

New Century Hall Manchester

Plant Noise Assessment Report

26658/PNA

29 April 2022

For:

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1.0 Introduction

New items of fixed building services plant are proposed as part of the wider scheme to deliver a mixed-use scheme at New Century Hall in Manchester. This report assesses the plant proposed plant installations of the tenants of New Century Hall. We understand the tenant spaces are proposed to be Access Creative College in the basement a dining hall on the ground floor and venue hall on first floor.

Planning permission has been granted subject to conditions, with regards to fixed building services plant noise emission Condition 10 states the following:

“The proposed plant and associated equipment shall be implemented in accordance with the following: Plant and Equipment Noise Levels as detailed within the Hann Tucker report dated 26th July 2019. The approved noise targets and insulation scheme for the plant and equipment shall be met / completed before each of the basement, ground floor and first floor uses commence.

Prior to occupation of each floor a post completion report to verify that all of the target noise attenuation levels have been met and any potential adverse noise impacts in adjacent buildings arising directly from the plant and equipment within the proposed development have been adequately mitigated, shall be submitted and agreed in writing by the City Council as local planning authority.

Prior to occupation any non-compliance shall be suitably mitigated in accordance with an agreed scheme.”

This report provides an assessment of the proposed tenant plant installation and comments upon acceptability with reference to the discharge of Condition 10.

2.0 Objectives

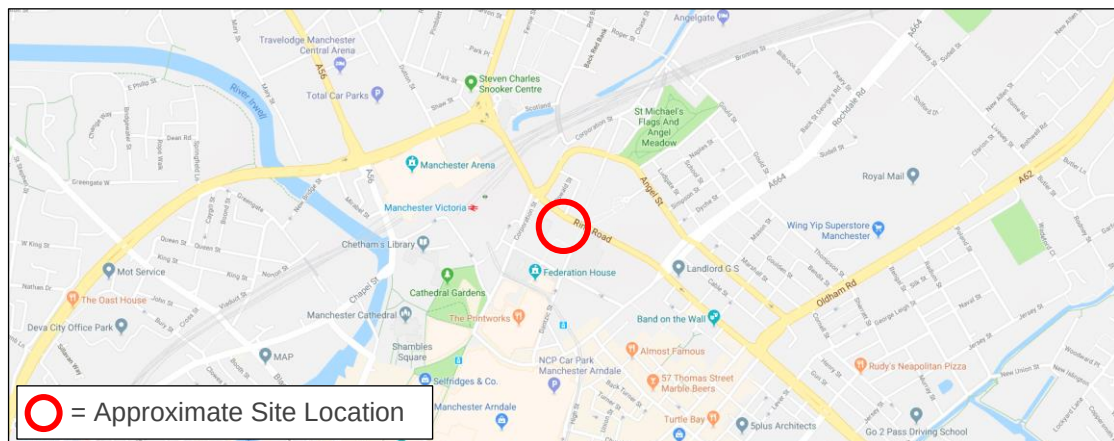
To carry out a desktop assessment of the tenant plant with respect to potential noise emissions to the nearest noise sensitive properties and compliance with Planning Condition 10 on the basis of the existing noise climate as established in the Noise Impact Assessment Report 26658/NIA1.



3.0 Site Description

3.1 Location

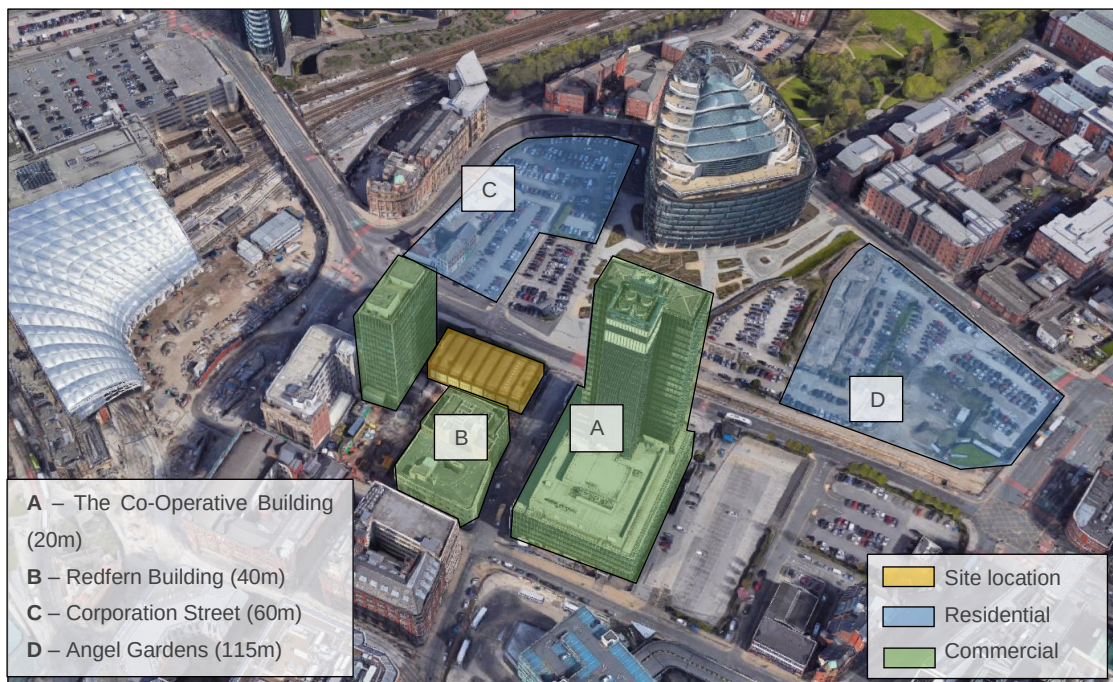
The proposed development is located on Mayes Street in Manchester city centre, and falls under the jurisdiction of Manchester City Council. See site location below.



Site Location (© maps.google.co.uk)

3.2 Description

New Century Hall is bounded by New Century House (currently vacant) to the west, Ring Road to the north, Mayes Street and Sadler's Yard to the south and Dantzic Street to the east. The surrounding area is predominantly commercial (offices) and the nearest residential receptors are approximately 95m away from the proposed development. See site plan below.



Site Plan (© maps.google.co.uk)

4.0 Acoustic Terminology

For an explanation of the acoustic terminology used in this report please refer to Appendix A enclosed.

5.0 Acoustic Standards and Guidelines

5.1 BS 4142:2014

When setting plant noise emission criteria reference is commonly made to BS 4142: 2014 “*Methods for rating and assessing industrial and commercial sound*”.

The procedure contained in BS 4142:2014 provides an assessment of the likely effects of sound on people when comparing the specific noise levels from the source with representative background noise levels. Where the noise contains “a tone, impulse or other characteristic” then various corrections can be added to the specific (source) noise level to obtain the “rating level”.

BS 4142 states that: “*The significance of sound of an industrial and/or commercial nature depends upon both the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound occurs*”. An estimation of the



impact of the specific noise can be obtained by the difference of the rating noise level and the background noise level and considering the following:

- *“Typically, the greater this difference, the greater the magnitude of the impact.”*
- *“A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context.”*
- *“A difference of around +5dB 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.”*

The determination of the “rating level” and the “background level” are both open to interpretation, depending on the context.

In summary it is not possible to set plant noise emission criteria purely on the basis of BS 4142:2014. It is reasonable to infer from the above, however, that a difference of around -5dB corresponds to “No Observed Effect Level” as defined in the Noise Policy Statement for England. It is also reasonable to infer from the above that if the plant noise rating level does not exceed the existing background noise level outside any noise sensitive residential window then the plant noise is of “low impact”.

5.2 Statutory Noise Nuisance

There is no quantitative definition of statutory noise nuisance. It is generally accepted however, that if the plant noise level is at least 5dB (or 10dB if tonal) below the minimum background $L_{90(15\text{minutes})}$ at 1m from the nearest noise sensitive residential window, then the risk of a statutory noise nuisance is avoided. By adopting this as a design criterion the guidance contained in BS 4142:2014 should also be complied with.

5.3 Local Authority Requirements

It is common for Local Planning Authorities to set a requirement relating to plant noise emissions from the new development in order to protect the interests of local residents and other potentially noise sensitive areas.



The site falls within the jurisdiction of Manchester City Council who have requested plant noise emission limits be controlled to a level 5 dB below the prevailing background noise level at the nearest residential properties when assessed in accordance with BS 4142.

As previously stated, MCC have requested in Planning Condition 10 that all plant is assessed to the levels set out in the previously issued Hann Tucker report titled “26658.rp.26072019.jm Rev02”.

6.0 Baseline Noise Survey

A baseline noise survey for the development was undertaken by Hann Tucker Associates in April 2019. The details of the survey methodology are presented in the Noise Impact Assessment report 26658/NIA1. The below table summarises the results of the baseline noise survey.

Position	Daytime 07:00-23:00 hours		Night-time 23:00-07:00 hours		Office Hours 08:00-18:00 hours	
	L _{Aeq,16hr}	Typical Lowest L _{A90,15min}	L _{Aeq,8hr}	Typical Lowest L _{A90,15min}	L _{Aeq,10hr}	Typical Lowest L _{A90,15min}
Miller St Elevation	70	51	68	46	72	59
Mayes St Elevation	61	48	60	45	61	52

7.0 Plant Noise Emission Criteria

On the basis of the previously issued Hann Tucker report, and the results of the environmental noise survey presented in Section 6.0, the criteria are as follows.

Period	Plant Noise Emission Limit
Daytime/Office Hours 07:00 – 19:00 hours	47 dB L _{Aeq,1h}
Evening 19:00 – 23:00	43 dB L _{Aeq,1hr}
Night-time 23:00 – 07:00 hours	40 dB L _{Aeq,15min}

The above criteria are to be achieved with all proposed plant operating simultaneously.



8.0 Plant Noise Assessment

8.1 Overview

Hann Tucker Associates have undertaken an assessment of atmospheric plant noise egress based on manufacturers' noise data for the proposed plant items. The following sections outline the basis of the plant noise egress assessment and our findings.

8.2 Proposed Plant Installation

The proposed external building services plant will be installed in a ground floor plant enclosure in the northeast corner of the development. The tenants' building services plant installations comprise the following proposed items:

Air Handling Unit			
Location	Quantity	Manufacturer	Model
Ground Floor Plant Area	2	Daikin	RYMQ40U
Ground Floor Plant Area	2	Daikin	RZAG35A
Ground Floor Plant Area	1	Daikin	RZAG50A
Ground Floor Plant Area	1	Air Source	ASV1050-1820 EXT

VRV Systems			
Location	Quantity	Manufacturer	Model
Ground Floor Plant Area	2	Daikin	REYQ14
Ground Floor Plant Area	1	Daikin	REYQ8
Ground Floor Plant Area	1	Daikin	REYQ16
Ground Floor Plant Area	1	Daikin	RXM35R

Heat Pump			
Location	Quantity	Manufacturer	Model
Ground Floor Plant Area	4	-	-

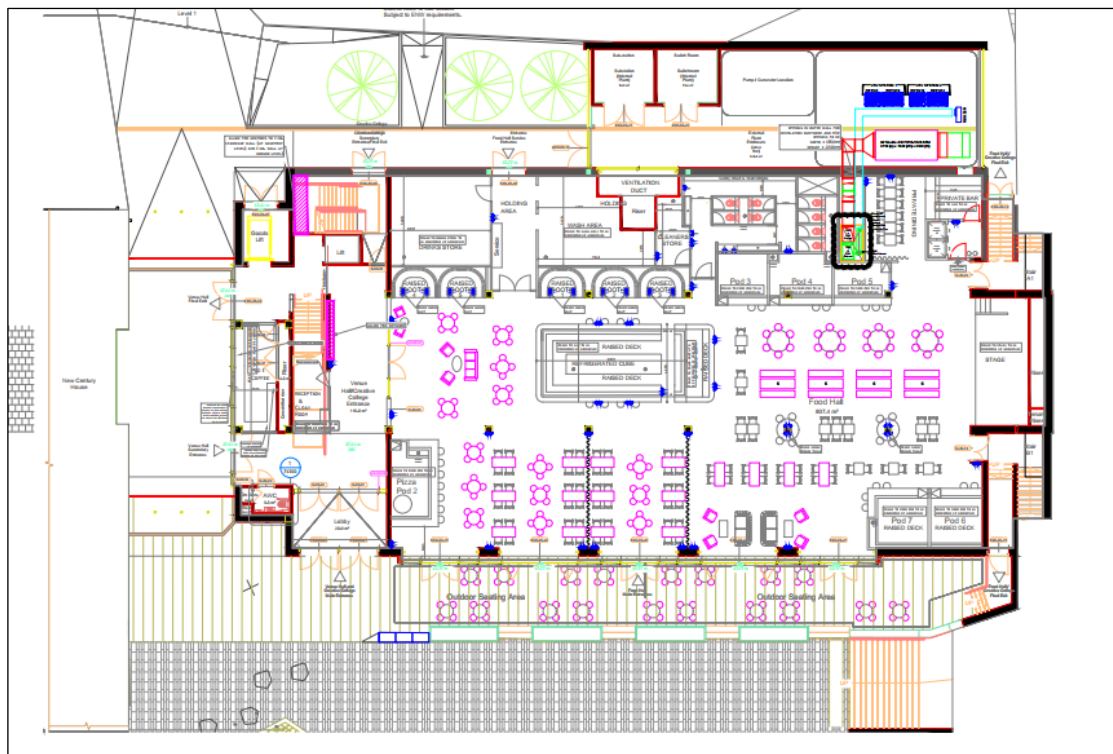
We understand that selections have not been made yet for the heat pump units.



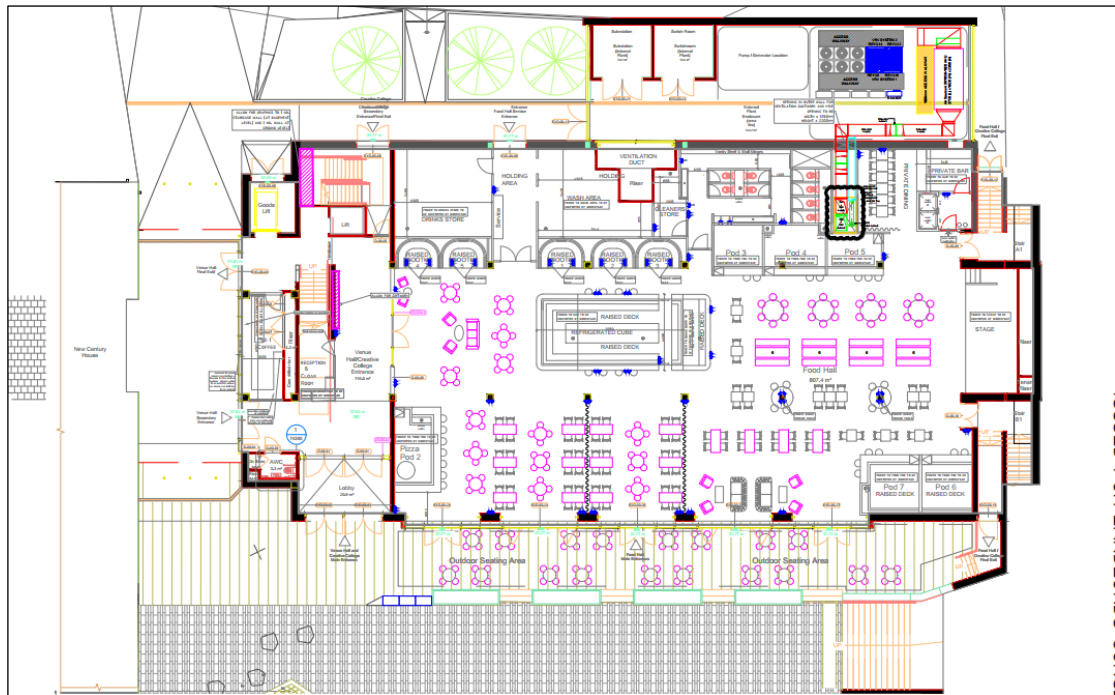
Extract Fans			
Location	Quantity	Manufacturer	Model
Ground Floor Plant Area	2	System Air	MUB/T 062 630EC

The following drawings have been used as the basis of assessment with regards to the position of the proposed plant items within the plant installation areas. For reference these drawings are also enclosed.

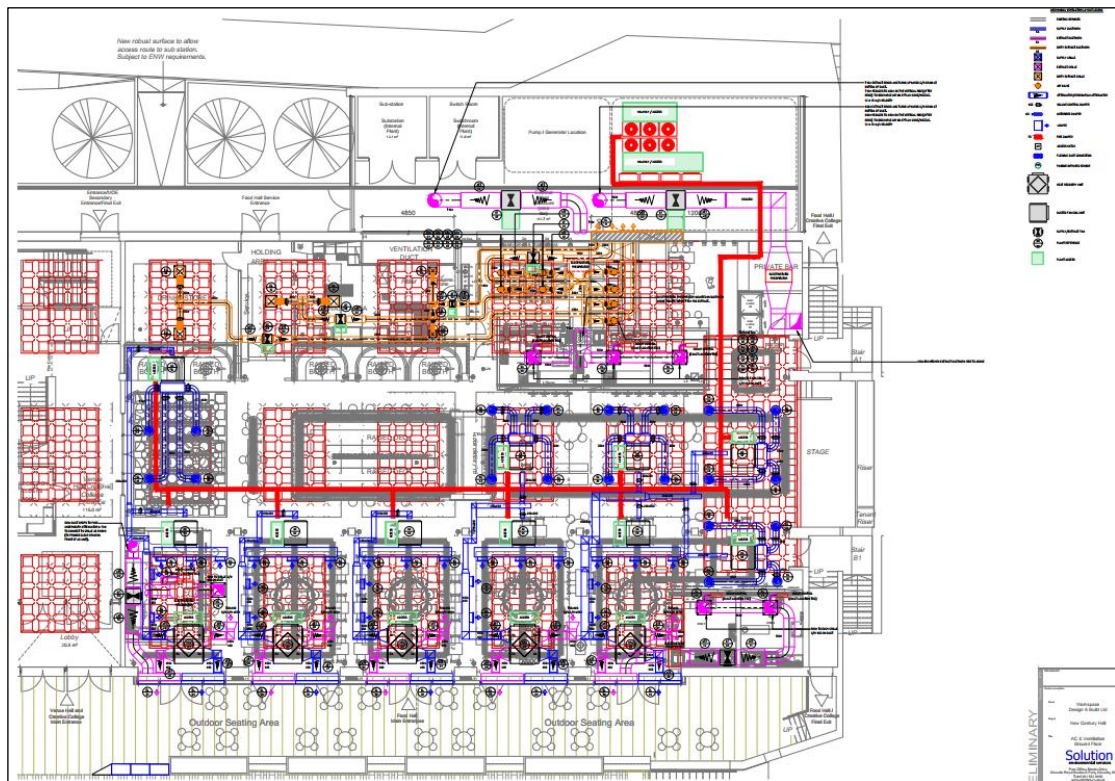
Drawing Ref	Description	Rev/Date
C5415.M02	Provisional Ground Floor Ventilation & Air Conditioning Services Routes	08/12/2021
C5415.M03	Provisional Ground Floor Ventilation & Air Conditioning Services Routes	08/12/2021
QS4669/JH/M11	AC & Ventilation Ground Floor	08/02/2022



Drawing C5415.M02 (© AC Ventilation Ltd)



Drawing C5415.M03 (© AC Ventilation Ltd)

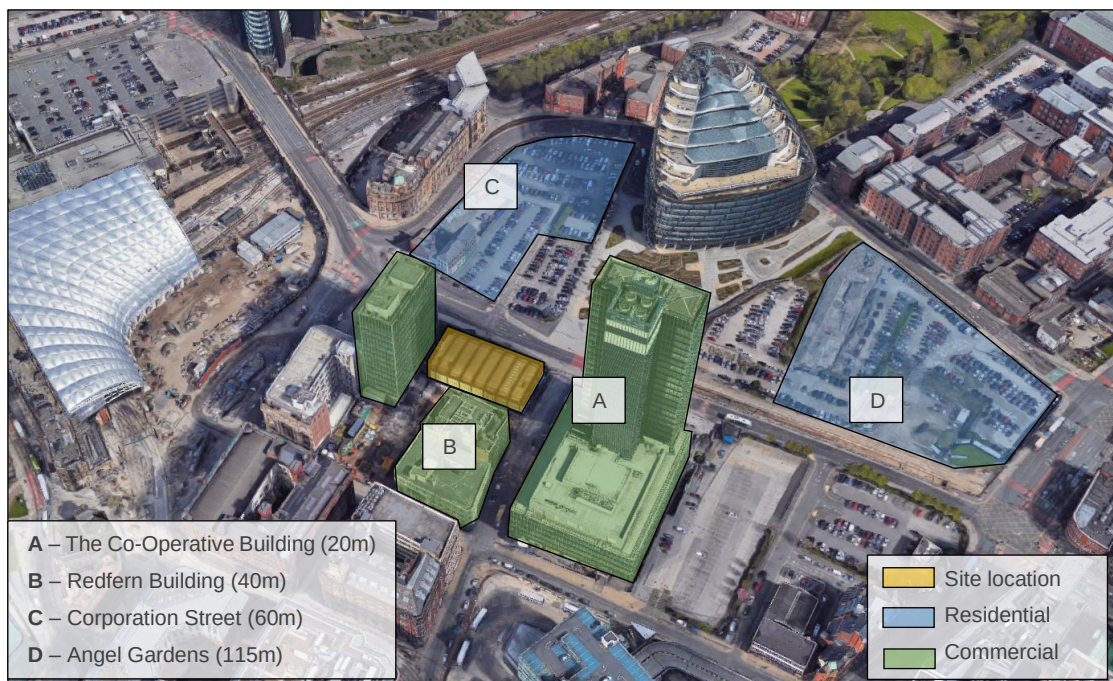


Drawing C5415.M02 (© AC Ventilation Ltd)



8.3 Worst Affected Receptors

The nearest noise sensitive receptors are formed by both office and residential receptors, which will be sensitive during office hours only and 24 hours respectively. Please see below plan showing nearest noise sensitive receptors and their relative distance from the site.



Site Plan (© maps.google.co.uk)

During office hours only (07:00-19:00) the nearest/worst affected noise sensitive receptor is The Co-Operative Building at the Eastern border of the site, the nearest windows of which are overlooking the proposed ground floor plant area.

Therefore for the purposes of the assessment the nearest sensitive receptor during office hours is The Co-Operative Building to the East at an approximate distance of 20m from the plant area. The nearest 24 hour sensitive receptors are the residential units on Corporation Street, approximately 55m from the site boundary.

It has been assumed that the proposed equipment could run 24 hours a day and so all items of plant have been assessed at both daytime and night time to the residential receptor.



8.4 Assessment

Based on the manufacturers' noise data, the cumulative sound pressure level at the worst affected noise sensitive receptor has been calculated and assessed as below (note SWL refers to sound power level).

8.4.1 Office Hours (07:00-19:00): The Co-Operative Building

Description	Sound Pressure Level at Octave band centre frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
2No. RYMQ18U	68	64	60	60	56	53	53	46	62
Correction for multiple units	+3	+3	+3	+3	+3	+3	+3	+3	-
Distance Loss (40m)	-25	-25	-25	-25	-25	-25	-25	-25	-
Sound Pressure Level @ worst affected noise sensitive receptor	46	42	38	38	34	31	31	25	40
2No. RYMQ12U	64	66	62	57	53	51	53	44	61
Correction for multiple units	+3	+3	+3	+3	+3	+3	+3	+3	-
Distance Loss (40m)	-25	-25	-25	-25	-25	-25	-25	-25	-
Sound Pressure Level @ worst affected noise sensitive receptor	42	44	40	35	31	29	30	22	39
2No. RYMQ10U	59	63	58	56	49	48	47	36	57
Correction for multiple units	+3	+3	+3	+3	+3	+3	+3	+3	-
Distance Loss (40m)	-25	-25	-25	-25	-25	-25	-25	-25	-
Sound Pressure Level @ worst affected noise sensitive receptor	37	41	36	34	27	26	25	14	35
2No. RZAG35A	53	53	51	46	41	37	28	26	48
Correction for multiple units	+3	+3	+3	+3	+3	+3	+3	+3	-
Distance Loss (40m)	-27	-27	-27	-27	-27	-27	-27	-27	-
Sound Pressure Level @ worst affected noise sensitive receptor	27	29	27	22	17	13	4	2	24
1No. RZAG50A	48	54	52	48	43	37	31	23	49
Distance Loss (40m)	-27	-27	-27	-27	-27	-27	-27	-27	-
Sound Pressure Level @ worst affected noise sensitive receptor	19	27	25	21	16	10	4	-4	22
2No. REYQ14	62	63	60	59	53	49	49	47	60
Correction for multiple units	+3	+3	+3	+3	+3	+3	+3	+3	-
Distance Loss (40m)	-25	-25	-25	-25	-25	-25	-25	-25	-
Sound Pressure Level @ worst affected noise sensitive receptor	40	41	38	37	31	27	27	25	38
1No. REYQ8	63	64	59	55	50	45	44	36	57



Description	Sound Pressure Level at Octave band centre frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
Distance Loss (40m)	-25	-25	-25	-25	-25	-25	-25	-25	-
Sound Pressure Level @ worst affected noise sensitive receptor	38	39	34	30	25	20	19	11	32
1No. REYQ16	68	69	64	62	56	52	52	48	63
Distance Loss (40m)	-25	-25	-25	-25	-25	-25	-25	-25	-
Sound Pressure Level @ worst affected noise sensitive receptor	43	44	39	37	31	27	27	23	38
1No. RXM35R	53	54	52	49	45	40	36	28	51
Distance Loss (40m)	-28	-28	-28	-28	-28	-28	-28	-28	-
Sound Pressure Level @ worst affected noise sensitive receptor	22	25	24	21	17	12	8	0	23
1No. ASV1050-1820 AHU – Supply Inlet*	66	80	73	71	67	63	62	60	73
Duct and Distance Loss	56	51	46	44	45	45	45	45	-
Level @ worst affected noise sensitive receptor	10	30	29	28	23	19	18	16	29
1No. ASV1050-1820 AHU – Extract Outlet*	70	80	74	76	73	69	65	60	78
Duct and Distance Loss	54	49	45	44	45	45	45	45	-
Level @ worst affected noise sensitive receptor	16	31	31	33	29	25	21	16	34
4No. Heat Pump	-	-	-	-	-	-	-	-	62
Correction for multiple units	-	-	-	-	-	-	-	-	+6
Distance Loss (40m)	-	-	-	-	-	-	-	-	-32
Sound Pressure Level @ worst affected noise sensitive receptor	-	-	-	-	-	-	-	-	36
2No. MUB/T 062 630EC Outlet	76	80	74	73	69	65	61	60	75
Correction for multiple units	+3	+3	+3	+3	+3	+3	+3	+3	-
Distance Loss (40m)	-27	-27	-27	-27	-27	-27	-27	-27	-
Insertion Loss	-4	-8	-14	-20	-17	-11	-8	-6	-
Sound Pressure Level @ worst affected noise sensitive receptor	48	48	36	29	28	30	29	30	38
2No. MUB/T 062 630EC Case	60	69	59	45	42	40	34	28	56
Correction for multiple units	+3	+3	+3	+3	+3	+3	+3	+3	-
Distance Loss (40m)	-27	-27	-27	-27	-27	-27	-27	-27	-
Sound Pressure Level @ worst affected noise sensitive receptor	36	45	35	21	18	16	10	4	32
Cumulative SPL of ground floor plant units	79	82	76	75	71	67	65	62	77



Description	Sound Pressure Level at Octave band centre frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
Cumulative Sound Pressure Level @ worst affected noise sensitive receptor	52	53	47	44	40	37	37	33	47
Plant noise limit	47 dBA Daytime			43 dBA Evening			40 dBA Night-time		
+/- dB compared to limits	±0			N/A			N/A		

*= Sound power level.

8.4.2 24 Hour Assessment: Residential Receptor

Description	Sound Pressure Level at Octave band centre frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
2No. RYM18U	68	64	60	60	56	53	53	46	62
Correction for multiple units	+3	+3	+3	+3	+3	+3	+3	+3	-
Distance Loss (60m)	-30	-30	-30	-30	-30	-30	-30	-30	-
Screening Loss	-5	-5	-5	-5	-5	-5	-5	-5	-
Sound Pressure Level @ worst affected noise sensitive receptor	36	32	28	28	24	21	21	14	30
2No. RYM12U	64	66	62	57	53	51	53	44	61
Correction for multiple units	+3	+3	+3	+3	+3	+3	+3	+3	-
Screening Loss	-5	-5	-5	-5	-5	-5	-5	-5	-
Distance Loss (60m)	-31	-31	-31	-31	-31	-31	-31	-31	-
Sound Pressure Level @ worst affected noise sensitive receptor	31	33	29	24	20	18	20	11	28
2No. RYM10U	59	63	58	55	49	48	47	36	57
Correction for multiple units	+3	+3	+3	+3	+3	+3	+3	+3	-
Distance Loss (60m)	-31	-31	-31	-31	-31	-31	-31	-31	-
Screening Loss	-5	-5	-5	-5	-5	-5	-5	-5	-
Sound Pressure Level @ worst affected noise sensitive receptor	26	30	25	23	16	15	14	3	24
2No. RZAG35A	53	53	51	46	41	37	28	26	48
Correction for multiple units	+3	+3	+3	+3	+3	+3	+3	+3	-
Distance Loss (60m)	-32	-32	-32	-32	-32	-32	-32	-32	-
Screening Loss	-5	-5	-5	-5	-5	-5	-5	-5	-
Sound Pressure Level @ worst affected noise sensitive receptor	16	19	17	12	7	3	-6	-8	14
1No. RZAG50A	48	54	52	48	43	37	31	23	49
Distance Loss (60m)	-32	-32	-32	-32	-32	-32	-32	-32	-
Screening Loss	-5	-5	-5	-5	-5	-5	-5	-5	-
Sound Pressure Level @ worst affected noise sensitive receptor	8	17	15	11	6	0	-6	-14	12

[illegible]



Description	Sound Pressure Level at Octave band centre frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
2No. MUB/T 062 630EC Outlet	76	80	74	73	69	65	61	60	75
Correction for multiple units	+3	+3	+3	+3	+3	+3	+3	+3	-
Distance Loss (40m)	-32	-32	-32	-32	-32	-32	-32	-32	-
Barrier Loss	-5	-5	-5	-5	-5	-5	-5	-5	-
Insertion Loss	-4	-8	-14	-20	-17	-11	-8	-6	-
Sound Pressure Level @ worst affected noise sensitive receptor	38	38	26	19	18	20	19	20	28
2No. MUB/T 062 630EC Case	60	69	59	45	42	40	34	28	56
Correction for multiple units	+3	+3	+3	+3	+3	+3	+3	+3	-
Distance Loss (40m)	-32	-32	-32	-32	-32	-32	-32	-32	-
Barrier Loss	-5	-5	-5	-5	-5	-5	-5	-5	-
Sound Pressure Level @ worst affected noise sensitive receptor	26	35	25	11	8	6	0	-6	22
Cumulative SPL of ground floor plant units	81	87	80	80	76	72	69	66	82
Cumulative Sound Pressure Level @ worst affected noise sensitive receptor	42	43	37	36	31	28	28	24	38
Plant noise limit	47 dBA Daytime			43 dBA Evening			40 dBA Night-time		
+/- dB compared to limits	-9			-5			-2		

*= Sound Power level.

As can be seen above the proposed plant items are compliant with the plant limits set out in Hann Tucker report "26658.rp.26072019.jm Rev02" when measured at both nearest sensitive receptors.

9.0 Conclusions

Hann Tucker Associates have undertaken an assessment of the potential noise impact of proposed building services plant on surrounding properties, with reference to the proposed plant noise limits.

The assessment has shown that when measured at the nearest sensitive receptors the proposed plant is below the limits set out by the LPA and should be suitable for the discharge of Condition 10.

Appendix A

The acoustic terms used in this report are defined as follows:

dB Decibel - Used as a measurement of sound level. Decibels are not an absolute unit of measurement but an expression of ratio between two quantities expressed in logarithmic form. The relationships between Decibel levels do not work in the same way that non-logarithmic (linear) numbers work (e.g. 30dB + 30dB = 33dB, not 60dB).

dBA The human ear is more susceptible to mid-frequency noise than the high and low frequencies. The 'A'-weighting scale approximates this response and allows sound levels to be expressed as an overall single figure value in dBA. The _A subscript is applied to an acoustical parameter to indicate the stated noise level is A-weighted

It should be noted that levels in dBA do not have a linear relationship to each other; for similar noises, a change in noise level of 10dBA represents a doubling or halving of subjective loudness. A change of 3dBA is just perceptible.

L_{90,T} L₉₀ is the noise level exceeded for 90% of the period *T* (i.e. the quietest 10% of the measurement) and is often used to describe the background noise level.

L_{eq,T} L_{eq,T} is the equivalent continuous sound pressure level. It is an average of the total sound energy measured over a specified time period, *T*.

L_{max} L_{max} is the maximum sound pressure level recorded over the period stated. L_{max} is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the L_{eq} noise level.

Sound Pressure Level (L_p) is the sound pressure relative to a standard reference pressure of 2×10^{-5} Pa. This level varies for a given source according to a number of factors (including but not limited to: distance from the source; positioning; screening and meteorological effects).

Sound Power Level (SWL or L_w) is the total amount of sound energy inherent in a particular sound source, independent of its environment. It is a logarithmic measure of the sound power in comparison to a specified reference level (usually 10^{-12} W).