

SANDY BROWN

Consultants in Acoustics, Noise & Vibration

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Old Granada Studios, Zone 6

Plant noise egress assessment report

London, Manchester, Edinburgh, Birmingham, Belfast

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Summary

Sandy Brown has been appointed by Bowmer + Kirkland to undertake an assessment of plant noise egress for Zone 6 of Old Granada Studios, Manchester.

This report sets out the plant noise egress criteria in line with planning condition 15, the proposed plant items and an assessment of noise egress.

The following mitigation measures have been included in the proposals to control plant noise egress:

- In-duct attenuation to the recycling store HRU and the level 4 extract fan.
- Acoustic screening to the east and west sides of the rooftop plant area. The proposed screening has a sound absorbent lining.

An assessment of noise egress from normally operating landlord and indicative tenant plant items has been undertaken. Considering the proposed mitigating measures above, it is predicted that the relevant plant noise egress criteria will be met at the nearby noise sensitive receptors.

On this basis, planning condition 15 should therefore be discharged for Zone 6.

All future tenant plant should be selected to be equivalent to the units assessed within this report in terms of noise emissions.

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1 Introduction

Sandy Brown has been appointed by Bowmer + Kirkland to undertake an assessment of plant noise egress for Zone 6 of Old Granada Studios, Manchester.

This report sets out the plant noise egress criteria, the proposed plant items, an assessment of noise egress.

2 Acoustic criteria

2.1 Planning condition 15

Planning condition 15 imposed by Manchester City Council states the following:

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 scheme shall be submitted to and approved in writing by the City Council as local planning authority prior to first occupation in order to secure a reduction in the level of noise emanating from the site.

Reason - To minimise the impact of the development and to prevent a general increase in pre-existing background noise levels around the site, to safeguard the amenities of the occupiers of nearby residential accommodation, pursuant to policies SP1 and DM1 of the Core Strategy

2.2 Normally operating plant – Cumulative limits

Previously, octave band noise egress criteria were set for Old Granada Studios however the latest Manchester City Council plant noise egress criteria is provided within the 'Planning & noise technical guidance 2015' and is as follows:

'The development should be designed so as to achieve a rating level of 5 dB (L_{Aeq}) below the typical background (L_{A90}) level at the nearest noise sensitive location'

As such, the octave band criteria have been converted to their corresponding broadband values. This is in line with planning condition 15.

Based on the above, the cumulative noise level resulting from the operation from all new plant at 1 m from the most affected windows of the nearest noise sensitive premises shall not exceed 5 dB below the minimum background (L_{A90}) external noise levels as per Table 1. This relates to the overall plant noise egress levels from the entire Old Granada Studios development.

Table 1 Cumulative plant noise limits for overall OGS development.

Location	Plant noise limit at 1 m from noise sensitive receiver, L_{Aeq} (dB)	
	Daytime (07:00 – 23:00)	Night (23:00 – 07:00)
West and south of the site	46	45
East of the site	46	40

For Zone 6, the overall limits have been reduced by 3 dB for receptors to the east allow for contributions from Zones 4 and 5.

For receptors to the west and south of the site, the Zone 6 noise sources are sufficiently distanced such that they will not have equal contributions to Zone 4 and Zone 5 at any of the same facade points.

Based on the above, the plant noise limits applicable to Zone 4 and Zone 5 are set out in Table 2.

Table 2 Cumulative normally operating plant noise limits for Zone 6 at 1 m from the noise sensitive facades

Location	Plant noise limit at 1 m from noise sensitive receiver, L_{Aeq} (dB)	
	Daytime (07:00 – 23:00)	Night (23:00 – 07:00)
West and south of the site	46	45
East of the site	43	37

Corrections will need to be applied for any attention catching features in line with BS4142:2014.

To the east of the site, the nearest and worst effected receptor is considered to be Bauhaus. This residential receptor is considered to be sensitive during the daytime (07:00-23:00) and night-time (23:00-07:00).

To the west of the site, the nearest and worst effected receptor is considered to be Manchester Goods Yard. This comprises of office premises and is therefore considered to only be a receptor during the daytime (07:00-23:00).

These criteria are cumulative and therefore should not be exceeded by the cumulative noise levels resulting from noise egress from landlord and tenant plant items.

2.3 Emergency plant – Landlord plant

Noise egress from emergency plant will need to be controlled. MCC typically allows emergency plant to achieve a rating level of 10 dB (L_{Aeq}) above the typical background level outside the nearby noise sensitive receptors. On this basis, emergency plant limits are given in Table 3.

Table 3 Emergency landlord plant noise limits at 1 m from the noise sensitive facades

	Emergency land noise limit at 1 m from noise sensitive receiver, L_{Aeq} (dB)	
	Daytime (07:00 – 23:00)	Night (23:00 – 07:00)
Emergency plant	61	55

2.4 Emergency plant – Tenant plant

Emergency operating tenant plant items will need to be carefully selected such that the cumulative plant noise egress criteria as per Table 3 are not exceeded. Based on noise egress from landlord plant dominating, emergency operating plant noise egress criteria for tenant plant are provided within Table 4.

Table 4 Emergency tenant plant noise limits at 1 m from the noise sensitive facades

	Emergency land noise limit at 1 m from noise sensitive receiver, L_{Aeq} (dB)	
	Daytime (07:00 – 23:00)	Night (23:00 – 07:00)
Emergency plant	51	45

3 Plant proposals

3.1 Landlord plant - Normally operating plant items

3.1.1 Extract fans

Between level 4 to level 9, for each floor a single extract fan will serve the WCs and exhaust directly via a louvre in the west facade. A typical arrangement is shown in Figure 1.

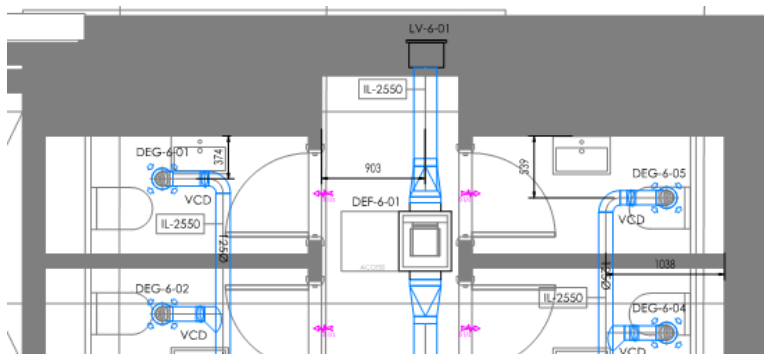


Figure 1 Typical WC extract fan arrangement

3.1.2 Heat recovery unit (HRU)

A heat recovery unit (HRU) is proposed within the GF recycling store. This intakes and exhausts via louvres within the west facade.

3.2 Landlord emergency generator

An emergency landlord generator is proposed within the rooftop plant area.

The location of the landlord generator is shown in Figure 2 highlighted in blue.

3.3 Tenant plant – Normally operating plant items

3.3.1 VRF and condenser units

The following normally operating tenant plant items are proposed to the rooftop of the building. These are understood to be indicative selections for future tenant plant at this stage. As such, any future tenant plant should be selected to be equivalent to these units in terms of noise:

- 12 x PURY P500YNW 50kW VRF standard efficiency condenser
- 9 x PUZ_ZM100YKA 10kW split condensers

Figure 2 show the proposed tenant VRF and condenser unit locations in red.

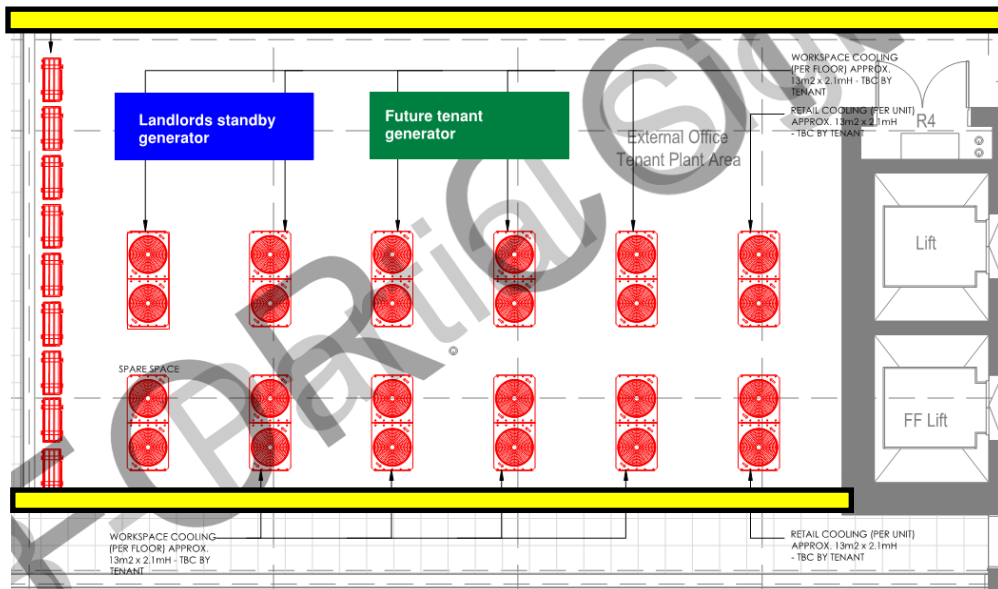


Figure 2 Rooftop plant locations

3.4 Tenant emergency generator

As per Figure 2, a spatial allowance has been made for a tenant emergency generator however at this time, no information regarding its specification has been provided. It will need to be ensured that if a tenant emergency generator is provided, the noise egress criteria as per Table 4 are not exceeded.

4 Plant data

4.1 Landlord plant - Normally operating plant items

4.1.1 Extract fans

The sound power data for the landlord level 4 and level 5-9 extract fans is provided in Table 5.

Table 5 Sound power data for landlord extract fans

	Sound power level, L_w (dB)						
	Octave-band centre frequency (Hz)						
	63	125	250	500	1000	2000	4000
<i>Level 4</i>							
Exhaust	86	86	68	65	58	56	51
<i>Level 5-9</i>							
Exhaust	69	61	57	47	40	41	37

4.1.2 Heat recovery unit (HRU)

Sound power data for the landlord recycling store HRU is provided within Table 6.

Table 6 Sound power data for landlord HRU

HRU	Sound power level, L_w (dB)						
	Octave-band centre frequency (Hz)						
	63	125	250	500	1000	2000	4000
Breakout	63	62	49	52	39	38	38
Induct intake	71	65	63	65	60	56	48
Induct supply	76	77	72	76	66	66	62
Induct discharge	77	78	72	75	66	66	64
Induct extract	70	64	62	65	59	56	48

4.2 Landlord emergency generator

The landlord emergency generator acoustic data is summarised in Table 7.

Table 7 Landlord emergency generator data

	Sound pressure level at 15 m, L_{eq} (dB), per octave-band centre frequency (Hz)							
	63	125	250	500	1000	2000	4000	8000
Canopy	37	43	50	46	42	26	26	20
Inlet (attenuated)	58	57	55	46	43	40	33	29
Discharge (attenuated)	59	58	57	48	39	34	28	27
Exhaust (not attenuated)	67	69	41	42	35	30	39	41

The canopy data is for the generator with an acoustic canopy however this is not proposed to the generator. A generator with a standard canopy results in breakout noise levels of L_{Aeq} 85 dB at 1m.

To predict the noise levels for a standard canopy level of L_{Aeq} 85 at 1 m, the spectral data for the canopy at 15 m has been adjusted accordingly.

4.3 Tenant plant – Normally operating plant items

4.3.1 VRF and condenser units

The acoustic data for the proposed tenant VRF and condenser units are provided in Table 8.

Table 8 Acoustic data for the proposed tenant VRF and condenser units

	Sound pressure levels at 1 m, L_{eq} (dB) Octave-band centre frequency (Hz)						
	63	125	250	500	1000	2000	4000
Mitsubishi PURY EM500YNW-A1	77	68	66	61	56	54	51
Mitsubishi PUZ_ZM100YKA (heating mode worst-case)	54	54	53	49	46	41	36

4.4 Proposed mitigation

4.4.1 Screening

A solid screen is proposed as part of the base build around the rooftop plant area at a height of 2.8 m above the rooftop level with a minimum mass of 15 kg/m². The extent of this screening is shown in Figure 2 highlighted in yellow.

This screening is to have a sound absorbent inner facing with a minimum sound absorption performance of α_w 0.90.

4.4.2 In-duct attenuation – Extract fans

The in-duct attenuator insertion losses for the landlord level 4 extract fan exhaust are provided in Table 9.

Table 9 Proposed landlord level 4 extract fan exhaust attenuator insertion losses

	Attenuator insertion loss (dB)						
	Octave-band centre frequency (Hz)						
	63	125	250	500	1000	2000	4000
Level 4 extract fan exhaust	1	2	6	15	20	15	14

4.4.3 In-duct attenuation – HRU

The in-duct attenuator insertion losses for the landlord recycling store HRU are provided in Table 10. No attenuation is proposed to the HRU intake.

Table 10 Proposed landlord HRU exhaust attenuator insertion losses

	Attenuator insertion loss (dB)						
	Octave-band centre frequency (Hz)						
	63	125	250	500	1000	2000	4000
Exhaust	2	4	8	16	32	29	26

5 Plant noise egress assessment

5.1 Operational hours

It is understood that normally operating plant items will be capable of operating during the daytime (07:00-23:00) and night-time (23:00-07:00). As such, the assessment considers all normally operating plant at design duty as a worst-case scenario. Emergency plant only runs for routine testing (during the daytime) and during an actual emergency.

5.2 Assessment

5.2.1 Cumulative normally operating plant

Based on the above mitigation being implemented, the levels of plant noise egress predicted from the operation of the landlord and tenant plant items are summarised in Table 11.

Table 11 Predicted noise egress from rooftop plant at the nearest noise sensitive premises

Location	Predicted levels at 1 m from noise sensitive receiver, L_{Aeq} (dB)
Manchester Goods Yard to west	42
Bauhaus to east	36

This complies with the cumulative daytime (07:00-23:00) and night-time (23:00-07:00) noise egress criteria for the east and west of the site as per Table 2.

5.2.2 Landlord emergency operating plant

Based on the above mitigation being implemented, the levels of plant noise egress predicted are summarised in Table 11

Table 12 Predicted noise egress from rooftop plant at the nearest noise sensitive premises

Location	Predicted levels at 1 m from noise sensitive receiver, L_{Aeq} (dB)
Manchester Goods Yard to west	55
Bauhaus to east	50

The predicted levels of plant noise egress comply with the daytime (07:00-23:00) and night-time (23:00-07:00) emergency plant noise egress criteria as per Table 3.

6 Conclusion

An assessment of noise egress from normally operating landlord and tenant plant items has been undertaken. Considering the proposed mitigating measures, it is predicted that:

- The daytime (07:00-23:00) and night-time (23:00-07:00) noise egress criteria will be achieved at Bauhaus to the east of the site. This is a residential receptor and is therefore considered to be sensitive during the daytime (07:00-23:00) and night-time (23:00-07:00).
- The daytime (07:00-23:00) noise egress criteria will be achieved at Manchester Goods Yard to the west of the site. This comprises of office premises and is therefore

considered to only be a receptor during the daytime (07:00-23:00). This building is not considered to be noise sensitive during the night.

An assessment of noise egress from the landlord emergency generator has been undertaken. Considering the proposed mitigating measures above, it is predicted that:

- The daytime (07:00-23:00) and night-time (23:00-07:00) noise egress criteria will be achieved at Bauhaus to the east of the site. This is a residential receptor and is therefore considered to be sensitive during the daytime (07:00-23:00) and night-time (23:00-07:00).
- The daytime (07:00-23:00) noise egress criteria will be achieved at Manchester Goods Yard to the west of the site. This comprises of office premises and is therefore considered to only be a receptor during the daytime (07:00-23:00). This building is not considered to be noise sensitive during the night.