8th March 2022

Introduction

Caddick Construction has appointed Stroma Built Environment (SBE) to provide acoustic consultancy in relation to planning requirements for Base Building, Manchester Science Park. The development was granted planning consent subject to conditions set out in Decision Notice ref 125018/FO/2019.

Condition 19 relates to control of noise break out from four 'Maker Space' units located at ground floor level. The units are double height workshop spaces which will be separately tenanted. The specific planning condition is reproduced below for information.

> 19) The Maker Space and ancillary workshop shall be acoustically insulated and treated to limit the break out of noise in accordance with a noise study of the premises and a scheme of acoustic treatment that has been submitted to and approved in writing by the City Council as local planning authority. The scheme shall be designed by an approved acoustic consultant and shall be implemented in full before the use commences or as otherwise agreed in writing by the City Council as local planning authority.
> Upon completion of the development a verification report will be required to validate that the work undertaken throughout the development conforms to the recommendations and requirements in the approved acoustic consultant's report. The report shall also undertake post completion testing to confirm that acceptable criteria has 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.
>
> Reason - To safeguard the amenities of the occupiers of nearby residential accommodation, pursuant to policies SP1 and DM1 of the Core Strategy.

A scheme of acoustic treatment has been set out by the client side acoustician BDP, and is outlined in BDP report '*Base, Manchester Science Park – RIBA Stage 4 Acoustic Design Strategy Report'.*

This technical note summarises the noise insulation scheme and provides a more detailed assessment of external noise breakout.

Noise Insulation Scheme

The existing noise insulation scheme set out by BDP is based on limiting the internal noise levels within Maker Space workshops and providing appropriate sound insulation to the façade to ensure noise breakout is controlled to suitable levels. Site background sound levels are taken from a site noise survey undertaken by BDP and set out in report *'Base, Manchester Science Park – Environmental Noise Assessment Report'* which was submitted with the planning documents and is referenced in the planning decision notice.

Identified Noise Sensitive Receptors (NSR) adjacent to the new building are summarised in Table 1. Site plans are included in Appendix I.

The noise limits proposed by BDP are reproduced below in Table 2. A separate noise limit has been assigned to each of the four Maker Spaces such that the total cumulative noise level from all four units does not exceed 5 dB below the background sound level at the closest noise sensitive receptors.

Table 1: Noise Sensitive Receptors

Noise Sensitive Receptor	Type	Approximate distance from Base Building (m)
Greenheys Lane	Residential Properties considered noise sensitive during daytime and night time	33
Greenheys Building	Commercial building considered noise sensitive during daytime hours	15
Darul Aman Mosque	Religious building considered noise sensitive during daytime hours	32

Table 2: BDP Proposed Operational Noise Limits (Table 6 of BDP Stage 4 report)

Noise Sensitive Receptor	Time Period	Operational Noise Limits at NSR façade dB $L_{Ar,Tr}$				
		North Corner Maker Space	South Corner Maker Space	West Maker Space	North Maker Space	Total Noise Level all units[1]
Greenheys Lane	Daytime (07:00 – 19:00)	36	36	29	33	40
	Evening (19:00 – 23:00)	36	36	29	33	40
	Night (23:00 – 07:00)	29	25	21	22	31
Greenheys Building	Daytime (07:00 – 23:00)	33	24	20	33	36
Darul Aman Mosque	Daytime (07:00 – 23:00)	28	36	25	19	37

Notes to Table 2:
1. Calculated by SBE from BDP limits

In order to achieve the above external noise limits it has been proposed that noise limits within Maker spaces are limited to a maximum level of 85 dB $L_{Aeq,T,}$ which would represent a typical internal noise level for a busy workshop space. Based on this internal noise level a glazing sound insulation of 30 dB $R_w + C_{tr}$ has been set to ensure that the external noise limit are met.

Noise Break Out Assessment

The Maker's Spaces are to be mechanically ventilated such that open windows or ventilators are not required to provide air supply and extract. The façade is to be constructed of solid areas of insulated cladding panels with a brick external face and an internal plasterboard lining, and areas of glazed curtain walling.

Calculations indicate that the proposed solid façade build up will provide a sound insulation of 48 dB $R_w + C_{tr}$. Glazing to curtain walling is to be formed of double glazed units with two glass types. Sound insulation test certificates are not available for the glazing, however the sound insulation of the glazing

system has been assessed by calculation and comparison to similar constructions and is set out in Table 3 below.

Table 3: Glazing sound insulation assessment

Glazing Build up	Assessed Sound Insulation dB $R_w + C_{tr}$
8.8mm laminate glass, 14mm argon filled cavity, 11.5mm laminate glass	37
6.8mm laminate glass, 18mm argon filled cavity, 9.5mm laminate glass	35

Sound insulation calculations are appended to this note. Both glazing proposals significantly exceeds the project requirement of 30 dB $R_w + C_{tr}$ set by BDP.

Calculations have been undertaken to assess the noise break out at the closest noise sensitive properties based on the assessed sound insulation of the building façade. As with the design stage assessment an internal noise level of 85 dB $L_{Aeq,T}$ has been used to inform the assessment. The assessment makes an allowance for the potential reduction in sound insulation of doors to units, however assumes that doors and any openable windows are kept closed to limit noise break out.

Table 4 sets out an assessment of calculated break out noise in relation to pre-development background sound levels and BDP proposed noise limits. The calculations assume all four Maker Space units are in use, each with a maximum internal noise level of 85 dB $L_{Aeq,T}$.

The calculated rating level has been assessed in line with guidance set out in British Standard 4142. The noise from Maker Spaces when considered at the closest NSR is not expected to be tonal, impulsive, or intermittent, however may feature other acoustic characters that are noticeable against the background sound at quieter times. A +3dB acoustic feature correction has been applied to account for sound characteristics.

Calculations indicate that the rating level of noise break out from all four units will be at least 7 dB below the lowest measured pre-construction background sound level. When assessed in line with BS 4142[1] this is classed as an indication of a low noise impact.

It is recommended that the maximum reverberant Maker Space noise level of 85 dB LAeq,5mins is set within tenancy agreements for each Maker Space. If tenants need to exceed these noise levels then further upgrade of the unit façade would be required.

Noise levels should be considered as an average reverberant level averaged across at least 4 separate positions within the space.

[1] BS 4142:2014+A1:2019 '*Methods for rating and assessing industrial and commercial sound*'

Table 4: Noise break out assessment

Noise Sensitive Receptor	Lowest Background Sound Level[1] dB $L_{A90,T}$	BDP Proposed Operational Noise Limit dB $L_{Ar,Tr}$	Calculated Operational Break out Rating Level dB $L_{Ar,Tr}$
Greenheys Lane Daytime	48	40	31
Greenheys Lane Evening	44	40	31
Greenhays Lane Night	38	31	31
Greenheys Building	42	36	34
Darul Mosque	45	37	31

Notes to Table 4:
1. As measured and reported by BDP

Verification Measurements

At the time of writing the Maker Spaces' are being constructed as Shell and Core to be tenanted after hand over of the building. As such it is not possible at this time to undertake any verification measurements on site with the Maker Spaces' in use.

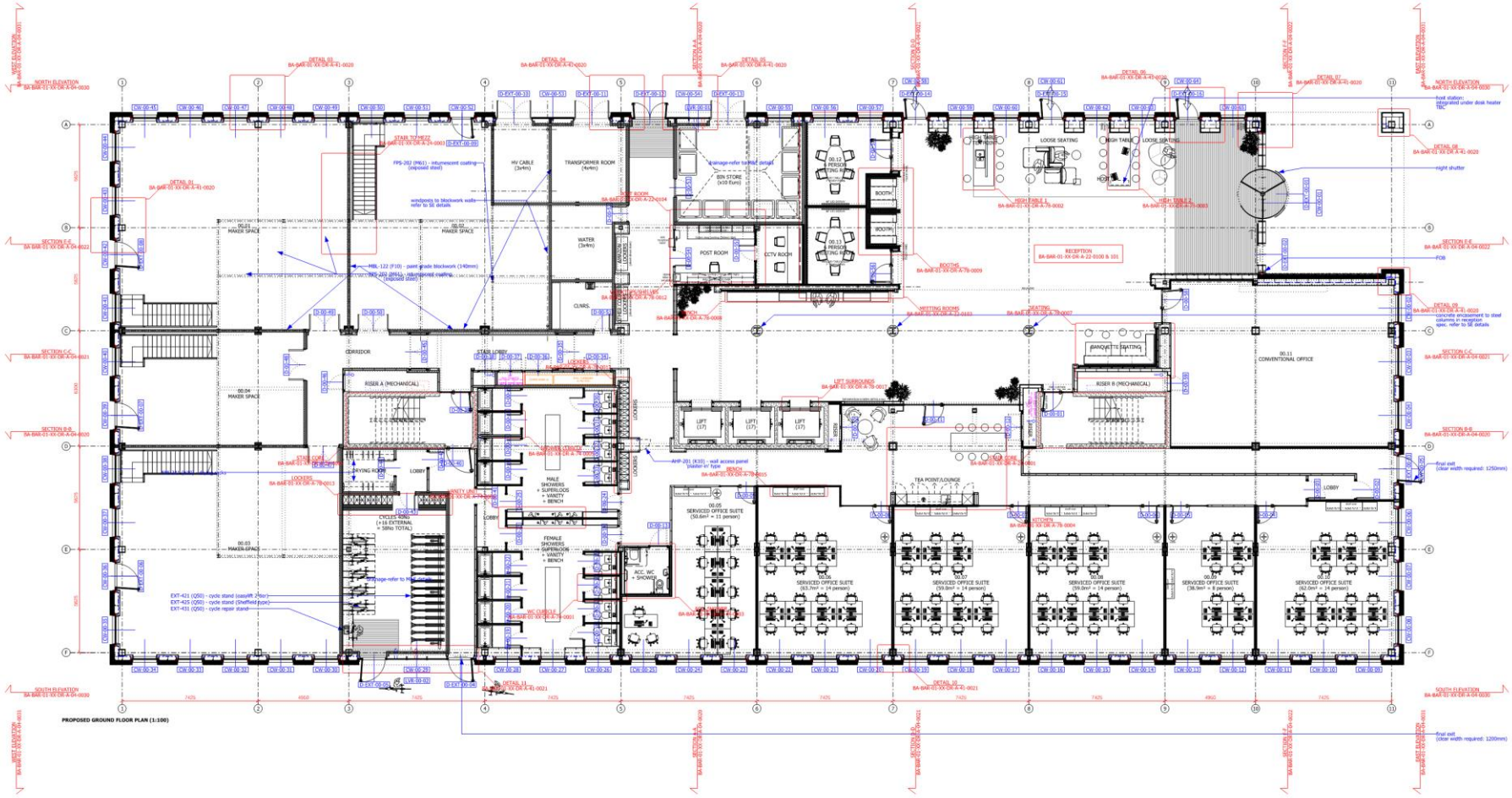
An indicative test is to be undertaken by using a pink noise source to create a noise level of 85 dB $L_{Aeq,T}$ within a single Maker Space selected on a worst case basis to represent the proposed internal noise limit within the spaces. Measurements of breakout noise will be taken outside the façade of the unit to validate the existing noise break out desktop assessment.

Additional measurements will be undertaken at the closest noise sensitive receptor, however based on the existing desktop noise breakout assessment it is calculated that noise break out from the units will be below the existing background sound level and the noise is likely to be inaudible at the closest noise sensitive receptor. As such it is anticipated that it may not be possible to undertake a valid measurement of noise at the closest noise sensitive receptor, however in this instance subjective comments will be made to confirm inaudibility.

Should you require any further information please do not hesitate to contact me.

Tom Chaffer MSc BSc MIOA
Principal Acoustic Consultant

Appendix I. Site Plans


PROPOSED GROUND FLOOR PLAN (1:100)
CORRIDOR
STAIR LOBBY
RISER A (MECHANICAL)
RISER B (MECHANICAL)
00.04 MAKER SPACE
00.03 MAKER SPACE
00.11 CONVENTIONAL OFFICE
RECEPTION
BIN STORE
POST ROOM
CCTV ROOM
TRANSFORMER ROOM
WATER
LIFT
LOBBY
CYCLE RING
MALE SHOWERS + SUPERLOOS + VANITY + BENCH
FEMALE SHOWERS + SUPERLOOS + VANITY + BENCH
ACC. WC + SHOWER
TEA POINT/LOUNGE
SERVICED OFFICE SUITE
LOOSE SEATING
BANQUETTE SEATING
BOOTH
DRYING ROOM
NORTH ELEVATION
SOUTH ELEVATION
WEST ELEVATION
EAST ELEVATION

Appendix II. Glazing Sound Insulation Calculations

Sound Insulation Prediction (v9.0.8)

Program copyright Marshall Day Acoustics 2017
margin of error is generally within Rw +/- 3 dB
- Key No. 1599
Job Name:
Job No.: Initials:tom.chaffer
Date: 26/01/2022
File Name:

Notes:

Rw 43 dB
C -2 dB
Ctr -6 dB

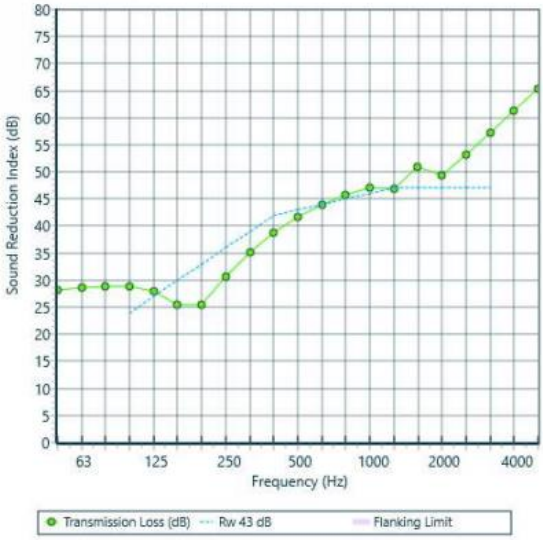
Mass-air-mass resonant frequency = =164 Hz
Panel Size = 2.0 m x 1.5 m
Partition surface mass = 48.1 kg/m²

System description

Pane 1 + 1 x 8.76 mm Laminated Glass (generic PVB-0.76 mm)

argon: 14 mm
Pane 2 + 1 x 11.38 mm Laminated Glass (generic PVB-0.38 mm)

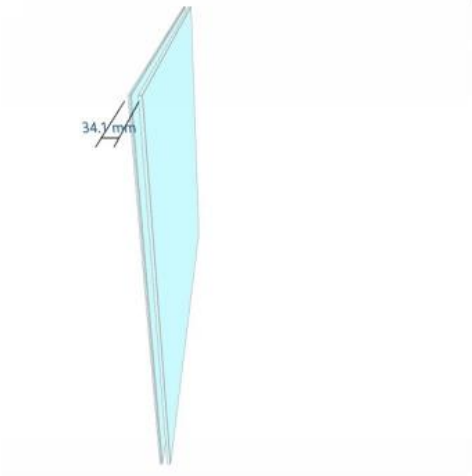
freq.(Hz)	TL(dB)	TL(dB)
50	28	
63	29	29
80	29	
100	29	
125	28	27
160	25	
200	25	
250	31	29
315	35	
400	39	
500	42	41
630	44	
800	46	
1000	47	47
1250	47	
1600	51	
2000	49	51
2500	53	
3150	57	
4000	61	60
5000	65	



Sound Insulation Prediction (v9.0.8)

Program copyright Marshall Day Acoustics 2017
margin of error is generally within Rw +/- 3 dB
- Key No. 1599
Job Name:
Job No.: Initials:tom.chatter
Date:.26/01/2022
File Name:

Notes:

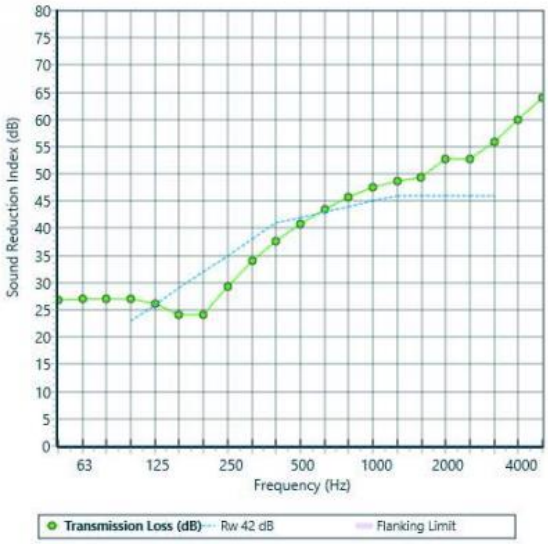


Rw 42 dB
C -2 dB
Ctr -7 dB

Mass-air-mass resonant frequency = =163 Hz
Panel Size = 2.0 m x 1.5 m
Partition surface mass = 38.4 kg/m²

System description

Pane 1 + 1 x 6.76 mm Laminated Glass (generic PVB-0.76 mm)

argon: 18 mm
Pane 2 + 1 x 9.38 mm Laminated Glass (generic PVB-0.38 mm)

freq.(Hz)	TL(dB)	TL(dB)
50	27	
63	27	27
80	27	
100	27	
125	26	26
160	24	
200	24	
250	29	27
315	34	
400	38	
500	41	40
630	44	
800	46	
1000	48	47
1250	49	
1600	49	
2000	53	51
2500	53	
3150	56	
4000	60	59
5000	64