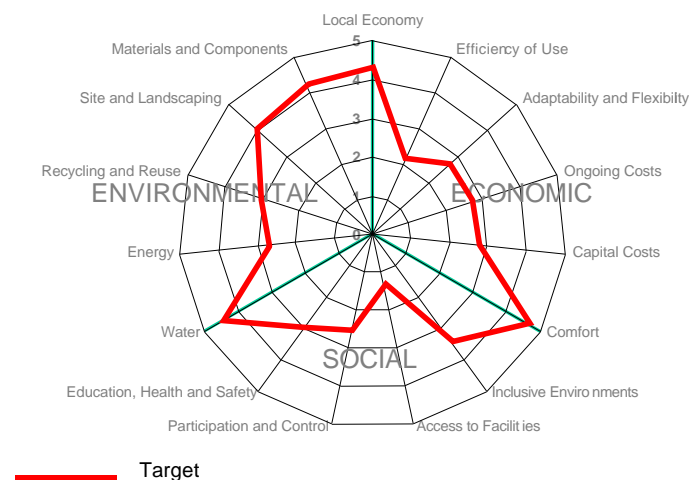


Introduction

The baseline document provides a multi-faceted approach to the construction of the proposed buildings, highlighting certain points to create an overall understanding of what should be achieved in the design.

Non-renewable resources are being depleted and increasing environmental damage is done as a result of human activities. It is therefore increasingly important that this is addressed, so that sustainability becomes a key issue in the way we live and work. Buildings can play an important role in supporting sustainability. This is done through careful planning in which design decisions, material specifications and so on are carefully evaluated in terms of their long term impact on the economic, social and environmental sustainability of a society and the natural environment [Gibberd, 2002; 1].

The Sustainable Building Assessment Tool (SBAT) has been designed to assess the sustainability of buildings. It measures the performance of a building in relation to a number of economic, social and environmental criteria. The tool also enables a building to be rated in terms of its sustainability, and for buildings to be compared to each other and to existing benchmarks. Target setting was done using the SBAT-tool to establish the most critical aspects regarding the sustainability of the building.



### An austere luxury

Buildings that continue to captivate us are free of "isms", free of superficial "good taste" and superfluous additives [Blaser, 2001; 15]. The view of empty space reflects the architectural expression of restraint and the ingenuity of unsurpassable clarity in spatial treatment, achieving tranquillity in monastic solitude [Blaser, 2001; 13].

The architecture should be rigorously reduced and refined in order to allow nature to penetrate into the interior [Blaser, 2001; 25]. Architecture of simplicity is introspective, creating a mood that exudes an atmosphere of harmony and an appeal for silence. Architecture of silence facilitates the process of ritual and allows it to come to the foreground. The building is to act as backdrop for events and activities to play out.

Simplicity means loyalty to oneself, the ultimate goal being clarity [Blaser, 2001; 17]. Religion is expressed as a public ritual but depends on the introspective journey of individuals. Utilising emptiness releases the intensity of the introspective experience [Blaser, 2001; 87]. The architecture allows for internal reflection to occur. Internal purity is restrained to the point of monastic silence, although it never neglects cheerfulness. The subtle modulations of sharp edges, clean lines and smooth surfaces are what stimulates us. These are loci of spiritual exchange. Moments of silence are gifts. In silence we feel at home [Blaser, 2001; 15].

The proposed design should be based on a ritual movement from public to private; subjects follow a procession through spaces that become more simplistic and silent towards the chapel, and experience psychological changes which will draw them towards their own inner thoughts.

Building is nature is building

Inside - outside

The relentless complexities of contemporary life have made the distinction between inside and outside a dilemma. Avoiding the distinction and creating an almost invisible interrelation between them, must be an important factor in the design development. The climatic condition of Pretoria furthermore suggests such an interaction. For Tadao Ando [1991; 110], the nature that a sacred place must relate to is a man-made nature, or rather an architecturalised nature. He believes that when greenery, water, light, or wind is abstracted from nature-as-is according to man's will, it approaches the sacred.

The emphatic unity of buildings and nature maintains the vitality of a unified spatial arrangement. Such a design captures the harmony between "interior space" and "exterior space". As a result a "pure space" generates a sense of well-being [Blaser, 2001; 17].

At the Naoshima Contemporary Art Museum, the rectangular shapes connect to the surrounding sea and mountains, while the cylindrical structures tie the sky to the land (SEE FIG. 60) [Blaser, 2001; 9]. Similar ideas of connection are seen in the Cathedral Church of the Holy Nativity and the Fellowship Building in Pietermaritzburg (SEE P. 42-45). Here, simple shapes provide a two-way route by which nature can flow back and forth.

The building is designed as an open structure; where intimate interior spaces relate to the existing exterior. The structure does not create space but rather exists within the spaces already present on the site.



### The courtyard typology

The structure of the Islamic Medina forms a tightly knit urban fabric that is based on interdependence. Structures are designed in accordance with strict traditional rules; the owner is not allowed to build his house, or add to it in any way, without taking into account the morphology of the city [Metals, 1999; 44]. The proposed design is seen as having a similar structure, prototype, density and interdependence.

Open courtyards in Islam have developed because of various religious, social and physical conditions, in particular, the tendency of families to become extended and for women to rarely go out in public [Kazimee, 2002; 24]. Courtyards form a fundamental space in both private and public Islamic architecture. The number of courtyards and their complexity vary from a single courtyard in most domestic spaces to a system of courtyards found in palaces. The size of the courtyard tends to determine its importance, from the small residential courtyard up to the huge courtyards of mosques and other public spaces.

The residential open courtyard is the place where all cooking in a traditional household takes place and it serves as the workshop of the house. Within the traditional Afghan courtyard a solid platform half a metre high allows people to sit above the level of circulation. In most instances courtyards are adorned by a well, tree, fountain or ornamental pool. In working-class houses a single courtyard connects all the rooms of the house. Rooms surrounding the courtyard are closed on three sides with one side opening directly onto the courtyard. In this manner a strong inside-outside connection is established.



In the sacrosanct family environment of the Moroccan House, the courtyards are often masterpieces of architecture and ornamentation; finely carved wood, sculpted plaster, stylish faience tiling and skilfully arranged wall fountains are found in the courtyard [Metals, 1999; 44]. The transition zone between inside and outside, the in-between, recalls ancient truths, reminding us of the relationship between man, nature and architecture [Blaser, 2001; 85]. In the design of the retreat, the indoor-outdoor transitions or thresholds are of great importance in the ritual process.

The principle of diurnal rotation is key to the layout of domestic courtyards in Afghanistan. According to this principle, activities naturally rotate around courtyard areas according to daily and seasonal cycles in response to climatic factors [Kazimee, 2002; 23].

During the summer months the eastern part of the open space is the starting point for a gradual rotation, or "migration", of the inhabitants around the edge of the enclosure, following the available shade provided by the huts and other screening features. In winter, the pattern described is altered; outdoor tasks follow a similar pattern, only now they take advantage of the warmth of the sun during the day [Kazimee, 2002; 23]. Through diurnal rotation a strong daily secular ritual occurs. The retreat should incorporate ideas on diurnal rotation in the courtyards and sections of the cloister.

There should not be a single central courtyard in the proposed design that forms the heart of the structure, but rather a number of smaller courtyards where the centre of activity moves according to the position of the residents. It is a system consisting of more, or less, secret places.



52\_ Courtyard in the Mausoleum of Moulay Ismail in Meknes, Morocco

53\_ Two courtyards allow daylight into the back part of a deep property

54\_ Sunken courtyard and roof garden as extension to a villa

### Site

The position of the site demands a high degree of interaction with the surrounding urban fabric. The design should not be detrimental to the site, but should rather use its qualities and attractiveness to add to the quality of the surrounding area, and to contribute to the local community.

### Brownfield Site

The aim is to create a high quality, high density urban infrastructure that successfully integrates the new building into the existing street pattern. The development must be seen as part of a larger systemic regeneration of the inner city that is choreographed over a stretch of time.

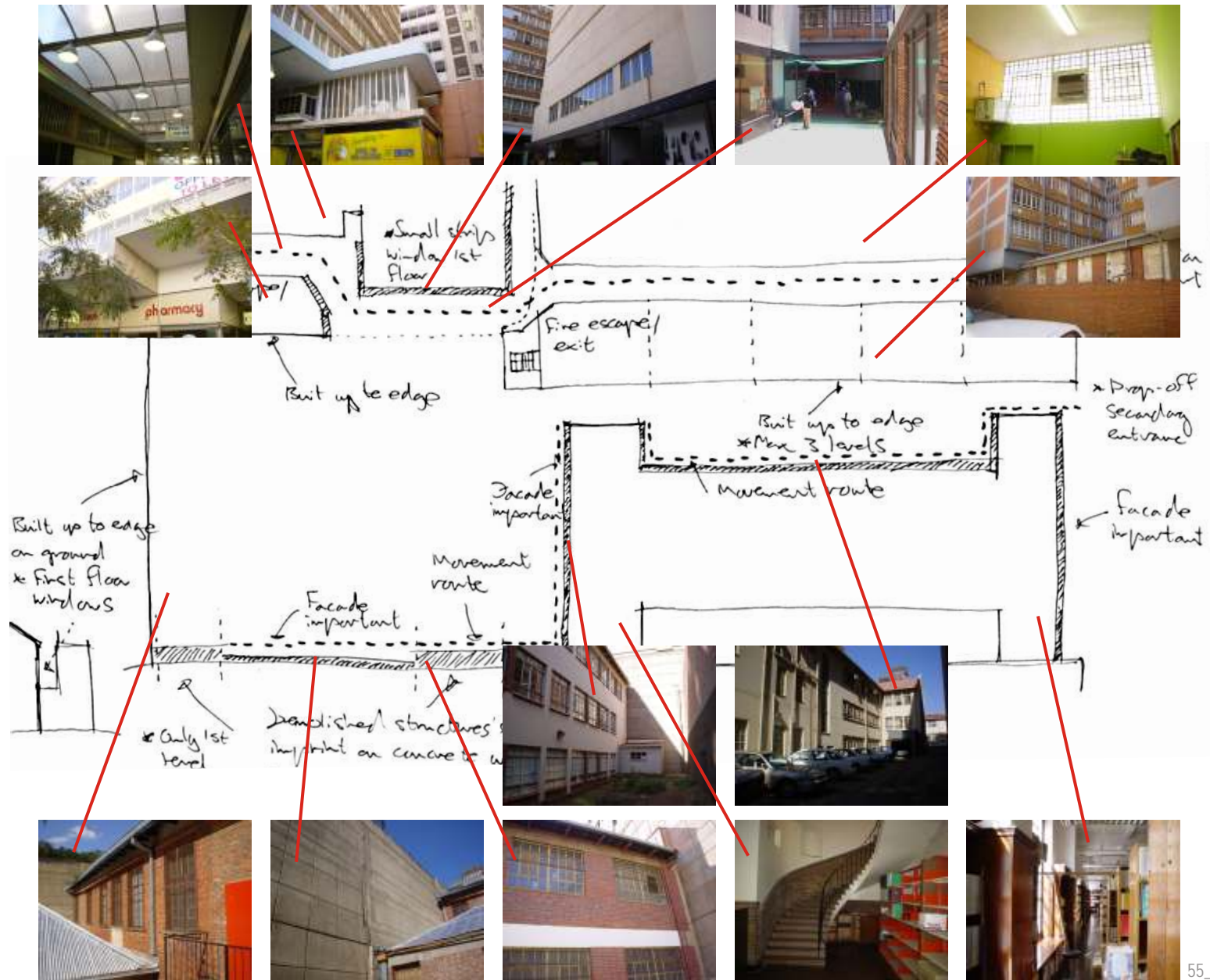
### Surrounding fabric

The design must create awareness of the existence of the site and its surrounding fabric. It must reveal previously unseen elements. Historical layering, traces of demolished structures and their existence must be incorporated into the design (SEE FIG. 55). New buildings should not have a harmful effect on neighbouring buildings, for instance by casting shadows over them where access to sunlight is important.

### Landscaping

The variety of colours and foliage of different plants enhances and modifies the spaces and forms of buildings; they become "mood generators". In this way boundaries are blurred by bringing nature back into the city.

The landscape should portray stylised or abstracted ideas of veld (planes of vegetation) and sky. Planting should be simple and monochromatic. Only hardy plant materials that require the minimum amount of attention are to be utilized. Indigenous plants must be used as far as possible. Plant species should further be chosen based on texture (grasses) and their inherent sculptural qualities (trees). Roof gardens should mainly be planted with grasses and low shrubs for screening; i.e. lovegrass (*Eragrostis curvula*), thatchgrass (*Hyparrhenia hirta*) and kweek (*Cynodon dactylon*) are possible grass options. White stinkwood (*Celtis africana*) and wild olive (*Olea europaea subs africana*) are possible tree options.





## Scale

In cities like Florence and Marrakesh, where a dense urban fabric has been woven, ideas on community is strengthened. The site must be knitted into the urban fabric and flow patterns of the CBD. This requires careful consideration and integration of adjacent built masses to form a continuous and homogeneous urban fabric.

The design should be low scale, with buildings spread out over the whole site, right up to and even touching neighbouring buildings. The buildings surrounding the site are influential in generating the form of the building. The building should not shout but rather exists silently in amongst the surrounding fabric. This concept connects to the idea of intimacy.

Single elements in the design should have a larger scale. A bell tower will announce the building to pedestrians in the square or arcade, and to users of the surrounding office buildings. The chapel should also be designed as a vertical element due to its ritual importance and the symbolism of verticality that exists in the Christian religion. These vertical elements should only be visible from the square and the surrounding office buildings.

From the micro-climatic conditions it can be established that the amount of sunlight reaching the site during the winter months should be maximised. A low structure around different sized courtyards will permit sunlight to reach most parts of the building. The low vertical scale of the structure also ensures that the same amount of sunlight reaches the open section of the arcade.



56\_ Marrakesh's Medina - the aerial view gives a good idea of the tightly-knit structure of Muslim towns, the interlocking buildings all but obscuring the network of narrow streets and alleys.

### Structural System

Due to the nature of the programme a dualistic structure is required. The public spaces and storage areas should be temporary spaces in terms of changing needs and should be flexible. The Retreat on the other hand, requires a more permanent structure that provides silence and seclusion.

### Flexibility and adaptability

The design should be able to accommodate possible future changes. Design parameters that should be adhered to include minimum structural dimensions of 3 m in the vertical direction and the use of non-loadbearing elements. Spaces and finishes further need to be robust to cope with future requirements or changes in use. The design should be based on a modular system. The use of a service wall in the building should provide easy access and modification to services.

The use of open building systems reduces the need for wet construction and subsequent damage that the extraction and manufacture of lime and cement has on the environment. These systems demand structures that can be erected or dismantled with the minimum use of energy and waste of materials. A dry-walling system should be used in the public and storage components of the project to internally divide spaces.

### Ritual space

The structure should be able to accommodate privacy and discovery. There should be a strong indoor - outdoor connection that offer spaces where planned or spontaneous events can unfold. Users should be offered multiple choices. Both indoor and outdoor spaces should consist of various sizes and scales to accommodate different activities. The structure should consist of solid interiors connected to outdoor spaces, tied together by various circulation routes.

57\_ Typical plan of the Ghoza house and contemporary structures in Guinea, communicating ideas of space accommodating gathering and indoor - outdoor connections .



## Social issues

### Comfort of Occupants

Personal comfort is the most important user need to be satisfied. Standards of comfort grow out of a range of conditions with determining factors categorised as follows:

- every space should have an opening of at least 10% of the floor area of that space
- minimum lighting requirements are as follows - offices and kitchen (working areas) 400 lux; multi-use rooms 100-400 lux; libraries 300 lux; bedrooms, entrance and circulation 150 lux; bathrooms and storage space 100 lux [Tutt, 1998; 413]
- artificial lighting should be energy efficient and comfortable
- no occupant should be further than 6m from an outside view
- access to green outside space should be provided
- air should be provided at a minimum of 7,5 l/s per person
- noise levels in the chapel, office and library should be <40-50dBA. Quiet areas on site should be identified and activities with the same noise requirements should be grouped together

### An Inclusive environment

Ensuring that buildings are inclusive supports sustainability, as replication is avoided and change of use supported. The design should be able to accommodate various types of users. The following should be considered:

- access to information and public spaces should be easy but controlled
- public areas should be accessible and inviting
- access to private areas should be controlled, with facade treatments that are sensitive to the public
- all levels of the public spaces should be accessible either through ramps or lifts. All areas on the ground floor of the retreat should be accessible to disabled persons

### Facades

Its is important to consider thresholds between interior and exterior spaces by either defining or blurring them. The facades should be flexible in terms of transparency and penetrability (transparent, semi-transparent or closed). Views should be carefully controlled by the size and placement of openings, directing views towards specific elements

#### Health and safety

The following design aspects should be employed to provide a safe and secure environment:

- fire regulations should comply with SABS 0400
- visual links and linkages across open spaces should be a prime concern if informal surveillance is to be promoted
- a spatially accessible layout should be provided with no hidden and unsafe places
- adequate lighting should be provided to ensure that there are no dark areas adjacent to the building or in the square. Building elements that will assist surveillance of open spaces, like bay windows or balconies, should be used
- in terms of security, consideration must be given to the different times that different parts of the building would be used

#### Public open space

Public open spaces in cities give form to the ebb and flow of human exchange. Such spaces provide channels for movement, communication and common spaces for recreation and contemplation. A public energy must be created through the design of this open space, creating a vibrant 24-hour activity node. A public open space should be formed on the western edge of the site by widening the middle section of the Noordvaal Thoroughfare. The space created will form part of the hierarchical public open space system of the CBD; Church Square, Church street (Civic Mall) and the arcade system.

The following should be considered:

- open spaces should be people-centred and designed to accommodate comfortable social interaction
- spaces should be scaled to form an intimate square with tranquil spaces adjacent to the pedestrian movement route
- the Noord Vaal Thoroughfare should be resurfaced. The new surface material will visually connect and unify the arcade and the new intervention
- waiting and pause areas in the public open space must be designed to accommodate shelter, shading and street furniture

## Environmental issues

Energy

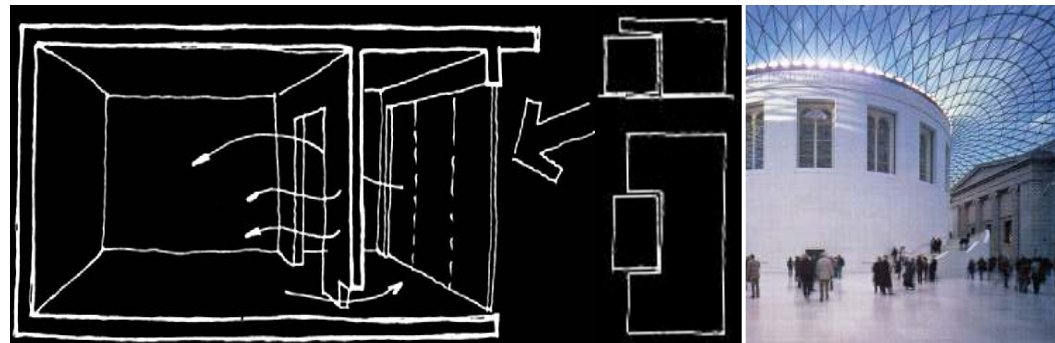
- use energy efficient lighting and task lighting
- provide the minimum possible lighting for the specific building function
- make use of daylighting
- make use of solar power, direct heat gain and sun porches
- reduce the use of mechanical ventilation through the introduction of passive climate systems
- design facilities with high occupation rate in best positions for passive climatic systems

Passive environmental control

The design should respond to the micro-climate of the site through basic passive control systems. Appropriate orientation, shading devices and ventilation will suffice as passive cooling during summer months. The winter conditions, however, requires a more dynamic approach.

A series of sun porches will be used as a passive heating system in the building. Sun porches are intermediate, usable spaces between the exterior and interior of the building (SEE FIG. 58). They increase the heat collection potential of a given facade, by allowing a larger glazing area than is practicable or desirable with direct gain.

With appropriate provision of shading and ventilation in summer, the porch spaces may be pleasant environments year-round in most climates. A sufficient portion of the glazing (>20%) must be openable, in order for the sun porches to become, in summer, the equivalent of shaded outdoor porches, providing shade for the building wall behind the sun space [Givoni, 1998; 171, 175].



58\_ Diagram of a typical sun porch, embedded into the main structure

59\_ The Great Court at the British museum forms a contemporary sun space

Sun admission into the building is desirable during winter months. This has a specific psychological value which is appreciated beyond its energy contribution [Givoni, 1998; 421]. The building must furthermore accommodate ample outside sun spaces which form part of the diurnal movement of the design.

#### Ventilation

The issue surrounding ventilation is addressed mainly from the perspective of occupant comfort; replenishing oxygen for respiration and increasing thermal comfort.

Natural ventilation alone will not be sufficient in providing the required air change of 7,5 l/s per person, because of the wind protection provided by the solid building edge surrounding the site. Sections of the new building would be placed right up against the surrounding fabric, in effect creating dead facades, that would further inhibit natural ventilation. Mechanical ventilation will be needed to ventilate spaces with a high occupancy density (Capel, multi-use hall), and deep spaces (bathrooms), while smaller areas (cells, meditative spaces) will depend on the natural forces of wind and buoyancy to deliver fresh air.

The Old Mutual Building will create strong air currents in the area. A high pressure pocket is formed against the facades of a high-rise building which faces the wind. This causes a strong downward current, and in this way mixes up the air layers near the ground between the lower buildings. During the summer months, in warm humid regions which often experience light winds, the stronger currents may be welcomed for increasing the comfort levels of the local residents [Givoni, 1998; 295].

#### Waste recycling

- Inorganic waste should be sorted and stored on site. Provision for this should be made in the storage space
- Large quantities of organic waste will be produced by the Refectory. An agreement should be made to have this waste collected daily and used elsewhere (e.g. in a piggery)

#### Water consumption

- reduce water usage
- use efficient devices, i.e. dual flush water closets and aerated shower heads
- promote water saving awareness in the building
- select planting with low water requirements (indigenous species)
- reduce run-off by using pervious or adsorbent surfaces and minimising hard landscaping. Retain run-off on site before releasing into stormwater channels

Harvest rainwater and store. Use for hand washbasins, flushing water closets and maintenance of landscaped areas. Where possible, collected water should be stored as water features on the surface. This would contribute to the climate of the building by making use of evaporative cooling in summer and heat storage in winter.

The amount of collectable rainwater from the existing buildings is 749 kl/year. Residents will require approximately 894 kl/year for use at hand washbasins and water closets [Tutt, 1998; 409]. Landscaping will require approximately 523 kl/year for irrigation purposes [Tutt, 1998; 409]. A collection area of a further 950m<sup>2</sup> is required for the balance needed. Taking the site coverage and size of storage tank into consideration, the design target is set to meet 75% of the water required annually, for above-mentioned services, from harvested rainwater.

-recycle grey water to supplement water demand not met through harvested rainwater



### Materials

We are not usually aware that an unconscious element of touch is unavoidably concealed in vision; as we look, the eye touches, and before we even see an object we have already touched it. Touch is the unconsciousness of vision, and this hidden tactile experience determines the sensuous quality of the perceived object, and mediates messages of invitation or rejection, courtesy or hostility.

Tadao Ando [1991; 126] uses natural materials on those parts of a building that come into contact with the human hand or foot, because he is convinced that substances such as wood and concrete are invaluable materials for architecture, and that one becomes aware of the true quality of architecture through the body.

Conventional building methods have been relied on without questioning whether they optimise the potential of the materials used. The potential of ordinary building elements should be exploited in order to express design quality.

### Environmental impact of materials

The ecological impact of materials must be assessed to inform the choice of materials. The following should be considered;

- use natural materials in their raw form
- use materials and components with low embodied energy (e.g. concrete and timber)
- choose materials with long term benefits (e.g. corten steel). Where finishes require higher maintenance (e.g. timber), it is not perceived as a negative but rather as a long term social project, benefitting local workers
- choose comfortable materials in terms of their thermal and acoustic abilities and durability
- the use of materials with inherent decorative qualities is encouraged (e.g. concrete and timber)
- local building materials must be used. This will reduce the amount of fuel used for transport and reinvest money in the local community. It also enhances awareness of materials and climate specific construction features unique to each region. The main construction materials (concrete, steel, brick and glass), will be sourced within a 100km radius (PPC plant and ISCOR foundries). Timber is sourced outside this area, but its renewability makes it a sound material choice
- save on construction costs by selling the materials of the demolished structures on the proposed site; corrugated iron sheets, red face bricks, steel window frames, and glass. Use building rubble as fill material

### Contextual influence

The design is to form a continuous and homogeneous urban fabric with the adjacent built masses. Establishing a contextual link to material use in the surrounding buildings is necessary.

A brick aesthetic has been established in Pretoria, as can be seen in the existing buildings on the site and in the surrounding areas. The presence of the solid off-shutter concrete wall on the eastern side of the site, as well as the column and beam office buildings on the western side, establish the use of concrete as an obvious choice. On ground floor level in the inner-city, especially in the arcade system and Church Street, glass is probably the material pedestrians most often come into contact with; vast shopfronts dominate this area.

In the surrounding buildings wood is used mainly as interior finish (cladding material, handrails) and mostly in limited amounts. A noteworthy exception to this is the Saambou Arcade where a massive atrium is clad exclusively in wood. In the proposed design the use of wood will primarily be inside, exploring the lavish quality of wood to create warm interiors.

The visual presence of metal in the area is limited mainly to columns, staircases and shopfronts. Cast iron columns are found along Civic Mall (Church Street), while staircases are made either of steel profiles or wrought iron elements. In the building steel will be used structurally as well as decoratively (e.g. cladding material). Shopfronts in Burlington Arcade and sections of the Noordvaal Thoroughfare are finished in copper. A possible roof option would be a craft-lock type copper roof sheet, which will establish a contextual link with the surroundings.



## Light

Thought immaterial, light can take on a surprising physical presence. It is sometimes the most tangible of building materials. Light can alter our perceptions of space. It can enhance our comprehension of the elements of a building, by making the perception of texture possible. In the Church of the Light, Tadao Ando [1991; 126] made as few openings as possible in the building, because light becomes brilliant only against a dark background (SEE FIG. 64).

With limited direct sunlight reaching the site, attention should be given to the movement of the sun. Light penetrating the same space from different openings at different times of the day creates interior layers, resulting in a weaving and flowing of air and light. The constantly changing quality of light and movement caused by natural light adds a dynamic quality to a space. This idea connects to the principle of "diurnal rotation", as seen in traditional courtyard structures.



61\_ Interior view of the Ibarak Church of the Light in Osaka

62\_ Interior view of the 'hot' room in the hamman el Kachacine.