

Intended for
Morgan Sindall

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GORTON COMMUNITY HUB PLANT NOISE ASSESSMENT

1. INTRODUCTION

This report provides an assessment of noise from plant associated with Gorton Community Hub. An assessment is required to demonstrate that proposals achieve the requirements of the planning conditions for the scheme.

Planning Condition 21 of permission 124359/VO/2019 requires that noise from plant is considered and mitigated, as given below.

Condition 21 *Before first occupation of the building hereby approved, any externally mounted ancillary equipment to form part of the building, shall be acoustically insulated in accordance with a scheme 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 equipment. The development shall be implemented in accordance with the approved details.*

1.1 Plant Noise Limits

Plant noise limits have been given in Ramboll report T02 – “Gorton Community Hub Noise Assessment” dated 2 July 2019. These are based on Manchester City Council’s guidance which states that plant noise emissions (L_{Aeq}) must be controlled to 5dB below the background noise level (L_{A90}) at the nearest noise sensitive properties (MCC Planning & Noise Technical Guidance, December 2015, section 3.6.1.5.1).

While no specific guidance is given in the MCC document, Ramboll have been advised by MCC Environmental Protection Team on other projects that it is acceptable for emergency plant to produce levels 10dB above the background noise level during emergency situations.

1.2 Measured Background Noise Levels

The nearest noise sensitive properties to the scheme are the houses on Garrett Way to the north.

Ramboll measured background noise levels at a position representative of these houses through the night on Thursday 27 June 2019. The measurement position is shown below and a graph of the measured background levels, L_{A90}, is shown in Figure 2.

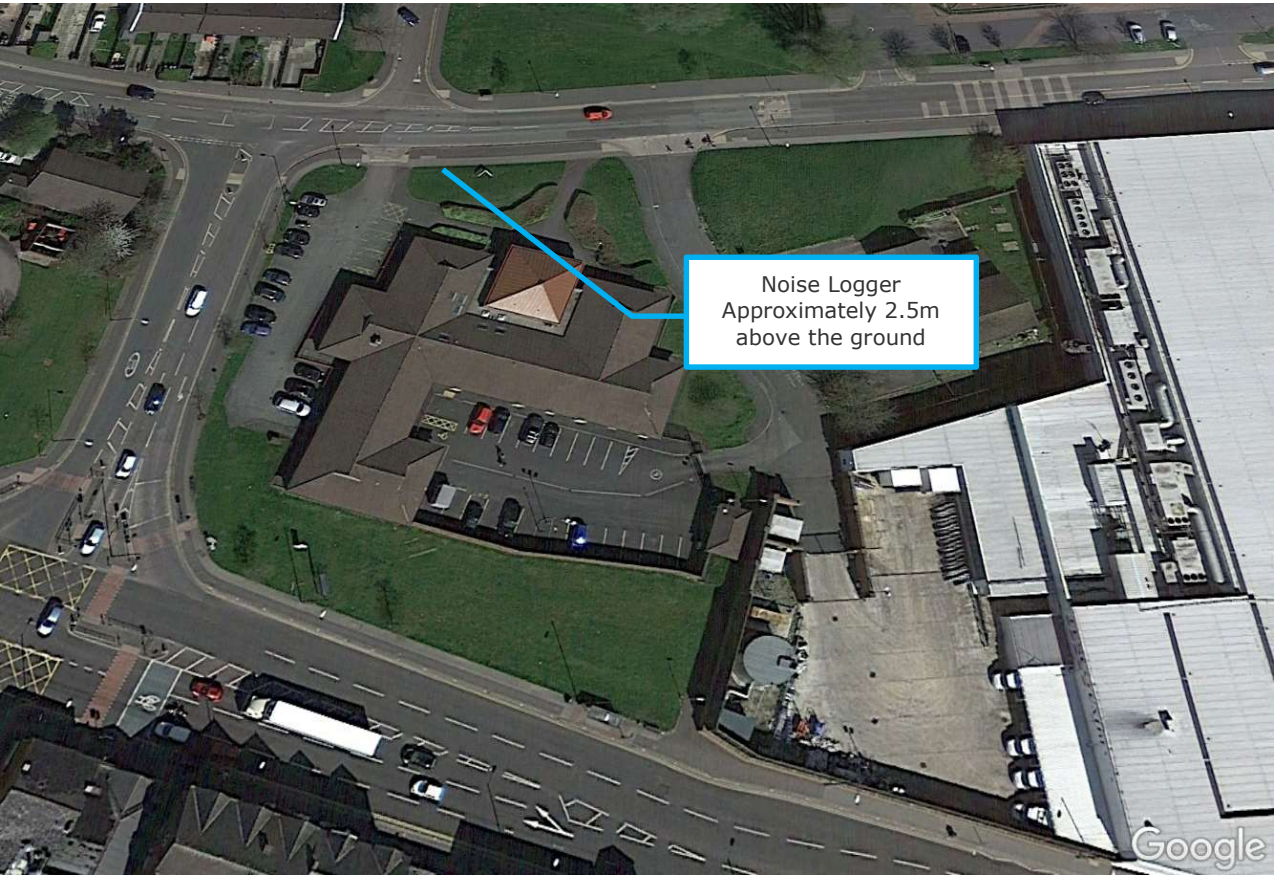


Figure 1 – Noise Logger Position

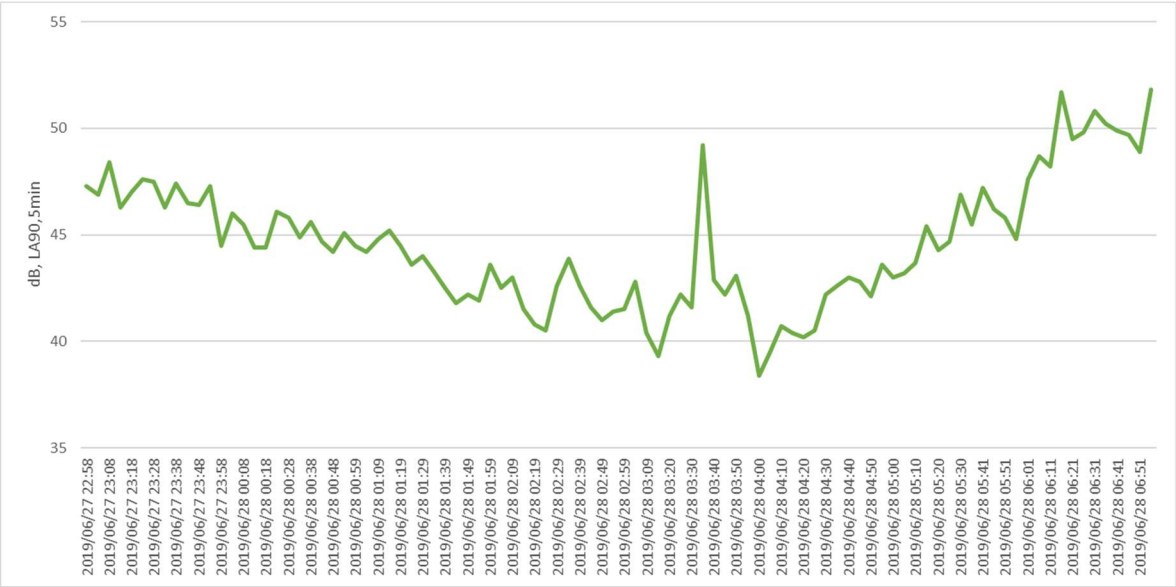


Figure 2 – Background noise levels, LA90, (27/28 June 2019)

The typical background noise level at night is around 42dB LA90,5min. The level at around 23:00 is around 47dB LA90,5min and this has been used to represent background levels during the quietest parts of the day (after 22:00). These levels have been used to set limits for plant noise emissions.

On this basis, the cumulative noise level from any plant associated with the scheme should be limited to the following:

Noise Sensitive Property	Typical Measured Background Noise Level	Proposed Plant Noise Limit
Houses on Garrett Way	Day: 47dB LA90	Day: 42dB LAeq
	Night: 42dB LA90	Night: 37dB LAeq

Table 1 – Plant Noise Limits

It is expected that background levels at houses on the opposite side of Hyde Road will be higher than those at Garratt Way due to the busier road.

If the installed plant has any distinctive features such as tonality or intermittency, then penalties should be applied to the noise level in accordance with the procedures in British Standard 4142:2014+A1:2019 ‘Methods for rating and assessing industrial and commercial sound’. The noise level including these penalties (the ‘rating’ level) must meet the limits in Table 1 above.

2. PROPOSED PLANT

2.1 Plant Details

Plant serving Gorton Community Hub is summarised below. Sound power levels are taken from manufacturers datasheets.

Plant	Model	Location	Sound Power LwA used in assessment ²
AHU 1	Exhausto VEX4090	Level 2 roof	FAI: 69 EXH: 85 CAS: 66
AHU 2	Exhausto VEX5160	Level 2 roof	FAI: 57 EXH: 83 CAS: 62
AHU 3	Exhausto VEX5090	Level 1 roof	FAI: 55 EXH: 81 CAS: 61
AHU 4	Exhausto VEX4030	Level 1 roof	FAI: 61 EXH: 80 CAS: 59
8no. Condensers	Panasonic U-12MF3E8	Level 2 roof	68 ¹
2no. Condensers (future 2 nd floor use)	Panasonic U-12MF3E8	Level 2 roof	68 ¹
4no. Condensers	Panasonic U-12MF3E8	Level 1 roof	68 ¹

¹ British Standards Institute, 2014 and 2019. British Standard BS 4142+A1:2019: Methods for rating and assessing industrial and commercial sound. BSI.

Plant	Model	Location	Sound Power LwA used in assessment ²
2no. Condensers (future 2 nd floor use)	Panasonic U-12MF3E8	Level 1 roof	68 ¹
3no. Comms room condensers	Unknown. U-12MF3E8 used	Level 1 roof	68 ¹
Extract fan EF1	Unknown. Attenuator fitted. Unlikely to be noisier than condensers	Level 2 roof	68 ¹
Extract fan EF2	Unknown. Attenuator fitted. Unlikely to be noisier than condensers	Level 1 roof	68 ¹
Emergency Generator	Musgrave ECO-53-B Canopied genset. A GRP security enclosure is included providing around 6dB Rw sound insulation.	Ground level, immediately north of building	96 ¹
Internal plant room	No plant discharging to outside. Contains hot water cylinder, pressurisation units, LTHW pumps etc.	Internal	n/a

¹ Calculated from manufacturers sound pressure level data ² FAI = fresh air intake, EXH = exhaust, CAS = casing noise.

Table 2 – Plant Serving Gorton Community Hub

2.2 Operating Hours

The community centre and its plant are not expected to normally operate at night. Any operation of the cooling plant at night or early morning will likely be at a reduced duty. Noise from the units would be lower than the sound power levels shown in Table 2 which are for full duty operation which would normally occur during the highest external temperatures and internal occupancies.

2.3 Noise Characteristics and Penalties

MCC guidance requires that noise from plant is assessed in accordance with BS 4142:2014¹ and therefore in terms of a “Rating Level” (LAR,Tr). Within the assessment methodology of BS4142, different penalties may be applied for noise sources that have an acoustic feature, such as tonality and intermittent operation (kicking in and out).

BS4142 gives a guide to the level of penalty that should be applied, as 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*

The condensers may have some tonality and they may kick in and out of operation according to demand, though with the low absolute levels calculated, the perceptibility of this is expected to be low. To allow for intermittency and tonality a penalty of +5dB has been applied to the cumulative plant noise however in practice the AHUs or EFs as are unlikely to be tonal when fitted with silencers.

The packaged generator, which includes attenuation, is not likely to be distinctively tonal.

2.4 Calculated Plant Noise Levels

The cumulative plant noise level from the scheme proposals has been calculated at each residential property using the data given above and proprietary noise modelling software (CadnaA). The levels predicted are summarised below. A noise map showing the levels expected across the site during the day is given in Figure 1.

Two scenarios have been calculated: normal operation and emergencies. Normal operation considers all plant running simultaneously and at full duty, which is unlikely to be the case for the majority of the time. This therefore represents a worst-case scenario.

The calculated noise levels are given in Tables 3 and 4 and Figures 3 and 4 below.

Property	Predicted noise Level	Penalty for Rating Level	Rating Level	Background Noise Level	Difference, dB	Criteria met (Y/N)
Houses off Garratt Way to north	31dB(A)	+5dB	36dB L _{Ar,Tr}	Day: 47dB L _{Aeq} Night: 42dB L _{Aeq}	-11 -6	Y
Flats above shops on Hyde Road to south	29dB(A)	+5dB	34dB L _{Ar,Tr}	Day: >47dB L _{Aeq} Night: >42dB L _{Aeq}	-13 -8	Y

Table 3 – Calculated plant noise levels at the nearest residential properties (normal operation)

Property	Predicted noise Level	Penalty for Rating Level	Rating Level	Background Noise Level	Difference, dB	Criteria met (Y/N)
Houses off Garratt Way to north	50dB(A)	0dB	50dB L _{Ar,Tr}	Day: 47dB L _{Aeq} Night: 42dB L _{Aeq}	+3 +8	Y
Flats above shops on Hyde Road to south	29dB(A)	0dB	29dB L _{Ar,Tr}	Day: >47dB L _{Aeq} Night: >42dB L _{Aeq}	-18 -13	Y

Table 4 – Calculated plant noise levels at the nearest residential properties (emergency operation - Generator)

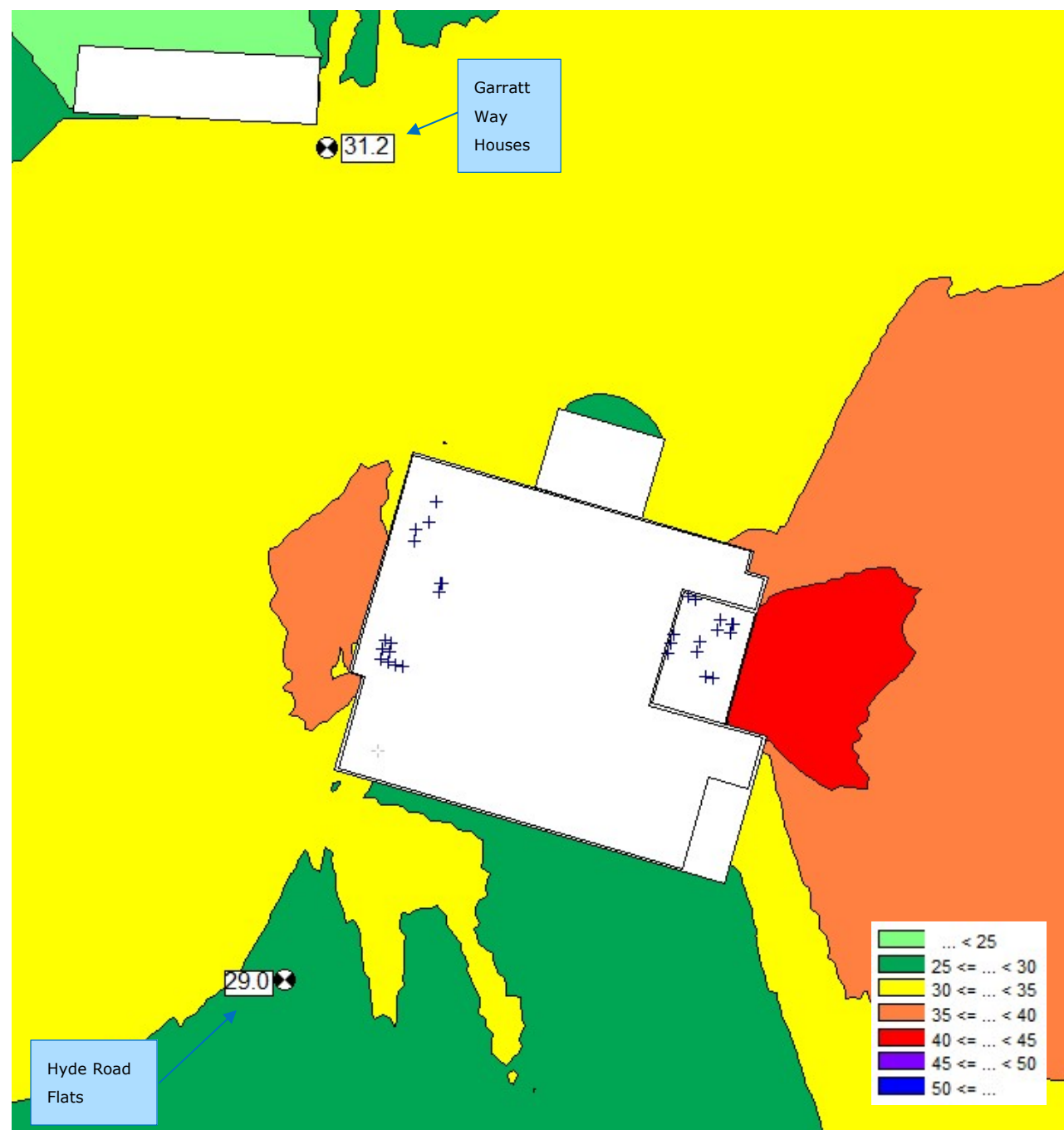


Figure 3 – Plant Noise Emissions, 2m Height, dB LAeq

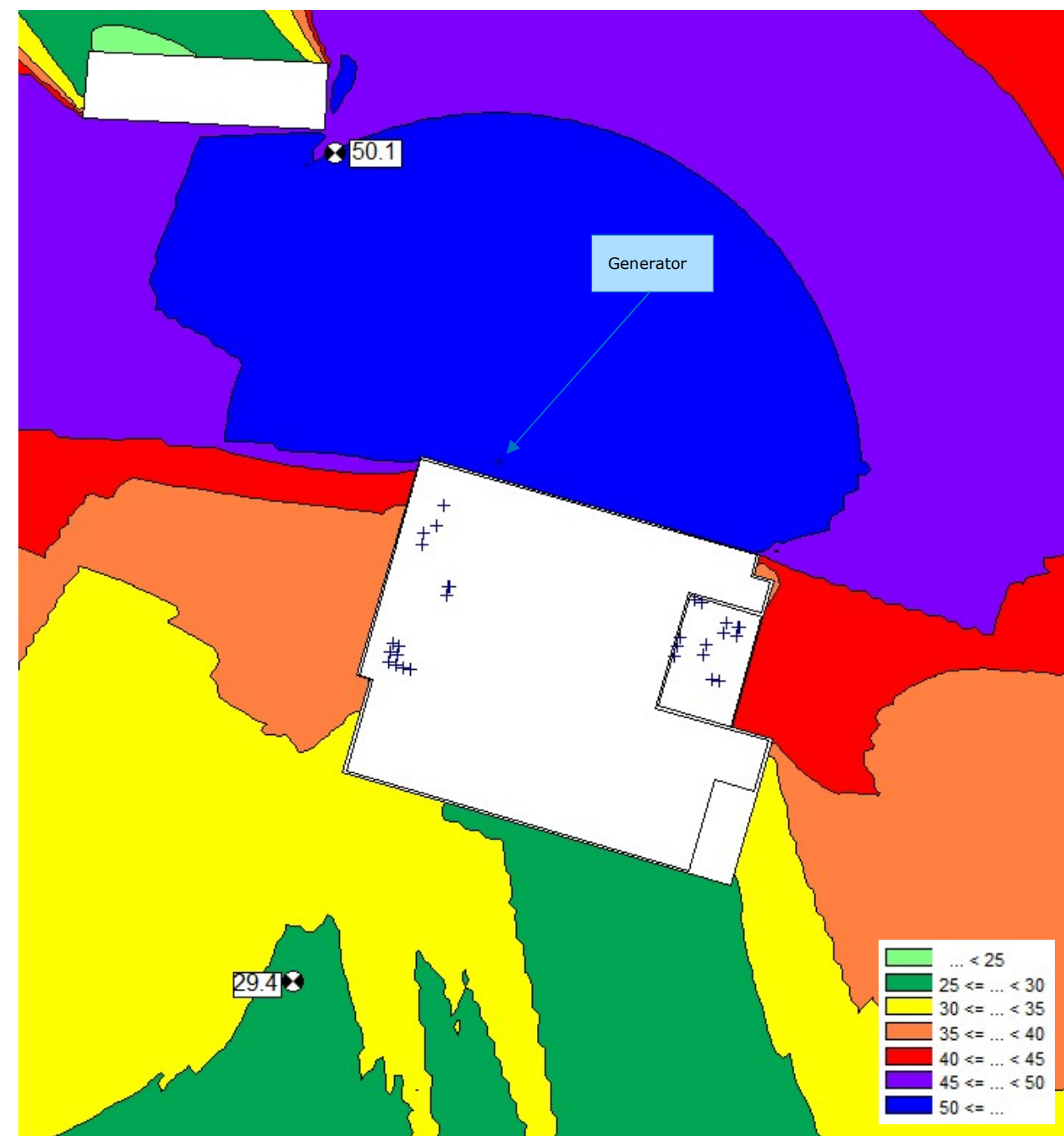


Figure 4 – Emergency Plant Noise Emissions, 2m Height, dB LAeq

2.5 Conclusions

During normal operation, the cumulative rating noise level from the scheme experienced at the nearest sensitive properties is at least 5dB lower than the background noise level and is in line with MCC guidance.

During emergency conditions during the day or night, noise from the generator is less than 10dB above the background level at the nearest properties and meets the typical limits for emergency plant. As the centre is not normally expected to operate at night, it is less likely that the generator would be run for emergency conditions at night. During the day noise from the generator is only 3dB higher than the background level at the nearest properties and as such is unlikely to cause significant disturbance. Testing of the generator will be during the daytime only.

2.6 Uncertainty

In line with the recommendation of BS 4142 (2014), uncertainties with the data and calculation method used are outlined below.

- The assessment assumes that all items of plant are running at full duty concurrently.
- Alternative plant selections may be made. These will be equivalent or quieter.