

Refer to the baseline and context study (parts two and three respectively) of this discourse for the complete context and guidelines that form the basis to design proposal.

Site Design and Development

The site design developed according to natural site features, and promotes the conservation of existing indigenous vegetation. Parking, access to and from the conservancy and the location of built structures all played an important role in the site design.

Parking

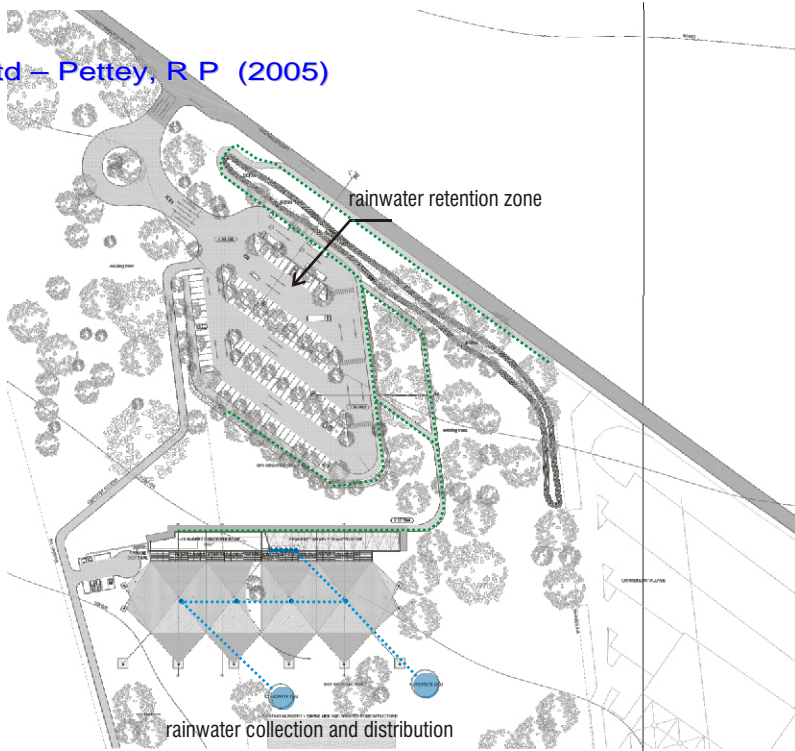
The concept around which site design evolved is one that encourages environmental issues to dominate. Vehicular access to the parking area is controlled with a ticket and boom system. There are 132 parking bays of which 4 are designed for the physically challenged. Four bus bays are also provided. Parking is situated in the most environmentally altered section of the site, as identified in the context study. The parking area is excavated into the landscape so as not to disturb the line of sight from the conservancy. The road surface is constructed from concrete cobble blocks while parking bays are finished with crushed stone that functions as rainwater retention zones (5.06).

Soil that is excavated will be placed on the northern side of the site to form a berm. The berm will be used as a natural barrier to demarcate public and semi-public areas, thus minimizing the need for security fencing (5.05).

As there is a parking shortage in the area parking will be provided to surrounding developments to generate extra income.

Access

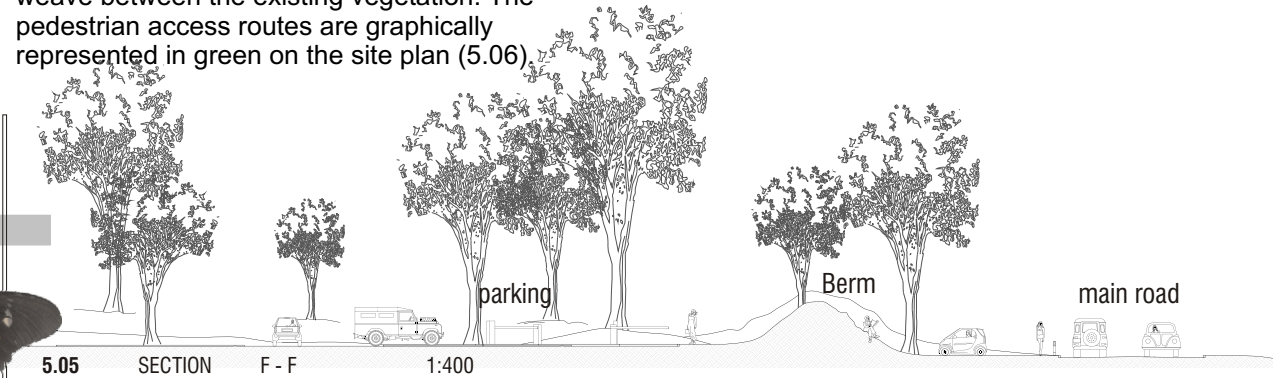
Access routes are carved into the landscape and weave between the existing vegetation. The pedestrian access routes are graphically represented in green on the site plan (5.06).



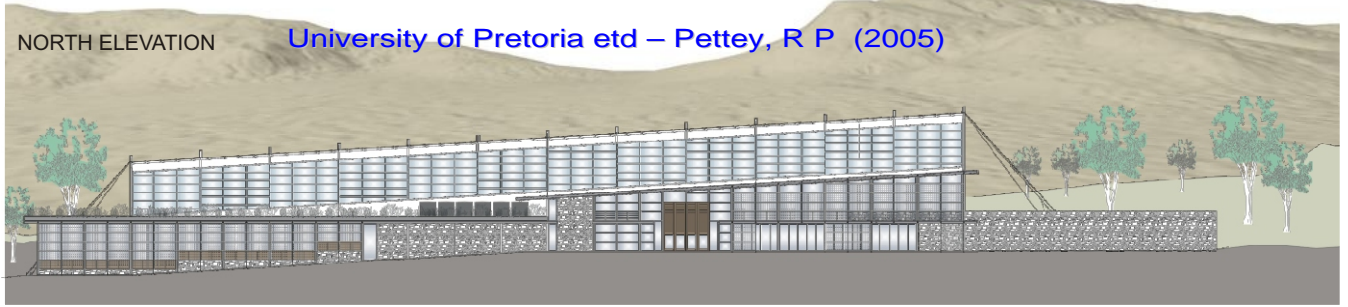
5.06 SITE PLAN

The Conservancy

The main building structure is located to take maximum advantage of passive energy technologies; to provide for human comfort and correct climatic conditions in the biomes. There are two prominent zones within the conservancy, the ridged northern section, which forms the human centred area - referred to from here on as the ridged core - and the second zone, the biomes. The following section covers design issues, structural systems and materials that are relevant to the proposed development. The technical investigation follows a progressive journey through the conservancy, similar to the route someone visiting the conservancy would.

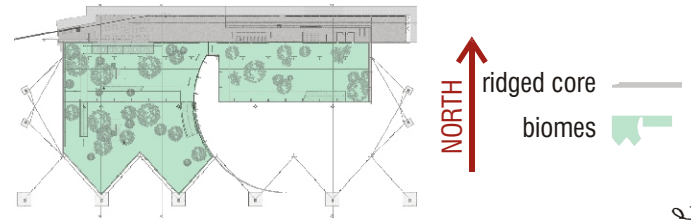


5.05 SECTION F - F



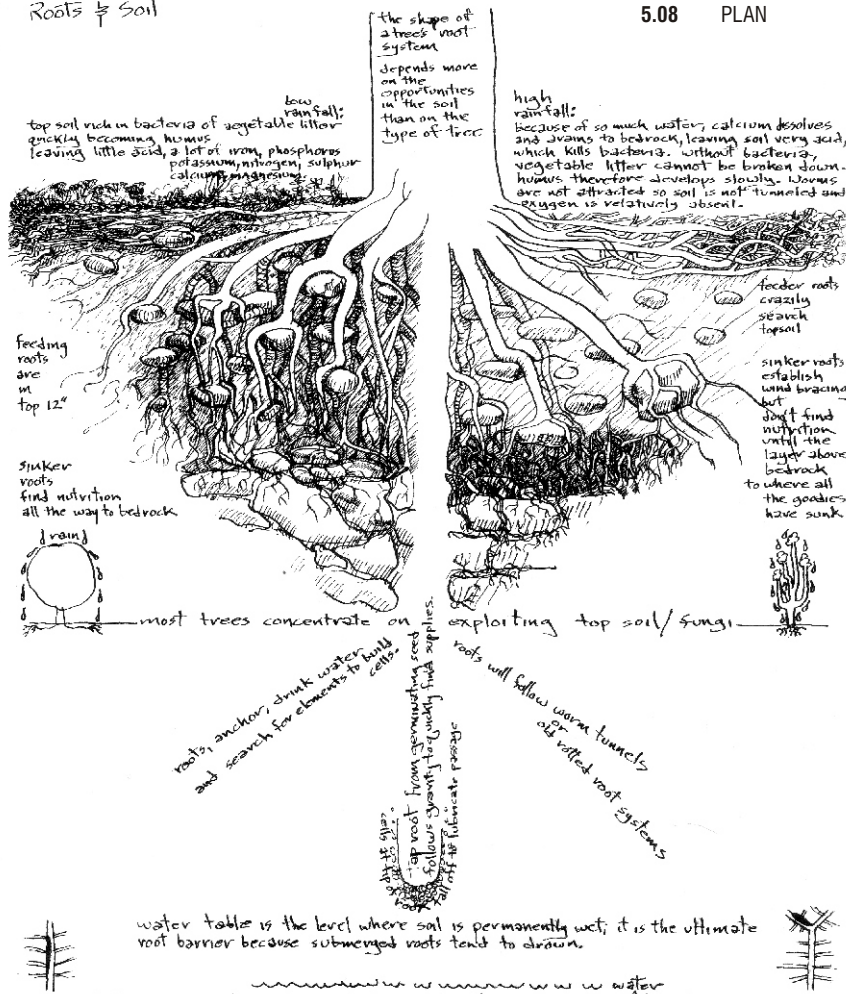
5.07

Similar technologies are used throughout the conservancy. One major difference with regards to climate control, is that, the ridged core (human centred zone) is controlled by the user and the biomes are monitored and controlled by a climate control unit.



5.08 PLAN

Roots & Soil



Density

Concentration versus dispersal? The final proposal is one which demonstrates a concentrated design, merged as one with the landscape. One of the strongest aspects which led to a concentrated layout, is that concentration of structure leaves more undisturbed natural areas. This ensures the continuity of vegetation growth and wildlife habitat.

The Third Dimension

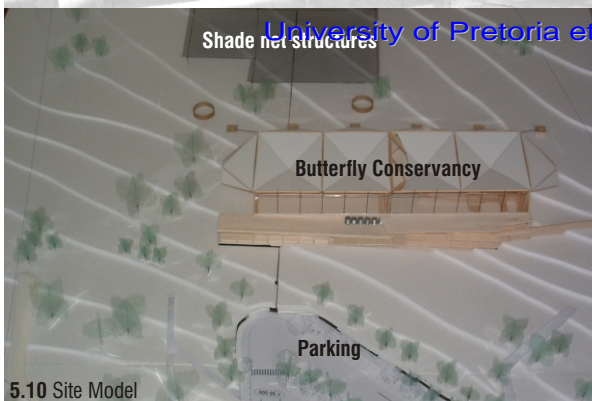
The third dimension in the ground plane is achieved through the creation of earth platforms and pits. Ramps which rise and drop, cut and fill and partial excavation of the structure into the contour that it follows, all contribute to increase understanding of the site and natural landscape. Natural features such as trees, ground forms, rock and water all give value to the site and links the user back to nature.

Technical Investigation & Design Discourse

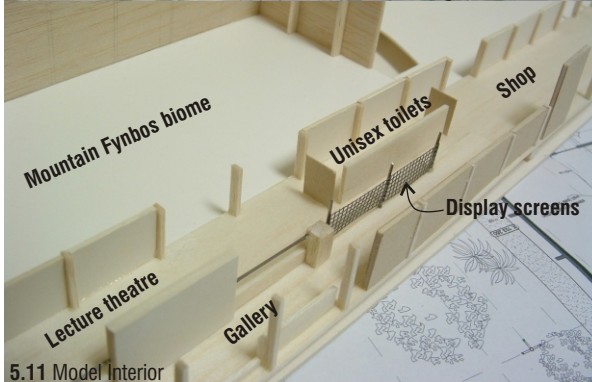


DESIGN INTERPRETATION - STEP BY STEP

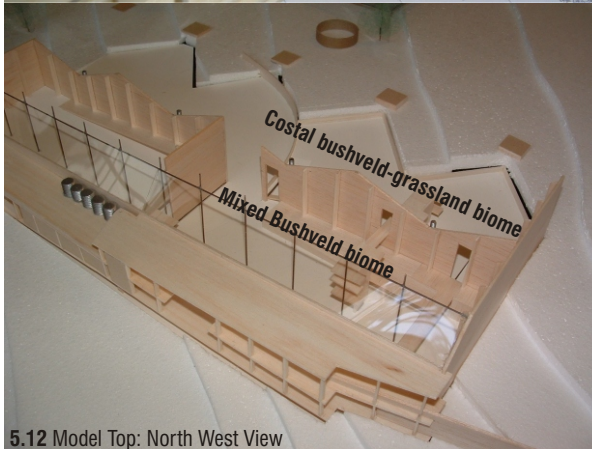
There are seven key spatial experiences created by the simple concept of the linear architectural structure: the gallery, shop, restaurant, laboratory and incubation centre, lecture theatre, unisex toilet cluster and activity zone.



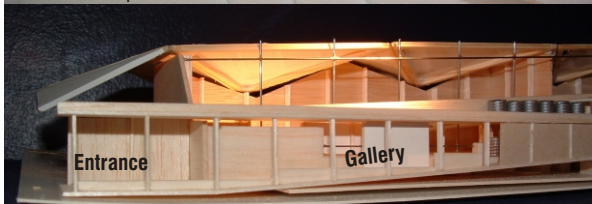
5.10 Site Model



5.11 Model Interior



5.12 Model Top: North West View



5.13 Model: North Elevation



5.14 Model: North Elevation

Gallery Space

198m² of floor area has been allocated to the gallery. The area is a multi functional zone with two primary functions; a gallery and movement zone. Display platforms and devices such as reinforced mesh screens, similar to the growth screens are used internally as display screens. The area is open plan and can be over looked from the lecture area and viewing platform. Louvres which can open and close as well as roller screens provide exhibitors and staff the opportunity to manage their own environment.

Shop

The 164m² of shop area is intended to function as a information and administrative hub. Amongst other things the shop will sell merchandise that relates to the conservancy. Tickets which allow visitor access to the biomes will also be sold here.

Restaurant - 221m²

The restaurant is the area within the conservancy which allows for extended periods of use. Early morning breakfasts, lunches and suppers will be served here. The restaurant is situated on the western side of the ridged core. At the end of the day visitors can indulge in sundowners here and take in the spectacular African sun set.

Laboratory and incubation centre - 19.5 m²

A multi-functional area with intense use of space. Specialized work, student research and intensive care will take place here. Visitors will only be allowed to visit this area under strict supervision. The bulk of incubation and breeding will take place in the activity zone where visitors will be able to appreciate aspects of the cycle normally hidden from view.

Lecture Theatre - 39m²

This is a small informal lecture space. Small school groups or other interested parties will be addressed here. Video and projector systems are provided.



Unisex Toilet Cluster - 34m²

One unisex toilet cluster is proposed for the conservancy. Controversial I know, but this is intended to minimize ques which usually form outside toilets for females only. The minimum number of toilets for maximum usage have been included in the design. Seven hand wash basins are positioned along the outer wall of the toilet cluster and an extra four hand wash basins are positioned outside the toilet block to promote hygiene.

Activity Zone - 278m²

The audio visual area will provide information to the visitor so that the Activity Zone becomes a more enjoyable, comprehensive, “hands-on” experience a window into the usually unknown phases of the butterfly life cycle.

Biomes

Different tiers within the biomes will transport the visitor to the different levels of habitat and will allow close observation of butterfly behaviour at these different levels. The biomes match the butterfly species to their natural environments and create an awareness of the diversity of vegetation.

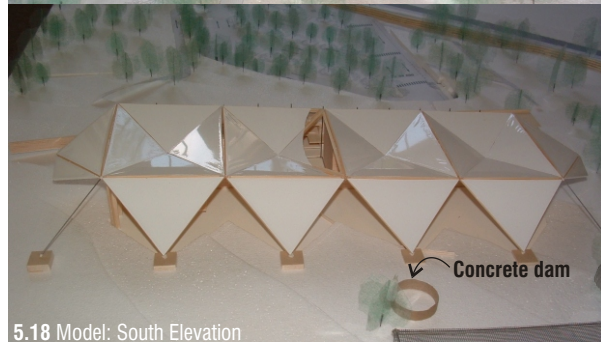
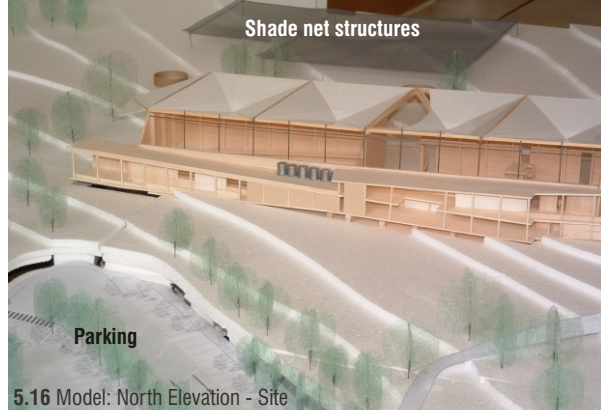
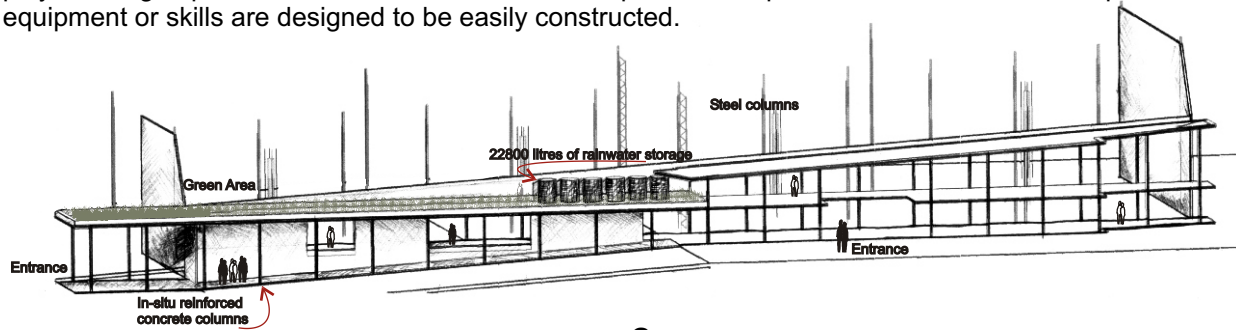


Figure 001: Parides iphidamas by Ryan Pettey

As a general rule the design focuses on the upliftment of local communities and contractors who are to play an integral part in the construction of the development. Components which do not need specialised equipment or skills are designed to be easily constructed.



5.19 ISOMETRIC VIEW OF CONSERVANCY

Structural Engineering

Initially a steel and precast member structural system was investigated. This system has many benefits that could contribute to the quick, high quality erection of the structure but lacked the high labour intensity that can be achieved with an in-situ concrete column and slab system. Thus 400 x 200 off shutter concrete columns are used as the support system for the in-situ concrete slab. Steel is still an integral part of the biome design and forms the support system for the tensile roof cladding.

Designed windows

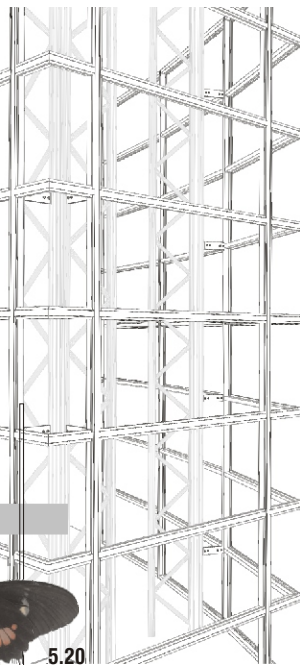
Steel window profiles are designed to be easily manufactured and installed in complete panels.

Green areas

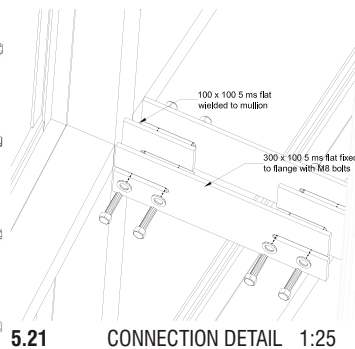
The semi-sustainable planted roof is to be planted with species of grass which occur naturally in the area. The concept involves planting a number of different grass and plant species that will progress through a number of stages until a semi-sustainable environment is formed. The planted roof will need limited but continual maintenance, which will include a biannual slashing of the grass to imitate the natural burning process. Sprinklers will be installed as the storage capacity of the soil is limited due to the soil depth. The sprinklers will also be used as a fire safety system should the grass ever catch alight. The planted roof is a dynamic aspect of structure that continually changes with the seasons.

Technical Investigation & Design Discourse

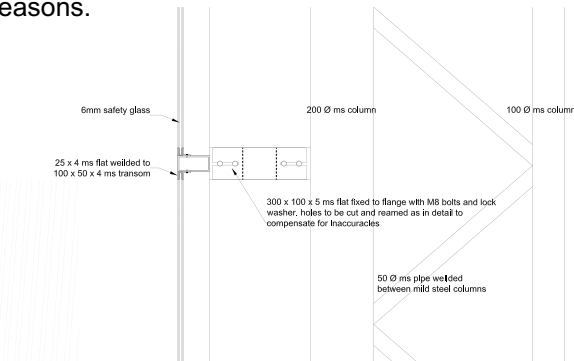
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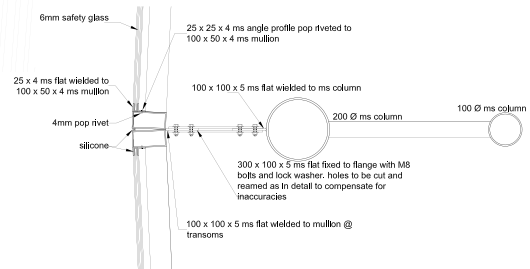
5.20



5.21 CONNECTION DETAIL 1:25



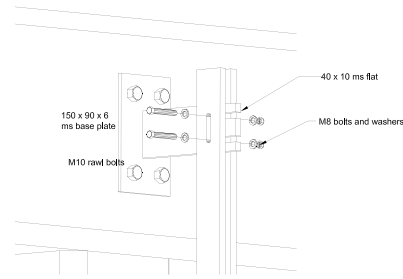
5.22 VERTICAL SECTION THROUGH WINDOW PROFILE AND SUPPORT STRUCTURE 1:25



5.23 HORIZONTAL SECTION THROUGH WINDOW PROFILE AND SUPPORT STRUCTURE 1:25

Growth Screens

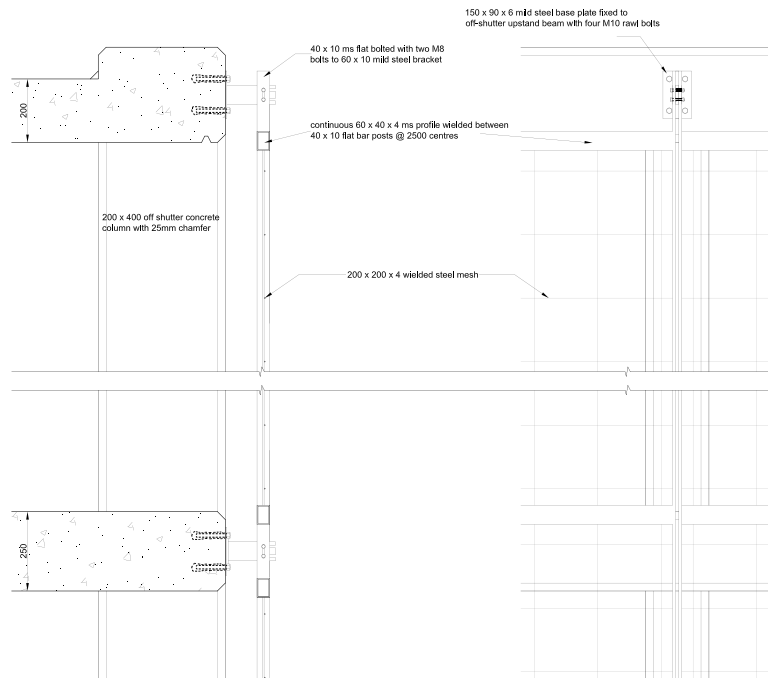
Growth screens form one of the major metamorphic components of the butterfly conservancy. Deciduous creepers growing on frames form the outer skin of the building. They provide the building with sufficient shade in summer and allow solar energy to fall on mass heat storage in winter. The growth screens will be constructed from steel and 200 x 200 x 4 reinforcing mesh. The screens have been designed in such away, so as to support a person climbing on them during periods of cleaning, pruning and maintenance .



5.24 GROWTH SCREEN FIXING DETAIL 1:25



5.25



5.26 GROWTH SCREEN TO SLAB DETAIL 1:25

Stonework

One of the factors that climatically responsive structures in hot dry climates rely upon is mass. In the past, houses were built with thick walls and recessed windows. This type of construction has a positive climatic response, reducing the need for extra internal heating or cooling.

Trombe rock walls work on a similar principle of providing mass storage for thermal energy. Throughout the conservancy rock trombe walls as well as in-fill panels of rock have been integrated into the structure to provide thermal mass. Metamorphic quartzite purchased from a local quarry will be used for all rock wall construction. This type of rock weathers well and can be chiselled into shape if necessary.

