

DESIGN & TECHNICAL RESOLUTON | 05

5.1 INTRODUCTION

Chapter five **illustrates** the interior design guidelines (set throughout chapters three and four), in an **example** of a typical Shoprite supermarket, which was used to develop and test the interior components. Here, the design and technical resolution of the interior components are presented. To recap, the components serve to **balance** minimising resources and maximising the user experience in order to enhance the efficiency of Shoprite interiors. By enhancing the efficiency of Shoprite interiors, the brand promise becomes evident within the interior.

The design of the components is illustrated using Shoprite's largest store format, which is 4500m² (Shoprite Holdings 2014e). This was to eliminate unnecessary add-ons to the design, which would have been inevitable if additional space was not considered. The components are then adapted to fit into Shoprite's smallest store format, which is 2500m². The flexibility of the design from the largest to the smallest format is illustrated in the dimensioning and enables the design to stay consistent throughout various sized outlets. The maximum dimensions are illustrated in grey and the minimum dimensions in red, as will be explained in more detail in the legends provided next to the applicable drawings.

The chapter commences with a three dimensional explanation of the 'new' store layout, which was used as the model to develop and test the interior components. It is **vital** at this point to remember that the project does **not** strive to present a **final, ideal layout** for Shoprite supermarkets, as stated in the delimitations in chapter one. This is due to the fact that additional, key aspects such as the visual merchandising of the products will have to be considered in detail first before an efficient, final layout can be designed.

The 'new' layout presented was however informed by the theory discussed in chapter four. It strives to serve as an example of how to improve the efficiency of the store through that which is in the power of the discipline of interior design. It mainly focuses on enhancing in-store navigation, productivity, lowering shrinkage (loss of inventory due to employee theft and shoplifting) and exploiting supermarket psychology to increase impulse purchases. It serves to improve convenience and comfort

within the supermarket to provide a satisfying, first world shopping experience. Next, the 'new' layout is shown on plan for more detail.

This is followed by the technical response of the design, with specific focus on the interior components. The technical response shows the main elements utilised to minimise resources within the design as far as possible, while keeping a balance between maximising the user experience. At the same time, the strategies employed were also considered in terms of what is appropriate to Shoprite with regards to price, performance and durability.

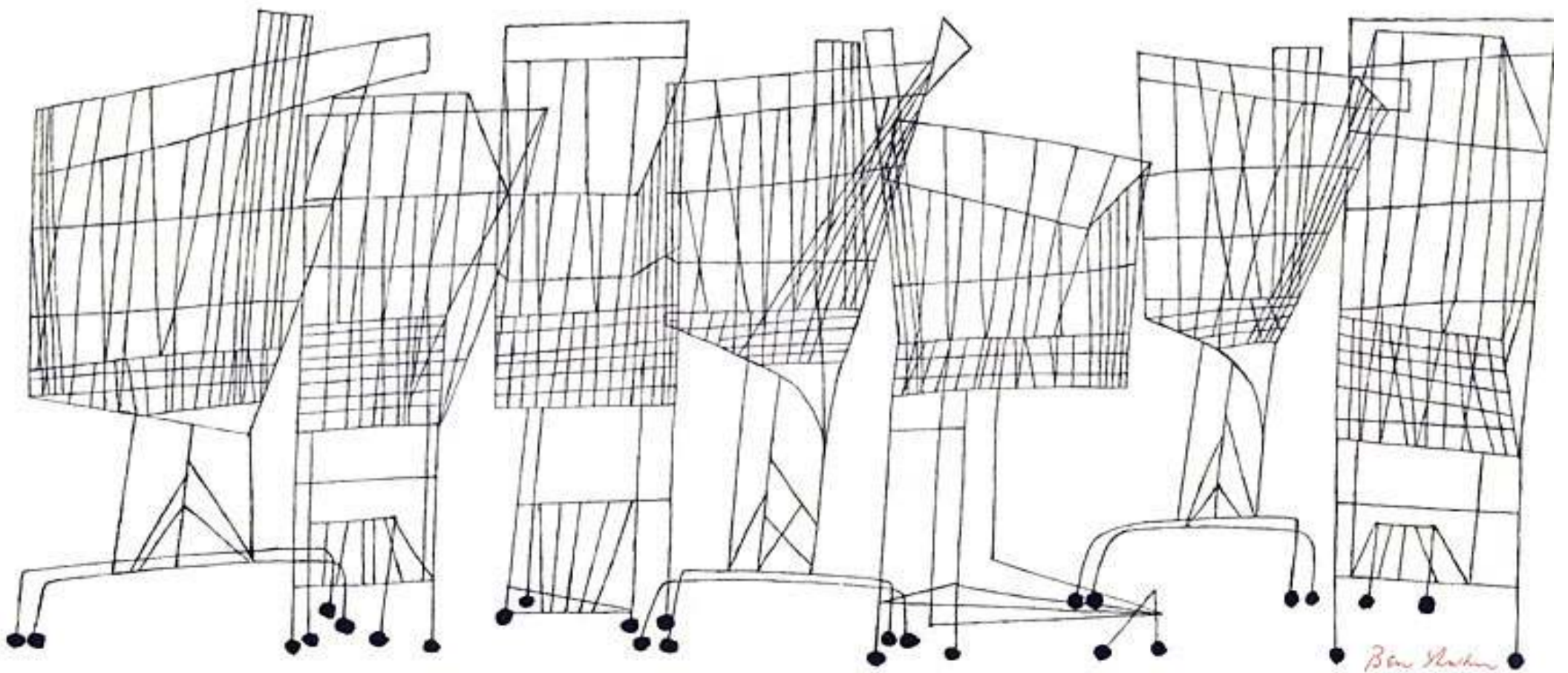
The core categories investigated under energy, water and material efficiency, as well as indoor environmental quality therefore become apparent in this chapter. Under indoor environmental quality, indoor air quality, acoustics and ergonomics are also investigated, as well as fire safety, which is a key consideration in any retail environment. The adaptability of the design to be translated into different sized stores, as mentioned earlier, also forms part of the technical response.

The Deli, which serves as the key component of the project, illustrating the interior design strategies employed, is then presented in a perspective view and on plan. Guidelines for appropriate lighting solutions for the Deli are then presented. These serve as an example of what to consider when lighting is resolved within the supermarket. Sections and details of the Deli design are then presented.

Hereafter, the Bakery and Butchery are presented. As the Deli serves as the main example of how the in-store departments are to be resolved, the other two departments are resolved in less detail.

Next, the aisle navigation is illustrated, followed by the checkout area design. Note that the informal retail inspiration is still used throughout the resolution of the design, in combination with the theory, in order to keep the design locally relevant.

Finally, the chapter is concluded.



5.2 New Store Layout

MAIN AIM: MAX TURNOVER BY INDUCING CUSTOMERS TO BUY ADDITIONAL MERCHANDISE (Arias 2005, Underhill 2001 and Bell & Ternus 2002).

5.2.1 CIRCULATION

Shoppers spend more money when they shop in a counterclockwise direction

Store parameter
Shoppers shop only 25% of the store on average, they use the parameter of the store and drop in and out of the aisles, this is why staples such as bread and milk & milk are put on the outside parameter

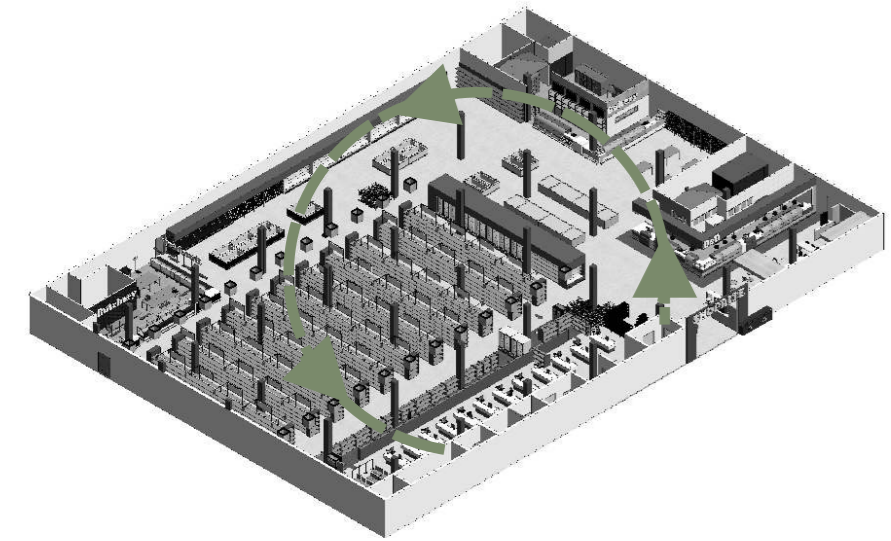


Figure 5.2.1: Circulation of the new store layout (Author 2015)

5.2.2 SIGHT LINES

- Sight lines from destinations prevent shrinkage (shoppers checked by staff & staff checked by staff)
- Sight lines from offices prevent shrinkage

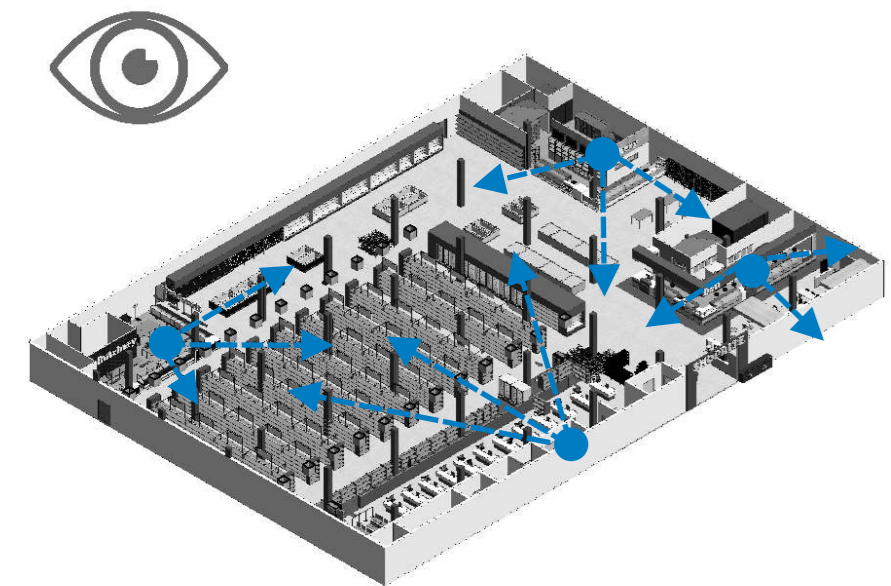
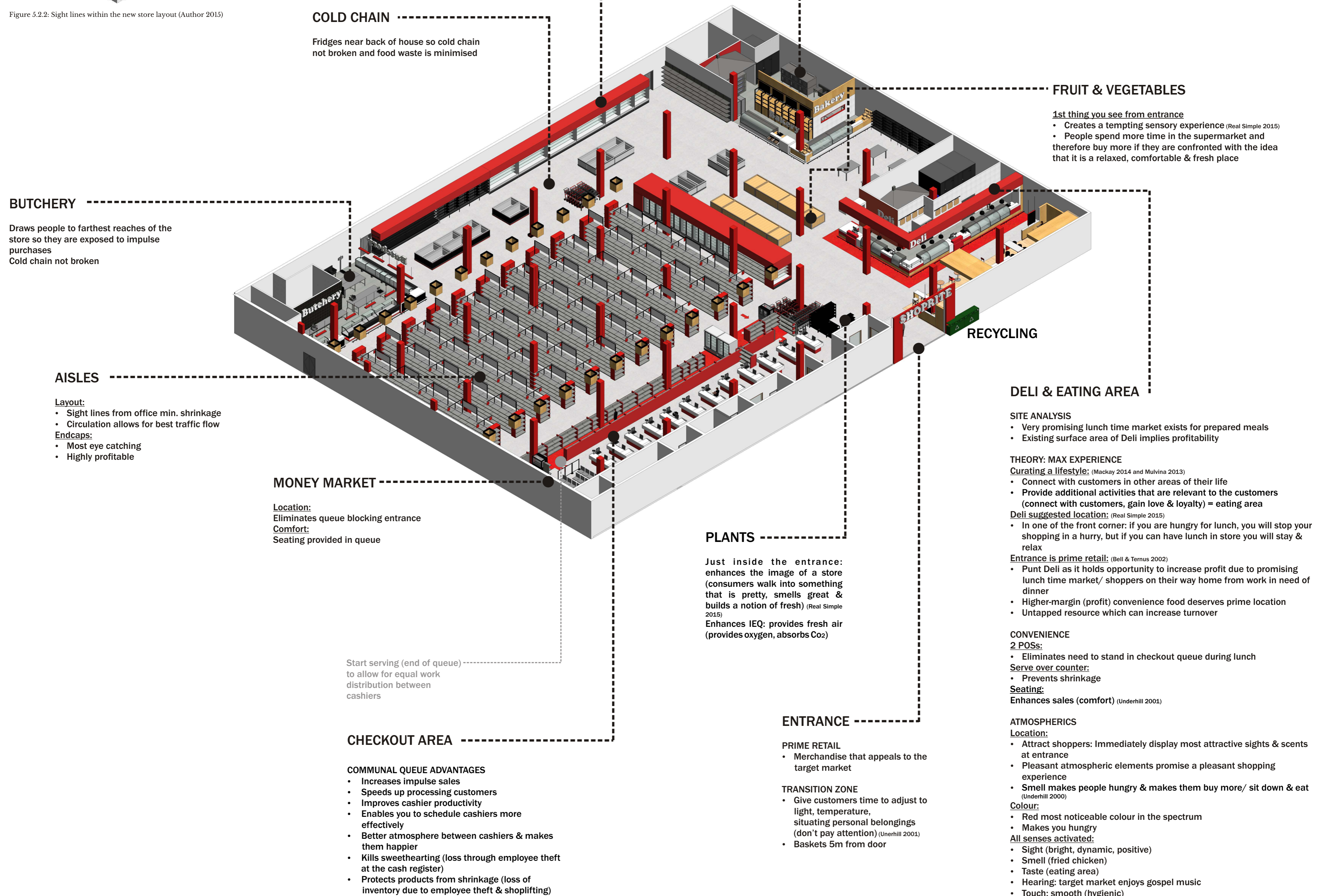


Figure 5.2.2: Sight lines within the new store layout (Author 2015)



5.2.3 GENERAL LAYOUT 3D

Figure 5.2.3: General layout 3D (Author 2015)

5.2.4 GENERAL LAYOUT

LEGEND	
FLOOR FINISH [pattern allows less dirt to show]	
	2000mm wide x 2.5mm thick Marmoleum Red sheathing as per FloorWork SA Colour: Blackonsteel 3127
	2000mm wide x 2.5mm thick Marmoleum Red sheathing as per FloorWork SA Colour: Concrete 3136
	2000mm wide x 2mm thick Compact Vinyl Sunstep Original sheathing as per FloorWork SA Colour: 171512 Oyster
	2.5mm thick x 2000mm wide Marmoleum Stone sheathing as per FloorWork SA Colour: Pacific Beaches 5216
ELECTRICAL, DRAINAGE & FIRE FIGHTING	
	SWITCH SOCKET OUTLET
	MICROWAVE OVEN
	GREASE TRAP
	FIRE EXTINGUISHER

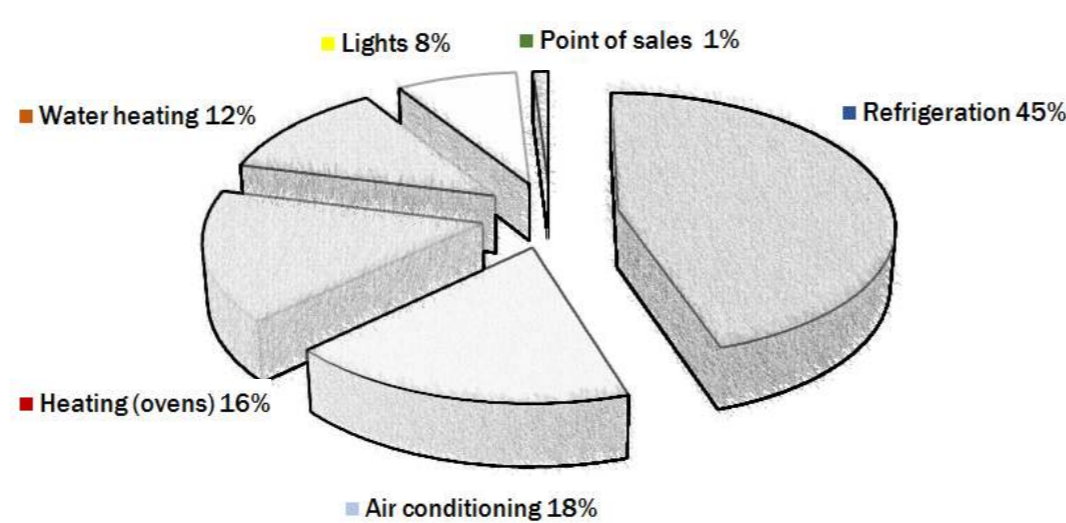


5.3.1 Interventionists Approach



ENERGY USAGE IN SA SUPERMARKETS

Areas which have the biggest impact on South African supermarkets:



DAYLIGHTING

LIGHTING DUCTS
3500 Solutube® 290 DS Daylighting System with 23-28 m2 Light Coverage as per Solutube, SA (Less heat than skylight)

ARTIFICIAL LIGHTING

LED
Longer life, high efficiency, no mercury, no flickering, no buzzing, instant start (Groenendaal & Rowland 2012)

LIGHTING CONTROLS

Dynalite as per Philips, SA
 • Save up to 60% energy
 • Presence detection
 • Daylight dimming
 • Sophisticated control, full system status

CEILING

SUSPENDED CEILING VS OPEN-PLENUM CEILING IN FOOD STORES
(CIRCA 2007; Oches 2008 and Taylor 2008)

Table 5.3.2.1: SUSPENDED CEILINGS ADVANTAGES

The advantages of a suspended ceiling outweigh those of an open-plenum ceiling

COST FLEXIBILITY	ANNUAL OPERATING COSTS	MAINTENANCE COSTS LOWER	HYGIENE	FIRE SAFETY	ACOUSTICS
Reduced reconfiguration costs.	ENERGY Save as much as 17% a year	* Less cleaning & no painting required	Prevent dust & small leaks from reaching occupied spaces below	EXTRA MARGIN OF FIRE SAFETY * Ceiling critical to controlling fire growth (large surface) * Provides air separation & creates fire resistance period	Controls noise
	HVAC * Downsizing of HVAC responsible for most of the savings * Return air plenums more efficient at removing heat from lights.				
	LIGHTING * 70% light reflectance * Reduces total number of luminaires required (reflectance) * Increases lighting performance by diffusing light & distributing it more evenly to the work plane.				

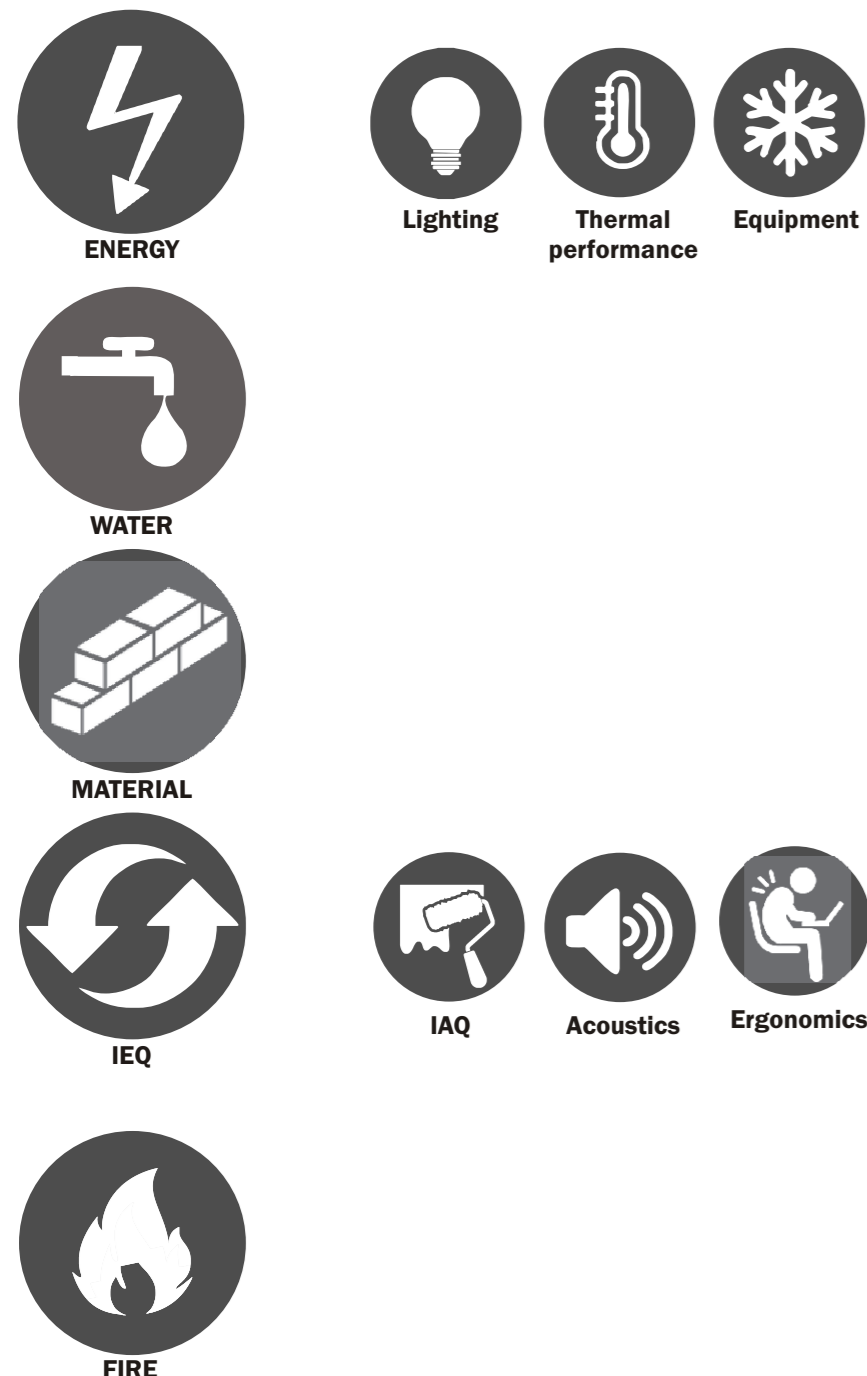
Regulations

Climate Zone 2: Pretoria (SANS 10400-XX:2011)

Maximum energy demand: 85VA/m²

Metal sheeting roof assemblies: R-value of ceiling 0.05
Added R-value of insulation: 2.85

5.3.2 Strategies



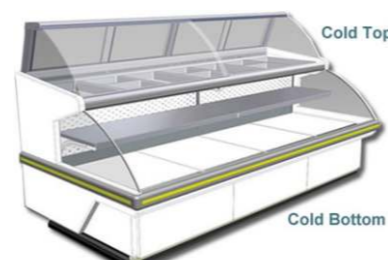
Recommendations

Study done on opportunities for electricity reduction, and carbon mitigation, in the food retail sector in South Africa, using a techno-economic approach, with a focus on store level (Pather-Ellis, S., Davis, S. & Cohen, B. 2012):

- Heat reclamation from refrigeration @ back end of store
 - assist with cooling high energy island freezers
 - reduces HVAC load
 - replaces electrical geyser
- Electronic controls for refrigeration
- Fridge curtains
- Energy efficient lights
- POS power management systems
(Information based on an average store size of 1 500m²)

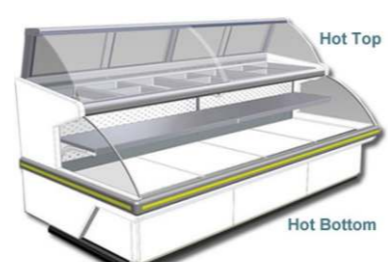
DELI EQUIPMENT

- Up to 50% energy saving
- Can be custom made to requirements
- Ozone friendly
- Simple controls for easy commissioning



REFRIGERATION [COLD MEAT]

Dual Case Cold Cabinet as per Omega, SA



DRY HEAT [CHICKEN, PIES, PRE-MADE MEALS]

Dual Case Hot Cabinet as per Omega, SA



BAIN MARIE [PREPARED MEALS]

Closed Curved Glass Cabinet as per Omega, SA
 • Air flow from front to rear of case ensures better temperature, without airflow onto curved glass



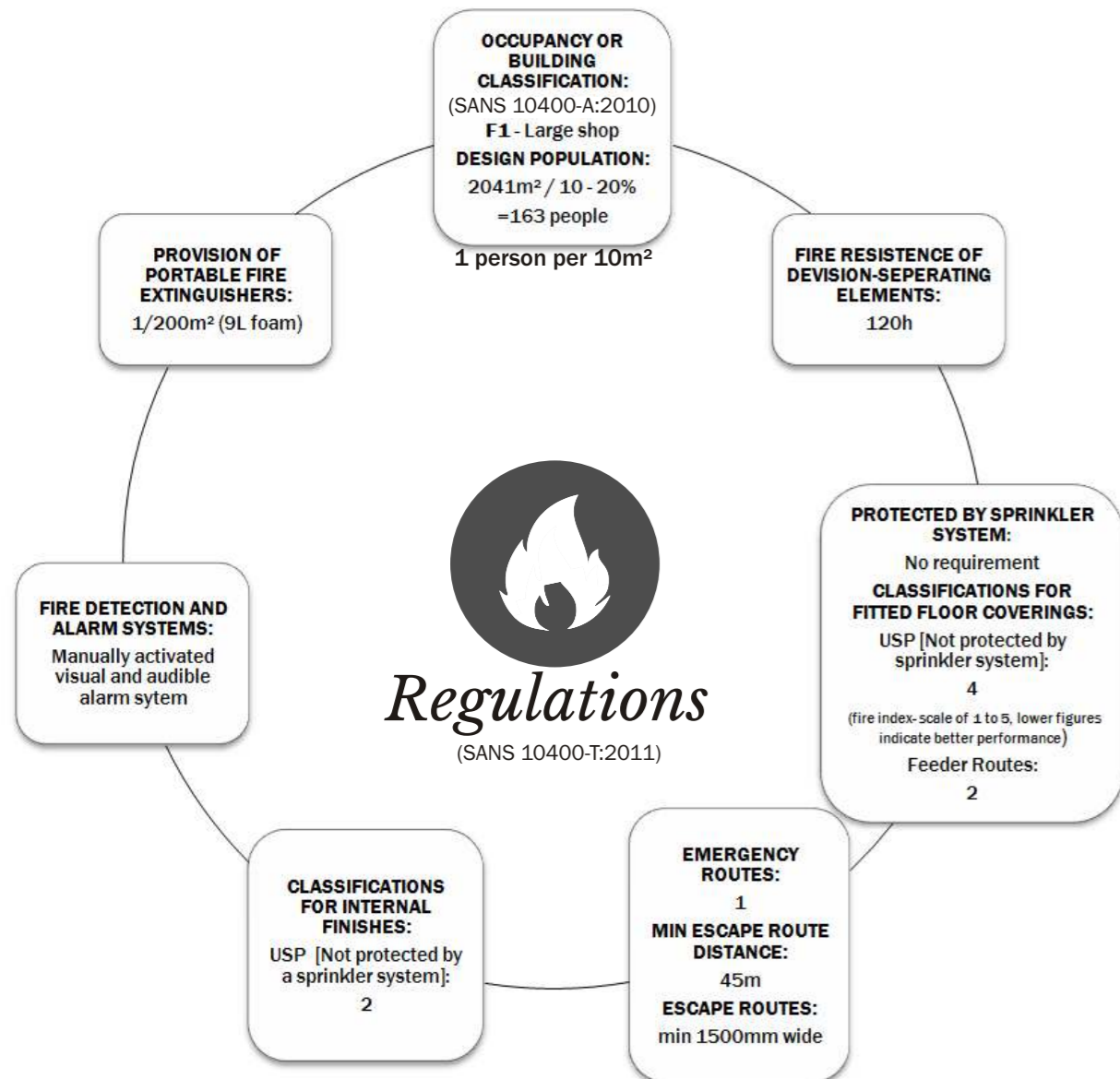
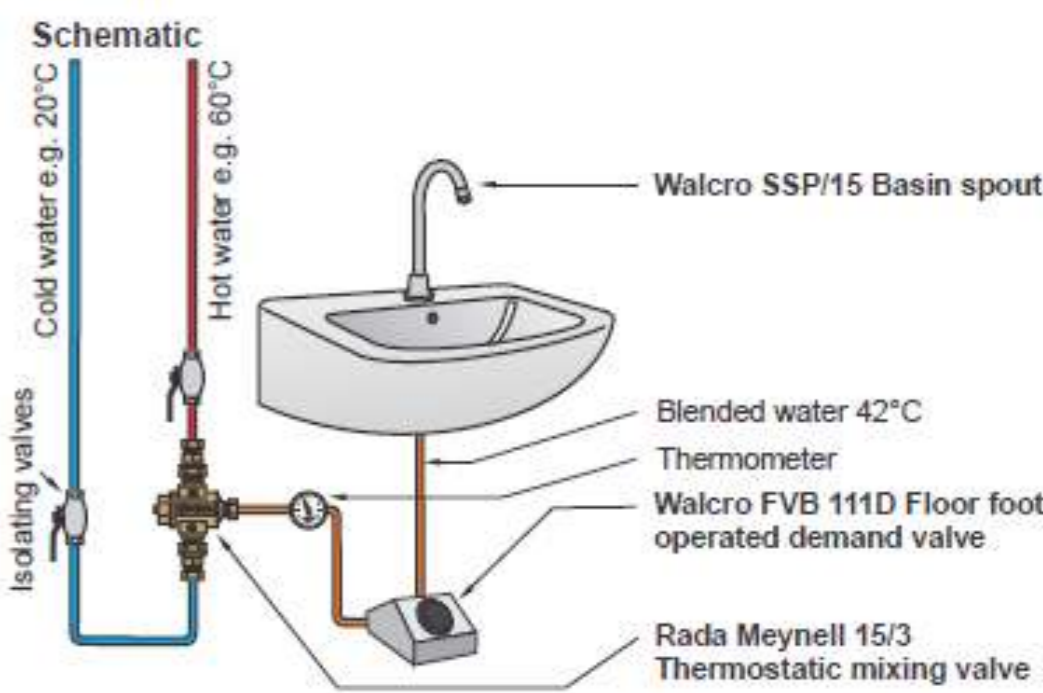
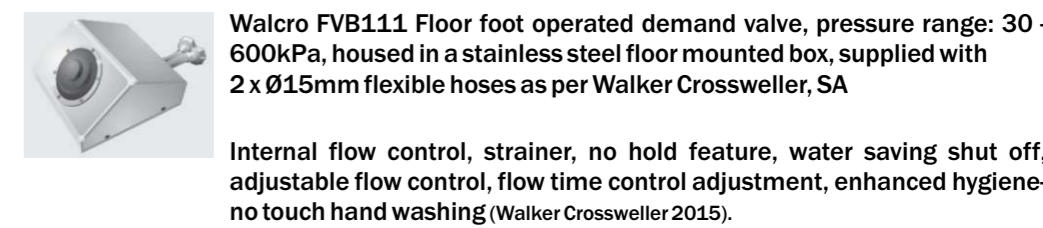
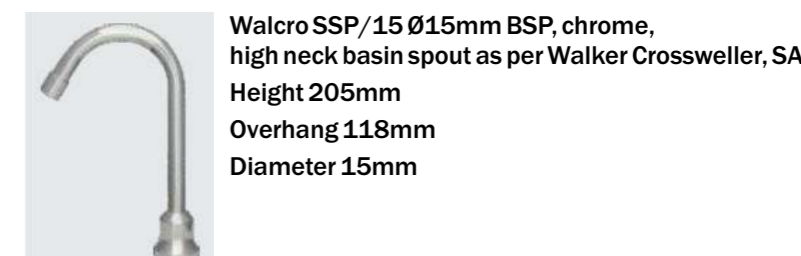
UPRIGHT REFRIGERATION [COLD DRINKS]

Glass Door Cabinet as per Omega, SA

LOW FLOW WATER FIXTURES

Table 5.3.2.2: LOW FLOW FITTINGS: TAPS

STANDARD FITTINGS	WATER EFFICIENT FITTINGS
15-18L/min	2L/min



* See Appendix C - Sample Board on page 69

MATERIALITY

*NOTE: NONE OF THE BOARD PRODUCTS AVAILABLE IN SA ARE TRULY SUSTAINABLE, THEREFORE THE PRICE OF THE SUSTAINABLE FLOORING & CEILING MATERIAL (larger surface area) IS SUBSTITUTED WITH THE CHEAPEST, DURABLE BOARD PRODUCT

Table 5.3.2.3: MATERIAL REQUIREMENTS

MATERIAL REQUIREMENTS AS PER GREEN STAR SA (GBCSA 2015)									
LIFESPAN		LIFECYCLE			ENVIRONMENTAL & HUMAN HEALTH			APPROACH TO RESOURCES	
REDUCE	REUSE	RECYCLE	RECYCLABLE	VIRGIN MATERIALS LIMITED	ECOLOGICALLY PREFERABLE MATERIALS	HEALTH PREFERABLE	MIN VOC	MIN ASBESTOS	MIN FORMALDEHYDE EMISSIONS

- MATERIALS - ALLOCATION FOR RECYCLING & WASTE MANAGEMENT PLAN
- FURNITURE - REDUCED ENVIRONMENTAL IMPACT
- ASSEMBLIES REDUCED IMPACT
- FLOORING REDUCED IMPACT
- WALL COVERINGS REDUCED IMPACT
- LOCAL SOURCING - TRANSPORT EMISSIONS
- SUNDRIES MATERIAL SOURCING - FINISHES REDUCED IMPACT, RESPONSIBLE MANUFACTURING, PRODUCT STEWARDSHIP, RESOURCE EFFICIENT DESIGN

LEGEND FOR KEY CONSIDERATIONS

- Sustainability
- Design requirements (atmospheric properties)
- Technical requirements (performance)
- Negatives

USE	MATERIAL	DESIGN REQUIREMENTS/ STRATEGIES (visual sense key)	CONTENT	ENVIRONMENTAL IMPACT	COST	SOURCING	DESIGN STRATEGY EMPLOYED	EMISSIONS OR TOXINS	RESISTANCE	DURABILITY	LOW MAINTENANCE	ACOUSTIC PROPERTIES	FIRE	END OF LIFE
Floor (sales floor)	Marmoleum	Comfortable to stand on Quiet under foot Soft landing for products to minimise breakage	Natural linoleum floor covering: linseed oil, natural resins, wood flour, pigments & inorganic fillers with jute backing	Renewable Manufactured using 100% green electricity	Low life-cycle costs/ low cost of ownership (more expensive to put in then vinyl but costs less to maintain) (Drakes 2009) R422.06/m ² excluding vat (rubber R999.22/m ² excluding vat)	Local (FloorWorx, Johannesburg, SA)	Pre-treated Standard size sheets: 2.5mm thick x 2m wide x 30-32m long On site installation	Less VOC emissions than rubber Healthy/hygienic: naturally antibacterial, hypo-allergenic (asthma & allergy friendly) Solvent-free adhesive available	Water resistant Scratch resistant Stain resistant Bacteriostatic Slip resistant Resists denting	Durable (similar to vinyl) (FloorWorx SA 2015) Resilient Withstands heavy loads Passed cater wheel test	No need for waxing/ sealing during life-time (manufactured with surface treatment) Very easy to clean Traps little dirt	7db sound absorption (2.5mm thick)	Flame retardant (radiation intensity of 4.5 kW/m ²) Reaction To Fire EN ISO 13501-1 Cl1 - S1	* Biodegradable Recyclable
Floor (kitchen)	Vinyl * SUSTAINABLE OPTIONS ARE NOT RESISTANT ENOUGH	Durability Stain resistance Slip resistance Hygiene Fire resistance	Coloured polyvinyl chloride (PVC) chips formed into solid sheets Contains no restricted substances Glass fibre-mat reinforced	50% natural materials 100% recyclable	Affordable R337.30/m ² excluding vat (price + performance unbeatable)	Local (FloorWorx, Johannesburg, SA)	Best flooring option available for commercial kitchen application Less mat used than ceramic tile flooring & more hygienic	PVC uniquely toxic among plastics - toxic ingredients which readily migrate into the environment during its production, use & disposal	Very stain resistant VDO slip resistance Resists intense traffic Exceptional indentation resistance of 0.02mm Antistatic	Homogeneous multi-layer Compact 0.7mm thick wear layer Abrasion resistant	PUR Pearl surface treatment - stain resistance, ease of maintenance, eliminates need for finishing throughout lifespan	5db sound absorption (2mm thick)	Reaction To Fire EN ISO 13501-1 Cl1 - S1	100% recyclable (can be safely incinerated)
Wall finish	Ceramic tile	Solid colour (unlike glass tile) Hygienic feel - typology requirement	Percentages of recycled materials - such as light bulbs, bottles and porcelain and other kinds of ceramics	Advances in production technologies have led to a considerable reduction in the environmental impacts of ceramic building materials	Affordable (Client in mind - why not glass) - availability in a wide range of prices	Local (Union Tiles, SA)	Standard size tile Easy installation (medium size tile) Pre-treated	Commonly made using low-VOC adhesives	Hygienic Stain resistant Scratch resistant	Durable Relatively impact resistant (A-grade tile)	Low maintenance Easy to clean - keep grout lines as narrow as possible	Reflects	Resistant	Recyclable (make new tiles)
Fresh Scent	Selfcoat SA, Eco Paint - Economical Contractors Paint	Water based (acrylic) No VOCs Durable Can match any colour from other paint company	Water-bond polymers	Reduction of temperatures by 8 to 13 degrees Celsius/light colours	Affordable	Local (Selfcoat SA, Eco Paint)	One paint for all surfaces Can match any colour from popular paint companies in SA - only used Plascon colours	Zero VOC, non-toxic, fungus resistant	Anti-condensation, waterproof, rust preventative, acid resistant, alkaline and stain resistant	Life expectancy 7 years +	Clean with water, it is colour and light fast, does not fade	N/A	Fire retardant No flame spreading	Repaint with any paint
Moth Mist	Ultima+ 7663M mineral ceiling tile	Energy saving (reflective) Recycled content Recyclable Noise reduction	50% recycled content Wet felt mineral fibre membrane	87% light reflectance 0.052 kJ value thermal conductivity	Affordable Construction 4.1% to 10.6% more than open plenum ceiling yet payback period less than 11 months due to energy saving	Local (Armstrong, SA)	Easy on site installation with easy levelling tee grid for 600 x 1200mm tiles	Low to no VOCs (A+) Low to no formaldehyde (E1)	Scratch resistant 95% humidity resistant	Durable Long life	Low maintenance Easy to clean with damp sponge	0.75 NRC 36db Sound attenuation 18db Sound reduction index	EEA Euroclass A2-s1,d0	100% recyclable (Armstrong Recycling Programme) C2C Bronze
Counter base/ suspended ceiling	Bisonboard (chipboard)	Less toxic than other board products in SA (plywood, MDF) Affordable Easy to work with Smooth surface for finishing	Chips of timber bond with resin (contains toxic formaldehyde)	Recycled & certified timbers lessen environmental impact	Affordable (less expensive than plywood alternative)	Locally manufactured (transport lessens carbon footprint - same company) (PG Bison, SA)	Standard sizes Utilises cut-offs Smooth surface for finish (unlike plywood that warps)	Fix with formaldehyde free resin	No heavy metals or carcinogens in the pigments Release few synthetic odours	Durable Structural strength, superior screw-holding capability & machinability, width consistent	More stable than plywood (and doesn't warp like plywood), more convenient to use	N/A	N/A	Recycling difficult
Counter base finish	Formica high pressure laminate (HPL)	Durable Variety of colours & wooden textures * Small amount of material used	Made from sustainable wood fibres & recycled paper, impregnated with melamine resin and phenolic resin (Formica uses PPS paper stock, bio-based energy management, water based phenolic resin, Melamine chemically bonded into it and does not outgas).	Minimal amount of material used (lightweight small carbon footprint) Fair amount of energy used in production	Expensive, yet durability unbeatable	Local (transport lessens carbon footprint - same company) (PG Bison, SA)	On site installation	HPL fabrication & installation can now be done with low-VOC adhesives.	RESISTANCE TO WEAR, SCUFF, IMPACT, HEAT, MOISTURE & STAINS	Durable	Easy to maintain Difficult to replace	N/A	N/A	Landfill
Counter top	Surinno Solid Surfacing	Durable * Seamless Corners tough - colour to remain in tact Hygienic	Mineral polymer: 2/3 Aluminium Trihydrate (ATH) (natural mat) mixed with 1/3 Acrylic Modified Polyester Resin (binder)	LEED Green Building Ratings MRc4 (2) MRc5 (2) Eqc4 (1)	More affordable than stainless steel (as will have to be powder coated to achieve design look and feel - not appropriate)	Locally manufactured (transport lessens carbon footprint - same company) (PG Bison, SA)	Pre-made units, on site installation	Non-toxic, no VOCs	100% non porous, hygienic, seamless joints prevents mould, bacterial & microbial growth, stain & chemical resistant, heat resistant.	Durable Scratches can be removed with a kitchen pad & polishing compound or by sanding and polishing the affected area	Low maintenance Highly resistant to deterioration Easy to repair if damaged (solid colour throughout)	N/A	N/A	Re-engineer
Wall panel connecting counter to suspended ceiling	Melawood (laminated chipboard)	Variety of colours & wooden textures Affordable (more so than Formica) Easy to work with	Chips of timber bond with resin with melamine laminate (plastic made with formaldehyde)	Recycled & certified timbers lessen environmental impact	Affordable	Locally manufactured (transport lessens carbon footprint - same company) (PG Bison, SA)	Standard sizes and easy on site assembly	Fix with formaldehyde free resin	Waterproof	Durable Doesn't dent easily	Low maintenance	N/A	N/A	Landfill
Suspended ceiling cladding	Supewood (Medium Density Fibreboard (MDF))	Colour (Melawood not available in red) Appropriate (smooth surface to prevent moisture problems)	Bonded softwood dust (contains toxic formaldehyde: HIGHER CONTENT THAN CHIPBOARD - sawing/cutting can cause health problems)	1.5% recycled	Affordable	Local (transport lessens carbon footprint - same company) (PG Bison, SA)	Standard sizing	Formaldehyde is still used to bond its component fibres, sawing & cutting it can cause health problems	Resistant	Durable	Maintenance lowered if painted/ sealed	N/A	N/A	Reusable Not recyclable
Menu's/ signage	Xanita board	* Informal market inspiration Recycled/ recyclable Variety of finishing options Lightweight (easy to move around/ replace)	Honey comb paper core manufactured from recycled paper & sandwiched between top and bottom layers of semi-rigid printable paper	Made from 100% recycled materials 100% Recyclable and re-pulpable VOC-free	Affordable	Local (Malzey, SA)	Min. waste (utilise entire board) Designed for re-use (easy to move around/ incorporate future frame) into existing product design	VOC free	High strength - weight ratio	Durable	Designed for longevity / durability (reduce the need to replace units - just replace stickers, reduced maintenance)	N/A	N/A	100% Recyclable Fire resistant
Menu's/ signage	Recycled steel sheeting & tubing	Compatible with steel gongola sheathing	Recycled steel profiles	Recycled steel requires about 74% less energy than production of steel from iron ore 100% Recyclable	Affordable	Locally manufactured/ recycled (Steelcase, SA)	Standard sizes Designed for re-use (easy to move around/ incorporate future frame) into existing product design	Recycled steel requires about 74% less energy than production of steel from iron ore 100% Recyclable	All-round high resistance	Very durable Long life	Low maintenance	N/A	N/A	100% Recyclable * retains structural integrity * endlessly recyclable

LEGEND FOR KEY CONSIDERATIONS

■ Sustainability/ positives
■ Why material was ruled out

Table 5.3.2.5: ALTERNATIVE MATERIALS CONSIDERED

USE	MATERIAL	ATMOSPHERE (sensorial)	CONTENT	SUSTAINABILITY	SOURCING	COST	DURABILITY	RESISTANCE	MAINTENANCE	ACOUSTIC PROPERTIES	FIRE	
Floor	Polished concrete	Variety of colours (acid stain, appropriate dye, staining agent/ paint over it with a water proof resin paint). Cold & hard - uncomfortable to stand on for long periods of time. Items more likely to shatter or crack if they fall on the floor.	Uses existing concrete floor that has been treated with a chemical densifier and ground with progressively finer grinding tools	No depletion of resources No carbon footprint	Supplied & manufactured in SA	Affordable	Durable (Solutions Sealers 2015)	Cracks Mold & mildew growth if water penetrates pores (Lewin 2015a)	Needs to be sealed every 3-4 months to maintain protective layer (moisture penetration) Natural cleaning agent	N/A (disadvantages cannot be overlooked)	N/A	
	Rubber	Variety of colours Comfortable Can be installed without seams	Made from recycled rubber tires (Dubose & Labrador 2009)	Recycled, 100% recyclable, manufactured without hazardous chemicals, healthy (no air pollutants), hygienic, no glare Distinctive odour	Local	Expensive (flat cost the of the building) Flat: R999.22/m ² excluding vat Studded: R1600/m ² excluding vat	Durable	Slip resistant (yet in COMMERCIAL KITCHEN - VERY SLIPPERY (Noramet as per Floorworks SA)	Easy maintenance	Good acoustic properties - absorbs sound better than linoleum	Flammable	
	Recycled ceramic tiles	Cold & hard - uncomfortable to stand on for long periods of time Grout lines susceptible to dirt Items more likely to shatter or crack if they fall on the floor (food waste)	* Refer to wall finish table 5.3.4	High embodied energy (production) Recyclable	Local	Affordable (available in range of prices)	Durable, yet can crack with impact	N/A (disadvantages cannot be overlooked since Marmoleum better choice)	N/A	N/A	N/A	
Wall finish	Recycled glass tile	Transparent (shiny, luxurious feel not appropriate)	Recycled glass	Recycled Reflects light		Expensive (twice as much as ceramic tile)	Chips or cracks if hard object falls	N/A (disadvantages cannot be overlooked)	N/A	N/A	N/A	
Ceiling	Open plenum ceiling	Provides a feeling of spaciousness & economy ("low cost look" reinforces the idea that store is going to save you money on your purchase)	Existing roof structure	HVAC & more energy needed to provide power to service greater volumes of air (requires higher static pressures & fan horsepower) LIGHTING: 50% light reflectance	Existing	Initial construction cost is high Fixed components more difficult & costly to move	Greater level of aesthetically acceptable finish required (visible)	Not hygienic - dust & leaks able to reach occupants & surfaces below	Periodic duct, pipes & rafterway cleaning & repainting necessary	None (noise from HVAC)	No physical separation between the elements of building services & the space below Height of the space is greater, & the size of the fire can thus be larger at the time of smoke detector or sprinkler system activation.	
Counter base/ Wall panel connecting counter to suspended ceiling/ Suspended ceiling cladding	Strawboard	*MATERIAL OF CHOICE: COUNTER, SUSPENDED CEILING, INTERIOR PARTITIONS (if it becomes available in SA) *MOST SUSTAINABLE BOARD PRODUCT AVAILABLE (Gieves 2015 and Moxon 2012) Smooth - can apply finish	Waste agricultural straw which uses no adhesive (just pressure)	Low embodied energy Rapidly renewable 100% recyclable & biodegradable No glue just high pressure & arborard outer layer High embodied energy & carbon footprint if need to import	NO (ROWANDA CLOSEST MANUFACTURER/ SUPPLIER) (Strawtec 2015)	Expensive (transport)	Strong Can be sawn, drilled, routed, nailed, screwed, & glued (Strowtec 2015)	Termites, mold-, & impact-resistant (Strawtec 2015)	Low maintenance	Reduces sound transmission	Fire resistant	
	Plywood	INTRIGUING JOINTS POSSIBLE (TAKE APART FOR FUTURE USE) Surface not ideal for required	Thin sheets of timber glued together for combined strength	High embodied energy Uses toxic formaldehyde resins (more than chipboard) NB to check that it contains certified timber	Local	Affordable	Not as dense or as uniform as particleboard	Warp Handles water better than chipboard				
	OBS	Surface too rough to finish (not as smooth as BisonBoard)	Formed by rectangular wood strips (flakes) arranged in cross-oriented layers, with the help of waterproof adhesives	High embodied energy (need heat in production) Use toxic formaldehyde Versions using recycled & certified timbers lessen environmental impact	Supplied & manufactured in SA (ITM 2015)	Affordable	More sturdy, water resistant & durable than chipboard	Expands when exposed to moisture	N/A	N/A	N/A	
Counter base finish	Eco clad	N/A	Layers of paper comprised of post consumer recycled paper fiber and rapidly renewable bamboo fiber, they integrate the performance wood grain and color paper layers with a UV armor layer on top and a balance layer on the back.	Recycled Renewable	NO (USA)	Expensive (transport)	Durable	N/A	N/A	N/A	N/A	
	Melamine	Uniform finish Large variety of colours and textures	Melamine starts with a compressed wood particle core. It's then covered with a resin and paper finish that can be manufactured to various styles and colours. It's often used for cabinetry in kitchens, bathrooms and other areas throughout the home.	Made with formaldehyde Landfill material	Local	Affordable	Chips Susceptible to wear damage	Moisture, heat & stain resistant Can splinter during installation	N/A	N/A	N/A	
	Veneer	Attractive & elegant alternative to solid wood Wooden textures only Doesn't have required colours	Thin slices of hardwood	Wood renewable Min. material used	Local	Affordable	Requires care & maintenance because it can scratch May want to protect with glass top or other desk top covering	N/A	N/A	N/A	N/A	
	Counter top	Recycled glass	Varies greatly in appearance (Jeresek 2015a)	Recycled glass	Cradle to Cradle certified Jeresek 2015a)	Local	Expensive	Chips easily Chips cannot be replaced (entire countertop will have to be replaced) (Jeresek 2015a)	High maintenance (Jeresek 2015a)	N/A	N/A	
	Paperstone	Not durable enough for supermarket application Using pigments rather than dyes colour stability and even distribution of colour throughout the entire panel	Made from 100% post-consumer recycled paper & PaperStone's phenolic resins	CLAIMED TO BE GREENEST ARCHITECTURAL SURFACE ON THE PLANET Manufactured using 100% recyclable materials (Andersen 2015)	Local	N/A	Damaged by general-purpose cleaners, bleach, ammonia & singlar (Andersen 2015)	Does not withstand heat or stains (Andersen 2015)	N/A	N/A	N/A	
	Stainless steel	Not compatible with design (will require powder coating, which is not justifiable)	Metal alloy with 10% chromium content	100% recyclable, made from an estimated 60-100% recycled stainless steel Recycling steel uses a fraction of the energy required to produce it from virgin sources. Healthy - does not offgas Phigmine Chromium mixing high embodied energy	Local	Expensive, yet has a long life (save money in the long run and is better for the environment)	Very durable Nonporous Does not corrode, rust or stain with water Impervious to heat	Dents & scratches easily Fingerprint smudges show up easily (if sanded to brushed finish, it helps hide prints)	Low maintenance Easy to clean	Noisy	N/A	
	Powder coated steel	Powder coating does not require a solvent & is VOC free - virtually no waste (any reclaim generated during the application process can be captured & recycled with nearly 100% use of the coating)	* Refer to menu's/ signage table 5.3.4			Affordable	Dents	Rust inevitable even with powder coating - chips	* Refer to menu's/ signage table 5.3.4			
	3 Form 100 percent	Not available in red Complex fabrication	Made entirely from post-consumer recycled High Density Polyethylene (HDPE). It is a household plastic that is incorporated into high density panels.	Made from 100% recycled materials Recycled Renewable	Local	Expensive	Low service temperature	Good chemical resistance Withstands impact Not abrasion resistant	*CHROMA - low impact strength low chemical resistance	N/A	N/A	Flame resistant

5.4.1 DELI



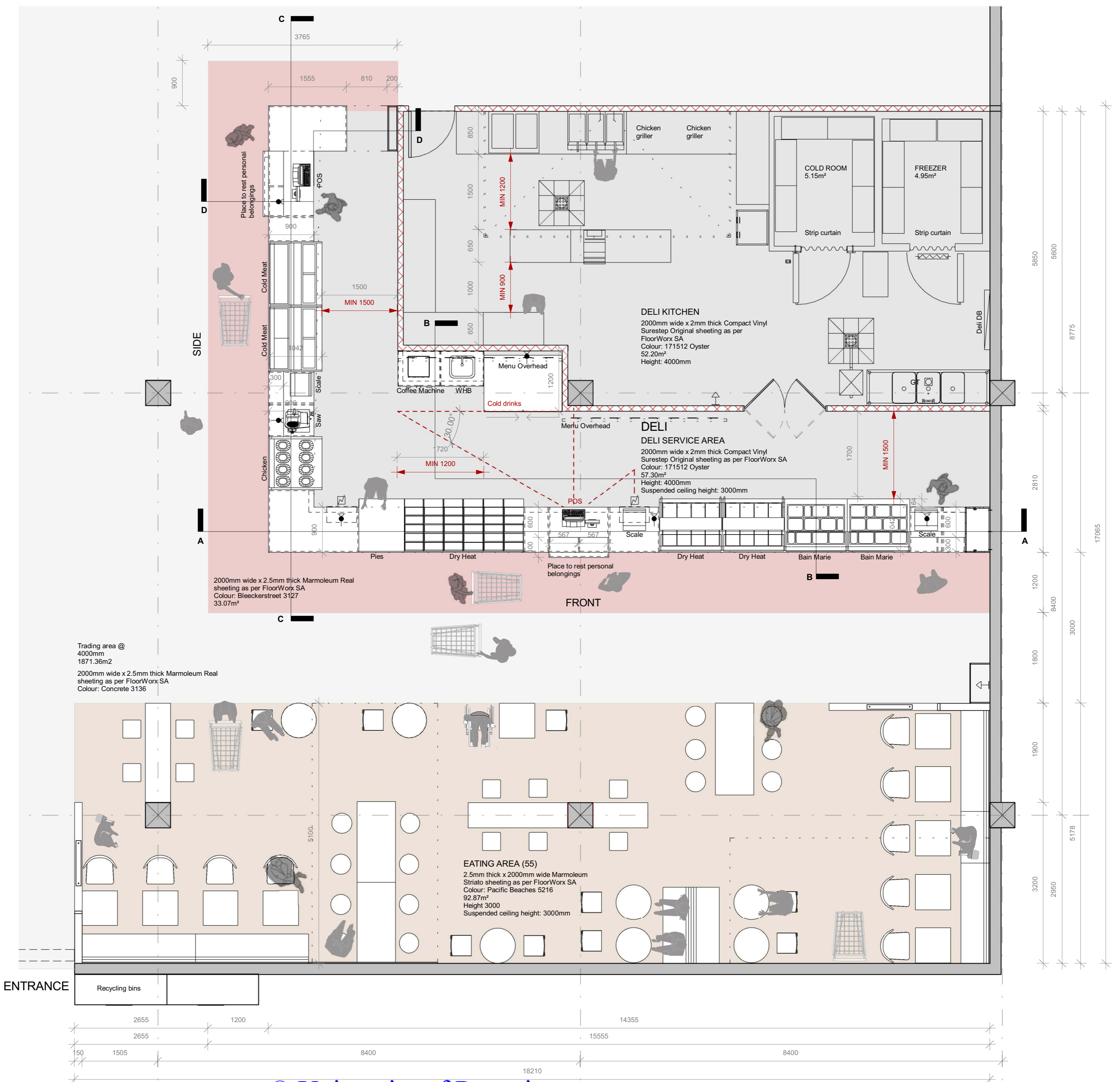
Figure 5.4.1.1: Deli Perspective (Author 2015)



KEY PLAN

LEGEND	
FLOOR FINISH [pattern allows less dirt to show]	
	Floor around Deli 2000mm wide x 2.5mm thick Marmoleum Real sheeting as per FloorWorx SA Colour: Bleekerstreet 3127
	Sales floor 2000mm wide x 2.5mm thick Marmoleum Real sheeting as per FloorWorx SA Colour: Concrete 3136
	Service area & kitchen 2000mm wide x 2mm thick Compact Vinyl Surestep Original sheeting as per FloorWorx SA Colour: 171512 Oyster
	Eating Area 2.5mm thick x 2000mm wide Marmoleum Striato sheeting as per FloorWorx SA Colour: Pacific Beaches 5216
ELECTRICAL, FIRE FIGHTING & DRAINAGE	
	SWITCH SOCKET OUTLET
	MICROWAVE OVEN
	FIRE EXTINGUISHERS
	GREASE TRAP

ADAPTABLE DESIGN LEGEND	
MAX DIMENSIONS [4500m ² STORE]	
MIN DIMENSIONS [2500m ² STORE] / CRUCIAL RELATIONSHIPS INDICATED	
Calculation: Max 4500 ÷ Min 2500 = 1.8 Max dimensions ÷ 1.8 = Min dimension Answer rounded off to nearest 100mm	



DELI PLAN

SCALE 1:50

Figure 5.4.1.2: Deli Plan (Author 2015)

5.4.1.3 Deli Lighting Guidelines

* Kindly refer to Appendix D - Deli Ceiling Plan on page 70 to see how the guidelines are illustrated in an example.

TABLE 5.4.1.3a: AVERAGE ILLUMINATION CALCULATION
(Bean 2004:284-289)

ZONE 1: KITCHEN.....
KITCHEN AREA
Manufacturing of delicatessen foods, kitchens Em, **min. 500 lx** (SABS 10114-1:2005, Table 1)
[Maxos LED 4MX850]: 48W; 6600lm
Width: 5.85m
Height above horizontal working plane: (4000-850) = 3.15m
Total area: 52.2m²
 $Rf = W/2H = 5.85/2(3.15) = 5.85/6.3 = 0.93$
 $UF = 0.32$
 $MF = LLMF \times LSF \times LMF \times RSMF = 0.8 \times 1 \times 0.82 \times 0.98 = 0.64$
 $Eav = n \times FL (lm) \times UF \times MF / Awp = 1 \times 6600 \times 0.35 \times 0.64 / 52.2 = 28.32 \text{ lx per LED}$
500 lx required / 28.32 lx per LED = **18 LED's required**

[FOR COMPARATIVE PURPOSES]
Standard T8 Fluorescent 32W; 2850lm
 $MF = LLMF \times LSF \times LMF \times RSMF = 0.84 \times 0.75 \times 0.98 = 0.51$
 $Eav = n \times FL (lm) \times UF \times MF / Awp = 1 \times 2850 \times 0.35 \times 0.51 / 52.2 = 9.75 \text{ lux per lamp / luminaire}$
500lux required / 9.75lux per lamp = **51.28 = 51 lamps required**

• 33 LESS LAMPS REQUIRED THEN WHEN TYPICAL T8 IS USED
COLD ROOM
Chilling and cold rooms, ice-making Em, **min. 200 lx** (SABS 10114-1:2005, Table 1)
[Maxos LED 4MX850]: 48W; 6600lm
Width: 2m
Height above horizontal working plane: (3000-850) = 2.15m
Total area: 5.15m²
 $Rf = W/2H = 2/2(2.15) = 2/4.3 = 0.47$
 $UF = 0.31$
 $MF = LLMF \times LSF \times LMF \times RSMF = 0.8 \times 1 \times 0.82 \times 0.97 = 0.64$
 $Eav = n \times FL (lm) \times UF \times MF / Awp = 1 \times 6600 \times 0.31 \times 0.64 / 5.15 = 254.26 \text{ lx per LED} = 1 \text{ LED required}$

FREEZER
Chilling and cold rooms, ice-making Em, **min. 200 lx** (SABS 10114-1:2005, Table 1)
[Maxos LED 4MX850]: 48W; 6600lm
Width: 2m
Height above horizontal working plane: (3000-850) = 2.15m
Total area: 4.95m²
 $Rf = W/2H = 2/2(2.15) = 2/4.3 = 0.47$
 $UF = 0.31$
 $MF = LLMF \times LSF \times LMF \times RSMF = 0.8 \times 1 \times 0.82 \times 0.97 = 0.64$
 $Eav = n \times FL (lm) \times UF \times MF / Awp = 1 \times 6600 \times 0.31 \times 0.64 / 4.95 = 264.53 \text{ lx per LED} = 1 \text{ LED required}$

ZONE 2: SALES FLOOR.....
Sales areas (large) Em, **min. 500 lx** (SABS 10114-1:2005, Table 1)
GENERAL LIGHTING
[LuxSpace Accent Performance, fixed version, RS751B, LED 39S]: 35W; 3500lm
Width: 12.79m
Height above horizontal working plane: (4000-900) = 3.1m
Total area: 118.02m²
 $Rf = W/2H = 12.79/2(3.1) = 12.79/6.2 = 2.06$
 $UF = 0.42$
 $MF = LLMF \times LSF \times LMF \times RSMF = 0.9 \times 1 \times 0.82 \times 0.98 = 0.72$
 $Eav = n \times FL (lm) \times UF \times MF / Awp = 1 \times 3500 \times 0.42 \times 0.72 / 118.02 = 8.97 \text{ lx per LED}$

ACCENT LIGHTING (MENU'S & ADVERTISEMENTS) - 4 x menu's & 2 x advertisements = 6 LED's required
[LuxSpace Accent Performance, adjustable version, RS751B, LED 39S]: 35W; 3500lm
 $MF = LLMF \times LSF \times LMF \times RSMF = 0.9 \times 1 \times 0.82 \times 0.98 = 0.72$
 $Eav = n \times FL (lm) \times UF \times MF / Awp = 6 \times 3500 \times 0.42 \times 0.72 / 118.02 = 53.81 \text{ lx for the 6 LED's}$

PROJECTORS (FOOD DISPLAYS) 12 LED's required
[StylID Fresh Food, Performance 3C-track version, LED26S, light source colour Fresh Food Meat (FMT)]: 47W; 2600lm
 $MF = LLMF \times LSF \times LMF \times RSMF = 0.7 \times 1 \times 0.82 \times 0.98 = 0.56$
 $Eav = n \times FL (lm) \times UF \times MF / Awp = 12 \times 2600 \times 0.42 \times 0.56 / 118.02 = 62.18 \text{ lx for the 12 LED's}$

PENDANT LIGHTING 10 LED lamps required
[MASTER LEDbulb]: 7W; 470lm
 $MF = LLMF \times LSF \times LMF \times RSMF = 0.7 \times 1 \times 0.82 \times 0.98 = 0.56$
 $Eav = n \times FL (lm) \times UF \times MF / Awp = 10 \times 470 \times 0.42 \times 0.56 / 118.02 = 9.37 \text{ lx for the 10 lamps}$

500 lx required - 53.81 lx (ACCENT LIGHTING) - 62.18 lx (PROJECTORS) - 9.37 lx (PENDANT LIGHTING) = 374.64 lx left to obtain
374.64 lx / 8.97 lx per LED (GENERAL LIGHTING) = **42 LED's required for GENERAL LIGHTING**

ZONE 3: EATING AREA.....
Restaurant, dining room, function room, bars Em, **min 200 lx** (SABS 10114-1:2005, Table 1)
GENERAL LIGHTING
[LuxSpace Compact Power BBS49S (UGR19 version)]: 30W; 2660lm
Width: 5.1m
Height above horizontal working plane: (4000-850) = 3.15m
Total area: 92.87m²
 $Rf = W/2H = 5.1/2(3.15) = 5.1/6.3 = .81$
 $UF = 0.3$
 $MF = LLMF \times LSF \times LMF \times RSMF = 0.7 \times 1 \times 0.82 \times 0.98 = 0.56$
 $Eav = n \times FL (lm) \times UF \times MF / Awp = 1 \times 2660 \times 0.3 \times 0.56 / 92.87 = 4.81 \text{ lx per LED}$

ACCENT LIGHTING (ADVERTISEMENTS) 2 LED's required
[LuxSpace Accent Performance, adjustable version, RS751B, LED 39S]: 35W; 3500lm
 $MF = LLMF \times LSF \times LMF \times RSMF = 0.9 \times 1 \times 0.82 \times 0.98 = 0.72$
 $Eav = n \times FL (lm) \times UF \times MF / Awp = 2 \times 3500 \times 0.3 \times 0.72 / 92.87 = 16.28 \text{ lx for the 2 lamps}$

PENDANT LIGHTING 6 fluorescent lamps required
[T5 Fluorescent Circular Lamp]: 22W; 1800lm
 $MF = LLMF \times LSF \times LMF \times RSMF = 0.84 \times 1 \times 0.75 \times 0.98 = 0.51$
 $Eav = n \times FL (lm) \times UF \times MF / Awp = 6 \times 1800 \times 0.3 \times 0.51 / 92.87 = 17.79 \text{ lx for the 6 lamps}$

PENDANT LIGHTING 6 LED lamps required
[MASTER LEDbulb]: 7W; 470lm
 $MF = LLMF \times LSF \times LMF \times RSMF = 0.7 \times 1 \times 0.82 \times 0.98 = 0.56$
 $Eav = n \times FL (lm) \times UF \times MF / Awp = 6 \times 470 \times 0.3 \times 0.56 / 92.87 = 5.10 \text{ lx for the 6 lamps}$

200 lx required - 16.28 lx (ACCENT LIGHTING) - 17.79 lx (PENDANT LIGHTING) - 5.10 lx (PENDANT LIGHTING) = 160.83 lx left to obtain
160.83 lx / 4.81 lx per LED (GENERAL LIGHTING) = **33 LED's required for GENERAL LIGHTING**

LIGHT COLOUR OPTIONS TO ENHANCE MERCHANDISE
Philips has developed a complete LED portfolio for fresh food

	LED Rose	LED Authentic White	LED Champagne	LED Frolic White
Meat				
Fruit and vegetables				
Cheese				
Bread and pastries				
Fish				

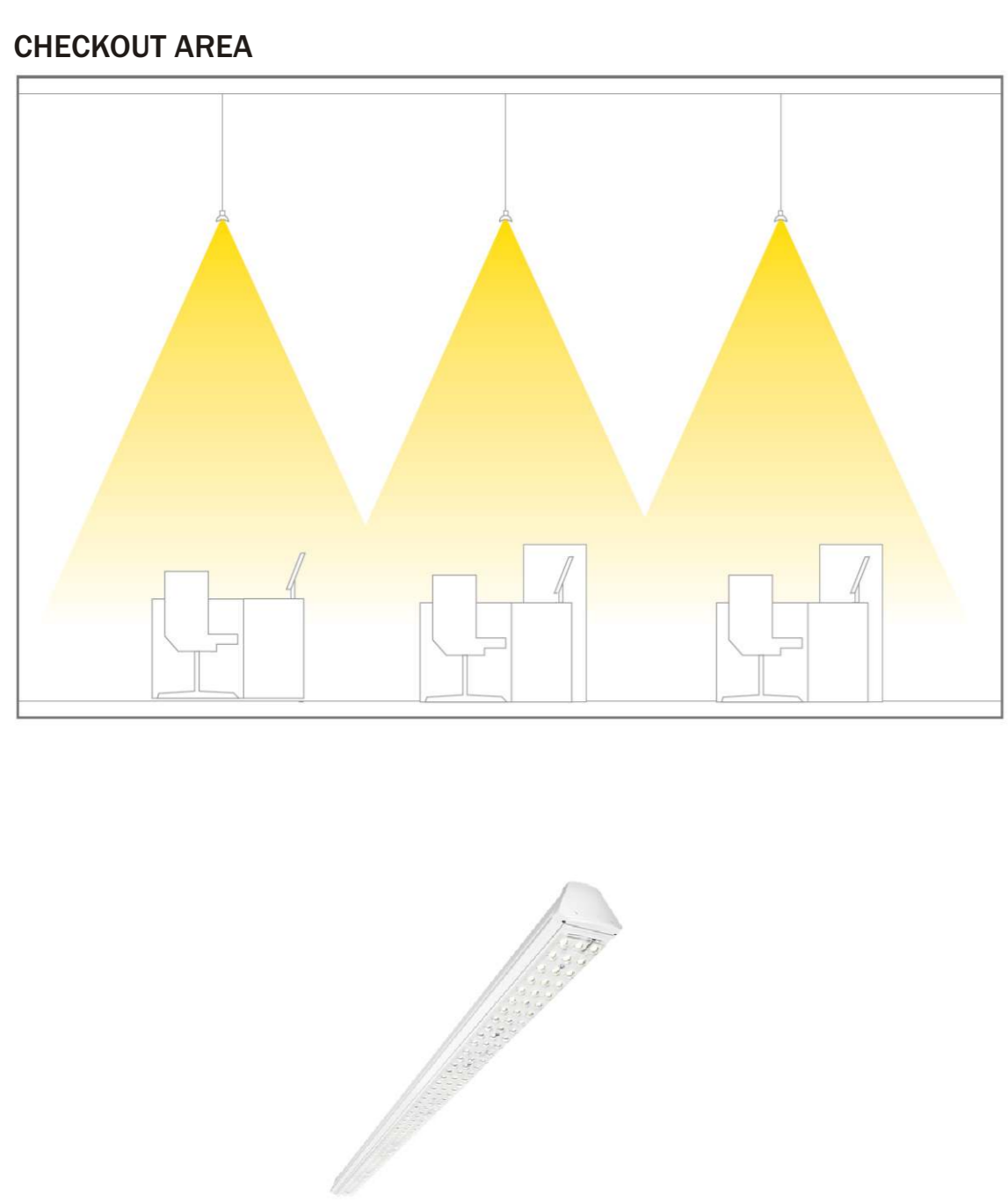
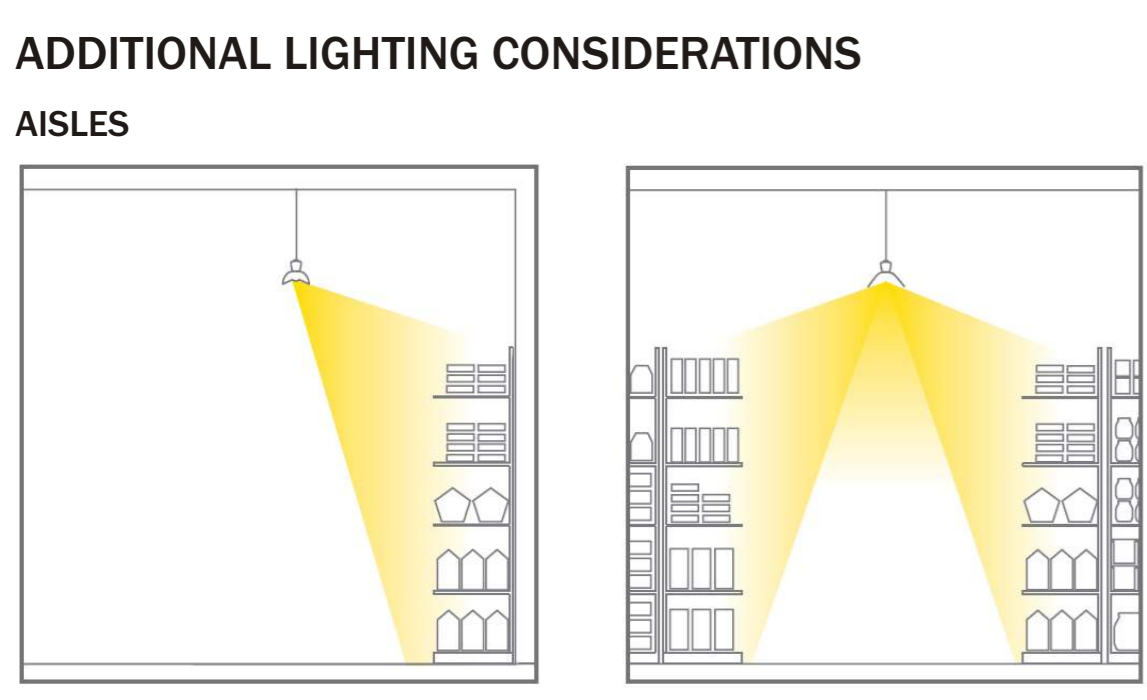
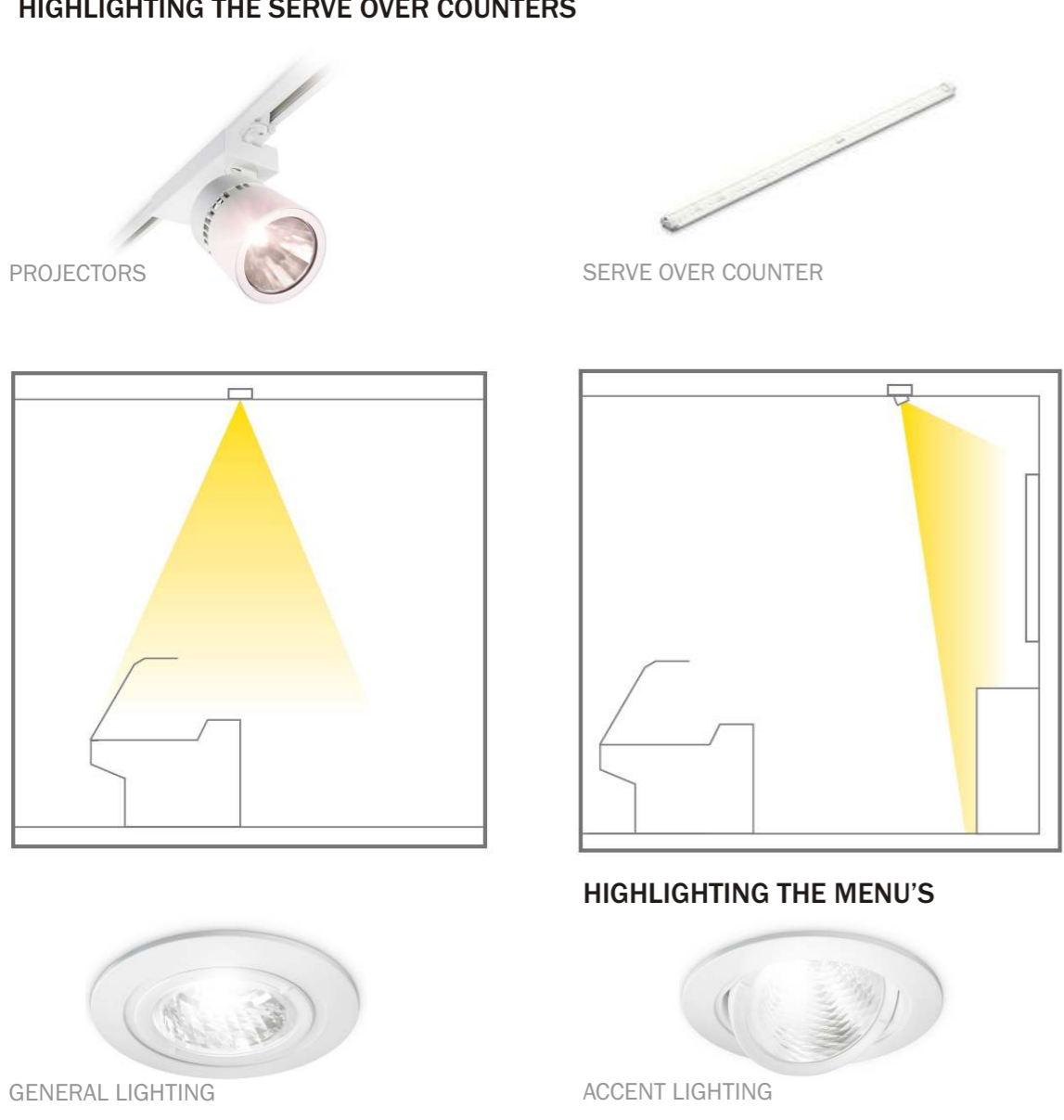
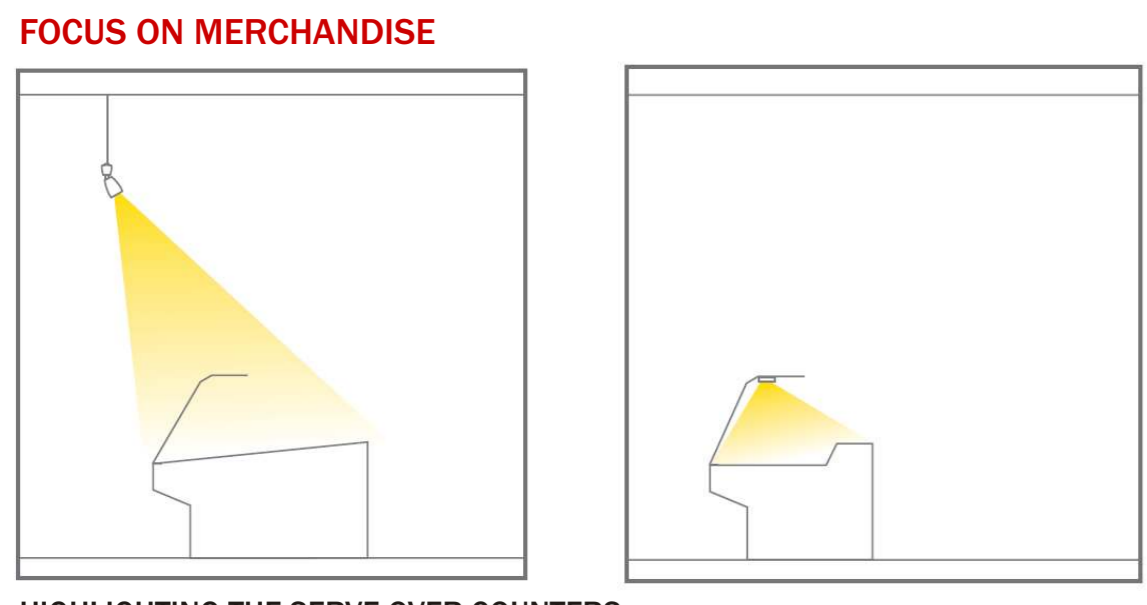
Authentic white light highlights the colour of the merchandise in Deli counters

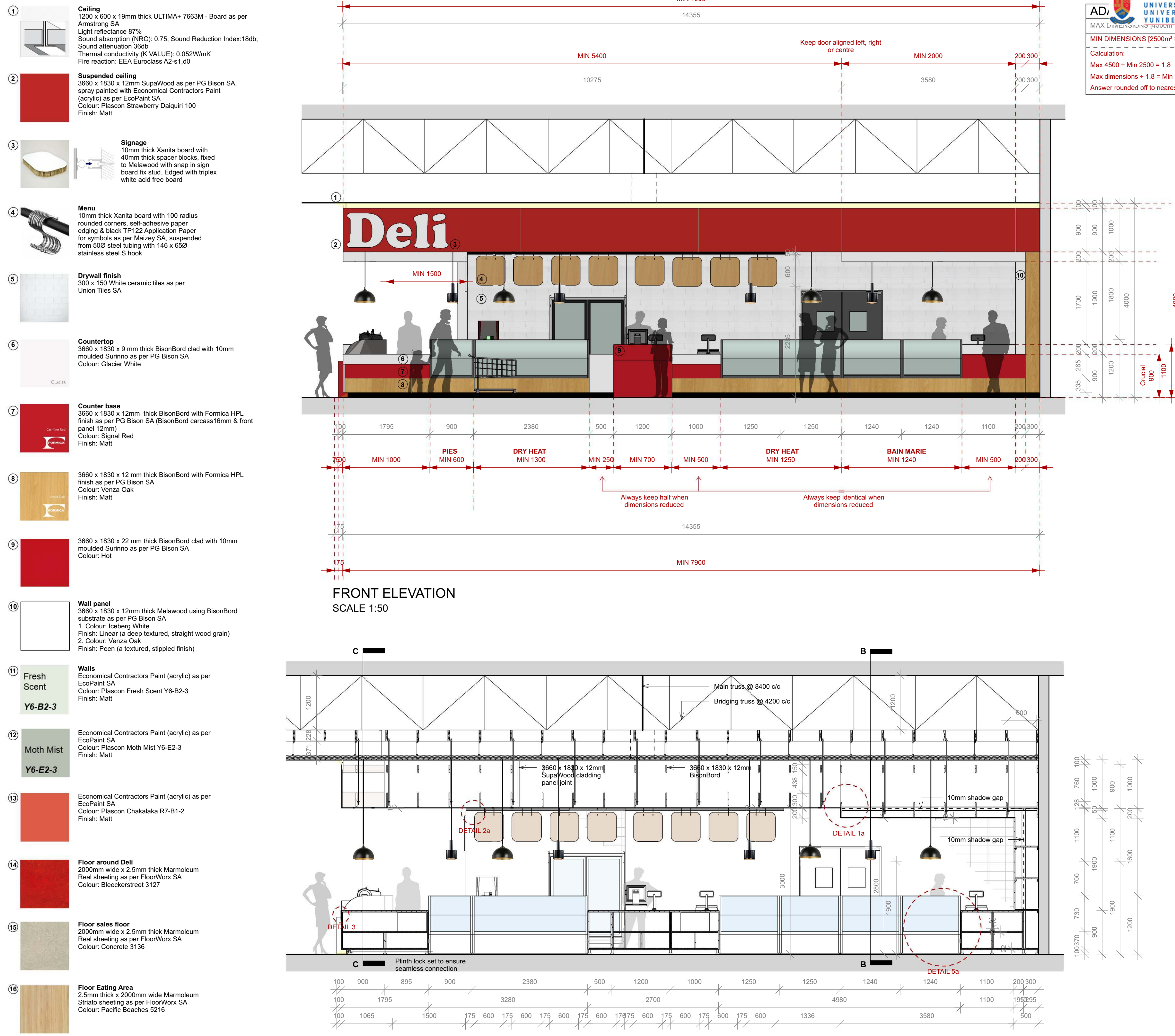
TABLE 5.4.1.3b: LIGHTING LEGEND

SYMBOL	LUMINAIRE SPECIFICATIONS	LAMP SPECIFICATIONS	QUANTITY (luminaire x lamp)	LUMINOUS FLUX (lumen per lamp)	TOTAL LOAD (watt)	TOTAL LUMINOUS FLUX (lumen)	EFFICACY (lumen/watt)
ZONE 1: BACK OF HOUSE							
	KITCHEN (3x LED), COLD ROOM (1x LED) & FREEZER (1x LED)	[Maxos LED 4MX850] by Philips, SA 1500 x 63 Surface mounted LED; White (WH) sheet metal Power: 48W; Luminous flux: 6600lm; Correlated colour temperature: 4000K Light colour: Natural White; CRI: 90; Colour Rendering Index: 90; Median useful life: 70 000hr; Average ambient temperature: 25°C; Beam angle: 2 x 50° (wide beam)	20	6600	960 W	132 000 lm	138 lm/W
TOTAL			20	6600	960 W	132 000 lm	138 lm/W
	KITCHEN, COLD ROOM & FREEZER	Standard T8 Fluorescent by Philips, SA (for comparative purposes) Power: 32W; Initial lumens: 2850lm; Colour temperature 3000K; Median useful life: 29 000hr	51	2850 lm	1632 W	145 350 lm	89 lm/W
ZONE 2: SALES FLOOR							
	GENERAL LIGHTING	[Presentation in meat, bread and cheese counters is optimally supported by warm white lighting (3000K) (Osram 2015)] [LuxSpace Accent Performance, fixed version, RS751B, LED 39S] by Philips, SA 1680 Adjustable surface mounted LED; White (WH) Power: 35 W; Luminous flux: 3500 lm; Correlated colour temperature: 3000K Light colour: Warm white; Colour Rendering Index: 90; Median useful life: 70 000hr; Average ambient temperature: 25°C; Beam angle: 60°	42	3500 lm	1470 W	147 000 lm	100 lm/W
	ACCENT LIGHTING (MENU'S & ADVERTISEMENTS)	[LuxSpace Accent Performance, adjustable version, RS751B, LED 39S] by Philips, SA 1680 Adjustable surface mounted LED; White (WH) Power: 35 W; Luminous flux: 3500 lm; Correlated colour temperature: 3000K Light colour: Warm white; Colour Rendering Index: 90; Median useful life: 70 000hr; Average ambient temperature: 25°C; Beam angle: 60°	6	3500 lm	210 W	21 000 lm	100 lm/W
	PROJECTORS (FOOD DISPLAYS)	[StylID Fresh Food, Performance 3C-track version, LED26S, light source colour Fresh Food Meat (FMT)] by Philips, SA 1190 LED track light; White (WH) Power: 47 W (LED26S, light color FMT); Luminous flux: 2600; Correlated colour temperature: 3000K; Light colour: Warm white; Colour Rendering Index: 90; Median useful life: 70 000hr; Average ambient temperature: 25°C; Beam angle: 60°	12	2600 lm	564 W	31 200 lm	55 lm/W
	PENDANT LIGHTING	[MASTER LEDbulb] by Philips, SA Power: 7W (Wattage Equivalent: 40 W) Luminous flux: 470lm LLMF - end nominal lifetime 70 % Correlated colour temperature: 2700K Light colour: Warm white Colour Rendering Index: 80 Median useful life: 70 000hr Average ambient temperature: 25°C	10	470 lm	70 W	47 000 lm	67 lm/W
TOTAL			70	2314 W	20 390 lm	322 lm/W	
ZONE 3: EATING AREA							
	EQUIPMENT LIGHTING	[Affinium LED Display Module LDM 400 for refrigerated display cases, Value Plus] by Philips, SA 1200 long Power: 8 W Illuminance: 760 lux LLMF - end nominal lifetime 70 % Lumen maintenance Correlated colour temperature: 6600K Light colour: Cool white Colour Rendering Index: 75 Median useful life: 60 000hr Operating temperature: min -30°C/max 30°C Beam angle: 15° • Suitable for vertical full-height glass-door freezers/coolers • Energy saving up to 80%	1	8 W	-	-	-
	2x COOLERS (COLD MEAT) 1290mm	[Affinium LED display modules 424 Well and serve-over] by Philips, SA 1150 long Power: 18 W Illuminance: 750 lux Light colour: LED ROSE Colour Rendering Index: 75 Median useful life: 60 000hr Operating temperature: min -30°C/max 30°C Beam angle: 130° • Energy saving up to 80%	2	30 W	-	-	-
	1x DRY HEAT (CHICKEN) 1060mm	[Affinium LED display modules 422 Canopies, Value-plus] by Philips, SA 850 long Power: 18 W Illuminance: 750 lux Light colour: LED AUTHENTIC WHITE Colour Rendering Index: 70 Median useful life: 60 000hr Operating temperature: min -30°C/max 30°C Beam angle: 60° • Energy saving up to 50%	1	18 W	-	-	-
	1x DRY HEAT (PIES) 900mm (850)	[Affinium LED display modules 422 Canopies, Value-plus] by Philips, SA 850 long Power: 18 W Illuminance: 750 lux Light colour: LED AUTHENTIC WHITE Colour Rendering Index: 70 Median useful life: 60 000hr Operating temperature: min -30°C/max 30°C Beam angle: 60° • Energy saving up to 50%	1	18 W	-	-	-
	1x DRY HEAT (SANDWICHES, HOTDOGS ETC) 2383mm (2x850)	[Affinium LED display modules 422 Canopies, Value-plus] by Philips, SA 850 long Power: 18 W Illuminance: 750 lux Light colour: LED ROSE Colour Rendering Index: 75 Median useful life: 60 000hr Operating temperature: min -30°C/max 30°C Beam angle: 130° • Energy saving up to 80%	2	30 W	-	-	-
	2x DRY HEAT (PRE-PACKED LUNCHES WITH MEAT, STARCH AND VEG ETC) 1226mm (1200)	[Affinium LED display modules 422 Canopies, Value-plus] by Philips, SA 850 long Power: 18 W Illuminance: 750 lux Light colour: LED ROSE Colour Rendering Index: 75 Median useful life: 60 000hr Operating temperature: min -30°C/max 30°C Beam angle: 130° • Energy saving up to 80%	2	30 W	-	-	-
	2x BAIN MARIE (MEAT, STARCH, VEG, CHEESE) 1240mm (1200)	[Affinium LED display modules 422 Canopies, Value-plus] by Philips, SA 850 long Power: 18 W Illuminance: 750 lux Light colour: LED ROSE Colour Rendering Index: 75 Median useful life: 60 000hr Operating temperature: min -30°C/max 30°C Beam angle: 130° • Energy saving up to 80%	2	30 W	-	-	-
	LED AUTHENTIC WHITE: Natural display, slightly enhancing the red	Natural display, slightly enhancing the red	1	18 W	-	-	-
	Natural display	Natural display	1	18 W	-	-	-
	ATMOSPHERIC LIGHTING (ABOVE SUSPENDED CEILING AND BELOW COUNTER)	[LightStrip Curve Colour] by Philips, SA 1600mm long Power: 0.06W x 60 bulbs in strip = 3.6 W	19	68.4 W	-	-	-
TOTAL			33	2660 lm	990 W	87 780 lm	89 lm/W
GRAND TOTAL (including equipment)							
			1234 W	108 400 lm	338 lm/W		
			4608 W [4776.4]	444 300 lm	798 lm/W		



DIAGRAMS ILLUSTRATING LIGHTING STRATEGY FOR DELI



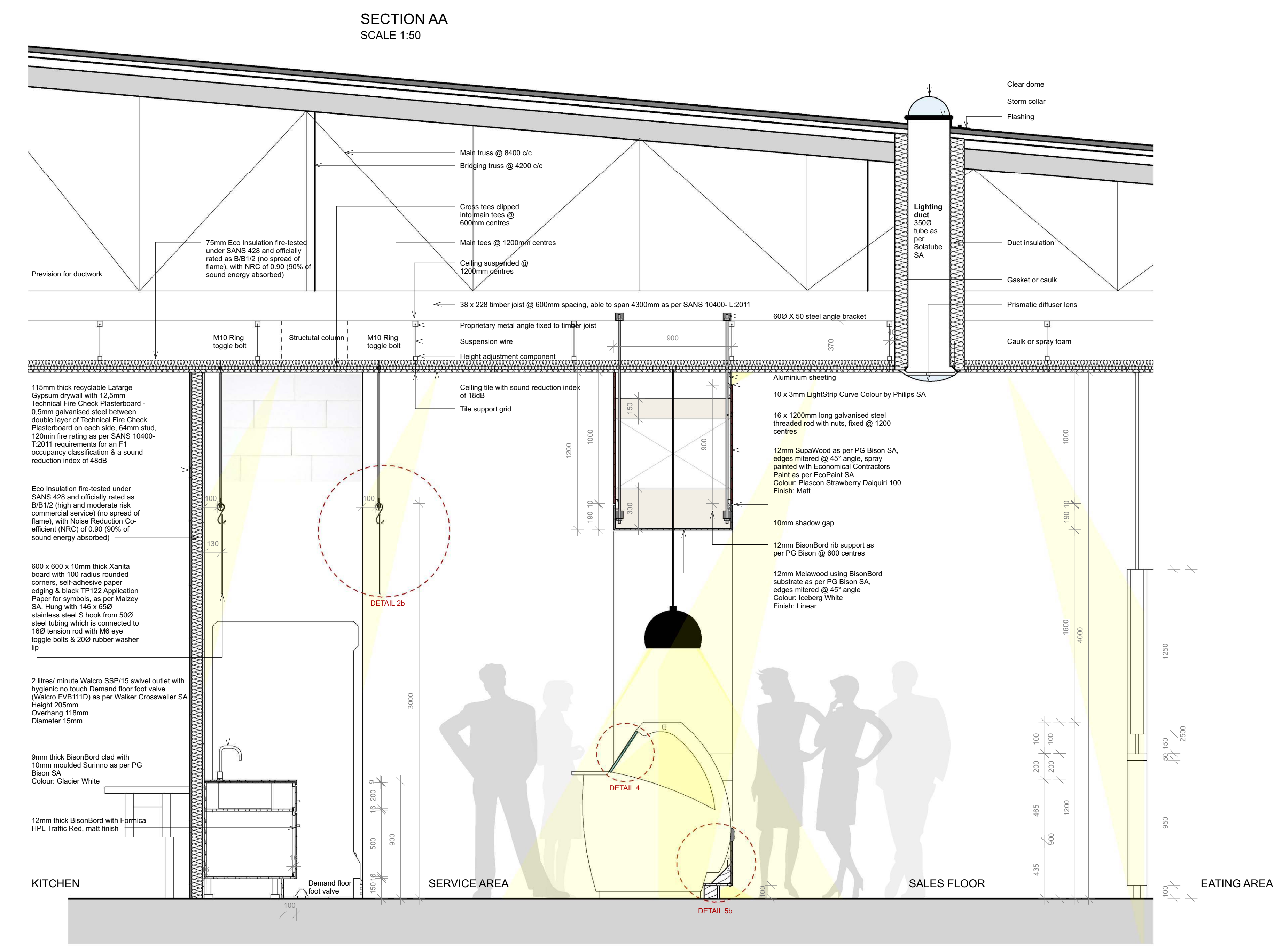


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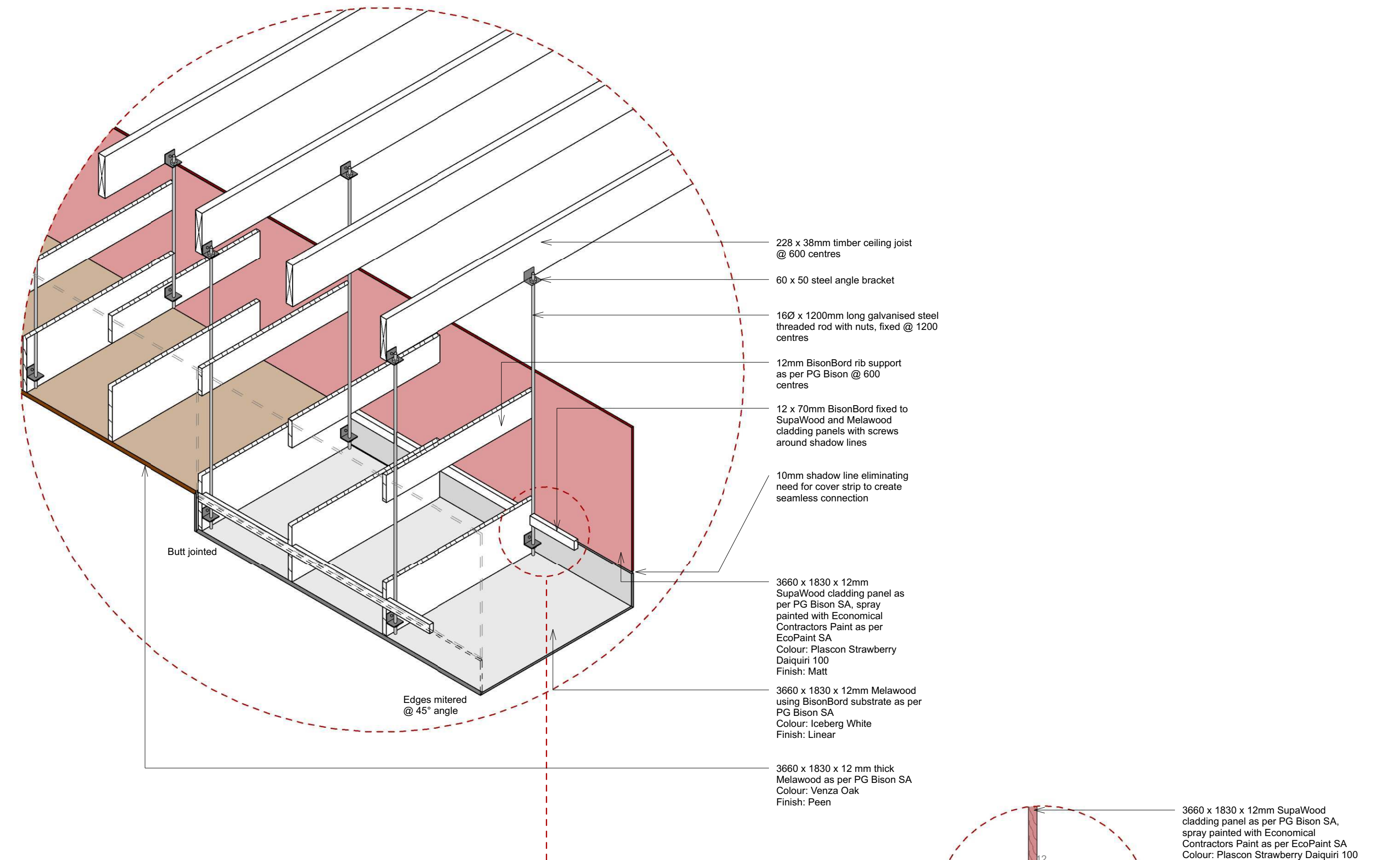
AD. ARCHITECTURAL DRAWINGS

MIN DIMENSIONS [2500* STORE]

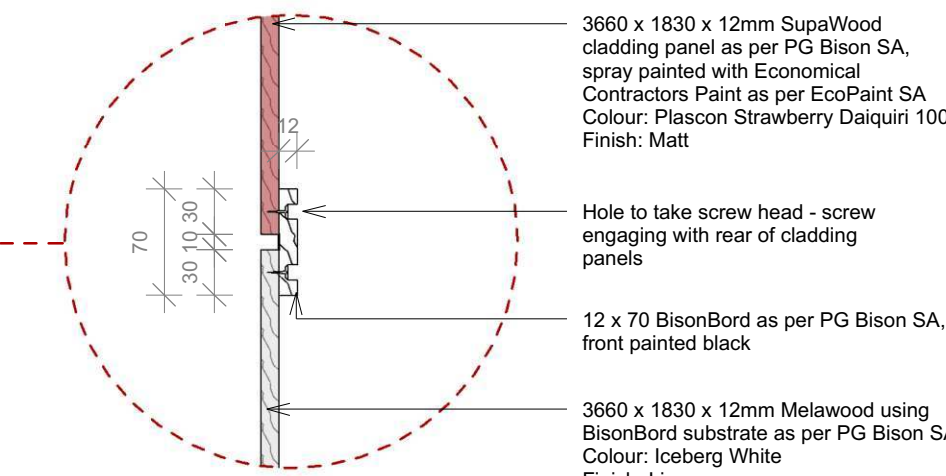
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Max dimensions = 1.8 + Min dimension
Answer rounded off to nearest 100mm



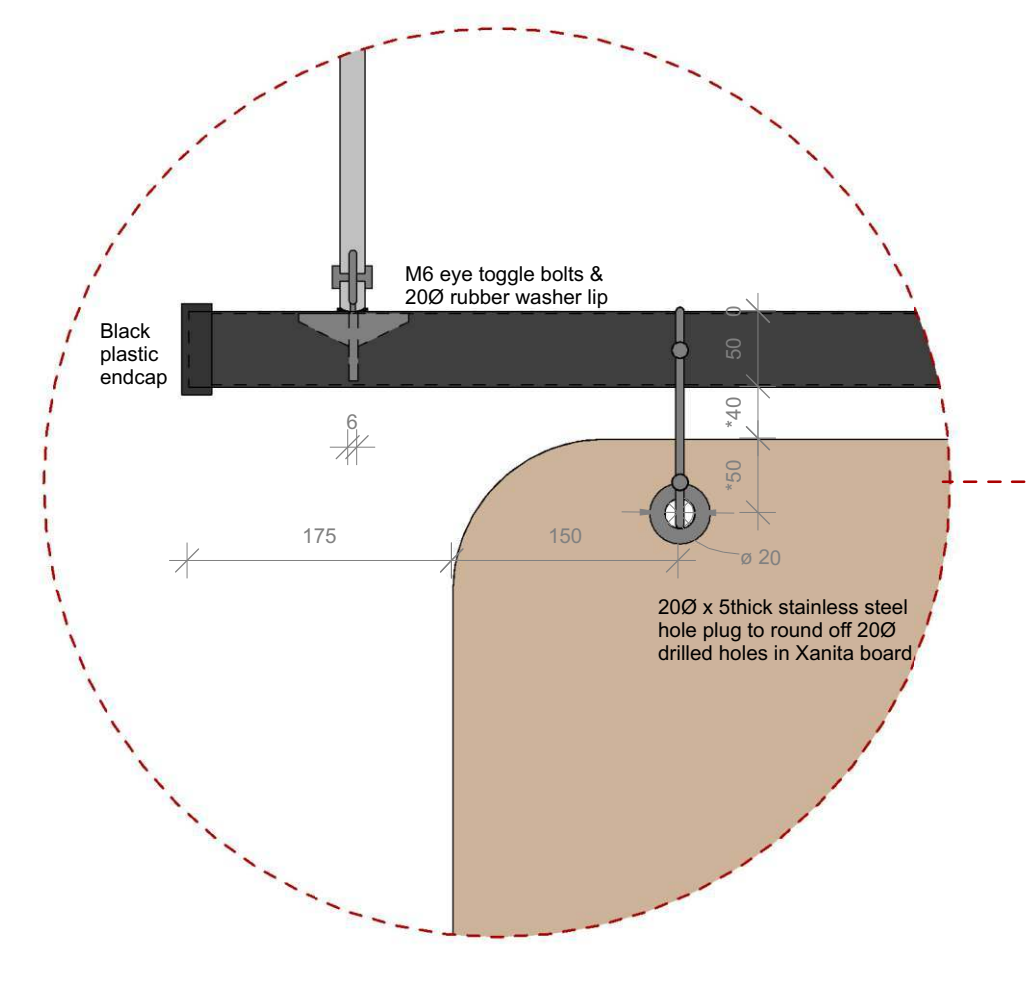
SECTION BB
SCALE 1:20
Figure 5.4.1.4: Deli Sections & Details
(Author 2015)



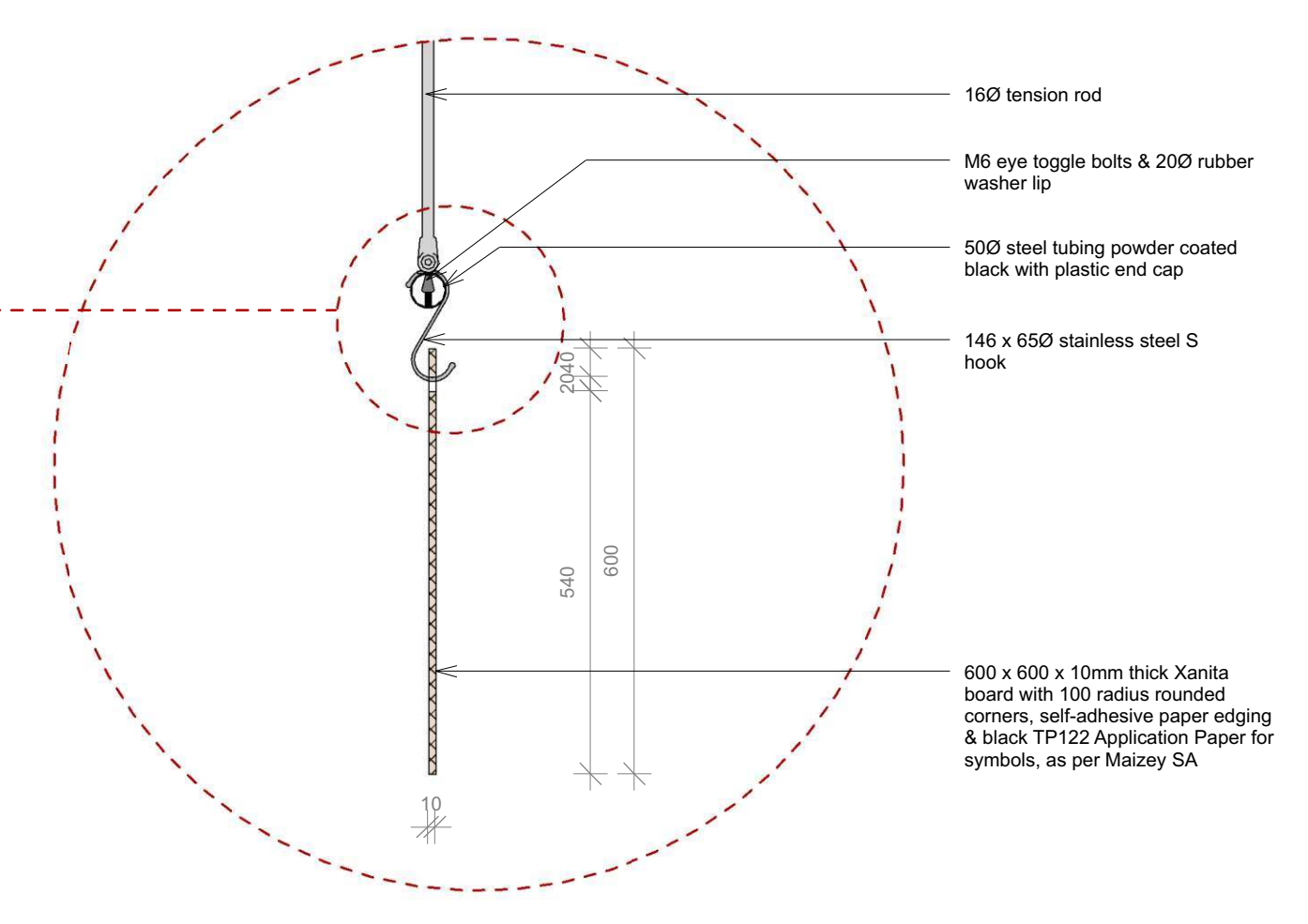
DETAIL 1a - SUSPENDED CEILING AXONOMETRIC
SCALE 1:20



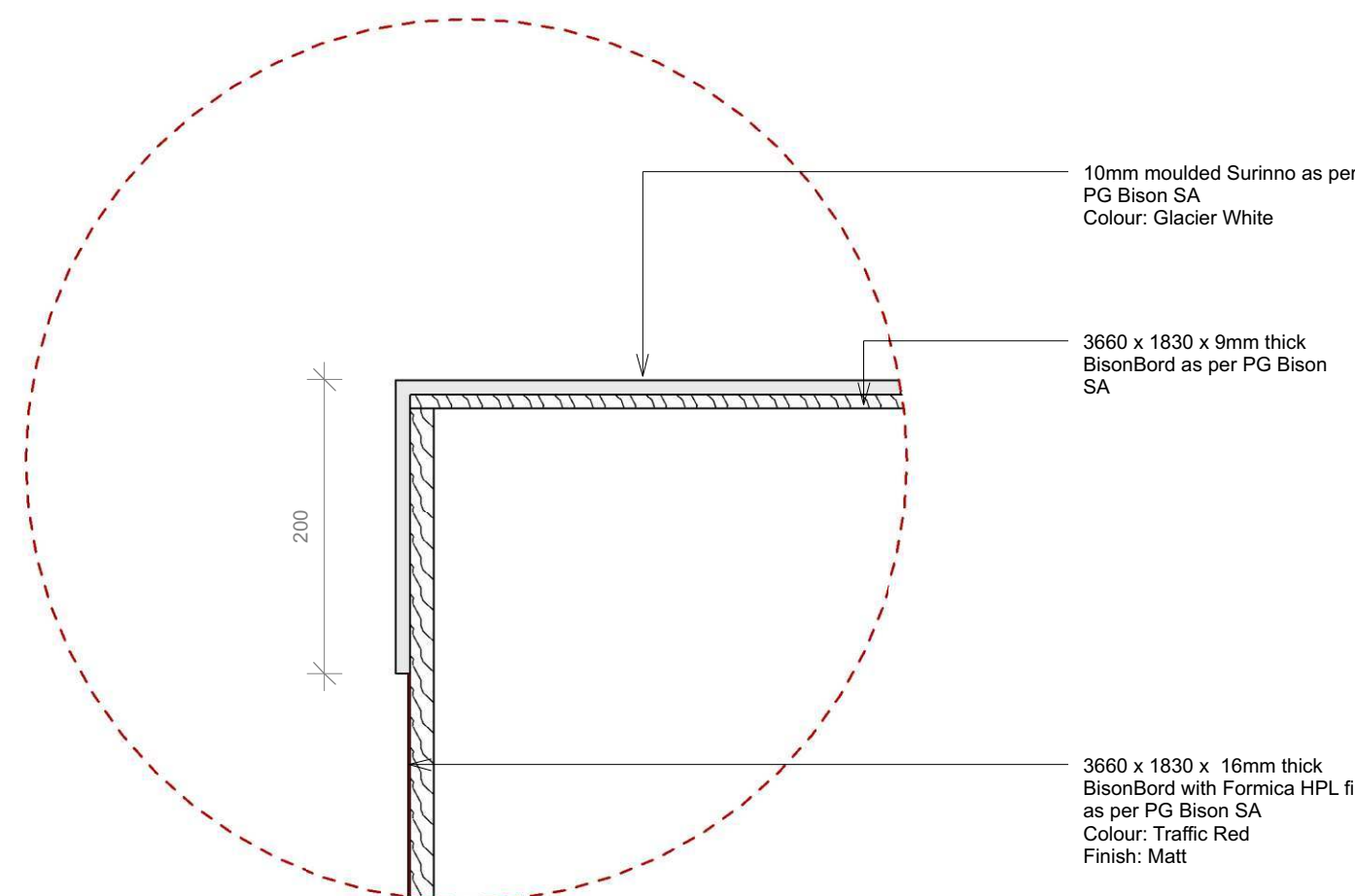
DETAIL 1b - SHADOW LINE
SCALE 1:5



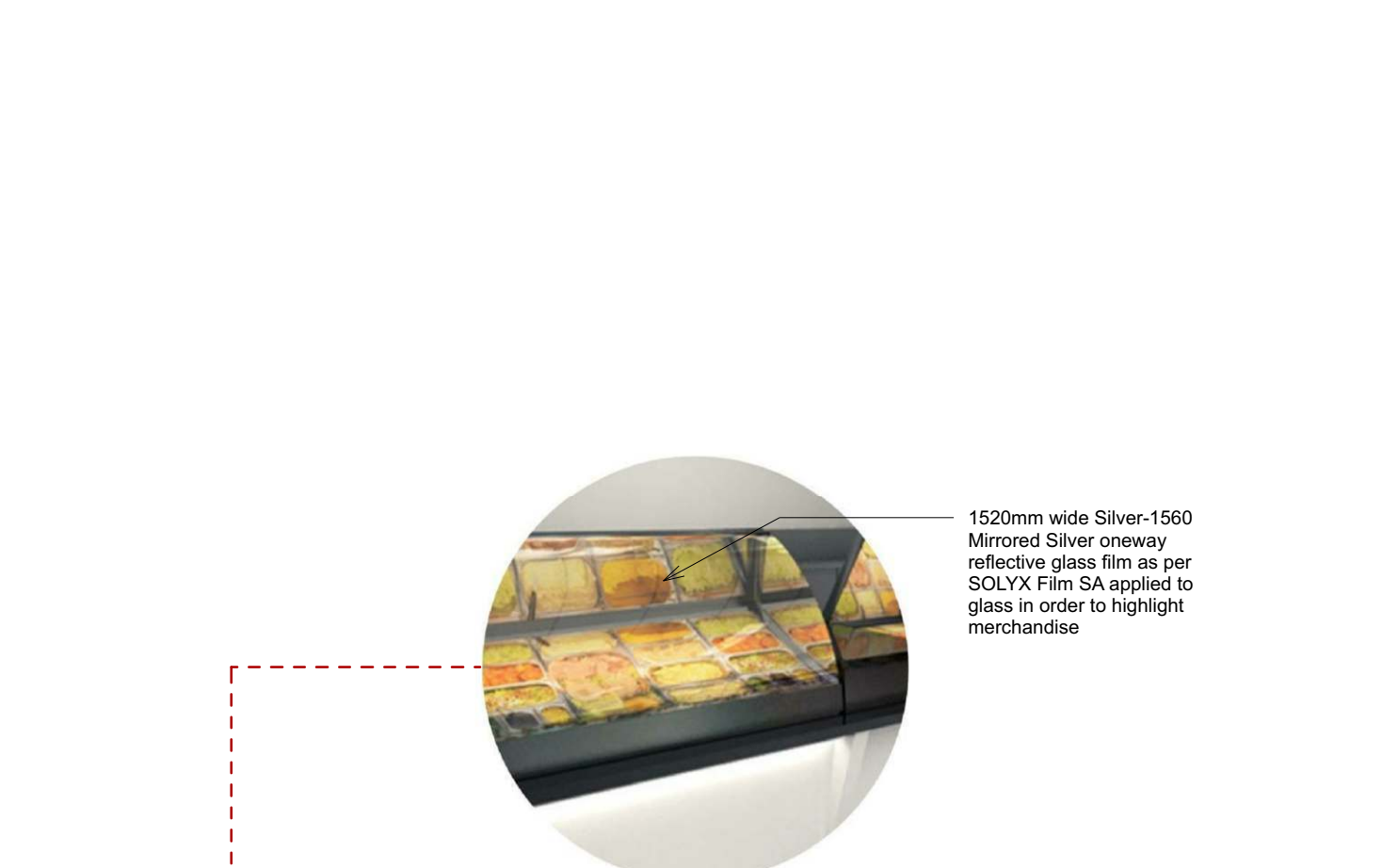
DETAIL 2a - MENU FRONT ELEVATION
SCALE 1:5



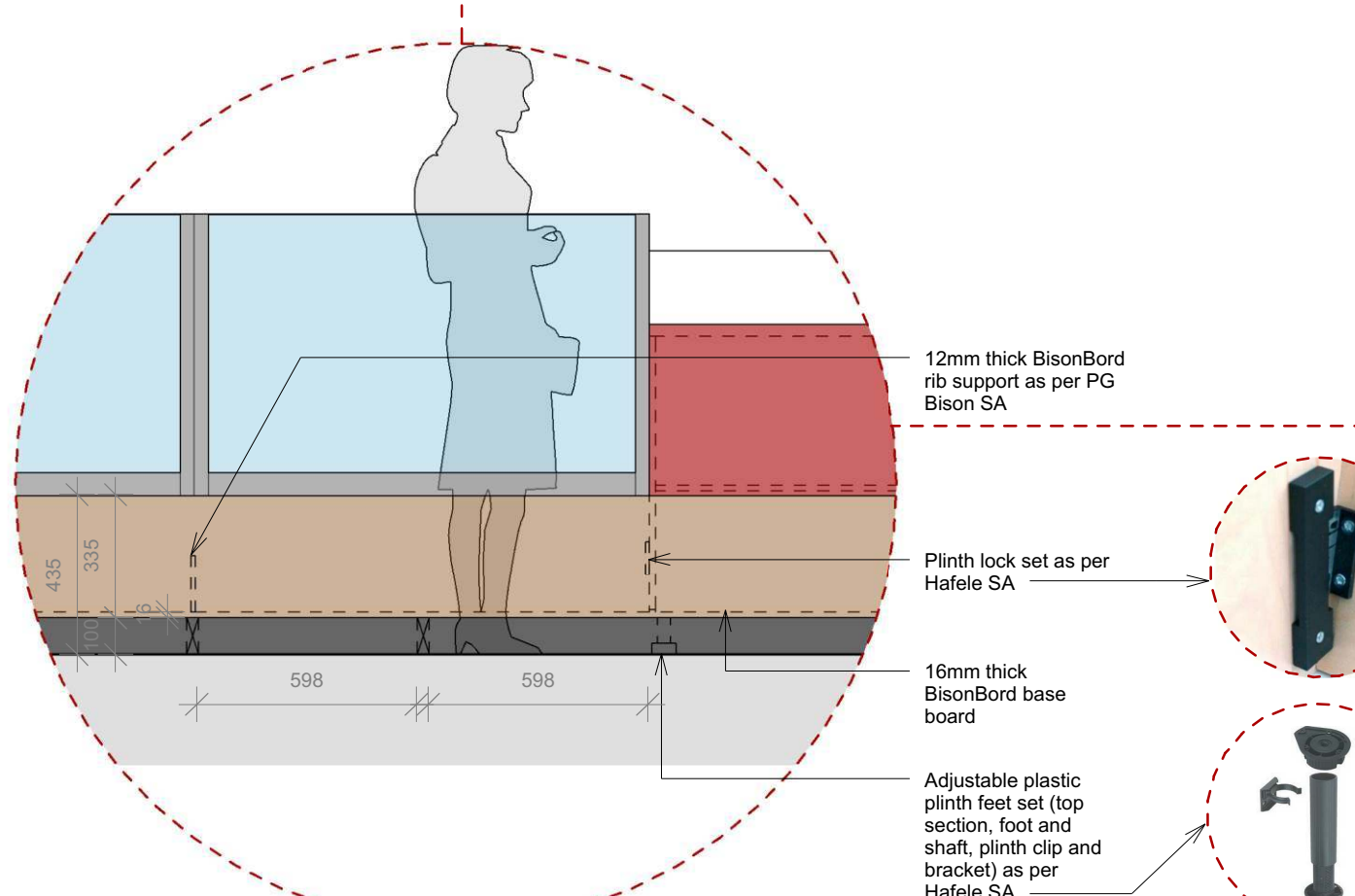
DETAIL 2b - MENU SECTION
SCALE 1:10



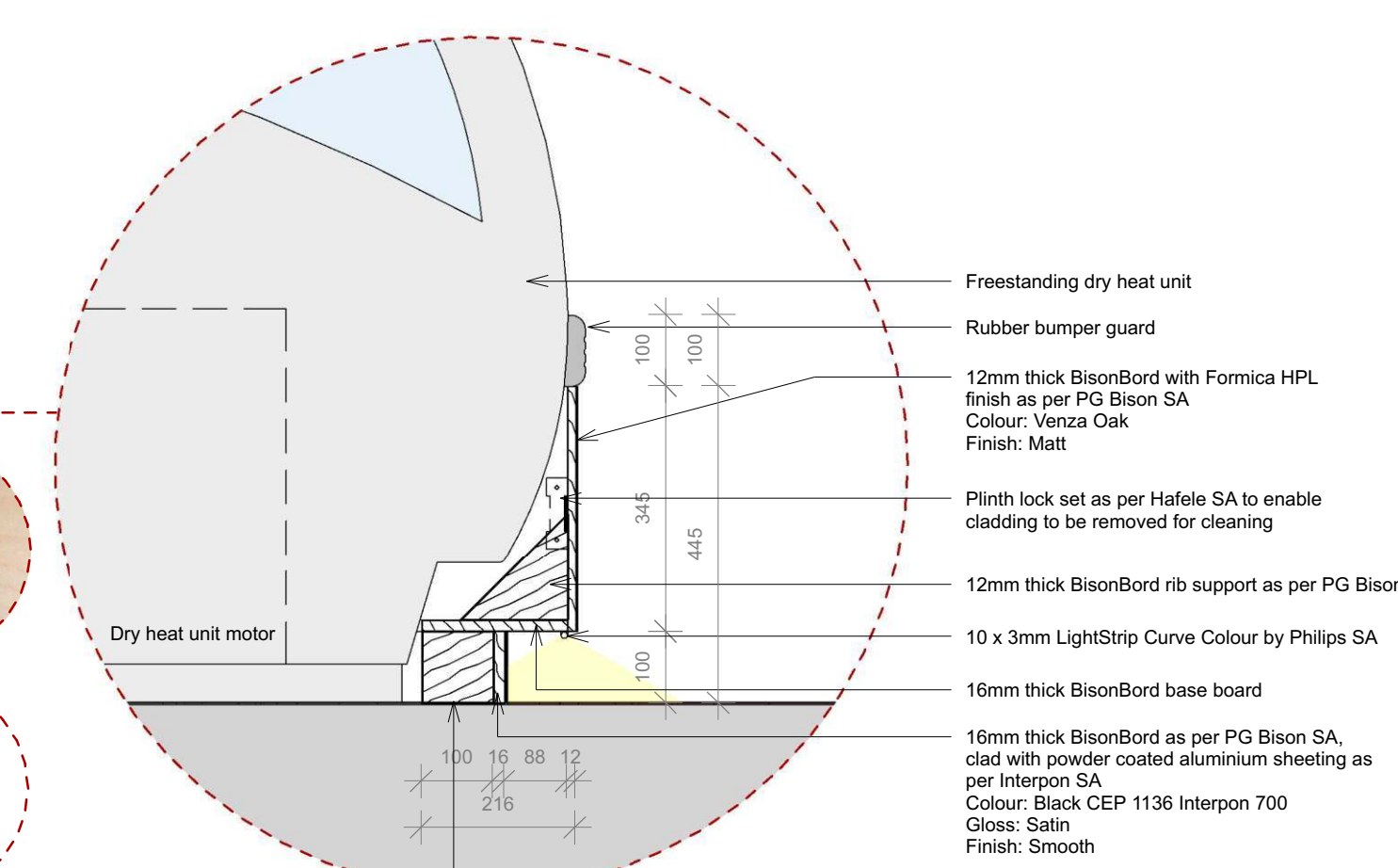
DETAIL 3 - COUNTERTOP
SCALE 1:5



DETAIL 4 - SERVE OVER COUNTER MODIFICATION
NOT TO SCALE



DETAIL 5a - SERVE OVER COUNTER FRONT ELEVATION
SCALE 1:20



DETAIL 5b - SERVE OVER COUNTER SECTION: REMOVABLE CLADDING
SCALE 1:10

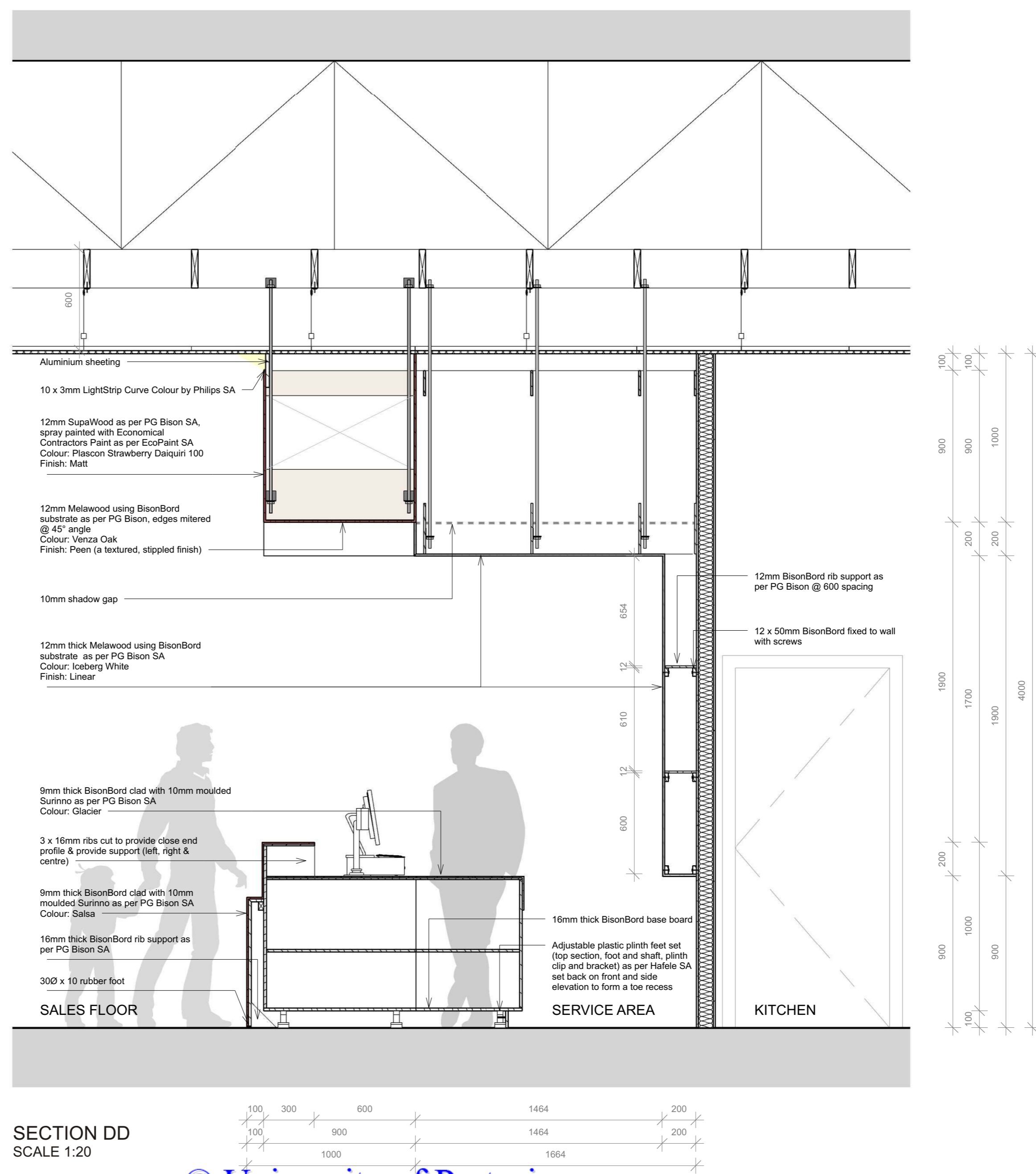
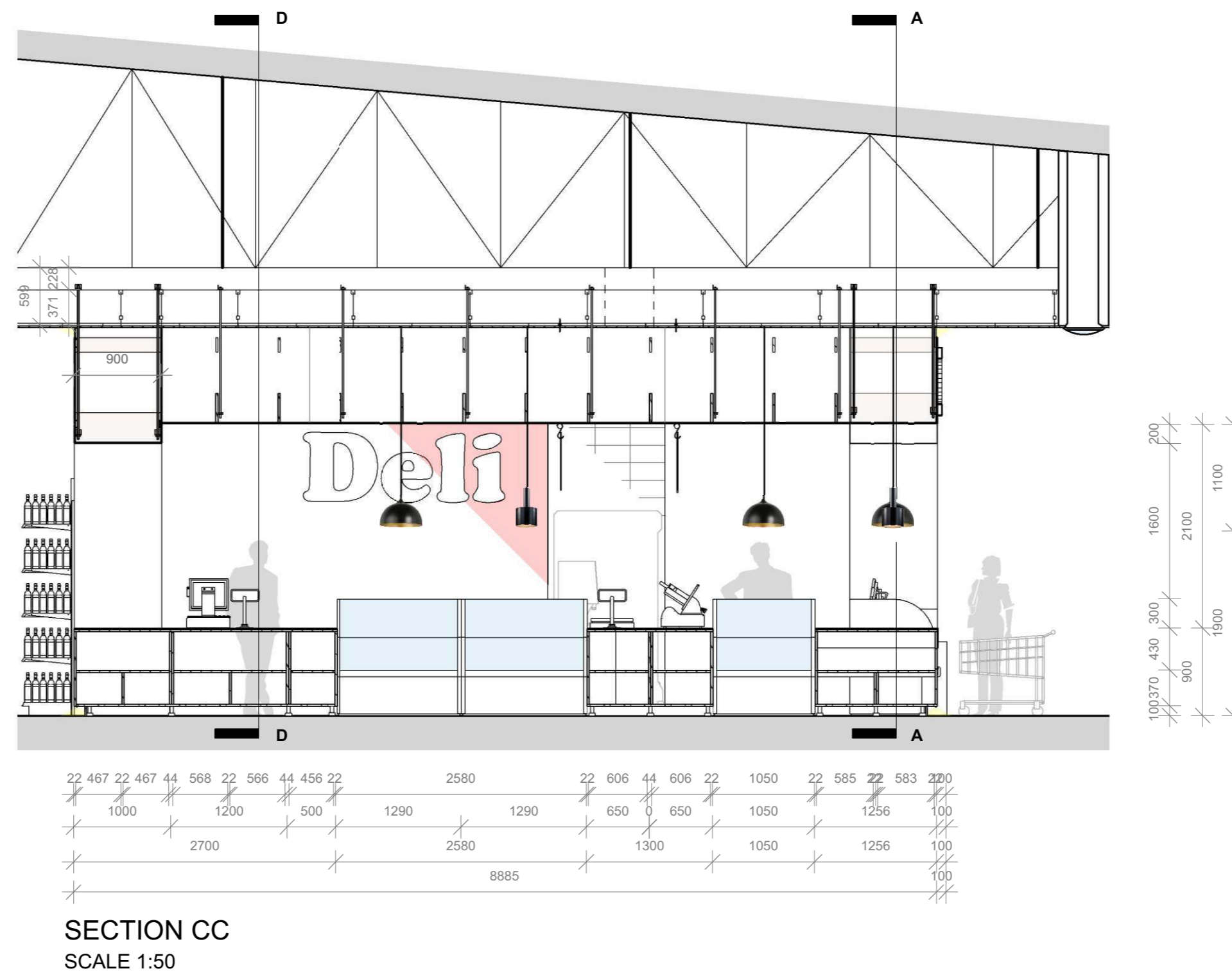
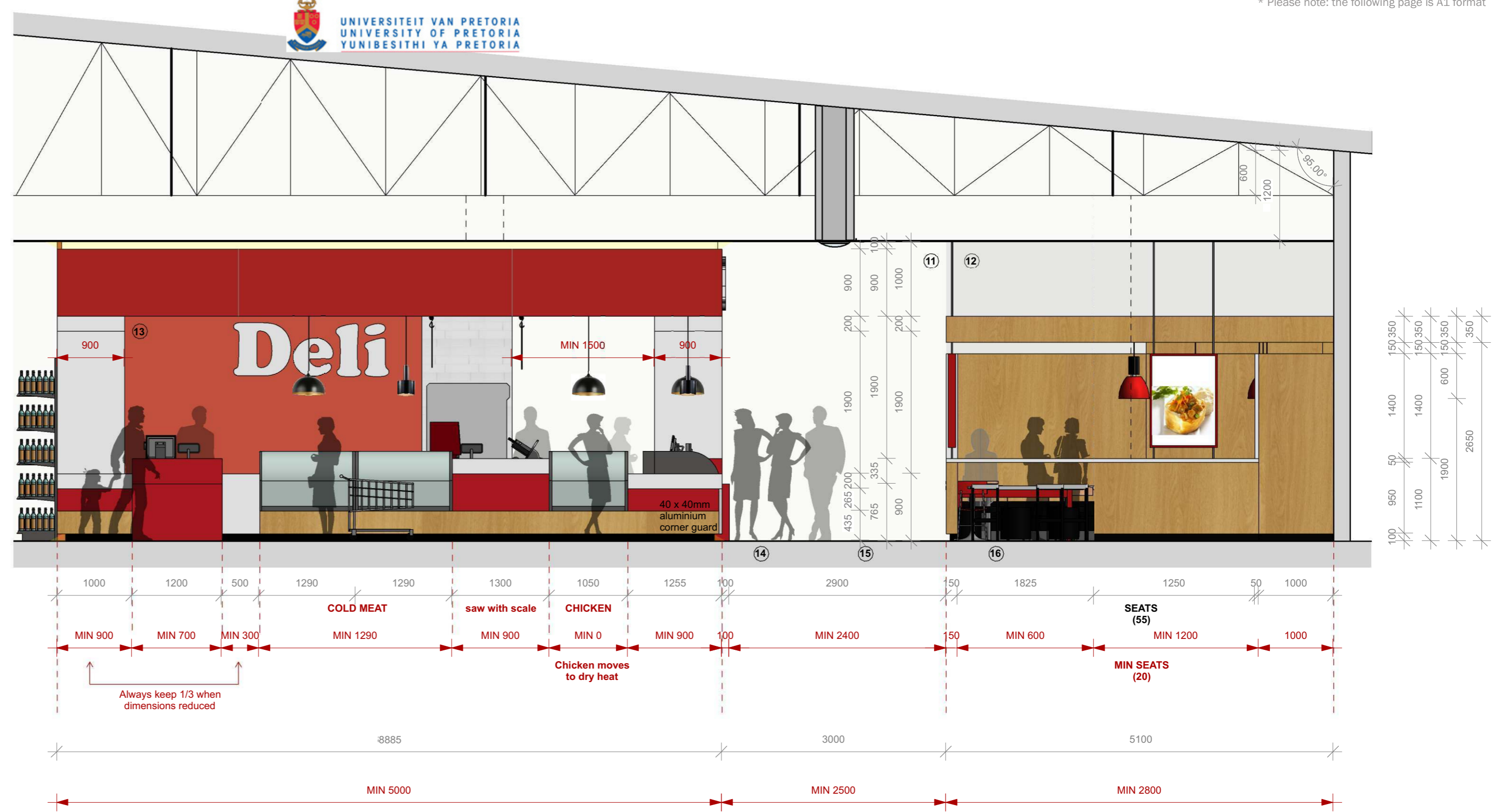


Figure 5.4.L5: Deli Sections Contin... University of Pretoria (Author 2015)

5.4.2 BAKERY



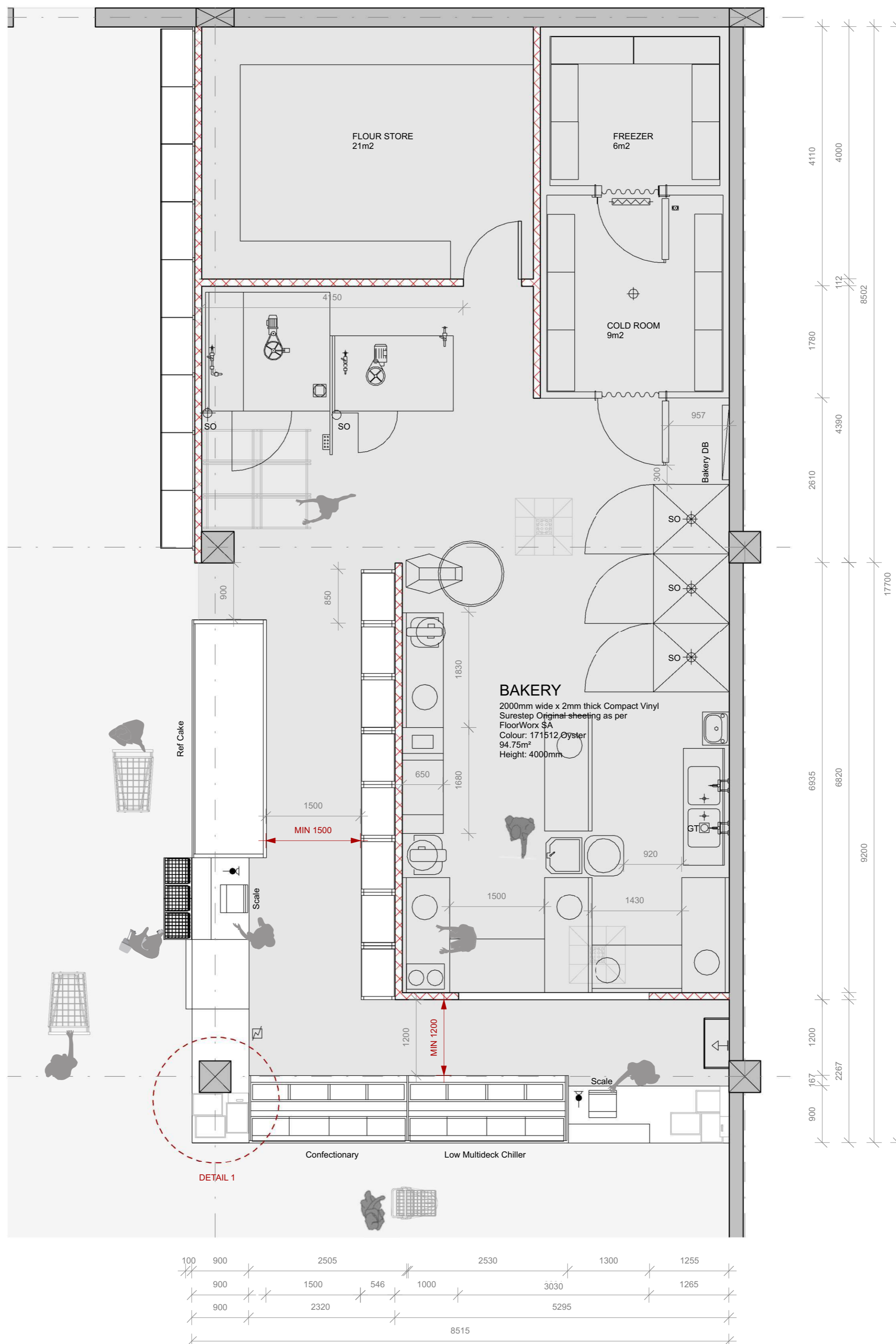
Figure 5.4.2.1: Bakery Perspective (Author 2015)



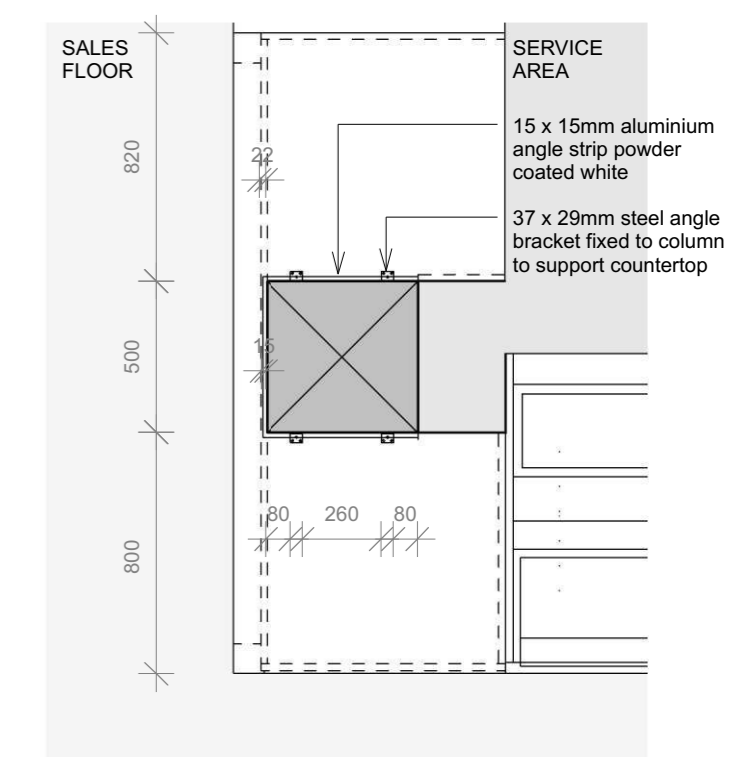
KEY PLAN

LEGEND	
FLOOR FINISH [pattern allows less dirt to show]	
	Sales floor 2000mm wide x 2.5mm thick Marmoleum Real sheeting as per FloorWork SA Colour: Concrete 3136
	Service area & kitchen 2000mm wide x 2mm thick Compact Vinyl Surestep Original sheeting as per FloorWork SA Colour: 171512 Oyster
ELECTRICAL, FIRE FIGHTING & DRAINAGE	
	SWITCH SOCKET OUTLET
	MICROWAVE OVEN
	FIRE EXTINGUISHERS
	GREASE TRAP

ADAPTABLE DESIGN LEGEND	
MAX DIMENSIONS [4500m² STORE]	
MIN DIMENSIONS [2500m² STORE] / CRUCIAL RELATIONSHIPS INDICATED	
Calculation: Max 4500 ÷ Min 2500 = 1.8 Max dimensions ÷ 1.8 = Min dimension Answer rounded off to nearest 100mm	



Ideally no column should intersect counter.
If needed, column should be situated in service area apposed to sales floor. Ideally, columns should be placed in kitchen area (refer to Detl Plan)



BAKERY PLAN
SCALE 1:50
Figure 5.4.2.2: Bakery Plan (Author 2015)

DETAIL 1 - IN CASE OF COLUMN
SCALE 1:25

5.4.3 BUTCHERY



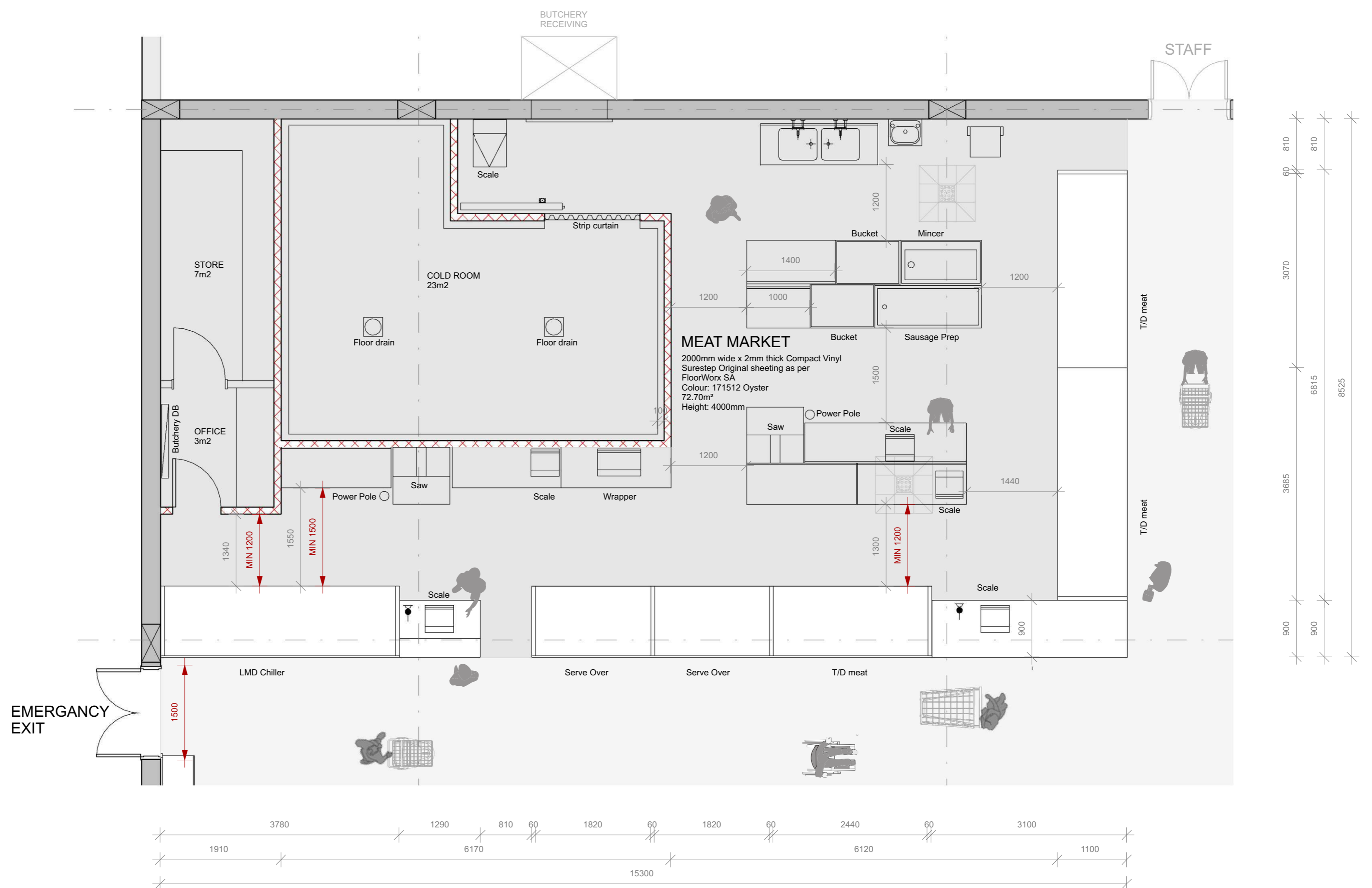
Figure 5.4.3.1: Butchery Perspective (Author 2015)



KEY PLAN

LEGEND	
FLOOR FINISH [pattern allows less dirt to show]	
	Sales floor 2000mm wide x 2.5mm thick Marmoleum Rabiil sheeting as per FloorWorx SA Colour: Concrete 3136
	Service area & kitchen 2000mm wide x 2mm thick Compact Vinyl Surestep Original sheeting as per FloorWorx SA Colour: 171512 Oyster
ELECTRICAL, FIRE FIGHTING & DRAINAGE	
	SWITCH SOCKET OUTLET
	MICROWAVE OVEN
	FIRE EXTINGUISHERS
	GREASE TRAP

ADAPTABLE DESIGN LEGEND	
MAX DIMENSIONS [4500mm STORE]	
MIN DIMENSIONS [2500mm STORE] / CRUCIAL RELATIONSHIPS INDICATED	
Calculation: Max 4500 ÷ Min 2500 = 1.8 Max dimensions + 1.8 = Min dimension Answer rounded off to nearest 100mm	



BUTCHERY PLAN
SCALE 1:50

Figure 5.4.3.2: Butchery Plan (Author 2015)

5.4.4 AISLE NAVIGATION



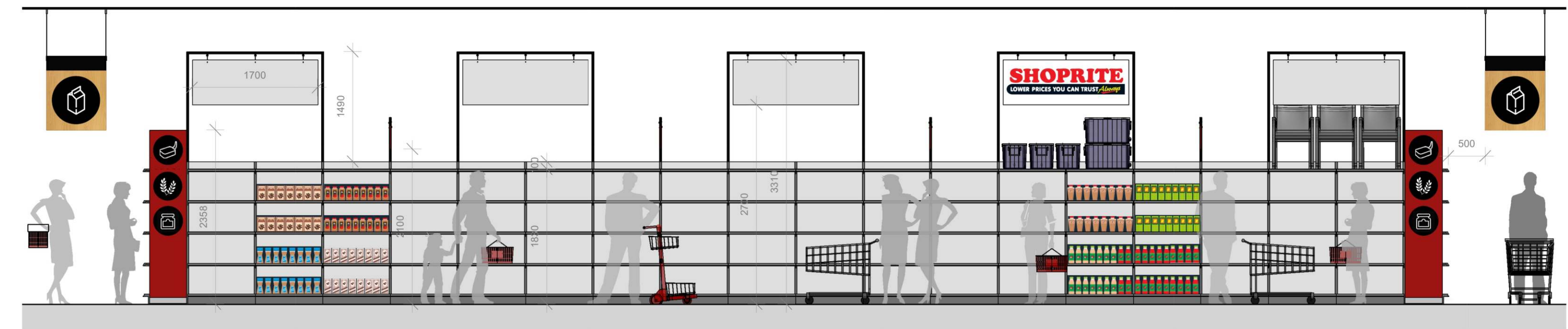
KEY PLAN



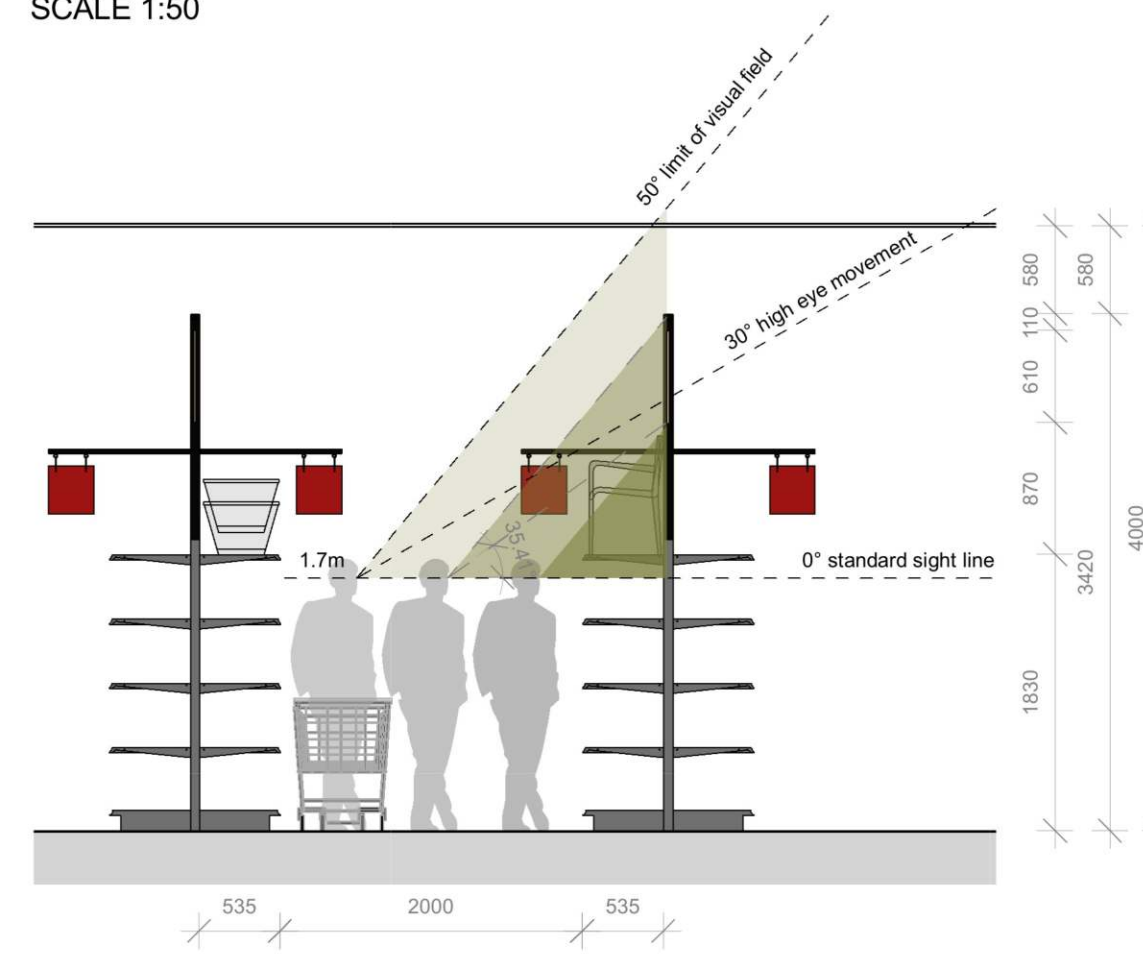
INSPIRATION [INFORMAL RETAIL - LOCAL RELEVANCE] + ENHANCED NAVIGATION



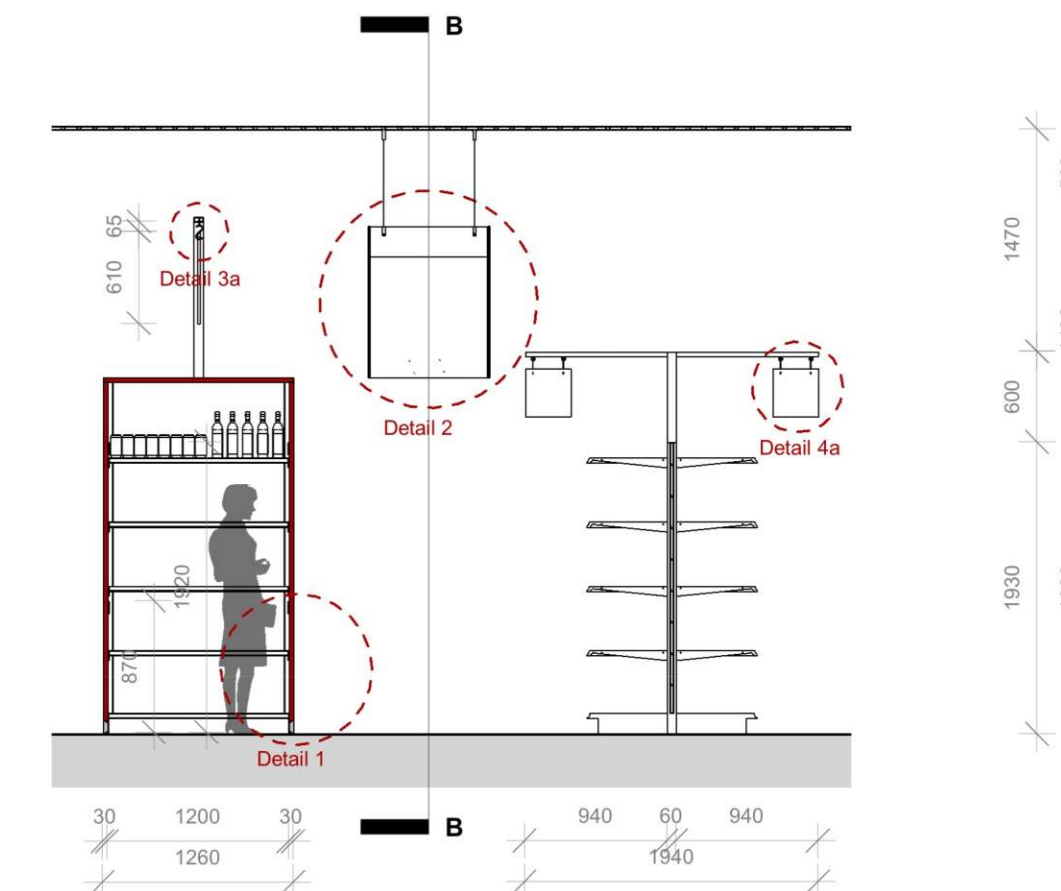
FRONT ELEVATION
SCALE 1:50



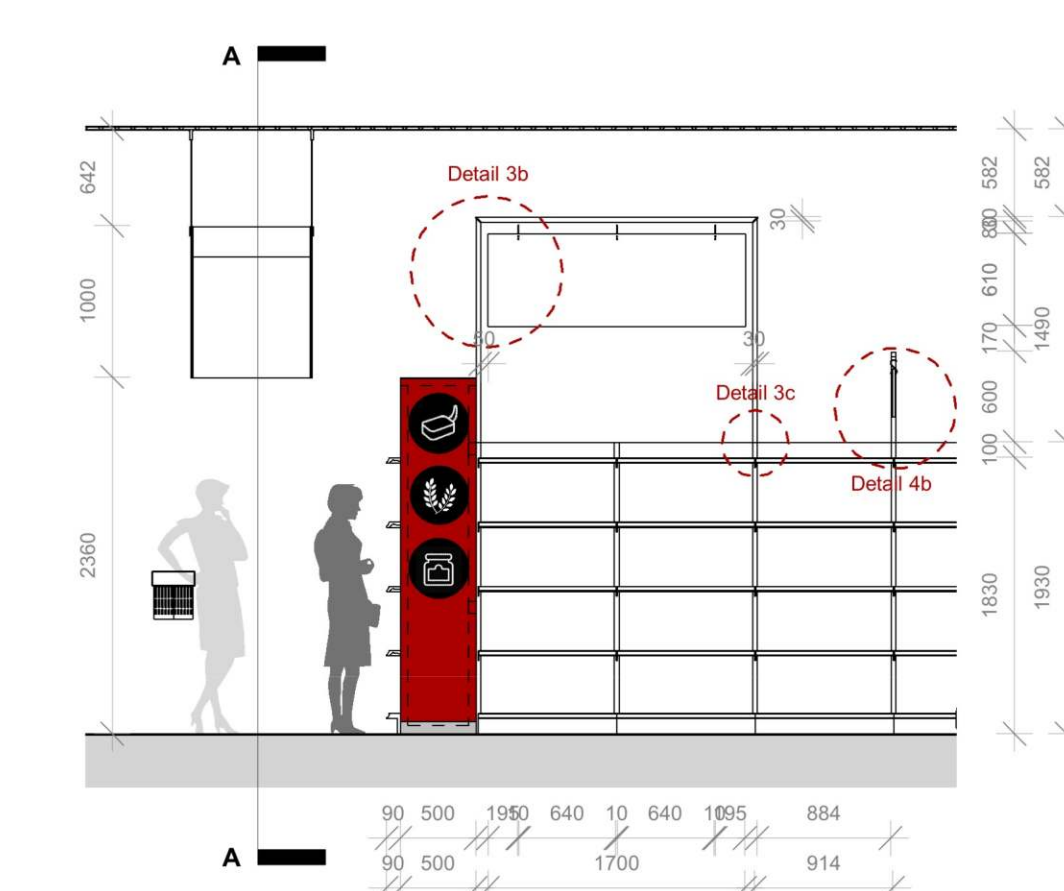
SIDE ELEVATION
SCALE 1:50



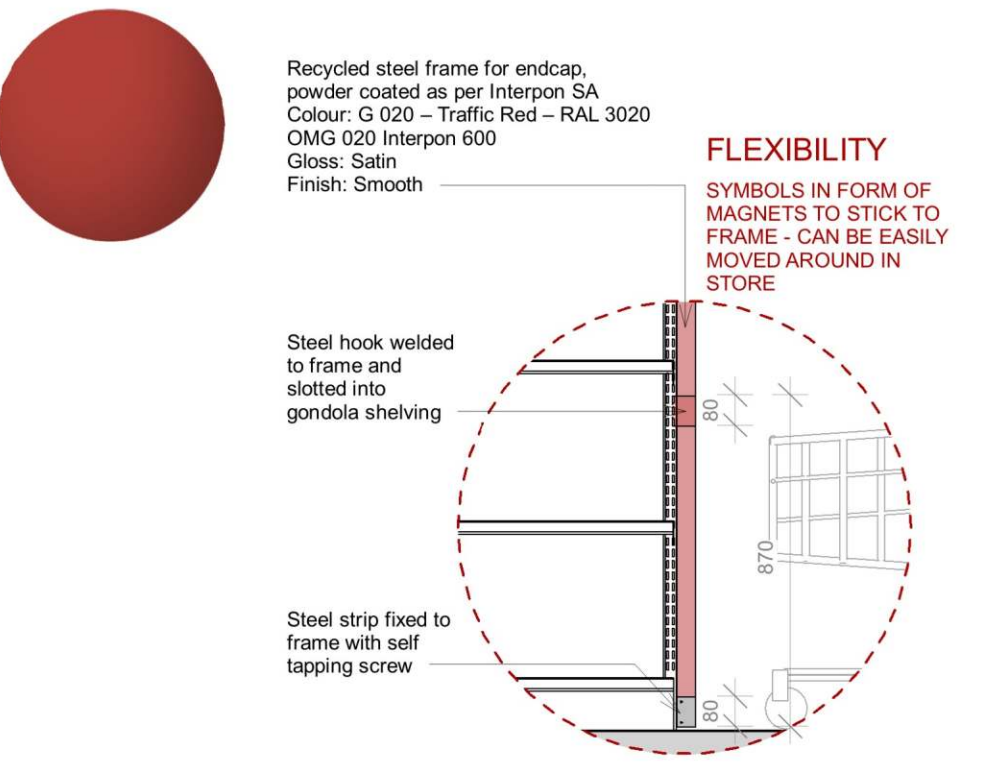
HUMAN VISION RANGE



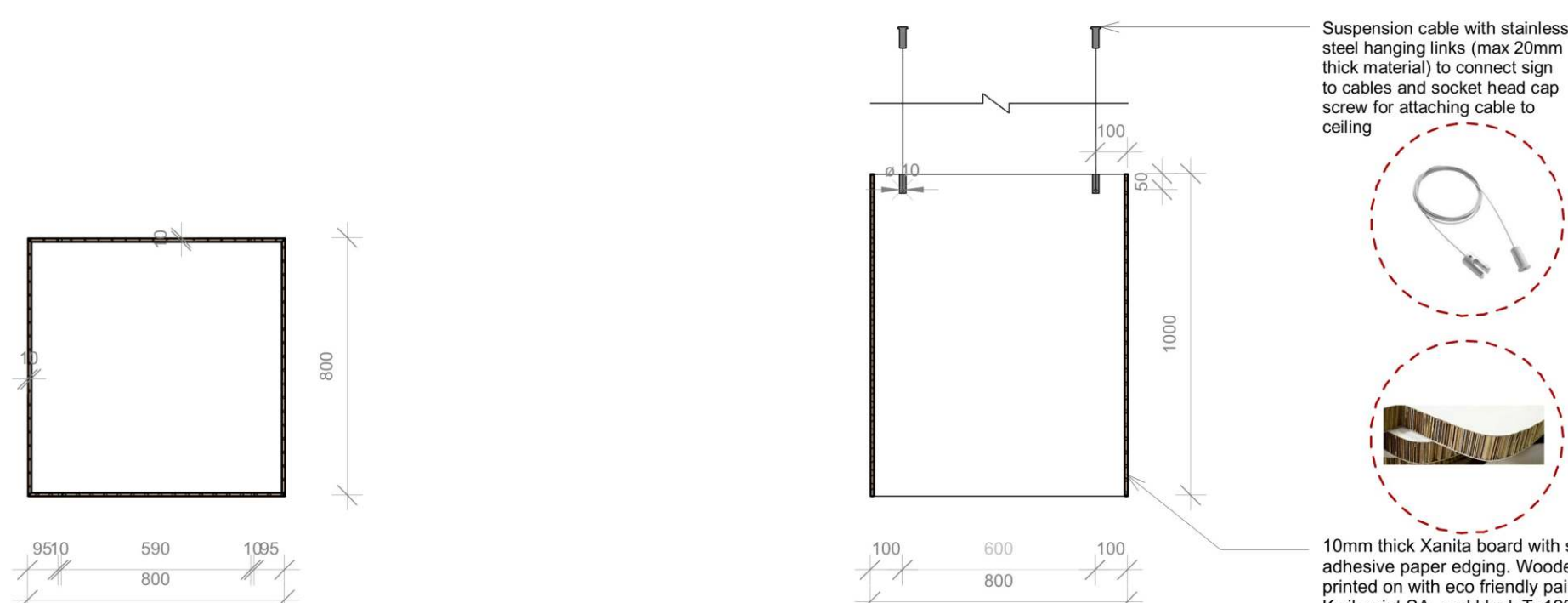
SECTION AA
SCALE 1:50



SECTION BB
SCALE 1:50

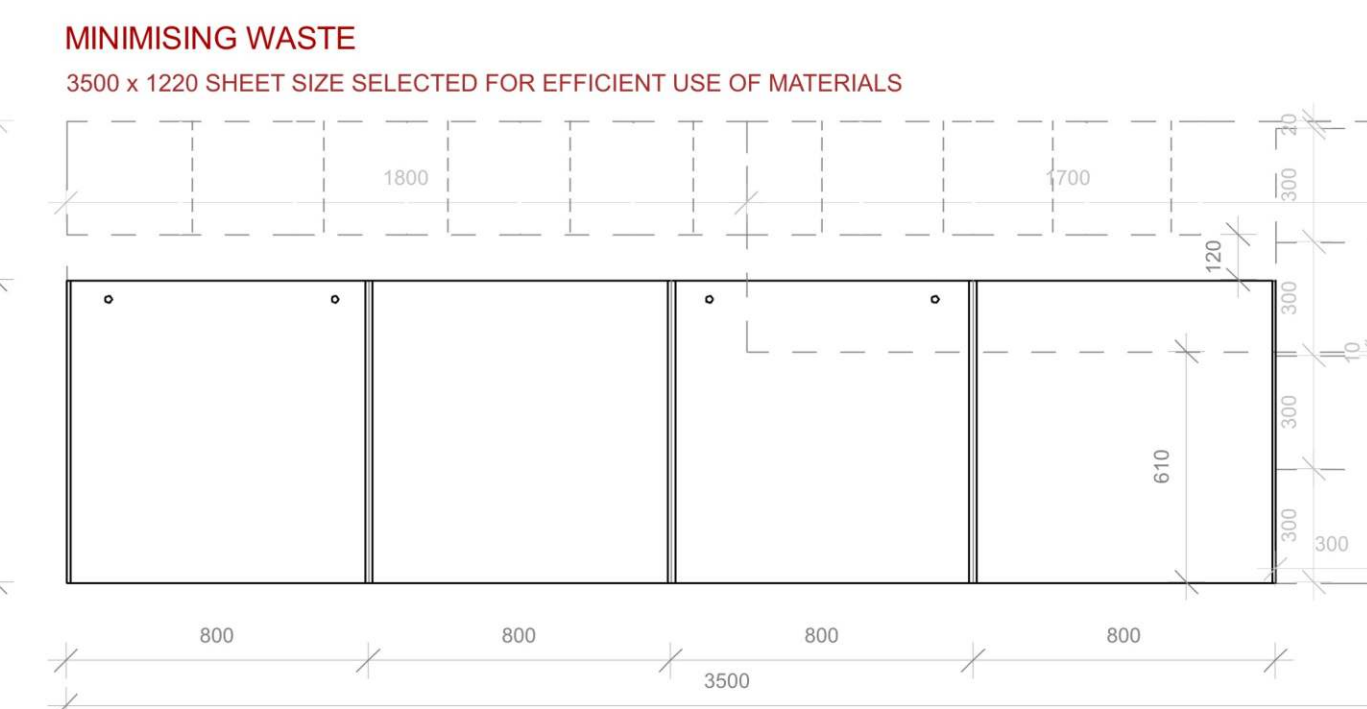


DETAIL 1 - ENDCAP FRAME [FRONT]
SCALE 1:20

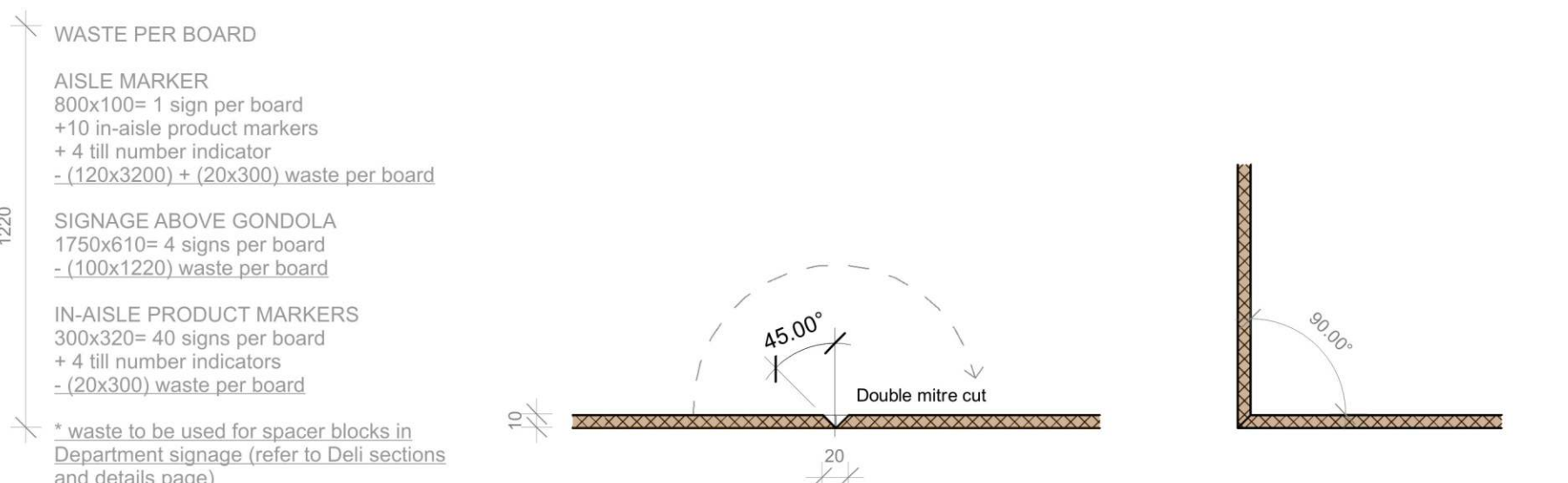


DETAIL 2 - AISLE MARKER [PLAN]
SCALE 1:20

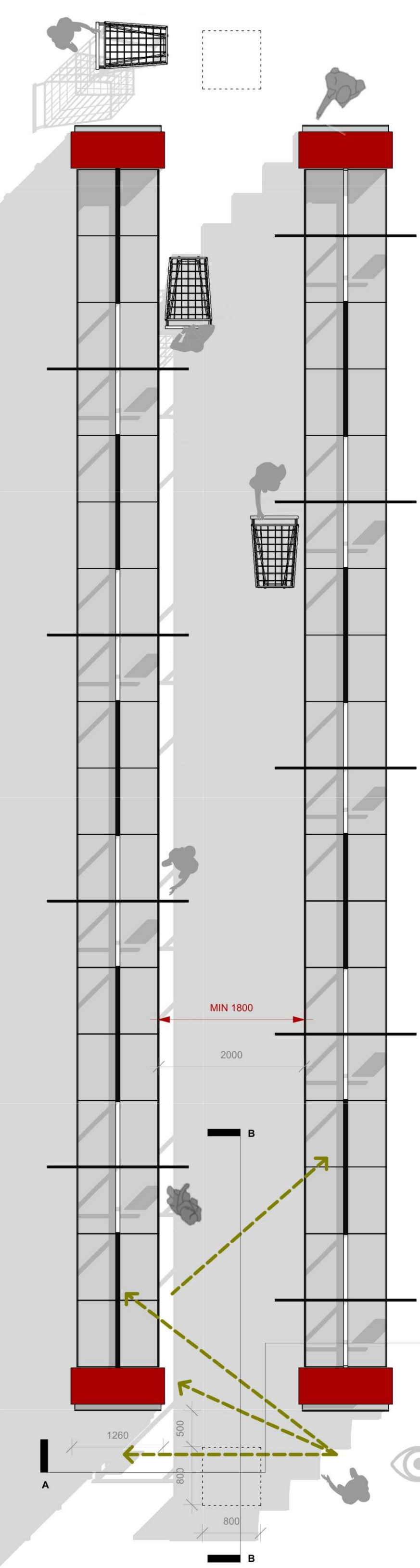
DETAIL 2 - AISLE MARKER [SECTION]
SCALE 1:20



DETAIL 2 - AISLE MARKER [XANITA BOARD FOLD-OUT & MATERIAL EFFICIENCY]
SCALE 1:20

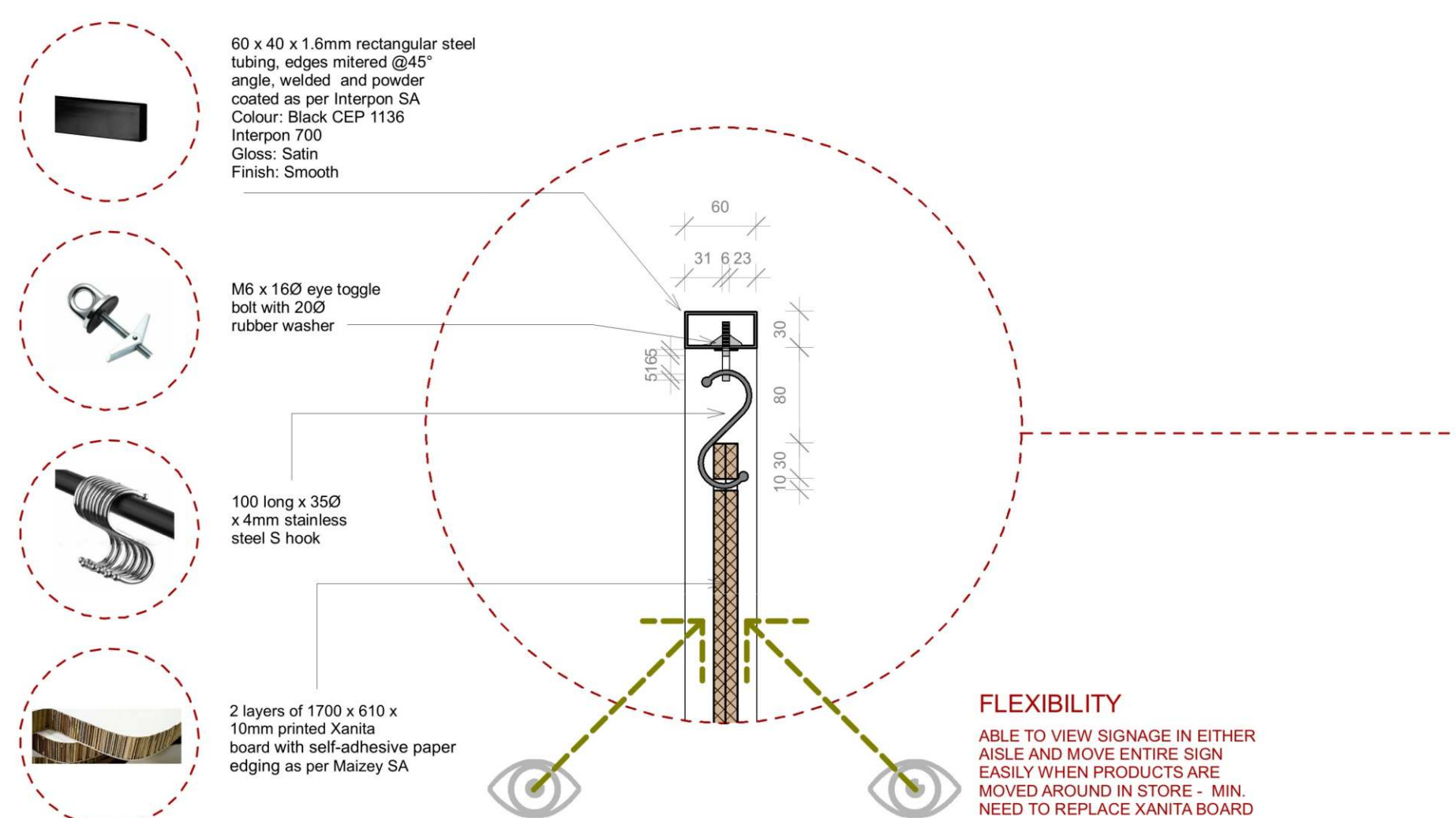


DETAIL 2 - AISLE MARKER [JOINT INSTRUCTIONS]
SCALE 1:5

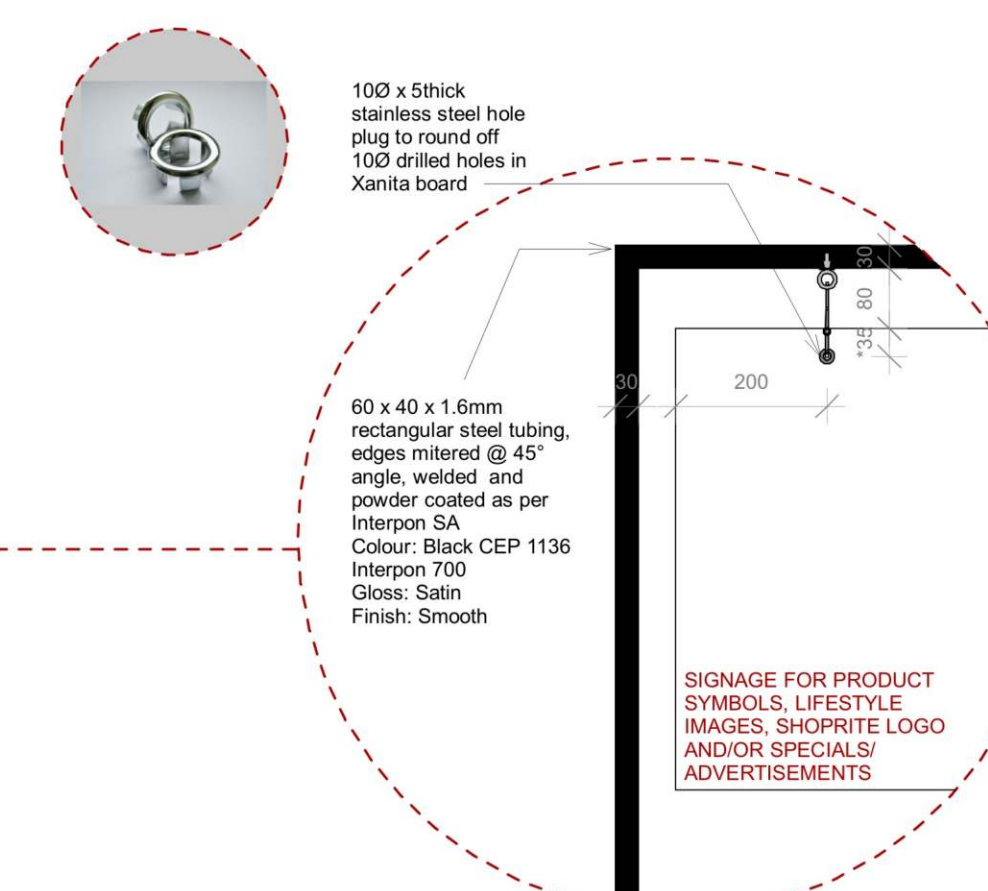


PLAN
SCALE 1:50

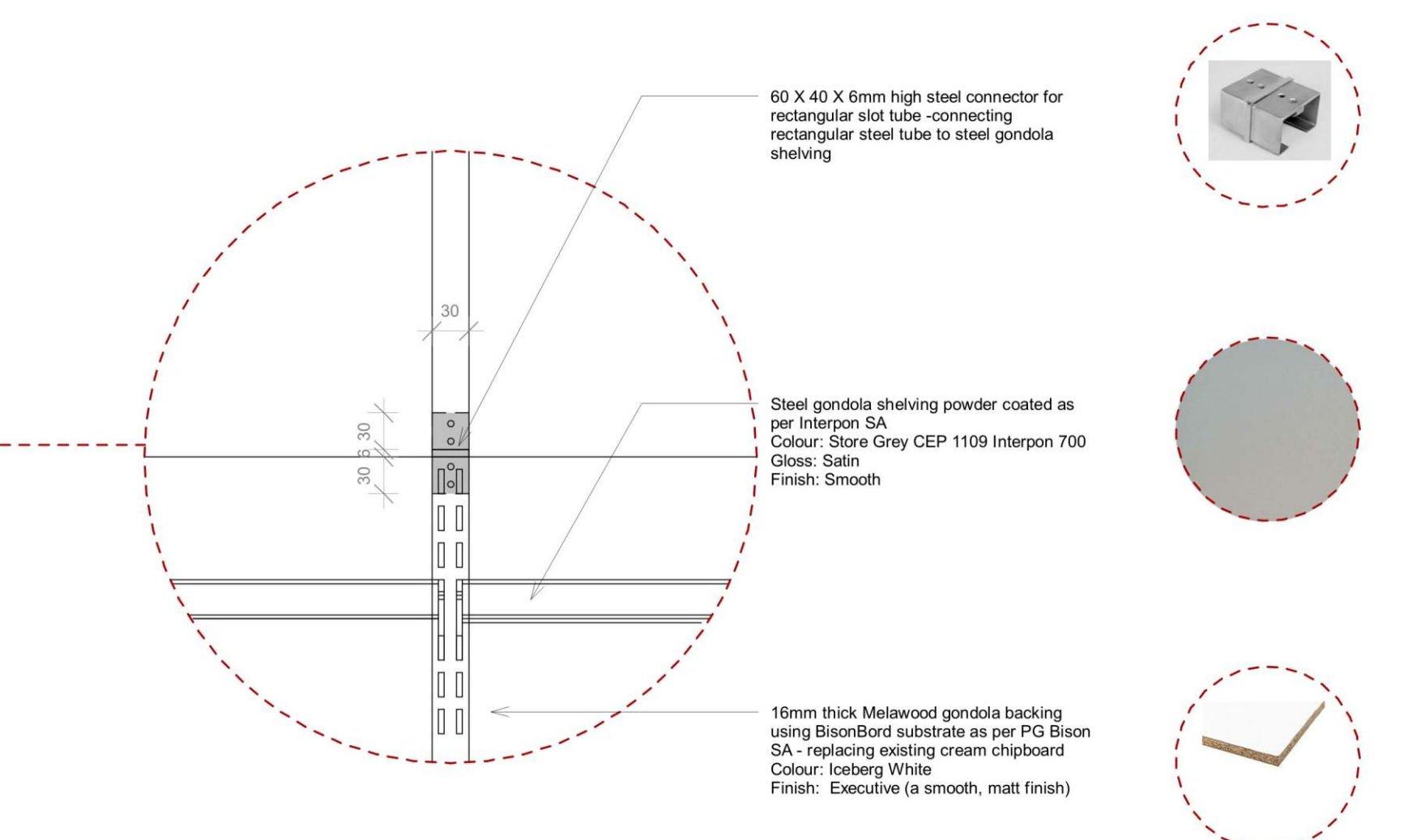
Figure 5.4.4.1: Aisle Navigation (Author 2015)



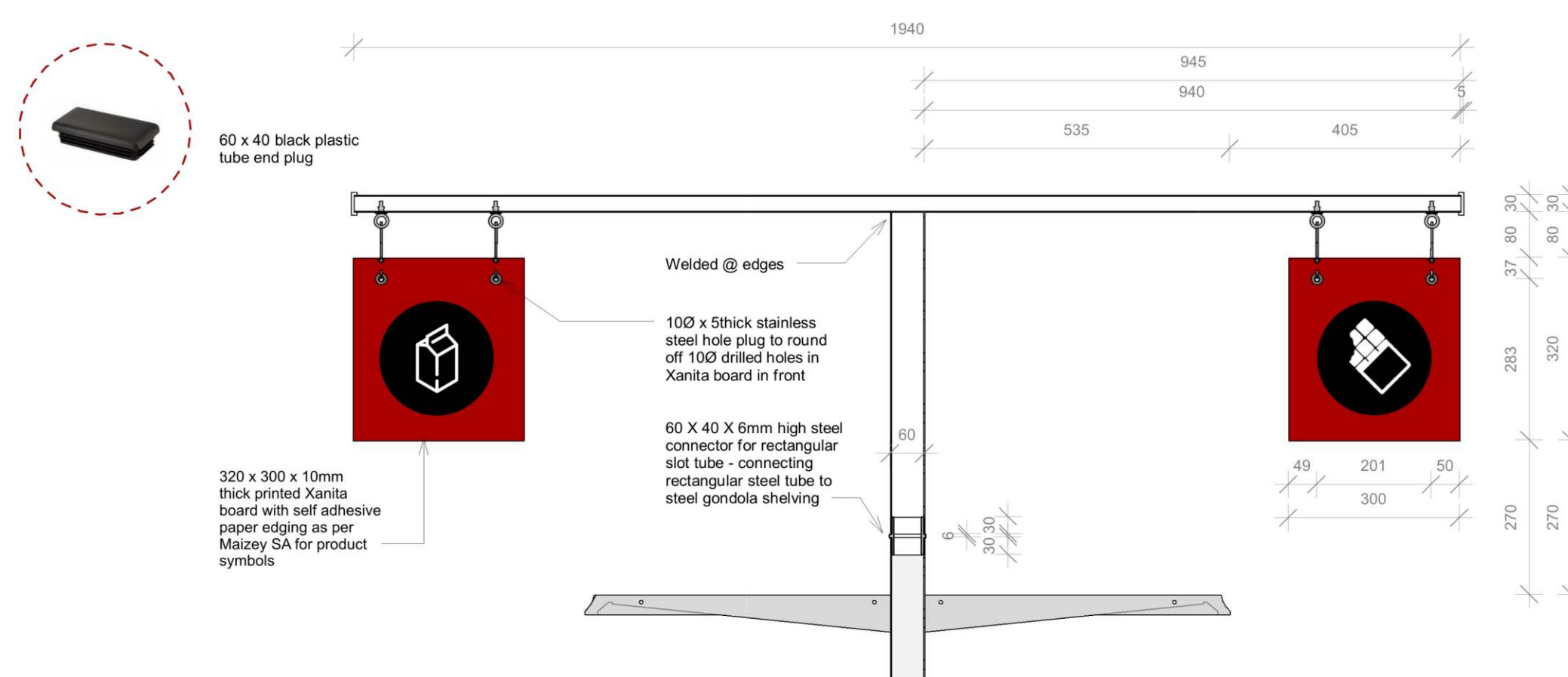
DETAIL 3a - SIGNAGE ABOVE GONDOLA [SECTION]
SCALE 1:5



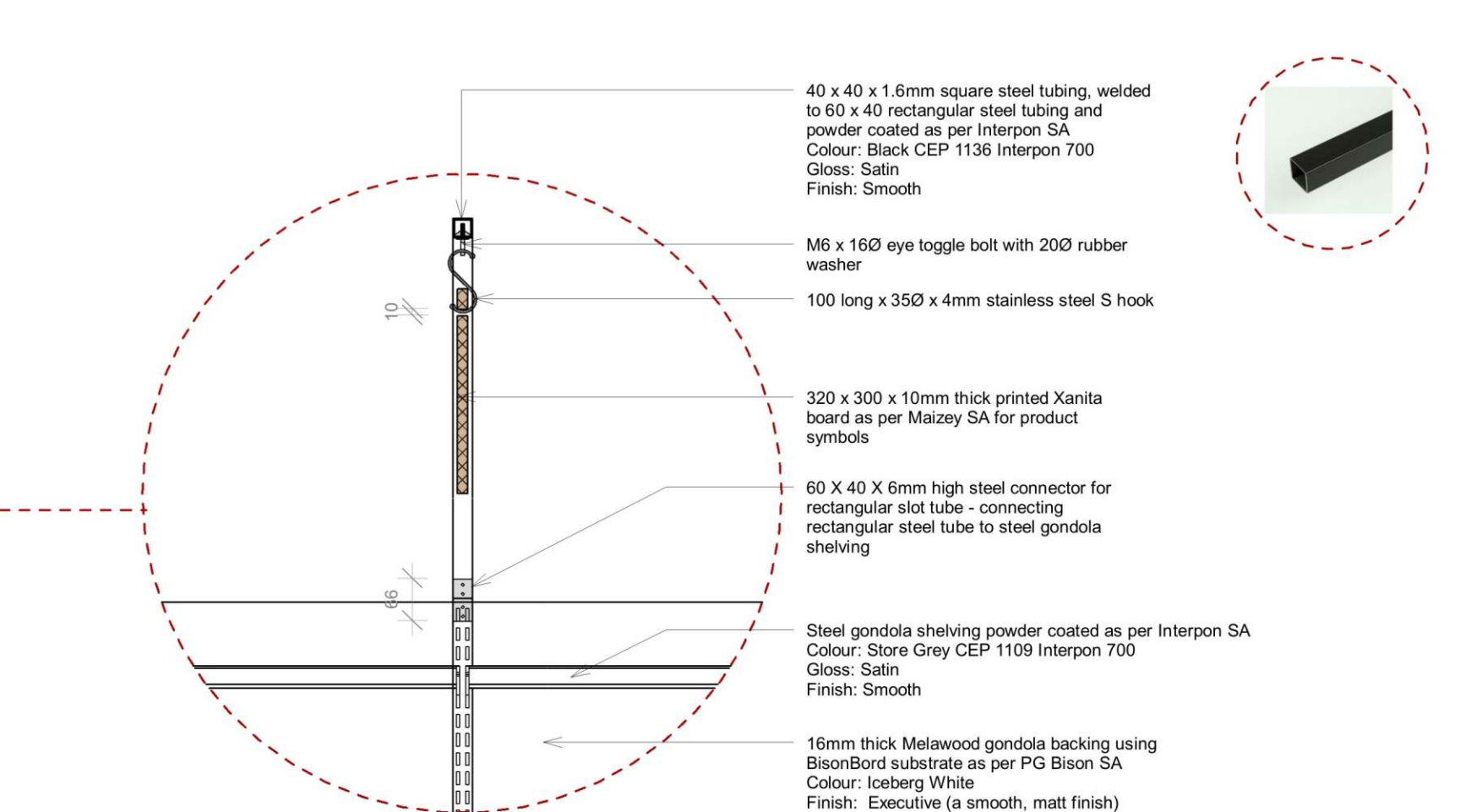
DETAIL 3b - SIGNAGE ABOVE GONDOLA [FRONT]
SCALE 1:5



DETAIL 3c - SIGNAGE ABOVE GONDOLA [FRONT: CONNECTION TO GONDOLA]
SCALE 1:5



DETAIL 4a - IN-AISLE PRODUCT MARKERS [FONT]
SCALE 1:10

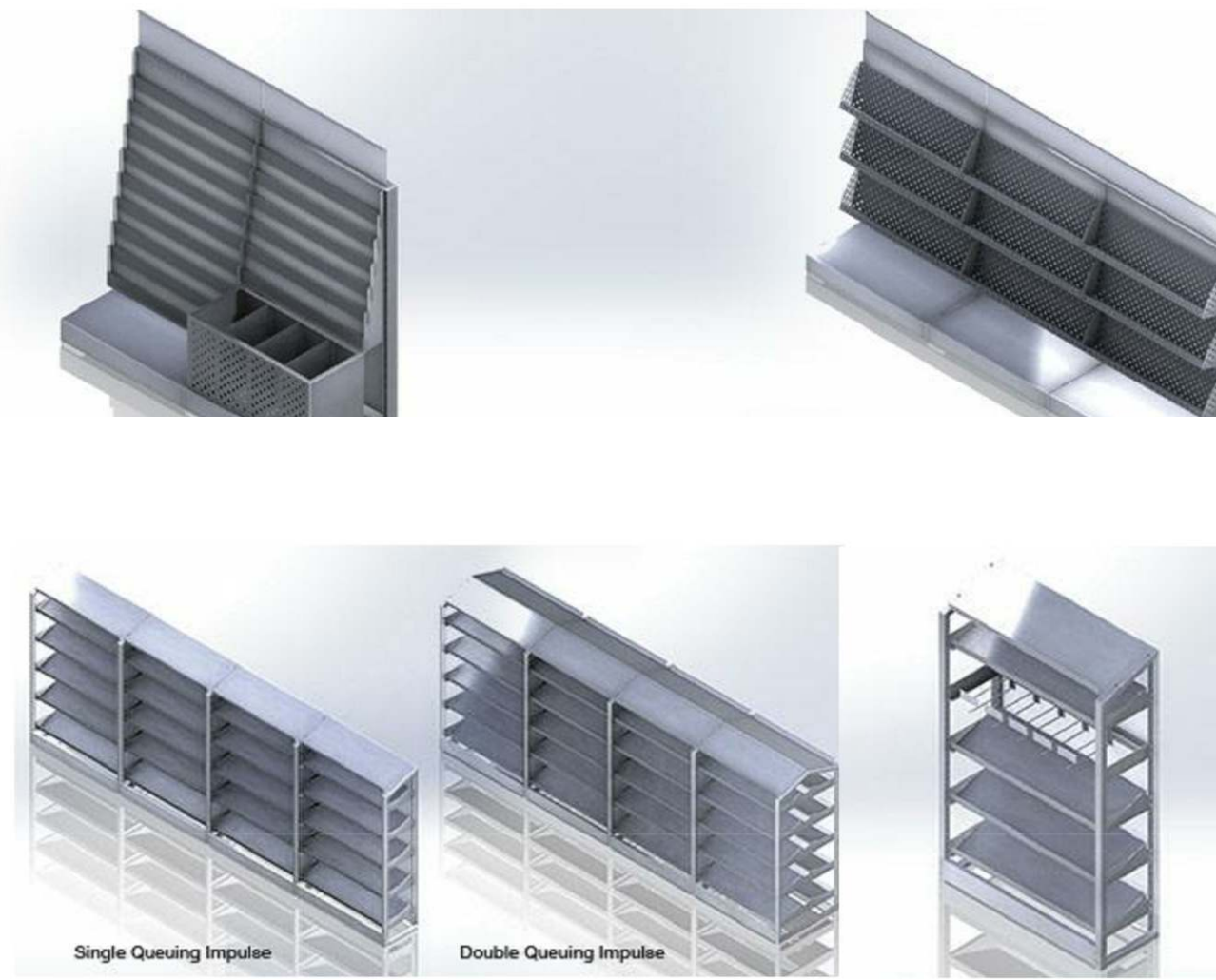


DETAIL 4b - IN-AISLE PRODUCT MARKERS [SIDE]
SCALE 1:10



Figure 5.4.5.1 Checkout Area Perspective

COMMUNAL QUEUE SPECIFICATIONS



MAGAZINES
 Magazine Stands as per BIS South Africa
 • Variety of options, for magazines, newspapers, greeting cards and wrapping paper
 • All steel and include in construction
 • Price point included
 Powder coated as per Interpon SA
 Colour: Stone Grey CEP 1109 Interpon 700
 Glaze: Satin
 Finish: Smooth

IMPULSE PURCHASES
 Queuing Impulse Merchandisers as per BIS South Africa
 • Single and Double variants
 • Various options on queue layout
 • 1200mm high units
 • Various shelf and peg options
 Powder coated as per Interpon SA
 Colour: Stone Grey CEP 1109 Interpon 700
 Glaze: Satin
 Finish: Smooth

COMPOSITE CHECKOUT COUNTERS



CHECKOUT COUNTERS SPECIFICATIONS
 Anessa - Solid Surface as per BIS South Africa
 • Typical 'U' shape with packing slope
 • Mild steel base powder coated with chipboard backing
 • Generous inner and outer radius
 • Easy cleaning
 • Includes electrical plug points
 • Height suited for a seated cashier
 • Shelves and drawer included

EXPRESS CHECKOUT COUNTERS SPECIFICATIONS
 Snello - Solid Surface as per BIS South Africa
 • Runway and packing slope same width
 • Typical 'L' shape
 • Various standard sizes
 • Mild steel base powder coated with chipboard backing
 • Includes electrical plug points
 • Shelves and drawer included
 • Can be positioned back-to-back
 • Secure computer CPU cupboard
 • Includes scanner box



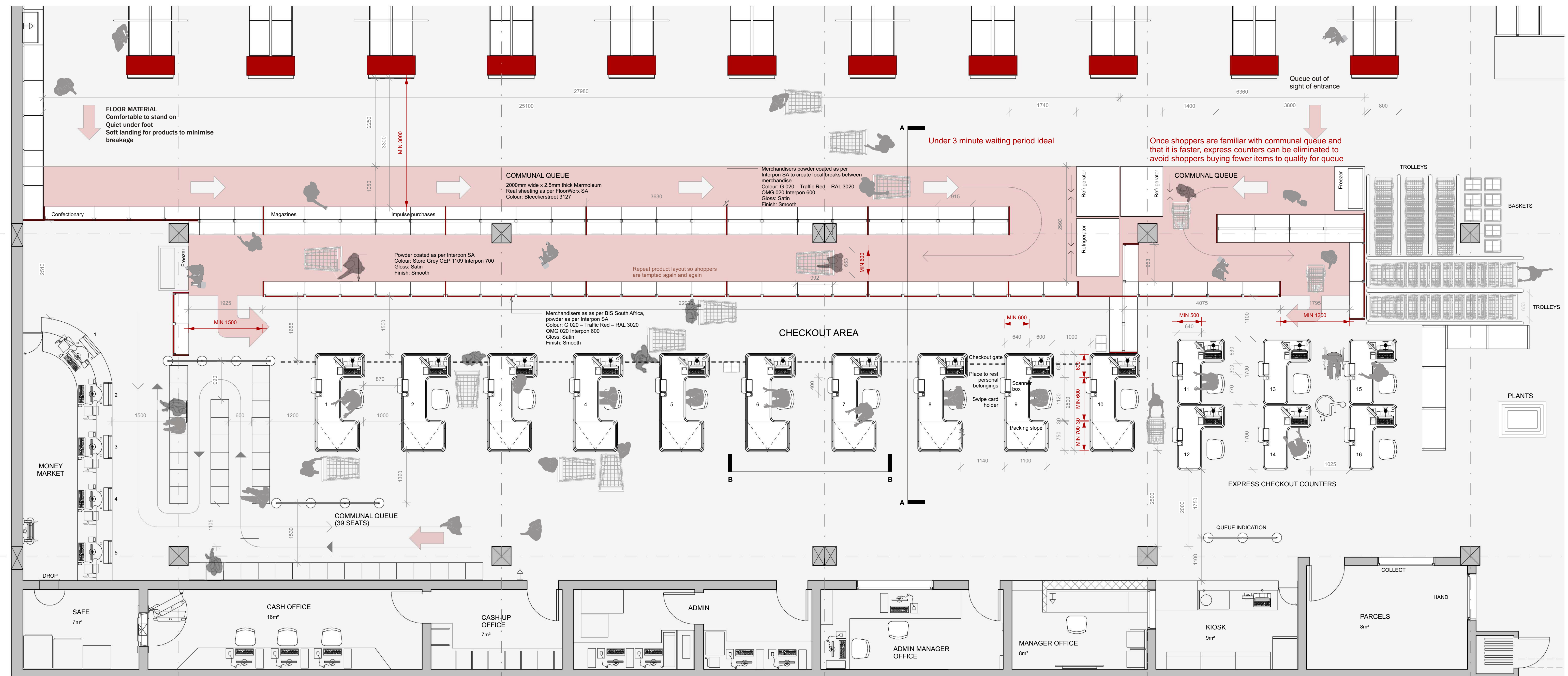
KEY PLAN

LEGEND

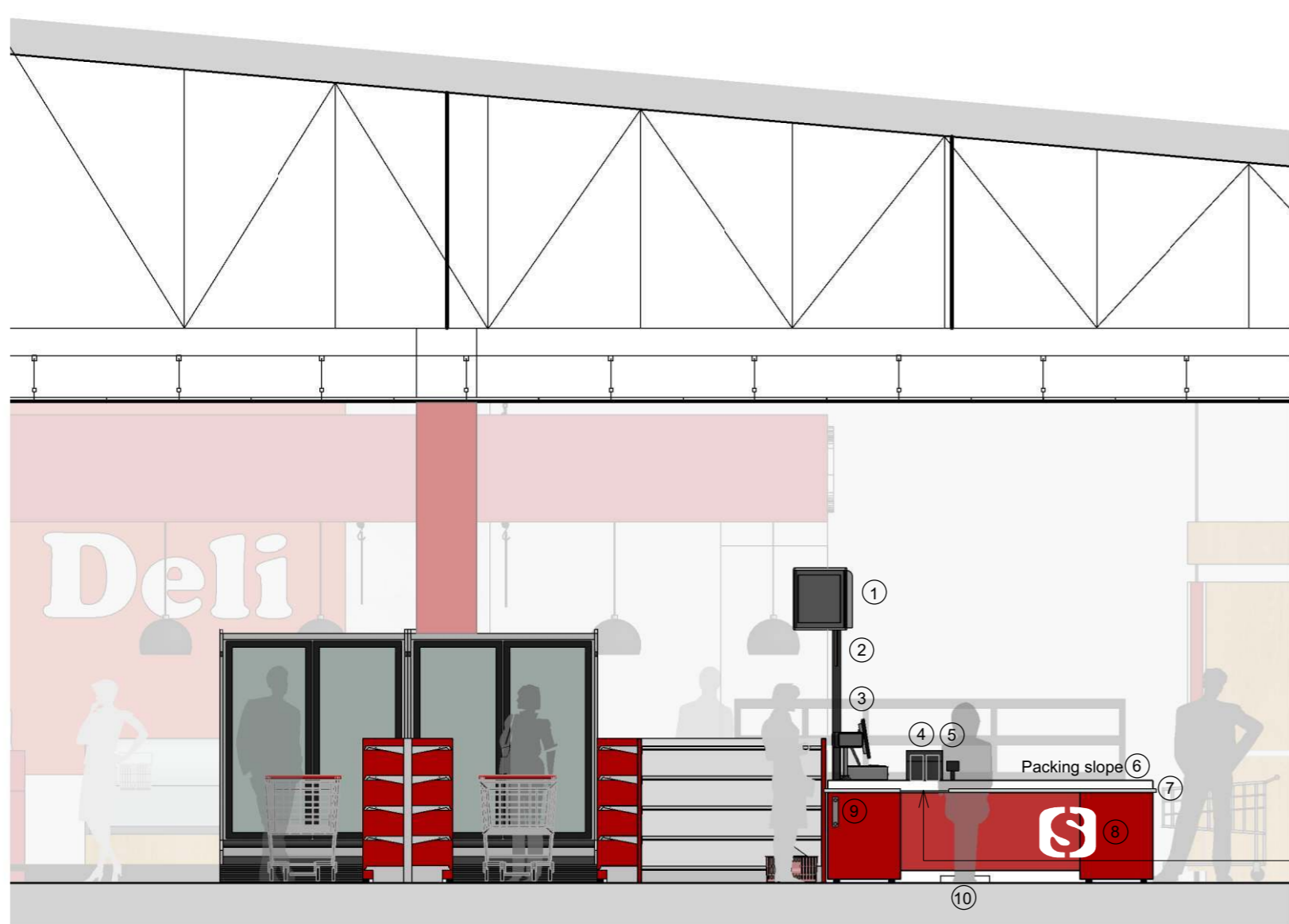
FLOOR FINISH	
	2000mm wide x 2.5mm thick Marmoleum Real sheeting as per FloorWorks SA Colour: Blackbeetroot 3127
	2000mm wide x 2.5mm thick Marmoleum Real sheeting as per FloorWorks SA Colour: Concrete 3136
ELECTRICAL	
	SWITCH SOCKET OUTLET
FIRE FIGHTING	
	FIRE EXTINGUISHERS

ADAPTABLE DESIGN LEGEND

MAX DIMENSIONS (4500mm STORE)
MIN DIMENSIONS (2500mm STORE) / RECOMMENDATIONS

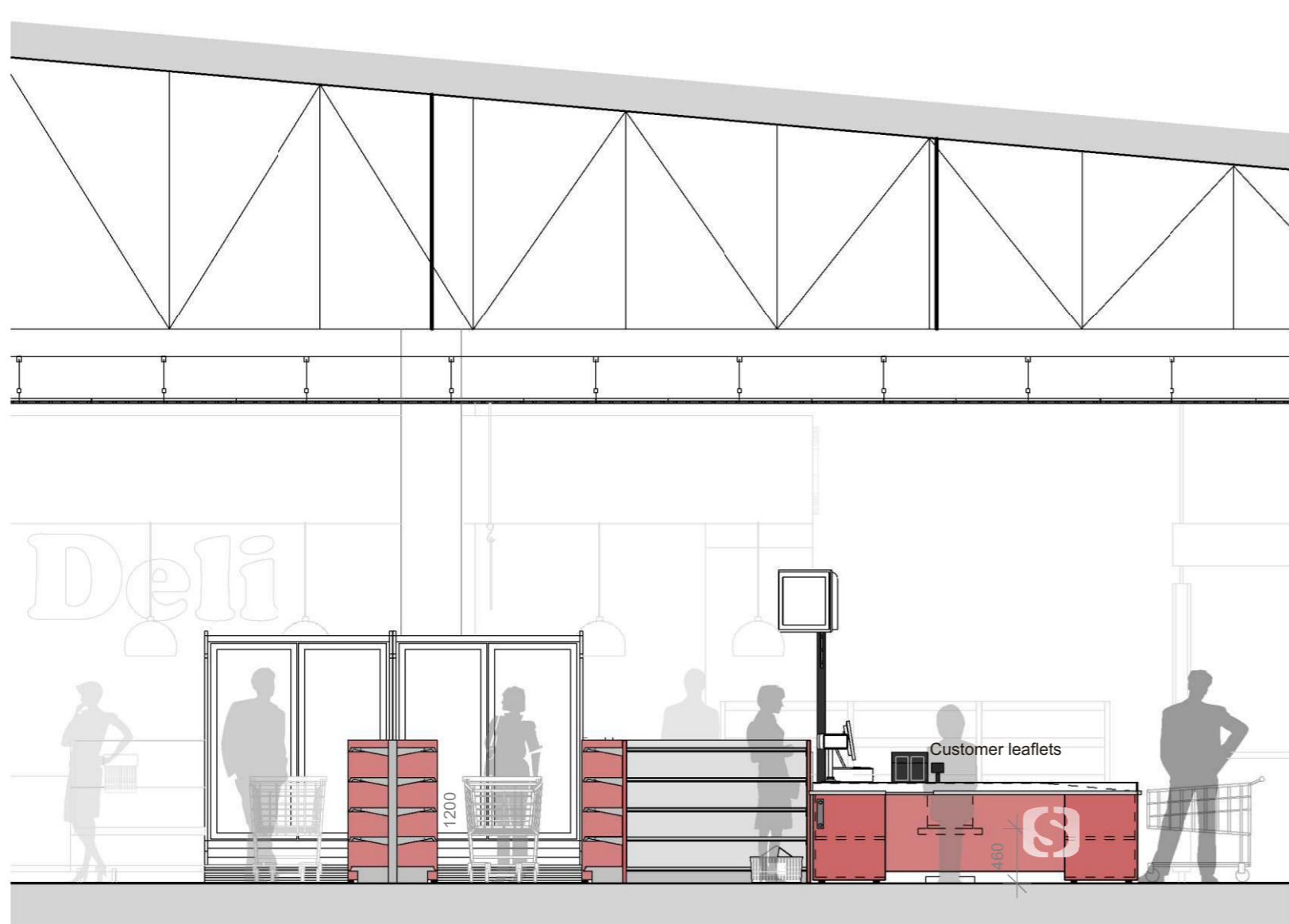


CHECKOUT AREA PLAN
 SCALE 1:50
 Figure 5.4.5.2 Checkout Area Plan



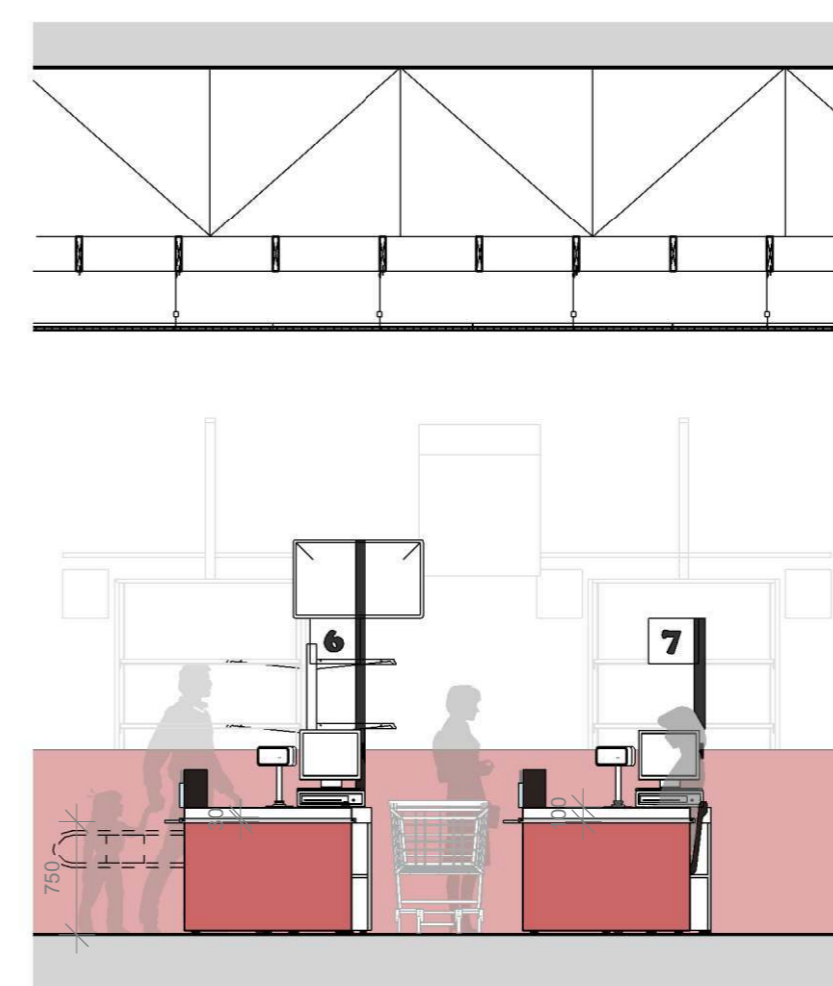
SIDE ELEVATION
SCALE 1:50

- ① **Advertisements**
Mounted LCD screen fixed to steel tubing
Running specials and brand offerings on screen can minimise printed advertisements and increase sales while shopper is in store
- ② **Till number indicator**
300 x 300 x 10mm Xarita board with self adhesive paper edging and black Tp122 Application Paper for numbering as per Matzev SA fixed to steel tubing with stainless steel spacer
- ③ **700 steel tubing** mounted to counter, powder coated as per Interpon SA
Colour: Black CEP 1136 Interpon 700
Gloss: Satin
Finish: Smooth
- ④ **Scanner base** BIS South Africa powder coated as per Interpon SA
Colour: Black CEP 1136 Interpon 700
Gloss: Satin
Finish: Smooth
- ⑤ **Swipe card holder** BIS South Africa, powder coated as per Interpon SA
Colour: Black CEP 1136 Interpon 700
Gloss: Satin
Finish: Smooth
- ⑥ **Checkout counter top**
Chipboard clad with solid surfacing as per BIS South Africa
Colour: Glacier
- ⑦ **Stainless steel crash rail**
- ⑧ **Mild steel base** as per BIS South Africa, powder as per Interpon SA
Colour: G 020 - Traffic Red - RAL 3020 OMG 020 Interpon 600
Gloss: Satin
Finish: Smooth
- ⑨ **Checkout gate** as per BIS South Africa
- ⑩ **Cashier chair** as per BIS South Africa

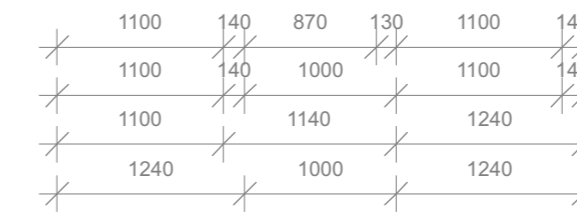
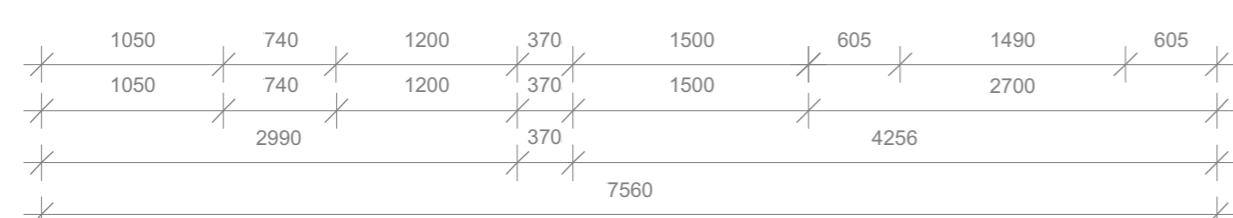


SECTION AA
SCALE 1:50

Figure 5.4.5.3 Checkout Area Sections



SECTION BB
SCALE 1:50



5.5 CONCLUSION

This chapter presented the new, efficient interior designed components for Shoprite which allow the interior space to represent the brand's promise by balancing minimising resources and maximising the user experience.

As chapter four successfully aided in demonstrating how the experience is maximised within the new design, through establishing an appropriate brand identity in store which relates to the target market and improves convenience, comfort and productivity to achieve satisfaction, the following conclusion will focus more on summarising how resources are minimised within the new design. Resources are minimised in order to lower the supermarket's operational costs, while further enhancing convenience and comfort within store - to fully achieve customer satisfaction (within the boundaries of the project).

As a technical response to the design, energy, water and material efficiency, as well as indoor environmental quality was further explored. In addition, the adaptability of the design to be translated into different sized stores was also explored in order for the design to be adaptable to various existing and new Shoprite outlets.

ENERGY

Starting with energy, as air conditioning is one of the largest energy consumers in South African supermarkets, a **suspended ceiling** was incorporated throughout the entire store, since the advantages of a suspended ceiling outweigh those of an open plenum ceiling in terms of energy consumption, maintenance, hygiene, fire safety and the acoustics in store (see table 5.3.2.1: Suspended Ceilings Advantages on page 43).

Next, as refrigeration is the largest energy consumer in store (responsible for 45 percent of the energy usage), heating and cooling equipment was specified, which provide 50 percent energy saving. It was further recommended that the heat from the refrigeration be reclaimed to further reduce the HVAC load and to replace the electrical geysers in store.

As for lighting, guidelines were presented on page 46 and in Appendix D on page 70. Firstly, daylight was introduced through lighting ducts with lighting controls to further reduce electricity consumption in store. Since most of Shoprite supermarkets are in single storey shopping centres, lighting ducts are viable. The facades of the store on the other hand have limited exposure to daylight, therefore adding windows were not an option (hence the lighting ducts were the best alternative).

General, task and accent lighting in the form of LEDs were recommended, paying special attention to the efficacy of the lamps, the colour temperature and light colour, as well as the median useful life. Continuing to use the Deli as the main example, 3000K, warm white lighting was utilised in and around the counter to optimise the colour of the majority of the merchandise displayed in the serve over counter (refer to

page 46 under 'Light Colour Options to Enhance Merchandise'). Within the cold meat serve over counter however, an LED Rose lamp by Philips was used, which most enhances the red of the meat, so it appears appealing and fresh to the consumer.

WATER

To improve water efficiency, hygienic low-flow water fixtures were specified for the basins, which can reduce consumption with up to 16 litres per minute. This is to tie in with Shoprite's proposed greywater system (Shoprite Holdings 2013b and 2014g).

MATERIALS

Lastly, materials were selected according to their production process, use and end of life, as recommended by Greenstar SA to lower the environmental impact and improve indoor environmental quality. The floor, walls and ceiling materials are the most sustainable, since they cover the largest surface area in store. The rest of the materials, such as the Deli counter materials are based on the availability and appropriateness of the material to create the required design and which are durable enough, low maintenance and economical - to balance out the cost of the flooring and ceiling materials. A table is provided on page 44 showing the additional materials considered and why they were ruled out.

As an example of the material selection process, chipboard is used in the deli counter as there is no sustainable board product available in South Africa and chipboard proved to be the most sustainable and appropriate material as compared to MDF and plywood. If the alternative choice, which is strawboard becomes available in South Africa however, I recommend that it replace the chipboard, as it is made from waste agricultural straw which uses no adhesives, just pressure and is 100% recyclable and biodegradable and allows for intricate joints (unlike chipboard) which are easy to assemble and disassemble for future use.

The Formica used in the Deli design, however it is a landfill material, was selected for its local availability, price, unbeatable durability and aesthetic, as well as the fact that it uses such a small amount of material. Its use is also limited to the high traffic front of counter.

The newly designed interior components for Shoprite therefore illustrate how interior design can balance minimising resources and maximising the user experience in store, and thereby achieve an efficient interior design for Shoprite. An efficient interior design for Shoprite provides an interior environment which represents the brand promise within the interior - as was the main aim of the project.