8. TECHNICAL INVESTIGATION

8.1 INTRODUCTION
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STORAGE ROOF

8.2.1

1. PURPOSE: Collecting & storing rainfall to utilise within the building for non-potable purposes & reduce mains water consumption.

2. WATERPROOF MEMBRANE TURNS UP EDGES

3. DRIP EDGE PROTECTS PROOF MEMBRANE

4. MAKES LEAKS LESS LIKELY TO OCCUR THAN CONVENTIONAL ROOF

5. ACTS AS THERMAL BUFFER FOR MEMBRANE

6. PROTECTS FROM DAMAGING UV RAYS.

USED FOR:

1. ROOF VALleys
2. RIDGE-UP (WIND STOPPERS)
The vast scope and scale of the project has lead to a technical inquiry which focuses largely on servicing the site as a whole, and to investigate the systems that is called for in order to fulfill the requirements as set out in the baseline document (Addendum .10.1)

Although not the only technical aspect considered, an important part of the site systems development is the recirculation of water. Water as a source of life, as well as a growth agent plays an important role in creating an awareness of the community’s dependence on the Sterkspruit River. In developing rivulets that meander through the site and serve the building in that it can cool, purify and feed, the central theme around the importance of the river within the town is reinforced.

The water cycles that were implemented in the working systems of the terrain included rainwater harvesting, grey water recycling, the use of evaporation ponds and retaining ponds. Other systems that were considered in the technical resolution
In order to be greater than collection: A flat roof eliminates the need for a rainwater disposal system of falls, outlets, downpipes, catchpans and surface dings.

STRUCTURE: Must be: 100% H2O proof.

1. Most membranes are butyl.
2. Not expensive: do not need to be solar resistant.
5. 10% more mesh for mesh against wind.
6. May be overlaid by: CC slab to support underneath if roof to be accessible.
of the design are the application of the construction methods as highlighted in the Design Discourse (Chapter 6.) and other thermal comfort systems such as the use of trombe walls, the allowance of winter sunlight for heat gain, and cross ventilation. The light reflecting quality of interior ponds was also harnessed in utilising natural sunlight.

.8.2 SITE USE
The site use is determined by the hundred and fifty year flood lines, the urban influence, as well as the natural drainage patterns of the site. The building footprint superimposed onto the site creates valleys and watersheds that guide the harvested rainwater back into the river. As part of the baseline criteria (building performance criteria) predetermined in Addendum 10.1. It is important that the rainwater channeled onto the site is redirected back into the site and eventually into the river on site as well.
LIGHT SHALE PERMITTING GLARE CLOSE TO THE WINDOW AND REFLECTING LIGHT DEEP INTO THE ROOM.

F.8.2.1
.8.3 EXTERNAL TREATMENT

.8.3.1 Facades
In the facades of the north facing buildings (the education facilities and the catering school, as well as the workshops) trombe walls are used as passive climate control systems. The walls are shaded in summer, maintaining coolth in the building, while the angle of the winter sun manages to penetrate the walls which radiate the heat to the interior spaces. In the business school, where incremental heat gains can be expected due to the use of computers, evaporative cooling is applied: the building is designed with a depth of less than twelve meters and place perpendicular to the predominant north-easterly summer wind direction (Holm 1996:64). A pond placed across unobstructed apertures in the inner corridor of the building cools the warm air flowing from the flood plain, and the air is directed through the business school through long narrow slits made in the north-façade trombe wall. The slits can be controlled through a wooden louver system.
LIGHT SHELF PREVENTING GLARE CLOSE TO THE WINDOW AND REFLECTING LIGHT DEEP INTO THE ROOM.

PASSIVE ENERGY HARVESTING SYSTEMS

1. Solar energy collected is stored by a wall with high thermal mass. screens out the room by connecting air flow controlled by vents.
2. Night heat is slowly released into the room as the wall cools.

HEAT HARVESTING GLASSING SYSTEM

F.8.3.1

.8.8.
.8.3.2 Roofs
The concrete roof systems are typically 200 mm deep and carries glass covered slits in order to let light through.

.8.3.3 Landscaping
Indigenous grass species are used as in a layer in conjunction with the water recycling systems. Grass swales are implemented to impede erosion of valuable soil, while the grass also serves an aesthetic function in representing the indigenous name of Masing.

.8.4 ENVIRONMENTAL ISSUES
.8.4.1 Natural lighting
The application of natural sunlight is promoted through large louvered glass panels which face the southern view of the site in the exhibition wall. The evaporation ponds as an internal corridor that run through the business school and the restaurant are positioned as such as to reflect light into the interior of the spaces they run through.
O WARMTH NORTH LIES 16° N OF TRUE NORTH.

- Exclude direct solar radiation in summer, but admit during winter months.

- Maximizing solar heat gain takes precedence.

Maximum shading: Summer solstice - PSL 22

Lat 26 (5) 01:00 on 22nd June

Azimuth - 45° East of North

Altitude - 24°

21st Nov - 10:00

Vertical Shading Angle - 62°

Hor. Shade - 38° 2"
.8.4.2 Sun control
With the sun angles being 64.9° on summer solstice (21 March and 23 Sept) and 41.4° during winter, an overhang of 1700 mm is required in order to shade the summer sun completely. This is not feasible from a construction and economical point of view. An additional shading mechanism such as a louver system is required. The louver system is a solid wood construction as described in the Design Discourse (.6.)
.8.4.3 Ventilation
Ventilation through the Business School is to be assisted through evaporative cooling in the strategic position of ponds along the length of the building.

.8.4.4 Water systems
(i) Rainwater
Rainwater is to be harvested through the catchment basins of the roofs and to be stored in the water tank that also serves as an architectural feature on the north-west corner of the site. From the water tank, the water is channeled to the kitchen where it is used for non-potable purposes such as washing.

(ii) Grey water
The grey water from the kitchen area is to be diverted into two tanks, the one to serve as an irrigation mechanism for the landscaped garden on the western façade of the restaurant, and the other to serve as a retaining tank from which the water is pumped towards the inmates’ terraced vegetable garden.
Rumps connected: Steam enters pump, from storage tank,
into the cooking ponds, and from the boiling tanks to outfall.

Cooling ponds
(iii) Evaporation ponds
   The evaporation ponds are a closed system through which the water is continually recycled. It serves both an aesthetical and climate control purpose.

(iv) Retaining ponds
   Retaining ponds are ponds catchment areas designed for the slow release of water back into the natural water cycle such as the river or ground water table. Retaining ponds have been placed in the base of the amphitheatre and the sculpture garden. When heavy rains fall during the summer rainy season, the ponds will be filled with water to be eventually ciphered away or to be channeled through an overflow system. The building is shape allows for water to compliment its shape and is therefore also an aesthetical feature.
Ceaseable roofs: Polythene sheet laid without support & painted with acrylic emulsion paint to protect against radiation.

One laid polyethylene surface

Subject to windlift: held in place by equilizing suction provided by the gap to prevent this.

Overflow outlets to the vertical face of the building will have to be carefully designed to prevent wind blowing through the gap and