Willow Acoustics Pty Ltd ABN 94 660 341 337 Trading as
AUDIOMETRIC & ACOUSTIC SERVICES
noiseconsult.com.au
(03) 9817 5517
info@noiseconsult.com.au

13th September 2024 **Report No. 24073.1**

Title: **Traffic noise assessment for One School Global, Melton Campus located at 769-797 High Street, Melton West, VIC 3337.**

Brief: **Assess a proposed extension of a school campus located at 769-797 High Street, Melton West, VIC 3337 regarding external traffic noise intrusion by application of AS3671 – 1989, Acoustics - Road Traffic Noise Intrusion – Building Siting and Construction and provide recommendations as required.**

Client: **One School Global**
Melton Campus
769-797 High Street
Melton West
VIC 3337

Contact: [redacted]
Solve Town Planning

Executive Summary

Audiometric and Acoustic Services (A&AS) has completed an external traffic noise intrusion assessment for a proposed extension of a school campus located at 769-797 High Street, Melton West, VIC 3337.

The external noise levels have been addressed by application of AS3671 – 1989: Acoustics - Road Traffic Noise Intrusion – Building Siting and Construction and AS2107 – 2016: Acoustics - Recommended design sound levels and reverberation times for building interiors.

Recommendations are provided in Section 7.

Contents

1 Introduction

Audiometric and Acoustic Services (A&AS) has been commissioned by One School Global, Melton Campus to complete an external traffic noise intrusion assessment for a proposed extension of a school campus located at 769-797 High Street, Melton West, VIC 3337.

Traffic noise is to be assessed as per AS3671 – 1989, Acoustics - Road Traffic Noise Intrusion – Building Siting and Construction (Standards Australia, 1989) and AS2107 – 2016 Acoustics - Recommended design sound levels and reverberation times for building interiors.

Recommendations are thereafter provided for the proposed external building envelope to achieve the internal design levels of AS2107.

A glossary of the acoustic terminology used in this report is presented in Appendix A.

2 Site Description

The project site is located at 769-797 High Street, Melton West, VIC as shown below in Figure 1.

The noise levels received on site are observed to be primarily of traffic.

Figure 1 Location of Project Site (Image Source: Google Maps)

Appendix C presents the proposed layout. Areas within the scope of works are indicated in 'green'.

3 Design Criteria

The design internal noise levels have been addressed by application of AS3671 – 1989, Acoustics - Road Traffic Noise Intrusion – Building Siting and Construction (Standards Australia, 1989). Note that AS3671 requires design to sound levels specified in AS2107 – 1987 Acoustics - Recommended design sound levels and reverberation times for building interiors. This has been superseded by AS2107 – 2016 (Standards Australia, 2016).

Noise exposure levels can be measured or predicted. Where relevant and practicable, measurements are preferred.

For residential dwellings the $L_{A10,T}$ is the descriptor with "T" being the time period. Commonly the 18-hour period is used from 0600 – 2400. This approach eliminates the dilution of the effective noise level by the quieter night period.

More commonly in recent years, Responsible Authorities request for all noise including industry, commerce and traffic to be assessed by application of the measured L_{Aeq} and AS2107 to be used as the criterion. Where more than traffic is required to be assessed the L_{Aeq} should be used as the effective noise level.

For the application to schools or educational facilities the $L_{A10(12hr)}$ between 8 am and 6 pm applies.

An adjustment of 1.3 dB is applied to the $L_{A10(18hour)}$ or $L_{Aeq,T}$ for a 10% increase of noise as per the VicRoads – Traffic Noise Reduction Policy Review, Discussion Paper (August 2015) to accommodate increases in noise levels over the next 10 years.

3.1 Internal Room Design Levels

'AS2107 – 2016 Acoustics - Recommended design sound levels and reverberation times for building interiors' (Standards Australia, 2016) provides guidance on internal noise levels and reverberation times for different types of spaces. The methodology provided is relevant to the development in respect of noise intrusion from external sources, specifically the calculation of effective noise levels received within habitable rooms.

The external façade of the proposed rooms must attenuate external noise levels to within the recommended internal design sound levels specified in AS2107.

Table 1 AS2107 – 2016 Design Sound Levels for Education Buildings Near Major Roads

Type of Occupancy/Activity	Design Sound Level (LAeq,t) range (dB(A))
Art/Craft Studios	40 to 45
Engineering Workshops - Teaching	< 45
Engineering Workshops – Non-teaching	< 60
Laboratories - Teaching	35 to 45
Laboratories – Working	40 to 50

Libraries – General Areas	40 to 50
Libraries – Reading Areas	40 to 45
Music Practice Rooms	40 to 45
Staff Common Rooms	40 to 45
Sports Hall	< 50
Teaching Spaces – Open Plan Teaching Spaces	35 to 45
Teaching Spaces – Primary Schools	35 to 40
Teaching Spaces – Secondary Schools	35 to 40

4 Existing Noise Levels

Audiometric and Acoustics Services undertook environmental noise logging at the south property line of the project site from Wednesday, 7th August 2024 until Tuesday, 13th August 2024 to determine the existing traffic noise levels at the proposed facade.

The weather over the logging period included some intermittent periods of wind on Thursday the 8th of August 2024 and Monday 12th August 2024 as measured at the nearest weather station. However, the weather appears not to have affected the measured noise level at the measurement location.

Figure 2 Location of Measurement Point (Image Source: Google Earth 2024)

Table 2 presents the noise levels as measured on site and the effective noise level at the most affected proposed facade.

Table 2 Unadjusted Noise Levels from Logging Device

Date	$L_{A10(12hour)}$ (dB)
Thursday, 8 August 2024	73.1
Friday, 9 August 2024	73.9
Saturday, 10 August 2024	73.9*
Sunday, 11 August 2024	73.0*
Monday, 12 August 2024	72.6
Average	73.2
VicRoads 10% Adjustment	0.3
Façade	2.5
Distance Adjustment	-0.8
Total	76.0

*Not included in calculations.

The noise levels on site are graded due to distance to the nearest trafficable lane.

The effective noise level at the east wing of the building is calculated to be $L_{A10(12hr)}$ = 68 dB whilst the effective noise level at the most affected façade is calculated to be $L_{A10(12hr)}$ = 76 dB.

5 Nominated Standard Construction Details

The proposed building is taken to be constructed using the following assembly.

5.1 External Walls

External wall construction is understood to be of minimum 150 mm thick concrete panel for the ground level and lightweight cement board or steel cladding for the first floor.

It is taken that lightweight construction includes a 90 mm stud and minimum R1.5 fibrous insulation within the cavity.

5.2 Roofing

The roof construction is taken to be metal deck roofing of minimum 0.48 BMT with minimal R2.5 fibrous insulation within the cavity.

5.3 Glazing

The glazing thickness or air gap is not specified. Therefore, the recommendation will be to achieve a minimum R_w value to achieve the internal design criteria.

5.4 Doors

Doors are taken to provide a comparable sound insulation to the glazing specified.

5.5 Ventilation

To be designed to not to de-rate the overall performance of the building façade.

6 Results of Proposed Systems

The building components used in this situation must attenuate the external noise from local industry and traffic to achieve the indoor design noise levels.

The system is marked as 'improve' in the standard construction column if the existing construction does not meet the required attenuation shown as an R_w value.

Table 3 Minimum Required Attenuation of Building Components

Room	Construction Item	Rw Rating	Standard Construction
GL Science	Roof / Ceiling	44	OK
	Glazing	48	Improve
	External Walls	38	OK
GL Prep Room	Roof / Ceiling	49	OK
	Glazing	48	Improve
	External Walls	45	OK
GL Technology	Roof / Ceiling	44	OK
	Glazing	35	Improve
	External Walls	41	OK
GL Art	Roof / Ceiling	40	OK
	Glazing	34	Improve
	External Walls	36	OK
GL Collab Area and Focus Area	Roof / Ceiling	32	OK
	Glazing	24	Improve
	External Walls	23	OK
GL Medium Studio	Roof / Ceiling	41	OK
	Glazing	36	Improve
	External Walls	33	OK
GL Food Technology	Roof / Ceiling	33	OK
	Glazing	21	OK
	External Walls	24	OK
GL Collab & Semi Collab Area & Library	Roof / Ceiling	39	OK
	Glazing	30	Improve
	External Walls	29	OK
GL Large Studio	Roof / Ceiling	41	OK
	Glazing	32	Improve
	External Walls	40	OK
FF Large Studio 66m2	Roof / Ceiling	51	Improve
	Glazing	46	Improve
	External Walls	47	OK
FF Large Studio 59m2	Roof / Ceiling	49	Improve
	Glazing	42	Improve
	External Walls	39	OK
FF Large Studio 52m2	Roof / Ceiling	51	Improve
	Glazing	43	Improve

	External Walls	49	OK
FF Collab Area	Roof / Ceiling	44	Improve
	Glazing	35	Improve
	External Walls	33	OK
FF Focus Area	Roof / Ceiling	36	OK
	Glazing	27	Improve
	External Walls	28	OK
FF Quiet Rooms and Pods	Roof / Ceiling	43	Improve
	Glazing	43	Improve
	External Walls	38	OK

The minimum required R_w is based on a TNAc +5 dB.

The following subsection provide recommendations to achieve the required attenuation for external façade elements of rooms marked 'improve.'

7 Recommendations

The following subsections provide further recommendations.

7.1 External Wall Construction

External walls of a minimum 150 mm thick concrete panel for the ground level will be suitable for all applications. 150 mm thick concrete panel would be suitable for any walls above around R_w = 43 dB.

However, the lightweight cement board or steel cladding for the first floor should be constructed as below.

Table 4 Recommended Lightweight Construction

Room	Min Required R_w	Suitable Lightweight Construction
FF Large Studio 66m2	47	▪ 75 mm Hebel PowerPanel (45 kg/m2) with 25 mm furring channel, 90 mm steel stud framing, 10 mm thick plasterboard (7kg/m2) and min R2.0 fibrous insulation in the cavity. ▪ Standard brick veneer construction. ▪ Two layers of 8.5 mm cement board (James Hardie Easy Lap) with surface density of >12 kg / m2 each direct fixed to 90 mm timber stud, with 2 layers of 16 mm fire rated plasterboard direct fixed to the internal with Soundscreen R2.5 fibrous batts to within the cavity. ▪ Exo Tec (James Hardie) compressed sheet cladding fixed to a 90 mm stud with 14 kg/m3 fibrous insulation to the cavity and standard 10 mm plasterboard. ▪ Metal Colorbond cladding (BTM 0.48) fixed to a 90 mm timber frame with 32 kg/m3 fibreglass insulation and an internal lining of 16 mm fire rated plasterboard (13 kg/m2) or equivalent and two layers of 13 mm high density plasterboard (13 kg/m2).
FF Large Studio 59m2	39	▪ CSR 5165 - Cemintel textured base sheet (7.5 mm) or weatherboard cladding, with sarking and 1 layer of 16 mm Fyrchek MR plasterboard fitted to the external of 19 – 35 mm battens fixed to a 70 mm steel stud frame with min R1.5 fibrous insulation and an internal lining of 10 mm Gyprock superchek plasterboard (10.4 kg/m2). ▪ Metal Colorbond cladding (BTM 0.48) fixed to a 90 mm timber frame with R2.5 fibrous insulation and an internal lining of 16 mm fire rated plasterboard (13 kg/m2) or equivalent and one layer of 13 mm plasterboard (13 kg/m2). ▪ 9 mm cement board (min 12.5 kg/m2) fixed to a 90 mm timber frame with R2.0 fibrous insulation and an internal lining of 10 mm standard plasterboard (5.7 kg/m2) or equivalent.
FF Large Studio 52m2	49	▪ Metal Colorbond cladding (BTM 0.48) fixed to a 90 mm timber frame with 32 kg/m3 fibreglass insulation and an internal lining of 3 x 16 mm fire rated plasterboard (13 kg/m2) or equivalent.

		▪ Standard brick veneer construction.
FF Collab Area	33	▪ Metal Colorbond cladding (BTM 0.48) fixed to a 90 mm timber frame with R2.5 fibrous insulation and an internal lining of 16 mm fire rated plasterboard (13 kg/m2) or equivalent. ▪ 75 mm Hebel Power Panel XL (33 kg/m2), 25 mm furring channel fixed to 90 mm timber stud with minimum R2.0 insulation in the cavity, standard 10 mm plasterboard (5.7 kg/m2) as the internal lining. ▪ 9 mm cement board (min 12.5 kg/m2) fixed to a 90 mm timber frame with R2.0 fibrous insulation and an internal lining of 10 mm Soundchek plasterboard (9.3 kg/m2) or equivalent. ▪ Cemintel textured base sheet (7.5 mm), with sarking and 1 layer of 13 mm Fyrchek MR plasterboard fitted to the external of a 90 mm steel stud frame with R1.5 fibrous insulation and an internal lining of 10 mm Gyprock Plus plasterboard (5.7 kg/m2).
FF Focus Area	28	▪ Metal Colorbond cladding (BTM 0.48) fixed to a 90 mm timber frame with R2.5 fibrous insulation and an internal lining of 10 mm standard plasterboard (5.7 kg/m2) or equivalent. ▪ 75 mm Hebel Power Panel XL (33 kg/m2), 25 mm furring channel fixed to 90 mm timber stud with minimum R2.0 insulation in the cavity, standard 10 mm plasterboard (7 kg/m2) as the internal lining. ▪ 9 mm cement board (min 12.5 kg/m2) fixed to a 90 mm timber frame with R2.0 fibrous insulation and an internal lining of 10 mm standard plasterboard (5.7 kg/m2) or equivalent. ▪ Cemintel textured base sheet (7.5 mm), with sarking and 1 layer of 13 mm Fyrchek MR plasterboard fitted to the external of a 90 mm steel stud frame with R1.5 fibrous insulation and an internal lining of 10 mm Gyprock Plus plasterboard (5.7 kg/m2).
FF Quiet Rooms and Pods	38	▪ CSR 5165 - Cemintel textured base sheet (7.5 mm) or weatherboard cladding, with sarking and 1 layer of 16 mm Fyrchek MR plasterboard fitted to the external of 19 – 35 mm battens fixed to a 70 mm steel stud frame with min R1.5 fibrous insulation and an internal lining of 10 mm Gyprock superchek plasterboard (10.4 kg/m2). ▪ Metal Colorbond cladding (BTM 0.48) fixed to a 90 mm timber frame with R2.5 fibrous insulation and an internal lining of 16 mm fire rated plasterboard (13 kg/m2) or equivalent and one layer of 13 mm plasterboard (13 kg/m2). ▪ 9 mm cement board (min 12.5 kg/m2) fixed to a 90 mm timber frame with R2.0 fibrous insulation and an internal lining of 10 mm standard plasterboard (5.7 kg/m2) or equivalent.

7.2 Roof and Ceiling

Standard metal deck roofing with insulation of min R2.5 fibrous batts and Bradford Anticon 60 MD insulation over battens, with internal lining of standard 10 mm plasterboard will be adequate to meet the requirements for all rooms with the exception of the rooms listed in Table 5.

Table 5 Recommended Roof and Ceiling Construction

Room	Min Required Rw	Suitable Metal Deck Construction
GL Large Studio	41	CSR 6425 – Pitched steel roof (22.5 degrees nominal) of min 0.42 mm with minimum R3.0 fibrous batts within the cavity and Bradford Anticon 60 MD R1.3 insulation over battens, framing at 450 mm centres and 1 x 13 mmGyprock Fyrchek Plasterboard.
FF Large Studio 66m2	51	CSR 6440 – Pitched steel roof (22.5 degrees nominal) of min 0.42 mm with minimum R4.1 fibrous batts within the cavity and Bradford Anticon 60 MD R1.3 insulation over battens and 2 x 16 mm Gyprock Fyrchek Plasterboard.
FF Large Studio 59m2	49	CSR 6440 – Pitched steel roof (22.5 degrees nominal) of min 0.42 mm with minimum R4.1 fibrous batts within the cavity and Bradford Anticon 60 MD R1.3 insulation over battens and 2 x 16 mm Gyprock Fyrchek Plasterboard.
FF Large Studio 52m2	51	CSR 6440 – Pitched steel roof (22.5 degrees nominal) of min 0.42 mm with minimum R4.1 fibrous batts within the cavity and Bradford Anticon 60 MD R1.3 insulation over battens and 2 x 16 mm Gyprock Fyrchek Plasterboard.
FF Collab Area	44	CSR 6425 – Pitched steel roof (22.5 degrees nominal) of min 0.42 mm with minimum R3.0 fibrous batts within the cavity and Bradford Anticon 60 MD R1.3 insulation over battens, framing at 450 mm centres and 1 x 13 mmGyprock Fyrchek Plasterboard.
FF Quiet Rooms and Pods	43	CSR 6425 – Pitched steel roof (22.5 degrees nominal) of min 0.42 mm with minimum R3.0 fibrous batts within the cavity and Bradford Anticon 60 MD R1.3 insulation over battens, framing at 450 mm centres and 1 x 13 mmGyprock Fyrchek Plasterboard.

7.3 Glazing and Doors

The glazing is not specified and therefore required to meet the minimum R_w value presented in Table 6 below. Typical construction is presented however any glazing that meets the minimum required R_w value (inclusive of frame) will be sufficient.

Table 6 Glazing Schedule

Room	Minimum Required Rw	Typical Construction
GL Science	48	Specialty glazing required
GL Prep Room	48	Specialty glazing required
GL Technology	35	6.5 mm V-lam Hush - 8 mm argon - 4 mm Double Glazed
GL Art	34	6.38 mm Laminated - 8 mm argon - 4 mm Double Glazed
GL Collab Area and Focus Area	24	4 mm Single or 4 mm - 10 mm argon - 4 mm Double Glazed
GL Medium Studio	36	6.5 mm V-lam Hush - 8 mm argon - 4 mm Double Glazed
GL Food Technology	21	4 mm Single or 4 mm - 10 mm argon - 4 mm Double Glazed
GL Collab & Semi Collab Area & Library	30	6.38 mm Laminated or 6 mm - 12 mm - 6 mm Double Glazed
GL Large Studio	32	6 mm - 8mm argon - 4 mm Double Glazed
FF Large Studio 66m2	46	Specialty glazing required
FF Large Studio 59m2	42	Specialty glazing required
FF Large Studio 52m2	43	Specialty glazing required
FF Collab Area	35	6.38 mm Laminated - 8 mm argon - 4 mm Double Glazed
FF Focus Area	27	4 mm Single or 4 mm - 10 mm argon - 4 mm Double Glazed
FF Quiet Rooms and Pods	43	Specialty glazing required

The R_w rating for glazing is particularly dependent on frame material and quality of construction as well as effective resilient mounting of the glass, plus the mass of the glass and the size of the air gap in the case of double glazing. Technically an R_w rating for a glazed window or door is specific to a product which has been through a test process to obtain the R_w rating. Extrapolation of an R_w value to other products in the range is often done but is not advised, because conditions in both manufacturing and installation will vary from ideal laboratory conditions.

The main features required for good acoustic performance are an adequate glass section, a good resilient seal between glass and frame, and between fixed and openable frames. Good acoustic performance is achieved by either maximising the airgap between panes (where double glazing is used), or using panes of greater than standard thickness. In addition, good

quality frames with adequate mass are necessary. To gain the benefit of the rating, care should be taken with installation. All windows must be flush fitting with the walls and any gaps filled with a suitable material, such as rubber strip or mastic. Expanding foam types of fillers are not suitable to seal between frames and the external face of the brickwork as they have little density and result in a closed cell which is not suited to acoustic absorption.

Where specialty glazing is specified the glazing is likely to require a 100 mm gap between panes of glass and a uPVC frame.

Any external doors must achieve the minimum required R_w values in Table 6.

7.4 Ventilation

To meet attenuation requirements, all doors and windows would theoretically have to remain closed, so cooling systems such as an evaporative cooler is typically not suited to noise exposed buildings if windows are required to be open.

Split system air conditioning would be better suited, if required.

A forced mechanical ventilation system may be necessary for the following rooms.

- GL Science
- GL Prep Room
- GL Technology
- GL Art
- GL Medium Studio
- FF Large Studio 66m2
- FF Large Studio 59m2
- FF Large Studio 52m2
- FF Collab Area
- FF Quiet Rooms and Pods

Fresh air would be from forced ventilation likely using silencers/attenuators or drawn from a non-external source.

8 Summary

Audiometric and Acoustic Services (A&AS) has completed an external traffic noise intrusion assessment for a proposed extension of a school campus located at 769-797 High Street, Melton West, VIC 3337.

The external noise levels have been addressed by application of AS3671 – 1989: Acoustics - Road Traffic Noise Intrusion – Building Siting and Construction and AS2107 – 2016: Acoustics - Recommended design sound levels and reverberation times for building interiors.

Recommendations are provided in Section 7.

Please feel free to contact us should any additional detail be required. This applies to any parties that have legitimate access to this report.

Respectfully,

S. Henderson
Principal Acoustic Consultant
M.A.A.S.

Reviewed by R. Feltwell, Acoustic Consultant.

9 References

Standards Australia. (1989). AS 3671:1989 Acoustics – Road Traffic Noise Intrusion – Building Siting and Construction.

Standards Australia. (2016). AS/NZS 2107:2016 Acoustics - Recommended Design Sound Levels and Reverberation Times for Building Interiors.

Appendix A Definitions of Terminology

Sound Pressure Level:
The root-mean-square values of the pressure fluctuations above and below atmospheric pressure caused by the passage of a sound wave, usually expressed in deci Bels (re 20 µ Pa)

decibel: Unit usually used to define sound pressure level relative to a reference pressure.

$$dB = 20 \log_{10} \left(\frac{P}{Pref} \right)$$

(A): Reference to particular weighting network within a Sound Level Meter which modifies the linear response. 'A' weighting is designed to approximate the response of the human ear.

R_w Weighted Sound Reduction Index. A single figure rating of the acoustic attenuation of materials either singly or as multiples.

L_{10} The noise level exceeded for 10% of a measurement period. Often used as a measurement of occasional interruptive noise, such as traffic.

$L_{A1018hr}$ The 18 hour Traffic Noise average. Arithmetic average of the A weighted L_{10} sound levels from 0600hrs to 0000hrs.

L_{90} The noise level exceeded for 90% of a measurement period. Commonly accepted as the natural Background Noise Level.

L_{eq}: Equivalent Continuous Sound Level. This is calculated on the basis of average of the Sound Pressure Level (acoustic energy) over a period of time and is expressed in deci Bels.

L_{Aeq}: The 'A' weighted Equivalent Continuous Sound Level.

$L_{Aeq(8hr)}$ The LAeq for the night period between 10pm and 6am.

$L_{Aeq(16hr)}$ The LAeq for the day period between 6am and 10 pm.

L_{Amax} The root-mean-square (rms) maximum sound pressure level measured with sound level meter using the 'A' frequency weighting and the 'F' (Fast) time weighting. Often used for noise assessments other than aircraft.

Fast - F: Dynamic characteristic - time averaging constant is 125m sec.

Appendix B Instrumentation

Equipment Used

Convergence	Sound Sentry NSRT MK3 Type 1
	Serial No. CHLWh326cf+fqpnSyyJxt
B&K4230	Sound Level Calibrator
	Serial No. 1441408

NATA Laboratory calibration due 21/02/2025

The equipment was check calibrated before and after the measurements. No significant change was found to have occurred.

Appendix C Floor Plans

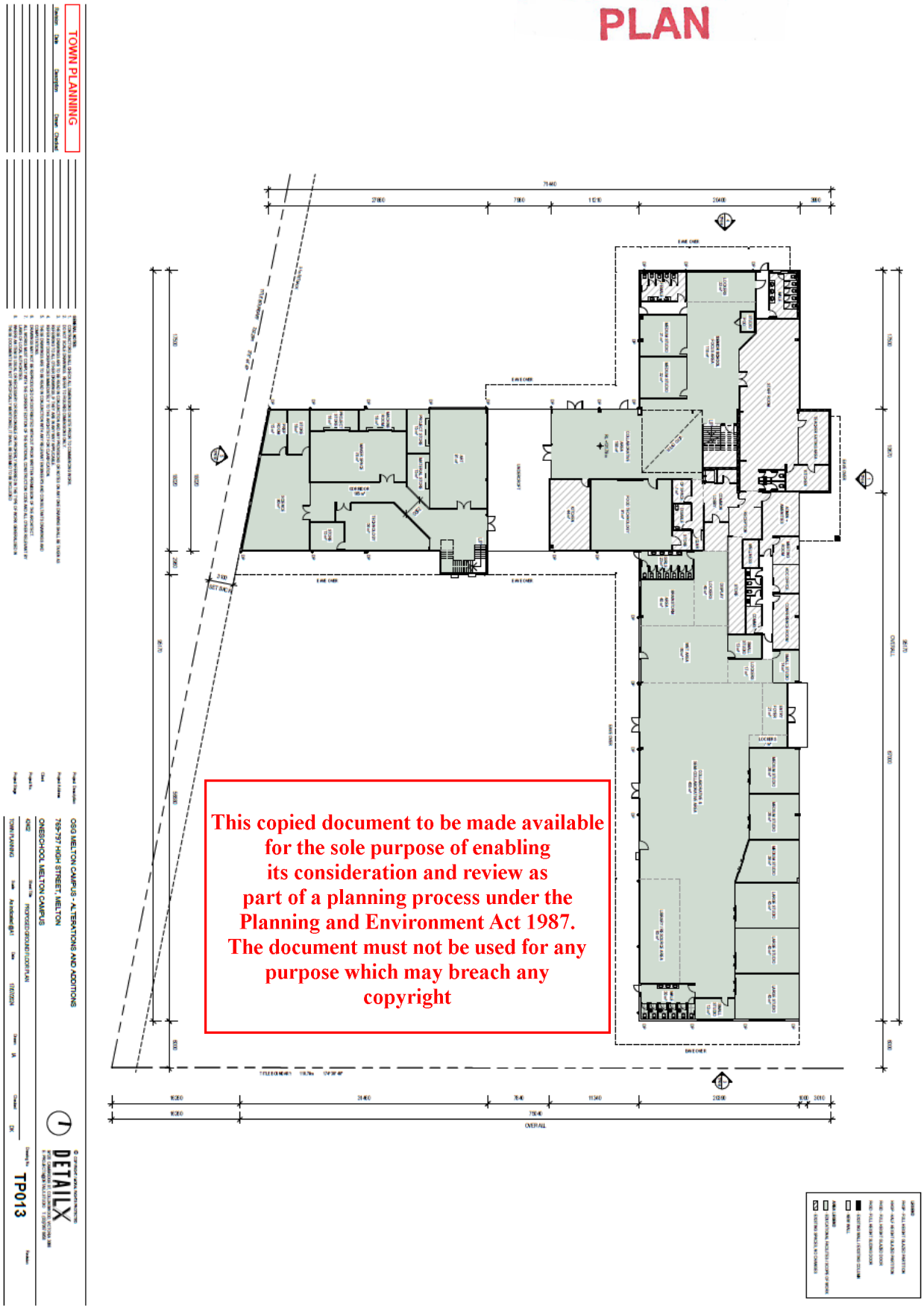

Figure 3 Proposed Ground Floor

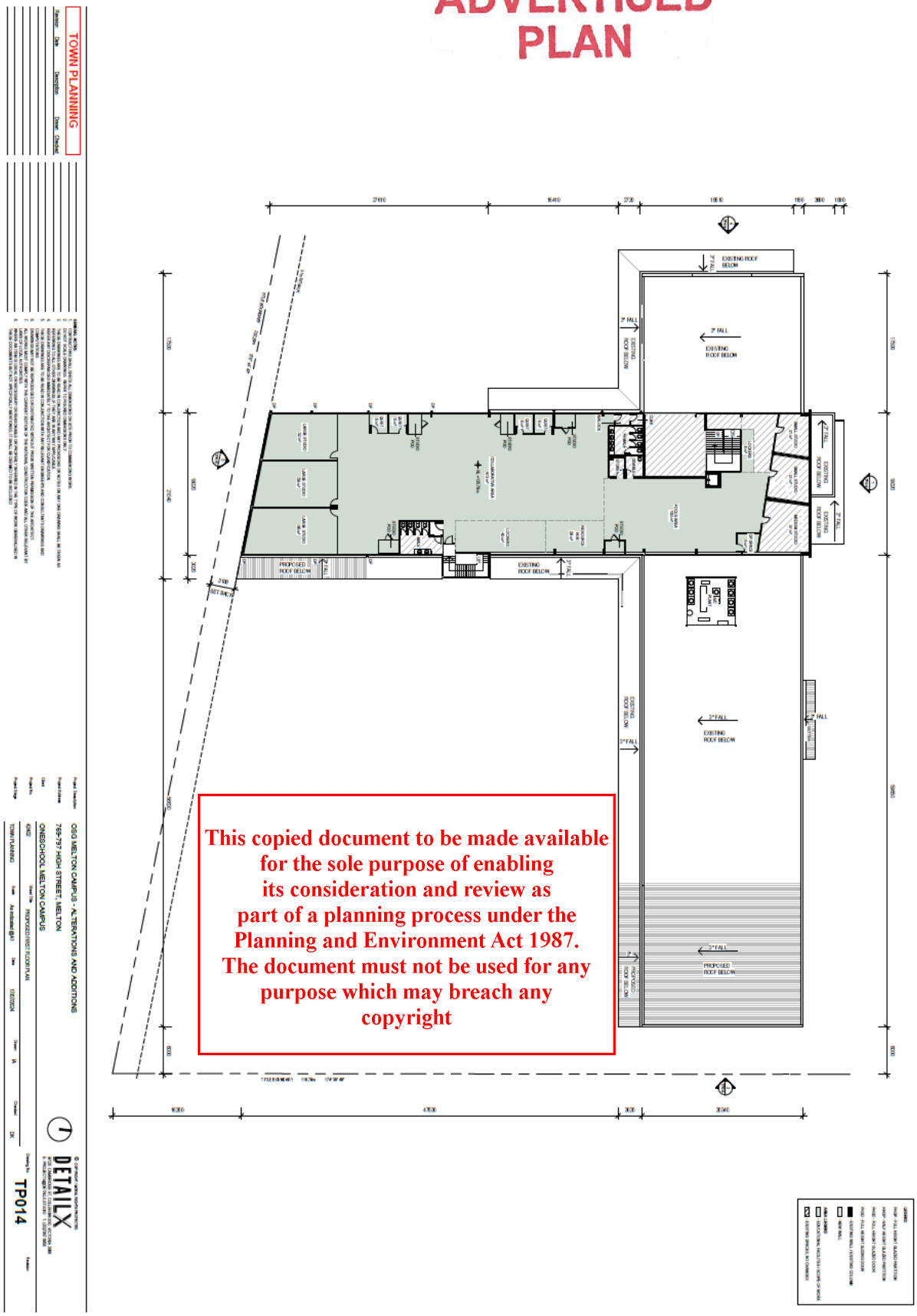

Figure 4 Proposed First Floor

Appendix D Specialty Glazing

Specialty glazing options are presented below is Figure 5 and Figure 6. Note that the R_w value presented is for the glass only and manufactures should present laboratory test data or an equivalent to justify attenuation. Typically, in frame attenuation data is 3-5 dB less than the R_w presented in the figures below.

Frequency Hz	8.5mm Hush 16mm Gap 12.5mm Hush	4mm VFloat 16mm Gap 8.5mm Hush	5mm VFloat 16mm Gap 8.5mm Hush	6mm VFloat 16mm Gap 8.5mm Hush	8mm VFloat 16mm Gap 8.5mm Hush	8mm VFloat 16mm Gap 10.5mm Hush	10mm VFloat 16mm Gap 10.5mm Hush	10mm VFloat 16mm Gap 12.5mm Hush
100	27.4	26.8	24.3	27.2	28.4	28.2	31.3	30.9
125	23.9	23.3	22.8	23.7	21.3	23.9	29.7	30.3
160	29.3	22.8	19.6	22.9	21.9	23.6	27.8	27.6
200	32.1	23	22.7	22.6	24.2	28	27.5	29
250	38.7	28.3	26.6	27.8	30.9	31.5	36.6	37.9
315	42.5	30.3	31.4	31.7	36.1	38.8	39.9	39.7
400	45.2	32.7	36.1	37.8	39.8	40	43.3	42.9
500	46	35.5	38	39.9	41.5	41.1	44.1	44.2
630	47.9	39.9	41.5	42.9	44.4	43.8	46.4	46.2
800	49	44.2	45	46.3	46.9	45.9	45.8	45.9
1000	49.7	47.5	47.6	48.3	48.2	47.5	44.3	44.3
1250	50.1	50.4	50.3	48.4	45.4	44.9	43.8	43.2
1600	50.5	51	49.6	48.2	45	43.9	44.2	43.3
2000	52.1	51.3	46.5	44.3	46.5	45.3	46.7	47.3
2500	55.1	50.3	44.5	45.4	48.4	49.3	51.1	52.1
3150	59.9	47.6	48.3	50.1	52.4	54.4	56.6	57.2
4000	64.7	52.8	54.9	55.8	58.1	59.4	61.9	62.5
5000	69	58.6	60.6	61	63	63.7	65.6	66.3
R_w	47	39	40	41	42	43	44	45
C	-2	-1	-3	-3	-3	-2	-1	-2
C_{tr}	-7	-5	-7	-7	-7	-6	-5	-6
STC	47	39	40	41	42	43	45	45

Table A6. Sound Attenuation for VLam Hush Double Glazing

Figure 5 Specialty Glazing Options (Image Source: CSR Viridian)

Frequency Hz	6mm 100mm Gap 4mm	6mm 150mm Gap 4mm	10mm 200mm Gap 6mm
100	25	27	32
125	27	30	37
160	27	30	39
200	33	34	45
250	33	34	46
315	37	39	46
400	41	42	47
500	46	46	45
630	50	50	45
800	54	54	44
1000	57	57	45
1250	59	58	50
1600	58	58	53
2000	52	52	58
2500	51	49	58
3150	48	47	64
4000	57	52	64
R_w	46	47	49
C	-2	-2	-1
C_{tr}	-7	-6	-4
STC	46	47	49

Table A5. Sound Attenuation for Wide Air Gap Double Glazing

Figure 6 **Specialty Glazing Options with >100 mm Gap(Image Source: CSR Viridian)**