01—STRUCTURE
02—MATERIAL ELEMENTS
03—GREEN STRATEGY
04—SYSTEMS

TECHNICAL RESOLUTION

08

01– STRUCTURE

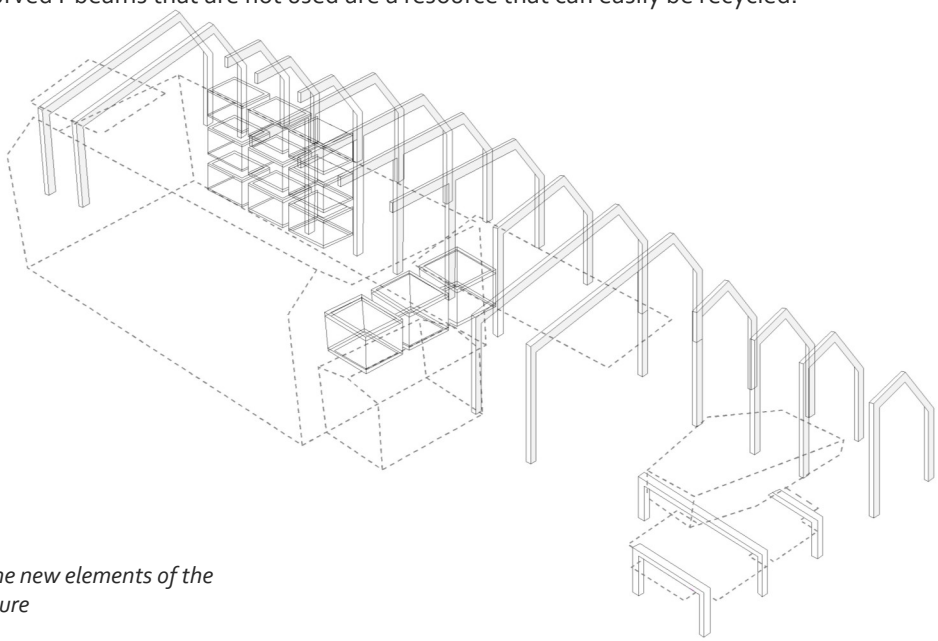
The original structure of the Lewis & Marks building was a series of 7 shops divided by 500mm walls and timber floors. With the erection of the Sammy Marks Development, all the internal elements were removed and replaced with reinforced concrete columns and slabs. (Refer to chapter 4)

All the new elements added to the development are a part of a steel structure, comprised of steel columns, beams and bracing where required. This was done in acknowledgement of the existing culturally significant parts of the building. A lightweight appearance is thus achieved, which creates a sensitive contrast, emphasising the existing elements of Lewis & Marks building and making a clear distinction between the old and the new.

The construction method for the floors of the new box elements is bond-deck composite decking. This option has a faster construction time resulting in cost saving and minimal disturbance to the rest of the Sammy Marks Development, which will still be in operation.

In Citizen Connect there is an atrium that removes a significant portion of the existing reinforced concrete slab of the second floor. Discussions with the engineer took place as to whether the existing reinforced concrete slab is to be retained and only portions of it demolished or if the entire slab is to be demolished and a new steel floor structure is to be introduced. It was concluded that a new steel structure would be the neater option with the additional benefits being that the services can run through the second floor space and service both the first and second floors, this being the more cost effective alternative. The demolished concrete will be used as a fill on the eastern portion of the site.

The new steel arcade structure is designed so as to re-use the existing steel I-beams on site as far as possible. The curved I-beams that are not used are a resource that can easily be recycled.



Illus 8.1. Illustration indicating the new elements of the development using a steel structure

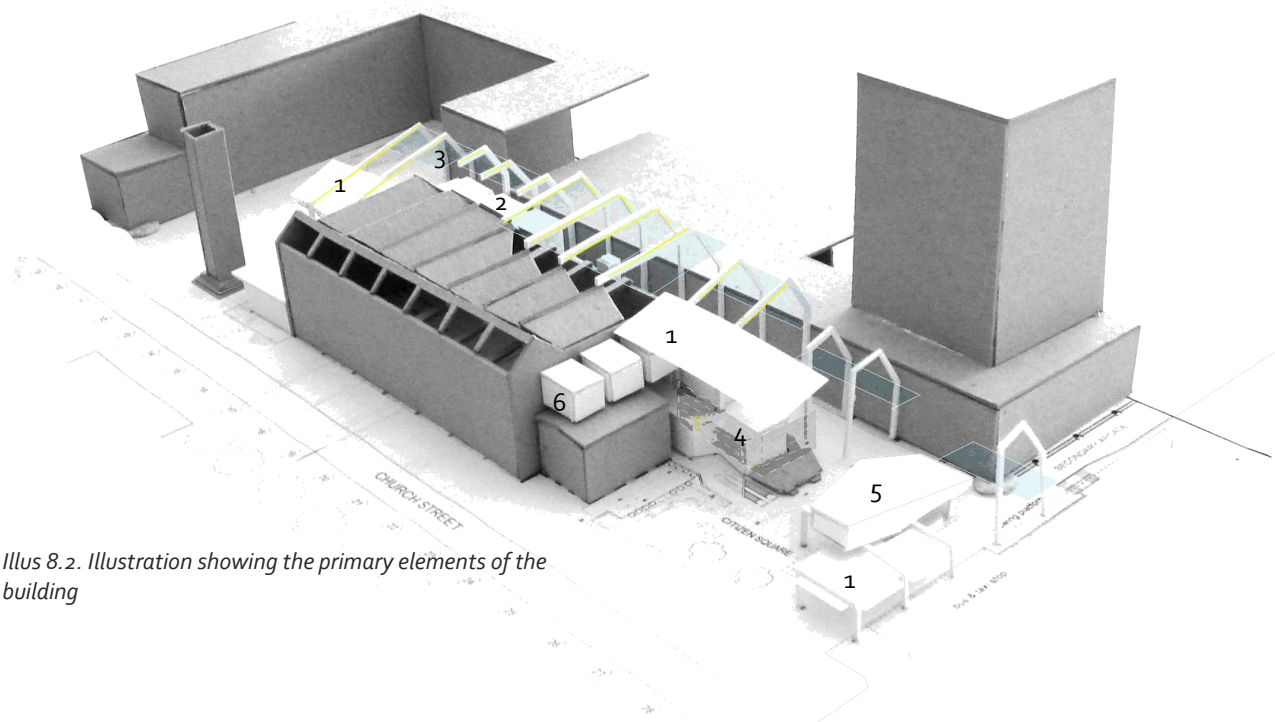
chapter 08

02– MATERIAL ELEMENTS

When selecting the material elements, the following was considered:

- Erection time: because the Sammy Marks Development will still be in operation, minimal disturbance and a fast erection time is a requirement.
- Sustainability
- Principles of reclaiming building materials where demolition work takes place including brickwork, shopfront, concrete and I-beams

1. Brownbuilt roof
2. Translucent tensile fabric roof
3. LED lights
4. Mediamesh screen
5. Aluminium cladding
6. Box structures comprising of steel frame structure and glazed shopfronts



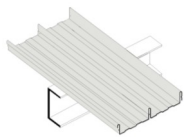
Illus 8.2. Illustration showing the primary elements of the building

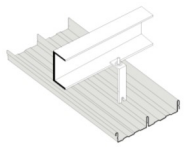
ROOF


Illus 8.3.Ttranslucent fabric roof.


Illus 8.4. Retractable fabric roof .


Illus 8.5. Brownbuilt.


Illus 8.6. Brownbuilt.


Illus 8.7. Suspended brownbuilt.

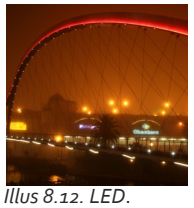

Illus 8.8. Aluminium cladding.

CEILING


Illus 8.9. Thermo-coustex.


Illus 8.10. Thermo-coustex.


Illus 8.11. Aluminium cladding.


Illus 8.12. LED.

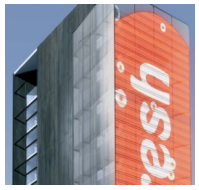

Illus 8.13. LED.


Illus 8.14. LED strip.

WALLS


Illus 8.15. Media-mesh.


Illus 8.16. Media-mesh.

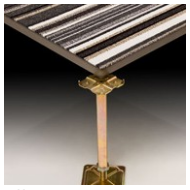

Illus 8.17. Media-mesh.

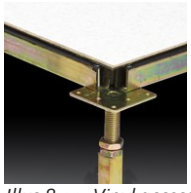
Illus 8.18. Paint.

Illus 8.19. Glass.


Illus 8.20. Aluminium cladding.

FLOORS


Illus 8.21. Carpet access flooring.

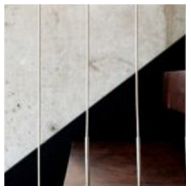

Illus 8.22. Vinyl access flooring.

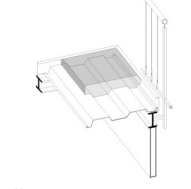

Illus 8.23. Carpet.


Illus 8.24. Terrazzo.


Illus 8.25. Terrazzo.

FINISHES


Illus 8.26. Cable.


Illus 8.27. Box con-struction.

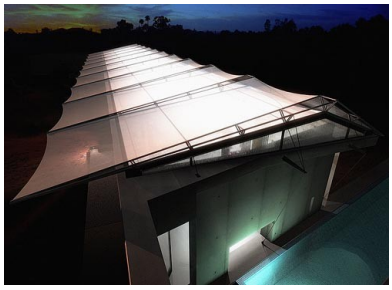
Illus 8.28. Glass.

02.1.– ROOF

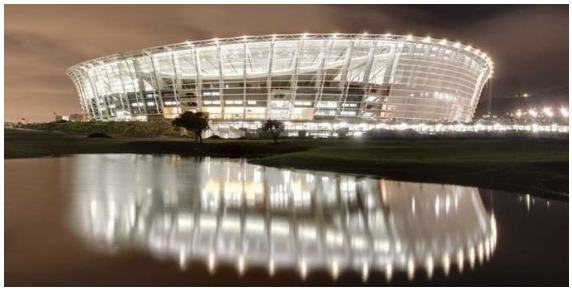
FABRIC ROOF (High TRANSLUCENT TENSILE FABRIC Teflon coated fibre glass MEMBRANE)

Illus 8.29.
The House of Earth + Light, designed by Marwan Al-Sayed, is located in Phoenix, Arizona and has a translucent fabric roof.

Illus 8.30.



Illus 8.31. Cape Town stadium is clad with a fibre-glass translucent membrane and changes in appearance throughout the day from blue to red.



- **Solar Qualities**
  - Maximises daylight in the building interiors, therefore reduces electricity costs with the added benefit of eradicating the harsh glare.
  - Woven material offers 40% light transmission.
  - Serves as a backdrop for night-time lighting; where light floods out into the environment creating a landmark of the Lewis & Marks building.
  - A connection is formed between the indoor and outdoor environments through daylight penetrating the space and the translucent quality of the fabric
  - Resists UV rays
  - Waterproof
- **Wide width**
  - Rolls of 4m wide reduce the seams.
- **Cost saving**
  - Fabric erection time is less than conventional roofing.
  - Structurally fewer components are required because the fabric is a light material, therefore saving on costs.
  - Fulfils all functional requirements using the least amount of materials possible lowering the embodied material of the building which has a direct impact on the buildings carbon footprint.
- **Durability**
  - Fabric is extremely durable and is known to last longer than 30 years in areas of extreme heat or cold.
- **Fire resistance**
  - Non-combustible material and qualifies as a class A material
- **Soil resistant finish**
  - Chemically inert (non-stick) therefore exceptionally stain resistant and easy to clean by rinsing if necessary. It is also low maintenance.
  - The fabric membrane has an integrated self-cleaning dimension functioning by using a chemical reaction to neutralise pollutants found in urban environments such as nitrogen oxide and sulphur oxide, both exhaust related pollutants.
- **Aesthetics**
  - The fabric functions as an interior and exterior finish. A ceiling is therefore not an additional requirement reducing cost and weight. The quality created is one of being *outdoors.*

BROWNBUILT

A brownbuilt profile roof is used by the entrances to Citizen Connect as well as the bus and taxi stop. It is to have a global-coat finish. The roof is to fall into a gutter where the downpipes lead the storm-water storage tanks to the basement.

The fixing method of the brownbuilt roof is a combination of suspended roofs (see *illus 8.7)* and conventional over-purlin construction (see *illus 8.6)*. Brownbuilt is appropriate for the application because the profile enables a gradual slope, which is desired.

ALUMINIUM CLADDING

Aluminium cladding is used for the roof of the information kiosk, being a landmark element. (See *illus 8.8 & 8.11)*

02.2.– CEILING

THERMOCOUSTEX

A combination of thermocouste boards to be skimmed (see *illus 8.9*) and thermocoustex suspended removable ceilings (see *illus 8.10)* are to be used because of its dual qualities of insulation and acoustics properties.

LED

LED strip lighting (see *illus8.12, 8.13 & 8.14)* is used on the structural elements of the arcade. The benefit of using LED lights is its longer operational life — 100,000 operational hours equating to 22 years operational (L.C.LED 2011) and a reduction in energy consumption being 80% more efficient (L.C.LED, 2011)

02.3.– WALL

PAINT

Dulux Light & Space paint is used where rooms appear brighter; therefore 20 % less lighting is required providing energy saving costs. (See *illus 8.18)*

MEDIA-MESH SCREEN

A Media-mesh screen is a media façade that displays images or animations on a large scale to the external viewer. The internal occupants experience a transparency of 60 – 90%; therefore it does not eliminate their external view. It is ideal to implement this technology as it is a medium for sending messages to the citizen, it doubles up as a shading device, and it can further be used to display, for instance, sports games, to the citizens on either side of the squares, made possible through IT-based control technology.

Media-mesh is constructed from stainless steel wire mesh with LED profiles interwoven into the mesh in intervals during its pre-manufacture, which is then rolled for transportation, and installed on site. The replacement of individual LED profiles can easily be done on site. Media-mesh screens are weather and temperature resistant, have a low weight and a large range of flexibility in the manufacture size, where it can be designed to suite the architecture and is not only manufactured in specific sizes, such as, for example, a LED board.

Illus 8.32. Media-mesh.

Illus 8.33. Media-mesh on a building.

SHOPFRONT

Glass (see *illus 8.28)* shopfronts are used around all the boxes with an aluminium frame powder coated charcoal and an integrated bulkhead to accommodate signage requirements for the private retail stores (see *illus 8.27)*.

02.4.– FLOORS

ACCESS FLOOR SYSTEM

Access flooring (see *illus 8.21 &, 8.22)* consists of 600 x 600mm modular steel panels, supported by a steel understructure. The access flooring is to be fitted with carpet (see *illus 8.23)* in the staff areas and acoustic vinyl in the public areas.

The space under the access floor will be used to run the services of the building such as electric power, data cables, air-conditioning and so on, for ease of accessibility for maintenance purposes.

Illus 8.34. Van Dyc Oxygen manufacture process.

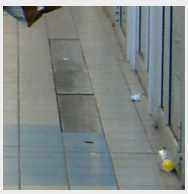
Carpet is used for its sound absorbing properties. It has a high embodied energy (Green Building Council, 2010: 47), therefore the *Van Dyck Oxygen* range is to be specified because it uses more than 50% recycled plastic bottles during its manufacture process.

TERRAZZO

Terrazzo is an aggregate of marble or granite chippings mixed with concrete or cement to form a reasonably non-slip hardwearing waterproof floor suitable for interior and exterior application as well as areas of high traffic. Terrazzo can be mixed and laid in-situ or precast panels can be manufactured. In-situ terrazzo is towelled onto a solid concrete base or onto screed bonded to a concrete base to form panels within aluminium dividing strips. It is then ground to produce a smooth but non-slip finish, washed, filled with cement paste, cured and polished. In Citizen Connect, Terrazzo is used internally and externally.

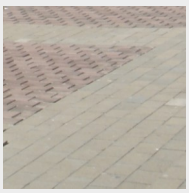
02.5.– LANDSCAPE (public domain) ELEMENTS

Illus 8.35.Graphic of the drinking fountain.

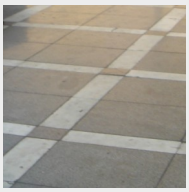


Illus 8.36.Ceramic tiles arcade: extremely slippery and in a poor condition.

Illus 8.37.Ceramic tiled arcade: extremely slippery and in a poor condition.



Illus 8.38. Sammy Marks Square: Concrete paving, natural and pigmented. Good condition.

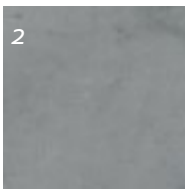


Illus 8.39. State Theatre Tquare: Terrazzo & marble/granite paving, good condition.

Existing material

Concrete paving slabs 600 x 600 x 50mm thick, 450 x 450 x 50mm thick

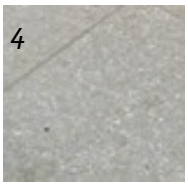
Illus 8.40. Smooth concrete finish, natural colour.



Illus 8.41 Smooth concrete finish, slate colour.

Illus 8.42. Exposed aggregate, natural colour.

Terrazzo



Illus 8.43.External Terrazzo.

The existing floor finishes to the arcade are ceramic tiles that are extremely slippery and in a poor condition and needs replacing (see *illus 8.34 & 8.35)*. The new paving is a selection of concrete paving blocks with different textures and colours, terrazzo (see *illus 8.38, 8.39, 8.40 & 8.41)* and external LED lighting (see *illus 8.42 & 8.43)* laid flush with the paving to give life and colour to the floor at night. The paving layout is so designed as to not give priority only to Citizen Connect, but to all the parts of the Sammy Marks Development.

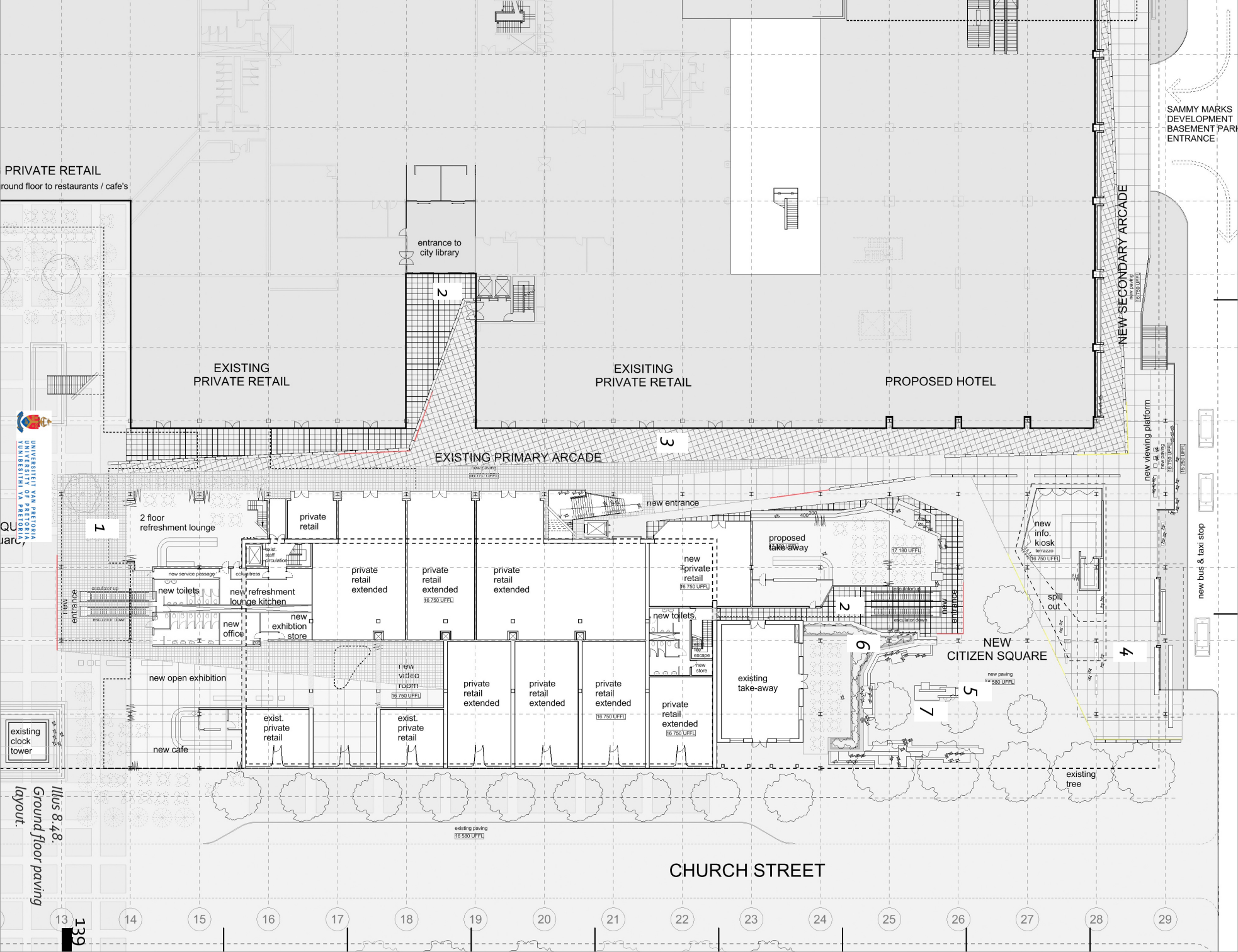
The plants selected for the planters in Citizen Square are indigenous Strelizia Reginae (see *illus 8.44)* and Bauhinia Galpini (see *illus 8.45)* ensuring that the square has colourful flowers throughout the year. Strelizia Reginae is a striking perennial that produces flowers from March until October. Bauhinia Galpini is a shrub that produces red flowers in summer. The trees in Citizen Square all already exist.

Illus 8.44. LED light.

Illus 8.45. LED light.

Illus 8.46. Strelizia Reginae

Illus 8.47. Bauhina Galpini.



Illus 8.48. Ground floor paving layout.

Illus 8.49

03.1 – GREEN STAR SA—RETAIL CENTRE V1 2010

Green star SA was created to:

- *Establish a common language and standard of measurement for green buildings*
- *Promote integrated, whole building design*
- *Identify building lifecycle impacts*
- *Raise awareness of green building benefits*
- *Recognise environmental leadership*
- *Transform the built environment to reduce the environmental impact of development*

(Green Star SA, 2011: xi)

Green star SA rating tools include 9 separate environmental impact categories:

- Management
- Indoor environmental quality
- Energy
- Transport
- Water
- Materials
- Land use & ecology
- Emissions
- Innovation

Citizen Connect achieves the above points in the following areas:

Management — having a waste and recycling management area for the centres operational waste

Indoor environmental quality — a BMS (electronic building management system) is integrated to monitor energy and water consumption, and to control building service systems, such as electronic passive systems (see *illus 8.63 & 8.70),* places of respite are designed where there is a citizen square and outdoor terraces, as well as to allow views from the Lewis & Marks building, where the existing windows are currently boarded.

Transport — to recognise and encourage developments near public transport, to encourage and recognise retail centres that are built in mixed-use areas in order to reduce the overall number of car trips taken by citizens, the traffic infrastructure is improved as a result of the formalisation of the bus and taxi stop.

Water — reduction of potable water consumption implemented by using a storm-water collection system as well as a dual flush system using rainwater, thus implementing water harvesting collection.

Materials — to encourage and recognise developments that reuse existing buildings to minimise material consumption, where possible materials are reused, such as the steel structure of the arcade, or the existing steel roof.

Citizen Connect has achieved 60 points (*table 8.1*), which gives it a 5 star rating, to be recognised for *South African Excellence*.

Green Star SA - Retail Centre v1

Credit Summary

Citizen Connect

Category	Title	Credit No.	Points Available	Points Achieved	Points to be Confirmed	Percent of Available Points Achieved	Weighting	Weighted Score
MANAGEMENT								
	Green Star SA Accredited Professional	Man - 1	2	2	0			
	Commissioning Clauses	Man - 2	2	2	0			
	Building Tuning	Man - 3	2	2	0			
	Independent Commissioning Agent	Man - 4	1	1	0			
	Building Guides	Man - 5	2	2	0			
	Environmental Management	Man - 6	2	2	0			
	Waste Management	Man - 7	3	3	0			
	Waste and Recycling Management Plan	Man - 9	1	1	0			
	Building Management Systems	Man - 10	1	1	0			
	Green Lease	Man - 11	1	1	0			
		TOTAL	**17**	**17**	**0**	100%	10%	**10.0**
INDOOR ENVIRONMENT QUALITY								
	Ventilation Rates	IEQ - 1	3	2	0			
	Air Change Effectiveness	IEQ - 2	2	1	0			
	Carbon Dioxide Monitoring and Control	IEQ - 3	1	0	0			
	Daylight	IEQ - 4	2	2	0			
	Thermal Comfort	IEQ - 9	1	1	0			
	Hazardous Materials	IEQ - 11	1	1	0			
	Internal Noise Levels	IEQ - 12	1	1	0			
	Volatile Organic Compounds	IEQ - 13	2	2	0			
	Formaldehyde Minimisation	IEQ - 14	1	1	0			
	Mould Prevention	IEQ - 15	na	na	-			
	Places of Respite and Connection to Nature	IEQ - 18	1	1	0			
		TOTAL	**15**	**12**	0	80%	10%	**8.0**
ENERGY								
	Conditional Requirement	Ene - 0	0	Achieved	-			
	Greenhouse Gas Emissions	Ene - 1	20	0	0			
	Electrical Energy Sub-metering	Ene - 2	2	2	0			
	Maximum Electrical Demand Reduction	Ene - 5	3	3	0			
	Thermal Energy Sub-metering	Ene - 6	1	1	0			
		TOTAL	**26**	**6**	**0**	23%	25%	**5.8**
TRANSPORT								
	Provision of Car Parking	Tra - 1	na	na	-			
	Fuel-Efficient Transport	Tra - 2	1	1	0			
	Cyclist Facilities	Tra - 3	3	0	0			
	Commuting Mass Transport	Tra - 4	6	4	0			
	Trip Reduction - Mixed-Use	Tra - 6	1	1	0			
	Vehicle Operating Emissions	Tra - 7	2	2	0			
		TOTAL	**13**	**8**	**0**	62%	12%	**7.4**
WATER								
	Occupant Amenity Water	Wat - 1	5	4	0			
	Water Meters	Wat - 2	3	3	0			
	Landscape Irrigation	Wat - 3	na	na	-			
	Heat Rejection Water	Wat - 4	4	2	0			
	Fire System Water Consumption	Wat - 5	1	0	0			
		TOTAL	**13**	**9**	**0**	69%	15%	**10.4**
MATERIALS								
	Recycling Waste Storage	Mat - 1	2	2	0			
	Building Reuse	Mat - 2	5	5	0			
	Recycled Content & Re-Used Materials	Mat - 3	3	1	0			
	Concrete	Mat - 5	3	3	0			
	Steel	Mat - 6	3	0	0			
	PVC Minimisation	Mat - 7	1	1	0			
	Sustainable Timber	Mat - 8	2	2	0			
	Design for Disassembly	Mat - 9	1	1	0			
	Dematerialisation	Mat - 10	1	0	0			
	Local Sourcing	Mat - 11	2	1	0			
		TOTAL	**23**	**16**	**0**	70%	13%	**9.0**

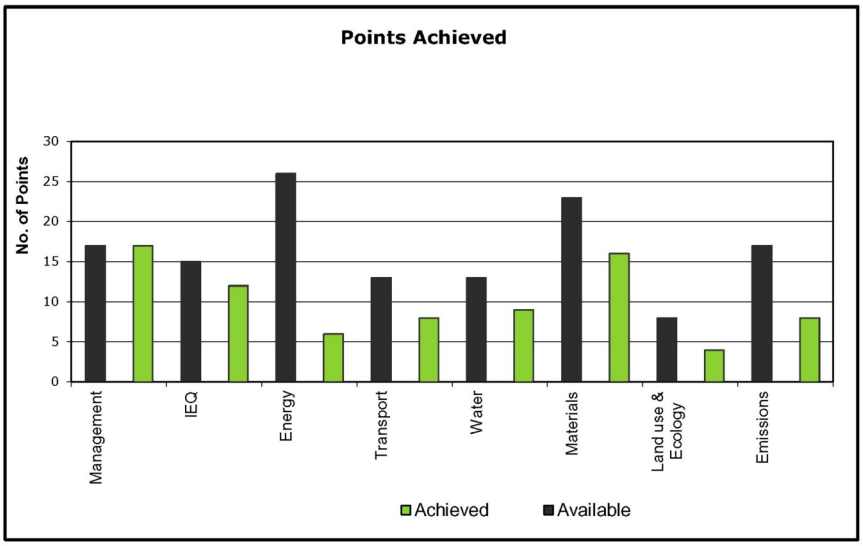
Table 8.1.

Category	Title	Credit No.	Points Available	Points Achieved	Points to be Confirmed	Percent of Available Points Achieved	Weighting	Weighted Score
LAND USE & ECOLOGY								
	Conditional Requirement	Eco - 0	0	Not Achieved	-			
	Topsoil	Eco - 1	na	na	-			
	Reuse of Land	Eco - 2	2	2	0			
	Reclaimed Contaminated Land	Eco - 3	na	na	-			
	Change of Ecological Value	Eco - 4	4	0	0			
	Urban Heat Island	Eco - 5	2	2	0			
		TOTAL	8	4	0	50%	7%	3.5
EMISSIONS								
	Refrigerant / Gaseous ODP	Emi - 1	1	0	0			
	Refrigerant GWP	Emi - 2	2	1	0			
	Refrigerant Leaks	Emi - 3	2	1	0			
	Insulant ODP	Emi - 4	1	1	0			
	Watercourse Pollution	Emi - 5	3	1	0			
	Discharge to Sewer	Emi - 6	4	2	0			
	Light Pollution	Emi - 7	1	0	0			
	Legionella	Emi - 8	1	1	0			
	Boiler and Generator Emissions	Emi - 9	1	1	0			
	Kitchen Exhaust Emissions	Emi - 10	1	0	0			
		TOTAL	17	8	0	47%	8%	3.8
						Sub-total weighted points achieved:		58
INNOVATION								
	Innovative Strategies & Technologies	Inn - 1	5	2	0			
	Exceeding Green Star SA Benchmarks	Inn - 2	5	0	0			
	Environmental Design Initiatives	Inn - 3	5	0	0			
		TOTAL	5	2	0	(Innovation is not weighted)		2
						Total weighted points achieved:		60

The GBCSA does not endorse any self-assessed rating achieved by the use of Green Star SA - Retail Centre v1. The GBCSA offers a formal certification process for ratings of Four Stars and above; this service provides for independent third party review of points claimed to ensure all points can be demonstrated to be achieved by the provision of the necessary documentary evidence. The use of Green Star SA - Retail Centre v1 without formal certification by the GBCSA does not entitle the user or any other party to promote the Green Star SA rating achieved.

Weighted Score	Rating
45-59	Four Star
60-74	Five Star
75+	Six Star

Table 8.1.



Graph 8.1.

04– SYSTEMS + SERVICES

04.1. – APPROACH

From the basement up (services entering the building)

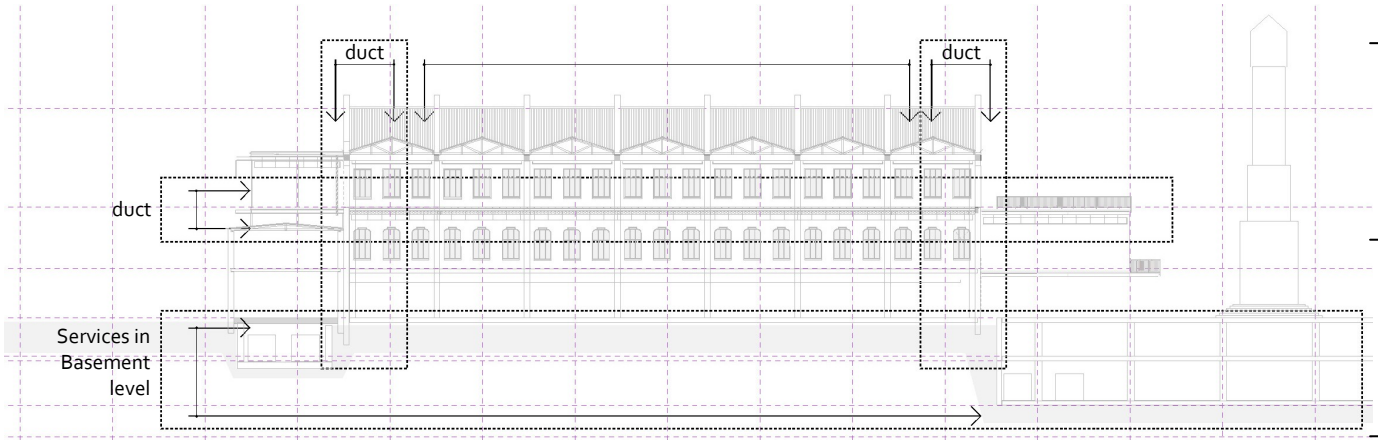
The Sammy Marks Development sits within an urban context, making the ground floor the most valuable part of the site because of its accessibility. Therefore, to take advantage of the ground floor, all the plant rooms and service yards are in a designated part of the basement level and enter the building from the basement up. *(see illus 8.50 & 8.51)*

Western & eastern façade (service circulation)

Within the Lewis & Marks building all the services enter the building and circulate through the building on the western and eastern walls in order not to obstruct the fenestration on the northern and southern facades of the building, which allow light and ventilation into the building, and open views to the surroundings. *(See illus 8.50)*

New second floor structure (service circulation)

The new second floor structure, being steel, enables the services to reach the entire length of the building, as well as service the first and second floors. (See i*llus 8. 51)*



Illus 8.50.Service approach.

Illus 8.51.Service location diagram.

04.2. – VENTILATION STRATEGY

Through the information gained by consulting with an automated ventilation expert, the ventilation strategies implemented in Citizen Connect are a combination of cross ventilation, stack ventilation and night passive cooling. *(See illus 8.53 — 8.56)*

The ventilation strategy will work in conjunction with a fully integrated energy management system. The main elements of the strategy include internal and external temperature gauges and rain and wind sensors to ensure optimum comfort for the citizens. A chain actuator will be installed on the existing and new windows, and a linear actuator will be installed for the skylight, thus, the automatic opening and closing of the windows and skylights operate in a controlled manner *(see illus 8.52)*. The management system will be linked to the retractable arcade and the fire detection system. *(See illus 8.59, 8.61)*

Linear actuator for skylight

Open/ close 2-way switch

Wind speed & direction sensor

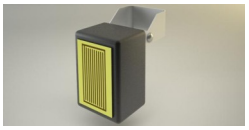
Internal temperature sensor

7 day timer

Auto manual control

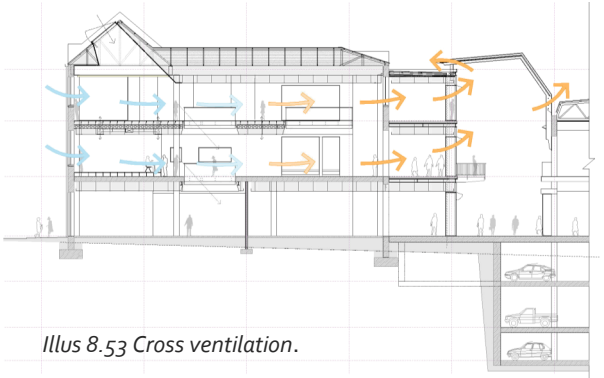
Smoke detector

Chain actuator for windows

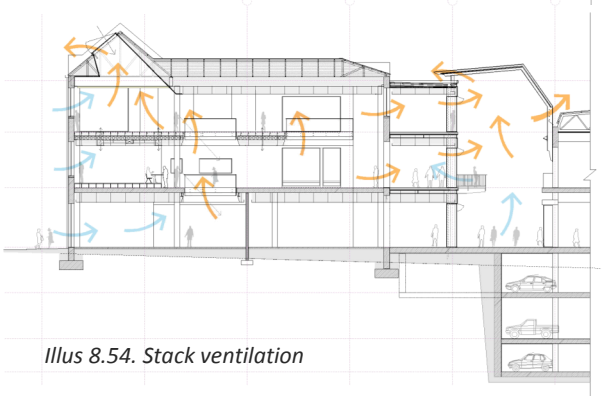


Rain sensor

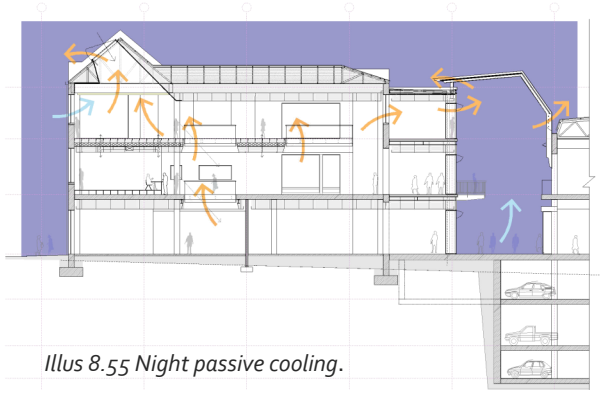
Illus 8.52



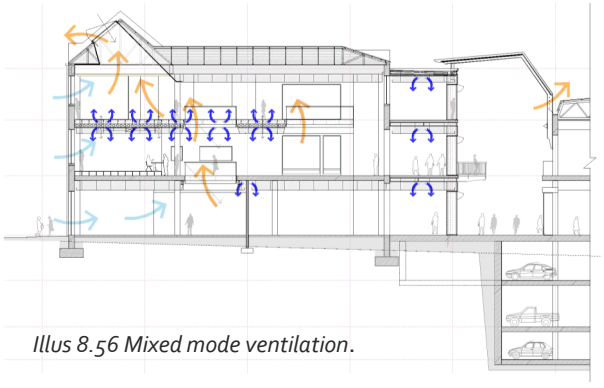
Illus 8.53 Cross ventilation.



Illus 8.54. Stack ventilation



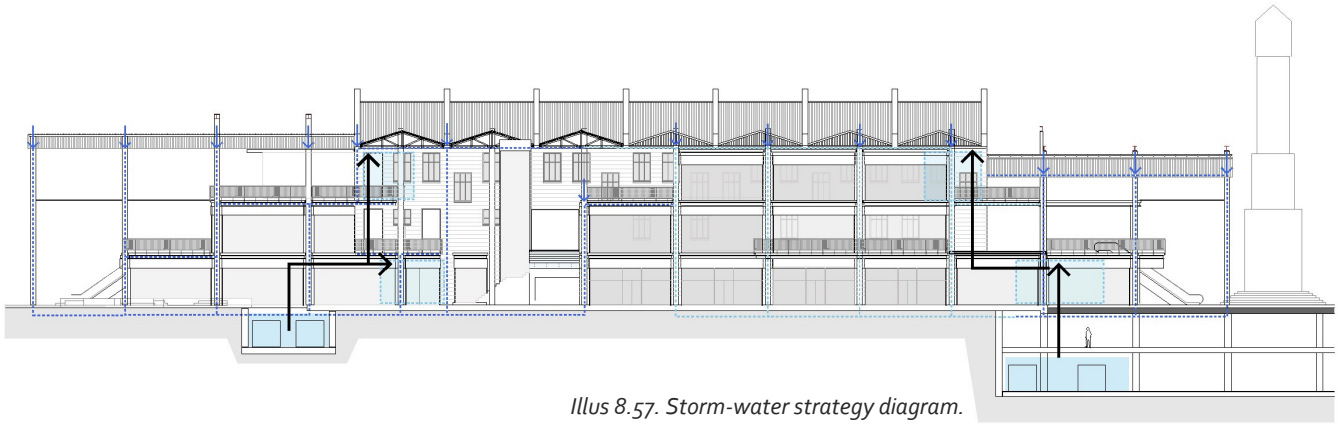
Illus 8.55 Night passive cooling.



Illus 8.56 Mixed mode ventilation.

04.3. – STORMWATER COLLECTION STRATEGY

Rainwater is conventionally channelled out through storm-water channels whereas it should rather be collected as a valuable resource. The table below shows that an approximate monthly target usage is 88 344 litres per month; a huge amount of water that could be collected from site. The rainwater harvesting strategy is to collect water from rooftops and store it in JoJo tanks in the basement (see *illus 8.57*) to supply water for the flushing of wc's, urinals and for watering the plants. The number of JoJo tanks required is calculated in table 8.2 where a reserve of water is kept for the winter months. A pump system will pump the water up into storage tanks above the ablution areas. If there is a surplus of water, the storm-water will overflow into the existing storm-water system, and if there is a deficit of water, water will be retrieved from the potable water municipal connection.



Illus 8.57. Storm-water strategy diagram.

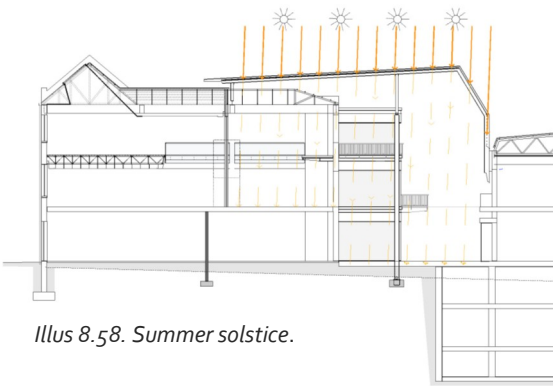
Monthly target usage	88 344															Blue = user input
Roof area	2300															Blue = user input
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year ave	Summer av	Winter ave	
WATER IN																	
Ave rainfall (mm)		136	75	82	51	13	7	3	6	22	71	98	110	56.1667	95.33333	17	Blue = user input
Ave rainfall (m)		0.136	0.075	0.082	0.051	0.013	0.007	0.003	0.006	0.022	0.071	0.098	0.11	0.05617	0.095333	0.017	
Above/below year average		above	above	above	below	below	below	below	below	below	above	above	above				
Factored rainfall (m)		0.1206	0.0584	0.064	0.0392	0.0088	0.004	0.0008	0.0032	0.016	0.0552	0.0768	0.0864	0.04333	0.074667	0.012	
Roof Area (m2)		2300	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300	
Water in (m3)		277.38	134.32	147.2	90.16	20.24	9.2	1.84	7.36	36.8	126.96	176.64	198.72	99.6667	171.7333	27.6	
Water in (litres)		277380	134320	147200	90160	20240	9200	1840	7360	36800	126960	176640	198720	99666.7	171733.3	27600	Orange = NB calculated value (use as monthly target usage when ALL rainwater harvasted)
WATER STORAGE																	
Monthly target usage		88344	88344	88344	88344	88344	88344	88344	88344	88344	88344	88344	88344	88344	88344	88344	Note: Values copied from user data
Monthly surplus/defecit		189036	45976	58856	1816	-68104	-79144	-86504	-80984	-51544	38616	88296	110376	11322.7	83389.33	-60744	
Total winter defecit	-165648																Adapt formula to reflect months of deficit
Total summer surplus	332340																Adapt formula to reflect months of surplus
Total water balance	166692																
Monthly target usage	88344																
Storage: Monthly usage + winter defecit	253992																
Jojo tank size (litres)	10000																Blue = user input
Amount of tanks needed	25.3992																Green=design value out

monthly target usage calculation:	no. sanitary appliance x no. Of times used in a hour x no. Of hours used in a day x days in a month
	wc: 22 x 4 x 8 x 30 = 84 480
	ur: 6 x 4 x 8 x 2 = 384
	tree: 120l per tree per month = 120 x 29 = 3480
	total: 88344

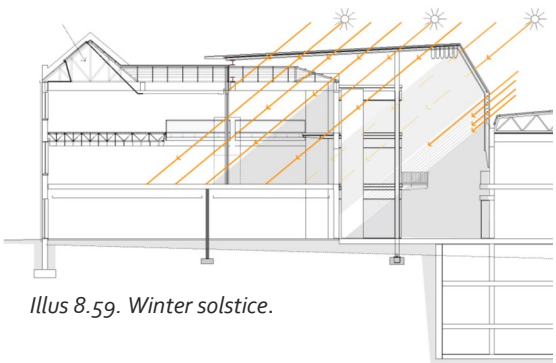
Table 8.2. Storm-water calculations

04.4. – SOLAR STRATEGY

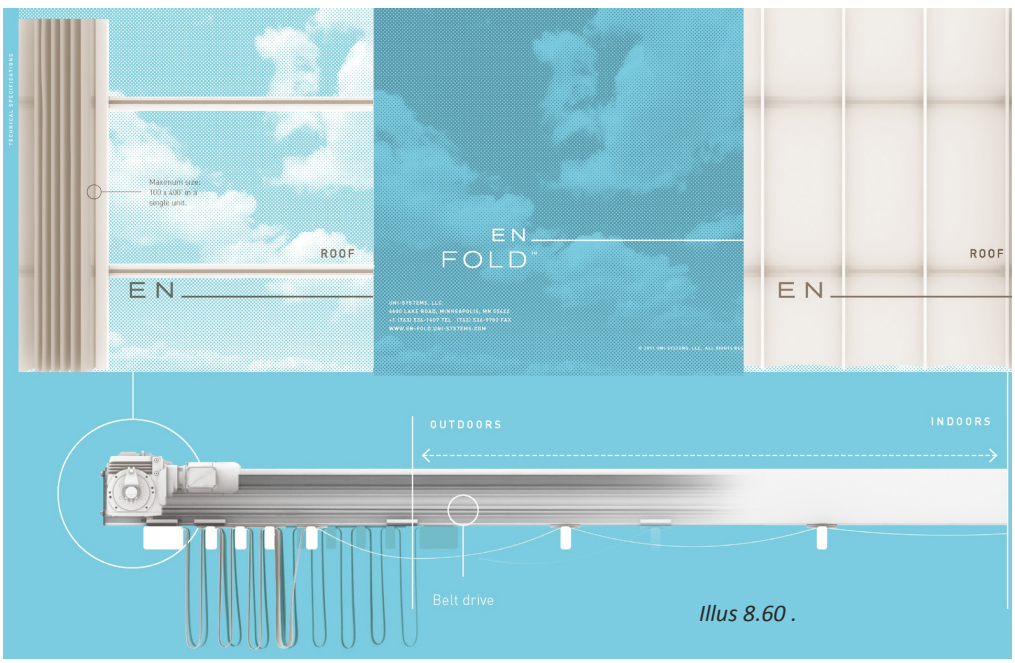
The northern portion of the site is predominantly shaded by the fabric arcade *(see illus 8.58)*. To enable passive design strategies to take place, at strategic points the fabric roof will be retractable, allowing sunlight to enter the building, warming up the environment for the occupants *(see illus 8.9)*. The En-Fold retractable roof is designed to use tensile fabric and will be integrated with the intelligent building automation system that functions with the ventilation strategy. En-Fold is designed to withstand winds of up to 130km/h representing its strength. And has been used in a wide variety of applications such as airports or stadiums and therefore is a feasible option for Citizen Connect.



Illus 8.58. Summer solstice.

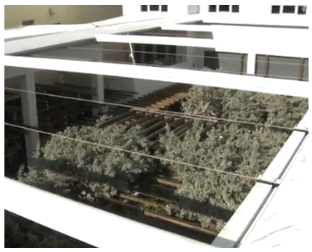


Illus 8.59. Winter solstice.



Illus 8.60 .

04.5. – FIRE STRATEGY



Illus 8.61. EN-fold retractable roof in operation.

The following measurements were made for type F1 building:

(1) Occupancy designed forF1 = 1 person per 10m²:
: Ground floor = n/a (all areas open up to the outside)
: First floor = 1845m² = 185 people
: Second floor = 1400m² = 140 people

(2) There will be a fixed fire-fighting equipment installed in the form of sprinkler systems and will have a manually activated audible alarm system in accordance with SABS 0139

(3) The requirement for fire escapes is 2 plus 1, therefore 3 are provided for at the correct travel distances (max 45m).

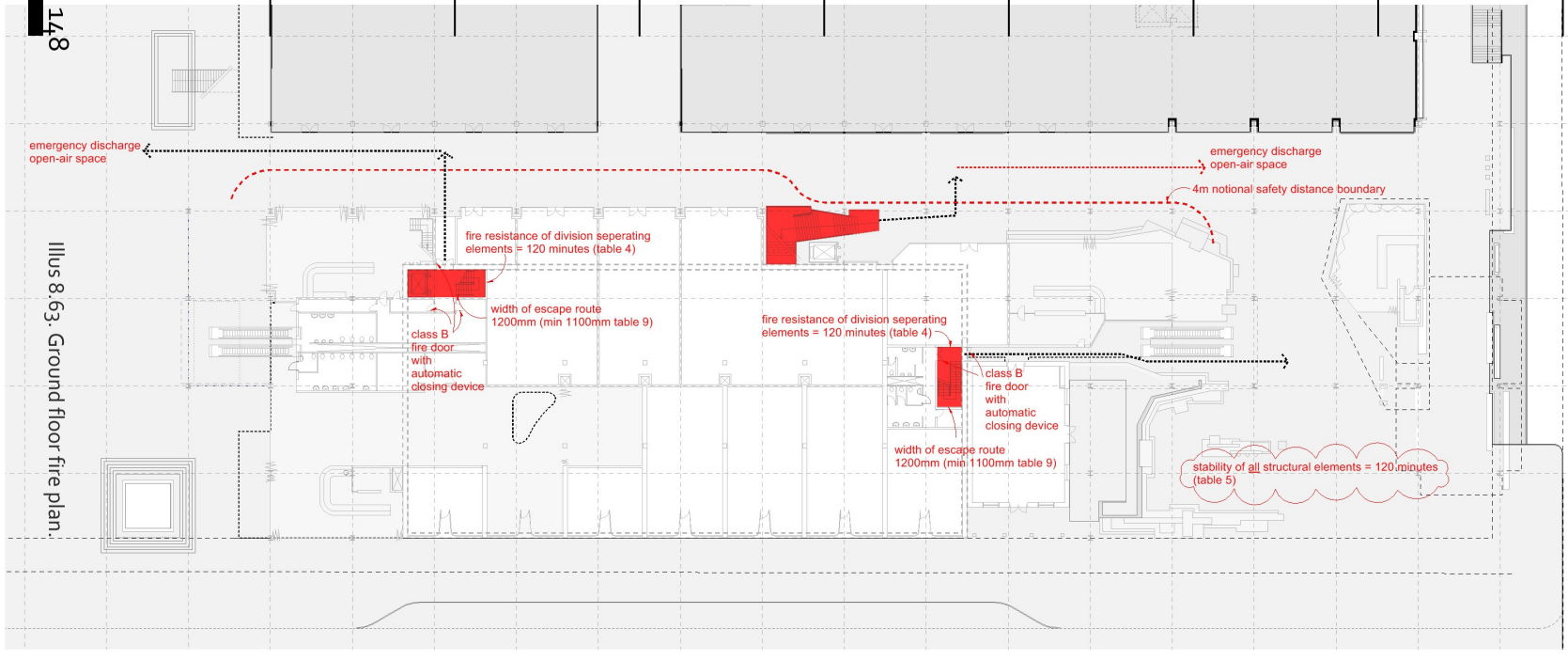
(4) Hose reels for every 500m² (as per SABS 543), portable fire extinguisher, 1 per 200m² (as per SABS 810, SABS 889, SABS 1151 SABS 0105) using the dry chemical type.

(5) Smoke ventilation measures are implemented in the walled fire escapes in the form of a louvered ventilator. In case of a fire the skylight and windows will open as part of the electronic management system.

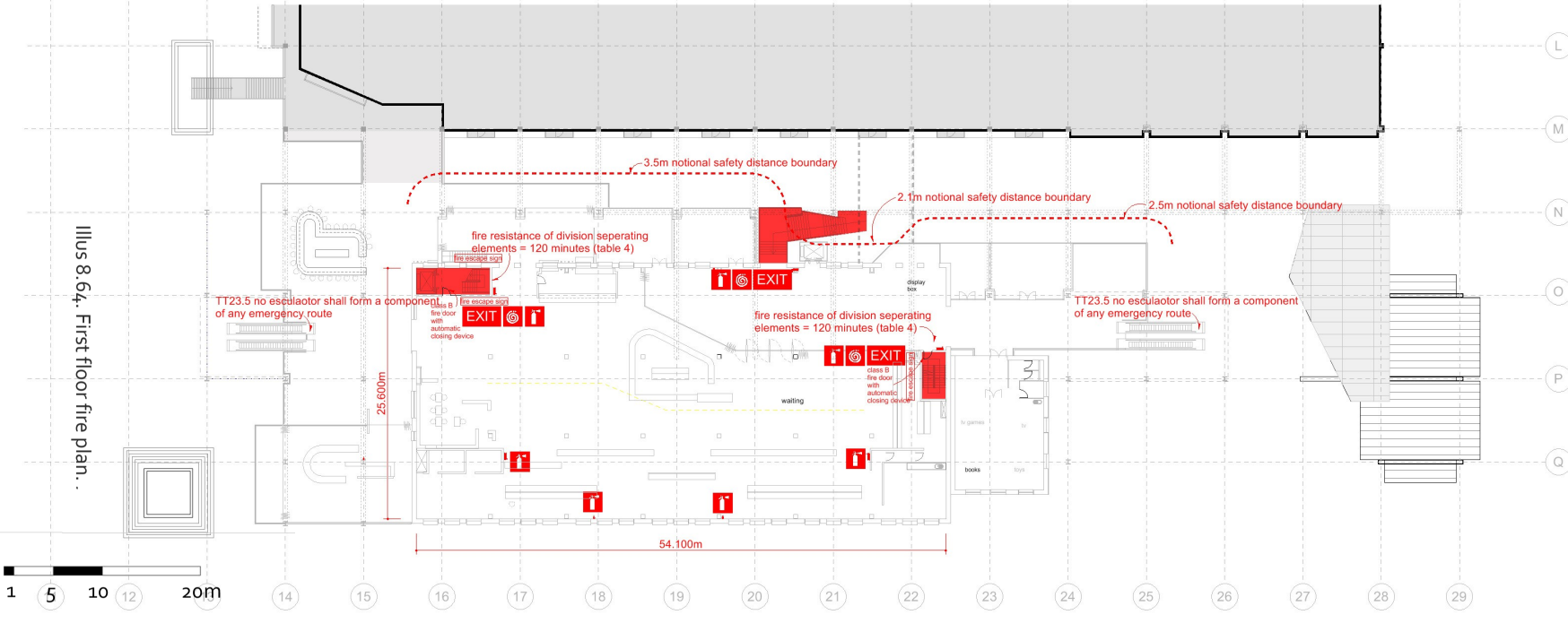
(6) The additional glass boxes on the arcade area comply with the safety distance requirement.

SABS 0400-1990
PART T: FIRE PROTECTION REGULATIONS
T1 GEERAL REQUREMENT
(1) Any building will be designed and equipped in case
of fire -
(a) The protection of occupants or users therein is ensured and that provision is made for the safe vacation of such occupants or users
(b) The spread and intensity of such fire within such building and the spread of fire to any other building will be minimized
(c) Sufficient stability will be retained to ensure that such building will not endanger any other buildings stability; provided that in the case of a multi-storey building no major failure of the structural system will occur
(d) The generation and spread of smoke will be minimised or controlled to the greatest extent reasonably practicable; and
(e) Adequate means of access, and equipment for detecting, fighting, controlling and extinguishing such fire, is provided.

Illus 8.62. Colt seefire ventilator above a fire escapes with translucent polycarbonate louvers to allow daylight to enter the fire escape staircase and to provide a smoke free route.



Illus 8.63. Ground floor fire plan.



Illus 8.64. First floor fire plan..

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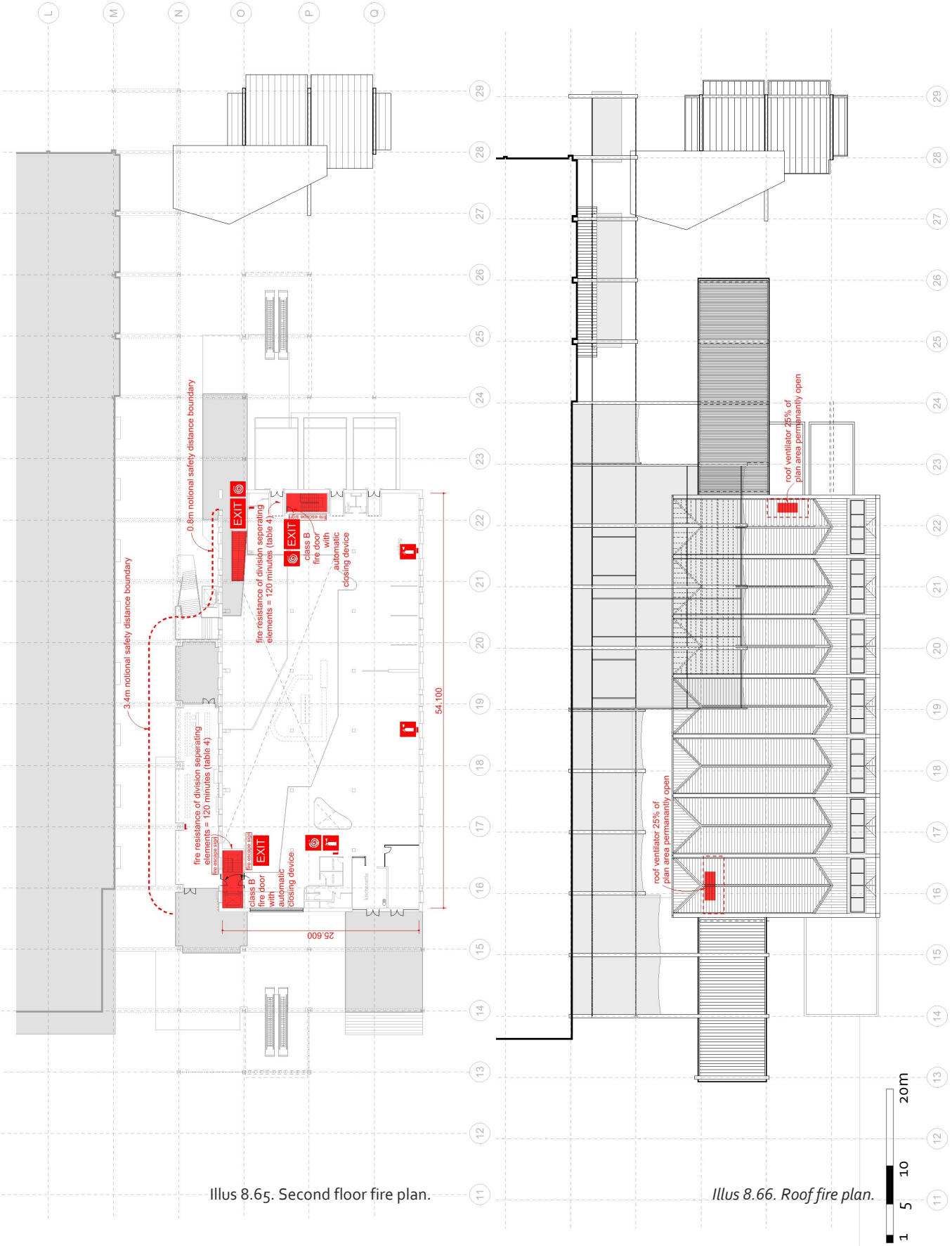


Illus 8.65. Second floor fire plan.

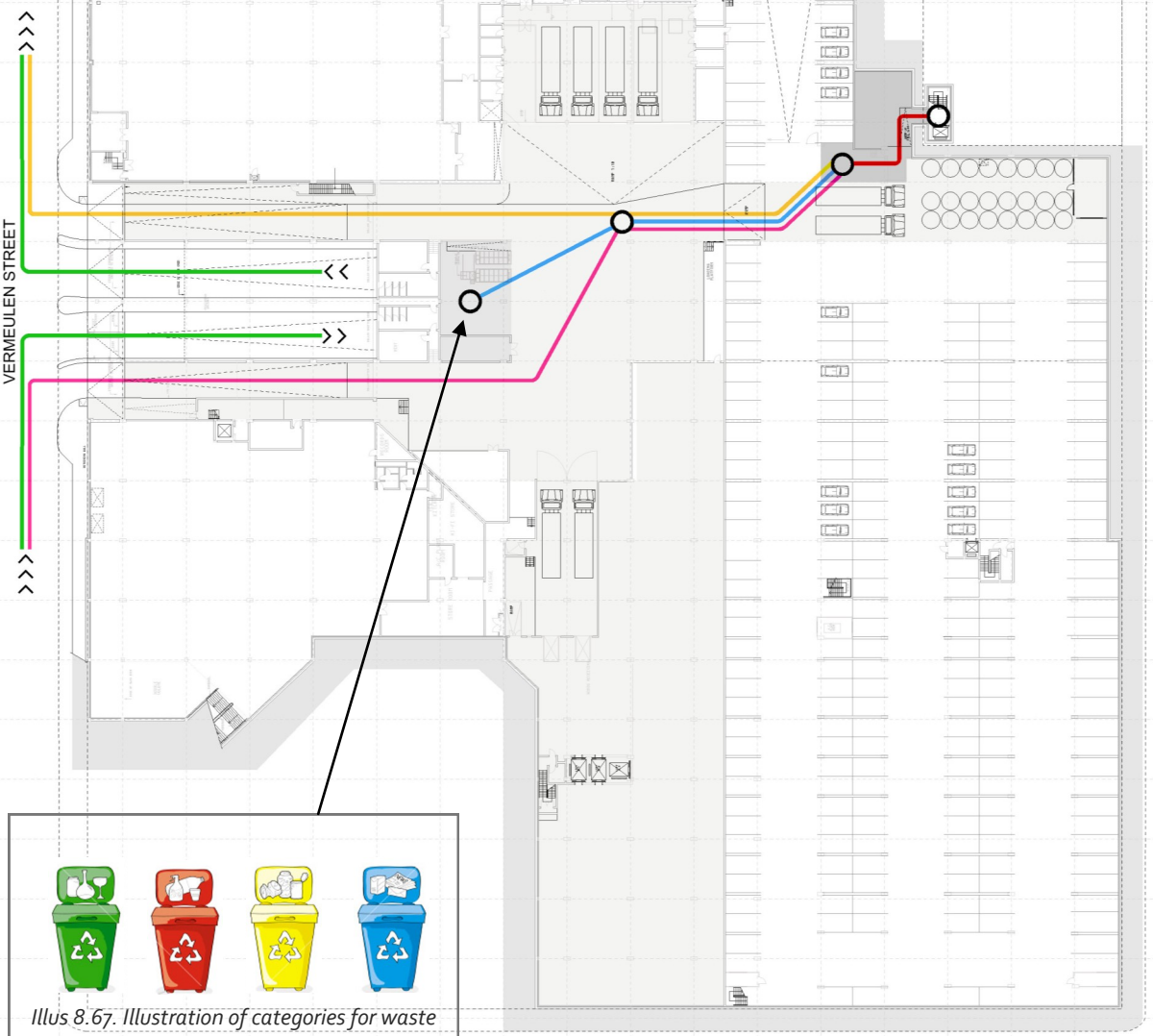
Illus 8.66. Roof fire plan.

04.6. – REFUSE + DELIVERIES + COLLECTION

Refuse, delivery and collection takes place in a designated portion in the basement level, as do the rest of the services (see *illus 8.51).*

REFUSE: there is a communal refuse area where there are separate bins for recycling purposes.

DELIVERIES + COLLECTION: The deliveries entrance (Vermeulen Street) is separate from the entrance to the basement parking for the citizen (Prinsloo Street). Deliveries circulate at the levels above via the existing lift shafts and staircases.



Illus 8.67. Illustration of categories for waste separation for recycling.

Illus 8.68. Refuse + collection + deliveries plan.