

Technical Note

Project name **Hammerstone Road Depot, Gorton**
 Project no. **1620005855**
 Client **Morgan Sindall Construction**
 Memo no. **2025/01**
 Version **2**
 To **Phil Williams**
 From **Ryan McNulty**

Prepared by **Ryan McNulty**
 Checked by **Simon Taylor**
 Approved by **Simon Taylor**

Hammerstone Road Depot – Condition 16

Date 09/04/2025

1 Introduction and Background

The Hammerstone Road development sees the refurbishment of a large locomotive shed, which was stripped out to create new offices for both Manchester City Council (MCC) and Biffa. The scheme is served by various items of plant, including several external air handling and air conditioning plant items.

RUK has been appointed by Morgan Sindall Construction to provide a technical note in support of the discharge of planning Condition 16 of the permission (137572/JO/2023) granted for the Hammerstone Road Depot site in Gorton, Manchester. The condition states:

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16) a) Externally mounted ancillary plant, equipment and servicing (including the condenser units) shall be selected and/or acoustically treated in accordance with a scheme designed so as to achieve a rating level of 5dB (LAeq) below the typical background (LA90) level at the nearest noise sensitive location.
 Prior to commencement of the use hereby approved the scheme shall be submitted to and approved in writing by the City Council as local planning authority in order to secure a reduction in the level of noise emanating from the site.

b) Prior to occupation of the development a verification report shall be submitted to and approved in writing by the City Council as local planning authority to validate that the work undertaken throughout the development conforms to the recommendations and requirements in the approved acoustic report. The report shall also undertake post completion testing to confirm that the noise criteria have been met. Any instances of non-conformity with the recommendations in the report shall be detailed along with any measures required to ensure compliance with the agreed noise criteria.

This technical note responds to the above condition to demonstrate that the selected plant has been designed to meet a rating level of 5 dB below existing background levels.

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2 Criteria

2.1 Manchester City Council – Planning and Noise, Technical Guidance

Planning permission for the scheme institute was granted in 2021 under application 137572/JO/2023. The planning application for the scheme was supported by a noise assessment by RUK¹ which sets limits for new external plant.

This report was prepared to confirm that the as installed plant meets the requirements of Manchester City Council's 'Planning and Noise, Technical Guidance'. (revised 2022)².

The guidance states:

'Externally mounted ancillary plant, equipment and servicing shall be selected and/or acoustically treated in accordance with a scheme designed so as to achieve a rating level of 5dB (L_{Aeq}) below the typical background (L_{A90}) level at the nearest noise sensitive location'

The assessment methodology and definition of a 'rating level' are from the following British Standard.

2.2 British Standard 4142:2014+A1:2019 Method for rating and assessing industrial and commercial sound

BS 4142:2014+A1:2019³ (BS4142) 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.

The basis of BS4142 is a comparison between the background noise level in the vicinity of residential locations and the rating level of the noise source under consideration. The relevant parameters in this instance are as follows:

- Background Level, $L_{A90,T}$: defined in the Standard as the 'A' weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T, and quoted to the nearest whole number of decibels;
- Specific Level, $L_{Aeq,T}$: the equivalent continuous 'A' weighted sound pressure level at the assessment location due to the specific sound source under consideration, over a given time interval, T; and
- Rating Level, $L_{Ar,T}$: the specific sound level plus any adjustment made for the characteristic features of the noise.

Potential impacts are predicted from the difference between the representative background level at a noise sensitive receptor and the rating level from the noise source considered. The standard suggests that the greater the difference, the greater the magnitude of impact.

Section 11 of BS4142 gives guidance for significance of impacts in reference to comparing rating noise levels against existing background noise levels:

¹ HRD-RAM-ZZ-XX-RP-Y-0001, 2018

² https://www.manchester.gov.uk/downloads/download/5199/information_for_developers

³ British Standards Institute, 2014 and 2019. British Standard BS 4142+A1:2019: Methods for rating and assessing industrial and commercial sound. BSI.

- i. Typically, the greater this difference, the greater the magnitude of the impact;
- ii. A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context;
- iii. A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context; and
- iv. 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.

2.2.1 BS4142 Noise Characteristics and Penalties

BS4142 applies different penalties for noise sources that have an acoustic feature. These penalties are applied to the plant noise level where such features increase attention to the noise, such as tonality and intermittent operation.

BS4142 gives a guide to the level of penalty that should be applied, summarised below.

Tonality

- Tone just perceptible at the noise receptor: +2dB
- Tone clearly perceptible: +4dB
- Tone highly perceptible: +6dB

Intermittency

- Identifiable on/off conditions, readily distinctive against the residual acoustic environment: +3dB

3 Existing Background Levels

3.1 2018 Noise Survey

Noise levels were measured using a fixed sound level meter was installed on the southern boundary of the site between 10 to 13 December 2018, as reproduced on Figure 1 (Position 1). This long-term monitor was used to establish typical daytime and night-time background noise levels, representative of the nearest noise sensitive receptors to the south (Sunny Brow House – nursing and care home).

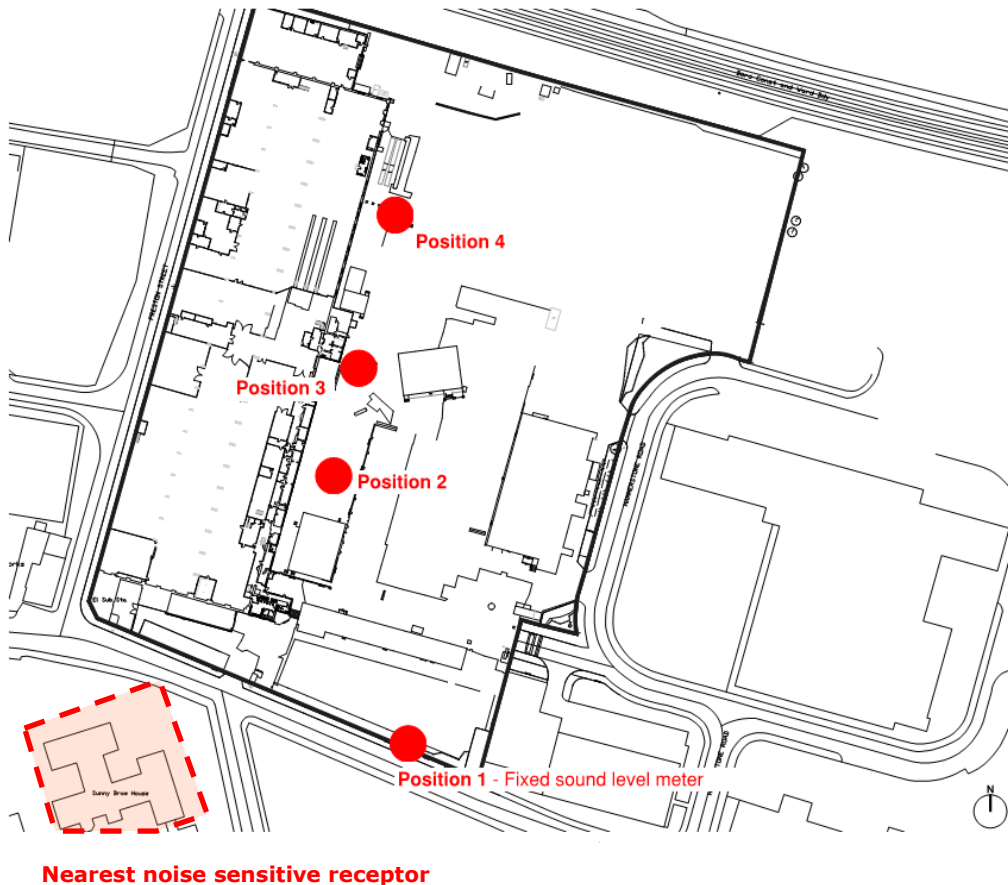


Figure 1 – Existing site layout showing locations of survey positions

In addition, Ramboll did several spot measurements on-site, on the 13 December (Positions 2 to 4) for the purposes of informing the design of the glazing to the refurbished areas of the scheme.

The noise survey details are provided in Appendix A of this note.

3.2 Noise Data

Table 1 below presents the 'typical' background level measured at position 1. This typical level has been derived from the measured data as per Appendix A of the MCC *Planning and Noise* guidance, by arithmetically averaging the data for each period of the days/nights and then obtaining the lowest background level.

Table 1 – Noise levels measured by Ramboll in December 2018 – Typical lowest background levels

Receptor	Daytime	Night-time
Position 1 (unattended meter) Southern boundary and representative of the nearest noise sensitive receptors	47 dB LA90	44dB LA90

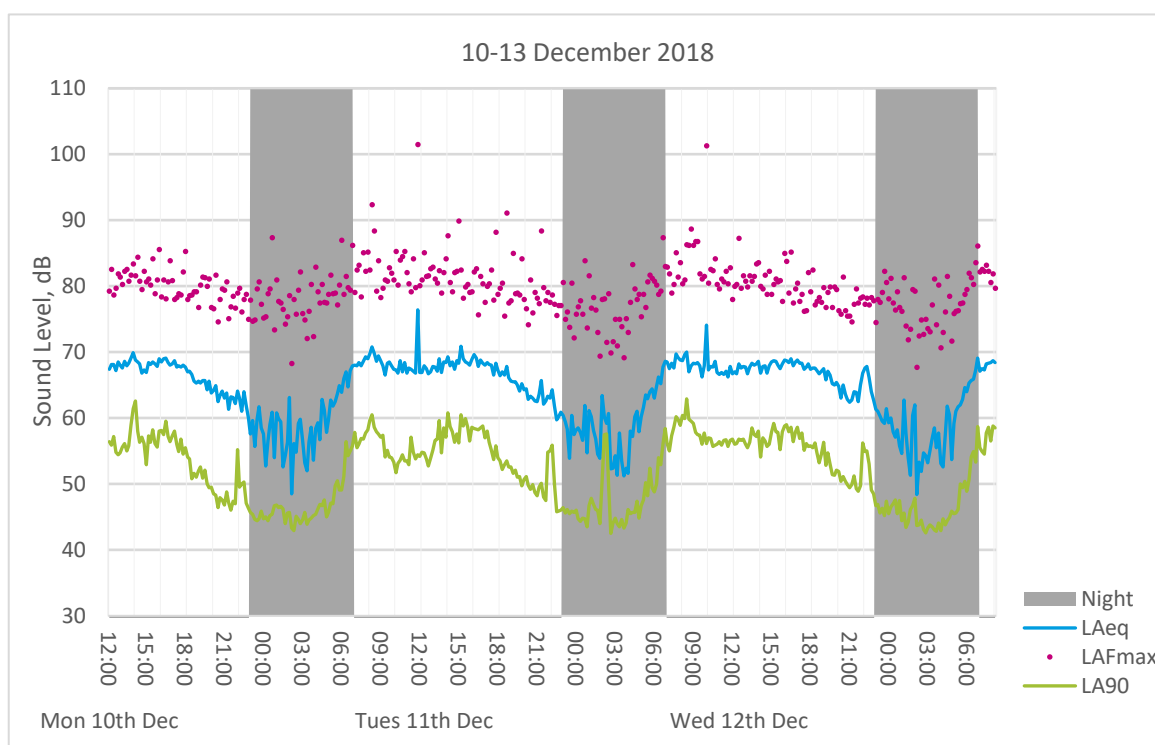


Figure 2 – Noise levels measured by Ramboll between 10-13 December 2018

4 Installed Plant and Location

The installed plant items at Hammerstone Road are presented in Table 2, and identified on subsequent Figure 3.

Table 2 – Noise data for installed plant items

Description	Overall, dB L _{WA}	Sound power level, dB, @ octave band centre frequency							
		63	125	250	500	1k	2k	4k	8k
Biffa Compound									
1.No. Mitsubishi PURY-EP200YNW	71	89	73	73	70	63	59	56	54
1.No. Mitsubishi PURY-EP300YNW	75	90	77	77	74	68	64	59	54
2.No. Mitsubishi PUZ-ZM100YKA	69	72	72	71	67	64	59	54	47
MCC Compound									
4.No. Mitsubishi PUZ-ZM35VKA	65	77	70	64	63	59	56	51	50
CR016M-PVIE-7 Air Cooled Condenser	78	69	69	71	70	72	72	71	62
Adjacent to plant room, which contains AHU									
2.No. Mitsubishi PUZ-ZM100YKA	69	72	72	71	67	64	59	54	47
2.No. Mitsubishi PURY-EP700YSNW	80	87	81	81	79	74	69	64	58
1.No. Mitsubishi PURY-EP200YNW	71	89	73	73	70	63	59	56	54
AHU fresh air intake – in duct	69	71	72	72	68	61	59	54	53
AHU exhaust – in duct	69	73	83	79	78	78	77	74	68

The data for the Mitsubishi units is based on the sound pressure sound spectra of each unit as per the manufacturer's data book and corrected to the published sound power levels. For the 'PURY' units, these are based on the published sound power level of each unit when operating at 75% capacity, which represents normal design duty.

Based on discussion with the MEP contractor, it is understood the AHU and Mitsubishi units off overnight and typically come back into use at 8am. As a result, noise from the Mitsubishi units will be limited to occasional frost protection modes.

The fresh air intake and exhaust connections of the AHU connect to atmosphere via louvres on the east wall of the plant room. The air intake and exhaust connections of the AHU include the following attenuators:

Table 3 – Insertion losses for the AHU attenuators

Description	Insertion loss, dB, @ octave band centre frequency							
	63	125	250	500	1k	2k	4k	8k
Exhaust attenuator (450 mm)	2	3	8	17	15	11	10	9
Intake attenuator (450 mm)	1	1	5	10	7	7	7	6

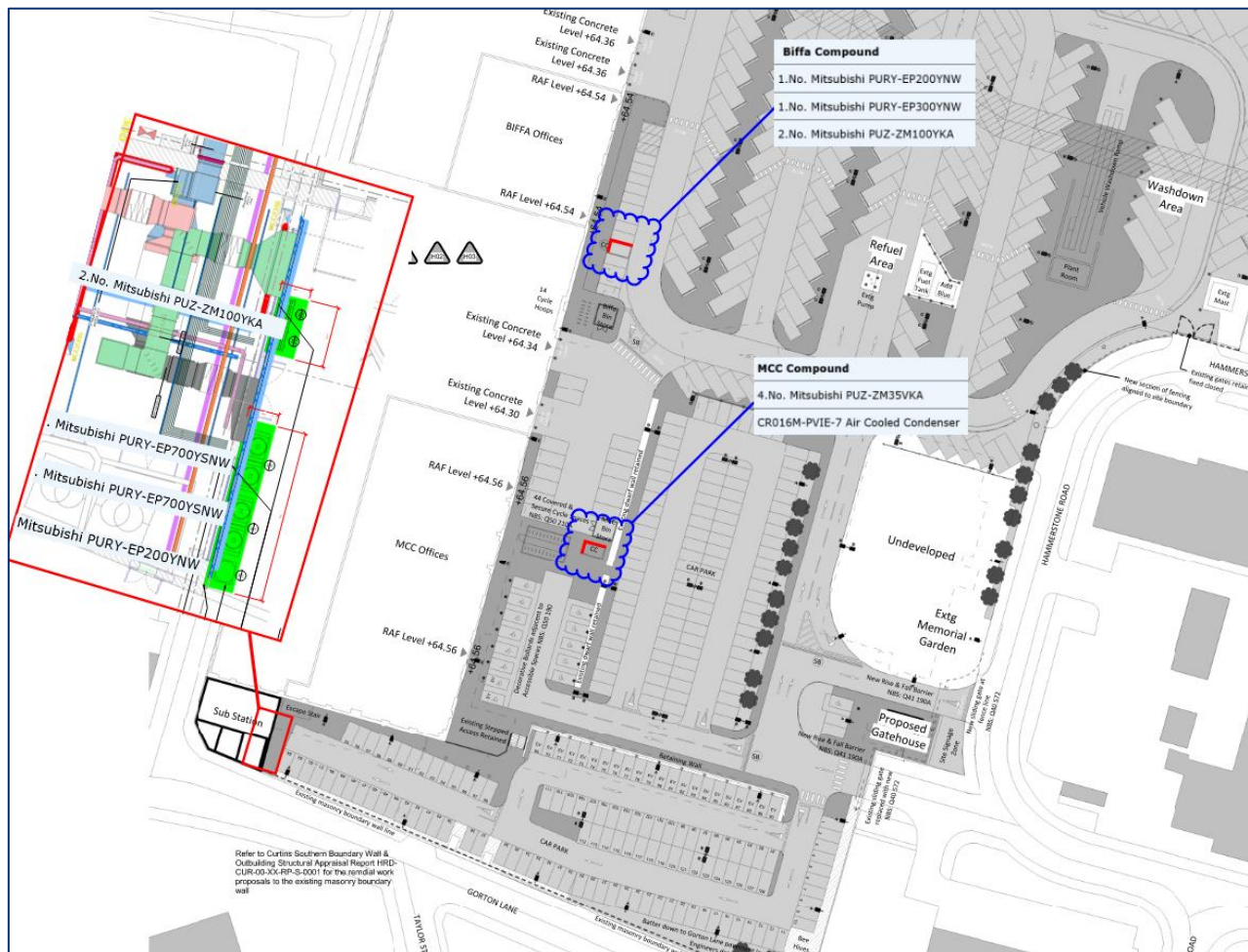


Figure 3 – Site plan showing locations of the installed plant items

5 Noise Survey 2025

To confirm the requirements of the commissioning measurements, Ramboll contacted Lisa Jones, Environmental Protection Officer at MCC in March 2025. Ms Jones stated *'the measurements should be 'worst case' and so all plant running at maximum capacity simultaneously and calculations can then be used to confirm noise levels at the nearest NSR'*.

Ramboll visited site on Wednesday 2nd April 2025 to measure noise levels from the installed plant items. Accompanied on the survey were A&B Engineering who were able to turn the plant on to simulate 'worst case' operation of the plant. The exception to this was the plant in the MCC compound area which could not be adjusted due to specific temperature control in place for these units (serves the weights room and other sensitive space). As a result, these plant items were not operating at the time of visit.

5.1 Southwest Plant Area

As can be seen on Figure 3 plant in the Southwest area of the site comprises 5.No Condensers, AHU intake/exhaust and 2.No small inverters. Figure 4 below shows these items in situ.



Figure 4 – Southwest Plant Area

Since vehicle movements on the adjacent road were regular, noise levels were measured as 1 second samples ($L_{Aeq, 1s}$). The time trace below shows the noise levels taken a 3m from the centre of all plant at 2m above ground, in-line with the tops of the condensers.

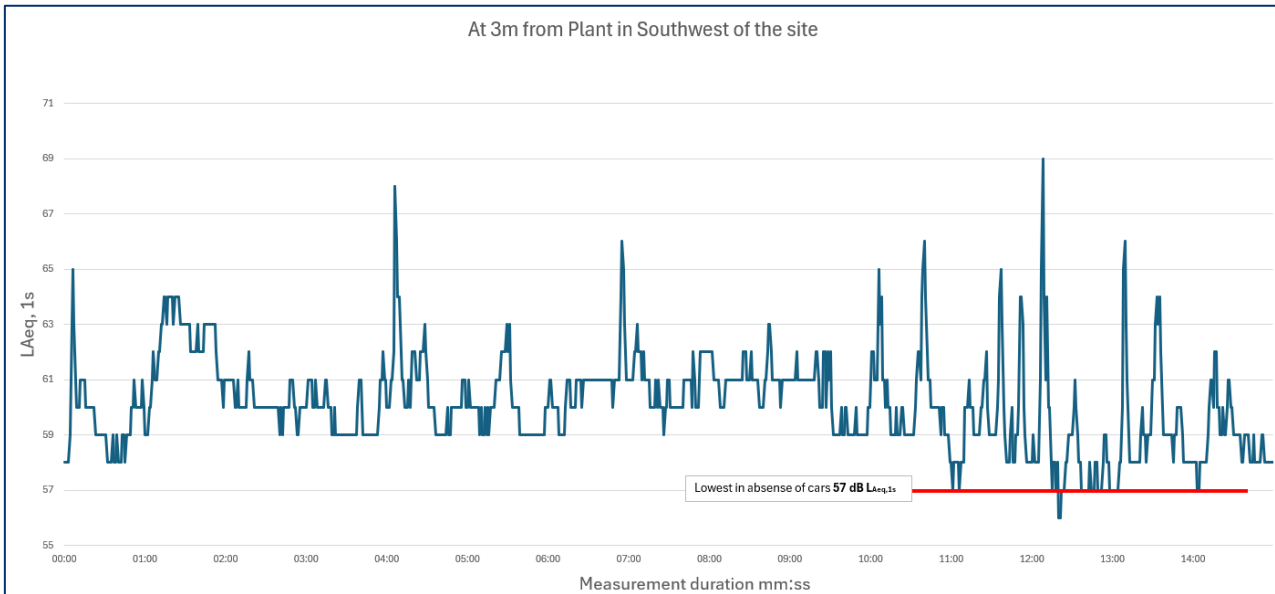


Figure 5 – Noise levels at 3m from the Southwest plant

As can be seen from the data above there is some variance due to road traffic along Gorton Lane. Lowest ambient noise levels measured in the absence of vehicle movements were 57 to 58 dB LAeq,1s.

To understand the contribution from road traffic only, noise measurements were also measured approximately 45m from the plant (but same distance from the road), where noise from the plant was subjectively inaudible compared to road traffic. Figure 6 shows the time trace at this position.

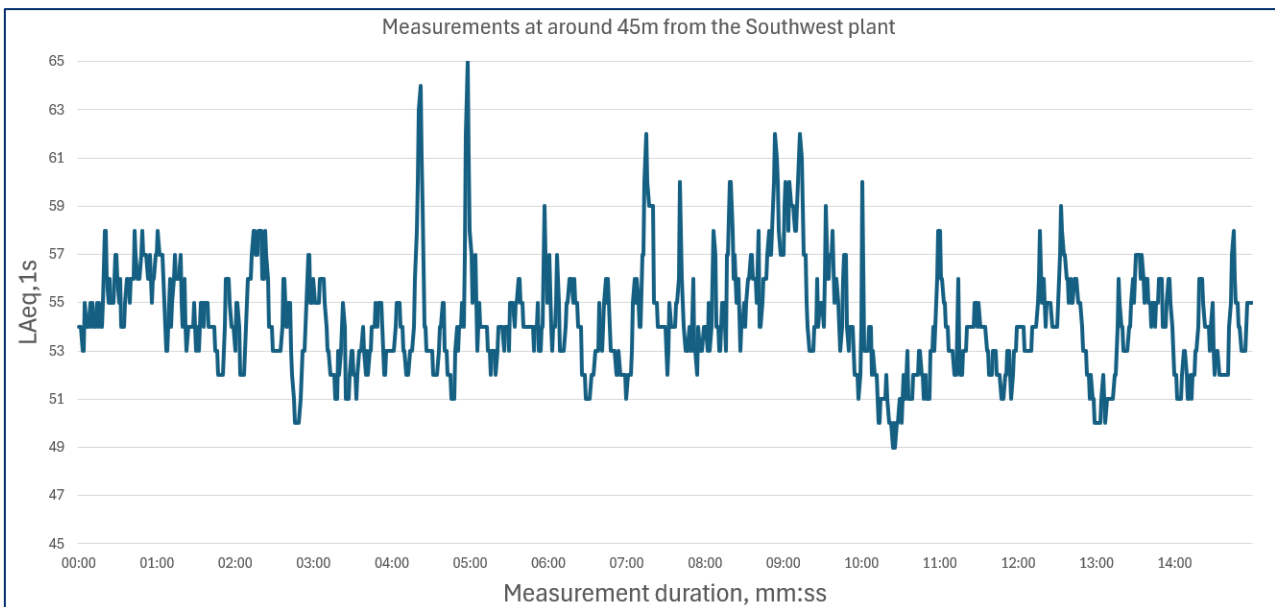


Figure 6 – Noise levels at around 45m from the Southwest plant

As can be seen from the above graph, noise levels when not affected by the plant are much lower during lulls in the traffic, and around 51 dB LAeq,1s as a typical lowest.

Subtracting the residual sound level of 51 dB LAeq from the specific sound of 58 dB LAeq identifies noise levels from the Southwest plant area are around 57 dB LAeq at 3m.

Noise levels from the plant were noted as broadband and steady with no tonal features. Table 4 below presents the spectral shape observed during a lull in traffic.

Table 4 – Spectral shape of plant as measured at 3m

Description	dB,Leq,1s @ octave band centre frequency							
	63	125	250	500	1k	2k	4k	8k
3m from plant in Southwest of site	68	63	59	55	53	49	44	36

5.2 Biffa Compound

Figure 7 below shows the Biffa plant compound as seen on site, which includes two large condensers and two smaller units.



Figure 7 – Biffa plant compound

Noise levels were steady at 1m from the compound and as per the table below. As with the Southwest plant area the noise levels were broad band without any distinguishing tonal features.

Table 5 – Insertion losses for the AHU attenuators

Location	Duration	L _{Aeq} (dB)	L _{A90} (dB)
1m from the east of the Biffa Compound	1 minute	54.5	52.7
1m from the east of the Biffa Compound	1 minute	54.8	53.2

5.3 MCC Office Compound

Figure 8 shows the MCC offices plant compound as seen on site.

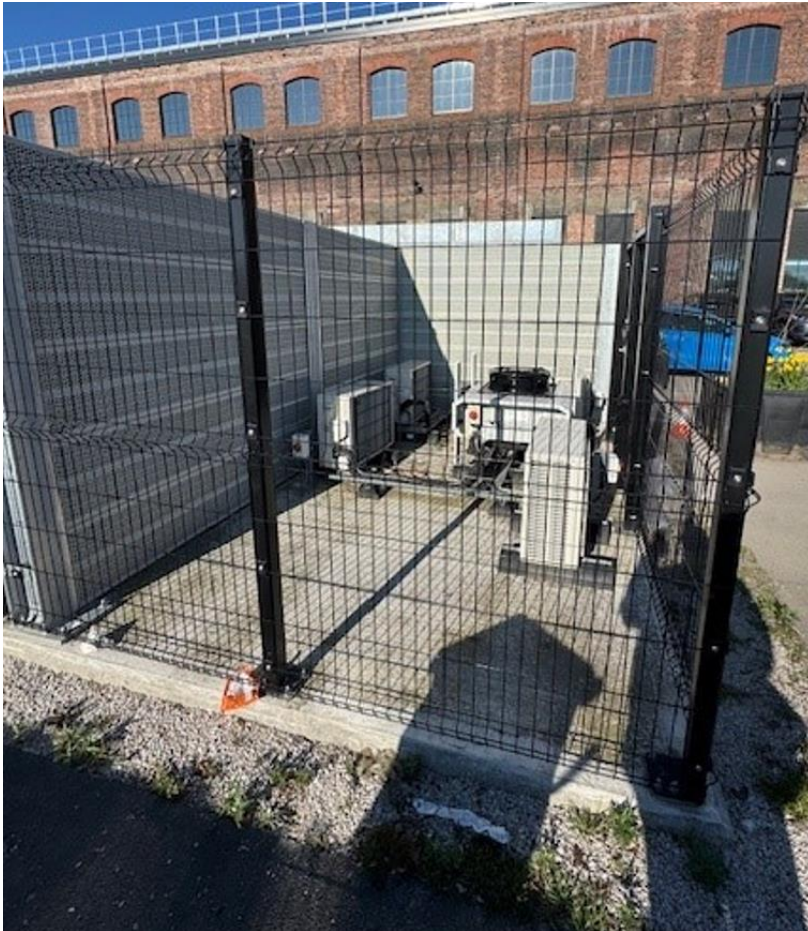


Figure 8 – MCC Offices Compound

As stated previously, the plant items in this plant area were not operating as they are set to specific requirements due to the areas they serve.

Based on the sound power data in Table 2, noise levels at 1m from this compound would be ≤ 63 dB L_{Aeq} at 1m.

5.4 Cumulative noise level of installed plant

Table 6 below shows the distance each plant area is from the nearest receptor of Sunny Brow House to the south. The noise levels discussed in the previous sections have been used to calculate distance attenuation.

In the case of the MCC offices and Biffa compounds there is no line of sight, so a 10 dB screening correction is allowed for. Screening to the Southwest plant area is limited and there is also a perimeter wall, so a 3 dB reduction of sound is allowed for.

Table 6 – Cumulative noise level of plant to Sunny Brow House

Description	Distance to receptor	Measured/modelled noise level	Predicted level at Sunny Brow House
Southwest plant	32 m	57 dB L_{Aeq} at 3m	33 dB L_{Aeq}
MCC Office compound	105 m	≤ 63 dB L_{Aeq} at 1m	13 dB L_{Aeq}
Biffa Compound	150 m	55 dB L_{Aeq} at 1m	0 dB L_{Aeq}
TOTAL			33 dB L_{Aeq}

6 Assessment

6.1 Criteria

Manchester City Council's guidance requires the rating level ($L_{A,Tr}$) of any external plant items, when assessed in accordance with BS4142:2014 to be controlled to 5dB below existing background noise levels (L_{A90}).

To meet this criterion, the noise limits in Table 7 below must be met by the new external plant items at the nearest noise sensitive premises, which as identified previously is Sunny Brow House to the south.

Table 7 – Rating noise limits to comply with MCC requirements

Noise Rating Limit, dB $L_{A,Tr}$	
Daytime	Night-time
≤ 42	≤ 39

Using the calculated level in Table 6 from the measured/modelled noise levels, a BS4142 assessment has been carried out as presented in Table 8. The plant is understood to run in steady state once operational and not run overnight. Therefore, no additional acoustic penalties have been applied since the site is a commercial site already and the new plant not expected to be readily distinctive in character.

Table 8 – BS4142 Assessment

Description	Noise level at nearest sensitive receptor, dB(A)	
	Sunny Brow House	
	Day	Night*
Noise level at receptor (Specific Sound Level, $L_{Aeq, 1hour}$)	≤ 33	≤ 33
Acoustic feature corrections	Not applied	Not applied
Rating level ($L_{Ar,Tr}$)	33	33
Background level (L_{A90})	47	44
Excess of rating level over background	-14	-11
Rating level complies with MCC requirements ?	✓	✓

* plant does not run overnight but shown for comparative purposes and to cover frost protection modes

The above table shows that predicted rating noise levels from the new plant serving the Hammerstone Road Depot using the methodology of BS4142 is more than 5 dB below the existing background noise climate. This meets the criterion set by Manchester City Council for new plant items and no mitigation measures are required.

6.2 Uncertainty

An assessment in accordance with BS 4142:2014+A1:2019 requires consideration of the potential effects of uncertainty on the assessment outcome. The effect of some types of uncertainty cannot be easily quantified. For this reason, the approach taken during this assessment has been to ensure control measures are in place to minimise uncertainty as far as practicable.

The control measures are listed below. Primarily, the assessment was undertaken by suitably qualified practitioners, using established best practice methods of measuring and predicting sound levels and applying professional judgement throughout the assessment.

Table 9 - Control measures taken to reduce uncertainty

Possible source of uncertainty	Control measures to reduce uncertainty
Date of survey	The noise survey used for this assessment was initially done in 2018, but even allowing for some difference in noise levels in 2025 it is not expected that background noise levels will have changed much or enough to affect the outcome of this assessment.
Selection of representative assessment locations	Initial appraisal and desk study carried out beforehand, and long-term meter installed in a location representative of nearest receptor.
Background sound level: measurement uncertainty	Measurements carried out with Class 1 (BS EN 61672-1:2013) instrumentation with effective windshield to minimise turbulence at the microphone. Calibration level checked before and after the survey. Background sound level measured over a period of several days to include the day and night. Representative value then determined using the typical average background sound level while excluding periods deemed to be atypical (due to high background sound levels).
Background sound level: effects of weather	Noise survey carried out under suitable weather conditions for environmental noise measurement, and weather conditions reported. Measurement results affected by periods of rain excluded from the analysis. Wind velocity during the survey was not sufficient to affect the measured background sound level. The background sound levels presented are considered representative of typical conditions in the absence of adverse weather conditions.
Specific sound level: source level uncertainty	Source emission levels for new sources were agreed with the client and MEP subcontractor. All plant measured was operating at 'worst case' duty except for the MCC offices compound.
Sound propagation uncertainty	Sound propagation predictions carried out using best industry practice (computational modelling applying ISO 9613-2:2024). Industrial sound level predictions apply under moderate downwind conditions at the assessment location (a moderate wind between source and receptor). This is considered suitable for evaluating the worst-case condition.
Rating level: acoustic feature corrections	Acoustic feature corrections not applied based on subjective observations at the assessment location and analysis of noise measurement frequency data for existing sources.
Context	Observations carried out during noise survey to assess the context into which the sound sources will be introduced. Consideration of the existing industrial sound level context forms part of the assessment.

7 Conclusion

Ramboll UK has measured noise from new external plant serving the Hammerstone Road Depot. It has been determined that the rating noise levels from the proposed plant item will be significantly lower than existing background noise levels at the nearest sensitive receptors as assessed using relevant British Standards and with reference to Manchester City Council's own Planning and Noise guidance.

Noise levels from the proposed plant meet the criterion set by Manchester City Council for new plant items and no mitigation measures are required.

This technical note confirms that the requirements of Condition 16 of the permission for this development are met.

I trust the assessment within this letter report are clear. Should any further information be required please do not hesitate to contact me.

Kind regards

Ryan McNulty
BA(Hons) MIOA

Acoustics

Appendix A – 2018 Noise Survey Details

Location

Hammerstone Depot, off Gorton Lane, Manchester M18 8EQ

Date, time

Monday to Thursday, 10 to 13 December 2018

Thursday 20 May 2021

Tuesday 1 June 2021

Weather

10-13 December 2018: 2 – 8°C, light wind (ESE), occasional gusts, approx. 50% cloud cover, dry road surfaces

Thursday 20 May 2021: 100% cloud coverage, 12°C, light wind, occasional gusts, dry road to slightly damp road surfaces

Tuesday 1 June 2021: 20% cloud coverage, 26°C, very light wind, dry road surfaces

Equipment

- Norsonic NOR-140 sound level meter with all-weather kit (serial number 1406951) – Kit 3
- Norsonic calibrator (serial number 34964) – Kit 3
- Bruel & Kjaer 2250 sound level analyser (serial number 3002075)
- Bruel & Kjaer 2270 sound level analyser (serial number 2644605)

Before and after the survey the sound level meter was check calibrated to an accuracy of ± 0.1 dB using type 1251 and 4231 Sound Level Calibrators.

Attended noise levels were measured at a height of 1.5m above ground, and approximately 4m above ground where unattended.

Noise levels are as reported in the main report body. Further data and spectral information available on request.

Appendix B – 2025 Noise Survey Details

Location

Hammerstone Depot, off Gorton Lane, Manchester M18 8EQ

Date, time

Wednesday 2 April 2025, approximately 8:30 to 10:00

Weather

2 April 2025: 9°C, light wind (E), occasional gusts, approx. 10% cloud cover, dry road surfaces

Equipment

- Norsonic NOR-140 sound level meter with all-weather kit (serial number 1406951) – Kit 3
- Norsonic calibrator (serial number 34964) – Kit 3

Before and after the survey the sound level meter was check calibrated to an accuracy of ±0.1 dB using type 1251 Sound Level Calibrators.

Attended noise levels were measured at a height of approximately 2m above ground (level with top of condenser) unless stated.

Noise levels are as reported in the main report body. Spectral information available on request.

Measured data

Location	Duration	L _{Aeq} (dB)	L _{A90} (dB)
1m from the east of the Biffa Compound	1 minute	54.5	52.7
1m from the east of the Biffa Compound	1 minute	54.8	53.2

