

# 8. Technical Investigation

## 8.1 Introduction

In this chapter the technical resolution will be discussed. The intervention addressed detailing in a way that informs users how the interior environment was made.

## 8.2 Design Innovations

### 8.2.1 Passive solar design

Most of the spaces of the building are either east or west facing. Through the design of fixed sun louvres the heat gain into these spaces are controlled. Right through the year the fenestration is shaded from direct sunlight. The louvres are rotated over the brickwork to shade the walls in the warmer months and to allow the sun to charge the brickwork in the cooler months, radiating the latent heat into the interior of the school (figure 8.2).

### 8.2.2 Natural daylight

The east-west orientation of the building led to sunlight that penetrates too deeply into the interior resulting in overexposure, glare and uncomfortable reflections from surfaces and screens. Through the addition of a louvre system this problem was diffused and indirect natural light penetrates the space. Thus the spaces are lit by natural light, without negatively affecting the usability of the classrooms.

The orientation of the theory spaces is designed in such a way that when students are facing the teaching wall, right handed individuals will not cast shadows from the natural light onto work surfaces when they write.

The windows in the classroom walls adjacent to the circulation and social learning spaces are double glazing. Blocking sound to travel between spaces but allowing light to penetrate.

### 8.2.3 Ventilation

The design makes use of a hybrid system of passive and mechanical ventilation. Stale air is drawn from the circulation routes through the stack effect into the atrium. Solar chimneys have been designed into the atrium roof to ventilate the spaces adjacent to the atrium while still complying with fire regulations. Fresh air is supplied through the old southern lift shaft, the exterior walls have been demolished and a water feature has been added into the shaft to further cool the fresh air. The solar chimneys will also receive mechanical extractor units which will kick in when the air flow is too slow.

### 8.2.4 Site

The site is located near major public transportation infrastructures and also close to social and affordable housing. Students can thus either walk, cycle or make use of public transport to reach the school.

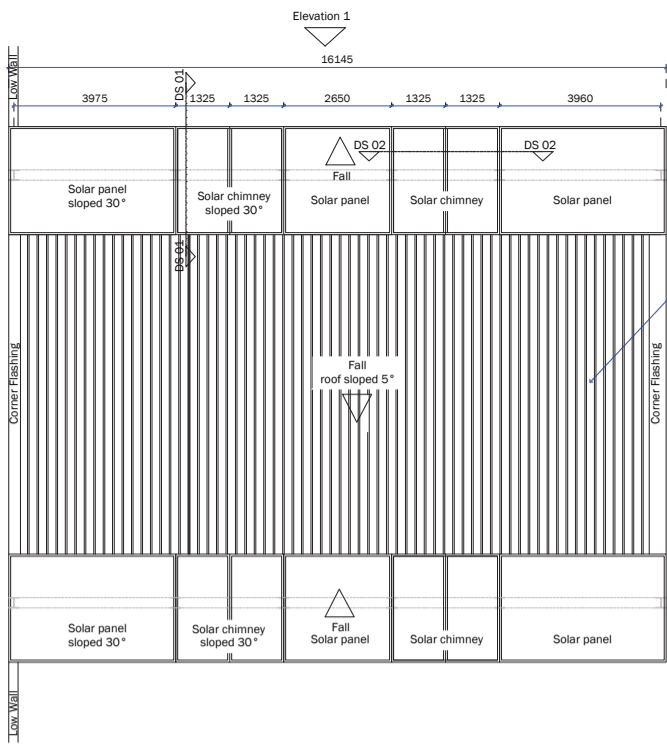
The site is also located near sport, theatre and informal Science facilities, thus school excursions and extra-curricular activities become more accessible.

The western facade of the building is shaded by neighbouring buildings, reducing the heat gain in the afternoons.

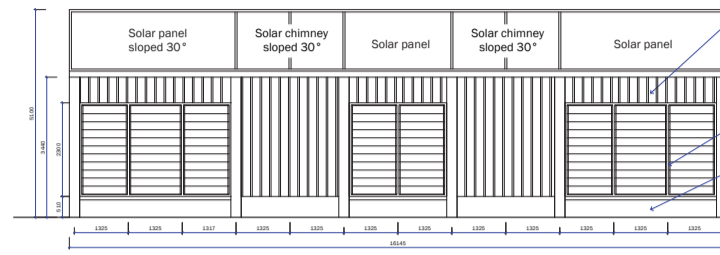
### 8.2.5 Rain water collection

The water from the atrium roof will be collected as irrigation water for the food garden and aquaponics. These water tanks will be stored on the roof.

The southern half of the existing roof will be drained into a collection point in the basement.



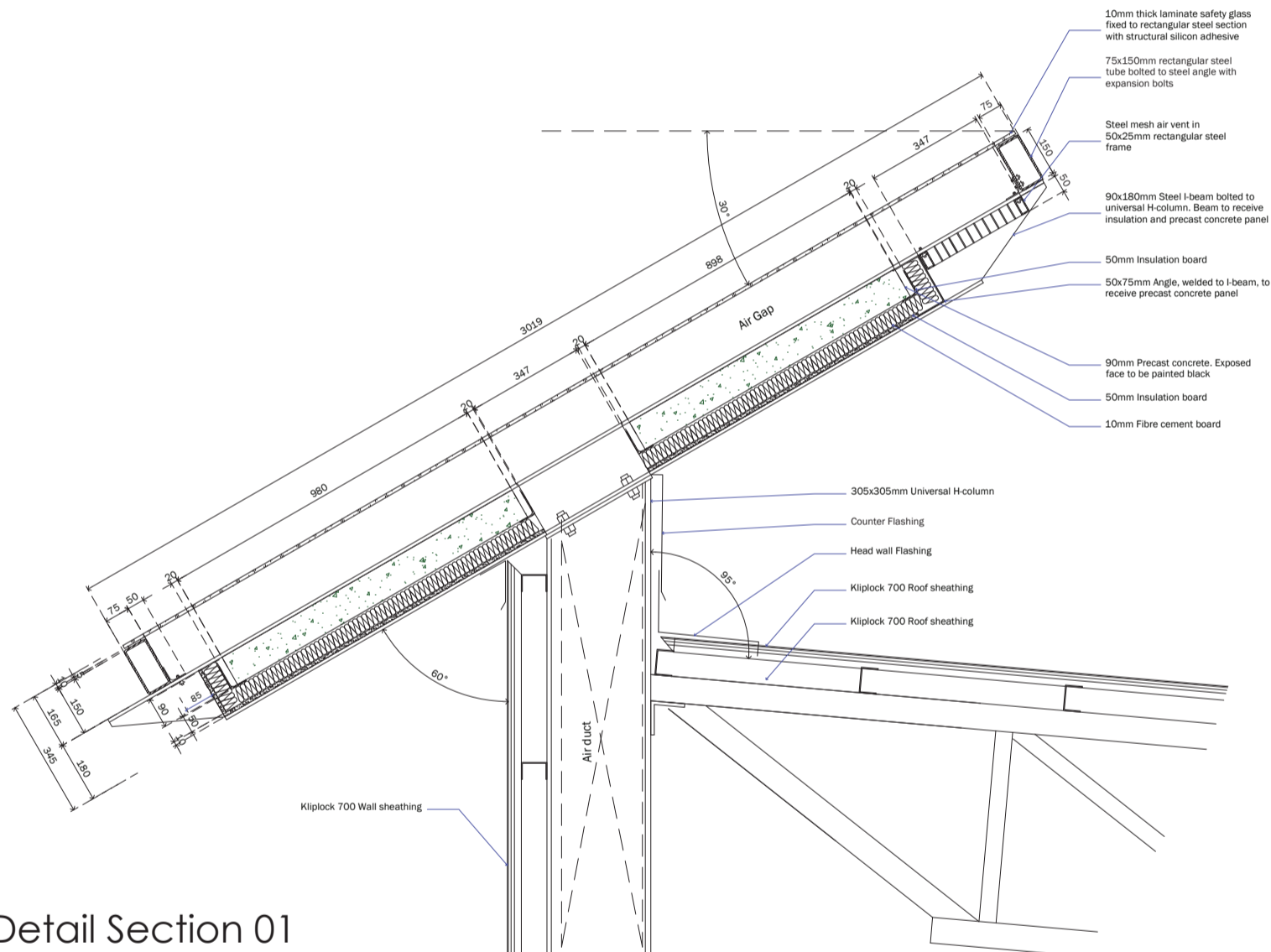
Roof Sheeting to be Klip-Lok 700 profile roll-formed from Clean Colorbond AZ150, Cape-Charcoal-AZ150 0.53mm G550 fixed to steel purlins using KL700 clips and class 3 fasteners, all in accordance with manufacturer's specifications.



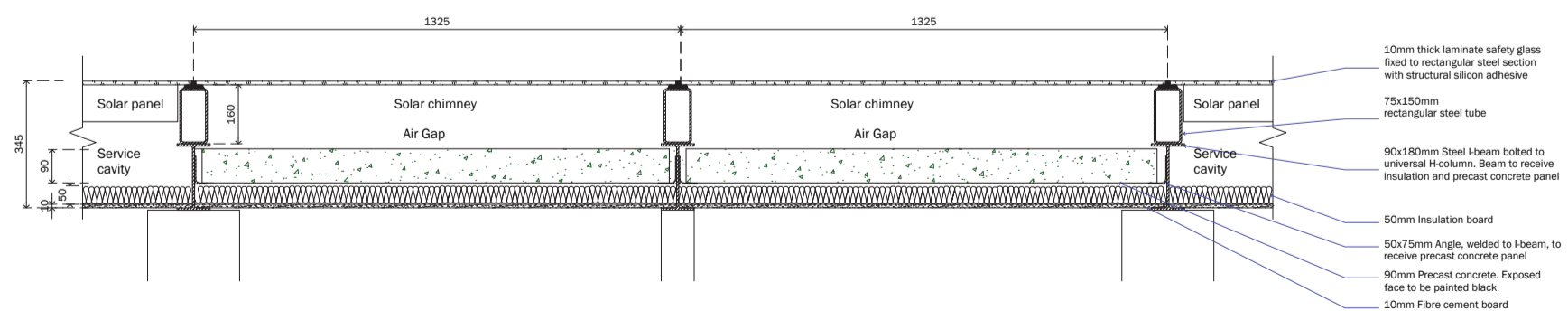
Wall cladding to be Klip-Lok 700 profile roll-formed from Clean Colorbond AZ150, Cape-Charcoal-AZ150 0.53mm G550 fixed to steel purlins using KL700 clips and class 3 fasteners, all in accordance with manufacturer's specifications. Automated, aluminium frame, louvre windows. Low brick wall. 305x305mm H Columns. Hot-rolled structural steel, base and head plates welded to columns. Base plate chemically anchored with levelling nuts to existing concrete slab. Head plate bolted to solar chimney above. All structural steel to be 2 hour fire protected with a intumescent finish, colour to match Interpon D2525 powder coating, Charcoal QQL258

Elevation 1

Plan of Atrium Roof



Detail Section 01



Detail Section 02

Figure 8.1 Design innovation - Solar chimney



## 8.3 Acoustics

### The classrooms and laboratories:

Here the drywall partitioning is from Lafarge's LPF 64-120/1 system. These walls are 115mm thick and can reach a sound insulation reduction index of 53dB where the standard 88mm thick drywalling only has a 38dB sound reduction index (Lafarge: 30-34).

The classrooms' interior windows are double glazing. All theory spaces will receive an acoustic absorbent ceiling, except at the front of the classroom, in order to aid sound reflection of the teacher's voice. The back walls of the classrooms will receive acoustic absorbent panels to prevent sound bouncing back to the front. The floor finishes in the classrooms are Marmoleum Decibel, thus reducing impact sounds traveling between levels. The theory spaces are designed for speech clarity from a sound source at the front of the classroom.

**The social learning spaces:** The approach was to minimise sound reverberation. The floors will receive a carpet tile with an Eco Rubber underlay finish and acoustic absorbent ceilings.

**The atrium:** The volume of the atrium allows sound to travel up. Therefore events happening in the atrium will be audible in the social learning spaces to encourage observation. Sound will be diffused by the angles of the raked seating. The riser on the raked seating will receive carpet cladding to help reduce sound reflections. The ceiling of the atrium will also help to absorb sound.

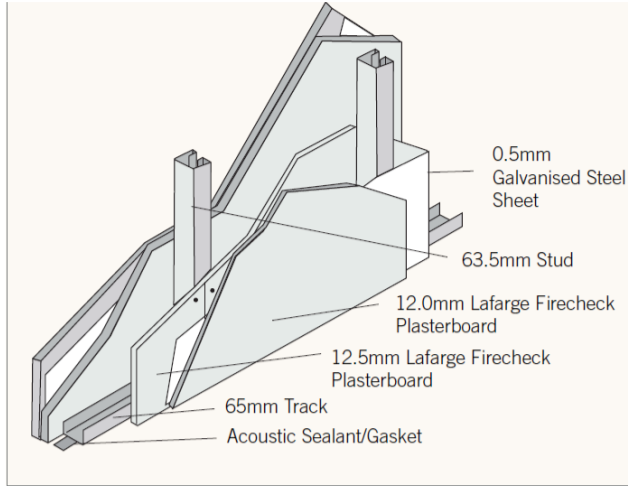


Figure 8.3: Sound insulation wall (Lafarge:7) sound insulation reduction index of 53dB



Figure 8.4: 63mm Glasswool cavitybatt by Isover.- Aids reduction of sound transmittance



Figure 8.5: Acoustic absorbent wall panels edge track FS110 by Fabricmate



Figure 8.6: 600X600mm Drop in ceiling panels, Cosmos 68/N (Needled) with 49 dB sound reduction index by OWA



Figure 8.7 Marmoleum Decibel, Dove Grey and Dove Blue with impact sound reduction of 17dB

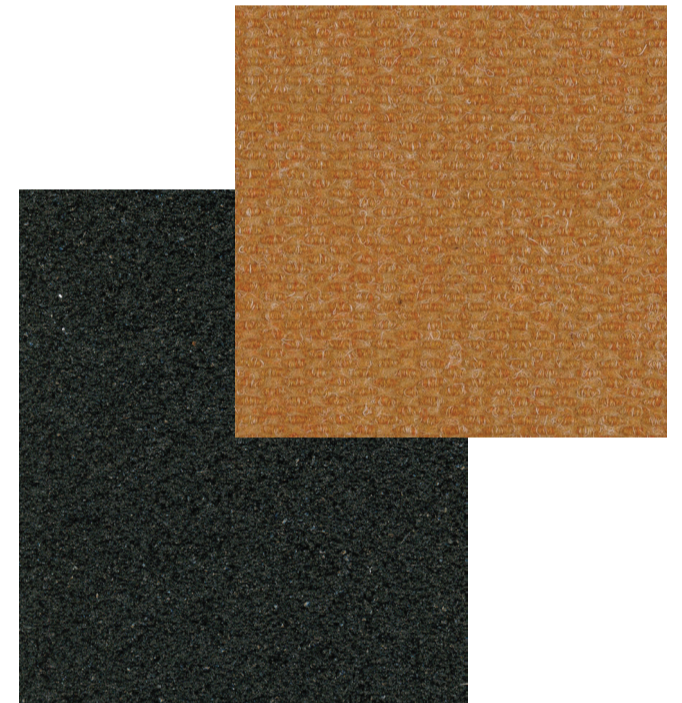


Figure 8.8 Carpet tile by Van Dyck

# 8.4 Artificial Lighting



	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	22	
<b>E (Lux Needed: lx)</b>	150	350	2,47	8,4	91,6	150	350	1,5	100	2,1	100	100	1,7	500	100	500	100	500	100	200	
<b>A (Surface Area: m²)</b>	97,27	97,27	97,27	66,22	66,22	90,73	90,73	90,73	38	42,5	52	41	60,72	65,72	12	65,72	12	56	8,58	22,68	
<b>E * A</b>	14590,5	34044,5	240,257	556,248	6065,75	13609,5	31755,5	136,095	3800	89,25	5200	4100	103,224	32860	1200	32860	1200	28000	858	4536	
<b>F (Lumens: lm)</b>	3050	3050	2,7	350	3050	3050	3050	2,7	3050	2,7	3050	3050	2,7	3050	3050	3050	3050	3050	3050	3050	3050
<b>R (Room Index)</b>	13,7	13,7	13,7	7,7	7,7	10,55	10,55	10,55	12,5	12,5	8,8	13,2	13,2	10,6	6	10,6	6	10	3,9	5,4	
<b>Width (m)</b>	4,32927	4,32927	4,32927	1,65385	1,65385	5,2439	5,2439	5,2439	0,57143	0,57143	1,27731	0,77311	0,77311	4,13333	1,33333	4,13333	1,33333	3,73333	1,46667	2,33333	
<b>Height (2h)</b>	7,1	7,1	7,1	8,6	8,6	8,6	8,6	8,6	3,4	3,4	7,6	4,6	4,6	6,2	2	6,2	2	5,6	2,2	4,2	
<b>U (Utilization Factor)</b>	1,64	1,64	1,64	5,2	5,2	1,64	1,64	1,64	5,95	5,95	5,95	5,95	5,95	1,5	1,5	1,5	1,5	1,5	1,5	1,8	
<b>M (Maintenance Factor)</b>	0,5	0,5	0,5	0,45	0,45	0,5	0,5	0,5	0,31	0,31	0,4	0,35	0,35	0,5	0,4	0,5	0,4	0,48	0,4	0,45	
<b>LLMF</b>	0,66148	0,66148	0,66148	0,44129	0,66148	0,66148	0,66148	0,66148	0,66148	0,52557	0,66148	0,66148	0,66148	0,66148	0,44129	0,66148	0,44129	0,66148	0,44129	0,66148	
<b>LMF</b>	0,89	0,89	0,89	0,7	0,89	0,89	0,89	0,89	0,89	0,8	0,89	0,89	0,89	0,89	0,7	0,89	0,7	0,89	0,7	0,89	
<b>LSF</b>	0,79	0,79	0,79	0,79	0,79	0,79	0,79	0,79	0,79	0,79	0,79	0,79	0,79	0,79	0,79	0,79	0,79	0,79	0,79	0,79	
<b>RSMF</b>	0,98	0,98	0,98	0,95	0,98	0,98	0,98	0,98	0,98	0,99	0,98	0,98	0,98	0,98	0,95	0,98	0,95	0,98	0,95	0,98	
<b>F*U*M</b>	0,96	0,96	0,96	0,84	0,96	0,96	0,96	0,96	0,96	0,84	0,96	0,96	0,96	0,96	0,84	0,96	0,84	0,96	0,84	0,96	
<b>n = E*A / F*U*M</b>	1008,75	1008,75	0,89299	69,5038	907,876	1008,75	1008,75	0,89299	625,426	0,4399	807,001	706,126	0,6251	1008,75	538,379	1008,75	538,379	968,402	538,379	907,876	
<b>n (Number of Lamps)</b>	14,4639	33,7491	269,047	8,00313	6,68125	13,4914	31,48	152,403	6,07586	202,886	6,44361	5,80633	165,133	32,5749	2,22891	32,5749	2,22891	28,9136	1,59367	4,99627	
	15	34	7,1m	8	6	14	32	4m	6	5,5m	6	6	4m	33	3	33	3	29	2	5	

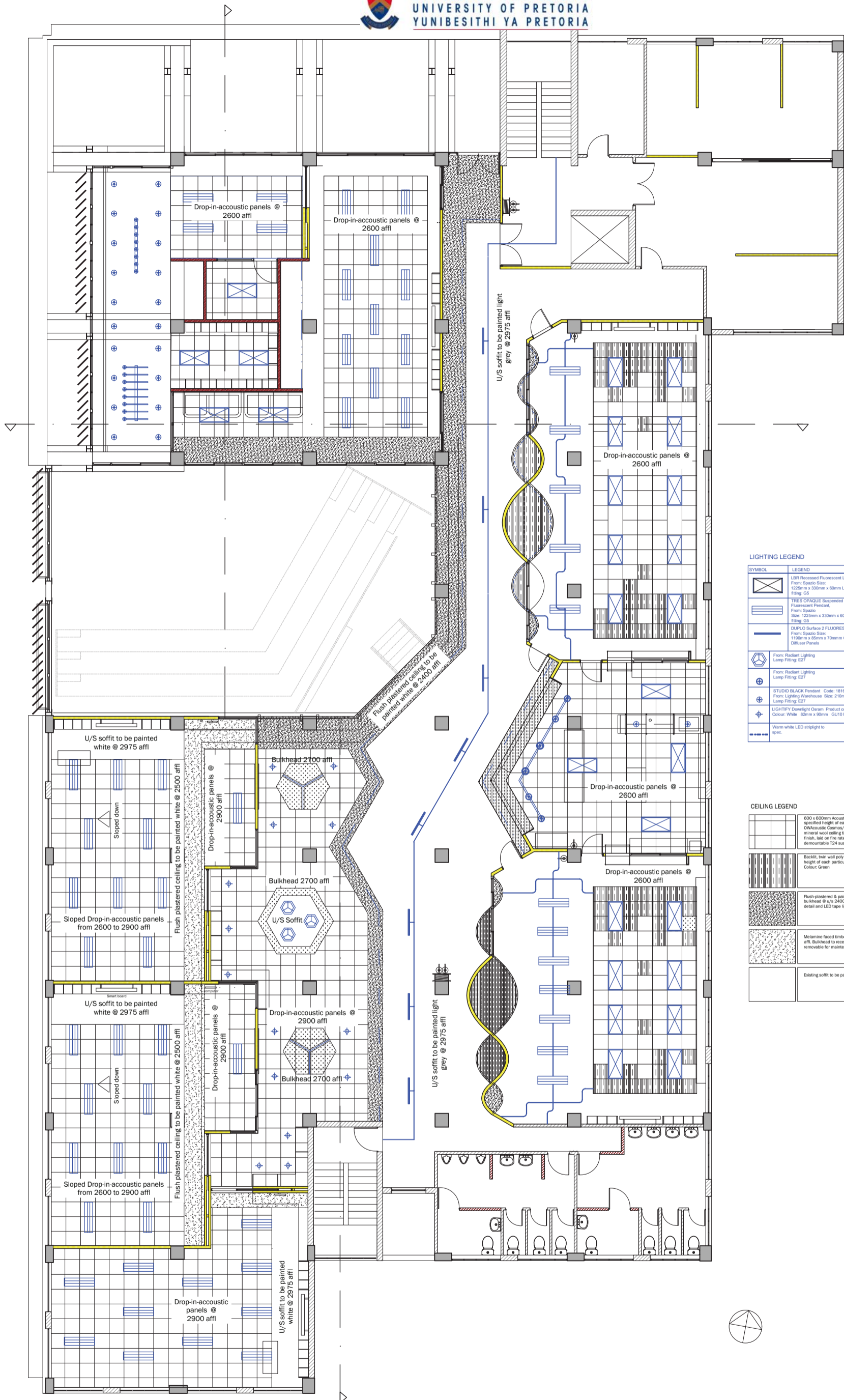
Figure 8.9 Lighting Calculations

Programme	Spatial zone	Number of lamps	Lamp Identification	Lamp specification	Luminaire Identification	Luminaire specification	Advantages
1. Science Laboratory (A)	125lx (Total 500lx)	N=15		T5 HE XT fluorescent tube, Osram Product code: 35W/865 base G5 16mm diameter LUMILLUX cool daylight Colour Temp: 6500K Colour rendering (Ra) = 80-89 Lifespan: 45 000h Energy efficiency class A+		TRES OPAQUE Suspended Fluorescent Pendant, From: Spazio Size: 1225mm x 330mm x 60mm Lamp fitting: G5	<ul style="list-style-type: none"> <li>Extremely long service life</li> <li>Low premature failure</li> <li>Dimmable for lower energy consumption</li> <li>Good colour rendering</li> <li>Uniform illumination</li> </ul>
2. Science Laboratory (A)	375lx (Total 500lx)	N=34 (lamps); 11 (luminaires)		T5 HE XT fluorescent tube, Osram Product code: 35W/865 base G5 16mm diameter LUMILLUX cool daylight Colour Temp: 6500K Colour rendering (Ra) = 80-89 Lifespan: 45 000h Energy efficiency class A+		LBR Recessed Fluorescent Luminaire, From: Spazio Size: 1225mm x 330mm x 60mm Lamp fitting: G5	<ul style="list-style-type: none"> <li>Extremely long service life</li> <li>Low premature failure</li> <li>Dimmable for lower energy consumption</li> <li>Good colour rendering</li> <li>Uniform illumination</li> <li>Modular</li> </ul>
3. Science Laboratory (A)	500lx (Together With General Lighting)	N= 7,1m (3,2m + 1,2m + 1,2m + 1,5m)		DECO FLEX RGB LED strip lights, Osram 3,6W/640mm 50mm cut intervals	(No luminaire; Plexiglass ceiling)	N/A	<ul style="list-style-type: none"> <li>Suitable for curved illumination</li> <li>Dimmable for energy efficiency</li> <li>Colour change suitable for chronobiologically-adaptive LED lighting for improved well-being and productivity</li> </ul>
5. Store Room (Science)	100lx	N=8 (lamps)		LIGHTIFY PAR16 TW LED, Osram GU10 base 50mm diameter TUNABLE WHITE Colour Temp: 2700 - 6500K Colour rendering (Ra) = 80-89 Lifespan: 20 000h efficiency class A		MIO SPOT TRACK, for LED From: Spazio Product code: 4127.1 Colour: Silver Lamp fitting: GU10	<ul style="list-style-type: none"> <li>Adjustable colour temperature controllable via smart devices (iOS; Android)</li> <li>Dimmable via LIGHTIFY app; enhances energy efficiency</li> <li>Good colour rendering</li> <li>Allows teachers/learners to adapt environment; enhances comfort; allows versatility for chemical storage lighting needs.</li> </ul>
5. Store Room (Science)	100lx	N=6 (lamps); 2 (luminaires)		T5 HE XT fluorescent tube, Osram Product code: 35W/865 base G5 16mm diameter LUMILLUX cool daylight Colour Temp: 6500K Colour rendering (Ra) = 80-89 Lifespan: 45 000h Energy efficiency class A+		LBR Recessed Fluorescent Luminaire, From: Spazio Size: 1225mm x 330mm x 60mm Lamp fitting: G5	<ul style="list-style-type: none"> <li>Extremely long service life</li> <li>Low premature failure</li> <li>Dimmable for lower energy consumption</li> <li>Good colour rendering</li> <li>Uniform illumination</li> <li>Modular</li> </ul>
6. Science Laboratory (B)	125lx (Total 500lx)	N=14 (luminaires); 7 (luminaires)		T5 HE XT fluorescent tube, Osram Product code: 35W/865 base G5 16mm diameter LUMILLUX cool daylight Colour Temp: 6500K Colour rendering (Ra) = 80-89 Lifespan: 45 000h Energy efficiency class A+		TRES OPAQUE Suspended Fluorescent Pendant, From: Spazio Size: 1225mm x 330mm x 60mm Lamp fitting: G5	<ul style="list-style-type: none"> <li>Extremely long service life</li> <li>Low premature failure</li> <li>Dimmable for lower energy consumption</li> <li>Good colour rendering</li> <li>Uniform illumination</li> </ul>
7. Science Laboratory (B)	375lx (Total 500lx)	N=32 (lamps); 11 (luminaires)		T5 HE XT fluorescent tube, Osram Product code: 35W/865 base G5 16mm diameter LUMILLUX cool daylight Colour Temp: 6500K Colour rendering (Ra) = 80-89 Lifespan: 45 000h Energy efficiency class A+		LBR Recessed Fluorescent Luminaire, From: Spazio Size: 1225mm x 330mm x 60mm Lamp fitting: G5	<ul style="list-style-type: none"> <li>Extremely long service life</li> <li>Low premature failure</li> <li>Dimmable for lower energy consumption</li> <li>Good colour rendering</li> <li>Uniform illumination</li> <li>Modular</li> </ul>
8. Science Laboratory (B)	500lx (Together With General Lighting)	N= 4m (2m + 2m)		DECO FLEX RGB LED strip lights, Osram 3,6W/640mm 50mm cut intervals	(No luminaire; Plexiglass ceiling)	N/A	<ul style="list-style-type: none"> <li>Suitable for curved illumination</li> <li>Dimmable for energy efficiency</li> <li>Colour change suitable for chronobiologically-adaptive LED lighting for improved well-being and productivity</li> </ul>
9. Corridor (Section A)	100lx	N=6 (lamps); 3 (luminaires)		T5 HE XT fluorescent tube, Osram Product code: 35W/865 base G5 16mm diameter LUMILLUX cool daylight Colour Temp: 6500K Colour rendering (Ra) = 80-89 Lifespan: 45 000h Energy efficiency class A+		DUPLO Surface 2 FLUORESCENT From: Spazio Size: 1190mm x 85mm x 70mm Opal Diffuser Panels	<ul style="list-style-type: none"> <li>Surface-mounted illumination to existing structure</li> <li>Suitable for continuous linear applications (such as corridors).</li> <li>Extremely long service life</li> <li>Low premature failure</li> <li>Dimmable for lower energy consumption</li> <li>Good colour rendering</li> <li>Uniform illumination</li> </ul>
10. Corridor (Section A)	100lx	N= 5,5m (2m + 2m + 1,5m)		DECO FLEX RGB LED strip lights, Osram 3,6W/640mm 50mm cut intervals	(No luminaire; Plexiglass ceiling)	N/A	<ul style="list-style-type: none"> <li>Suitable for curved illumination</li> <li>Dimmable for energy efficiency</li> <li>Colour change suitable for chronobiologically-adaptive LED lighting for improved well-being and productivity</li> </ul>
11. Corridor (Section B)	100lx	N=6 (lamps); 3 (luminaires)		T5 HE XT fluorescent tube, Osram Product code: 35W/865 base G5 16mm diameter LUMILLUX cool daylight Colour Temp: 6500K Colour rendering (Ra) = 80-89 Lifespan: 45 000h Energy efficiency class A+		DUPLO Surface 2 FLUORESCENT From: Spazio Size: 1190mm x 85mm x 70mm Opal Diffuser Panels	<ul style="list-style-type: none"> <li>Surface-mounted illumination to existing structure</li> <li>Suitable for continuous linear applications (such as corridors).</li> <li>Extremely long service life</li> <li>Low premature failure</li> <li>Dimmable for lower energy consumption</li> <li>Good colour rendering</li> <li>Uniform illumination</li> </ul>
12. Corridor (Section C)	100lx	N=6 (lamps); 3 (luminaires)		T5 HE XT fluorescent tube, Osram Product code: 35W/865 base G5 16mm diameter LUMILLUX cool daylight Colour Temp: 6500K Colour rendering (Ra) = 80-89 Lifespan: 45 000h Energy efficiency class A+		DUPLO Surface 2 FLUORESCENT From: Spazio Size: 1190mm x 85mm x 70mm Opal Diffuser Panels	<ul style="list-style-type: none"> <li>Surface-mounted illumination to existing structure</li> <li>Suitable for continuous linear applications (such as corridors).</li> <li>Extremely long service life</li> <li>Low premature failure</li> <li>Dimmable for lower energy consumption</li> <li>Good colour rendering</li> <li>Uniform illumination</li> </ul>



13. Corridor (Section C)	100lx	N= 4m (2m + 2m)		DECO FLEX RGB LED strip lights, Osram 3.6W/640mm 50mm cut intervals	(No 12V		for curved illumination energy efficiency Colour change or chronobiologically-adaptive LED lighting for well-being and productivity	• Dimmable
14. Classroom (A)	500lx	N=33 (luminaires); 10 (luminaires)		T5 HE XT fluorescent tube, Osram Product code: 35W/865 base 16mm diameter LUMILUX cool daylight Colour Temp: 6500K rendering (Ra) = 80-89 Lifespan: 45 000h Energy efficiency class A+	G5		TRES OPAQUE Suspended Fluorescent Pendant, From: Spazio Size: 1225mm x 330mm x 60mm Lamp fitting: G5	• Extremely long service life • Low premature failure • Dimmable for lower energy consumption • Good colour rendering • Uniform illumination
15. Classroom (A) Lobby	100lx	N=3 (luminaires); 2 1 (luminaires)		T5 HE XT fluorescent tube, Osram Product code: 35W/865 base 16mm diameter LUMILUX cool daylight Colour Temp: 6500K rendering (Ra) = 80-89 Lifespan: 45 000h Energy efficiency class A+	G5		TRES OPAQUE Suspended Fluorescent Pendant, From: Spazio Size: 1225mm x 330mm x 60mm Lamp fitting: G5	• Extremely long service life • Low premature failure • Dimmable for lower energy consumption • Good colour rendering • Uniform illumination
16. Classroom (B)	500lx	N=33 (luminaires); 17 (luminaires)		T5 HE XT fluorescent tube, Osram Product code: 35W/865 base 16mm diameter LUMILUX cool daylight Colour Temp: 6500K rendering (Ra) = 80-89 Lifespan: 45 000h Energy efficiency class A+	G5		TRES OPAQUE Suspended Fluorescent Pendant, From: Spazio Size: 1225mm x 330mm x 60mm Lamp fitting: G5	• Extremely long service life • Low premature failure • Dimmable for lower energy consumption • Good colour rendering • Uniform illumination
17. Classroom (B) Lobby	100lx	N=3 (luminaires); 2 (luminaires)		T5 HE XT fluorescent tube, Osram Product code: 35W/865 base 16mm diameter LUMILUX cool daylight Colour Temp: 6500K rendering (Ra) = 80-89 Lifespan: 45 000h Energy efficiency class A+	G5		TRES OPAQUE Suspended Fluorescent Pendant, From: Spazio Size: 1225mm x 330mm x 60mm Lamp fitting: G5	• Extremely long service life • Low premature failure • Dimmable for lower energy consumption • Good colour rendering • Uniform illumination
18. Classroom (C)	500lx	N=29 (luminaires); 10 (luminaires)		T5 HE XT fluorescent tube, Osram Product code: 35W/865 base 16mm diameter LUMILUX cool daylight Colour Temp: 6500K rendering (Ra) = 80-89 Lifespan: 45 000h Energy efficiency class A+	G5		TRES OPAQUE Suspended Fluorescent Pendant, From: Spazio Size: 1225mm x 330mm x 60mm Lamp fitting: G5	• Extremely long service life • Low premature failure • Dimmable for lower energy consumption • Good colour rendering • Uniform illumination
19. Classroom (C) Lobby	100lx	N=1 (luminaires); 1 (luminaires)		T5 HE XT fluorescent tube, Osram Product code: 35W/865 base 16mm diameter LUMILUX cool daylight Colour Temp: 6500K rendering (Ra) = 80-89 Lifespan: 45 000h Energy efficiency class A+	G5		TRES OPAQUE Suspended Fluorescent Pendant, From: Spazio Size: 1225mm x 330mm x 60mm Lamp fitting: G5	• Extremely long service life • Low premature failure • Dimmable for lower energy consumption • Good colour rendering • Uniform illumination
20. Social Learning Spill-Out Space (student common room)	N/A	N/A		DECO FLEX RGB LED strip lights, Osram 3.6W/640mm 50mm cut intervals	12V		From: Radiant Lighting Lamp Fitting: E27	• Suitable for curved illumination • Dimmable for energy efficiency • Colour change suitable for chronobiologically-adaptive LED lighting for improved well-being and productivity
21. Social Learning Spill-Out Space (student common room)	N/A	N/A		LED STAR PAR16 LED reflector Osram Product code: 50 36* 5.5 W/827 GU10 base 230V 50mm diameter WARM WHITE Colour Temp: 2700K Colour rendering (Ra) = 80 Lifespan: 25 000h Energy efficiency class A			LIGHTIFY Downlight Osram Product code : Downlight TW TW Colour: White 82mm x 90mm GU10 holder designation	• Long lamp life proof • low energy consumption • Shock
22. Maker Space (Craft/Workshop)	200lx	N=5 (lamps); 3 (luminaires)		T5 HE XT fluorescent tube, Osram Product code: 35W/865 base 16mm diameter LUMILUX cool daylight Colour Temp: 6500K rendering (Ra) = 80-89 Lifespan: 45 000h Energy efficiency class A+	G5		TRES OPAQUE Suspended Fluorescent Pendant, From: Spazio Size: 1225mm x 330mm x 60mm Lamp fitting: G5	• Extremely long service life • Low premature failure • Dimmable for lower energy consumption • Good colour rendering • Uniform illumination
23. Maker Space (Craft/Workshop)	180lx generated (Total 500lx with other fittings and natural sunlight)	N=16 (lamps); x2 Luminaires.		MAXI GLOBE CFL (E27) Eurolux Code: G626 (Frosted) Colour: Warm White (2700K) Lamp Life: 6000hours+			HAYWIRE CHANDELIER by David Krynauw Lamp Fitting: E27 Dimmable Standard Size: x8 lamp shades/fittings Available in variety of powdercoating colours, timber and finishes.	• Ample Service life • Good colour rendering • Closer to natural daylight than other fluorescent options; warmer atmosphere • Most Energy Efficient compared to other lamp types to fit luminaire • South African designer; locally manufactured luminaire • Magnetic technical design solution for adaptability & versatility of space illumination • Exposed joints to show how luminaire works
24. Maker Space (Craft/Workshop)	250lx generated (Total 500lx with other fittings and natural sunlight)	N= 22 (lamps); 22 (luminaires)		MAXI GLOBE CFL (E27) Eurolux Code: G626 (Frosted) Colour: Warm White (2700K) Lamp Life: 6000hours+			STUDIO BLACK Pendant Code: 18166 From: Lighting Warehouse Size: 210mm Dia; 330m H Lamp Fitting: E27	• Ample Service life • Good colour rendering • Closer to natural daylight than other fluorescent options; warmer atmosphere • Most Energy Efficient compared to other lamp types to fit luminaire
25. Art Room	750lx	N= 32 (luminaires); 11 (luminaires)		T5 HE XT fluorescent tube, Osram Product code: 35W/865 base 16mm diameter LUMILUX cool daylight Colour Temp: 6500K rendering (Ra) = 80-89 Lifespan: 45 000h Energy efficiency class A+	G5		TRES OPAQUE Suspended Fluorescent Pendant, From: Spazio Size: 1225mm x 330mm x 60mm Lamp fitting: G5	• Extremely long service life • Low premature failure • Dimmable for lower energy consumption • Good colour rendering • Uniform illumination
26. Wash-up room	300lx	N=4 (lamps); 2 (luminaires)		T5 HE XT fluorescent tube, Osram Product code: 35W/865 base 16mm diameter LUMILUX cool daylight Colour Temp: 6500K rendering (Ra) = 80-89 Lifespan: 45 000h Energy efficiency class A+	G5		LBR Recessed Fluorescent Luminaire, From: Spazio Size: 1225mm x 330mm x 60mm Lamp fitting: G5	• Extremely long service life • Low premature failure • Dimmable for lower energy consumption • Good colour rendering • Uniform illumination • Modular
27. Workshop/Tool Shed	500lx	N=4 (lamps); 2 (luminaires)		T5 HE XT fluorescent tube, Osram Product code: 35W/865 base 16mm diameter LUMILUX cool daylight Colour Temp: 6500K rendering (Ra) = 80-89 Lifespan: 45 000h Energy efficiency class A+	G5		LBR Recessed Fluorescent Luminaire, From: Spazio Size: 1225mm x 330mm x 60mm Lamp fitting: G5	• Extremely long service life • Low premature failure • Dimmable for lower energy consumption • Good colour rendering • Uniform illumination • Modular
28. Storage/Stock Room	100lx	N=2 (lamps); 1 (luminaires)		T5 HE XT fluorescent tube, Osram Product code: 35W/865 base 16mm diameter LUMILUX cool daylight Colour Temp: 6500K rendering (Ra) = 80-89 Lifespan: 45 000h Energy efficiency class A+	G5		LBR Recessed Fluorescent Luminaire, From: Spazio Size: 1225mm x 330mm x 60mm Lamp fitting: G5	• Extremely long service life • Low premature failure • Dimmable for lower energy consumption • Good colour rendering • Uniform illumination • Modular

Figure 8.10 Lamp Quantities



**LIGHTING LEGEND**

SYMBOL	LEGEND
	LDR Reversed Fluorescent Luminaire. From: Spazio Size: 1225mm x 330mm x 60mm Lamp Fitting: G5
	TRES OPAQUE Suspended Fluorescent Pendant. From: Spazio Size: 1225mm x 330mm x 60mm Lamp Fitting: G5
	DUPLO Surface 2 FLUORESCENT. From: Spazio Size: 1195mm x 85mm x 70mm Opal Diffuser Panels
	From: Radiant Lighting Lamp Fitting: E27
	From: Radiant Lighting Lamp Fitting: E27
	STUDIO BLACK Pendant Code: 18166 From: Lighting Warehouse (Size: 210mm Dia; 330mm H) Lamp Fitting: E27
	LIGHTIFY Downlight Osram Product code: Downlight TW TW Colour: White (20mm x 80mm GU10 holder designation)
	Warm white LED strip light to spec

**CEILING LEGEND**

	600 x 600mm Acoustic suspended ceiling panels @ specified height of each particular room. OMAcoustic Cosmos/In Premium biologically absorbable mineral wool ceiling tiles, with Square-edge and white finish, laid on fire rated OMAconstruct E3 exposed demountable T24 suspension system.
	Backlit twin wall poly carbonate sheeting @ specified height of each particular room, fixed as per details. Colour: Green
	Flush-plastered & painted gypsum board perimeter bulkhead @ u/s 2400mm affl with shadow line as per detail and LED tape light where indicated.
	Melamine faced timber panel bulkhead @ u/s 2500mm affl. Bulkhead to receive return air duct. Panels to be removable for maintenance.
	Existing soffit to be painted light grey

### 3rd Floor Ceiling Plan

Figure 8.11 Ceiling Plan  
not to scale



# 8.5 Detail Call-outs

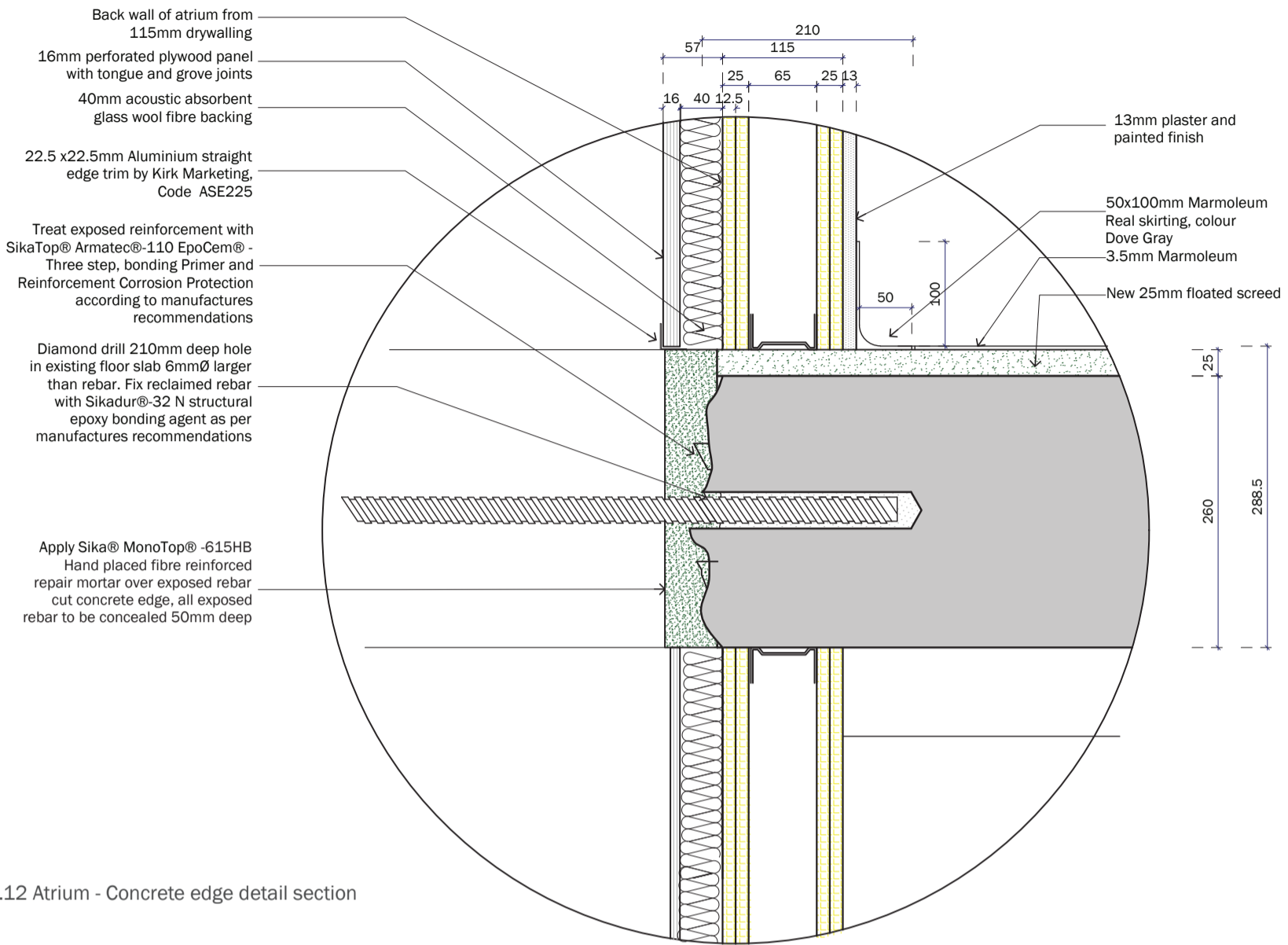


Figure 8.12 Atrium - Concrete edge detail section

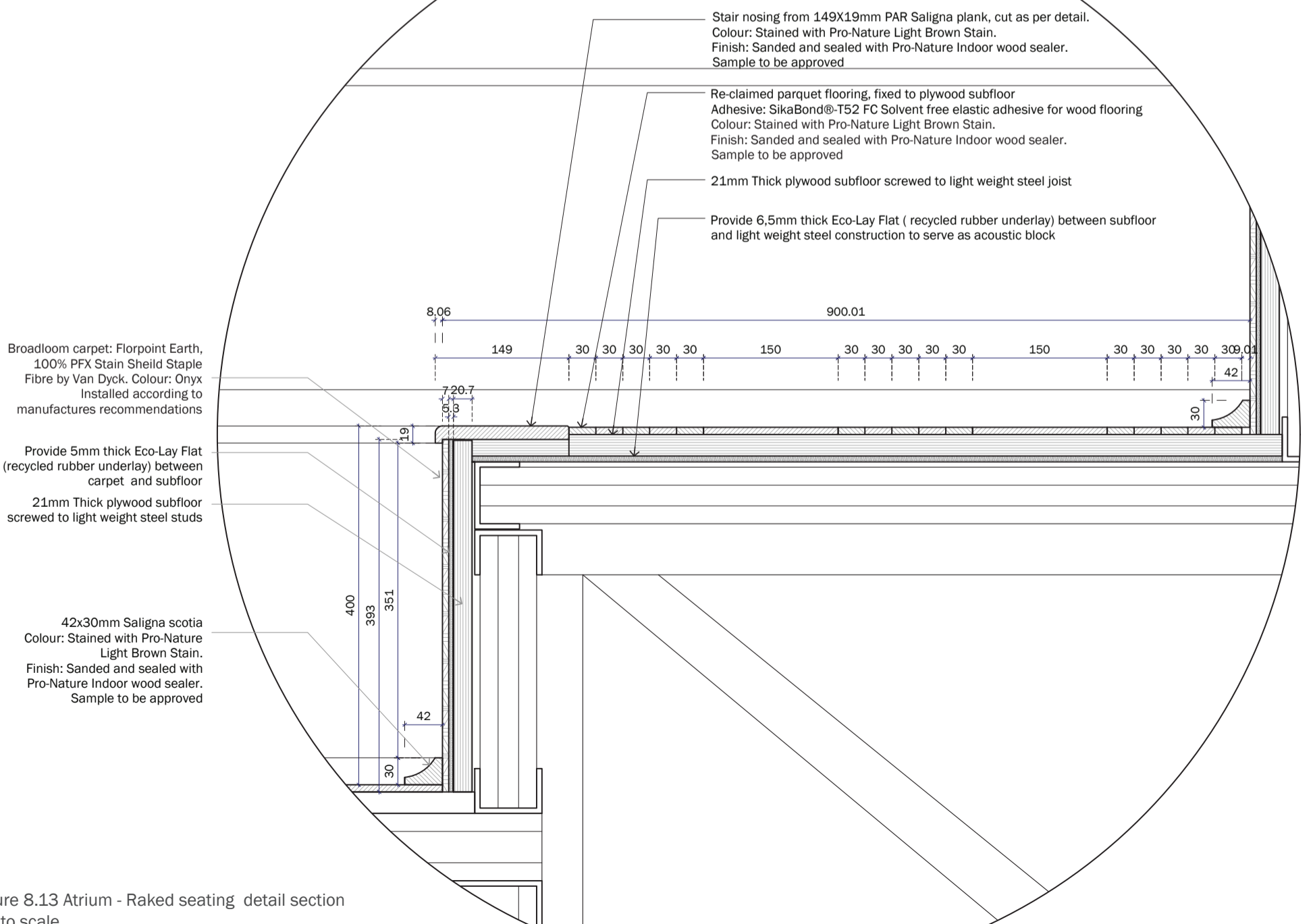


Figure 8.13 Atrium - Raked seating detail section not to scale

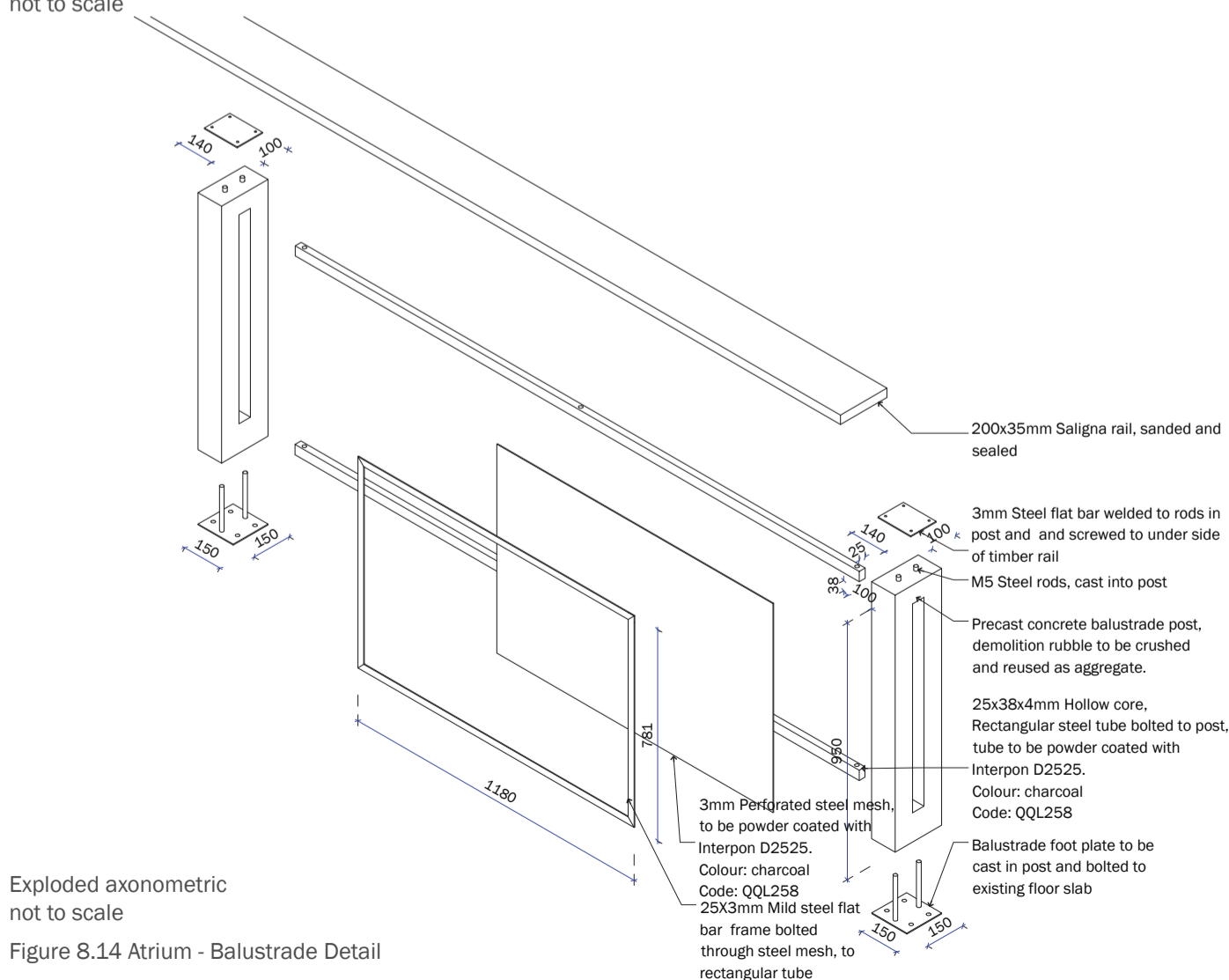
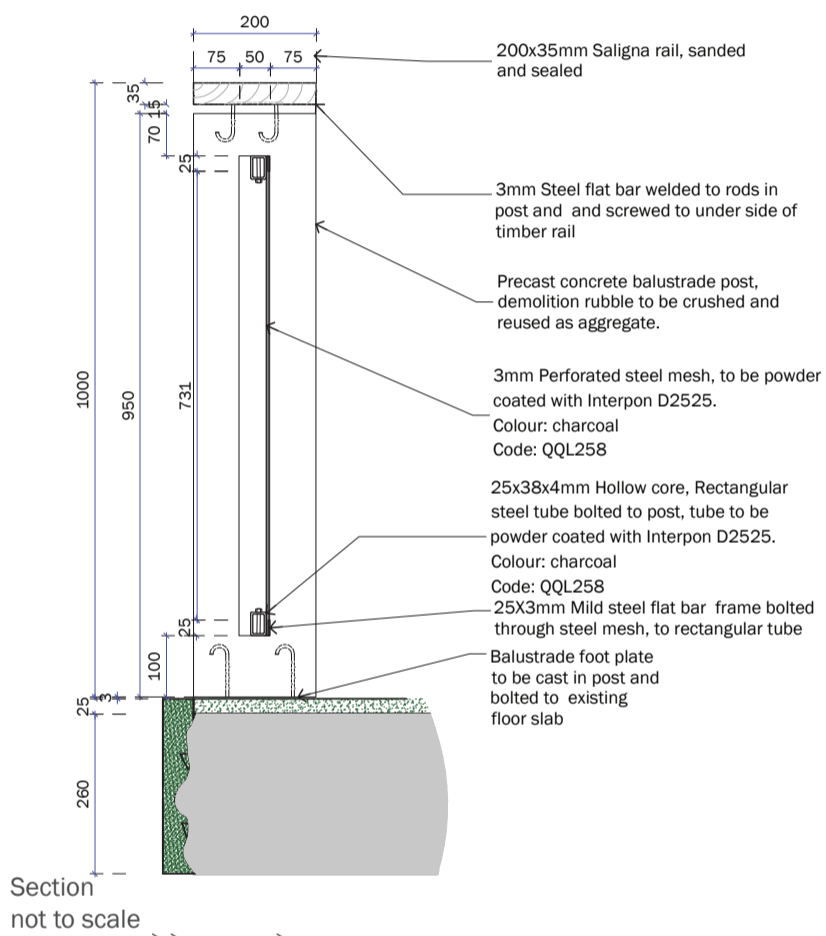
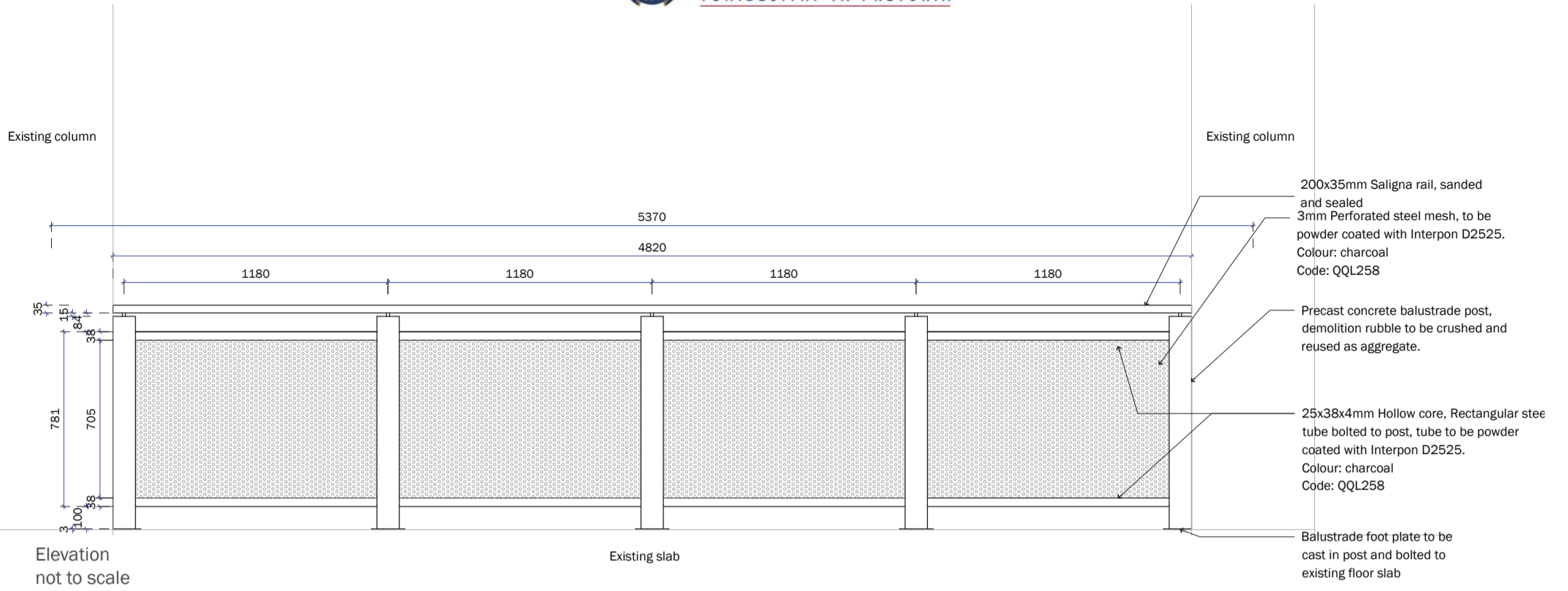


Figure 8.14 Atrium - Balustrade Detail

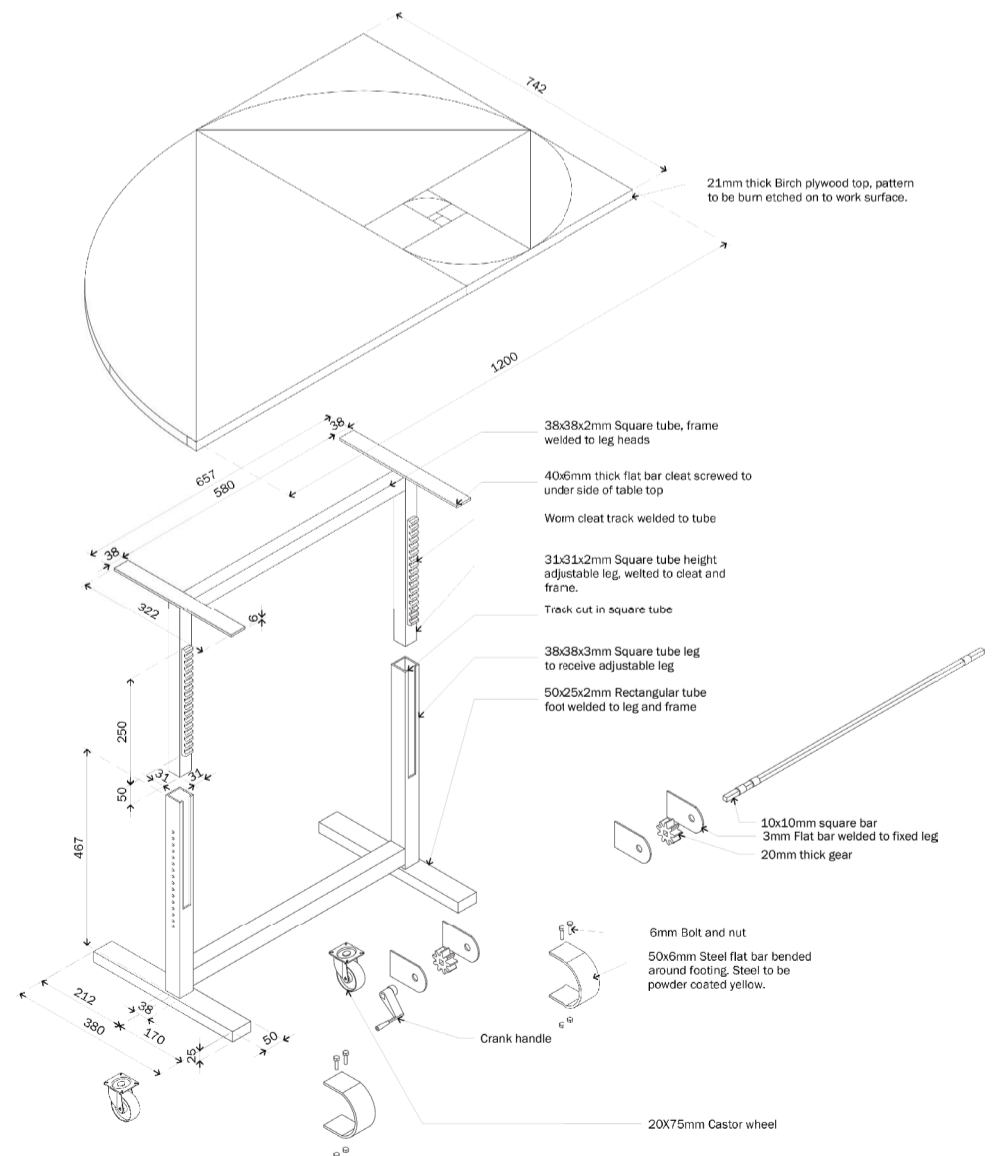
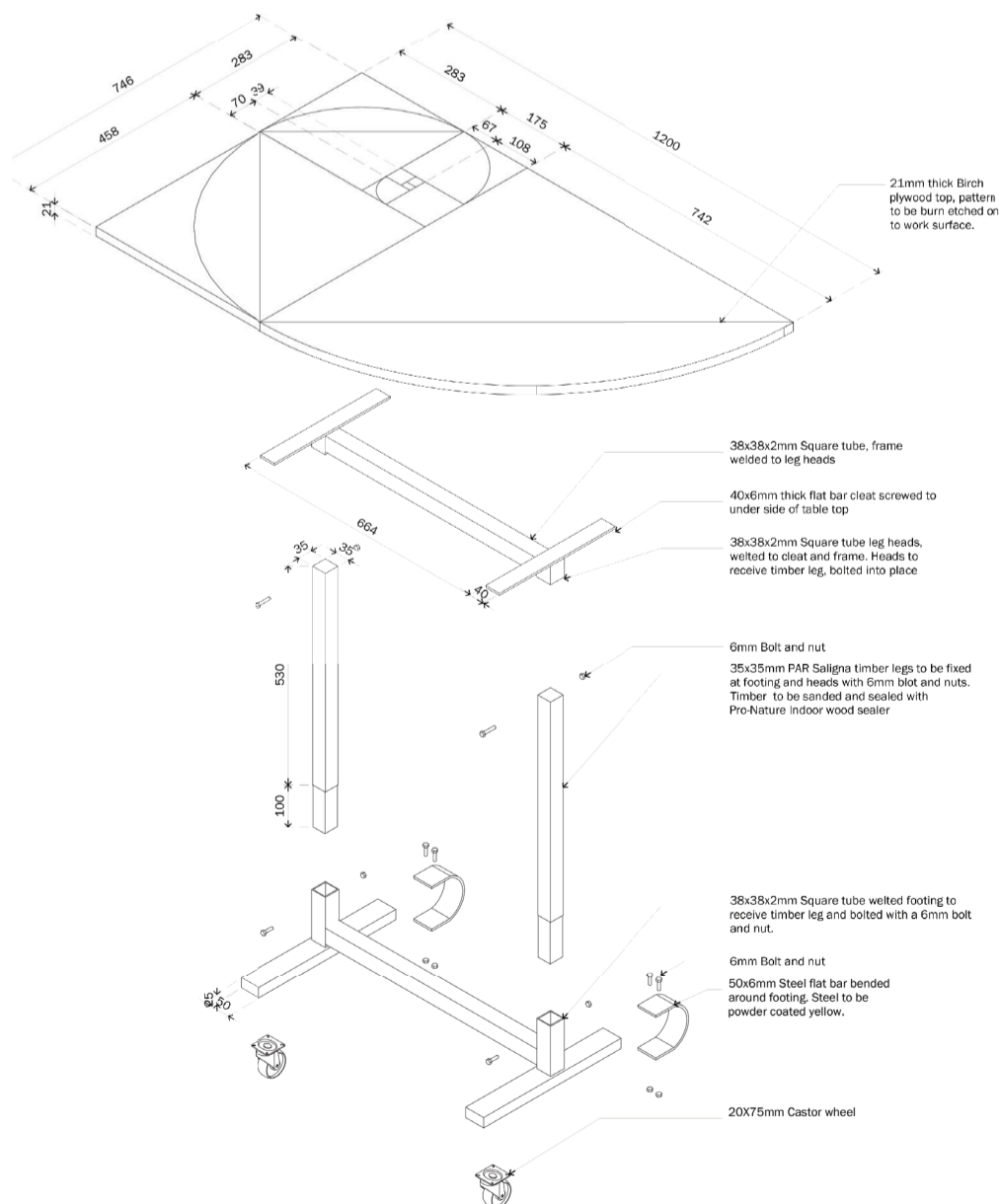
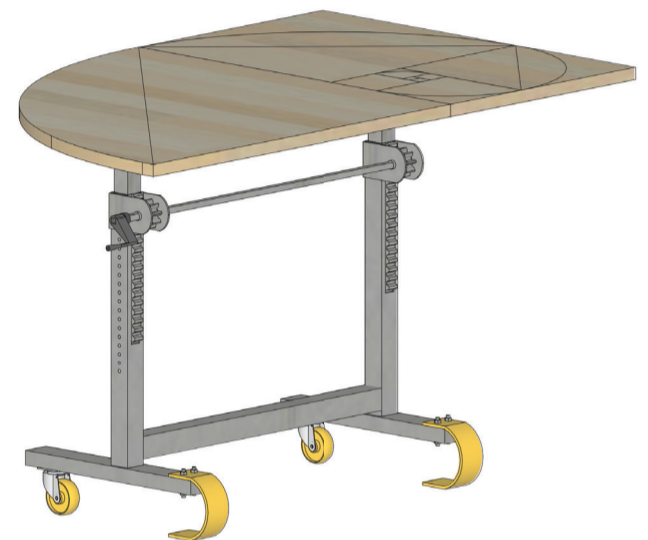
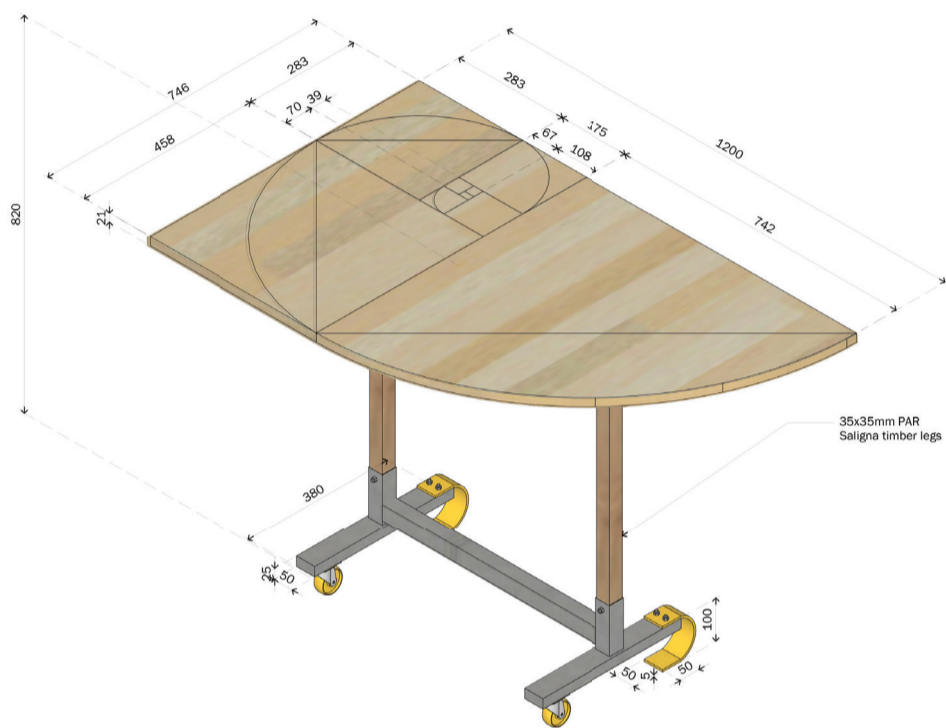
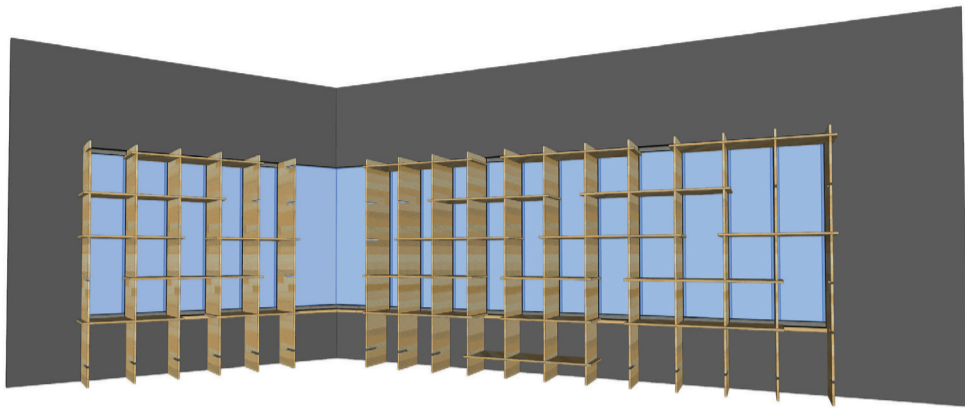
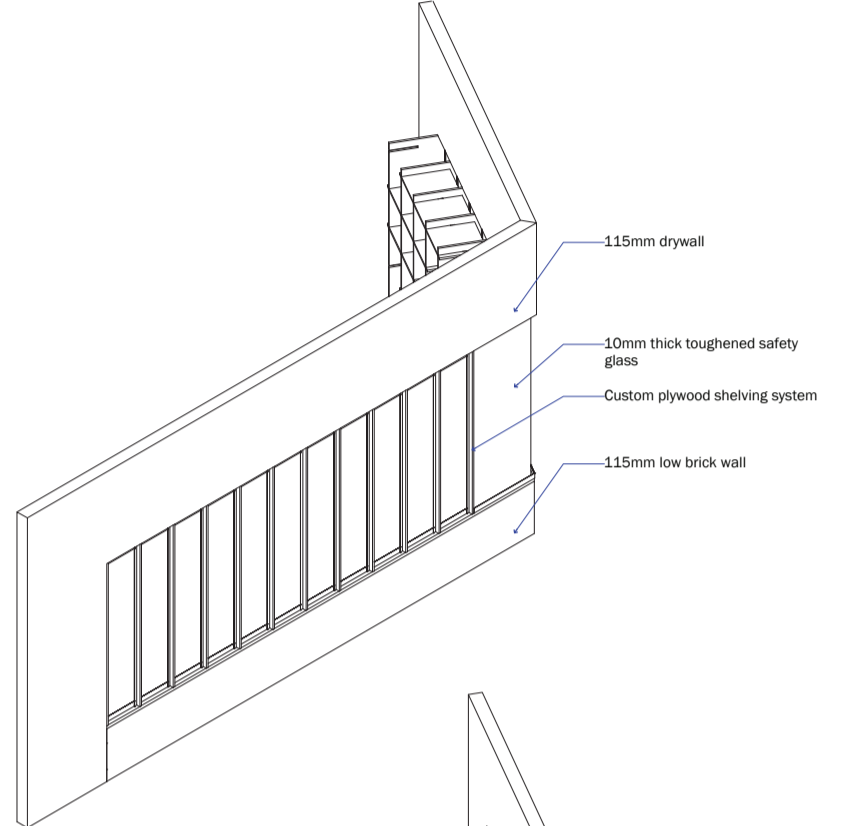


Figure 8.15 Exploded axonometric - Golden Ratio table fixed

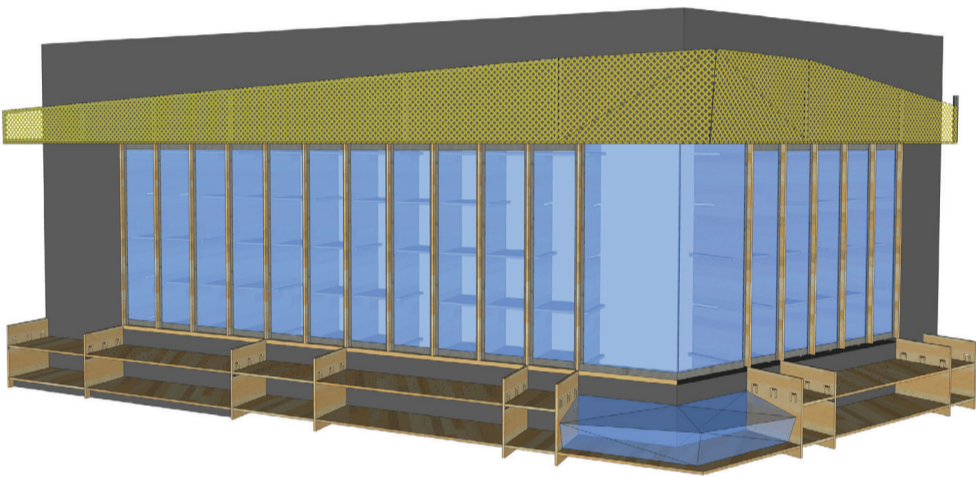
Figure 8.16 Exploded Axonometric - Golden Ratio table with crank mechanism



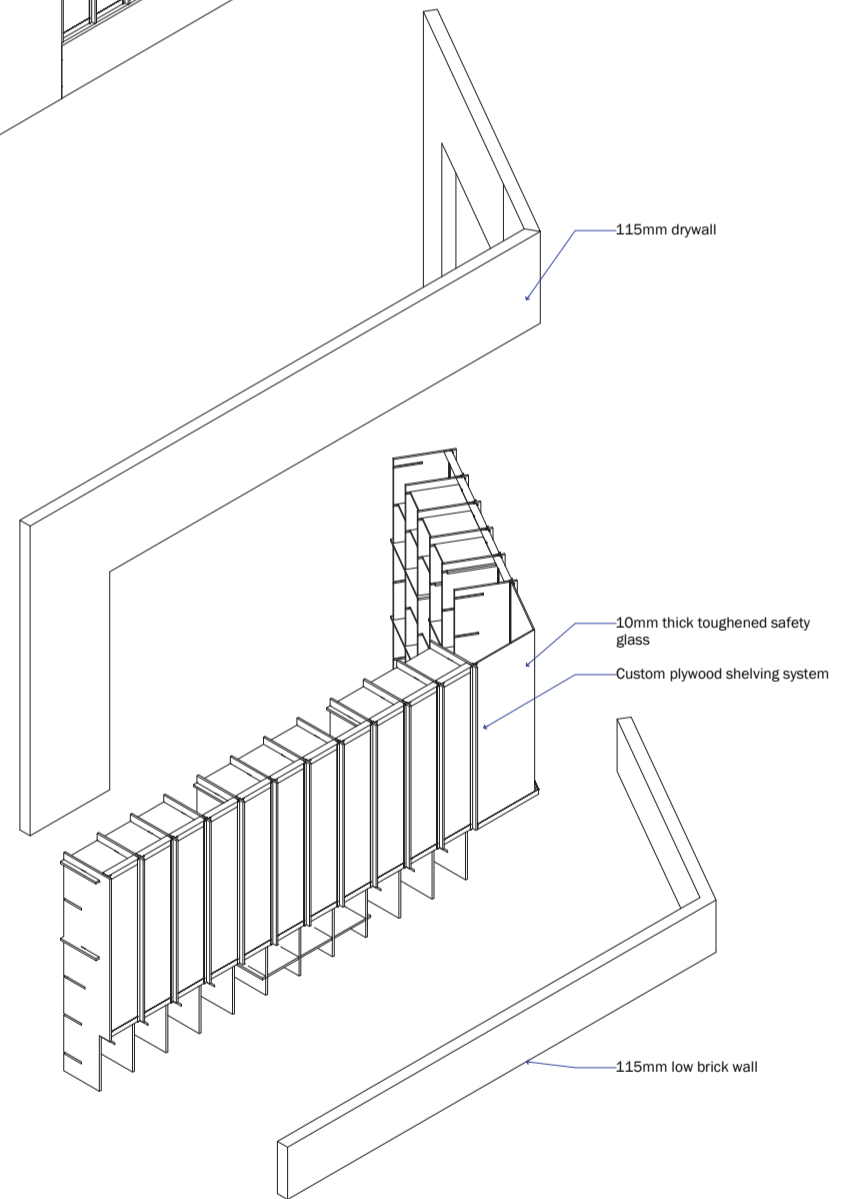
View of science store storage wall - View from inside store



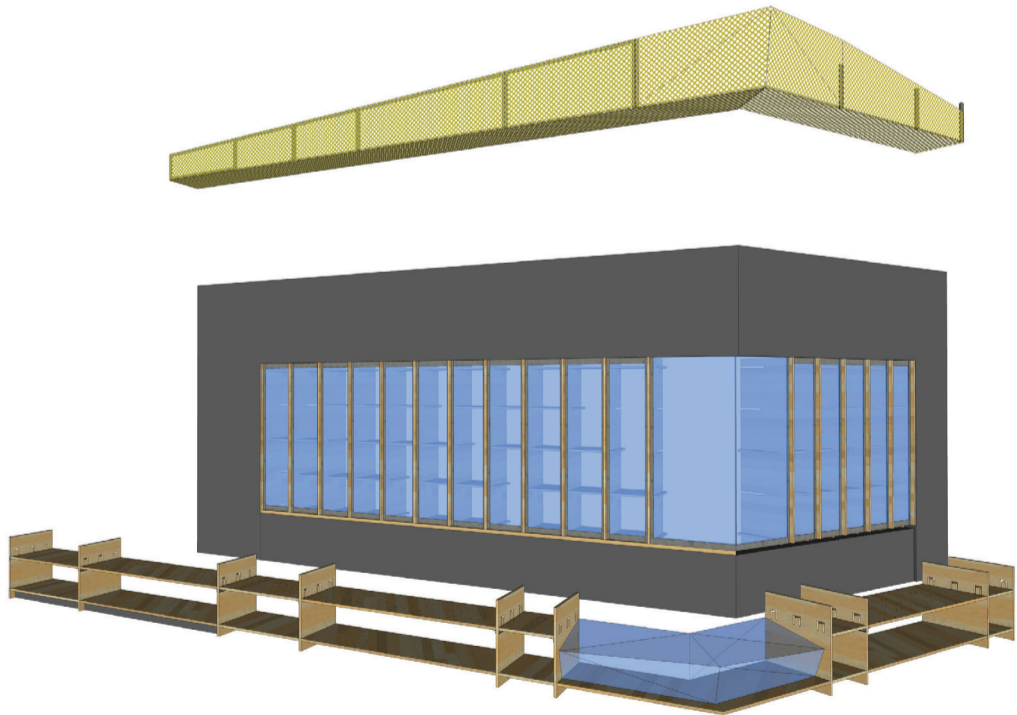
- 115mm drywall
- 10mm thick toughened safety glass
- Custom plywood shelving system
- 115mm low brick wall



View of science store storage wall - View from passage



- 115mm drywall
- 10mm thick toughened safety glass
- Custom plywood shelving system
- 115mm low brick wall



View of science store storage wall - Exploded

Exploded Axonometric storage wall

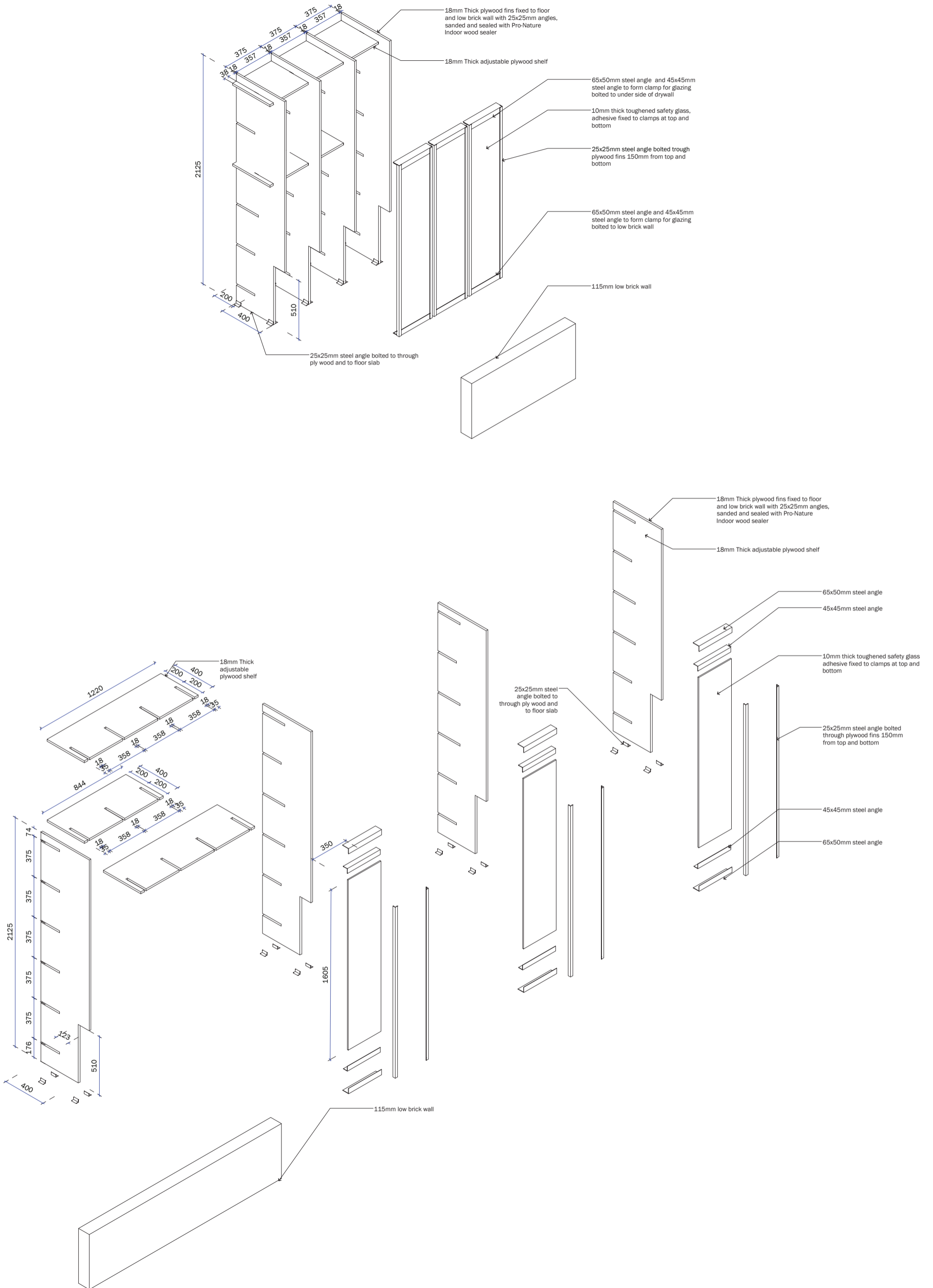


Figure 8.17 Exploded axonometric - Science store

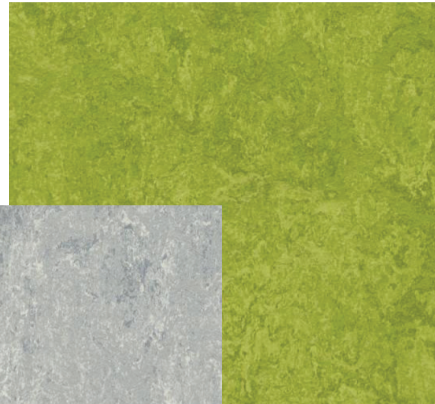
## 8.6 Sample board



Node Chair



Marmoleum Real  
Dove Blue



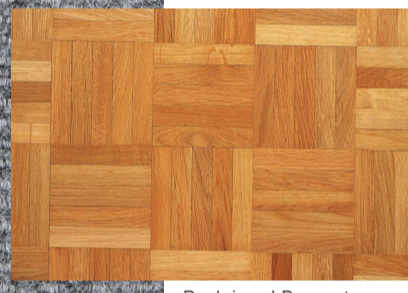
Marmoleum Real  
Green



Marmoleum Real  
Dove Grey



Carpet tiles



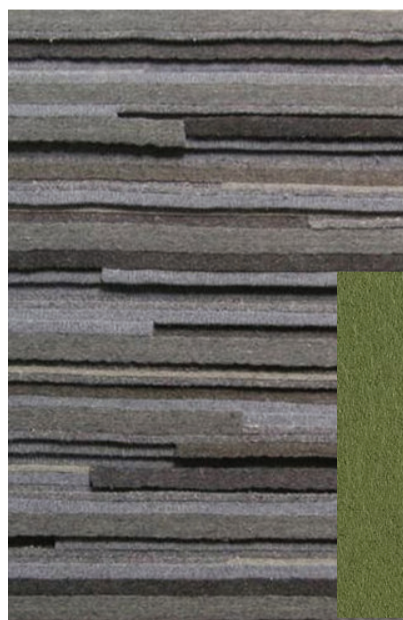
Reclaimed Parquet



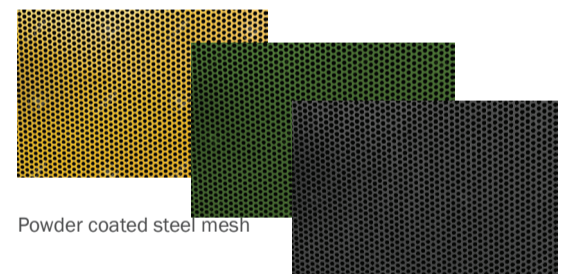
quartz carpet



Tom and Jerry Chair



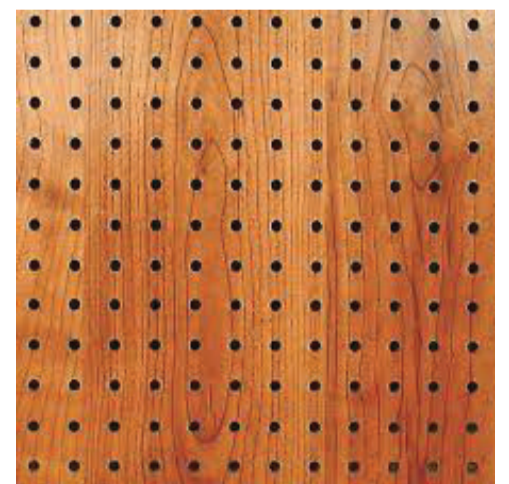
Felt Wall cladding



Powder coated steel mesh



Plywood birch veneer



Pin boards

Figure 8.18 Sample board

## 8.7 Sustainable building assesment

### SUSTAINABLE BUILDING ASSESSMENT TOOL RESIDENTIAL

1,04

Achieved

#### SB SBAT REPORT

3,2

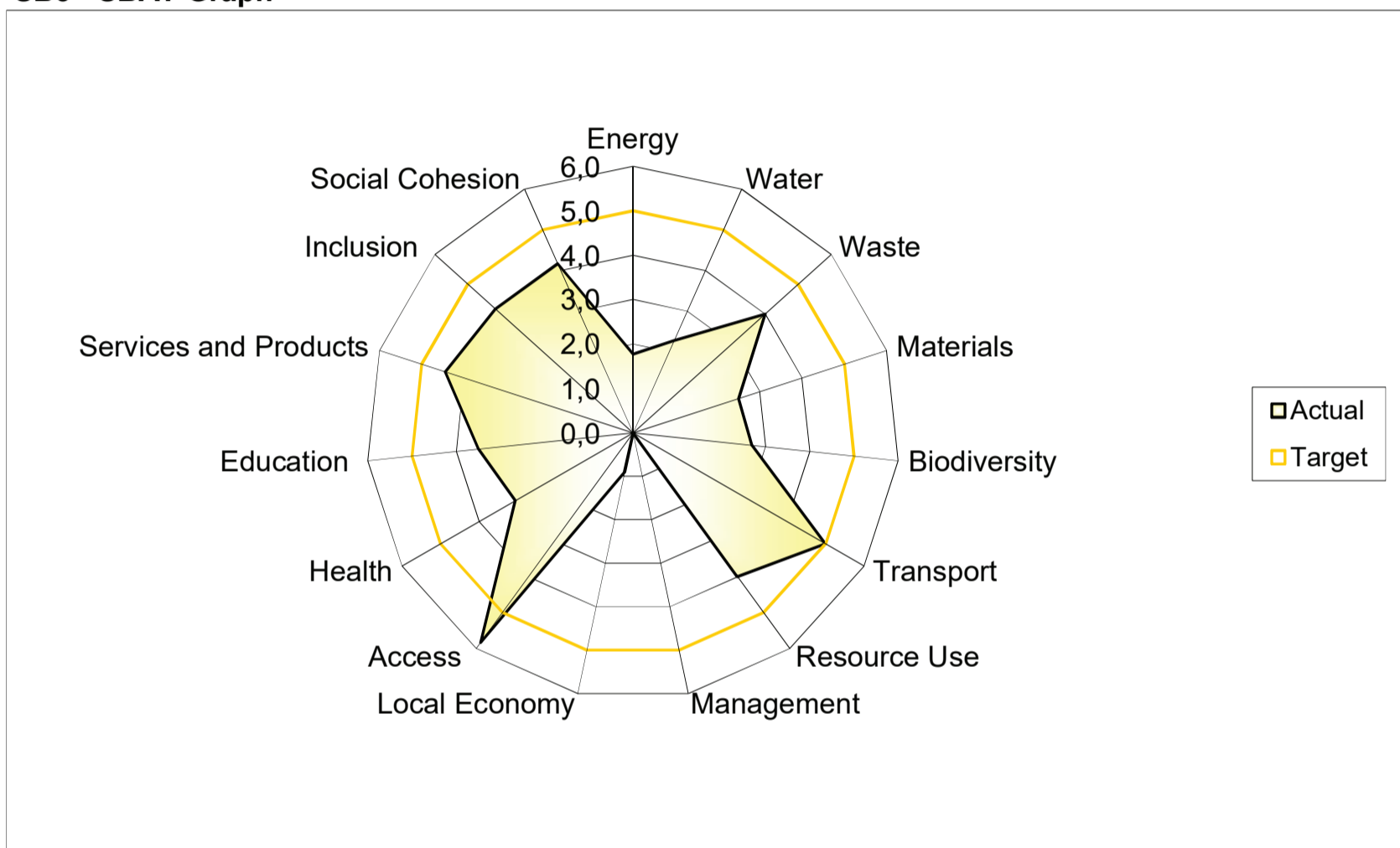
#### SB1 Project

0

#### SB2 Address

0

#### SB3 SBAT Graph



#### SB4 Environmental, Social and Economic Performance

Score

Environmental	2,6
Economic	3,1
Social	3,9
<b>SBAT Rating</b>	<b>3,2</b>

#### SB5 EF and HDI Factors

Score

EF Factor	3,5
HDI Factor	2,9

#### SB6 Targets

Percentage

Environmental	53
Economic	63
Social	77

#### SB7 Self Assessment: Information supplied and and confirmed by

Name	Date
Signature	

#### SB8 Validation: Documentation validated by

Name	Date
Signature	

#### SB9 Validation Report Version

IVR

## 8.8 Conclusion

This chapter resolves the concepts and design into a technified product that embodies the tangible and intangible objectives of Shift College.