy Framework' (NPPF), local planning policy, i.e. Policy LP52 of the KC Local Plan and the aims of KC 'Noise Design Advice' document.

## Appendices

## Appendix A: Acoustic definitions

Acoustic term	Definition
<b>rating level, <math>L_{Ar,Tr}</math></b>	specific sound level plus any adjustment for the characteristic features of the sound
<b>background sound level, <math>L_{A90,T}</math></b>	A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T, measured using time weighting, F, and quoted to the nearest whole number of decibels
<b>ambient sound level, <math>L_a = L_{Aeq,T}</math></b>	<p>equivalent continuous A-weighted sound pressure level of the totally encompassing sound in a given situation at a given time, usually from many sources near and far, at the assessment location over a given time interval, T</p> <p><i>NOTE The ambient sound level is a measure of the residual sound and the specific sound when present.</i></p>
<b>specific sound level, <math>L_s = L_{Aeq,Tr}</math></b>	equivalent continuous A-weighted sound pressure level produced by the specific noise source at the assessment location over a given reference time interval, T

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## Appendix B: National Planning Policy & Guidance

### National Planning Policy Framework

- B.1 The National Planning Policy Framework (NPPF)<sup>3</sup> adopted in 2012 in England outlines the Government's planning policies and requirements for the planning system. The NPPF forms a material consideration in planning decisions and hence should be complied with for planning permission to be granted.
- B.2 Regarding noise, the NPPF states that the planning system should contribute to and enhance the natural and local environment by preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of noise pollution.
- B.3 The planning system should therefore seek to:
- Avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;
  - Mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of planning conditions;
  - Recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established; and
  - Identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.
- B.4 To achieve these aims the NPPF refers to the Noise Policy Statement for England 2010.

<sup>3</sup> Department for Communities and Local Government, March 2012. National Planning Policy Framework. HMSO

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## Noise Policy Statement for England 2010

- B.5 The Noise Policy Statement for England (NPSE)<sup>4</sup> sets out the long term vision of Government, which aims to promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development.
- B.6 The NPSE outlines three aims for the effective management and control of environmental, neighbour and neighbourhood noise:
- Avoid significant adverse impacts on health and quality of life;
  - Mitigate and minimise adverse impacts on health and quality of life; and
  - Where possible, contribute to the improvement of health and quality of life

## British Standard 4142:2014+A1:2019 'Methods for rating and assessing industrial and commercial sound'

- B.7 BS 4142:2014+A1:2019 primarily provides a numerical method by which to determine the significance of sound of an industrial nature (i.e. the 'specific sound' from the proposed development) at residential NSRs. The specific sound level may then be corrected for the character of the sound (e.g. perceptibility of tones and/or impulses), if appropriate, and it is then termed the 'rating level', whether or not a rating penalty is applied. The 'residual sound' is defined as the ambient sound remaining at the assessment location when the specific noise source is suppressed to such a degree that it does not contribute to the ambient sound.
- B.8 The specific sound levels should be determined separately in terms of the  $L_{Aeq,T}$  index over a period of  $T = 1$ -hour during the daytime and  $T = 15$ -minutes during the night-time. For the purposes of the Standard, daytime is typically between 07:00 and 23:00 hours, and night-time is typically between 23:00 and 07:00 hours.
- B.9 BS 4142:2014 requires that the background sound levels adopted for the assessment is representative for the period being assessed. The Standard recommends that the background sound level should be derived from continuous measurements of normally not less than 15-minute intervals, which can be contiguous or disaggregated. However, the Standard states that there is no 'single' background sound level that can be derived from such measurements.
- B.10 BS 4142:2014+A1:2019 states that measurement locations should be outdoors, where the microphone is at least 3.5 m from any reflecting surfaces other than the ground and, unless there is a specific reason to use an alternative height, at a height of between 1.2 m and 1.5 m above ground level. However, where it is necessary to make measurements above ground floor level, the measurement position, height and distance from reflecting surfaces should be reported, and

<sup>4</sup> Department for Environment, Food and Rural Affairs (DEFRA), 2010. Noise Policy Statement for England. DEFRA

ideally measurements should be made at a position 1 m from the façade of the relevant floor, if it is not practical to make the measurements at least 3.5 m from the facade.

B.11 With regards to the rating correction, paragraph 9.2 of BS 4142:2014+A1:2019 states:

*“Consider the subjective prominence of the character of the specific sound at the noise-sensitive locations and the extent to which such acoustically distinguishing characteristics will attract attention.”*

B.12 The commentary to paragraph 9.2 of BS 4142:2014+A1:2019 suggests the following subjective methods for the determination of the rating penalty for tonal, impulsive and/or intermittent specific sounds:

#### *“Tonality*

*For sound ranging from not tonal to prominently tonal the Joint Nordic Method gives a correction of between 0 dB and +6 dB for tonality. Subjectively, this can be converted to a rating penalty of 2 dB for a tone which is just perceptible at the noise receptor, 4 dB where it is clearly perceptible, and 6 dB where it is highly perceptible.*

#### *Impulsivity*

*A correction of up to +9 dB can be applied for sound that is highly impulsive, considering both the rapidity of the change in sound level and the overall change in sound level. Subjectively, this can be converted to a penalty of 3 dB for impulsivity which is just perceptible at the noise receptor, 6 dB where it is clearly perceptible, and 9 dB where it is highly perceptible.*

*NOTE 2 If characteristics likely to affect perception and response are present in the specific sound, within the same reference period, then the applicable corrections ought normally to be added arithmetically. However, if any single feature is dominant to the exclusion of the others then it might be appropriate to apply a reduced or even zero correction for the minor characteristics.*

#### *Intermittency*

*When the specific sound has identifiable on/off conditions, the specific sound level should be representative of the time period of length equal to the reference time interval which contains the greatest total amount of on time. ... If the intermittency is readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied.*

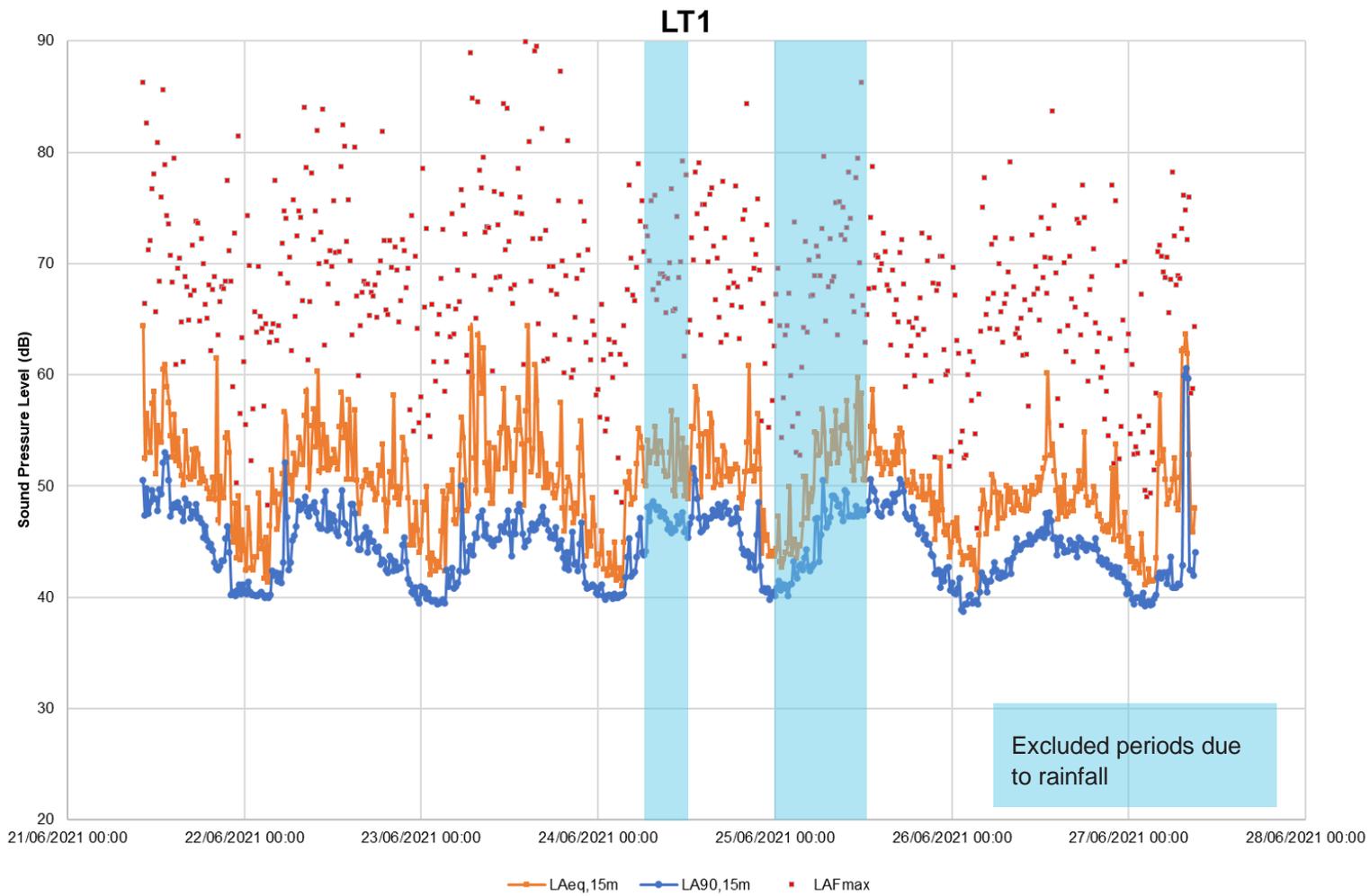
#### *Other sound characteristics*

*Where the specific sound features characteristics that are neither tonal nor impulsive, nor intermittent, though otherwise are readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied.”*

B.13 An initial estimate of the impact of the specific sound is obtained by subtracting the measured background sound level from the rating level of the specific sound. In the context of the Standard, adverse impacts include, but are not limited to, annoyance and sleep disturbance. Typically, the greater this difference, the greater is the magnitude of the impact:

- 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 noise 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 noise source having a low impact, depending on the context.

## Appendix C: Time History Graph



## References

- i Berglund, B. et al. Guidelines for Community Noise. World Health Organisation. 2000.
- ii Department for Communities and Local Government, March 2012. National Planning Policy Framework. HMSO
- iii Department for Environment, Food and Rural Affairs (DEFRA), 2010. Noise Policy Statement for England. DEFRA
- iv Kirklees Council (KC), Kirklees Local Plan, February 2019.
- v Kirklees Council (KC), Noise Design Advice, May 2007.
- vi British Standards Institution. British Standard 7445-2:1991 Description and measurement of environmental noise - Part 2: Guide to the acquisition of data pertinent to land use.
- vii ISO. International Standard ISO 9613-2:1996. Acoustics - Attenuation of sound during propagation outdoors - Part 2: General method of calculation.

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