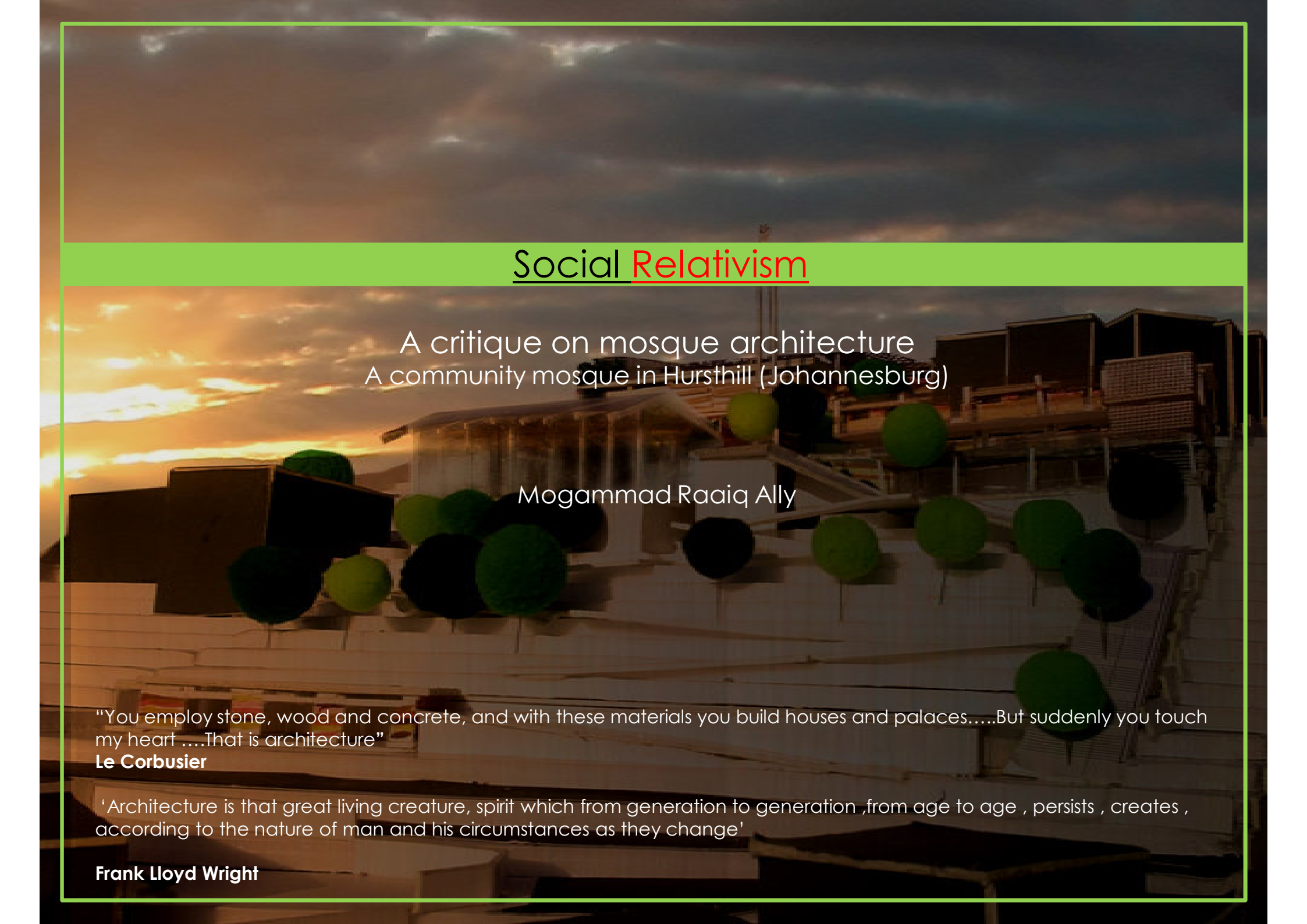




## Social Relativism

A critique on mosque architecture  
A community mosque in Hursthill (Johannesburg)

Mogammad Raaq Ally

"You employ stone, wood and concrete, and with these materials you build houses and palaces.....But suddenly you touch my heart ....That is architecture"

**Le Corbusier**

'Architecture is that great living creature, spirit which from generation to generation ,from age to age , persists , creates , according to the nature of man and his circumstances as they change'

**Frank Lloyd Wright**

Many thanks to Muhammad Munchi , Randall Bird and all the internal /external lecturers for their tireless assistance ,wise words and never ending encouragement that they have given throughout the year.

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Most importantly a huge thank you to my creator for giving me the opportunity to finish this dissertation .





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Master of Architecture (Professional).

At the University of the Witwatersrand, Johannesburg, South Africa.

I, Mogammad Raaq Ally (student number 0412430f) am a student registered for the course 'Master of Architecture (Professional)' in the year 2009. I hereby declare the following:

I am aware that plagiarism (the use of someone else's work without permission and/or without acknowledging the original sources) is wrong. I confirm that the work submitted for assessment for the above course is my own unaided work except where I have stated explicitly otherwise. I have followed the required conventions in referencing thoughts, ideas, and visual material of others. For this purpose, I have referred to the Graduate School of Engineering and the Built Environment style guide. I understand that the University of Witwatersrand may take disciplinary action against me if there is a belief that this is not my unaided work or that I have failed to acknowledge the source of the ideas or words in my own words.

Signature:.....

October 2009

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Revivalist and eclectic mosques built today are naive, they portray the mosque as an enclosed monument ,a structure which does not speak about connectivity and inclusivity. The eternal idea of the mosque is a community development centre and a centre that allows for the full worship of God.

This thesis is the manifestation of a search for a African/ South African Mosque architecture .The thesis looks at traditional African sacred space(all religions) and the essences of sacred space. These are merged together to create a mosque fit for the South African context of a dynamic ,multi cultural society.

With its active program and openness ,the community development centre mosque allows for the development of its community with the end goal of creating an integrated community.

## Introduction:

The argument this thesis makes is that sacred spaces designed to create elitist, monumental spaces or designing under the banner of revivalism and eclecticism of a style of architecture is incorrect, in other words recreating historic architecture with the intention or recreating its style only is a naive way of design.

In my view revivalism in mosque design can be interpreted as providing Islam with the attributes of a regressive and uncreative culture, a strict sense of rigidity, an over priced piece of arrogant sculpture to be praised but never used efficiently. The sad thing is that revivalism and eclecticism is extremely rife, this is done under the false notion that paleolithic building's sacred aura's can be reinstated.

This thesis is thus of the view that sacred architecture of the past can be looked at as a precedent .It also acknowledges that the context, time and place of the designs are extremely different .Besides that many religious spaces built in the past have political and social agendas coupled to them by their egotistic financiers .This said religious spaces of that day and age met the needs of people then and thus cannot be recreated in today's context and modern lifestyle .Their essences of sacred space can be looked at though .This is the main research body this thesis will be looking into.

The methodology that will be used is as follows, literature will be scrutinized and where a principle can be highlighted it will be documented. In this way the thesis will be made up of a list of essences and principles almost as a how to guide on how to construct sacred space.

So as said before this thesis proposes that the essences of sacred space be looked at, throughout the history of sacred space regardless of the religion or building type and the common elements be documented. These essences of sacred space can then be coupled with the architect's choice of building style be it modern or traditional. This way all religious or sacred spaces designed using the appropriate essences will have the aura of sacredness in one form or the other.

Religious buildings throughout history have been at the centre of communities and cities, they were also the largest buildings in their context .They also held the community together and promoted social interaction. Modernist town planning has relegated religious buildings to its periphery and split communities apart.

The design coupled to this thesis is a mosque and thus the essences of Islamic architecture will be looked at and documented.

Secondary to the essences of sacred space is the issue of what is the eternal idea of the mosque?, is it just a house of God or is it as Mohamad Tajuddin Mohamad Rasdi (a radical theologian) argued a community development centre, where its core function is to meet the needs of the community it serves and promote social integration and upliftment?.

This thesis debates this issue and comes to a reasonable answer taking both possibilities to be equally correct. The essences of Islamic sacred architecture coupled with the essences of other sacred architecture fused with principles of modern design, community interaction and development gives rise to a new mosque typology.

**Islam:**

Islam is a monotheistic religion followed by approximately one third of the world's population. Islam was a religious revolution in seventh century Saudi Arabia; it progressed to a global power straddling three continents in the medieval period and is now a world religion professed by a third of humanity. Islam in Africa is vast with 47.97% of Africa's population Muslim.

Faith in Islam is the belief in God, his angels, the meeting with him, his messengers and to believe in resurrection. Islam is to worship God alone and none else, to perform the prayers, give charity and fast in the month of Ramadan. Ihsan (perfection of faith) is achieved when a believer worships God as if he /she can see him or at minimum with the knowing that God is always watching.

## Muslim communities in a South African context:

All religions segregate to some degree, during apartheid and today one finds small communities or strongholds of Muslim, Christian, Hindu, Buddhist etc faiths. South Africa during Apartheid had mainly two bodies that made up the Muslim community. These were the Indians and Malays, who during apartheid under the group areas act lived as very enclosed societies. Issues facing them were minimal; everyone in the community knew everyone and a strong brother/sisterhood existed with the mosque as the hub or centre of the community.

Obviously exceptions existed, an example is the community of Strand in the Western Cape who in the 1950's had built up a strong Muslim community with a mosque and Islamic school, suddenly though in 1950 through forced removals they were shunned to an area called Rustoff. An area with no tar roads, homes with no ceilings and the bathrooms were communal meaning taps and toilets were outside. More importantly though there was no mosque built, all sense of community was lost at Apartheids expense.

Except for a hand full of gloomy stories the point is that many Malay and Indian communities enjoyed the benefits of community life. Christians, Muslims, Hindus, atheists, Jews etc in some areas all lived together harmoniously with their respective religion holding them together as a community. In other areas strongholds of one religion were found. The apartheid planning to Muslims was not too uncomfortable as it allowed for the development of institutions and infrastructure. It was also useful as a mechanism in protecting the youth from social ills such as pornography, prostitution and gambling. It allowed for a very conservative upbringing and an environment where society was interpreted and understood within the narrow confines of a limited social experience. Malays and Indians in their confined societies developed a substantial base of resources.

In comparison Muslims after apartheid's abolishment have moved out of these areas to previously white or new suburbs. The shackles of apartheid have broken and with that the security of Muslim communities. They now live between other faiths and cultures, people of different faiths are working together, their children attend the same schools and tolerances are being tested in terms of cultures accepting one another. New communities have been built over the last fifteen years where cultural diversity exists. Muslims are now in many areas the minority within their community. At present majority have to look outside their geographic location to fulfill their community needs.

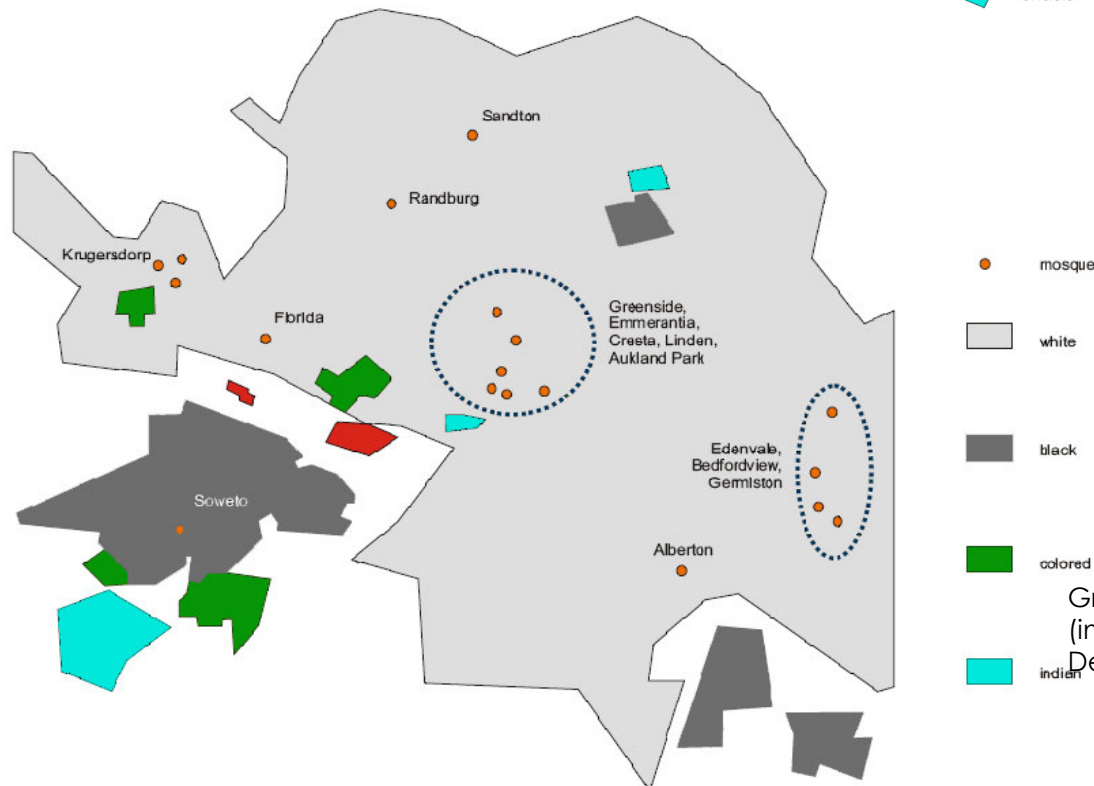
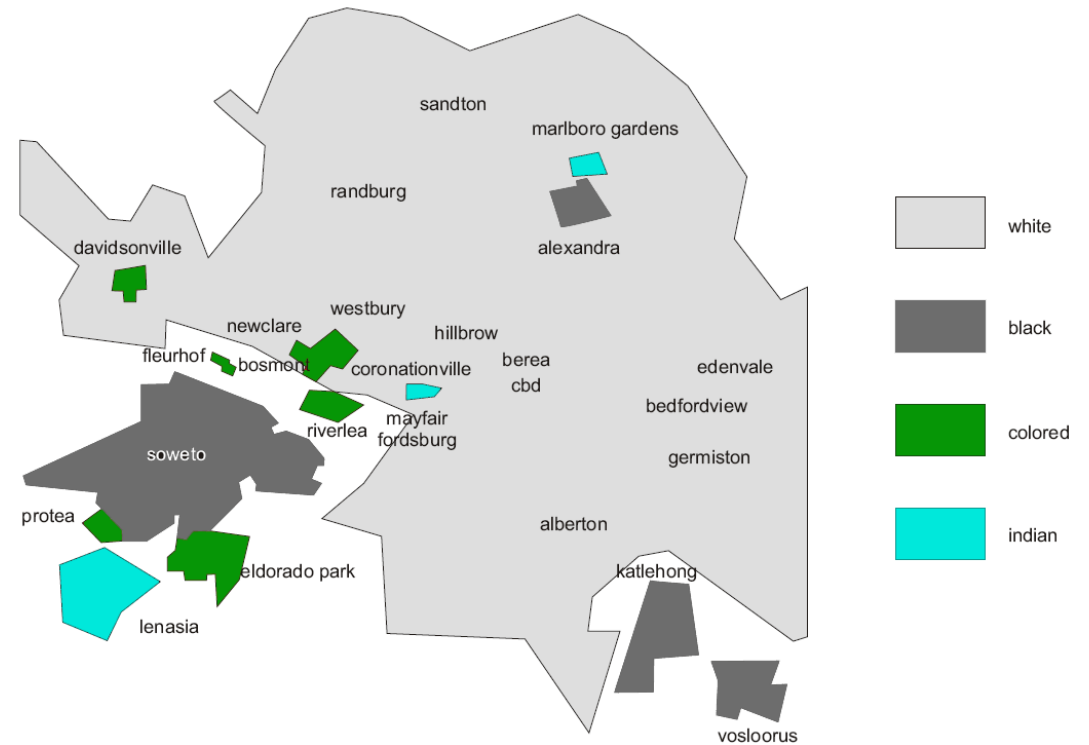


## SOCIAL RELATIVISM

## Muslim communities in a South African context

Apartheid planning (group areas)

Derived from (Omarshah ,S Contextualizing Islam p23.)



Group areas overlaid with post apartheid built Mosques  
(image shows the spread of Muslims to previously prohibited areas)  
Derived from (Omarshah ,S :Contextualizing Islam p26.)

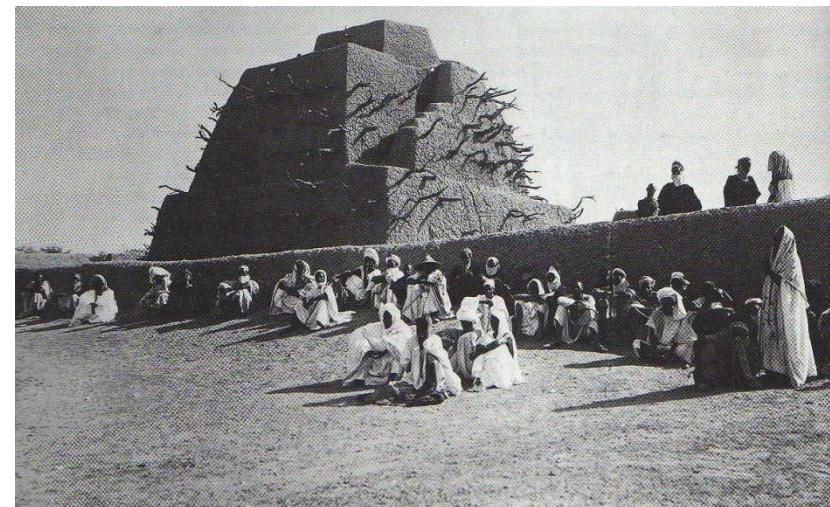
## Sustainability in mosque design:

The world was created by God for humanity, it is humanity that has been entrusted with the task of protecting the world, it is the Muslims role to appreciate and protect Gods creation .The future of cities and the planet in my view lies in environmental, social and cultural sustainable design. Principles like higher density mixed use living, the use of public transport, local food production, renewable energy resources, and recycling etc are examples of environmental principles. Of key importance to this thesis though is the, social and cultural sustainability. Religion as the centre or tie of the community can be implemented in communities of tomorrow. Sacred space coupled with other cultural programs can integrate, link, develop and bring the community closer. With crimes such as rape, murder, and violent assault at unbelievable levels in South Africa, there is a definite moral vacuum in the country. Religion gave the ancient communities morality and in my view the lack of religious facilities can be held liable for a relatively large portion of crimes .This said centers that promote religion and development of the community will instill morality and a fear of God in people.

Nature forms a formidable component in Islamic architecture , paradise described in the Quraan as being a place of "branches" and "spreading shade" with unfailing "fruits and fountains and pomegranates" , "cool pavilions", " fountains of running water", "couches lined with brocade" , "bracelets of gold" , "garments of silk and brocade". "The gardens of paradise shall be their hospitality, therein to dwell forever, desiring no removal of them". (Earthly paradise: P153)  
The Quraan makes mention of paradise being beautiful, extravagant gardens and thus as a taste of paradise the Islamic garden has been formed. Nature and the use of water (fountains etc) in and around the mosque is thus a reference to paradise whilst also bringing comfort to its context. The hierarchy of design this thesis will adopt is thus:

Nature  
Economy (creation)  
Infrastructure  
Community  
Individual

The mosque /mausoleum of Askia Mahammad, Gao.  
Hot climate thus people sit in the cool shadow cast by the thick mud brick walls.  
(Fisherman and Khan, 1994, p184)



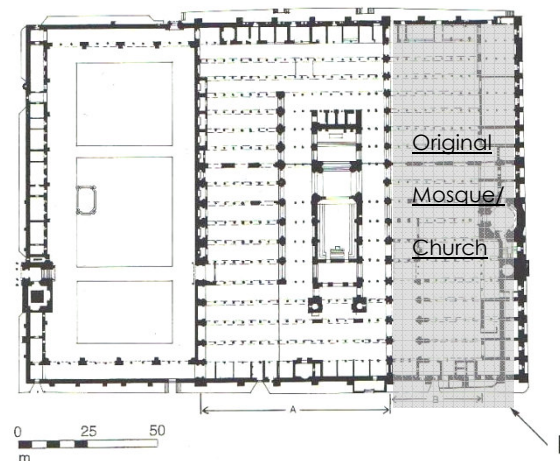
## Exclusion in contemporary mosque's in South Africa:

Being a Muslim I can speak from a subjective viewpoint in terms of mosques, and how in contemporary Muslim society in a South African context mosques exclude.

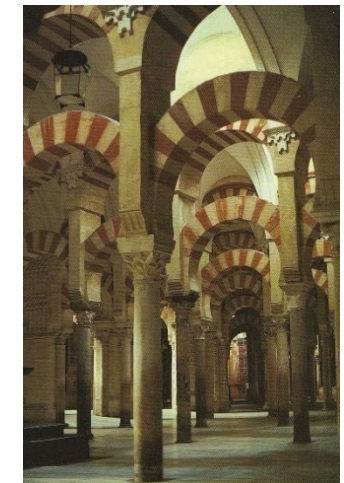
Mosques segregate against females, a huge percentage of woman feel they have the right to pray within the mosque either closely behind the males or adjacent to them. In some mosques woman are not accommodated at all whereas there are some where woman are relegated to secondary hidden spaces within the building. Historically females have prayed at home as it is not compulsory upon them to be part of congregational prayer. They refer to religious bodies of knowledge and easily prove that there were no screens or boundaries separating genders during prayer during the Prophet Muhammad's (p.b.u.h) time. Contemporary female Muslims in most cases out of need or financial pressures have move out of the home and entered the realm of society partaking in everything that was previously a 'mans job' .Females are found in universities, politics, sport, business etc. Islam is a religion of moderation and in my view looks favorably upon woman thus my view is that screens or constructing of separate sections are not religious but necessary in retaining the modesty of the female. In the mosque I will design I foresee a private entrance for females which will give them access to a elevated prayer space overlooking the males this allows a space for females to interact and talk freely without veils or the worry that they must be covered,.

Mosques are also seen to exclude non Muslims. All mosques however are open to non Muslims where they can meet with religious leaders and scholars and talk about issues of faith.

An example of inclusivity in history occurred in Cordova Spain, the Muslims conquered Spain which was a Christian strong hold .The Cordova mosque of today was back then a church, upon conquering the land the Muslim leader ordered that half the church be converted into a mosque. It was used in this way for a number of years until a new governor was instated, he ordered that the space be extended and used for the sole purpose of a mosque.



Plan and interior of the great mosque Cordoba  
(Frishman and khan, 1994, p104)

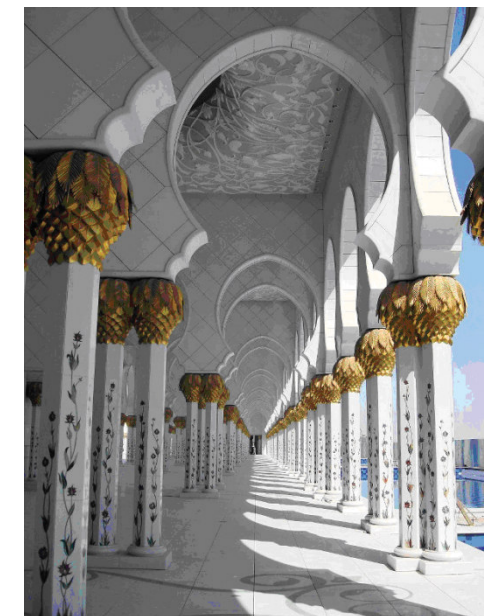


The very basis of religion is to propagate the religion and bring people who are on a path of destruction to one of salvation .It is only logical to assume that to do this the sacred space needs to be open to those eager to learn about the religion. This said it is extremely ironic that religion by it s very nature excludes on some grounds and is enclosed to change and evolution.

Another issue for me is monumental mosques built in many countries today that perpetuate the view of the mosque as a tourist destination; these mosques allow non Muslims inside where the architectural beauty is marveled at. Beside this reason and the occasional non Muslim venturing into a mosque due to curiosity it happens very rarely. In ancient and early religious architecture smaller communities of one faith lived in close proximity to a religious space (mosque, church, sacred tree etc) and thus this idea of inclusive religious space was not of key importance.

Contemporary South African society is mixed; there is a multitude of individuals of different race, ethnicity, culture, dress, language, religion etc found in an area. Thus within the South African context of a multi cultural society we need our religious spaces to be open to outside visitors (other faiths), thus this thesis proposes a new mosque curriculum, one with an active programme.

There is the obvious issue of what will (for example) an orthodox Christian do in a mosque?. Religious contamination is another; a person of one faith will think twice before sending their children to a school of another faith as the child's values will be undermined. But this curriculum's end goal is not to propagate Islam the religion but to rather integrate a diverse community and promote development in the community.

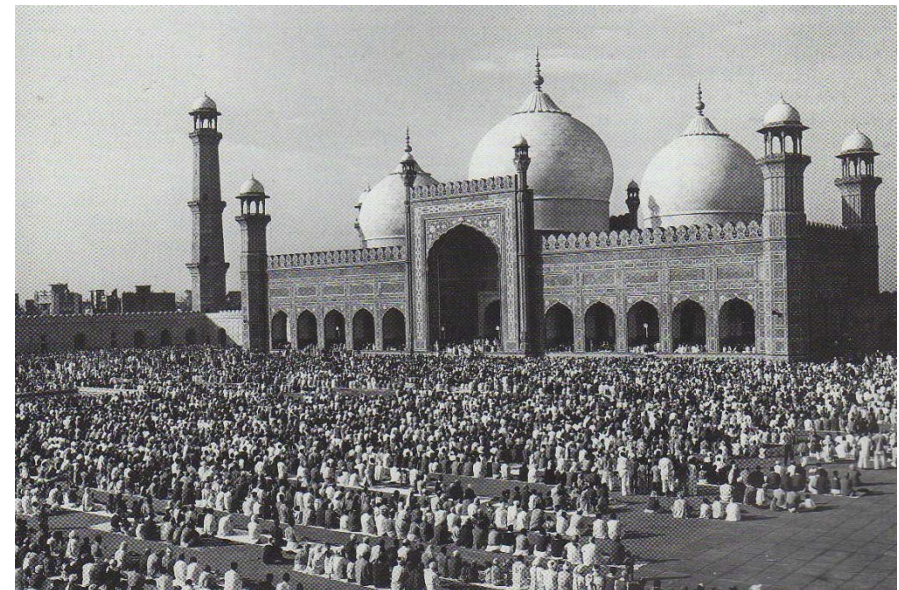


The 22000 sq meter,40000 faithful capacity, Sheikh Zayed Mosque, Abu Dhabi  
Promotes the mosque as a tourist destination  
([www.muslimheritage.com](http://www.muslimheritage.com), March 2009)



## Issues facing mosque architecture

This idea of having symbolic architectural elements that link to the sacred has no religious affiliation. In the mosque, the believer is in direct contact with the sacred which is God. Sacred architecture affects the user's senses and through that heightens their spirituality and brings them closer to the sacred, be it God or many Gods. So although in Islam there is no need for a physical building to pray in and the Quraan has no stipulations on the aesthetics of a prayer space, its only condition is that the faithful face Mecca (qiblah) and the space be clean as cleanliness is half of faith. This said a physical sacred space is necessary as it heightens a believer's connection to the sacred and grounds the community's beliefs; it becomes the sacred House of God where the faithful in the area meet to pray.

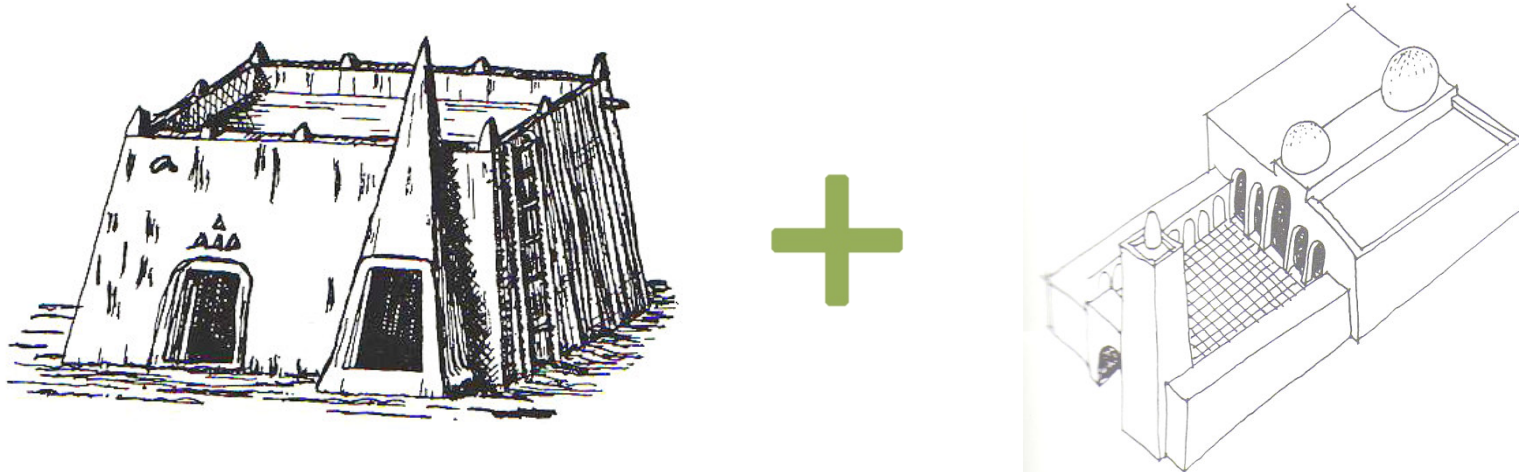


Frishman and Khan 1994 pg 19)  
Badshahi Mosque Lahore , inside and outside are both equally sacred.

As Islam grew after the Prophet's (p.b.u.h) demise, the new lands that were conquered by Muslim armies had a recognized religion be it Christian, Buddhist, Jewish etc, they each had their own architectural style in building sacred spaces, houses of God or shrines.

This placed pressure on the Muslims to develop their own architectural style. This saw the beginning of borrowing of architectural elements from other religions into Islamic architecture.

The vernacular added to adaptations of the existing religious architecture of the conquered nation coupled with principles from the Prophets house gave rise to the regional diversity seen in the blanket term Islamic architecture.



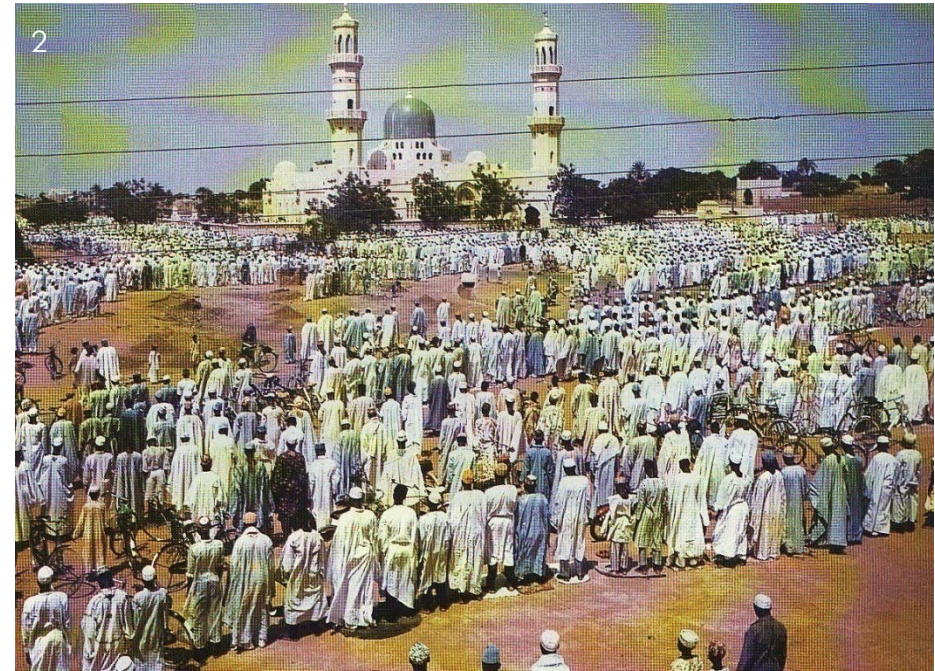
The example of the Arabian typology of hypostyle hall and open courtyard merging with the West African traditional housing (Senoufo Cote d'Ivoire) style to create the mud brick /rammed earth hypostyle hall typology mosque of West Africa (Great Mosque Jenne, Mali). (Frishman and Khan, 1994, p89-93)



The section on historiography (mosque as a community centre) explains how historians expound the shift from modesty to monumentality through their documentation and narrow understanding of the religion Islam.

Of key importance to this essay is the issue that Mosques built today are influenced by media and cultural exchange. Globalization and industrialization are two of many factors that have changed the way mosques are used today. Mosques when commissioned have 4 types of clients, labeled by Frishman and Khan:

(1) >The client that wants a benevolent showpiece intended to exhibit the benevolent nature of a government concerned with the spiritual well being of its people.



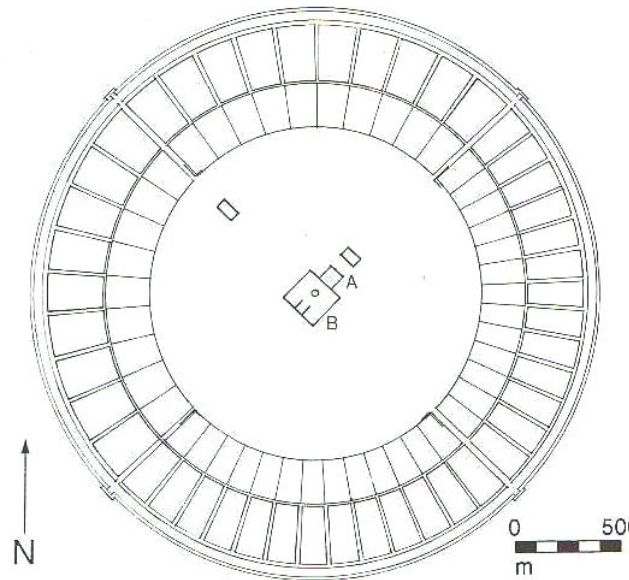
1>Kano Nigeria, mosque is built at the centre of the community, funded by the Amir(leader) and the people with the Amir's palace adjacent. (N.Elleh;1997,p149)

2>Eid and Fridays the congregations are extremely large, outdoors becomes an extension of the sacred prayer space. (N.Elleh;1997,p149)



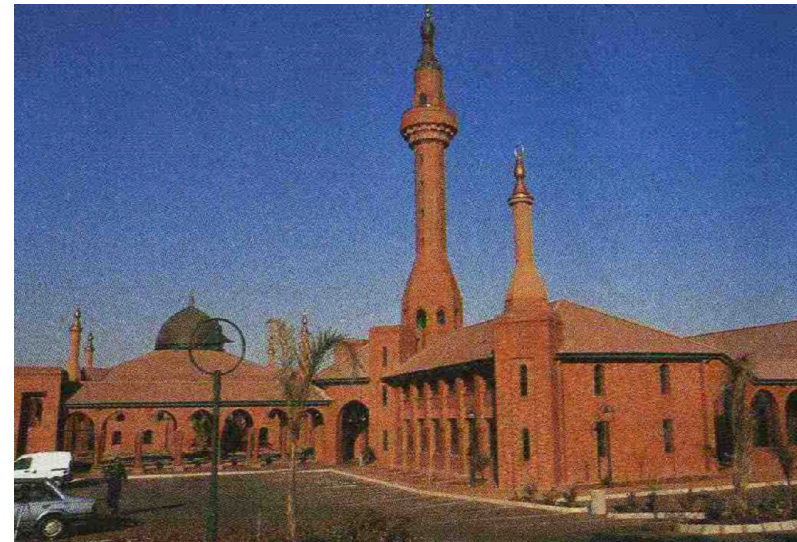
2> The local government or community body, these are mosques built in new settlements mostly. Elitism and secondary agendas are coupled to most of these mosques as they are funded by the egotistic well off families in a community.

Baghdad city plan, Mosque(b) and amir (leaders) palace(a) is found at the centre (N.Elleh;1997,p122)



3> Institutions: such as universities, schools, hospitals, airports. The mosque symbolizes the centrality of Islam to the institution, or in the South African context the social equality of the institution.

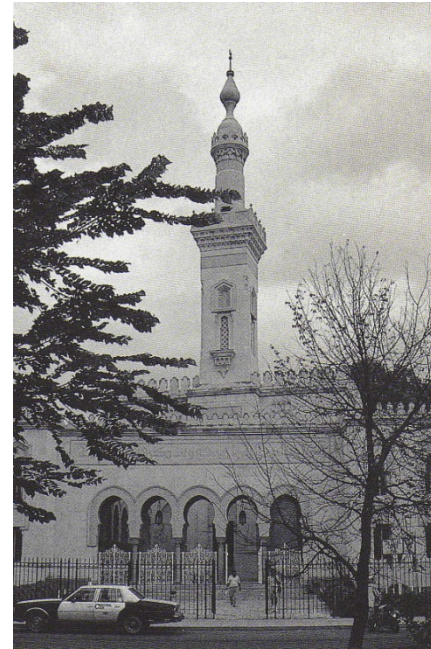
Darua Salaam Islamic Centre forms part of Pretoria Muslim School in Laudium South Africa.  
(Digest of South African architecture, volume7, 2003/04)





4> The fourth type has come about fairly recently, these are kings , princes ,national and religious leaders as well as well off institutions building mosques in countries and communities that are in need of a prayer space and lack funding.

Islamic center mosque Washington D.C.,showing a potpourri of styles (Frishman andKhan,1994;253)



The issue however with these mosques is that they are designed in the style the financiers are fond of. This places buildings in foreign contexts and in extreme cases the community rejects them.

## Principles of Islam:

Before the essences of sacred space can be appraised we must look at the principles of Islam. This is done to gauge just how Islamic the essences of Islamic architecture are.

The principles of Islam are:

Tawhid: the belief in the oneness of God, which is the unity of the creator.

Ummah: this is the bond that unites all Muslims throughout the world. Common elements that apply to all Muslims such as prayers and how they are performed the same way in the same language throughout the world. In essence it's the common bond between all Muslims.

Submission to the will of God: This is to worship, of which one portion of worshiping is the five times daily prayers, compulsory on every mature, sane believing male to be performed in congregation in the mosque.

Principle 1:

Islamic sacred space reminds a believer of God's presence. A mosque is a constant reminder of good business dealings to the business man for example. Symbolism plays an integral role, the vault and domes used in traditional mosques symbolize the heavens above, its apex points to the divine spirit residing above us. It is thus symbolic of the oneness of God.

Principle 2:

This principle is evident in Islamic city planning, where the congregational mosque is found at the centre of the city and functions as the hub of the community. The early mosques followed the example of the Prophet's mosque. The Prophet's mosque was used as a '*gathering space for communal meetings, court of justice, hall for official audiences, starting point for joint actions, shelter in case of danger and the treasure where precious valuables could be safely deposited in purpose built chambers, if somebody left for travels*' (Prochazka 1986:35)

In Islam, science and its many branches were never separate from religion. The cities in Baghdad and Islamic Spain are examples of the multiple facets the mosque had coupled to it; they are examples of the unity within Islam. Mosques were the cultural, political and social hubs of the community.

Principle 3:

Praying five times daily reminds one of God's presence and one's objective in the worldly life that is to obey God and follow the teachings of his last Prophet Muhammad. Perfection in faith is achieved when one is consciously thinking of God or at least has it in their mind that God is ever present and all knowing.

This state of mind requires concentration during prayer and thus some close their eyes whilst others have them open and picture the meanings of the verses being recited. The architecture can play a mammoth role in aiding in the attainment of this state of concentration by providing a peaceful, tranquil and meditative environment.

## Essences of sacred space:

The field of sacred architecture is extremely huge and thus distilling it to document just the essences would involve an appraisal of all literature on religious architecture. To aid in the task I have however found a historian named Martin Gray; Martin has visited over 1000 sacred sites (all religions and cultures) and compiled a list of the 20 essences that contribute to the sacredness or power of a sacred space. I have taken his list distilled it and further researched just the essences relevant to this thesis.

The list is to be treated as a horizontal grouping and not a hierarchical one, the point is that a combination of these factors incorporated into the design of the building is what catalyzes physiological and psychological effects in human beings. The site for the design project will be urban or suburban and thus some point regarding the power of the site has been left out. The chapter to follow lists, briefly explains and gives examples of these essences.

### The visual beauty of the location of sacred sites

A large percentage of the sacred/holy sites are located in or what was once considered a place of great visual beauty. The rarity and beauty of places like this have affected humans since the dawn of time arousing in them feelings of awe, inspiration and peace. Nature was venerated by the ancients and the sites physically represent or symbolize the power and might of the gods who created them.

The following are examples of sites chosen by its users specifically because of its sacred power:

- Rock formations unusual mountains



Mount Fuji Japan, many hundreds of mountains in Japan have small Shinto and/or Buddhist shrines upon their sides or summits and are therefore regarded as sacred sites to people living in their immediate locale (www.sacredsites.com, cited 05/03/09)



Mount Olympus Greece, traditionally regarded as the heavenly abode of the Greek Gods and the site of the throne of Zeus  
([www.sacredsites.com](http://www.sacredsites.com), cited 05/03/09)

- Waterfalls
- Elevated places with stunning views



Stonehenge stone circle, England , fulfilled a double function, namely astronomical observation and ritual prayers.  
([www.sacredsites.com](http://www.sacredsites.com), cited 05/03/09)



- Colorful mineral springs and geysers



The hot springs of the Roman temple of Aquae Sulis and the abbey of bath, England, the springs have been venerated as a healing site since time immemorial. ([www.sacredsites.com](http://www.sacredsites.com), cited 05/03/09)

- Meeting points of rivers



Lake Titicaca Bolivia ([www.sacredsites.com](http://www.sacredsites.com), cited 05/03/09)

- Lakesides



Lake Titicaca Bolivia, legends say that long ago, the creator God Viracocha arose from the depths of Lake Titicaca, he fashioned new men and women out of the stones of the surrounding mountains and, sending them to the four quarters, began the repopulation of the world ([www.sacredsites.com](http://www.sacredsites.com), cited 05/03/09)

- Crescent shaped bays



Itsukushima shrine Miyajima island Japan, the holy island of Miyajima is a sacred site of both Shintoism and Buddhism  
([www.sacredsites.com](http://www.sacredsites.com), cited 05/03/09)

- Islands within lakes



Miyajima island Japan, built on tidal land and giving the appearance of floating on the sea during high tide, the shrine is dedicated to three Shinto goddesses of the sea; Ichikishima, Tagori, and Tagitsu, each of whom is believed to live within the inner sanctum of the shrine.  
([www.sacredsites.com](http://www.sacredsites.com), cited 05/03/09)



- Luxurious forest groves



Buddhist monks at the Bodi tree (the site of Buddha's enlightenment)  
([www.sacredsites.com](http://www.sacredsites.com), cited 05/03/09)

- Entrance to caverns and grottos

Yeh T'ai a hermit nature poet who spent his time in the Chinese mountains writes about the beauty of sacred spaces:

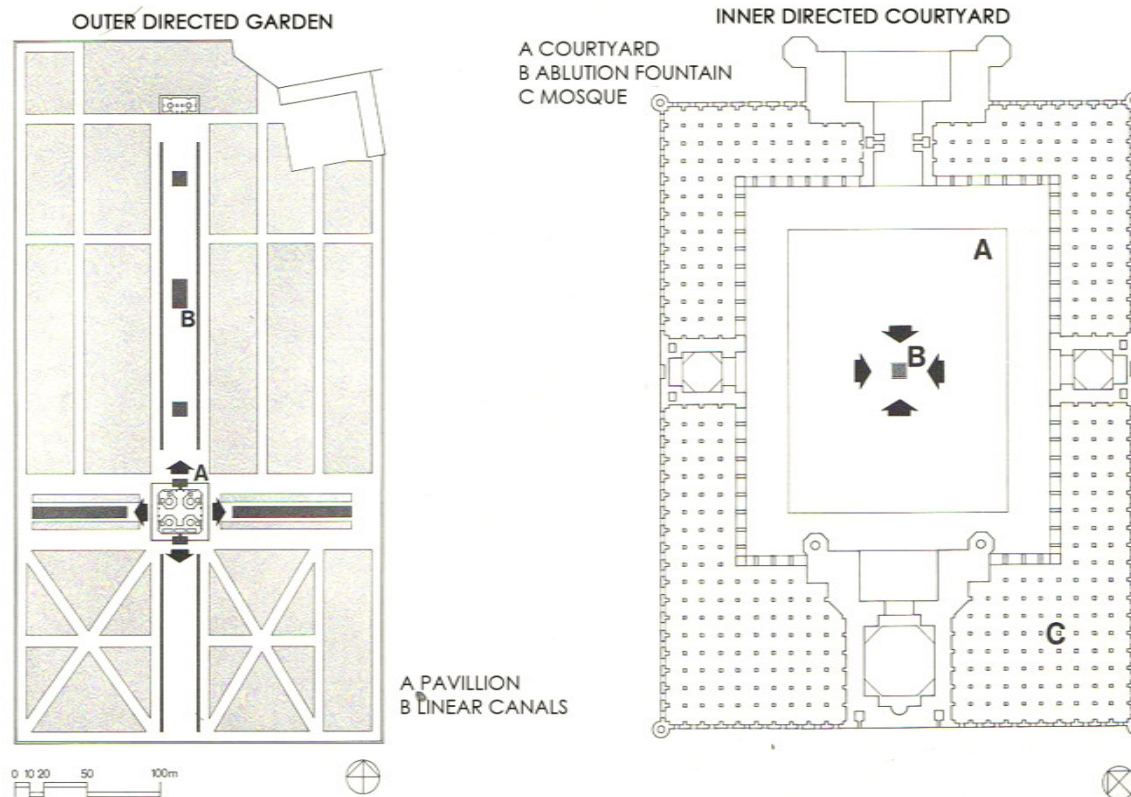
*At a true site....there is a touch of magic light. How so, Magic? It can be understood intuitively, but not conveyed in words. The hills are fair, the waters fine, the sun handsome, the breeze mild; and the sky has a new light: another world. Amid confusion, peace; amid peace, a festive air. Upon coming into its presence, one's eyes are opened; if one sits or lies, one's heart is joyful. Here the breath gathers, and the essence collects. Light shines in the middle, and magic goes out on all sides. Above or below, to right or left, it is not thus. No greater than a finger, no more than a spoonful; like a dewdrop, like a pearl, like the moon through a crack, like the reflection in a mirror. Play with it, and it is as if you can catch it; put it off, and it cannot be god rid of. Try to understand! It is hard to describe.*

The beauty of the locations with their natural features amid nature is what gave these spaces a spiritual aura. Geographic locations are sacred due to the presence of all or a few of the four elements, namely fire, wind, water and earth, these elements add to the sacred power of a space. Fire is quite simply light whereas sacred earth would be mountain peaks, caves etc.



**Islamic architecture:**

Majority of the Islamic world is located in dry, arid climates thus the sites chosen for cities/towns were selected due to their proximity to and availability of water. The sacred power of the ground or location to geophysical anomalies were secondary considerations. The physical beauty of the site is not important to Islamic architects as Islamic architecture through the use of courtyards and enclosed gardens has the ability to create its own internal environment.



The outer directed garden and the inner directed courtyard both have enclosures around them and allow for a meditative, serene environment despite the outside environment. The difference is that the court is private (sacred) and the garden public (yet tranquil). (J. Lehrman, 1999; 35)

### The visual beauty of the structures at the sacred sites

As the beauty of different geographic, natural features can inspire and spiritually transform people, so also can the beauty of the structures erected at the sacred sites. The field's art and architecture originate from the appreciation of the sacred. Stone rings, pyramids, temples, cathedrals, mosques and other sacred structures on top of their ceremonial function were works of art.

They represent the greatest artistic creations of human civilization. To their users and visitors they serve as a constant reminder of the sublime spiritual and artistic impulses that gave rise to their creation. They hold the inspiration of their creators (thousands of people toiling over hundreds of years) it is this inspiration that contemporary visitors connect with just by gazing at their beauty.



Giza pyramids soaring above the skyline of Egypt, Cairo  
<http://www.gizapower.com/pma/index.htm>

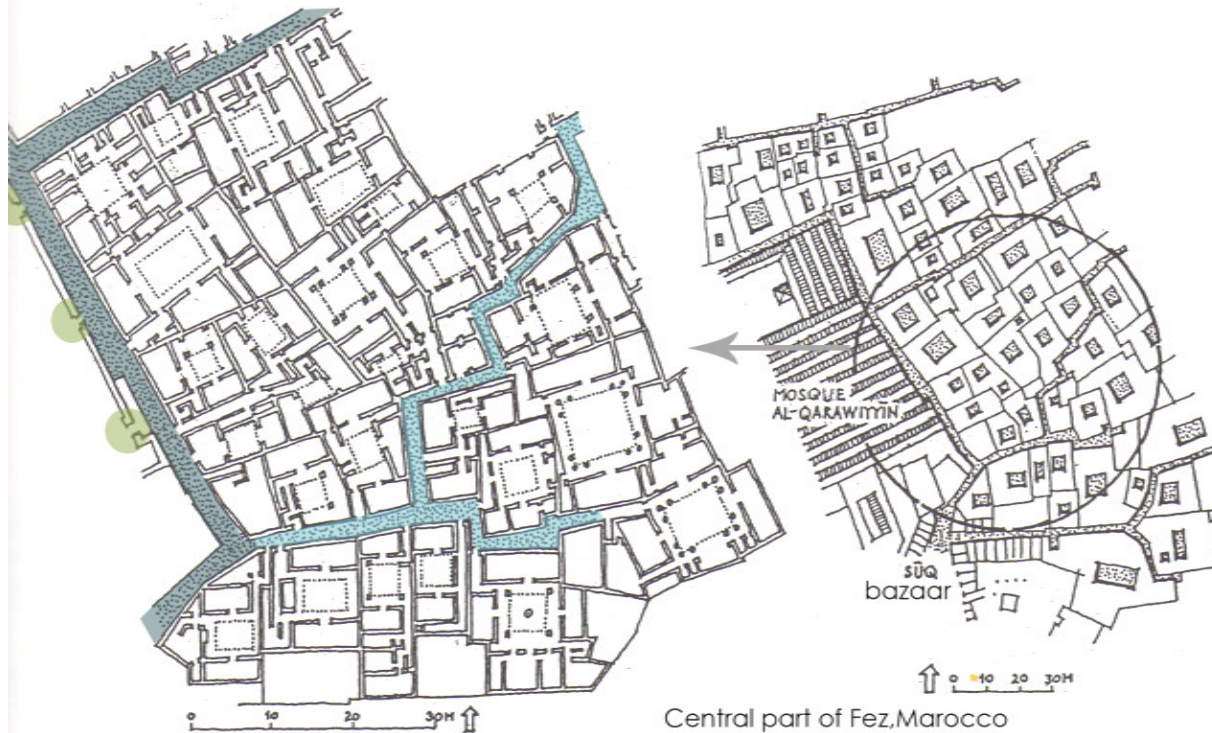


The central dome typology, monumental Sultan Ahmet Mosque, Istanbul, Turkey.  
(Frishman and Khan, 1994; 145)



**Islamic architecture:**

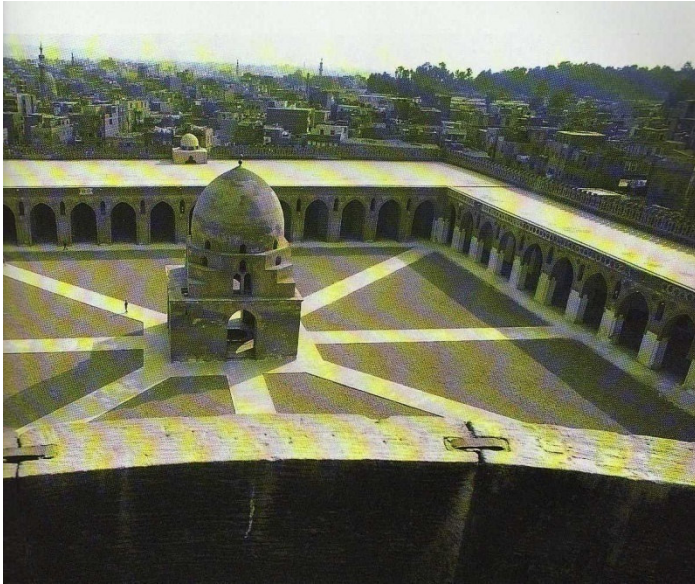
The visual beauty in Islamic sacred space is directly linked to the courtyard. Traditional Islamic towns are designs with the hierarchy of public to semi private to private .Islamic cities are composed of a “dense grouping of courtyard houses” (F. Ragette, 2003; 59).



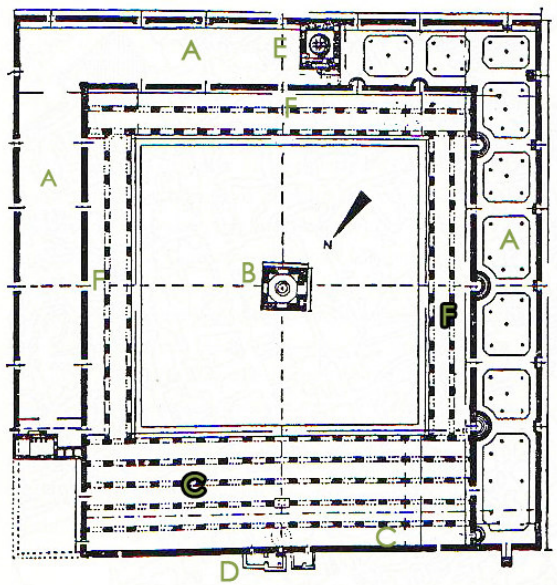
Fez, Morocco , the green dots show the entrances off the street into the Al-Qarawiyyin Mosque, the dark blue shows the public street whereas the lighter blue shows the semi private alleys leading to the private dwellings with their internal courtyard (J. Lehrman, 1999; 35)

The largest open space is the Sahn (court) of the Friday (Juma) Mosque ,adjacent to which one will find the other public spheres namely the school (madrassa) ,infirmary (Maristan) , public offices and central bazaar (suq)”(F. Ragette,2003; 59).Semi public space is the Hara (alleys) leading to the private dwellings with their extremely private courtyards. The courtyard typology building is efficient in that it makes maximum use of land use, it aids in climate control as majority of the Muslim world is in the dry, harsh desert climate and lastly it preserves privacy which is integral to conservative Muslims.

The Islamic courtyard has the ability to create a quiet, meditative environment in any context. Thus its function is to be enjoyed by the users of the space, from the enjoyment springs appreciation, from the appreciation discernment, from that an acquaintance with Islamic history could possibly follow. This would then lead to a subsequent interest in the symbolic aspects of design which brings about a reflection on Islamic philosophy.



View from minaret into courtyard of Ibn Tulun mosque Cairo, the ziyada (transition space) buffers the sacred space from the profane (city) (Frishman and Khan, 1994)



- A ZIYADA (BUFFER BETWEEN PROFANE AND SACRED)
- B ABLUTION FOUNTAIN
- C HYPOSTYLE HALL
- D MIMBAR/MIHRAB
- E MINARET
- F GALLERIES /PRAYER SPACE

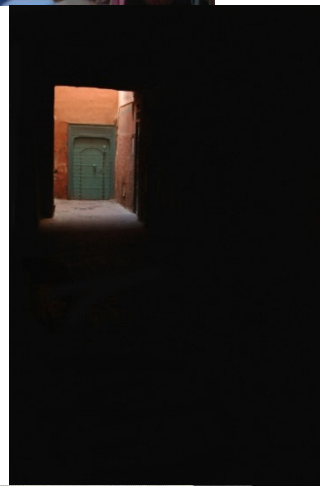
Plan :Ibn Tulun Mosque (Frishman and Khan, 1994)



Visualize the following experience and imagine the play on ones own senses:



From the hustle and bustle of the suq(bazaar) (image of Tunisia) (cited 05/06/09.[www.islamicart.com](http://www.islamicart.com))



Through the narrow alley ways using the view of the minaret as guidance  
Left (B Rudofsky ,1964;image81 )Right(cited8/06/09;[www.wikimedia.com](http://www.wikimedia.com))



Where one finally emerges into the quiet, meditative courtyard of the mosque  
(J. Lehrman, 1999; 197)

## The sacred geometry used in the structures

The crystalline structures of the mineral kingdom, the graceful swirl of a nautilus shell, and the remarkable patterns found in snowflakes and flowers are examples of shapes that are mysteriously pleasing to the human eye. It's the proportions and individual elements that compose these total forms that appeal to humans.

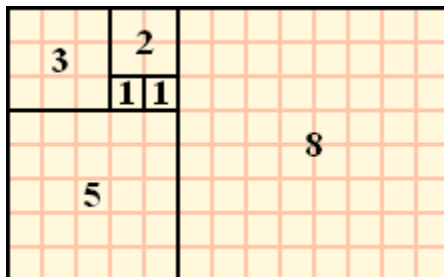
European classical painters applied this thinking by laying out their paintings using these geometric formulae. The Europeans inherited these formulae from the Greeks and Arabs who in turn inherited them from the ancient Egyptians. The Egyptians in turn got these formulae from keen observation of the natural world (sacred geometry).

Paul Devereux discusses this subject:

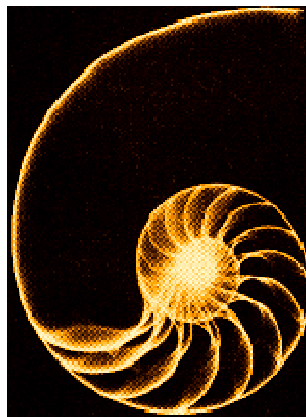
*"This geometry of nature is the essence of the sacred geometry used in the design and construction of so many of the world's ancient sacred shrines. These shrines encode ratios of creation and thereby mirror the universe. Certain shapes found in ancient temples, developed and designed according to the mathematical constants of sacred geometry, actually gather, concentrate and radiate specific modes of vibration. For example, a particular structural geometry and precise directional orientation of a pyramid shape completely alters the electromagnetic properties of the space contained within the pyramid. Three dimensional structure and vibration are absolutely, though mysteriously connected. This is well known to makers of musical instruments. It was also known to the makers of ancient temples. Certain shapes resonate to cosmic frequencies too fine to be registered on the electromagnetic spectrum. The fineness of the vibration is the key to their powerful effect. It is similar to the concept behind homeopathy where the slighter the application the greater the response". (P.Devereux, P12)*

Essentially, sacred geometry is simply the ratios of numbers to one another: 1:2, 2:3, 4:5. When such numerical ratios are incorporated into three-dimensional form we have the most graceful and alluring architecture in the world. An ancient Hindu architectural sutra said "The universe is present in the temple in the form of proportion." Therefore, when you are within a structure fashioned with sacred geometry, you are within a model of the universe. The vibrational quality of sacred space thus brings your body and mind into harmony with the universe.

Golden Mean or the Golden Section was immensely important to ancient architects. The Golden Section is a geometric proportion in which the ratio of the whole to the larger part is the same as the ratio of the larger part to the smaller. Thus  $a:b = b:(a-b)$ .



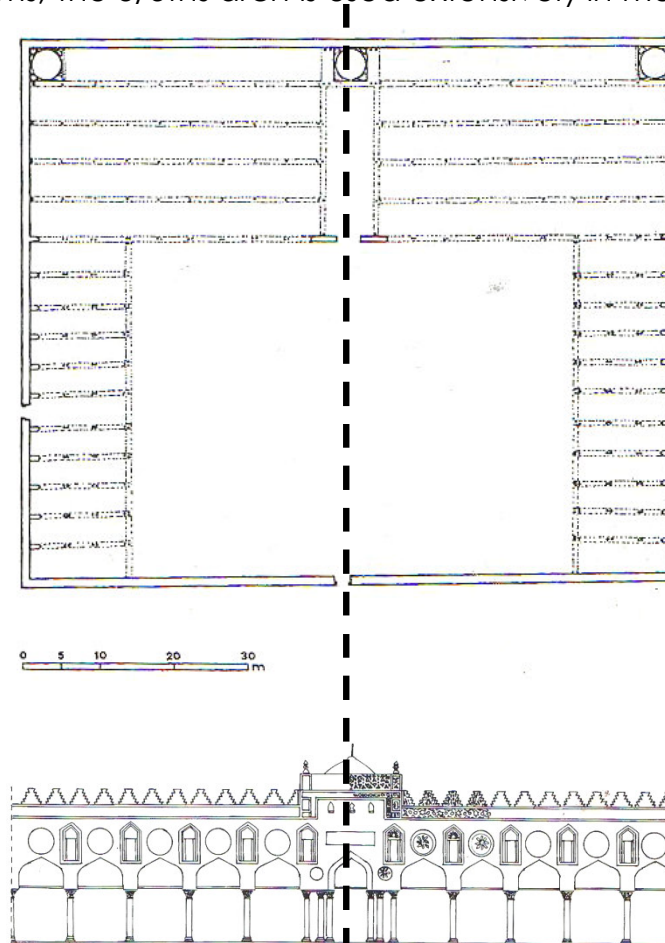
Golden section showing the Fibonacci Series  
(Cited 8/04/09, [www.crystallinks.com](http://www.crystallinks.com))



**Islamic architecture:**

In Islam mathematics is the language of the intellect and its abstraction reflects the divine order. Geometry, symmetry, shape and surface reflect natural processes and the inherent organization of natural elements. The dimensions of feet and fingers were used, allowing the space to have a constant awareness of human scale and proportion. Symmetry is used to symbolize Gods divine order in contrast to man's imperfections.

The goal of sacred geometry is to create a space, which is in physical harmony. This attempt at physical/environmental harmony is intended to be a reflection of the divine concept of the harmony of humanity (Fathy, p.1, 2). Furthermore, it is thought that when humans live in an environment that visually declares harmony they are also more likely to be in harmony. Sa'id al-Nursi said "An illuminated heart is capable of seeing the stamp which helps in transcending this realm to the other!" (abu-Sway, p.10). The pointed arch has been perfected by Muslims; the 3/5ths arch is used extensively in mosque design.



Al Azhar Mosque Cairo Egypt, prayer hall  
façade and plan showing symmetry  
(N.Elleh;1997,p69)



### The building materials used in the structures at the sacred sites

Granite, magnetic stones with reversed fields, stones with high concentrations of quartz and related minerals are examples of rock types used in constructing sacred sites throughout the world. These stones were purposely brought in from distant sources in some cases. The body of the Great Pyramid, for example, is built of locally available limestone, yet the “walls, ceiling, and floor of the main ceremonial chamber are built from huge blocks of granite quarried in Aswan, many hundreds of miles to the south”(A. Lawlor ,1994,P172). Granite is known to be a source of low-level natural radioactivity.



Huge blocks of pink granite used in the Pyramids, quarried in Aswan  
[www.oldroads.org/images](http://www.oldroads.org/images)



The point is that building materials used at certain sacred sites do indeed have a power that contributes to the overall energetic field of the site.

The Hindus and Buddhists of Asia made frequent use of precious metals and gemstones in the adornment of their statues of their deities. Cast or sculpted from gold and silver, the statues were studded with diamonds, emeralds, rubies, sapphires, topazes, aquamarines and other rare jewels. Besides their remarkable visual beauty, these gemstones were known to have powers that catalyzed spiritual transformation, healing and visionary trance states.



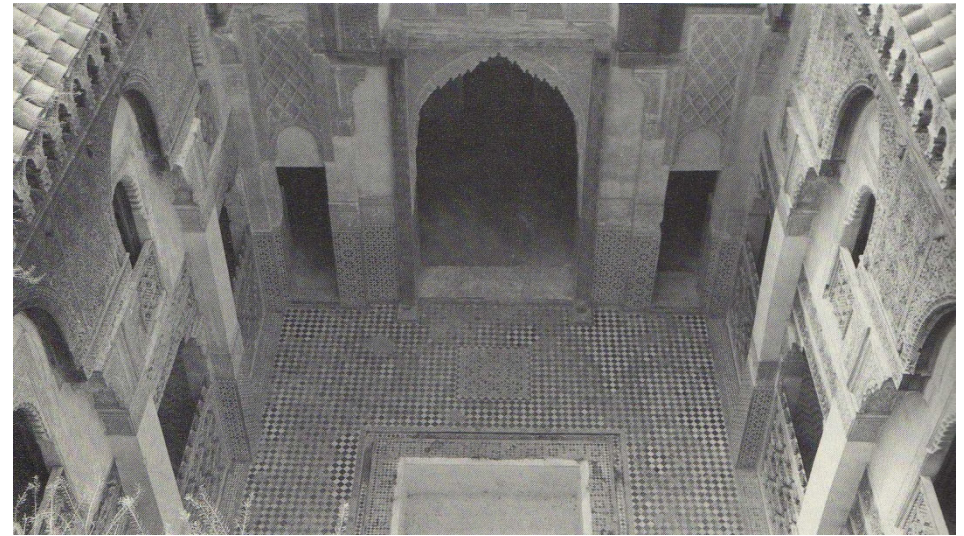
An example of such a power statues is the shrine of Maha Muni in Burma.  
([www.sacredsites.com](http://www.sacredsites.com), cited 05/03/09)

### **Islamic architecture:**

Islam works contrary to other religions in that it promotes simplicity and abhors wastefulness and extravagance. Materials used were sandstone, marble, porphyry, mosaic, wood, stucco, faience. In North and West Africa rammed earth or mud (layered or bricks) is used throughout the mosque, beautiful examples of intricate detailing can be found where ornamentation and patterns are created using layering.



Left: Decorated brick wall of a mud house in Mali (N.Elleh;1997, pg338)



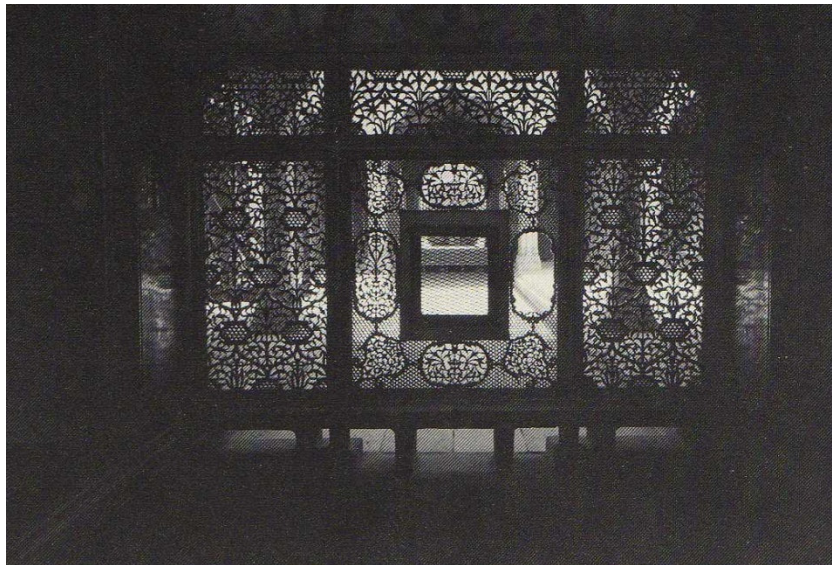
Right: Sahrij Madressa, Fez, courtyard showing an assortment of materials. (J. Lehrman, 1999; 204)



## The influence of light and color

Candles, torches and various types of fuel-burning lamps were used throughout the world to enhance the transformative power of sacred spaces. The ambiance created by such lighting can be truly enchanting; countless flickering candle flames simultaneously shower radiance throughout the shrine and within the pilgrim's heart.

Another system of illumination was to guide the sun's light into the sacred spaces. Latticework screens were used as windows/light sources before glass was able to be used. With openings carved in geometric shapes and intricate designs, these screens brought dazzling beams of light into the dark interiors of the shrines. As the sun's angle changed with the passage of hours, shafts of light danced slowly across floors and walls, creating lovely patterns of light and shadow.



Red fort ,Delhi , India ,Islamic architects used lattice screens to bring dappled light into its interiors. (J. Lehrman, 1999; 79)



Rue Rivoli arcade  
[B Rudofsky image78](#)



Ibn Tulun mosque Cairo Egypt colonnade  
[www.oldroads.org/images](http://www.oldroads.org/images)

Before colored glass was invented long pieces of dyed silk was placed over the lattice screens, thus bathing the shrines in rainbows of color. With the advent of glass the openings in the lattice were filled with colored glass and soon after entire openings were of plate-glass adorning the sacred sites, this technique is evident in Romanesque and Gothic pilgrimage cathedrals of medieval Europe. Light is symbolic of God and thus light beaming into the dark spaces through high stained glass windows symbolize God's presence above.



Stained glass windows in the French Gothic Chartres Cathedral  
(Cited 09/06/09, [www.greatbuildings.com](http://www.greatbuildings.com))

Builders at sacred sites have long used the colors of the spectrum. While the therapeutic and spiritual uses of colors are nearly unknown in modern times, various early cultures had a refined knowledge of the subject. The ancient Egyptians, Babylonians, Persians, Greeks, Chinese, Indians and Mayans all recognized that different colors were effective in treating both physiological and psychological ailments, as well as contributing to the awakening of spiritual insight. Colors can be chosen according to their specific vibrations and psycho spiritual effects for use in sacred spaces. Many temples were once painted, both inside and out, in a range of splendid colors.



The color red in Buddhism symbolizes life-force, preservation, fire, and sacred things or places. (Cited 26/06/09, [www.colourlovers.com/blog/2007/08/20/colors-of-religion-buddhism/](http://www.colourlovers.com/blog/2007/08/20/colors-of-religion-buddhism/))



**Islamic architecture:**

In Islam, light symbolizes God. The Quraan states: "God is the light of the heavens and the earth." Light in Islamic architecture, then, is used to symbolically represent God's presence in a space while emphasizing the color and texture of decorative elements, materials, and architectural articulation.

Light is one of the five sacred elements namely fire, it is believed that this element brings all the others into harmony. The sun and subsequently pure light symbolized the absolute being, since its illumination is the source of all existence.



Colonnade of Al Hakim mosque, beautiful shadows are cast from the 3/5ths arches (Frishman and Khan 1994, pg84)

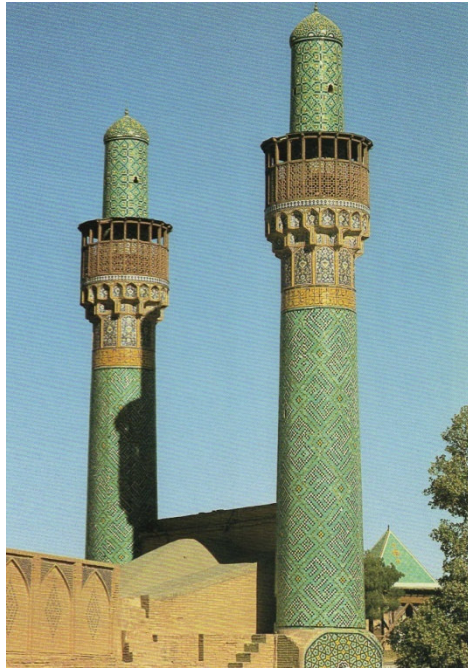
Light aids people in appreciating a building and from that enjoyment arises. The mood set in a space is greatly affected by the light intensity, quality and direction. Islamic buildings often make use of filtered light with the use of screens (jali) while reflection on the surface of water adds light into the spaces.

Color is used extensively in Islamic architecture, warm colors such as red, orange, white and yellow are seen to advance to the foreground whereas cooler subdued colors like green, blue and violet seem to recede and are thus used as backgrounds.

An interesting use of color I noticed is that in large areas contrasting colors are placed next to each other, this avoids diffusion of the area by the eye. On the contrary similar colors are interwoven in small areas, giving the illusion that the space is larger.

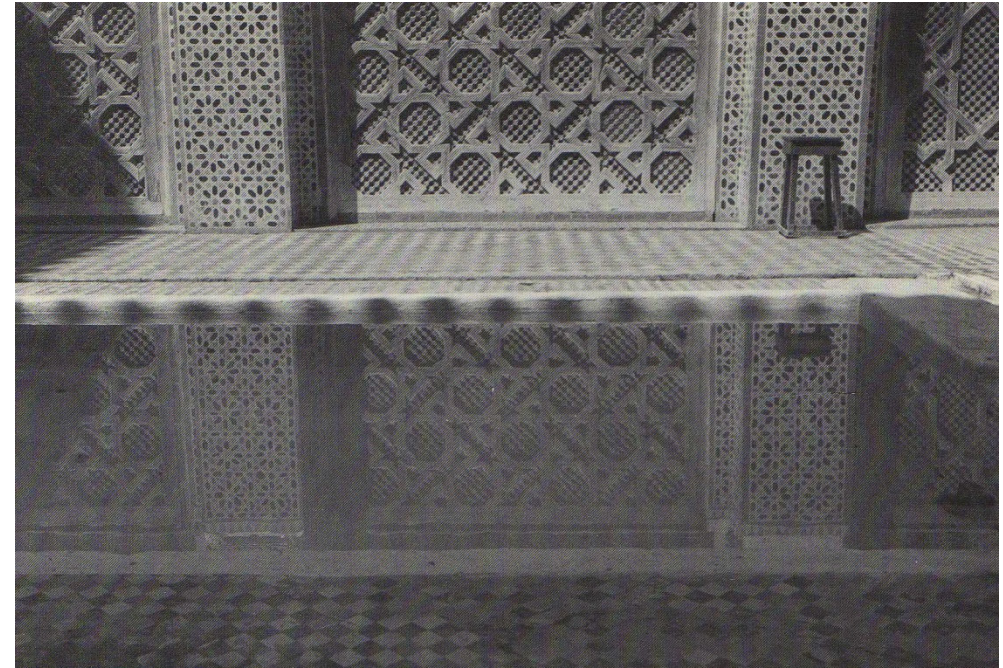
Color can be used in many ways; it can create a focal point, divide a space or create rhythm.

Green is considered a sacred color to Muslims. It has been suggested that green is revered because it was worn by Muhammad (p.b.u.h){peace and blessings upon him}, but it also symbolizes life and nature. When finally reaching paradise in the afterlife, the Qur'an states, "ornaments shall be given to them therein of bracelets of gold, and they shall wear green robes of fine silk and thick silk brocade interwoven with gold, (Quraan18:31)" and they will be "Reclining on green cushions and beautiful carpets (Quraan55:76)." In Islamic culture green and gold are the colors of paradise.



(left) Minarets, Iwan and glazed tiles of the Mader-I-Shah mosque, Isfahan (J. Lehrman, 1999; 6)

(Right) reflected light enters through the screens creating a beautiful light quality in the interiors J. Lehrman, 1999; 71)



### The influence of sound and music

The mosques, cathedrals and temples of historic times, designed and built with sacred geometry, function as resonant sound chambers. "The same mathematical proportions that gave birth to the various sacred sounds are also incorporated into the measurements of the religious structures" (Eliade, M, 1999, p45)

Sound and structure were simply different manifestations of the same universal mathematical constants. Therefore, when people make music within the sacred shrines, the vibratory field manifested by their sounds and the sacred geometry of the structure resonates. Out of this resonance comes an awakening and rush of spiritual consciousness.

Sound and music has a definite therapeutic effect. Cultures throughout the world have used sound, created by both the human voice and a remarkable variety of musical instruments, to call forth the spirits of unseen realms, to praise the divine and to awaken the mind to sublime states of spiritual consciousness.

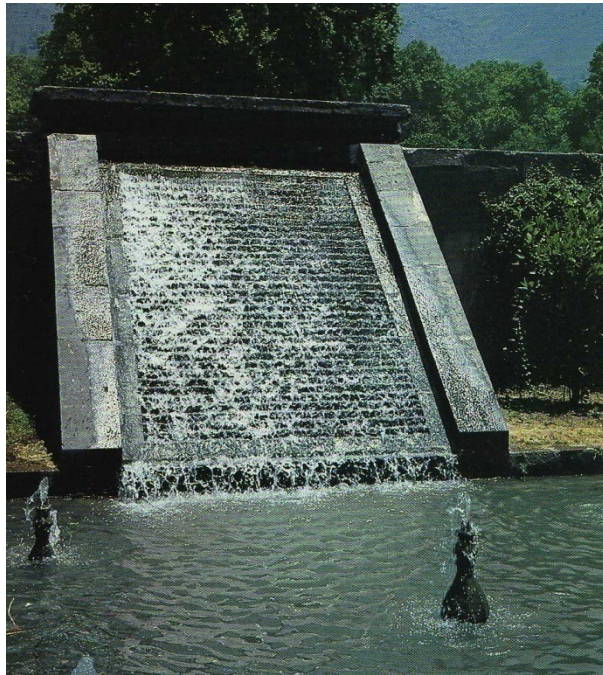
### Islamic architecture:

Music is prohibited in Islam, the drum and human voice are the only sounds acceptable in Islam, the Imam (leader) reads portions of the Quraan loudly during three of the five times daily prayer. The mihrab (niche) in the kiblah wall was added to reflect sound backward toward the congregation, with the use of loudspeakers today, echo free crisp sound quality can be achieved in almost all environments. This said this thesis will challenge itself to design a space using sacred geometry in



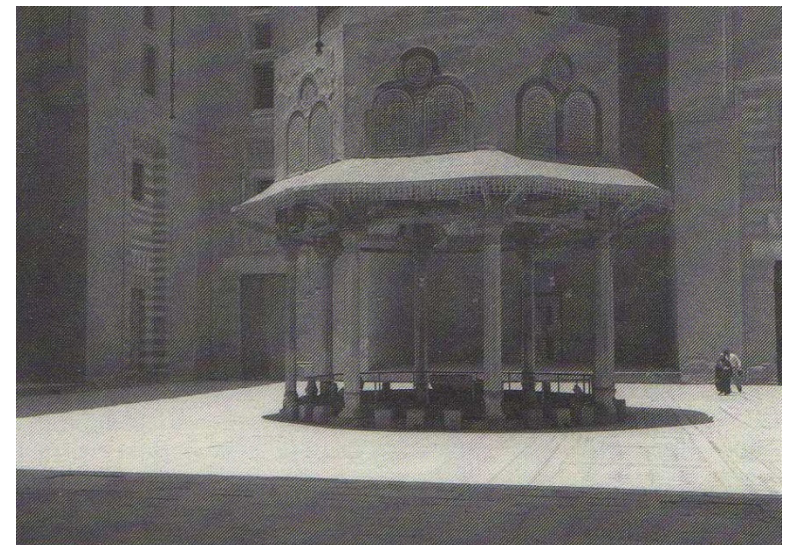
the mosque that will beautify the recitation and in turn awaken spirituality.

Sounds found in the courtyards and Islamic gardens are mesmerizing, fountains with the goal of delighting the eyes and ears, falling spray cools the courtyard while the sound of falling water is used to mask out any outside noises. Islamic gardens are extremely interesting places of contemplation and meditation, designed with copious amounts of trees and shrubs, man and nature meet in harmony, on top of the sound of falling water birds singing and large bees can be heard.



A water feature in an Islamic garden India (source unknown, authors personal collection)

Octagonal Sultan Hassan Mosque ablution fountain in the centre of the courtyard  
(J. Lehrman, 1999; 36)



## The ceremonial and therapeutic use of aromatic substances

The use of aromatic substances for spiritual and healing purposes dates back more than 5000 years ago. Scientists today are able to demonstrate that our sense of smell is thousands of times more acute than our other senses and that it is also sensitive to thousands of different chemical compounds, they and historians know little though of the practical wisdom of the ancient knowledge concerning scent. The knowledge on spiritual and therapeutic benefits of aromatic substances has been lost through the years to being minuscule today. Modern day visitors to some pilgrimage shrines (mostly Hindu, Buddhist and Christian lands) however still have the privilege of being exposed to traditional combinations of aromatic substances.

It is however known that, aromatic oils besides having pleasant fragrances are said to have vital electromagnetic properties and vibrational energies that invigorate the mind, the soul and body. These oils relax people, lower blood pressure, increase mental acuity, normalize body functions, reduce stress, and even act as aphrodisiacs. It can thus only be imagined that aromatic substances would have similar benefits in sacred spaces if used.

### Islamic architecture:

The Islamic gardens and some cases mosque courtyards were planted with flowering plants and fruit bearing trees. Of common use were roses and jasmines planted for their pleasant scent.



(J. Lehrman, 1999; 36) A view of the Patio de los Naranjos, Seville, courtyard of the Mosque planted with orange trees.



## The influence of the 'visual scriptures' which beautify the shrines

This topic is a hotly debated issue in modern sacred architecture; ornament is the emphasis of the joint and modern design being about minimalism looks unfavorably upon any ornament.

Martin Gray is of the rational, brilliant view that the 'art work' we of the modern age see in historic sacred architecture such as sculptures, mosaics, stained glass windows and paintings were not merely art to the users in pre modern time it however fulfilled theological, narrative and inspirational functions.



French Gothic Chartres cathedral stained glass  
[www.chartres-csm.org/us.html](http://www.chartres-csm.org/us.html)

For example, the stained glass windows and sculptures of Europe's great pilgrimage cathedrals illustrated the stories and ethics of the Christian tradition, while the magnificently decorated temples of southern India depicted episodes from the Ramayana and Mahabharata, the epic narratives of Hinduism.

To understand the emotions aroused in visitors to these embellished, beautifully ornamented shrines we have to visualize their pilgrimage.

Visualize the following: There's no media, you have never traveled out of your home village ever, everything you have ever heard about the shrines are from family and friends that have been there, you prepare weeks in advance for the journey, the day comes to leave and you walk for days /months to the venerated holy place, you arrive at the city and you are amazed by the size of the buildings and amount of people, the most astounding moment though occurs when" the"pilgrim enters the shrine where myth and beauty presented themselves in overwhelming proportions. *Stunningly beautiful mosaics, gloriously illuminated stained glass windows, and finely crafted sculptures and paintings illustrated the legends of the deities and saints. Since their childhood years the pilgrims had been told the myths of their culture and religion. Now, entering the shrine, they were magically transported to that long-imagined mythic realm. The power of this experience, so radically different from their usual life, catalyzed in them a profound state of awe and thereby openness to the miraculous*'. (M. Gray, 2003, ; 20)

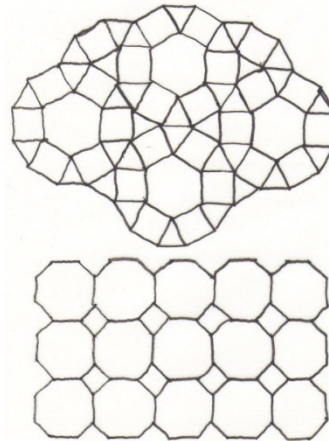
Today everyone, even in majority of the remotest parts of the world have been influenced by the media ,which has portrayed that the world is a vast place filled with a huge variety of things. The power of the visual scriptures in my view has been lost, ornament does not move the emotions of visitors as it once did.

**Islamic architecture:**

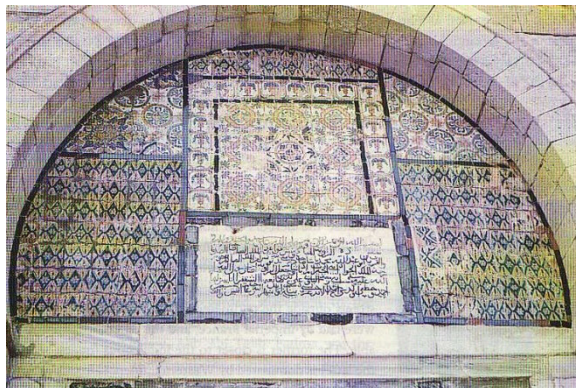
Islamic patterns main purpose is to transform matter so it loses its solidity and heaviness. Large areas are broken down into smaller pieces, this holds the viewers attention for longer and extends the sense of order and structure.

The beauty of the world is temporary thus these intricate patterns and mosaics are but a reminder of what awaits the believers in heaven, Islam prohibits the use of human or animal figures thus abstract and floral patterns are used in ornament. Geometric patterns reflect the unity of the universe and the unity in Islam. Calligraphic compositions on the other hand express the words and glory of God.

The repetition of the triangle or square multiple times to form intricate patterns are symbolic of God's unity in multiplicity. Ornament is used to transform a surface and encourage contemplation. They also testify to the energy of labor put into their creation and thus bring about feelings of appreciation and awe. This thesis is of the view that to get back to arousing the emotions and aiding the visitor in switching off from the profane to the sacred requires ornament to be used in small amounts in key areas which will have a far greater effect than an overuse which brings about distraction in a 21<sup>st</sup> century society.



These Islamic tile patterns display the power of the triangle and square to generate networks that are orderly yet dynamic. Each point of intersection in the network reflects every other intersection, creating a system of mutual support. (Source unknown, authors own collection)



Glazed tiles (calligraphy and floral ornamentation) in the Great Mosque of Qayrawan, Tunisia((N.Elleh;1997,p299)



Floral patterns in the Great Mosque of Qayrawan, Tunisia (N.Elleh;1997,p296)

### Intention:

There are three out of the twenty points that Martin Gray dedicates to Intention, intention is paramount when designing, constructing and using a sacred space. These are the three headings he outlines regarding intention:

- The intent of an individual pilgrim.
- The intent of the builders of the sacred sites.
- The influence of a culture's collective belief in the power of a pilgrimage center.

The clarity of intention that we bring to a sacred place is instrumental in opening us to the power of place. That power, while generated and perpetuated by many of the other factors discussed in the headings of the pages above , becomes truly available to us only when we make ourselves available to it through the focusing of our intent. As an example if one takes a design element (window, door etc), whatever the religion from which it serves, is an artistic artifact, a symbol of a spiritual ideal, and also a physical and living memory of the spiritual intention of the individual who created the element. What is being suggested is that the power of a sacred structure is in part caused by the passion and religious devotion of the people who originally designed, built, embellished and used the structure. During paleolithic times the community got involved in design , decision making and construction , by reviving this idea the sacred space will have a deeper meaning to its users(the community) rather than just being a designated prayer space erected by an elite monarchy.



Masjid ul Quba Medina Saudi Arabia, Prof. Abdul Wahed Al Wakil.

[www.zubeyr.kureemun.com](http://www.zubeyr.kureemun.com)

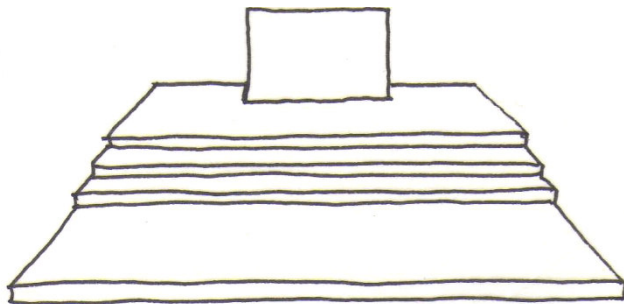
Due to the reward of working on the Quba mosque half the work force on site was not commissioned by the contractor , meaning they were not on the pay roll, name tags had to be kept to keep keen people from working on site.



### Eight elemental forms:

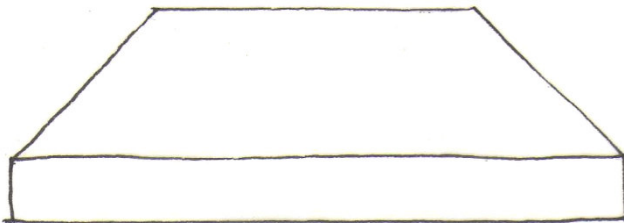
Anthony Lawlor in his book, the temple in the house mentions a few interesting points regarding sacred space .He outlines eight elemental forms that are found in sacred spaces. These are floor, wall, pillar, roof, space, doors and windows, ornament and rooms.

Floors are of three types:



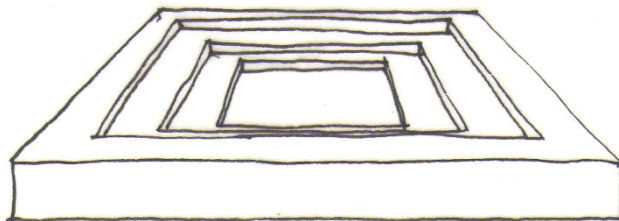
Raised:After (A, Lawlor, 1994, p80)

1.Raised: lifts one toward the heavens, early temples were raised by three steps.



Level floor:After (A, Lawlor, 1994, p80)

2.Level: Marks a piece of flat ground, a demarcated and defined space for a certain function to occur.

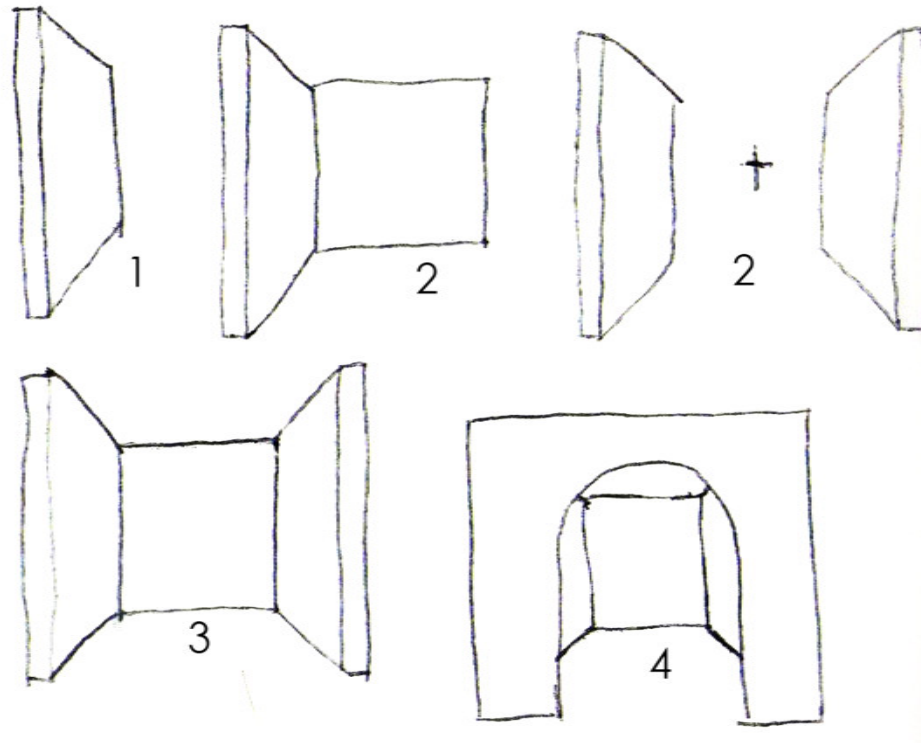


Lowered:After (A, Lawlor, 1994, p80)

3.Lowered: crates a sense of gathering and community, Greek amphitheatres are a good example .Lowering a floor reinforces the gathering energies of cradling and security.

Walls:

1. Single wall: cuts one place into two and is a reference point for organizing.
2. Two walls: if parallel focuses our attention e.g. a passage. Joining two walls to form a corner gives consciousness of interior and exterior space.
3. Three walls: form u shape and focuses ones attention to a specific area.
4. Four walls: Form an enclosure and there's a definite distinction between interior and exterior.



Columns:

Pillars echo the proportions of our height and slenderness (human proportions). They are also a reminder of gravity pressing down.



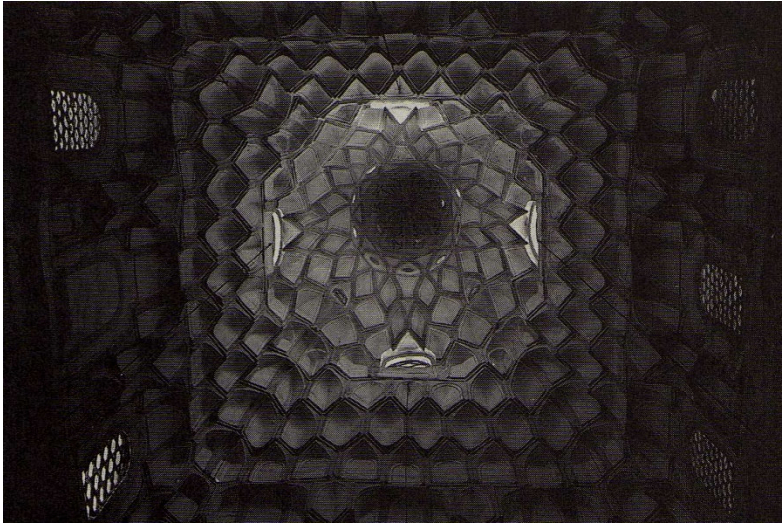
Pompey's pillar, Alexandria, The column is a symbol of our (human) stance on the landscape (A, Lawlor, 1994, p84).

)



Roof:

Provides shelter and symbolizes monumental leaps in faith. Domes, pitched roofs and flat slabs all symbolize a particular faith.



Damascus, coffers and a lantern allow a massive dome to dematerialize into light (A, Lawlor, 1994, p86)

Space:

Floors walls, pillars and roofs join to shape habitable space. Space is an unseen connector of all things.

Doors and windows:

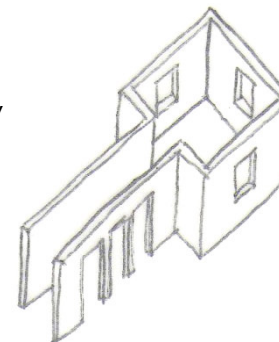
Are symbolic of a style or period, they give character to a space, their size, shape, proportion and materials may give different effects.

Ornament:

Is the adoration of the joint, it depicts unity in multiplicity. The power of ornament lies in the touch points between materials.

Rooms:

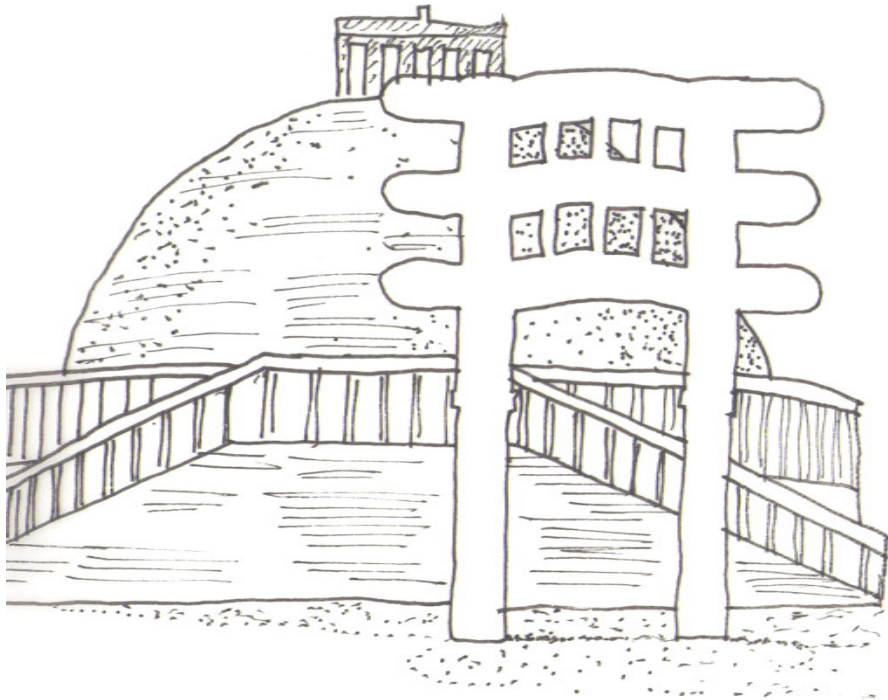
\_all seven elements come together to create rooms. Rooms can support movement along a path or arrival at a place, reflecting the soul's tendency to seek and find. Five types can be found, centralized, radial, linear, grid like and clustered.



A room at the end of a path reflects the soul's tendency to seek and find ,after (A, Lawlor, 1994, p92).

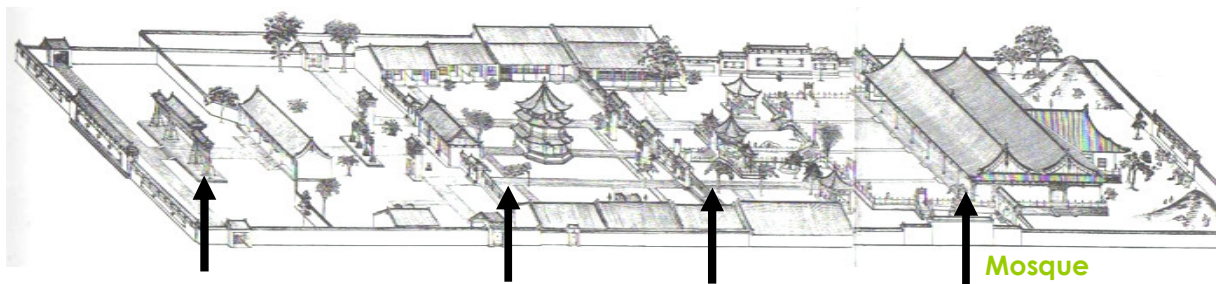
### Thresholds of entry:

An ancient example is the Stupa, one enters the gate ascends a staircase which brings you to the circular terrace, after which one arrives at the statue of the Buddha. Anticipation is created and a deeper appreciation of the sacred statue (sacred) is enforced.



Pilgrims pass through the layers of gate, stairway and circular terrace to reach the Buddhist Stupa at Sanchi India After (A, Lawlor, 1994, p42)

The Chinese detached pavilion mosque typology within a walled garden enclosure; courtyards are used as thresholds (each arrow represents a threshold) creating anticipation and superiority of the Mosque at the end.



(Frishman and Khan 1994, pg222)

### Sacred coolness or heating:

When you visit a place where the temperature is hot, there is an extremely refreshing feeling that rushes over you when you find refuge under a tree or when you catch a breeze. This effect is achieved through sacred coolness, which is created by using massive construction, water, shade and breezes.

*Massive construction, refreshing breezes, and water are used in this Shiva temple to create sacred coolness.*



Use of massive construction, refreshing breezes and water at the Shiva temple, India (Lawlor, A, 1994: P89).

### Symbolism:

Symbols derive their power from two sources, firstly the archetype that the symbolism is a manifestation of and secondly from the practice of belief, of consciously held intention. Belief is thus a way of "tapping into" and drawing from the realm of the miraculous. Intention is the connecting link with the power of the sacred sites.

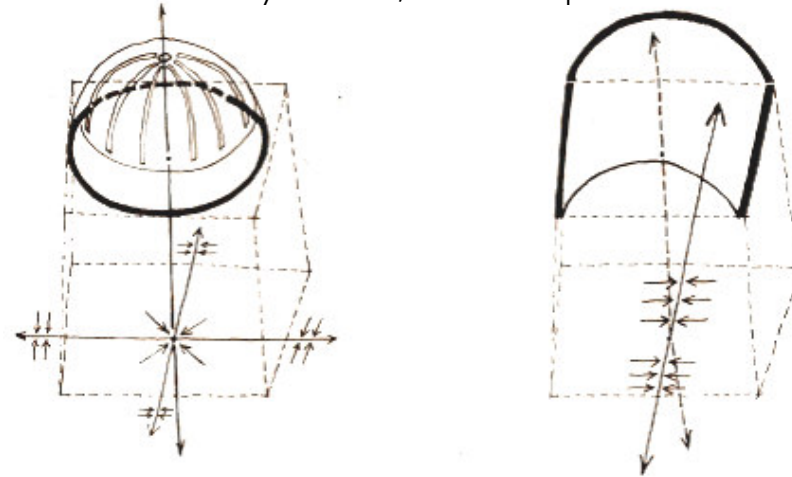
Symbolism within religious architecture dates back to the monolithic temples and shrines built by the Greek civilization to symbolize the power and might of their Gods. They used post and beam stone construction with huge Doric and ionic columns supporting beams and pendentives to symbolize the strength and superiority of the Gods.

Every element (columns, ornament, planning etc) used in early sacred architecture were symbolic of God. History has adorned sacred space with symbolism; society today however has evolved and now employ modernist thinking and thus are looking toward simplicity and minimalism. Some look toward a stripped down version of historical examples where as others look to creating extremely new typologies of sacred space. My view is, that we cannot be arrogant and disregard centuries of work by our fore fathers. We must therefore understand these symbolisms and adapt them to fit into a modern context and 21st century lifestyle.



The dome found in churches, temples and mosques is symbolic of the unity of God; its centre point is a vertical link to God residing above.

The dome and vault, symbols of the oneness of God,  
(Ardalan & Bakhtiar, 1973, p75)

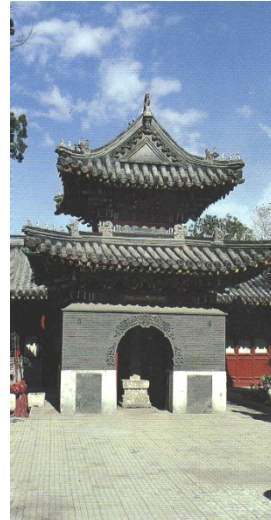


The minaret “reflects mans ontological axis ...and recalls the soul of man to its primordial place of origin” (Ardalan & Bakhtiar, 1973:73). The sight of the minaret by a Muslim assures him/her that a place of peace and refuge (Dar –al-Islam) is nearby, where his need will be seen to. It is a powerful landmark and allows the call to prayer to reach far and beyond.

Minaret examples in Beijing China and Beni Isguen Algeria (Frishman and Khan, 1994: 25)



Beni-Isguen, Algeria: a village mosque in the Mزاب Saharan style.



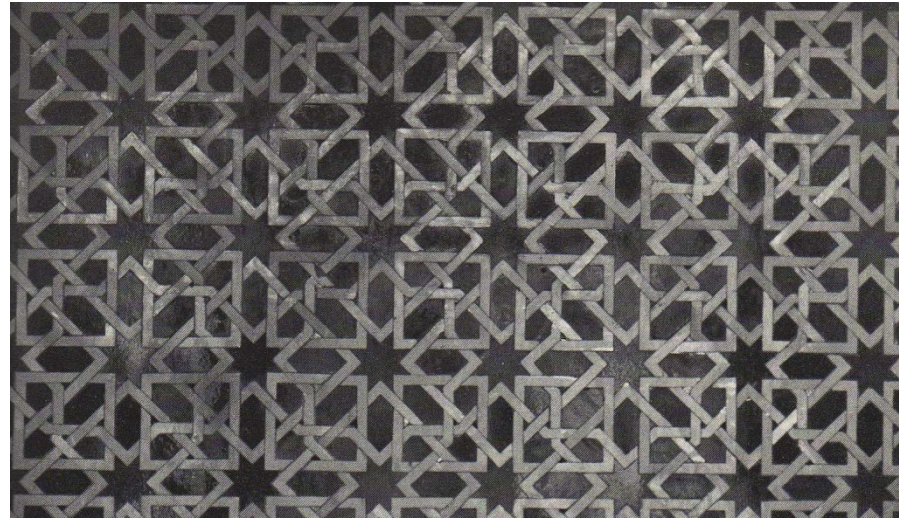
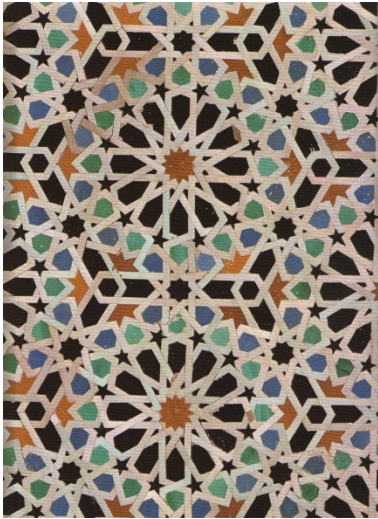
Beijing, China: Niu Jie (Ox Street) Mosque, founded in 1362 (renovated 1978).

### Symbolism of water:

It is seen to be the source of life. Before prayer the believer must be pure and clean, the ablution before prayer requires water thus the use of water here is a symbol of purity.

### Ornamentation:

The repetition of a geometric pattern or shape is symbolic of Gods ‘unity in multiplicity’, in other words God being one (unity) but yet everywhere (multiplicity).



Mosaic tile work in a Madresa(school) Fez,Marocco(J. Lehrman, 1999; 12)

This brings this chapter to a close, what can be extrapolated is that sacred space is far more than the superficial. The essences outlined above give a clear indication of just how vast this field is and how many influences there are in creating a powerful sacred space. The key point I want to draw attention to is the physical interaction between people and how important interaction is to the power of a sacred space.

The essences coupled with a design aesthetic to fit its context will be the beginnings of a sacred architecture for a twenty first century society

## Community was integral to paleolithic religious architecture

Sacred space touches the heart and moves ones emotions. There are two categories that are key to this topic for this thesis, these are:

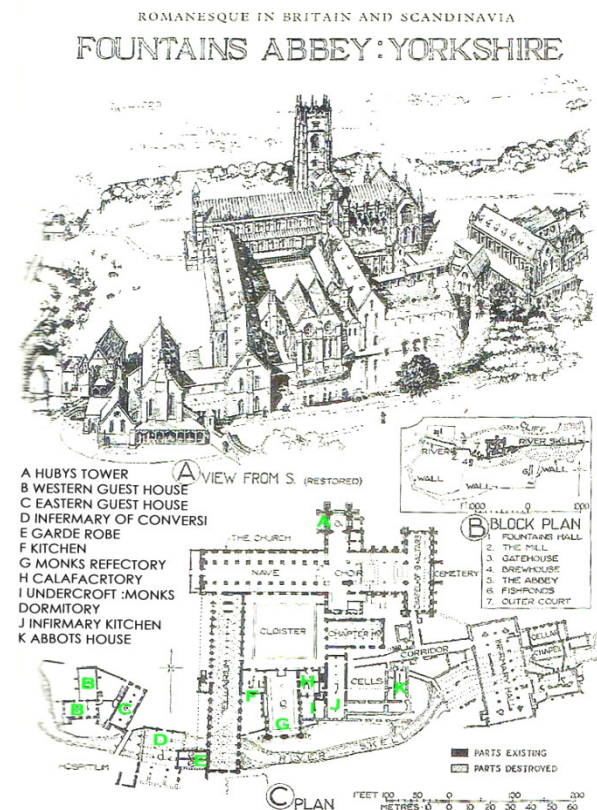
1. Ancient (communities)
2. Traditional (African tribal)(communities)

## Ancient

In ancient tradition the religious building took precedent within the city, village or town it was found. Religious space dominated the entire social structure and gave centralized direction to activities. With the religious building at the centre of early cities it meant the city was protected by the Gods /God. In this way the entire cities inhabitants were apart of a divine protection and therefore belonging to a community.

Early Christian churches were based on this idea of religious centrality. *'The Church was a neighborhood centre, a focus of daily community life and no neighborhood was so poor that it lacked a Church. A local church possessing any bones or relics of a saint became the goal of pilgrimages, becoming a museum of Christian faith as well as a house of worship'* (Mumford 1961, 255-57)

European medieval cities main purpose was the living of a Christian life. The church through this action is debted to modern day contributions such as hospitals and alms houses .Builders of these medieval churches were masons and carpenters under instruction from Priests /religious leaders, thus the church ordered the linkage of multiple functions to the monasteries and church. These functions met the needs of the Christian community of the time.

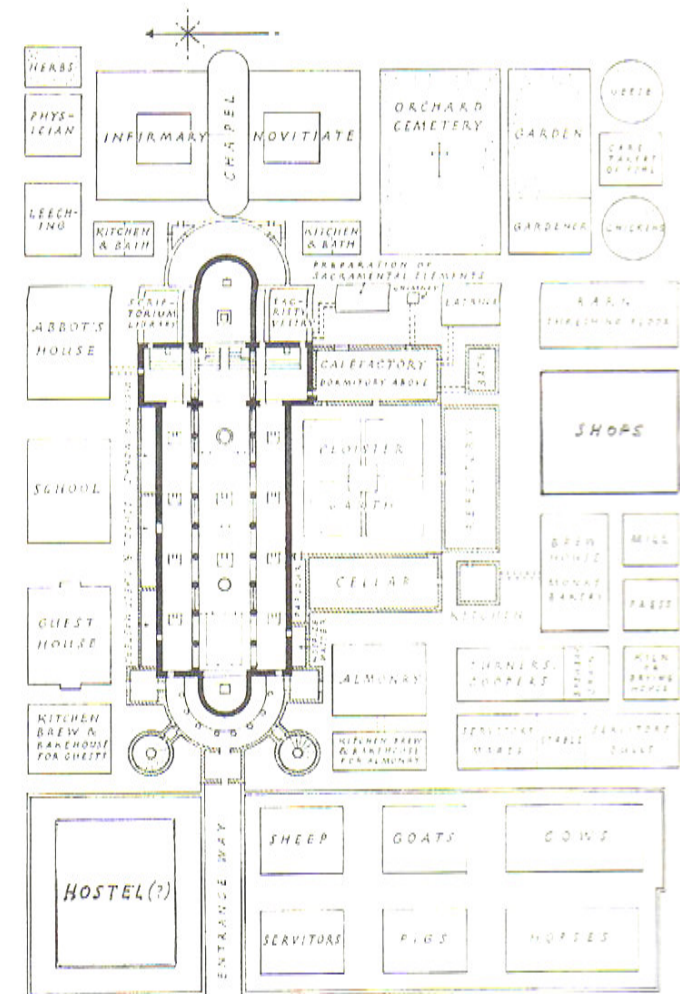


Fountain Abbey: Yorkshire, after (Fletcher 1975:570)



The church itself was a many sided institution and the church building performed many functions that were later separated and assigned to specialized secular institutions.

Monastery of S Gallen, after (Fletcher 1975:570)



### Spaces of faith in African tradition:

Early ancient traditions and cultures for example the Egyptians worshipped the sun God and built temples to symbolize the presence of their Gods. In ancient African tradition however there are no irreligious people as they belonged to a strict closely knit community, every individual was thus involved in participating in beliefs, ceremonies, rituals and festivals of that community. An individual who revolts against the tradition/religion of the group severs him/herself from their roots, foundation and context of security.

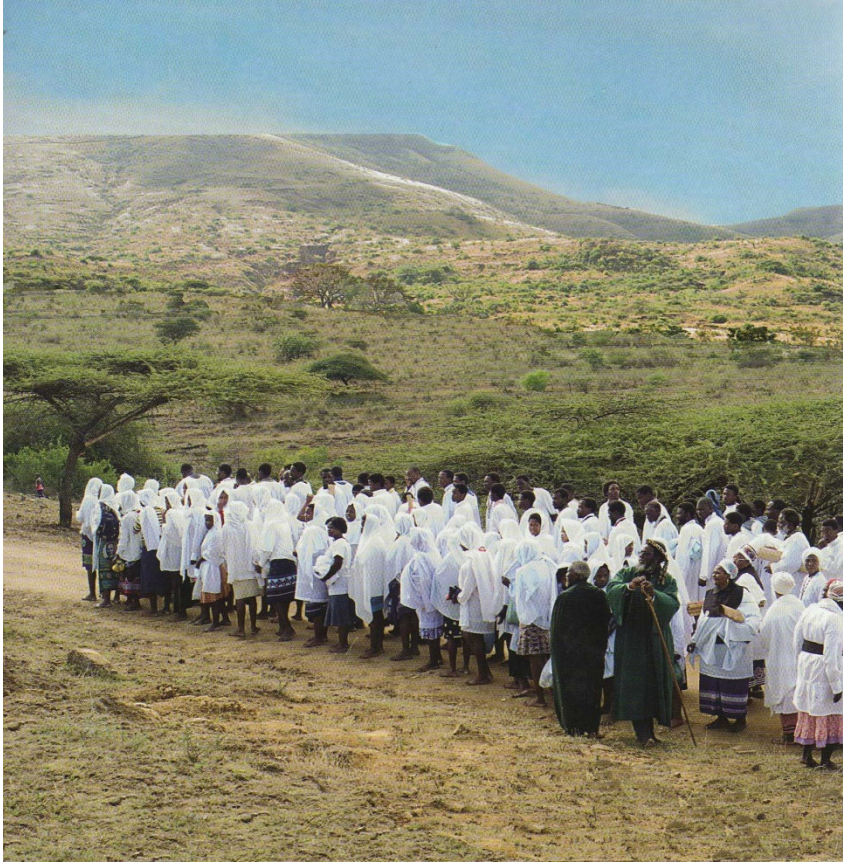
African traditional sacred space is thus not very different to other ancient civilizations in other parts of the world. Community and context's of security are a common thread even though the religion and people might be different. That sense of belonging to a bigger structure and believing in a common deity ties everyone in that context together.

"Instead of building shrines or temples, African belief has invested nature with powers. For example, a tree or a striking rock outcrop or a mountain might be considered sacred" (Harrison 2004:11)

In African tradition sacred spaces as in all other faiths are not thought to be God. They are also not vital to prayers, they are simply spaces chosen by religious leaders as spaces where a connection to a higher power (ancestors or God) happen. They are used as a meeting point to bring together people of the same belief and thus feed the soul achieving spiritual enlightenment.

Festival of the tabernacle, Mount Nhlankakazi  
(M.Haggerty, 2008, Nazareth church calendar,  
Phansi museum, Durban, South Africa)





Newly baptized members proceeding to Mount Nhlankakazi  
(M.Haggerty, 2008, Nazareth church calendar, Phansi museum,  
Durban, South Africa)

Tens of thousands of members of the Nazareth church meet every year on the last Sunday in July in KwaZulu-Natal at the Quadi tribal area. The highlight of the prayer is the festival of the Tabernacle held on the plateau of mount Nhlankakazi, where the members of the church are dressed in white robes and pray for two weeks on the mountain. This is a perfect example of traditional African belief merging with Christianity where nature is venerated as sacred space.



## Contemporary sacred space

Ancient cities with their avid community life were controlled and governed by mythical knowledge that is by the religious leaders. As early as the 16<sup>th</sup> century this changed to demythilised knowledge (based on reasoning and rational thought). The peak of this shift happened in the 19<sup>th</sup> and 20<sup>th</sup> century, in the form of industrialization and modernism. Philosophers replaced theologians, mathematics and physical science saw a decline in religious beliefs and familiar craft skills were replaced by technology. This saw a breakdown in traditional values encouraged by capitalism and colonization in some countries. This new age thinking pushed the sacred space to the periphery of the city.

Religion and science are seen as enemies, and in my view contemporary society has to move on to accept science and religion as partners.

The counter argument by modern planners can be that religion in itself is exclusive and enclosed, thus the modern city if it had adopted the pre modern planning would today possibly have been nodes of religious people of one faith living a very sheltered life. Much like the apartheid planning in South Africa just with religion as use of segregation.

This view assumes that religion allows for no transformation and is therefore naive; my view is that religion would have evolved to include other religions as it is doing. There would obviously have been clashes and conflicts but humans are rational beings and for this reason would have accepted each others differences. This evolution is at a cross-road now, that is why the inclusivity of religious space is under scrutiny. This is evident in the number of non denominational contemplation spaces found.

## The mosque as a community development centre:

Mohamad Tajuddin Mohamad Rasdi from the department of Architecture at the Universiti Teknologi in Malaysia has written a beautiful book "The mosque as a community development centre". In this book he uses theological sources to prove that the mosque is not merely a prayer space or house of God but a community development centre where community interaction is promoted.

This thesis agrees with his argument and thus will look at the needs of the community its mosque will benefit and serve, by using this understanding I will develop a program and curriculum that will meet the needs of its community .I have however labeled a flaw in his argument, Mohamad sees the mosque as nothing but a community centre and dispels that it be designed with any meditative space or sacred architecture principles. He argues that mosque interiors designed as meditative spaces are incorrect stating that during the Prophets time the mosque interior was used for many other functions and bustling with activity, when prayer time arrived everything came to a standstill for the prayer to be performed.

### Architectural historiography

Mohamad first looked at architectural historiography and pointed out that historians have been far too liberal by only documented the great monumental mosques ,the mosques that have exotic decorations, ornamentation, splendid domes and multiple minarets whereas the smaller obscure but active mosques were not, as they were seen as not being able to move the emotions in its architecture.

"A mosque is a place for private devotion and prayer" (E.H Short .history of religious architecture: 132). The mosque is understood as a prayer space by this historian.

He made the point that because historians see the mosque's core function as a place for the performance of ritual prayer, meditation, recital of the Quraan and nothing else the true eternal idea of the mosque was lost.

### Historic precedents to ascertain the eternal idea of the mosque:

Mohamad states that monumental mosques built from the dawn of what historians label as 'Islamic' architecture are tainted with political agendas, personal symbolic gestures for egotistic gain, questionable religious practices and in some cases the effects of colonization.

The political leaders of the Islamic ruled cities were based (palaces) near and in some cases adjacent to the mosque, for these leaders to have control of the masses they required a medium to communicate with the people. This is why large monumental congregational mosques were built, large mosques meant control of the media and thus control of the masses. We can thus conclude that the eternal idea of the mosque cannot be ascertained by looking at historic precedent as there are too many external influences affecting historic mosques.

Thus to ascertain the true eternal idea of the mosque, theological resources must be consulted. He then looked at the Quraan and hadith with focus on prayer, tilawah, ietikaaf and a Muslims social obligation.

## Mosque in the Quraan and hadith with focus on Worship, and the Social obligations of a Muslim to ascertain the true eternal idea of the mosque

### **Quraan:**

*"Permission (to fight) is given to those against whom war is wrongfully being waged - and, verily, God has indeed the power to succor them: Those who have been driven from their homelands against all rights for no other reason than their saying, "Our Sustainer is God!" For if God had not enabled people to defend themselves against one another, (all) monasteries and churches and synagogues and mosques - in (all of) which God's name is abundantly extolled - would surely have been destroyed And God will most certainly succor him who succors His cause: for, verily, God is most powerful, almighty. [Quraan, Sura 22, Verses 39-40]*

In the Quraan the word masjid (mosque) is used to refer to a variety of structures, these are all the structures that have to do with ritual worship of God the almighty. The meaning of the word masjid is thus too universal in the Quraan. There is thus insufficient evidence to derive the eternal idea of the mosque from Quranic verses.

### **Hadith:**

The Hadith are the sayings of the Prophet (p.b.u.h) and are secondary to the Quraan. There are multiple references to the use of the mosque during the Prophet's life, these mosques are the harem in Mecca and the Prophet's mosque in Medina. Both mosques had functions made up of a medley of social, political and religious activities.

Mohamad states that 'historians argue that the Arabs were uneducated and poor so could not separate the functions into separate buildings. They also argue that these early prayer spaces were tribal mosques as they had all the functions attached to it. This view is stereotypical as it assumes all societies are neat packagers of their entities and that Islam and all other religions are the same'.

"There are hadiths, which includes the functions of a shelter, an educational institution, a health care facility and a prison. Celebrations and recreational activities were also held near the mosque!" The mosque was also a stage to pass judicial decisions" (Mohamad Tajuddin, mosque as a community centre)

This thesis is of the ideology that the Prophet purposely allowed all these functions to happen in and around the mosque, and hence views the mosque as a community facility coupled to it being a house of God /prayer space.

In many hadith the Prophet rebuked wastefulness and excessiveness in building and all facets of a Muslim's life (eating, sleeping etc). This hadith means the Prophet would not have been pleased with the huge monumental mosques built after his demise.

*Narrated Abu Huraira: One day while the Prophet was sitting in the company of some people, a strange man "the angel Gabriel" came and asked many things. When will the Hour be established (Doomsday)? The Prophet answered, "The Answerer has no better knowledge than the Questioner....." (J Robson: 1973,p148)*



From that Hadith it can be ascertained that single function mosques of monumental scales are incorrect. The mosque is a place where the community gathers, interacts and discharges responsibilities for the benefit of Islam and the community. Historians consider these activities to be secular and thus these facets of the mosque have been lost. As stated earlier Islam is not a neat packager of its functions and purposely gives the mosque its multiple functions.

### **Social obligations and the eternal idea of the mosque:**

There are many communal responsibilities a Muslim has to perform that are related to the mosque, some directly others not. Charity must be collected to be distributed to the poor and needy. The young and old educated to ensure the spirit of Islam survives, non Muslims must be taught about Islam in the spirit of mutual exchange. This does not mean every Muslim must be a missionary, it merely requires explaining of faith to those who are interested and curious. The Muslim must ensure the accommodation of guests to their settlements and also see to the poor, destitute and needy. The Muslim must also prepare his community for the defense of the religion and it's required that all learn the art of warfare. The Muslim must know immediately the condition of his neighbors and members of the community to such an extent that he must help his brother before he asks for it. The Muslim must establish an organizing centre to implement all the educational, social and political programs to ensure the progressive development of the Ummah (all Muslims world wide). This is the level of brother/sisterhood required in Islam.

"Islam does not have such institution as 'the Vatican' to implement these social obligations. It is left up to each community to organize them selves and to discharge this responsibility. The Mosque seems best suited for instituting the programs of developing the Muslim society from all aspects. . It is sad to find that Mosque's now a day implement charity works at a seasonal basis such as during Ramadan(Fasting month)." (Mosque as community centre M,tajuddin)  
From this it can be noted that aside from ritual prayer five times daily a Muslim has many social obligations to fulfill. Fulfilling these responsibilities help create a conducive religious environment so the believer is at peace with him/herself and in constant remembrance of God.

### **Worship:**

Many Muslims and non Muslims may argue that prayer is the most important function in a mosque and therefore should be singled out. The following hadith is proof that this is a common misconception:

Narrated Abu Huraira: A man came to God's Apostle and said, "*Instruct me as to such a deed as equals Jihad(holy war) (in reward).*" He replied. "*I do not find such a deed.*" Then he added, "*Can you while the Muslim Fighters is in the battlefield, enter your mosque to perform prayers without cease and fast and never break your fast?*" The man said, "*But who can do that?*" Abu Huraira added, "*The Mujahid (Muslim fighter) is rewarded even for the footsteps of his horse while it wanders about (for grazing) tied in a long rope.*" (A.H.Siddiqi , 1976,p315)

The worship of God involves prayer , giving charity , fulfilling social obligations ,defending ones faith etc ,thus a Muslims life is a full and active one .The mosque in the past (Islamic cities with the Mosque, bazaar, Madresa and living quarters in close proximity) allowed a space for these activities to occur ,the lack of such a space in today's society is evident in the lack of unity and brotherhood in contemporary Islamic societies.

By understanding the definition of worship we can see a different picture of the Mosque role and function in a community and we get an understanding of the mosques role during the Prophets lifetime.

From this we can ascertain that the mosque is not just a place of ritualistic prayer but also a social centre, a centre that allows for the full worship of God.

### **Salat (prayer):**

Universally salat is accepted as the reason for the mosques existence. Firstly it must be stated that Muslims do not have to be in a mosque to pray and don't need a physical building for prayer for it to be accepted by God. It is an act that occurs five times daily regardless of what the Muslims day entails.

The only requirement as stated before is to face the direction of Mecca and pray on a clean place. As argued above salat is only a portion of worship and thus the mosque being built for the sole purpose of performing salat is a strange one. The mosques role is to foster a sense of community (unity), black ,white , rich , poor all standing side by side as one community and equal in Gods eyes.

Many mosques are designed to provide a meditative atmosphere for the performance of prayer. Mohamad argues that for us to understand the issue of meditative space in Islam we must look at congregational and individually performed prayer. All obligatory prayer must be performed in congregation:

Abu Huraira reported God's Messenger (PBUH) as saying: "Prayer said in a congregation is equivalent to twenty-five (prayers) as compared with prayer performed by a single person". (A.H.Siddiqi , v I, no 1363,1976,p315)

With the exception of the three holiest mosques (Mecca, medina and Al Aqsa) no extra virtue is given if one prays in solidarity in a mosque. Congregational prayers rewards being twenty five times more is independent of the building.

Individual prayer on the other hand are not compulsory. This does not mean they are not important; it brings great pleasure and a higher state of spirituality to the believer when non obligatory prayers are performed.

The Quraan and hadith argue forcibly about the importance of individual prayer. One idea that comes to mind when asking why this is so is that individual prayer can be performed as long as one would like. The merit or reward attached to individual prayer is more when performed at home as is evident from the following hadiths:

1)Ka'b b. Ujrah said: The Prophet (P.B.U.H) came to the mosque of Ibn, Abd al-Ashhal. He prayed the Maghrib(late afternoon) prayer there. When they finished the prayer, he saw them praying the supererogatory (Sunat) prayer after it. He said: This is the prayer to be offered in the houses. (A. H. Siddiqi , v I, no 1295, p. 342)

Zaid B. Thabit narrated that the Prophet said: Prayers are better performed at your own houses than at my mosque except the Fard prayers. (S.Syed.1990,pg9)

Jabir reported Allah's Messenger (PBUH) as saying: When anyone of you observes prayer in the mosque he should reserve a part of his prayer for his house, for Allah would make the prayer as a means of betterment in his house. (A.H.Siddiqi, v 1, no 1705, p. 376)

Ibn Umar reported Allah's Apostle (May PBUH) as saying: Observe some of your prayers in your houses and do not make them graves. (A.H.Siddiqi, v I, no 1703, p. 376)

The hadiths above show that it is recommended to perform the non obligatory prayer in ones home. If the Prophet performed all his non obligatory prayers in the mosque it would have been thought that it's compulsory to do so by his companions and followers. He thus suggested to them to perform some of their prayer at home. My view that counters Muhammad Talahudeen's is that his taken one extreme. He says that the mosque is a community centre only and not a sacred or meditative space. During the Prophet Muhammad's(p.b.u.h) time the mosque during the day was used for community activities ,as he stated, with activities such as teaching and political debate, while other activities such as tilawah (Quranic recitation) and non compulsory prayer occurred at home .He has overlooked what happens in the mosque at night and times it was not being used for those communal activities .The mosque then functions as a tranquil, peaceful space allowing for concentration and meditation to its users.

The companions of the Prophet as well as the Prophet would pray till the early hours of the morning performing nafl (non compulsory)prayers, making Zikr (remembering God)and tilawah(recitation of the holy book) Quraan. The mosque thus fulfilled a double function firstly as community development centre and secondly functioned as a space of solitary and meditation.

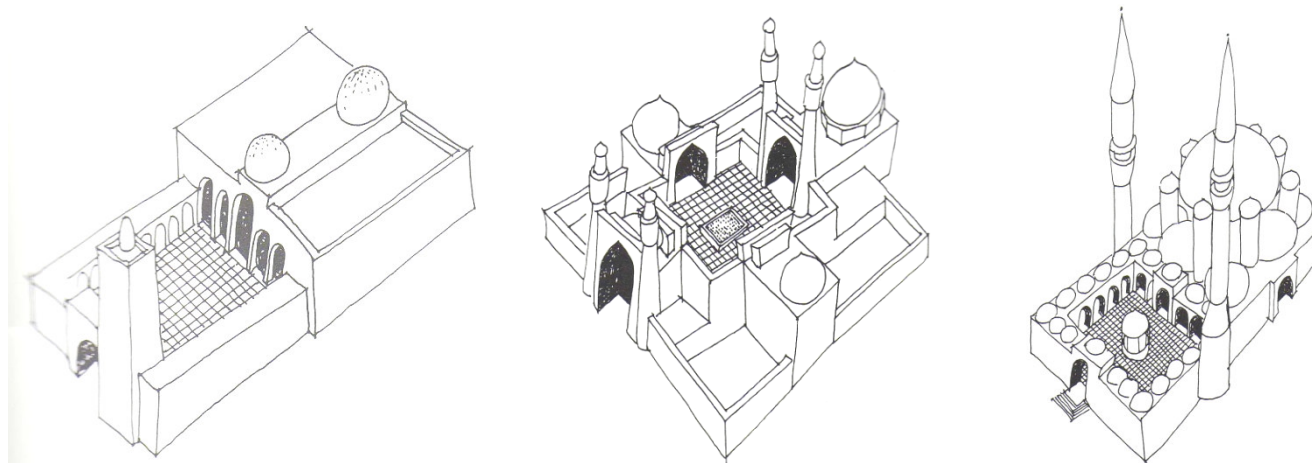
Thus the mosque is yes a community development centre and the hub of daily life to Muslims but coupled to that it must also allow a space of contemplation and meditation where a heightened closeness to God can be felt.



## A new mosque curriculum:

Abdul-Wahed Al-Wakil has taken the variations of mosques through history and categorized them into four groups:

1. Courtyard with Hypostyle Galleries
2. Madrassah or Iwan-type Mosque
3. Central Dome Type
4. Composite Type of Mosque



Images from left to right correspond with the numerical ordered list above (Frishman and Khan, 1994, p104)

Abdul Wahed argues in favor of traditional Islamic architecture, saying that ornament and pattern in buildings enlighten architectural space. He says that appreciation of nature arises from us viewing nature's patterns. He pleads to architects not to be arrogant by trying to improve on the mastery of the ancestors but rather to show humility by preserving and perpetuating the majesty of our heritage.

This view is squashed by Mohamed, I am taking a middle ground approach where all the essences of the majesty of the ancestors will be coupled with the eternal view of the mosque as community development centre. To bring about a community centre meeting the needs of the community at large with the Mosque at its core.

The needs of contemporary Muslims are the key driver in the community mosque and thus hold the key to contemporary mosque design. It is only through identifying the needs of Muslims in the society the mosque will serve that the curriculum for the mosque can be identified. Thus the thesis proposes that the curriculum of the mosque has as its main objective to develop the community as a whole intellectually and develop a strong brother/sisterhood. The mosque must serve as the hub or centre of the community's development with the end goal of bringing about positive growth and changes within the Muslim society.

### Design implementations for this curriculum:

Muslims have a role to play in protecting the earth, this coupled with the eternal idea of the mosque as community development centre means the centre can be designed to be a beacon of sustainability. Principles and design solutions used will be a first hand precedent to the users and hopefully will change their lifestyles, to a lifestyle of 'one planet living' and through that possibly inspiring them to implement a few sustainable solutions in other parts of their life (homes, workplace etc).

The push toward designing buildings with sustainable principles is huge especially in the last decade (due to drivers such as climate change etc). These principles include social, economic and environmental sustainability.

The community will be the client and end users of the community centre mosque thus this thesis proposes the implementation of green design principles with the goal that it will have a ripple effect, as an example if solar panels are installed it will lower the eco footprint of the building (environmental) which in turn means a saving in money, as electricity costs are now substantially less (economic sustainability) that money is then pumped back into the community for use in community development which equates to social sustainability. Applying this same thinking the following can be possible implementations:

Local labor (construction phase)

Use of local materials based on embodied energy

Recycling

Renewable energy

Water- recycling, reduction and reuse

Passive cooling and heating

The thesis also proposes that the mosque be sited where people are most found. It should not necessarily be on the ground but can be sited on several floors of a multi-functional block. It can also be placed where the busiest commercial and mixed-use complex is built. Isolated urban sites should not necessarily be chosen and where possible the mosque should be integrated into the urban fabric of the cities. Islamic Centres should also be located where there is an institutional complex where a great number of people live and work at the same place or within the same area. Where possible the Islamic centre should be sited in close proximity to schools, villages, the commercial activities and the main road of the town, this ensures easy access to people of various activities and to the travelers visiting the particular location.

Community interaction is paramount to the projects success, they are the clients, end users and maintainers of their centre, thus for full success to be attained a resident group should be set up. The group will administer all aspects of the project, funding especially. This design approach can be adopted by wealthy organizations or governments funding mosques in foreign lands, community interaction must be fostered for the project to meet the communities needs equating to its success. The centre is to be designed as a business entity with mixed use program where all profits will be re-circulated into the community for social upliftment.

## The Architectural Expression of the Mosque

Architects can be put into four groups when looking to history as a precedent in designing a mosque today: According to Khalid Asfour, a PHD student at MIT (Massachusetts institute of technology) these are:

1. Visual abstraction: Architects imitate past forms either two or three dimensionally or both.
2. Conceptual abstraction: Where architects use rules and formulae from the past and apply it to their designs in terms of proportion and sequencing of space for example.
3. The third is a combination of the first two, so both forms and formulae are used.
4. Design attitude: past is looked at to attain a design attitude, this occurs when the end user of buildings become involved in design decisions.

I plan to add a fifth type to this list, a design approach that builds on type four by looking at the essences of sacred space (all religions, traditional and modern) and employs relativist thinking, which involves looking to the purity of the mosque (socially and aesthetically) and reviving that in a modern context.

My approach sees the essences of sacred space being coupled with a style of design (modern universal aesthetic) to equate to a mosque that fulfills the needs of its community (Muslim and non Muslim) programmatically and offers a sacred space to the Muslims with the power to heighten the spirituality in its user.

By conducting an extensive site analysis I will ascertain what design style is most appropriate to the context, I will be designing for.

Without being wasteful or extravagant the mosque will be designed to be clearly identifiable.

The architectural expression in the mosque is to be versatile, at times meditative and tranquil and others a public facility willing toward community interaction. The rest of the facilities programs must be designed for a hustle and bustle atmosphere, inviting to both Muslims and non-Muslims, promoting integration and inclusivity.

The mosque interior should be designed to fit religious requirements as well as a place for education and social-interaction. If the community centre is to be built in an area of various ethnicities the architectural style chosen must be of a 'Neutral' language.



Due to colonial rule Islam was kept out of South Africa till the late 17<sup>th</sup> century , the Indians and Malays brought the religion to South Africa when they were brought here as slaves .This said a regional style of architecture has not been formed as compared to countries in the north of Africa where Islam docked many centuries ago.



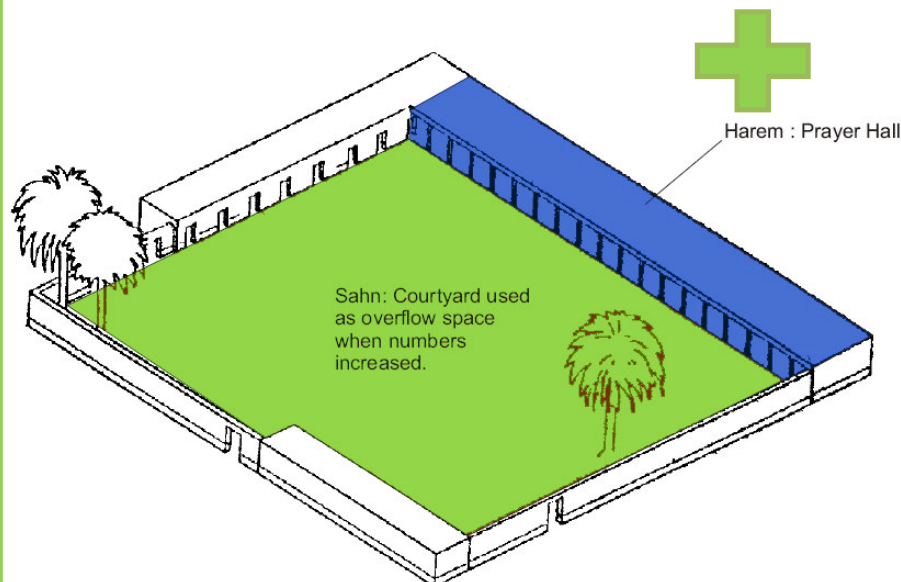
Islam in africa :

cited 18/04/09:[ultimatemuslimwarriors.wordpress.com/islam/](http://ultimatemuslimwarriors.wordpress.com/islam/)

This thesis thus proposes to pick up on traditional African sacred spaces and merge that together with Frank Lloyd Wright's principles from his Unitarian churches, essences of sacred space and the Prophets mosque typology .With the end goal of attempting to create a modern South African regional architectural mosque style.



African sacred space :  
African Zionist church Homestead Park  
Johannesburg  
Image :Authors own 26/03/09



International style in the  
form of Frank Lloyd  
Wrights principles



**My community  
Development centre  
mosque**

The prophets mosque after (Frishman and khan, 1994, p34)

This building formed the basic model from which the Friday mosque developed. The courtyard (sahn) and sanctuary (harem) were derived directly from the Prophets house.

## Conclusion:

This essay approaches mosque design in a way that goes beyond being a mere exercise in aesthetic or ornamental revivalism.

The mosques true and eternal idea is one of community development; this was its role historically and this will be reinstated. Due to over sanctification of the mosque this eternal idea was lost. The mosque however is a sacred space and a House of God and thus deserves immense design attention to arouse in its users an awe of the sacred. For this the essences of sacred space have been documented and will be used to invoke an aura of sacredness in the mosque proper area .Inclusivity of non Muslims, females and different ethnicities are of key concern and no exclusion on such grounds will exist. The key issue is that debates around which style or ornament should be used in designing the mosque is secondary to the role it plays in the larger context in social engineering of its community. The integration and development the mosque creates will be the gauge of the projects success.

**Glossary of Arabic terms:****Adhan**

Adhan is an Islamic way of calling Muslims to the five obligatory Prayers. The Adhan is announced daily from the Mosques.

**Allah**

Allah - the greatest and most inclusive of the names of God. It is an Arabic word of rich and varied meaning, denoting the one who is adored in worship, who creates all that exists, who has priority over all creation, who is lofty and hidden, who confounds all human understanding.

**Bid'a**

Any innovated practice introduced in the religion of Allah.

**Dawah**

Propagation of Islam through word and action, calling the people to follow the commandments of Allah and His Messenger Prophet Muhammad (S.A.W.).

**Du'a**

Supplication: invoking Allah for whatever one desires.

**Fajr**

"The Dawn". The time of the first obligatory prayer (Salah). It can be prayed at any time between the first light of dawn and just before sunrise.

**Hadith**

The word hadith literally means communication or narration. In the Islamic context it has come to denote the record of what the Prophet (S.A.W.) said, did, or tacitly approved.

**Hijab**

Any kind of veil-it could be a curtain, a facial veil, etc. The facial Hijab is divided into two types:

1. Niqab: full facial covering.
2. Khimar: partial facial covering

**'Ibadah**

'Ibadah is used in three meanings: (1) worship and adoration; (2) obedience and submission; and (3) service and subjection. The fundamental message of Islam is that man, as God's creature, should direct his 'ibadah to Him in all the above-mentioned meanings, and associate none in the rendering of it.

**I'tikaf**

I'tikaf refers to the religious practice of spending the last ten days of Ramadan (either wholly or partly) in a mosque so as to devote oneself exclusively to worship. In this state one may go out of the mosque only for the absolutely necessary requirements of life, but one must stay away from gratifying one's sexual desire.

**Jannah**

Paradise. A created abode in the Hereafter for those who believe in the Unity of Allah and in all His Prophets and Messengers, and who follow the way of life of the Prophets.

**Jum'ah**

"Friday." The Muslims' day of gathering together, when all Muslim males must go to the Masjid to hear the Friday Khutba (sermon) and to do the Jum'ah Salat (prayer).

**Ka'aba**

The cube-shaped stone building whose foundations were built by the angels and completed by Prophet Ibrahim (Abraham) and his son, Prophet Ismael, peace be on them, in Makkah. It is the focal point towards which all Muslims face when praying.

**Khalifah**

Khalifah or vicegerent is one who exercises the authority delegated to him by his principal, and does so in the capacity of his deputy and agent.

**Khutbah**

Sermon.

**Malaikah**

"Angels"

**Masjid**

Mosque. Plural Masjid.

**Masjid Al-Haram (al)**

The Grand Masjid in Makkah. The Ka'bah (the Qiblah of the Muslims) is situated within it.

**Masjid an-Nabawi (al)**

Another name for the Masjid ar-Rasool in Madinah. It is the second greatest Masjid in Islam.

**Mihraab**

Prayer niche of a Masjid, in front of which the Imam stands when leading the congregational prayers.

**Mimbar**

Steps on which the Imam stands to deliver the Khutbah (address) on the day of the Jumah (Friday).

**Muadhen**

The man who calls the Adhan loudly before each obligatory Salat, calling the people to prayer.

**Muhammad (S.A.W.)**

Muhammad (peace be upon him), the last Messenger of God.



**Glossary of Arabic terms:****Mumin**

Believer.

**Muslim**

A person who accepts Islam as his or her way of life.

**Mustahab**

An act in Islam that is recommended, but not obligatory.

**Nafil**

A voluntary act of supererogatory devotion such as Nafil Prayer or Nafil Fast.

**Niqab**

A type of veil that covers the entire face including the eyes.

**Niyyah**

Intention.

**P.B.U.H.**

Peace be upon him.

**Qiblah**

Qiblah signifies the direction to which all Muslims are required to turn when offering their prescribed Prayers, namely towards the Ka'bah, in Makkah, Saudi Arabia

**Ramadan**

The ninth month of the Islamic calendar. Fasting is obligatory during this month for all Muslims.

**Rasool**

Messenger and prophet of Allah.

**Ruku'**

Ruku' means to bend the body to bow. This bowing is one of the acts required in Islamic Prayer. Additionally, the same word denotes a certain unit in the Qur'an. The whole Book, for the sake of the convenience of the reader is divided into thirty parts, and each part consists usually of sixteen sentences.

**Sadaqa**

Anything given away in charity for the pleasure of Allah.

**Sahabi**

A companion of the Prophet (S.A.W.).

**Sajdah**

Prostration. The act of prostration, particularly in the Salat.

**Salah**

Prayers. There are five daily obligatory prayers. These prayers and their time zones are:

1. Fajr (morning prayer); After dawn but before sunrise;
2. Duhr (early afternoon or noon prayer); early afternoon till late afternoon;
3. 'Asr (late afternoon prayer) late afternoon prayer till sunset;
4. Maghrib (sunset prayer); just after sunset;
5. Isha (late evening prayer); late evening till late at night.

**Sallallahu 'Alaihe wa Sallam (S.A.W.)**

"May the peace and blessings of Allah be upon him." This is said whenever the name of prophet Muhammad (S.A.W.) is mentioned or read. The equivalent English phrase is usually abbreviated as S.A.W. (peace be upon him).

**Sawm**

Fasting

**Shahid**

Shahid in Islamic parlance means martyr.

**Sunnah**

hadeeth and the way of Prophet Muhammad (S.A.W.).

**Sunnah Prayers**

Sunnah Prayers are prayers which are considered recommended in view of the fact that the Prophet (S.A.W.) either performed them often and/or made statements about their meritorious character.

**Surah**

A chapter of the Qur'an. Literally means "a form". There are 114 Surahs in the Holy Quran.

**Taqwa**

Fearing Allah as He should be feared. A major sign of being a faithful Muslim.

**Glossary of Arabic terms:****Tawhid**

Oneness of God. The Divine Unity. Allah is One in His Essence and His Attributes and His Acts. The centermost concept of Islam.

**Ummah**

Ummah, community, or nation, is a special name given to Muslim brotherhood and unity. The Qur'an refers to Muslims as the best Ummah raised for the benefit of all mankind.

**Wudu**

Wudu refers to the ablution made before performing the prescribed Prayers. it requires washing (1) the face from the top of the forehead to the chin and as far as each ear; (2) the hands and arms up to the elbow; (3) wiping with wet hands a part of the head; and (4) washing the feet to the ankle.

**Zakah**

Zakah (Purifying Alms) literally means purification, whence it is used to express a portion of property bestowed in alms, as a means of purifying the person concerned and the remainder of his property. It is among the five pillars of Islam and refers to the mandatory amount that a Muslim must pay out of his property. The detailed rules of zakah have been laid down in books of Fiqh.

## South African precedents, essences of sacred space: African Zionist church > Homestead park

Many of the essences documented are evident in this church space:  
(all images; authors own; 26/03/09)



Raised floor: Raising the floor from the profane space creates the sense that the space is different and other.



The circular plan: The circle is symbolic of unity.



## African Zionist church > Homestead park

(Left) Materials: The use of locally found stone gives the space a natural feel and belonging.



(Above) Amongst nature: The space is constructed in a clearing, nature has not been affected. The musical whistling of the grass and birds chirping between the rustling leaves of the trees can be heard. The sound and smell of water nearby creates an ambience of peace and meditation.



African Zionist church > Homestead park

The sound of water adds to the tranquility felt at the site.



The space is found between tall eucalyptus trees showing that nature takes precedent as compared to monumental religious architecture.



## African Zionist church > Homestead park

Thresholds: The space sits at the bottom of a valley floor; white stone markers mark the entry to the raised sacred ground.





**African Zionist church > Homestead park**

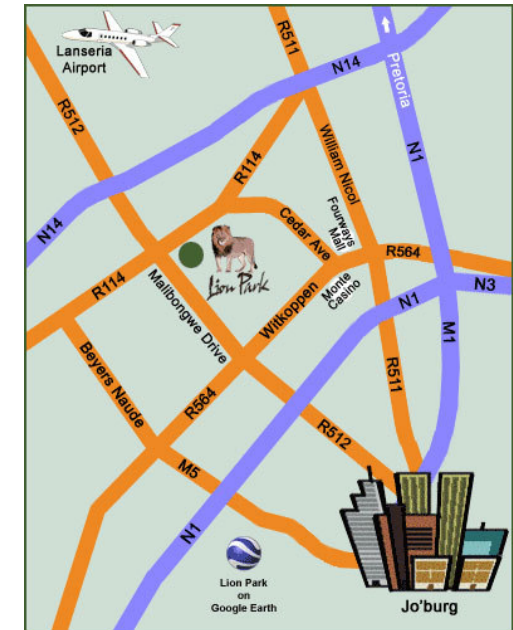
Light: the tall eucalyptus trees act as the roof of the space, dappled light falling onto the sacred ground.





## Lion park prayer space, >Honeydew, Gauteng

The essences of Mosque architecture are evident in this prayer space (jamat-e-khana), constructed by the owners for Muslim visitors.



Location map of the lion park  
(cited 12/03/09; [www.lion-park.com](http://www.lion-park.com))



Approach to the prayer area is from the south east; the exterior has no identifying elements or ornamentation. The essences /basics of a mosque are all one finds in this space.



### Lion park prayer space, >Honeydew, Gauteng

This space shows the inherent adaptability of Islamic architecture, the sacred floor is oriented to Mecca (Kaaba) and the floor is clean. These are the basics of a Muslims prayer space.

Cleanliness is half of a Muslim's faith, the image below left shows the area dedicated to the ritual ablution done before prayer.

No mihrab (niche) or mimbar (pulpit) is found in the interior, only a green carpet laid in the direction of Mecca. The translucent fabric separating interior from the exterior functions much like the (jali) screens used in Islamic architecture.



(all images; authors own;21/03/09)





### Lion park prayer space, >Honeydew, Gauteng

Attention is drawn to the floor, the concrete floor is raised off the ground giving it prominence it is also set back from the structure showing its independence of it. The sacred element is clearly the floor whilst the pillars and roof are merely secondary elements giving protection from the elements.



Raised floor offset from structure



Separate male and female entrances echo the Islamic principle of modesty.



**Frank Lloyd Wright, Unitarian Meeting House,  
Shorewood Hills (Madison):**

Wright was never an advocate of revivalism nor was he ever known to condone eclecticism in any form whatsoever. Revivalism seeks to lie about the true conditions and simplistic nostalgic references can never be seriously taken as an important rationale to produce works of socio-political importance. Thus Wright rejected the use of typological church models in his designs of both the Unity Temple and the Unitarian Church. He believed that religion is a progressive and not a dogmatic practice.

Wright glorified nature in the sense of learning from it, humbling his architecture to it and constantly reminding people of nature's presence in his use of natural materials and his organizational planning of buildings. Though he was a Christian he preferred Unitarian principles which come close to Islam's tauhidic (oneness of God) approach towards creation of space. There are many design principles Wright has used that this thesis can use in designing its sacred space -community centre.

The scale of the building:

The Unitarian Church is lower than the trees that surround it making a clear statement as to which is more important; man's creation or God's?



## Frank Lloyd Wright, Unitarian Meeting House, Shorewood Hills (Madison):

### Use of materials:

Wright preferred to use natural materials such as stone and timber. Wright would never think of applying a coat of plaster or even of painting the timber components as he wishes their texture to be detected by all. The use of natural materials has the power to remind man of his primeval origins. Stone and timber were here long before man set foot in this world. This connection to the primitive past helps to bring man down from the high pedestal which he has created for himself in the modern world. With all his modern gadgetry, man has forgotten that he is a mere 'keeper of the world' for God until a particular time. The use of natural materials can also help man discharge his duty as the vicegerent of God as they are sustainable materials. The materials do not need any maintenance and projects an eternal quality that brings great maturity to its aging process. If man were surrounded by plastered concrete walls and metal curtain partitions he would be surrounding his own 'greatness' and not the greatness of the Creator.



Materials  
(cited 22/07/09 [www.delmars.com/wright](http://www.delmars.com/wright))





**Frank Lloyd Wright, Unitarian Meeting House,  
Shorewood Hills (Madison):**

**Strong horizontal expression:**

In many writings, Wright has referred this horizontality to the horizon line of the open prairie. This horizon line is again another primeval reminder and it also acts as 'weight' to tie the building down to the ground thus creating a secure sense of shelter. Many mosques are designed standing vertically upright without a sense of humility. The church in question as well as most of Wright's buildings has a quality of humility that we do not find in many so-called 'Islamic' works. The non-existence of the idea of humility in Islam is an irony to the meaning of its word as 'submission to the will of Allah(god)'.



Horizontal expression  
(cited 23/07/09, www.greatbuildings.com)



## Frank Lloyd Wright, Unitarian Meeting House, Shorewood Hills (Madison):

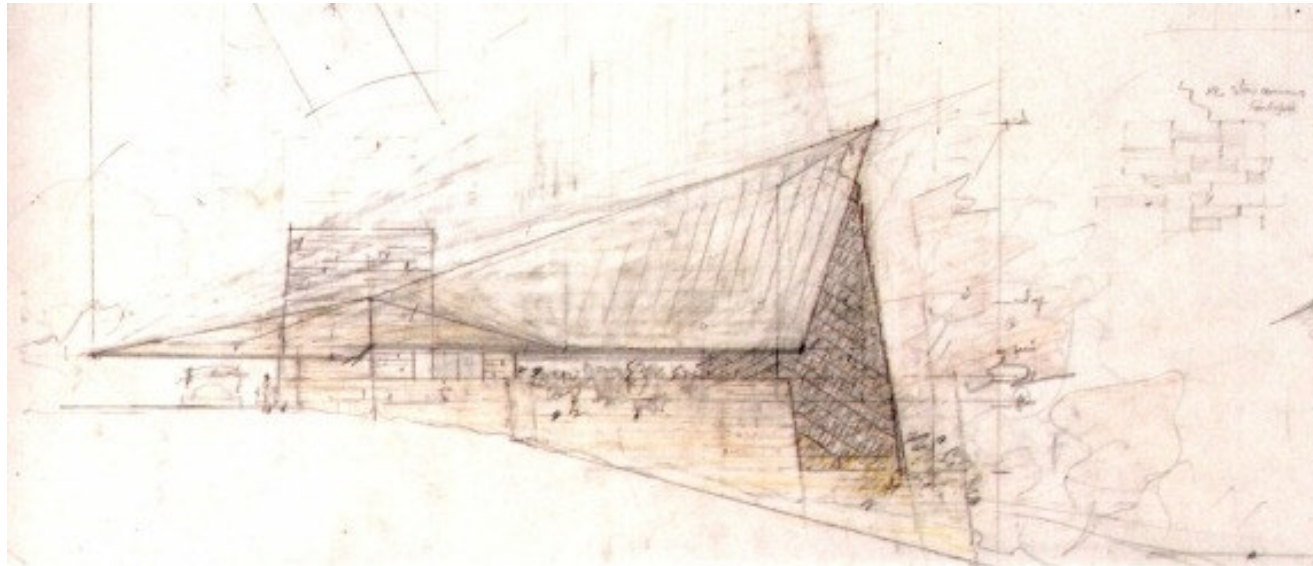
### Sustainability:

Wright is most concerned about sustainable architecture which can be seen in his preference for natural materials and his energy conservation strategies. Islam encourages actions of conserving resources and abhors wasteful acts of any kind.

### Ornament:

In the Unity Temple, Wright displays his powers of integrating ornament into the building's exterior characteristics and he had also rendered the interior ornamentation within the cubist perspective as part of the ceiling moldings, fixtures and wall paneling. Wright never advocated direct revivalism or imitation of traditional ornaments but chooses to select his own motifs and composition of ornamentation.

We can, therefore, see that Wright has many principles that are directly relevant to the design of mosques not as a monumental and glorified symbol but as a product that disintegrates into the landscape whilst emphasizing the lessons of nature as the main theme of reminding the Muslim of its humility and humble origins.



Ornament  
(cited 23/07/09, [www.bc.eduslashbc.underscore.org](http://www.bc.eduslashbc.underscore.org))

## Frank Lloyd Wright, Martin house

### Organization of spaces:

Lessons can be learnt from the organization of spaces. Instead of concentrating all the spaces into a single mass, Wright had separated it into three volumes interconnected by passageways. What he has ingeniously done is encouraged the dwellers to view the plants and trees littered throughout the gardens in the small courtyards created while moving to the different parts of the house.

The mosque can benefit from such a strategy; it would not only encourage the reminder of God but also sooth the spirit and cool the building by solar absorption.



Organization of spaces  
(cited 23/07/09, [www.greatbuildings.com](http://www.greatbuildings.com))



Organization of spaces  
(cited 23/07/09, [www.buildings.ca](http://www.buildings.ca))

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## Site selection:

From the onset ,the design was to be a mosque , with the research completed this transformed to become a community development centre mosque. The site had to meet the criteria as stated under the section “the architectural expression of the mosque”.

Below is a list of the criteria I used to appraise potential sites to ascertain which one to choose :

### CRITERIA:

1. The site must be located close to a main road and have a close relationship to predominant modes of transportation.
2. The site needs to be in an area where people work and live (creating that sense of community (Ummah))
3. The site needs to require spaces that could be described as sacred , places with water, trees, views and Shade(nature).
4. There needs to be a potential economic/social benefit from the construction process and the end product.
5. It needs to offer the opportunity to design a Mosque that is not of a revivalist or eclectic style.
6. There needs to be a number of Muslims already in the area in dire need of integration.
7. It needs to be centrally located in its community so that its target community is within 5 minute walking distance at maximum

## Site selection:

Using the criteria as a guide ,three potential sites were found.

Potential sites :

1. Houghton Johannesburg
2. Brixton Johannesburg
3. Hurst hill Johannesburg

Through a process of elimination the site was chosen in Hurst hill Johannesburg ,west of the Johannesburg CBD .

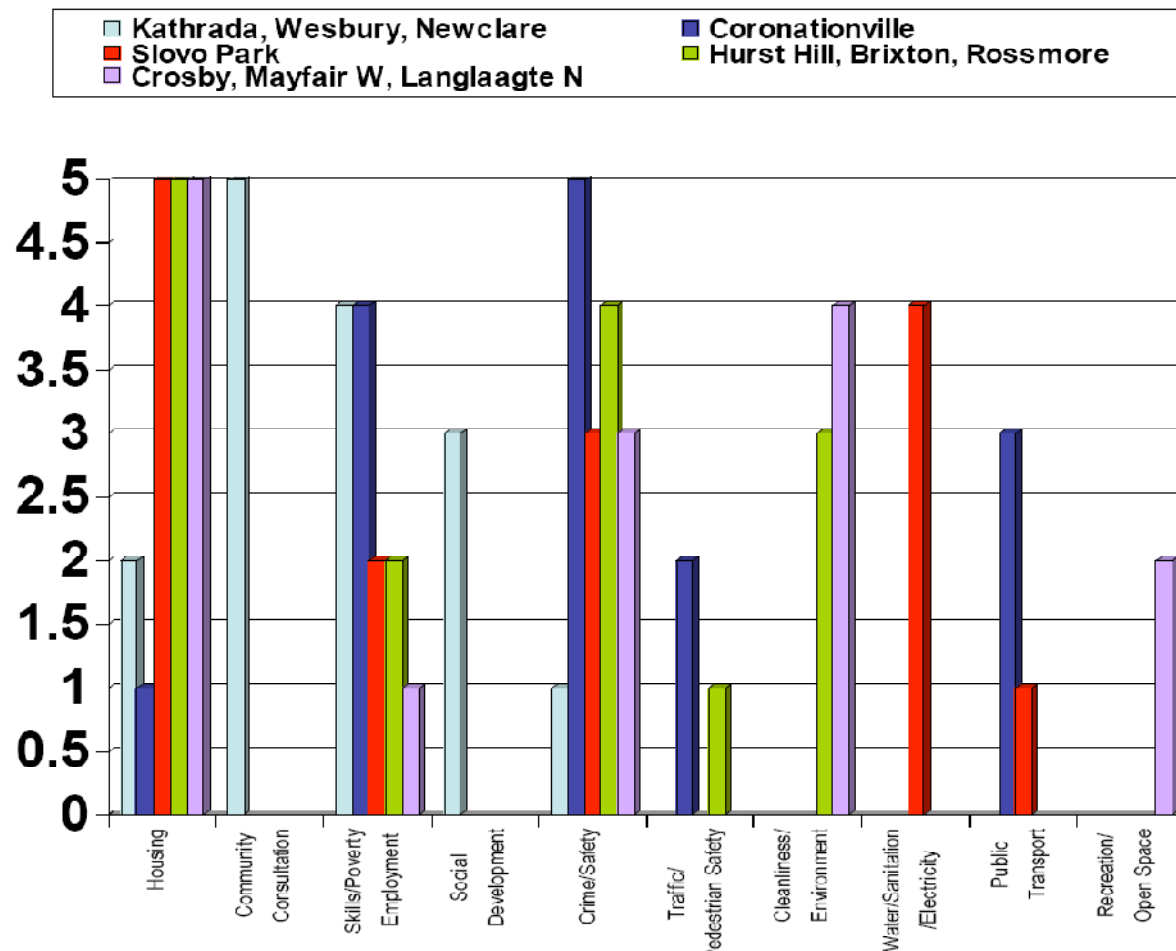




## Community needs:

As stated earlier the needs of the community is integral to the program the design will house , so to ascertain the needs of the community the following was done.

Firstly having stayed in the area of Crosby I spoke to many friends there and recalled my own reservations. I also interviewed people in Westbury and Coronationville. Secondary to that I researched and looked at the RSDF (regional spatial development framework) for region B section 5. This table is extracted from the RSDF. Crosby, Coronationville and Hurst hill fall in this region:



Housing, environment cleanliness, lack of recreation/open space and crime are the top four issues facing these communities. The program of the community development mosque has to thus factored these needs in with the end goal of providing for a safer ,cleaner more connected community .

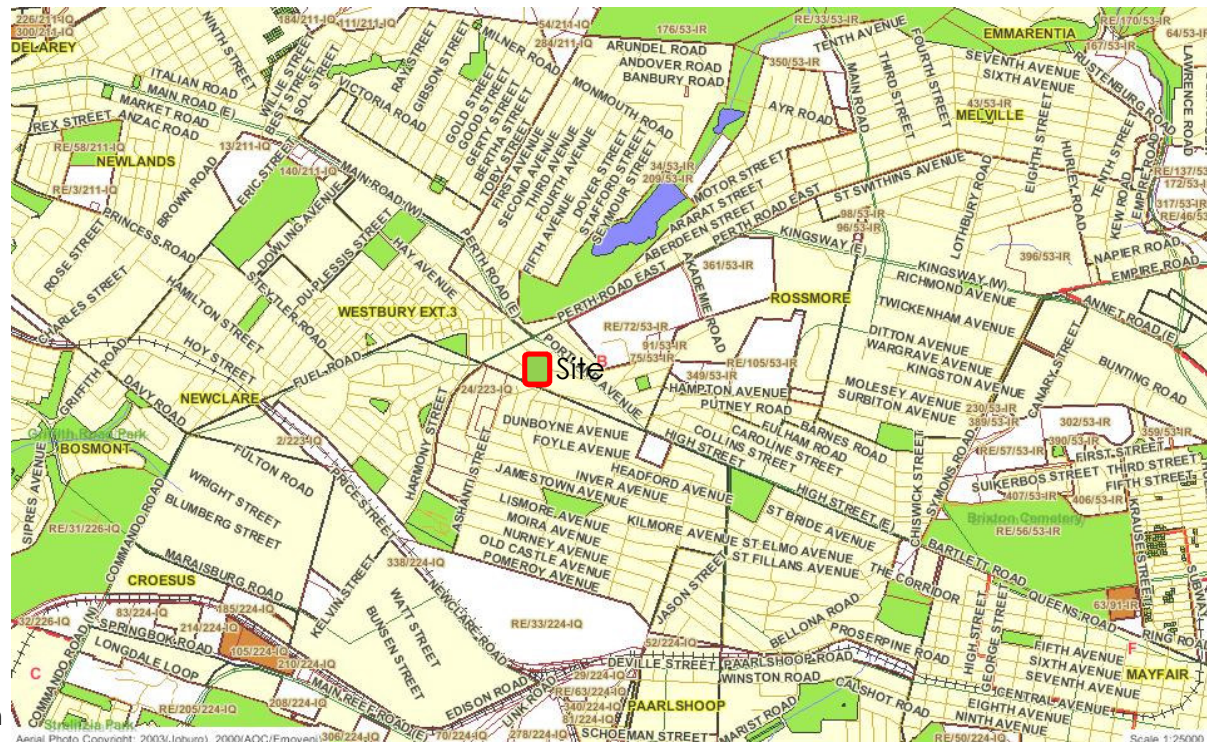
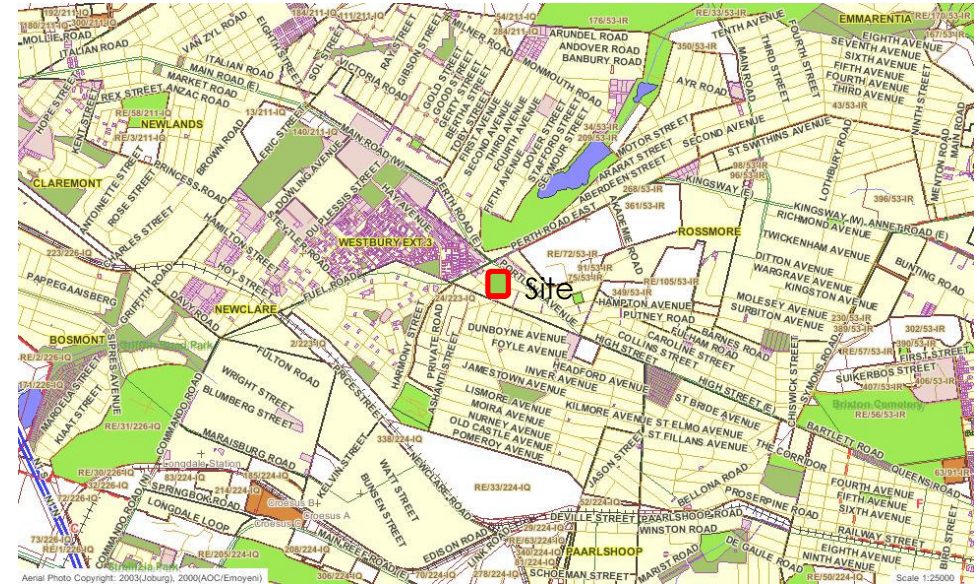
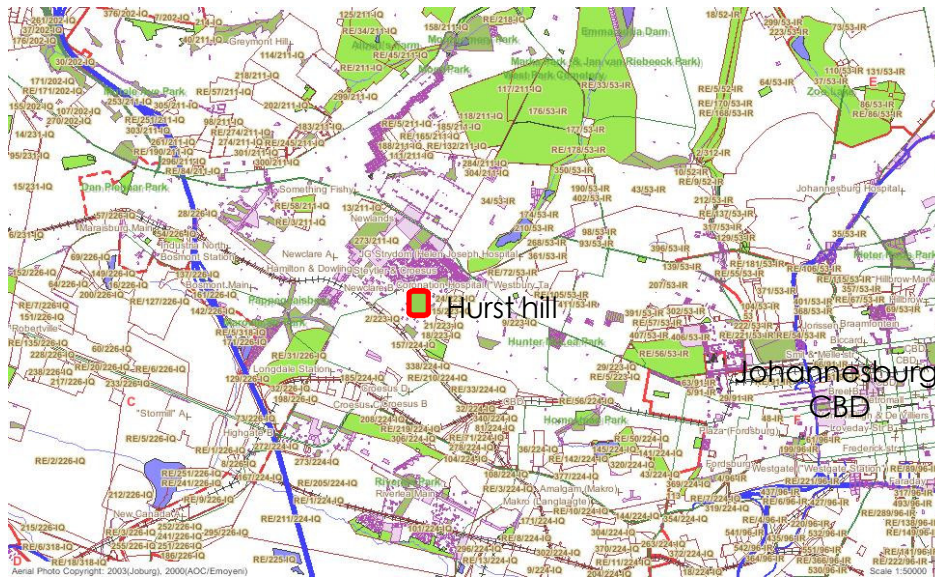
**Program:**

An active program is promoted, with a balance between community facilities and the sacred.

|                                     |                |
|-------------------------------------|----------------|
| Ablutions                           | 35bays =50sq/m |
| Toilets/showers(x3)                 | 80m/sq         |
| Kitchen(x2)                         | 40sq/m         |
| Seminar /counseling rooms (x2)      | 108m/sq        |
| Library(1)                          | 180m/sq        |
| Madresa (4 classrooms)              | 100m/sq        |
| Care taker and muezzin quarters(2)  | 150m/sq        |
| Guest unit                          | 50m/sq         |
| Landscaping/sidewalk                | 450m/sq        |
| Multi use hall /Auditorium(1)       | 200m/sq        |
| Computer room(1)                    | 90m/sq         |
| Kids game room(1)                   | 120m/sq        |
| Administration                      | 120m/sq        |
| Retail space/informal market        | 160m/sq        |
| Prayer space male(250 worshippers)  | 200m/sq        |
| Prayer space female(50 worshippers) | 40m/sq         |
| Parking (1:6worshippers)            | 50 bays+20 =70 |



## Site (Mapping):



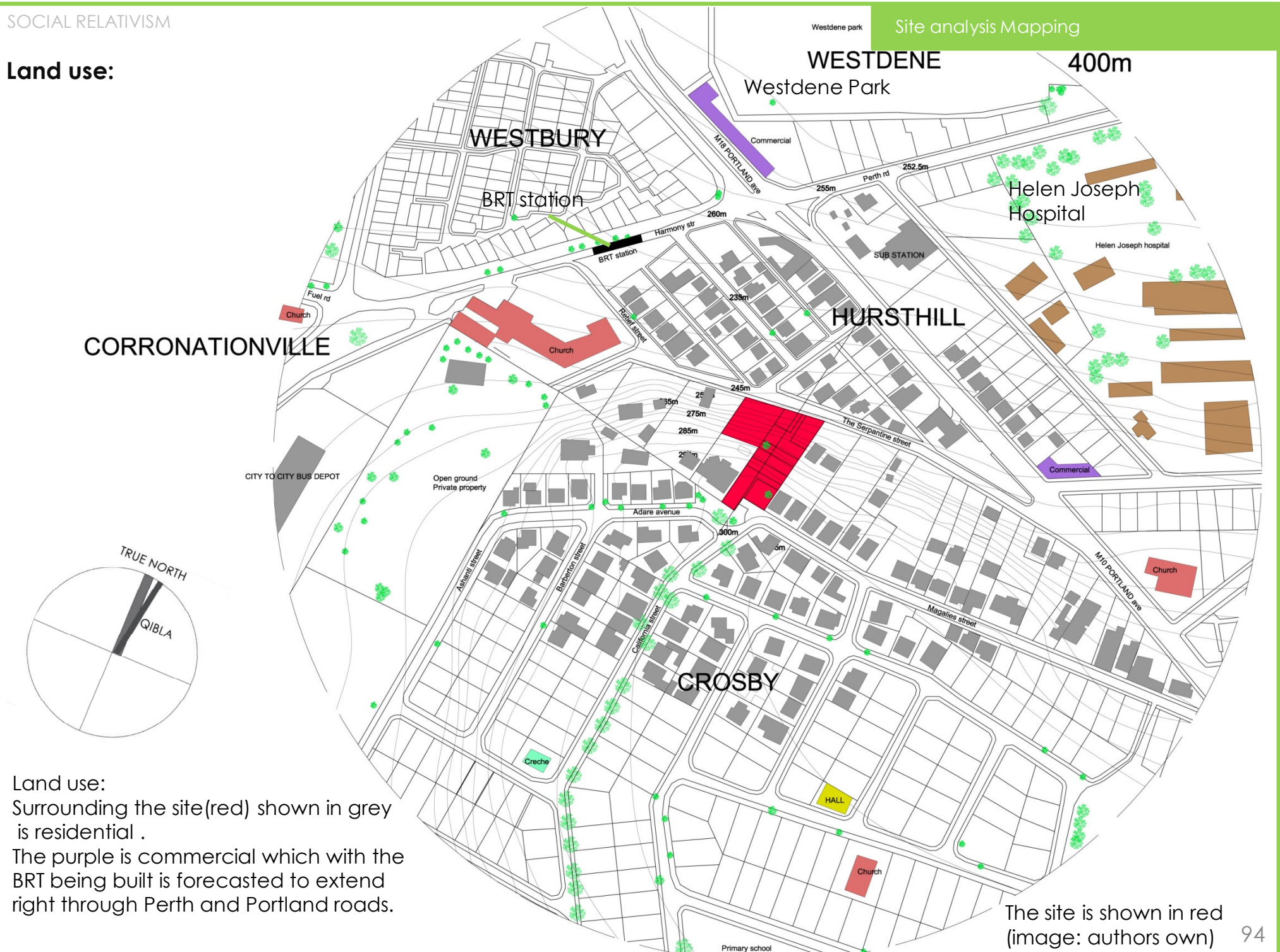




Roads: Perth and Portland are the main arterials, Perth an important north south link and Portland an east west link. The Serpentine and Magalies rd which becomes California street are secondary roads linking to Portland rd. The other roads in green are quieter residential roads.



## Land use:





# Main arterials

## Site analysis Mapping





# Primary schools:

## Site analysis Mapping



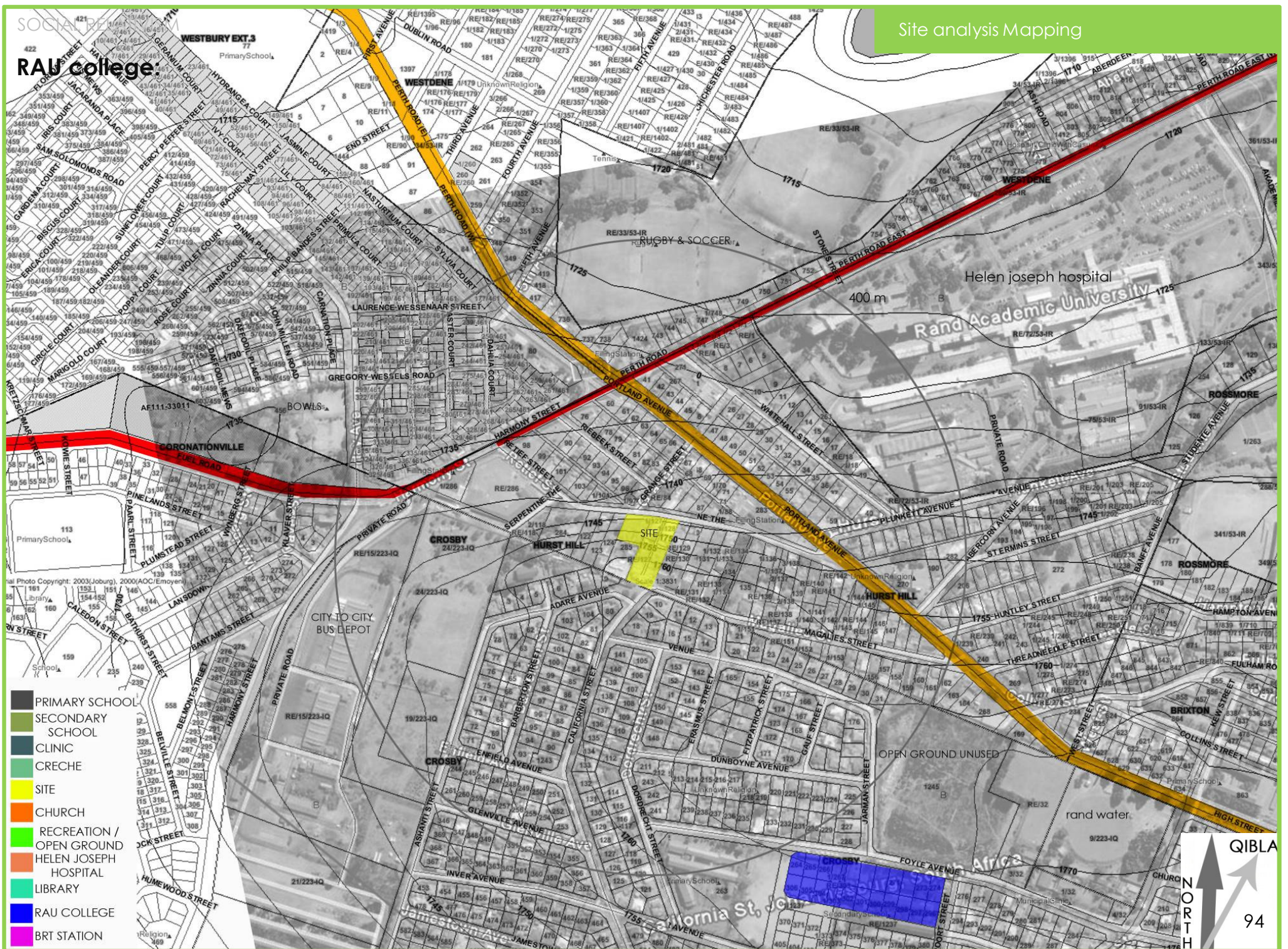






# RAU college

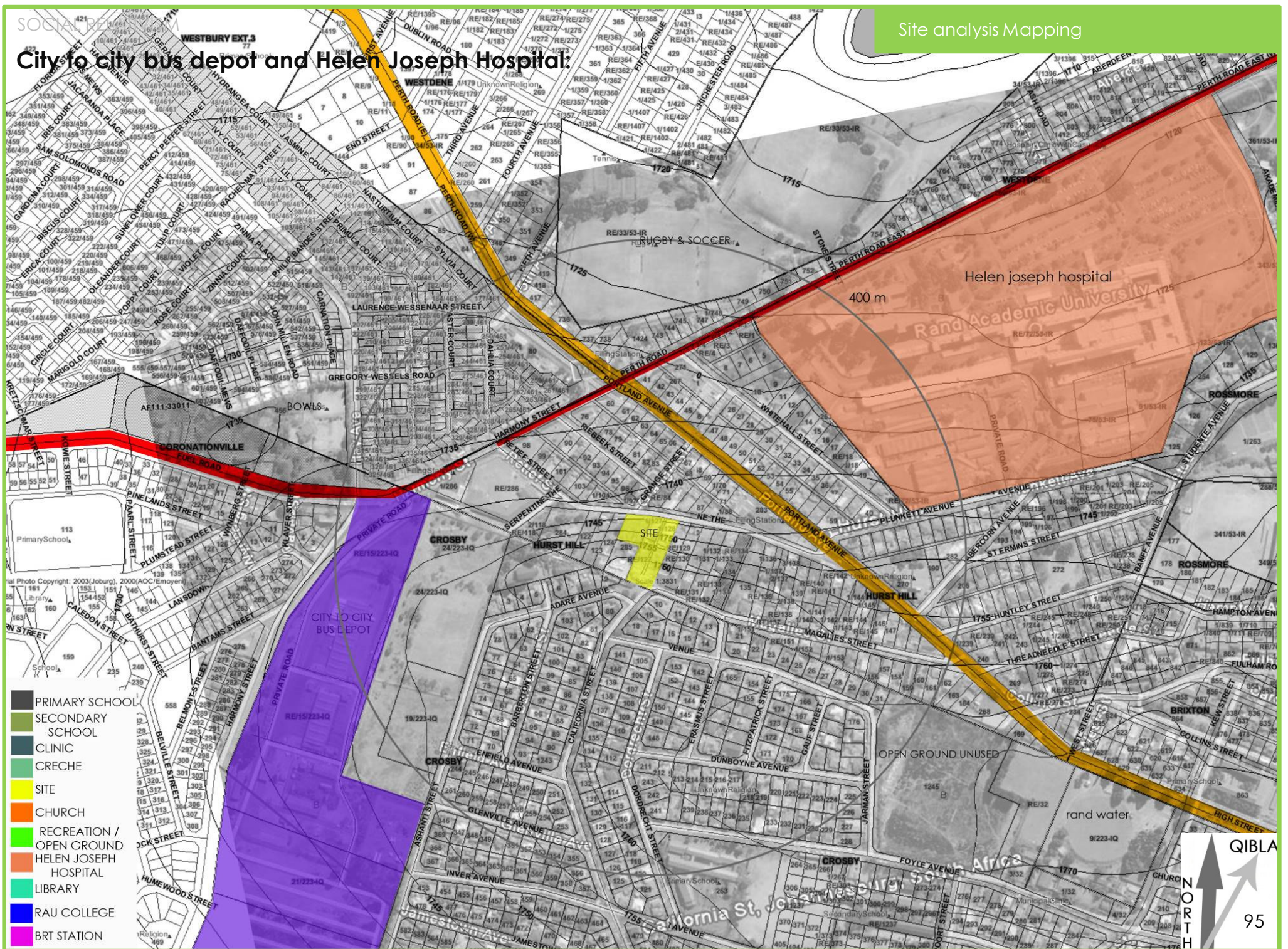
## Site analysis Mapping





# City to city bus depot and Helen Joseph Hospital:

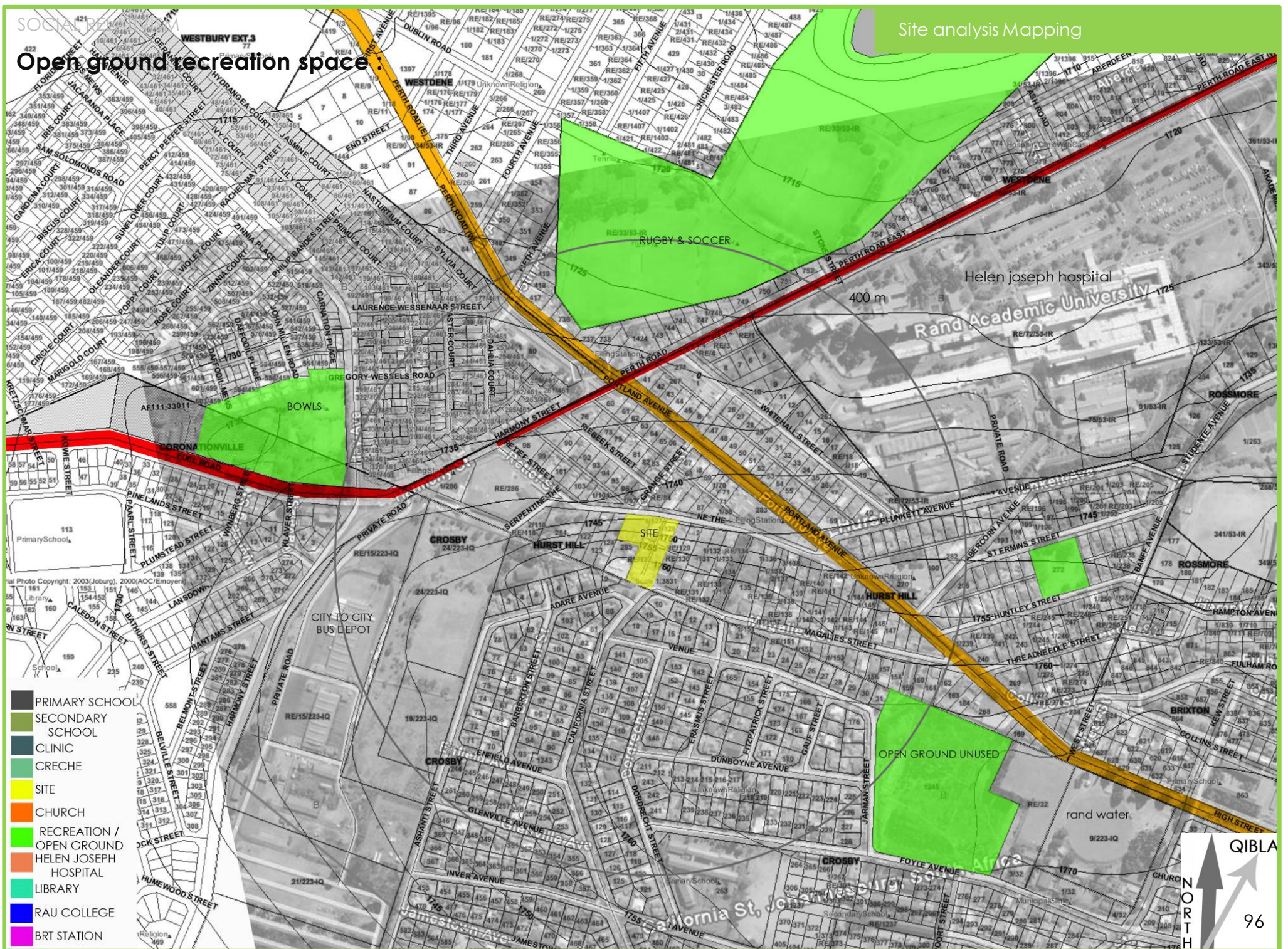
Site analysis Mapping





# Open ground recreation space

Site analysis Mapping

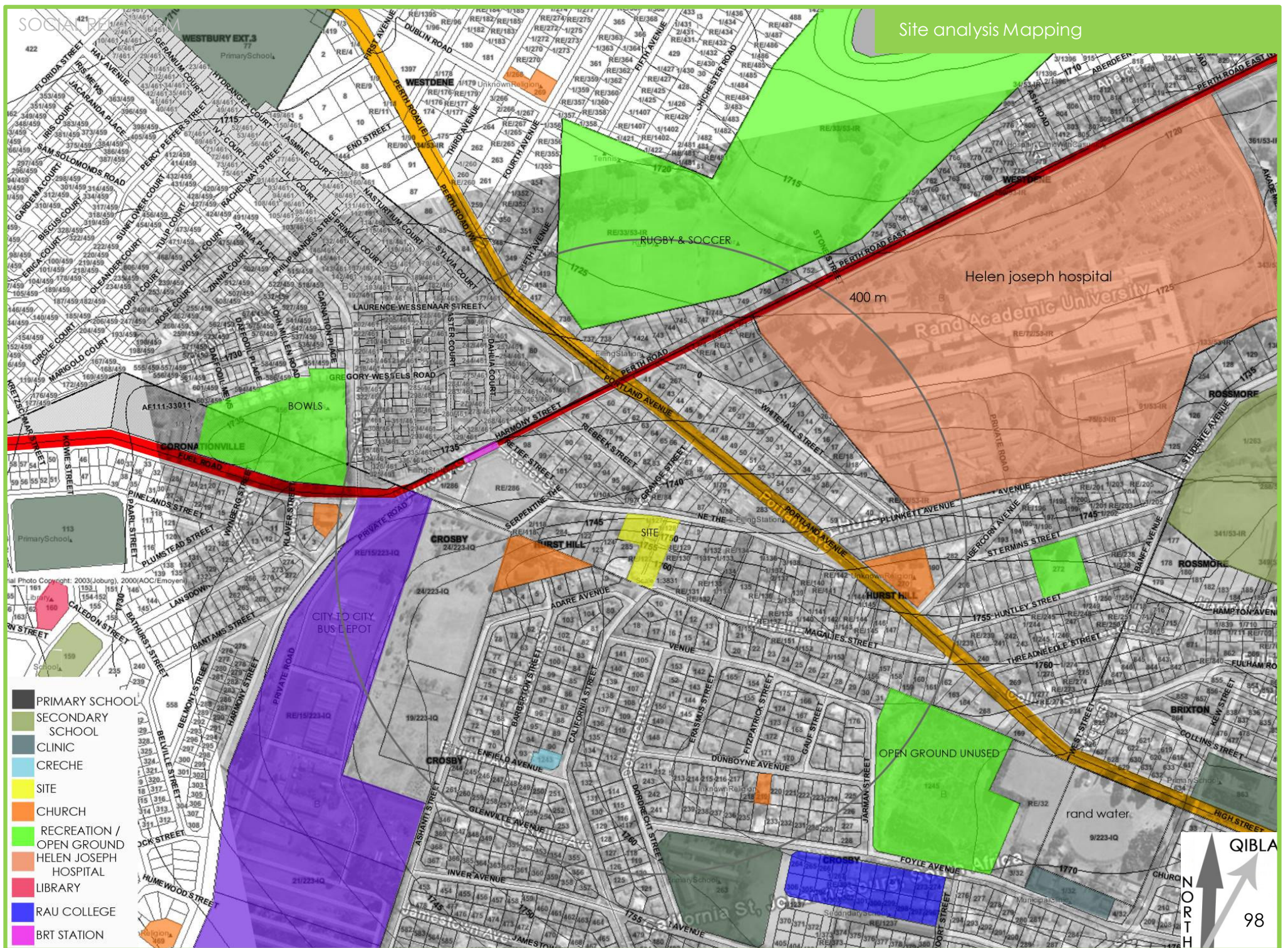








# Site analysis Mapping

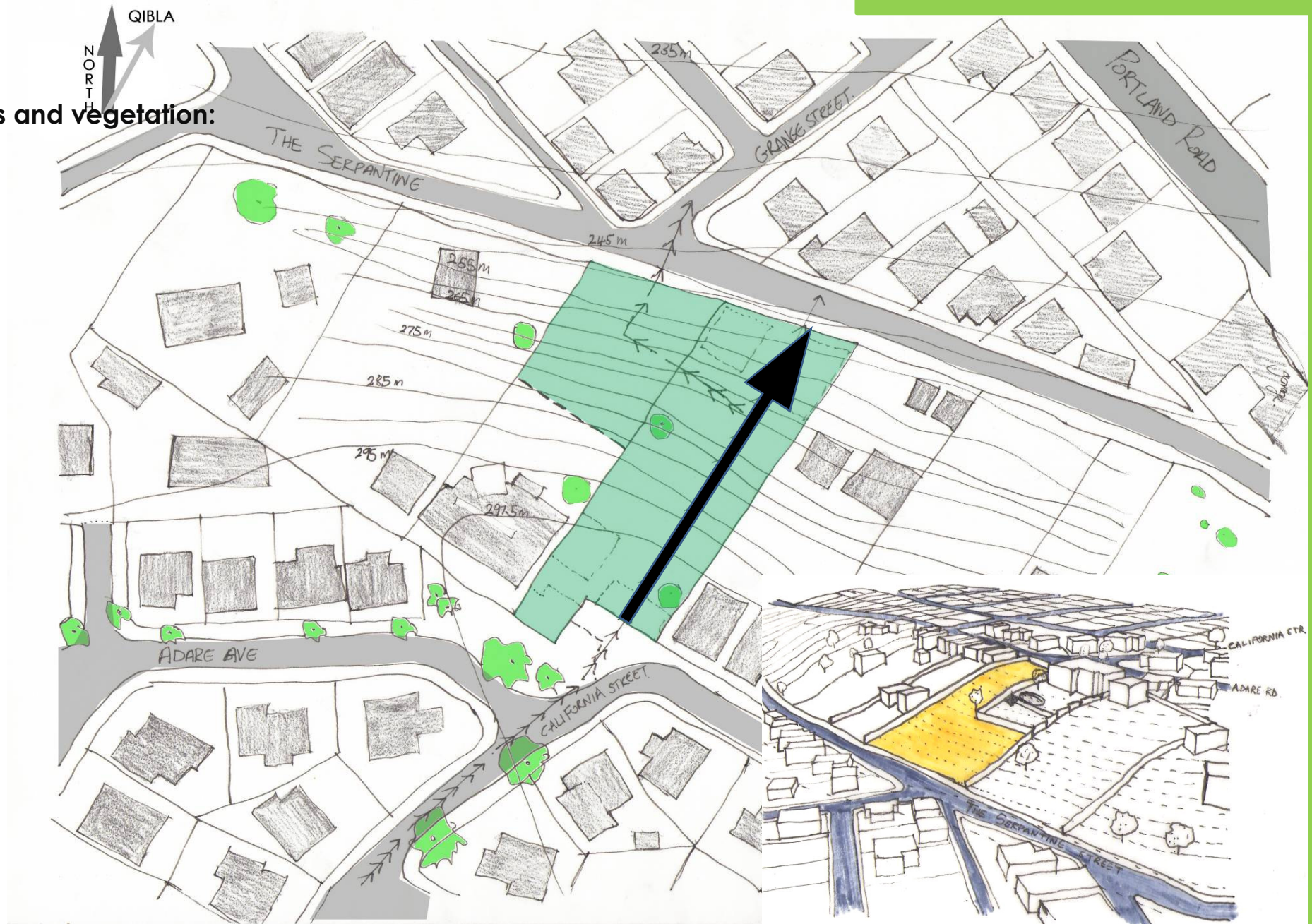








Contours and vegetation:



The site topography is a steep 25 meter drop over 96metres sloping from south to north (shown by the arrow) .The geology is granite/gneiss and is situated in a grassland biome thus is covered by grass in most parts.



**Contours and vegetation:**

California Street's sidewalks are planted with jacaranda trees all the way up creating a beautiful ambiance when moving toward the site.



## Pictures:



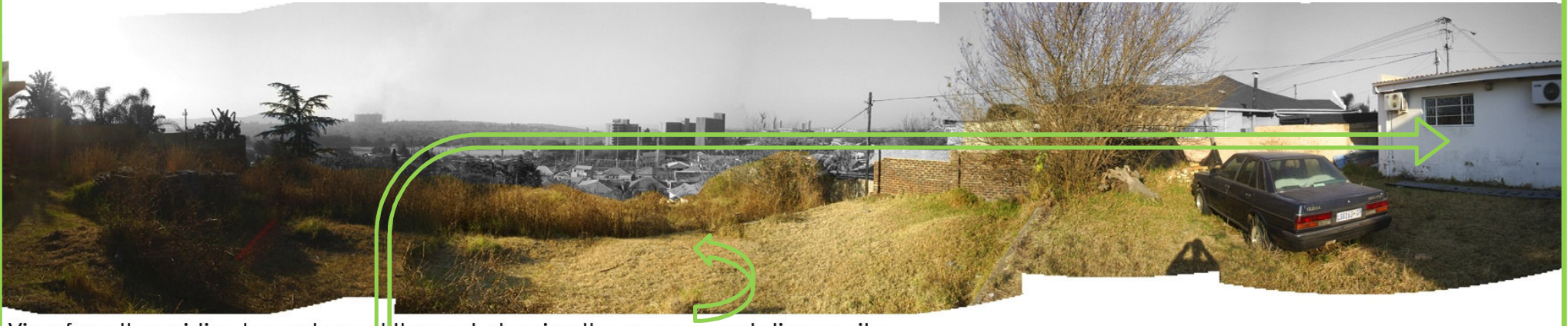
View from the south showing the existing parking and existing house used as Madresa (school). The beige gate gains one access to the existing mosque



Panoramic view showing California street on the left and Adare street on the right

California street is planted with jacaranda trees



**Pictures:**

View from the existing house toward the east ,showing the sparse vegetation on site

The site is being used as a mosque ,the existing ablution space and toilets are extremely bleak.



All images: authors own



**Pictures:**

The view from the highest point looks to the north with Helen Joseph and the Westdene park as focal points



View from the Serpentine road up to California street



View looking west toward the existing house, used as a Madresa and place for visitors to sleep



# Climate analysis

## Sun study:



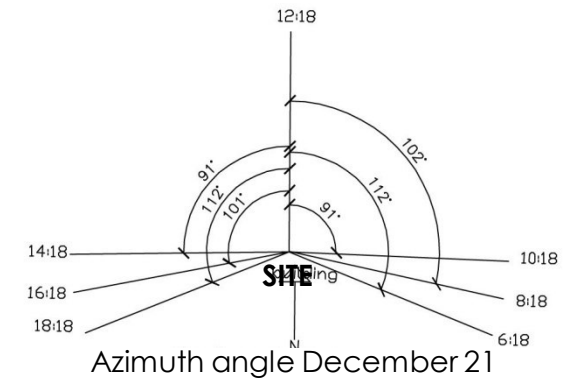
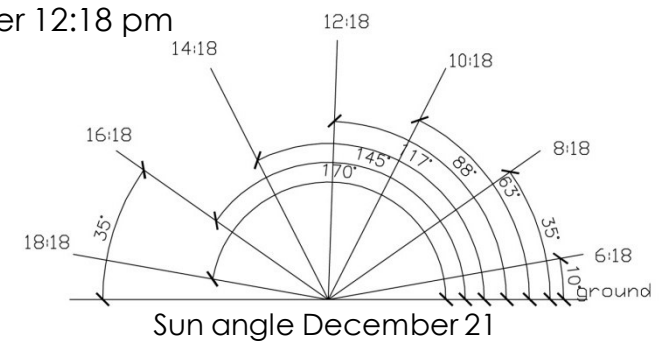
21 December 8:18 am



21 December 12:18 pm



21 December 4:18 pm

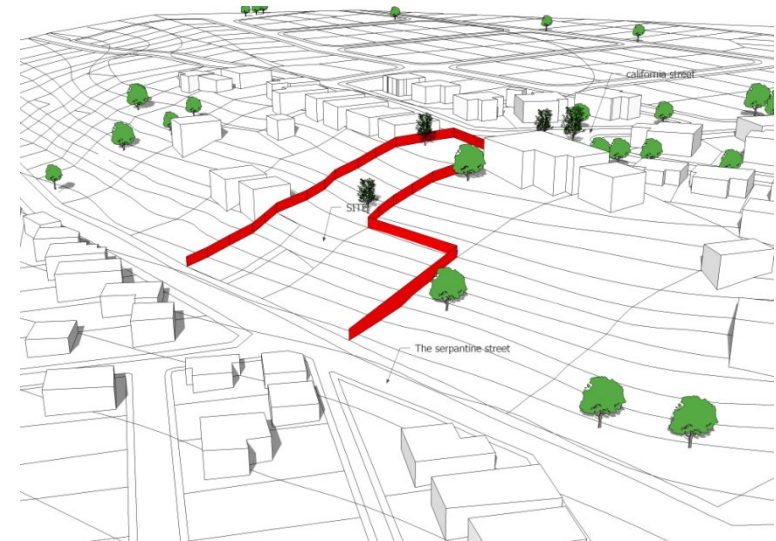




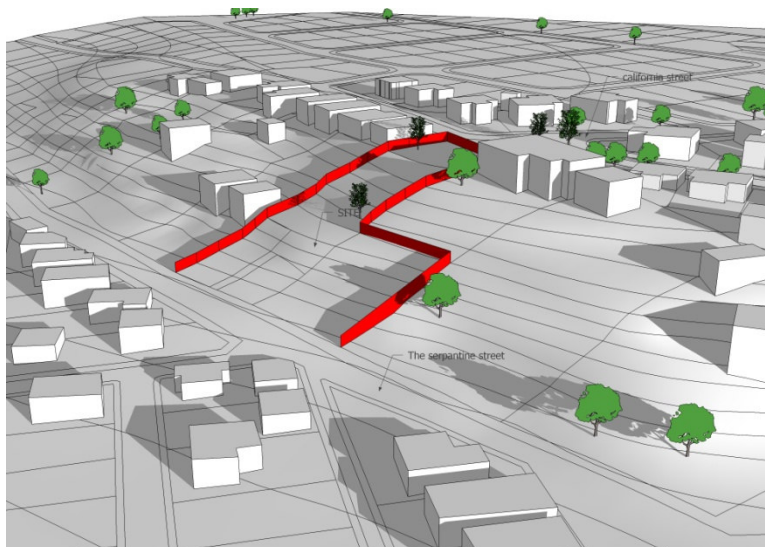
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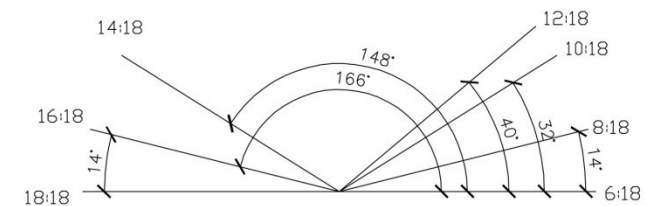


21 June 12:18 pm

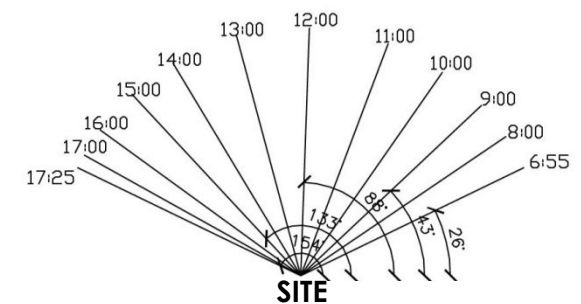


21 June 4:18 pm

21 JUNE

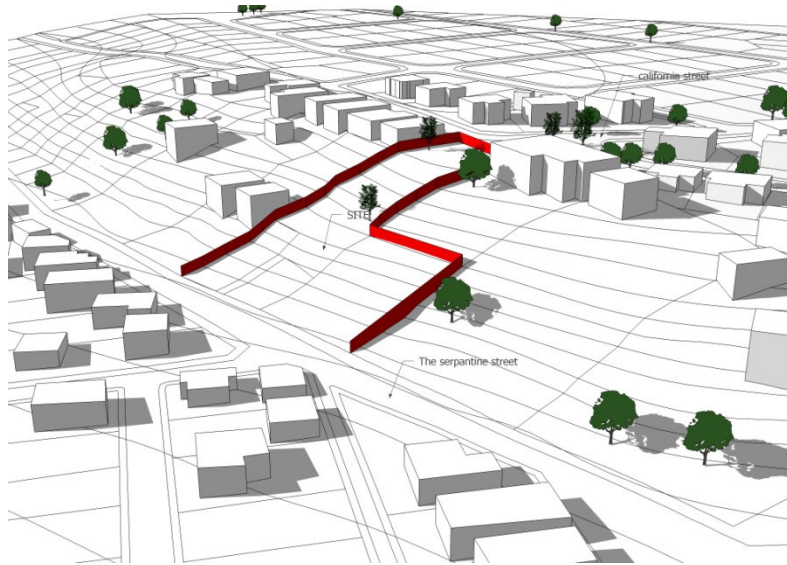


Sun angle June 21



Azimuth angle June 21

# Sun Study:



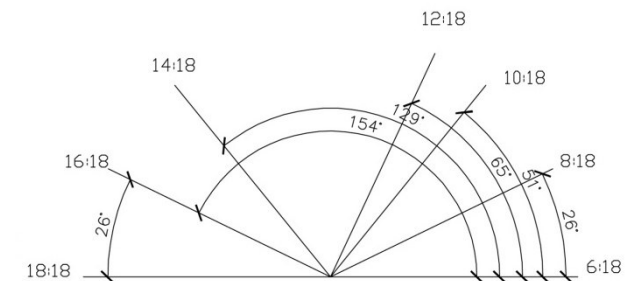
21 March/September 8:18 am



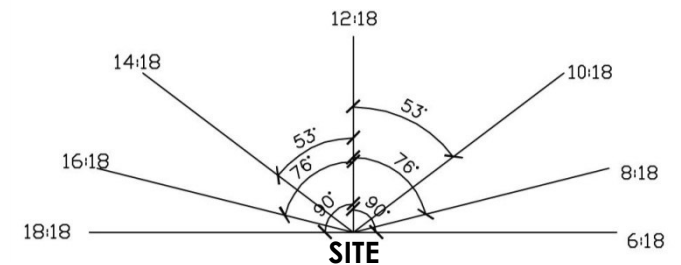
21 March/September 4:18 pm



21 March/September 12:18 pm

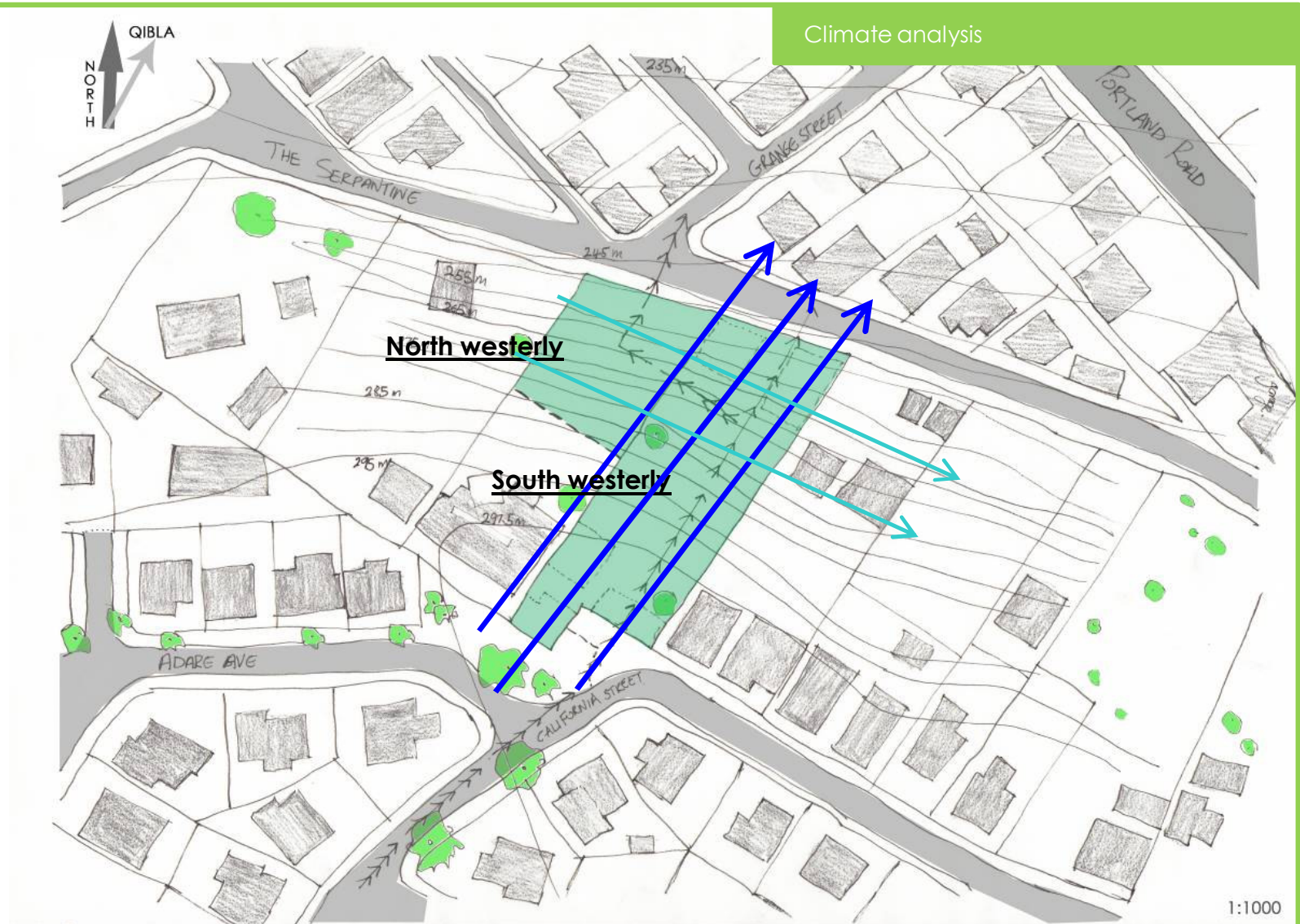


Sun angle March/September 21



Azimuth angle March/September 21



**Wind movement:****Average Prevailing Winds**

Period: (February, March & April)

Wind Description: Light South-westerly

Wind AM  $\pm 2.5\text{m/s}$  /  $0.277 = 9.0\text{km/h}$

Wind PM  $\pm 3.6\text{m/s}$

Period: (May, June & July)

Wind Description: Moderate South-westerly

Wind AM  $\pm 3.0\text{m/s}$  /  $10.80\text{km/h}$

Wind PM  $\pm 4.1\text{m/s}$

Period: (August, September & October)

Wind Description: light South-westerly

Wind AM  $\pm 2.2\text{m/s}$  /  $7.94\text{km/h}$

Wind PM  $\pm 2.7\text{m/s}$

Period: (November, December & January)

Wind Description: Light North-westerly

Wind AM  $\pm 2.2\text{m/s}$  /  $7.94\text{km/h}$

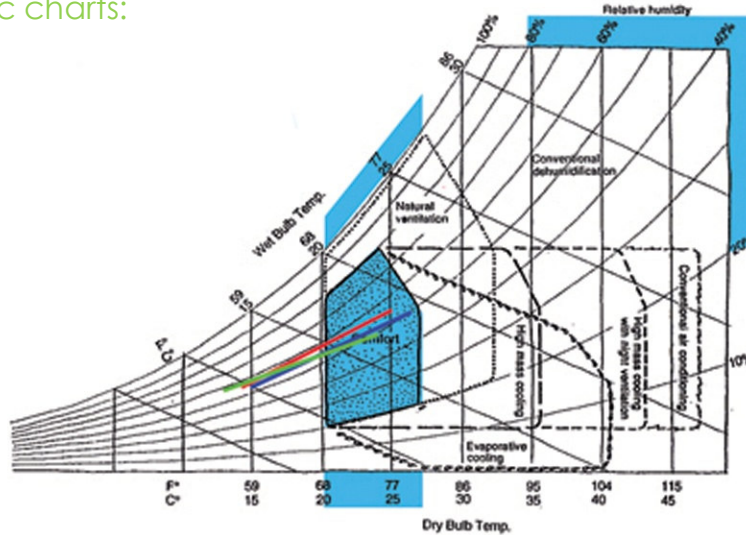
Wind PM  $\pm 2.7\text{m/s}$

1:1000

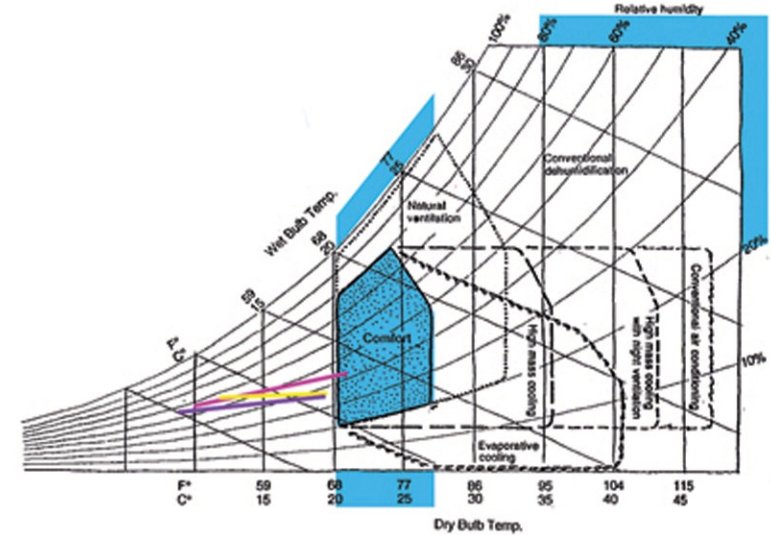
## Thermal comfort

Psychrometric charts:

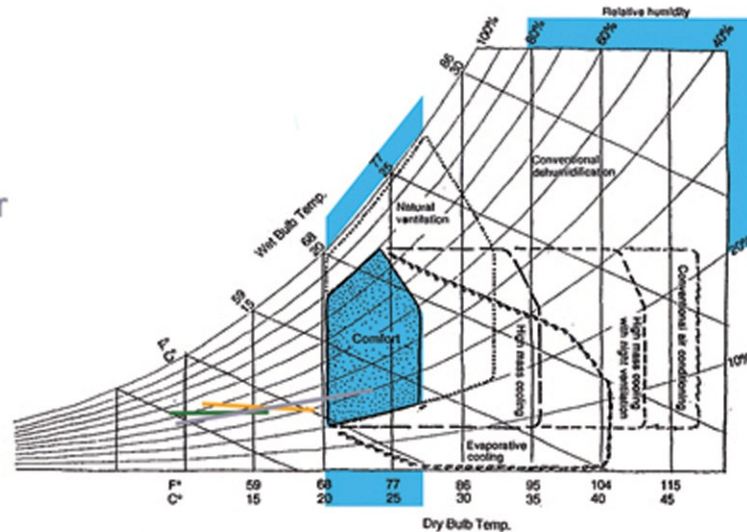
january  
february  
march



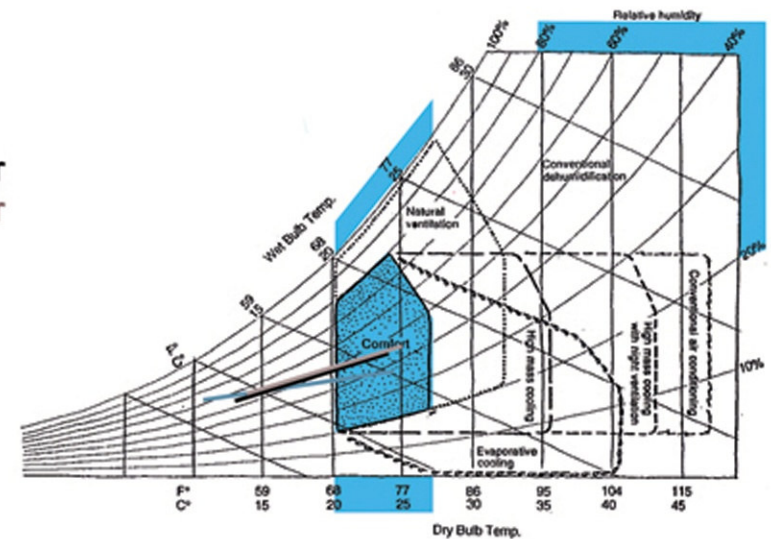
april  
may  
june



july  
august  
september



october  
november  
december



Thermal comfort lies between 20 and 26.5 degrees Celsius with a humidity of between 20% and 80%. The average highest and lowest temperatures for the month have been plotted on the relevant charts, what can be noted is that heating is necessary in the mornings during summer, winter however requires heating throughout the day to achieve thermal comfort.



**Solar radiation:**

Photovoltaic PV potential:

**SOLAR RADIATION PER SQUARE METRE IN JOHANNESBURG:**

Ave number of thunderstorm days per year =70

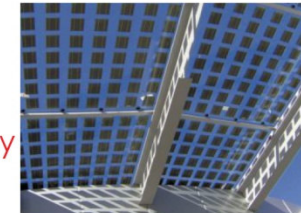
Ave. Daily Sunshine in Hours/month

|                                 |       |
|---------------------------------|-------|
| JANUARY                         | 13.5h |
| FEBRUARY                        | 12.2h |
| MARCH                           | 12.3h |
| APRIL                           | 11.9h |
| MAY                             | 11.1h |
| JUNE                            | 10.5h |
| JULY                            | 10.6h |
| AUGUST                          | 11.0h |
| SEPTEMBER                       | 12.0h |
| OCTOBER                         | 12.4h |
| NOVEMBER                        | 13.4h |
| DECEMBER                        | 13.9h |
| Average/year=154.8/12=12.9hours |       |



ERTEX Solar Glass

JAN:3,250kWh/day  
 FEB:2,912kWh/day  
 MARCH:2,930kWh/day  
 APRIL:2,834kWh/day  
 MAY:2,626kWh/day  
 JUNE:2,496kWh/day  
 JULY:2,496kWh/day  
 AUGUST:2,600kWh/day  
 SEPTEMBER:2,86kWh/day  
 OCTOBER:2,964kWh/day  
 NOVEMBER:3,224kWh/day  
 DECEMBER:3,354kWh/day



Ertex solar glass  
 module:2683x1748(+/-4 M SQ)

Power: 260watts/h/sq m

With an average size PV panel (260watts/hour) of 4sq.m an average total of approximately 78KWh can be produced in a month. Enough to power a 100w light bulb for 780hours

**Rainwater harvesting potential:**

Standard South African Weather Service rain gauge consists of an open cylinder with sharp rim having a diameter of 127 mm.

Thus to get the rainwater harvesting area per square meter multiply the rainfall in millimetres by 78.9391 (the number of 128dia circles to equate to 1 sq m)

Rainwater harvesting  
potential  
Hursthill Johannesburg

| Year                                          | Jan   | Feb   | Mar   | April | May  | June | July | Aug  | Sept  | Oct   | Nov   | Dec   | Year   | Season |
|-----------------------------------------------|-------|-------|-------|-------|------|------|------|------|-------|-------|-------|-------|--------|--------|
| 1983                                          |       |       |       |       |      | 0.0  | 9.0  | 7.0  | 18.5  | 73.3  | 133.5 | 206.5 |        |        |
| 1984                                          | 80.5  | 33.0  | 72.9  | 4.5   | 0.0  | 2.5  | 13.0 | 0.5  | 13.5  | 87.9  | 78.0  | 91.0  | 477.3  | 641.2  |
| 1985                                          | 108.5 | 81.5  | 74.6  | 3.5   | 10.5 | 0.0  | 7.5  | 0.0  | 49.5  | 98.5  | 134.0 | 116.5 | 684.6  | 562.5  |
| 1986                                          | 84.3  | 71.2  | 54.2  | 38.2  | 0.0  | 0.0  | 0.0  | 11.0 | 1.5   | 110.8 | 161.1 | 144.0 | 676.3  | 653.9  |
| 1987                                          | 131.2 | 67.1  | 152.5 | 5.0   | 0.0  | 0.0  | 0.0  | 12.0 | 124.0 | 59.1  | 192.7 | 99.2  | 842.8  | 784.2  |
| 1988                                          | 90.0  | 60.4  | 144.3 | 36.0  | 2.1  | 12.3 | 3.0  | 0.8  | 49.1  | 70.1  | 68.4  | 84.7  | 621.2  | 832.1  |
| 1989                                          | 64.4  | 225.0 | 32.7  | 40.5  | 15.5 | 52.0 | 0.0  | 2.8  | 0.0   | 41.0  | 166.1 | 117.3 | 757.3  | 706.2  |
| 1990                                          | 50.7  | 97.9  | 91.2  | 135.0 | 6.5  | 0.0  | 2.3  | 28.8 | 0.0   | 30.0  | 54.5  | 124.5 | 621.4  | 708.5  |
| 1991                                          | 103.4 | 121.1 | 107.0 | 0.0   | 0.0  | 6.4  | 0.0  | 1.8  | 13.2  | 57.5  | 43.5  | 125.3 | 579.2  | 578.0  |
| 1992                                          | 72.3  | 42.5  | 26.0  | 34.7  | 0.0  | 8.0  | 0.0  | 13.5 | 5.8   | 30.6  | 133.0 | 53.7  | 420.1  | 424.8  |
| 1993                                          | 126.7 | 45.0  | 124.7 | 52.0  | 1.0  | 8.0  | 0.0  | 8.0  | 3.0   | 173.3 | 73.2  | 109.1 | 724.0  | 594.0  |
| 1994                                          | 103.3 | 167.9 | 67.1  | 29.0  | 0.0  | 0.0  | 0.0  | 0.0  | 5.0   | 98.7  | 43.7  | 169.2 | 683.9  | 733.9  |
| 1995                                          | 60.7  | 83.7  | 142.8 | 58.3  | 14.7 | 0.0  | 0.0  | 11.7 | 7.7   | 90.8  | 124.4 | 189.7 | 784.5  | 676.8  |
| 1996                                          | 169.1 | 221.4 | 39.2  | 51.0  | 22.2 | 6.5  | 0.0  | 5.5  | 2.0   | 62.4  | 58.4  | 146.3 | 784.0  | 933.7  |
| 1997                                          | 142.4 | 50.2  | 318.2 | 32.2  | 95.5 | 3.5  | 9.5  | 4.0  | 41.8  | 26.7  | 173.1 | 116.7 | 1013.8 | 916.6  |
| 1998                                          | 157.9 | 64.1  | 36.9  | 27.0  | 0.0  | 0.0  | 0.0  | 0.0  | 45.4  | 85.0  | 228.2 | 124.0 | 768.5  | 657.7  |
| 1999                                          | 120.0 | 59.6  | 55.9  | 37.7  | 51.8 | 5.8  | 0.0  | 0.5  | 18.4  | 25.8  | 79.3  | 129.1 | 583.9  | 813.4  |
| 2000                                          | 153.6 | 322.6 | 191.7 | 39.8  | 18.7 | 2.4  | 0.0  | 4.2  | 33.0  | 128.4 | 86.2  | 167.2 | 980.6  | 981.9  |
| 2001                                          | 65.9  | 96.8  | 54.8  | 8.3   | 56.2 | 0.0  | 0.0  | 15.5 | 73.7  | 95.9  | 106.8 | 91.0  | 664.9  | 701.0  |
| 2002                                          | 137.7 | 94.4  | 60.5  | 15.7  | 9.6  | 49.2 | 0.0  | 13.8 | 3.5   | 59.0  | 13.3  | 144.8 | 601.5  | 750.0  |
| 2003                                          | 96.6  | 62.4  | 68.6  | 10.3  | 0.0  | 15.6 | 0.0  | 1.5  | 12.8  | 70.0  | 49.5  | 43.4  | 430.7  | 487.9  |
| 2004                                          | 117.7 | 168.7 | 101.3 | 33.2  | 12.0 | 6.0  | 20.0 | 4.9  | 0.0   | 45.1  | 50.9  | 225.8 | 785.6  | 616.1  |
| 2005                                          | 175.6 | 71.0  | 60.9  | 102.6 | 1.8  | 0.0  | 0.0  | 0.0  | 4.0   | 65.3  | 121.6 | 120.3 | 723.2  | 758.7  |
| 2006                                          | 176.9 | 117.2 | 114.6 | 9.1   | 3.2  | 0.0  | 0.0  | 36.8 | 1.5   | 52.0  | 139.8 | 156.6 | 837.7  | 762.2  |
| 2007                                          | 68.5  | 17.2  | 39.8  | 55.9  | 0.0  | 43.0 | 0.0  | 0.0  | 34.0  | 137.4 | 79.3  | 112.2 | 587.3  | 611.1  |
| Average                                       | 110.7 | 101.7 | 93.0  | 37.1  | 13.4 | 8.8  | 2.6  | 7.4  | 22.1  | 75.0  | 103.7 | 128.3 | 700.1  | 703.6  |
| potential<br>Rainfall<br>harvesting<br>1 sq/m | 8738  | 8028  | 7341  | 2928  | 1058 | 695  | 205  | 584  | 1745  | 5920  | 8186  | 10127 | 55265  | 55541  |

A total of **55.262 litres per square metre** a year can be harvested

For every square meter 55litres of water can be harvested a year ,that water can be used for toilet flushing and watering the greenery on site.



## Design brief:

The design brief I constructed for myself is as follows.

Programmatically to have a mix between :

1. (Sacred)prohibited space
2. Multi functional space
3. Single function space
4. Outside space(nature and recreation)

A design aesthetic that is:

Identifiable to Muslims but moving away from extravagance, a minaret is enough to signify the presence of the mosque.

To include the essences of sacred space throughout ,with an explosion of essences in the sacred area (mosque).

A modern architectural aesthetic with African sacred space undertones.

Sacred in mosque yet open for community interaction in other areas.

The design being in South Africa (multiple sects within Muslim society) there must be no ethnic elitism rather a universal style of architecture .

Other considerations:

The centre must be a public facility promoting integration and social interaction, hence it is to be open to Muslims and non Muslim .

## Realization of concepts:

Lack of connectivity:

During apartheid physical barriers were used to separate white suburbs from black or colored ones. Crosby was a previously white suburb whilst Westbury, Coronationville and Westdene were and are still predominantly colored areas. The city to city bus depot together with the height difference (topography) were used as a barrier separating white and colored. This thesis being about connectivity and integration picked up on this issue and aims to combat this lack of connection with its concept. The concept is thus to have a pedestrian link from California street down to serpentine and Grange road .. Opening Crosby residents to the BRT and providing access to the facility by those at the bottom (Hurst hill, Westdene, Westbury and Coronationville).



The orange line depicts the barrier separating Crosby from the previously colored suburbs.

Aerial photo: (after Google earth, cited 18/06/09)





1:1000

The concept of creating a pedestrian path linking California street at the top of the hill with Grange and Serpentine streets at the bottom. (Image: authors own)





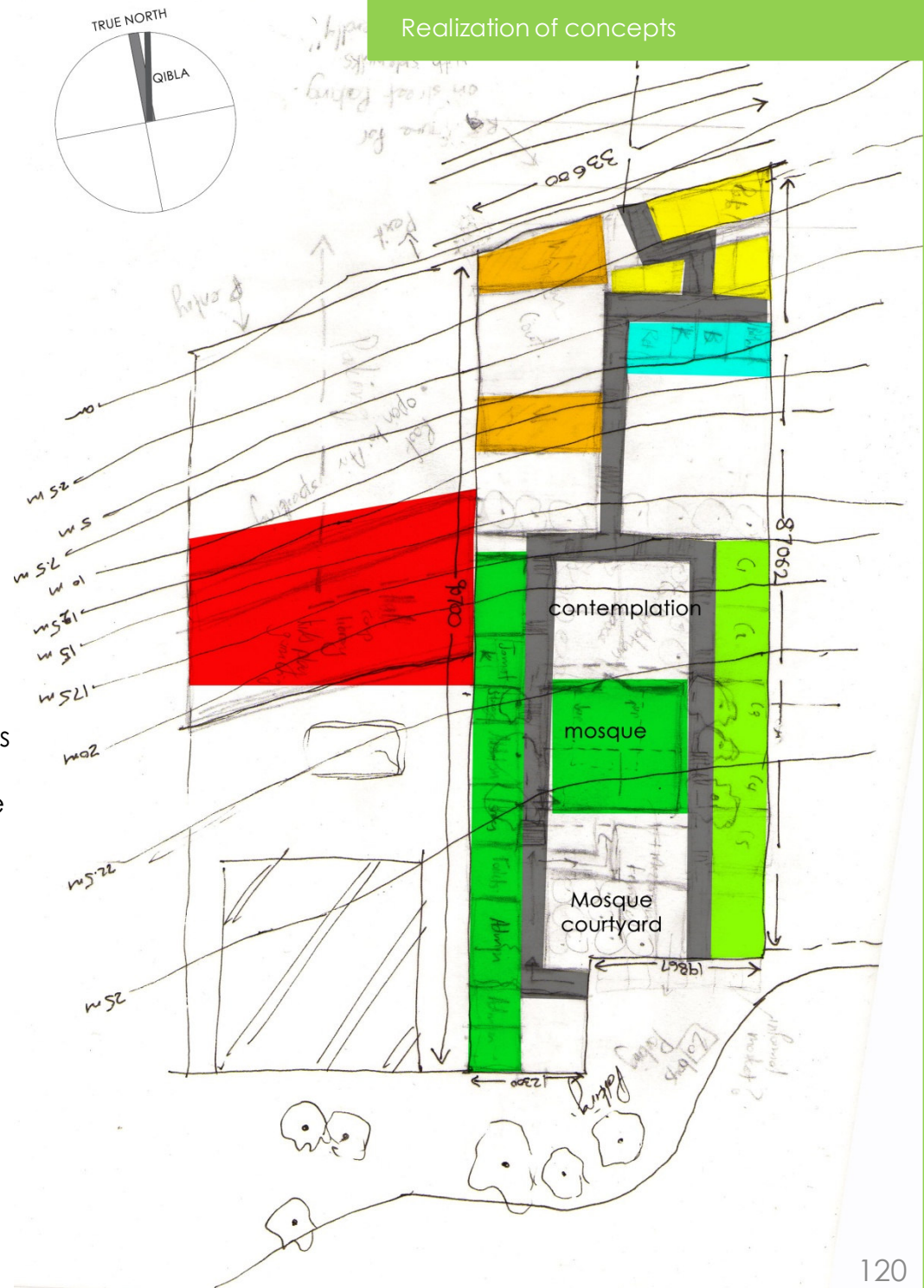
The pedestrian path is to become a continuation of California street.



**Early conceptual design:****Stage 1**

The initial design placed the mosque at the top of the site where the bulk of the users are. The other community facilities were bulked in red with retail shops on the street creating a hard edge to attract people and create a street culture. The issue however is that it treated the pedestrian path as a garden path and thus does not speak of the concept of connection.

- Mosque and its facilities
- Retail
- Community facilities
- Madresa (school)
- Pedestrian path
- Residential units

**Realization of concepts**

**Early conceptual design:****Stage 2**

Realization of concepts

Retail space.

Workshop/  
seminar  
rooms.

Residential units

Community  
facilities.

Pedestrian path

Mosque.

Classrooms  
Madresa

The next stage allowed the concept to read much stronger. The pedestrian path was the thread off of which the program fed.

Again the retail strip was placed along Serpentine road ,creating a vibrant street while also bringing in revenue to the centre.

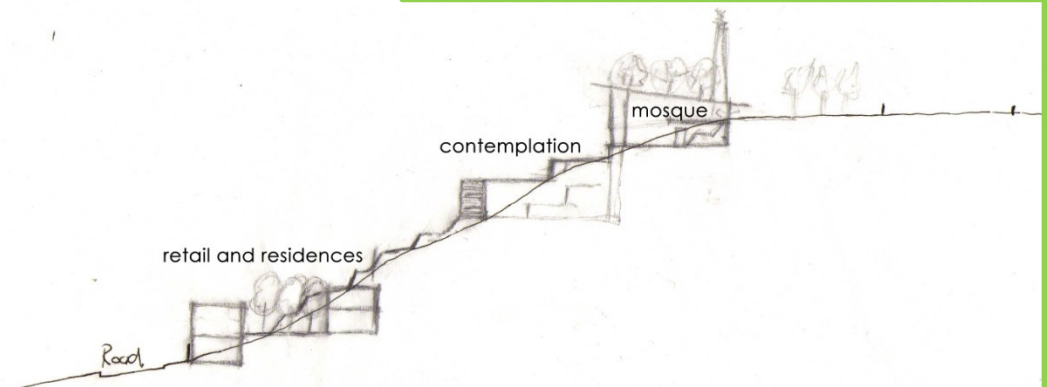
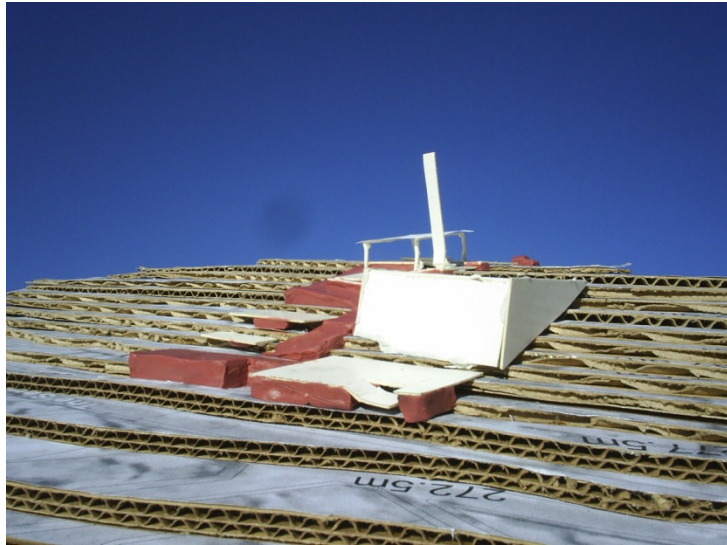
Thresholds and transition spaces were missing though especially in terms of the sacred space(mosque).



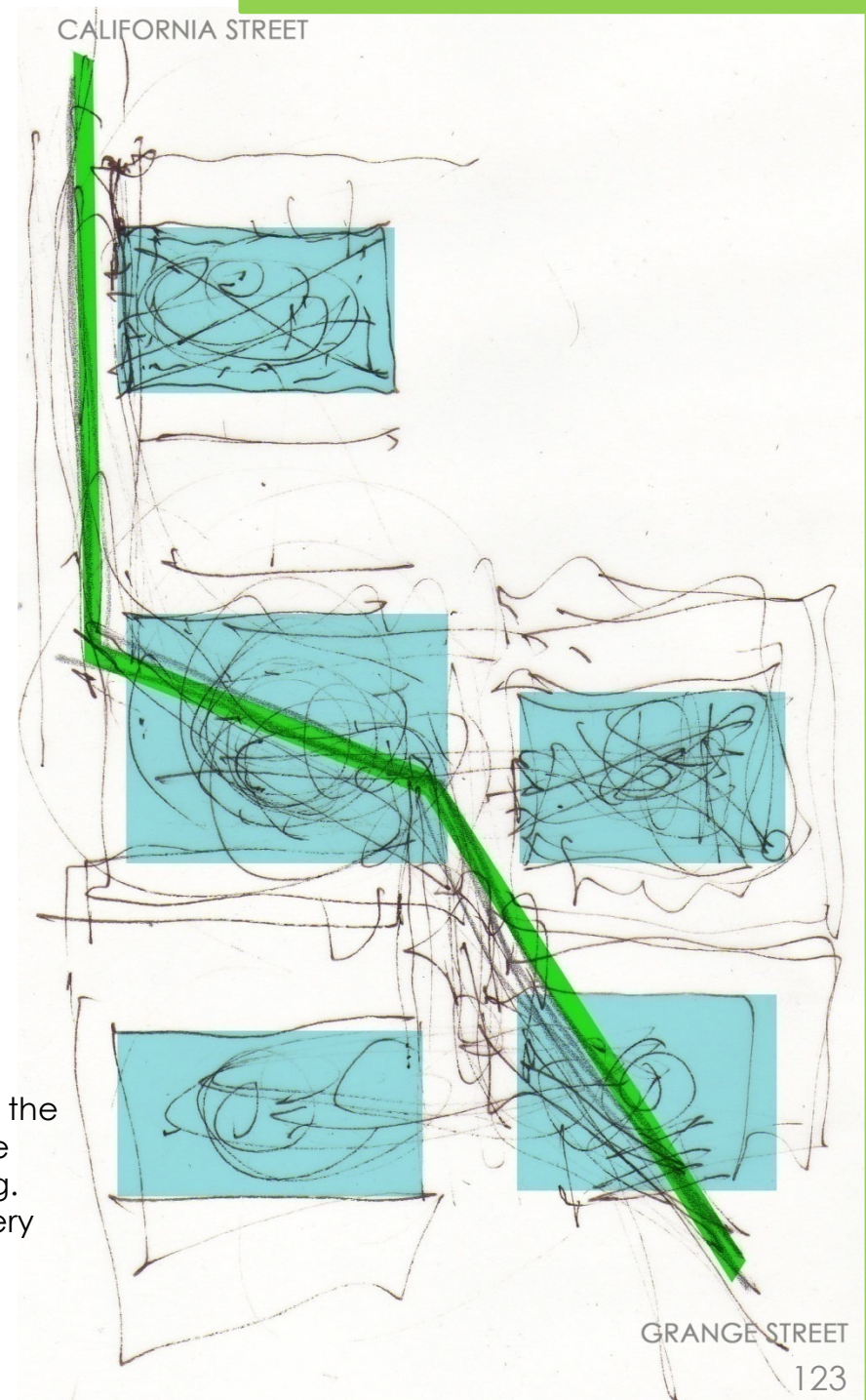


## Early conceptual design: Stage 2

Realization of concepts



The pathway on this stage read far too orthogonally, the mosque and Madresa are found at the top of the hill ,with its minaret the identifying element signaling to Muslims the place their needs will be seen to(dar-es-salaam) ,a contemplation space with fountains and nature is below the mosque .Residential units, workshops and retail are found at the bottom toward the street. The large building houses the community facilities(hall , library ,workshops/seminar rooms etc).

**Early conceptual design:****Stage 3**

The previous stage gave rise to the concept of forming courtyards along the path, either feeding off the path or becoming move through spaces. The courts allow for transition space before entering the sanctuary or building. They also allow spill out spaces so that the program can spill outdoors (very fitting to the South African climate).

The pedestrian path is much more defined, linking Grange road at the bottom to California street above. The path reads as an extension of California street.



The courtyard allowed privacy and tranquility before entering the sacred space, but again the transition from profane to sacred wasn't completely explored. The mosque at the top of the hill gave it the feeling of being a secondary programmatic element.

## Early conceptual design:

### Stage 3

Landscaped parkade roof used  
as play area /recreation space

Community facilities building: Multi function hall,  
library ,youth room (gaming ,homework  
,supervision )  
Empowerment facilities (skills training ,workshops,  
admin etc)

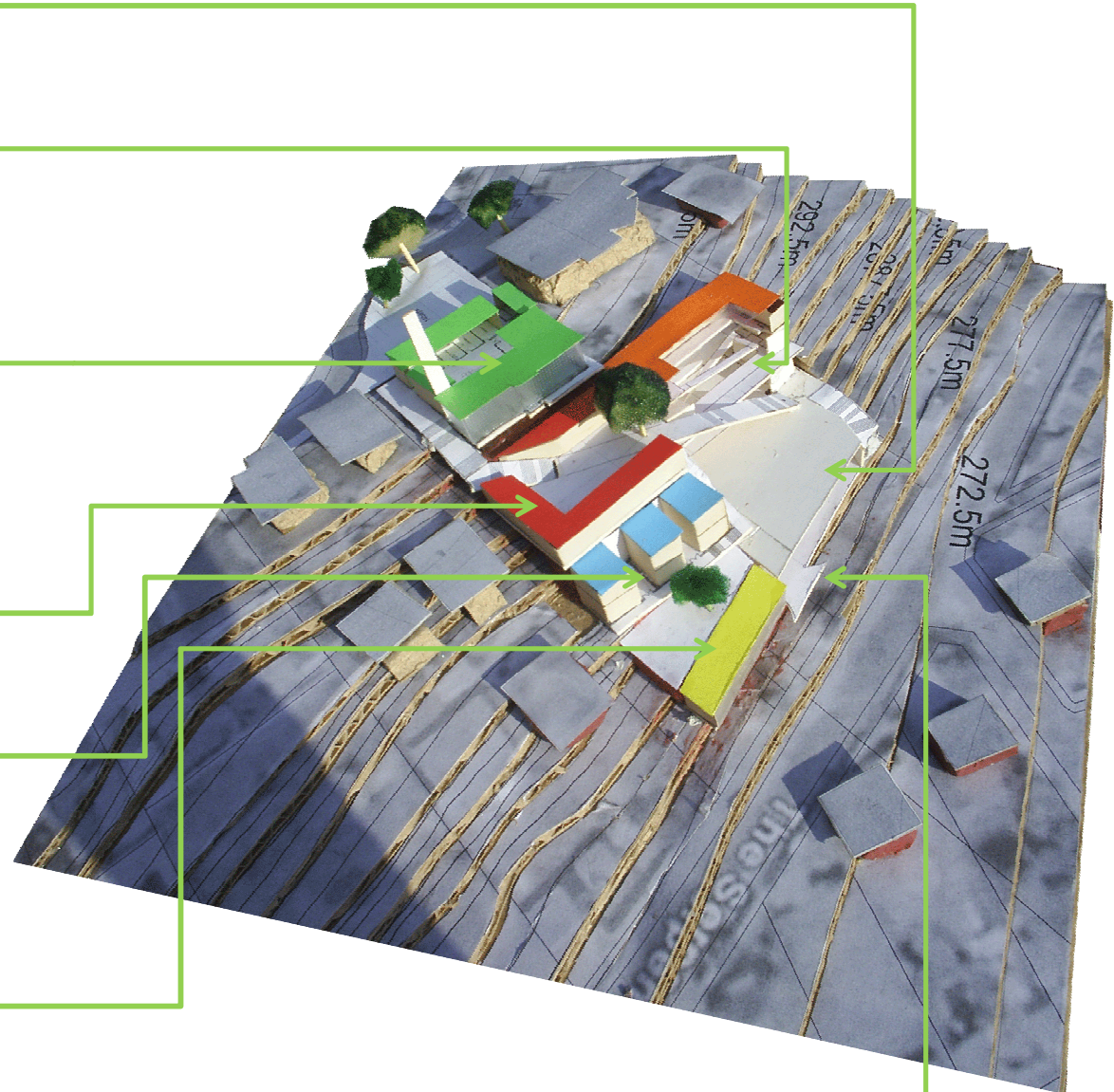
Mosque and Madresa (school) with courtyard as  
transition between profane and sacred space.  
The mosque is a glass box enclosing the sacred  
floor , it breaks away from the traditional mosque  
architecture of enclosed internal space by  
allowing a view into the sacred area as one  
moves along the pedestrian path. The minaret is  
the only identifying element that it is a mosque.

Community facilities courtyard: Admin, skills  
training, soup kitchens ,informal market  
,counseling rooms ,recruitment offices ,workshops

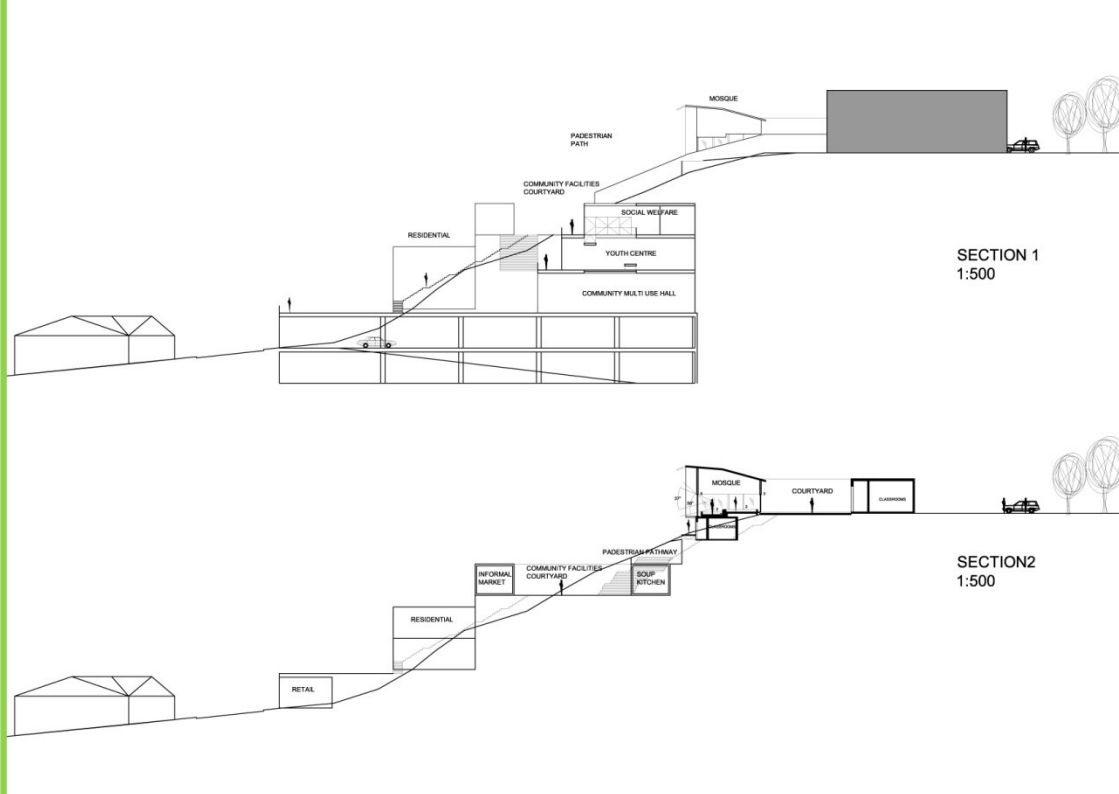
Residential units, for  
Moulana (priest), muezzin (person who call the  
faithful to prayer) and a guest unit

Retail shops , create a hard edge on the street ,  
draw people to the site.

Entrance to parkade :Two levels of parking



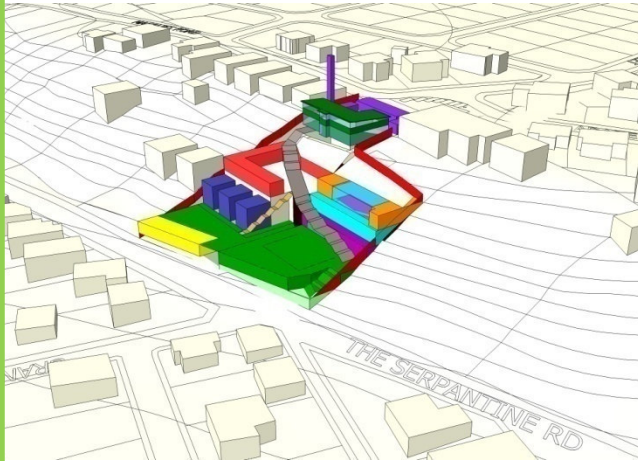


**Early conceptual design:**

This stage saw the creation of courtyards and the layering of the program to follow the site contours. The mosque at the top of the site has a separate female entrance, with males entering off the pedestrian pathway. The path then moved through the community facilities courtyard and main building to link to Grange road. The issue here was that the mosque read as a secondary space rather than the hub of activity. The other was the copious amount of cut to make way for the community facility building lit by its atrium.

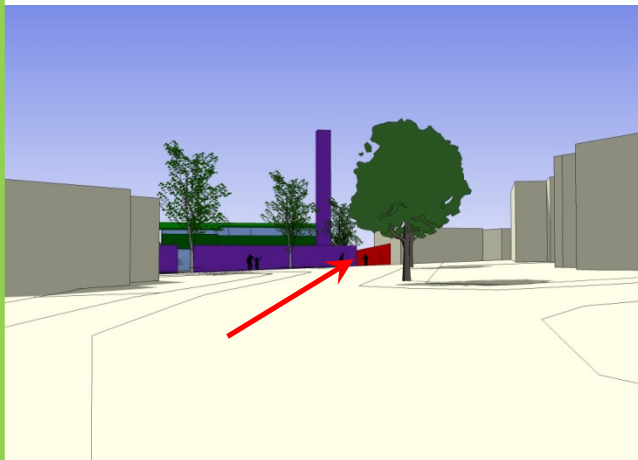
## Realization of concepts



**Early conceptual design:****Stage 3**

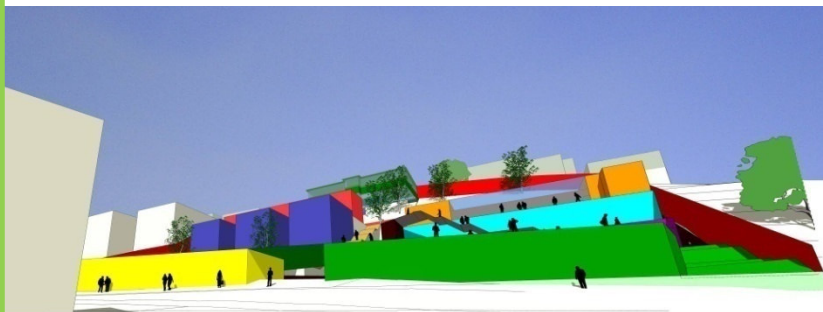
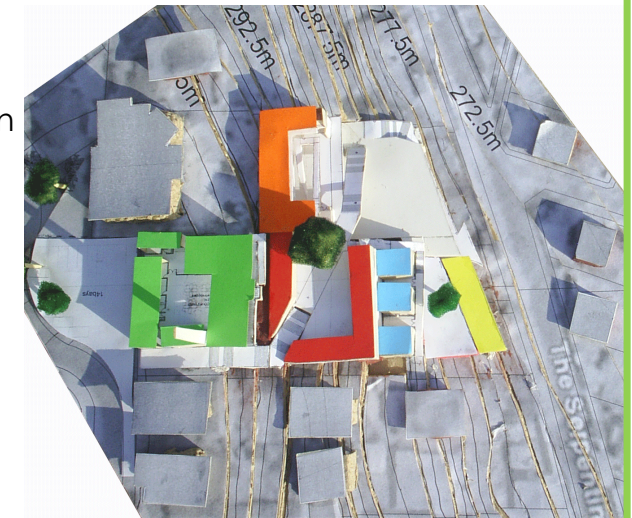
Left: the pedestrian path has a more organic feel and is visible throughout the scheme, it thus reads as the central vein of the design.

Right: the view from Portland road, the minaret is clearly visible signaling to Muslims a place of retreat.



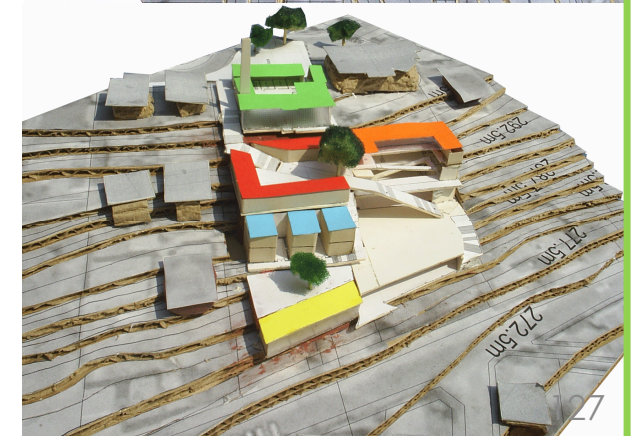
Left: the pedestrian path becomes a continuation Of California street.

Right: the layering of the plan gives the design a scale that fits its context.



Left: view from Grange road looking up to the mosque.

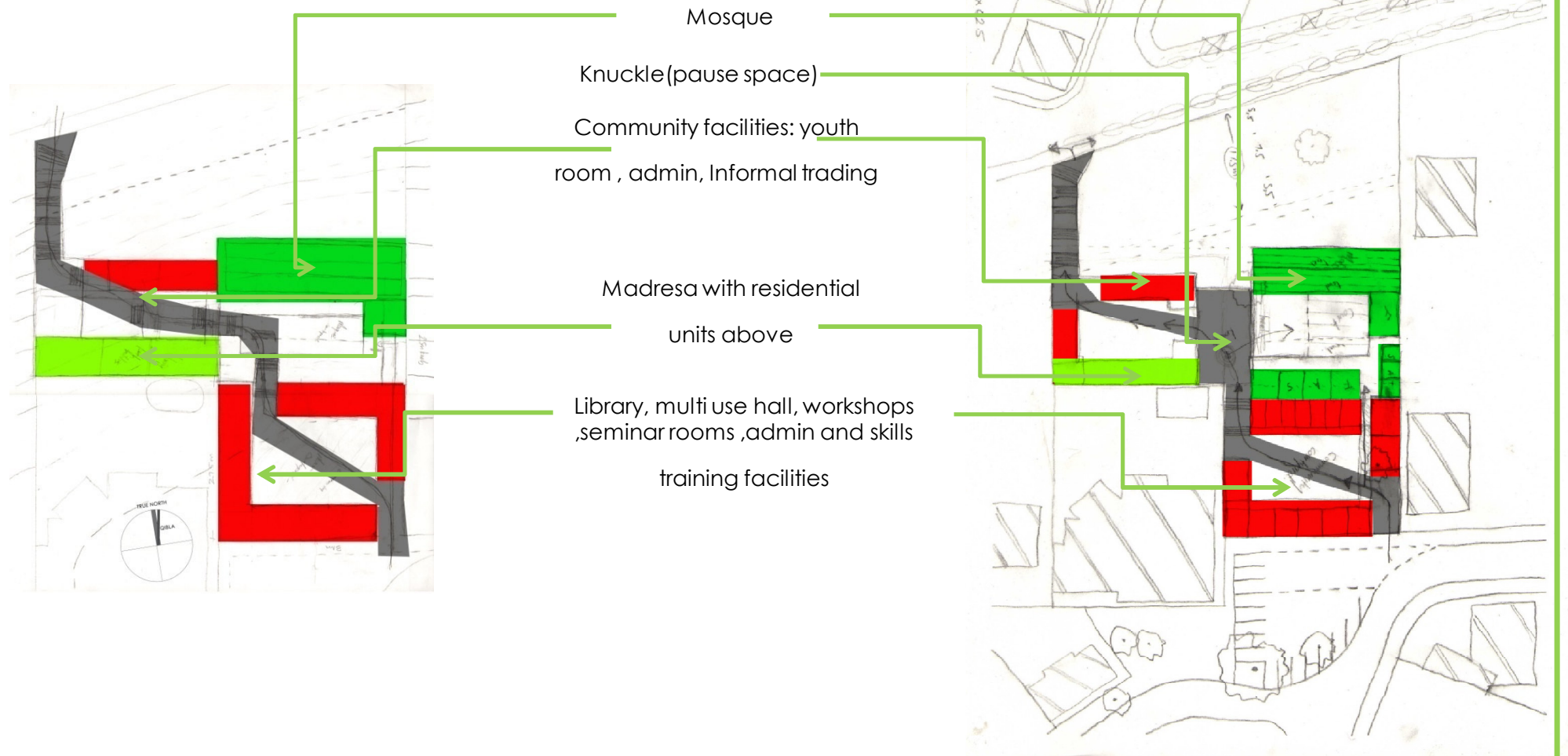
Right: south west axonometric view





**Early conceptual design:****Stage 4**

Realization of concepts

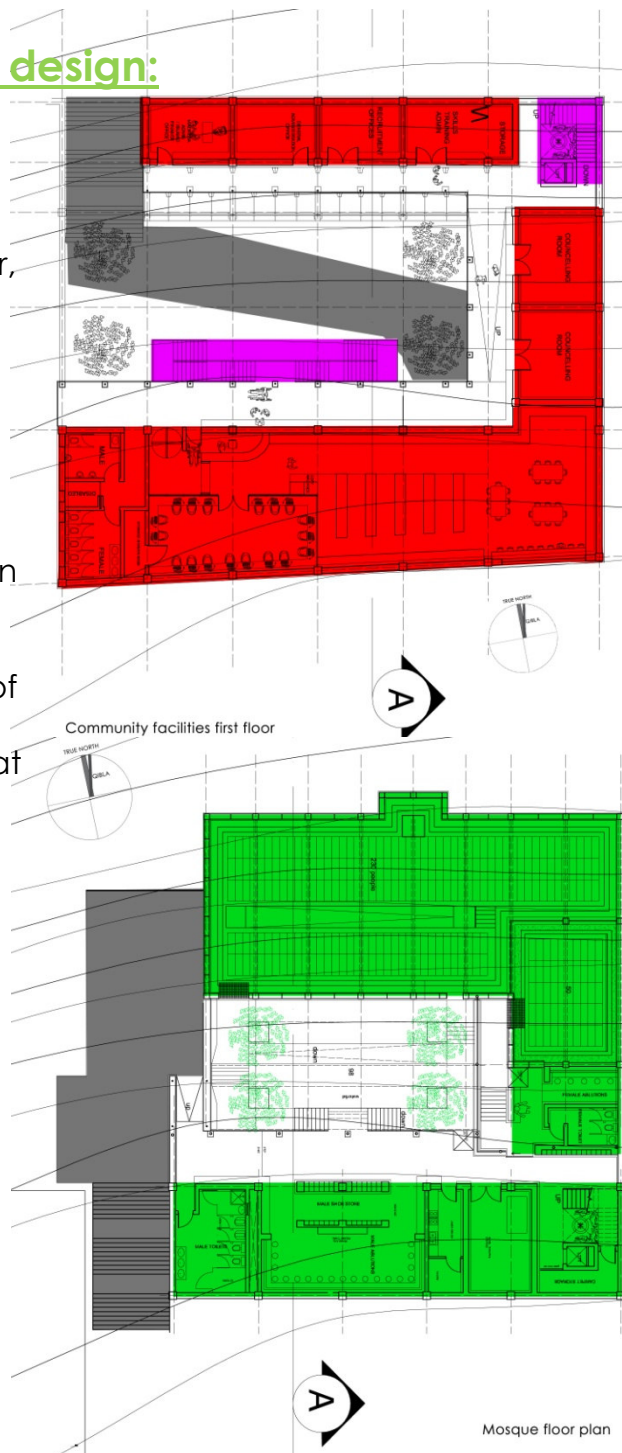


This stage picked up on the previous stages issues, it therefore placed the mosque /Madresa in the middle of the site so that you either descend or ascend to it, making it the heart of the scheme. The first idea was to allow the movement route through the mosque courtyard (image1), but this proved to be problematic and undermined the transition space I wanted so I opted to introduce a knuckle (image2) which behaves as a pause space where one connects to either the mosque, the Madresa or carries on to the other community facilities.

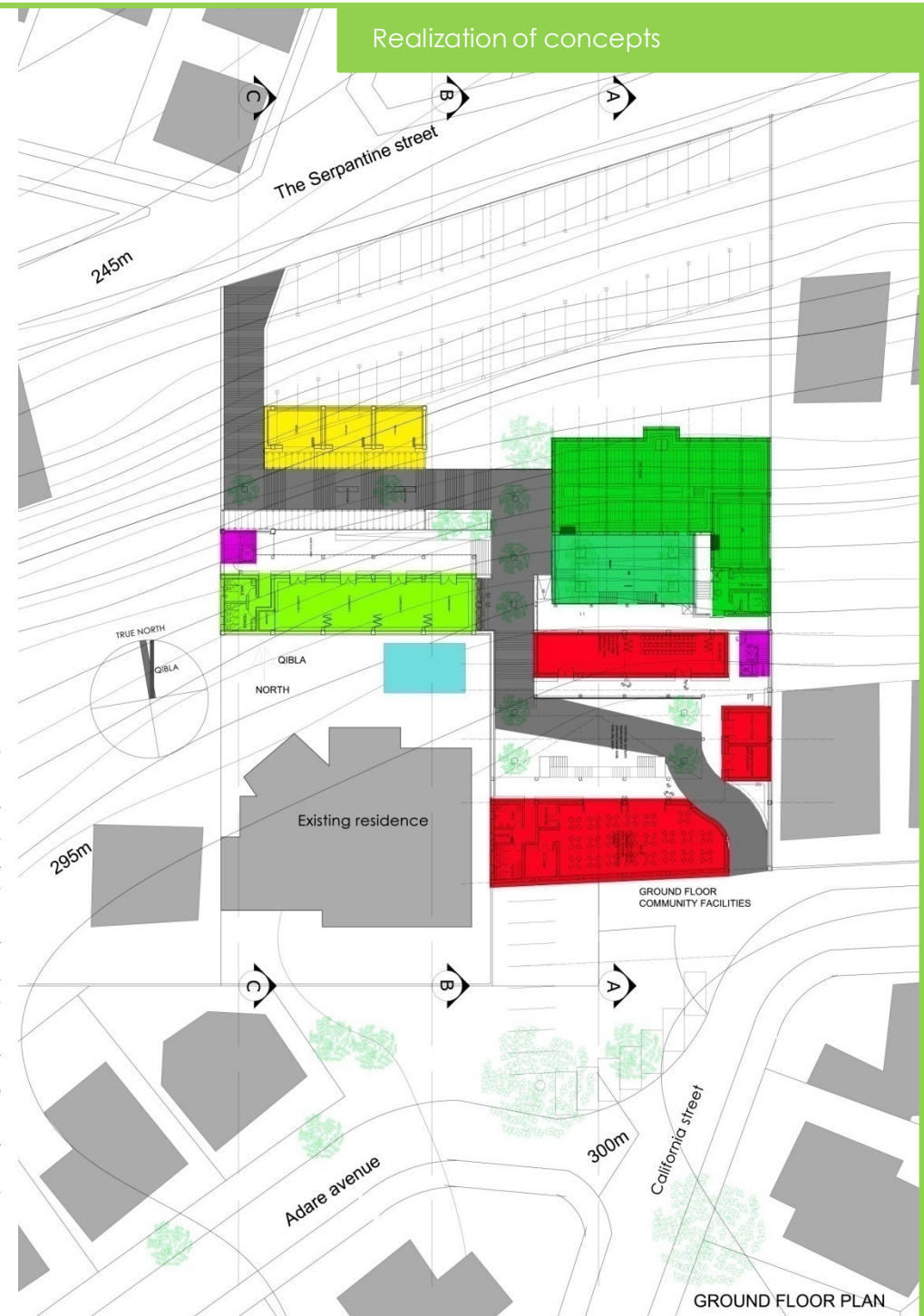
## Early conceptual design: Stage 5

This stage is the realization of the concepts in stage four, from the drawings it can be seen that the layered planning following the site contours has lost its clarity. The internal spaces have notions of African space with the use of elements, that is the seeing of the floor, roof walls and structure as separate elements that make up the space.

- Mosque and its facilities
- Retail
- Community facilities
- Madresa (school)
- Pedestrian path
- Residential units



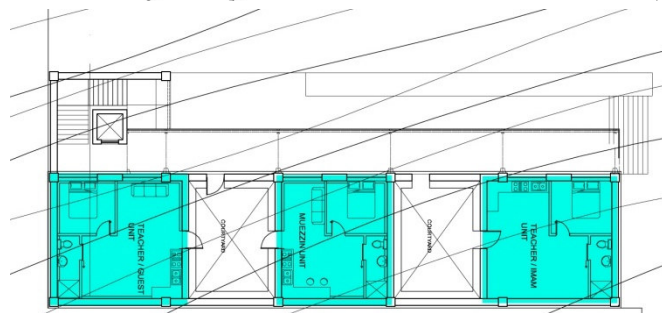
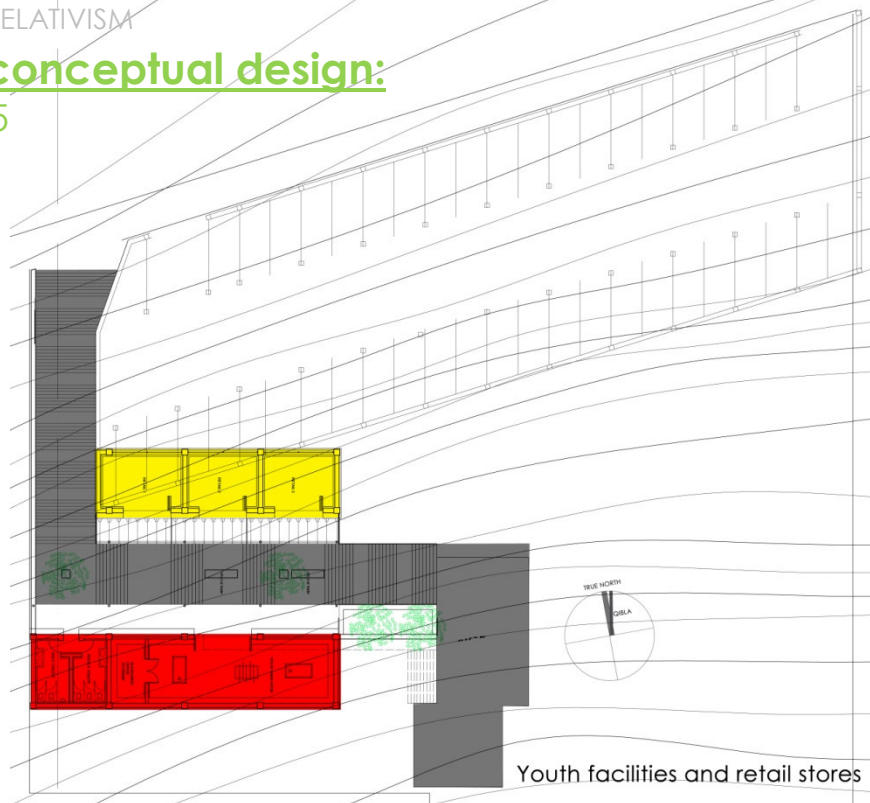
## Realization of concepts





# Early conceptual design:

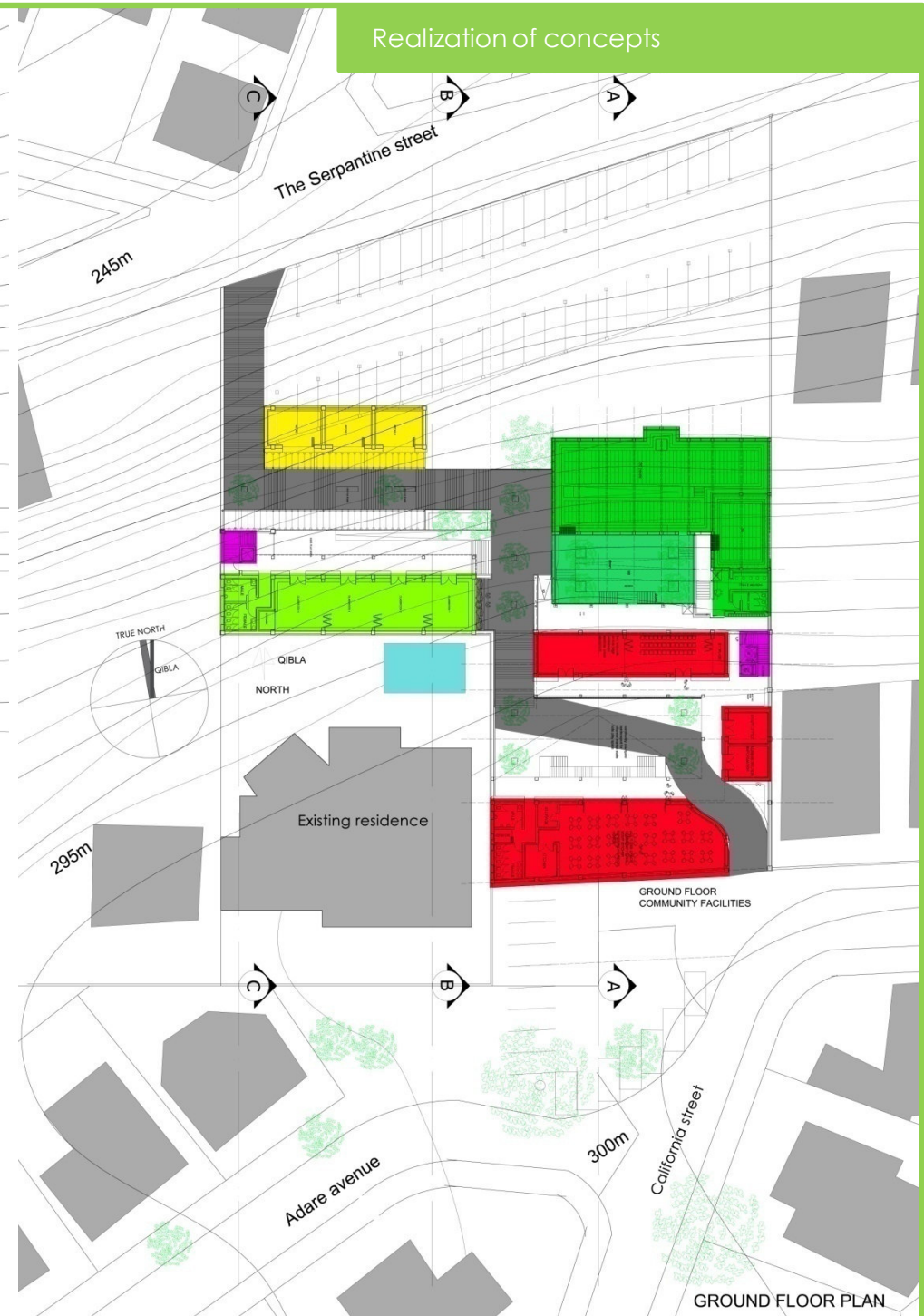
Stage 5



Level 2 ,accommodation units

- Mosque and its facilities
- Retail
- Community facilities
- Madresa (school)
- Pedestrian path
- Residential units

## Realization of concepts

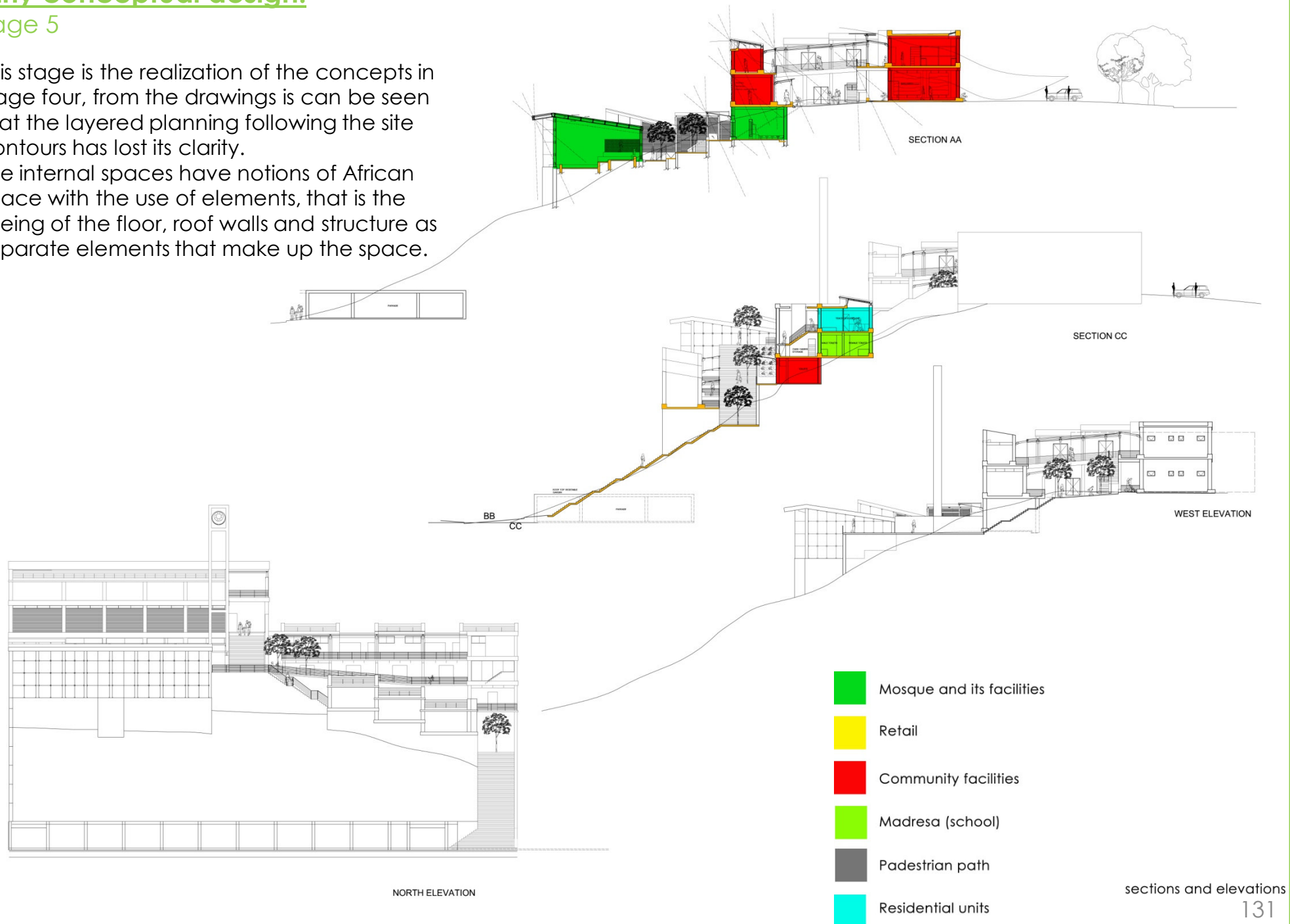


## Early conceptual design:

### Stage 5

This stage is the realization of the concepts in stage four, from the drawings it can be seen that the layered planning following the site contours has lost its clarity.

The internal spaces have notions of African space with the use of elements, that is the seeing of the floor, roof walls and structure as separate elements that make up the space.





## Early conceptual design:

### Stage 5

Model pictures

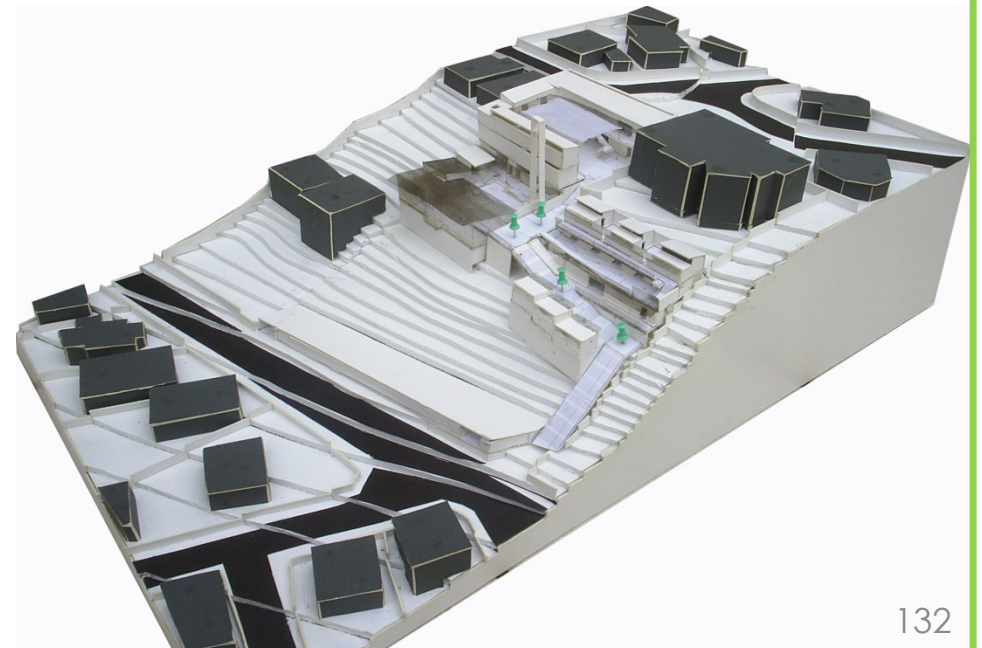
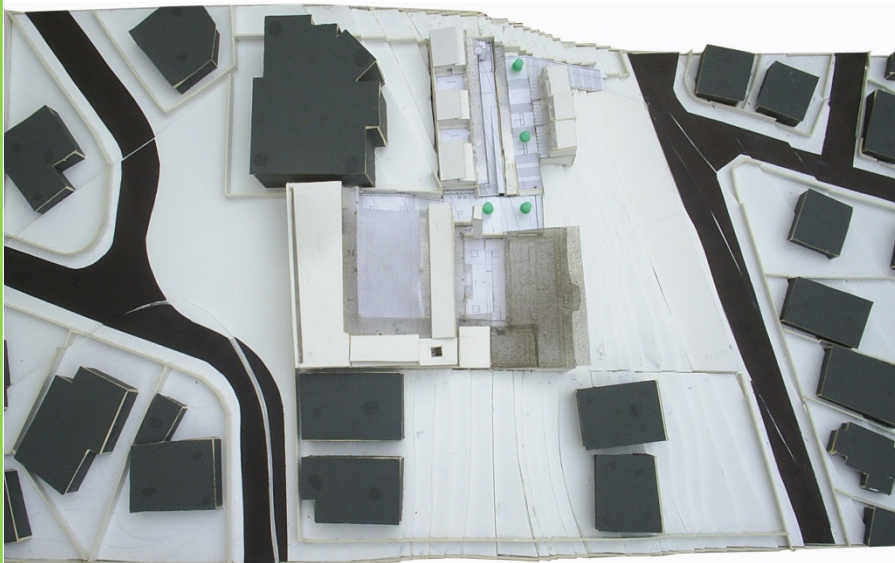
The view from Grange road looking to the south, the mosque will glow at night whilst disappearing into the context during the day.

Realization of concepts



North western axonometric view

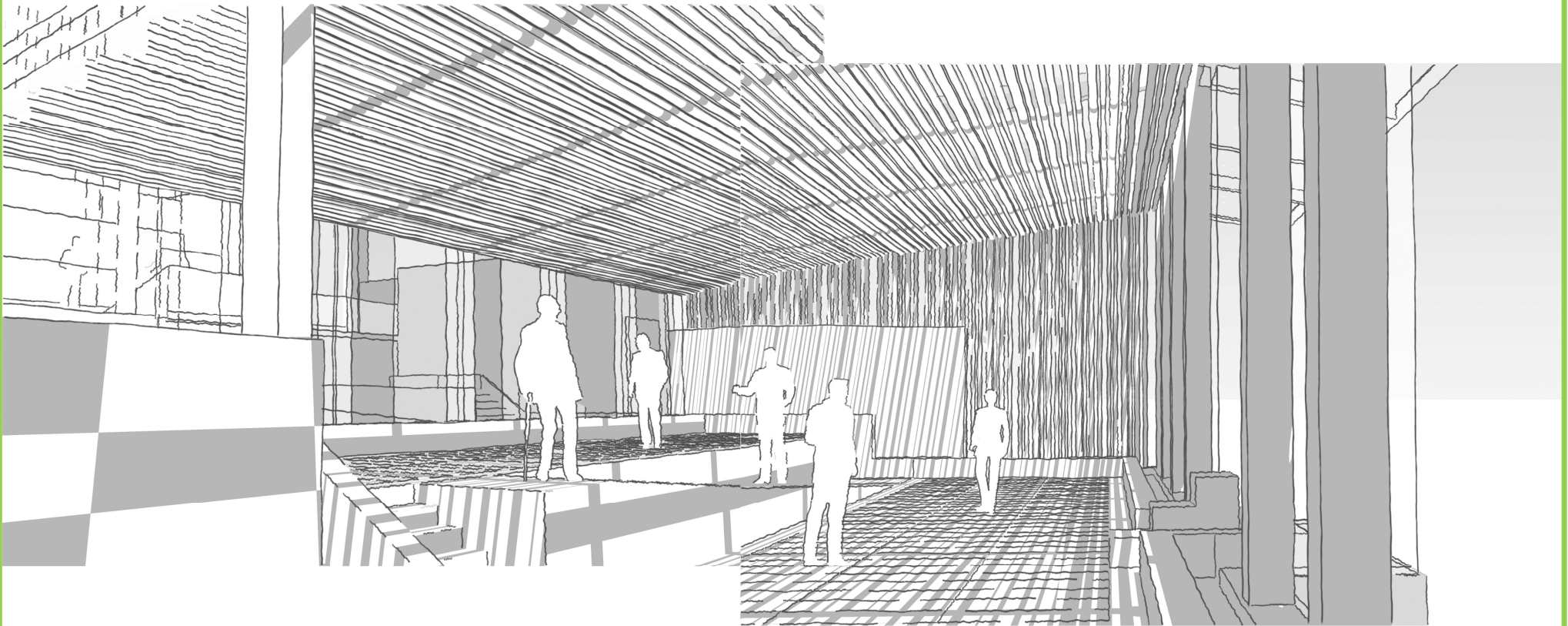
Roof plan, trees planted along the pedestrian path accentuate the path



## Early conceptual design:

### Stage 5

3D perspective:



Interior of mosque, between the double glazed roof is a tent fabric with random sizes holes dappling the light entering the mosque .Secondary to that functioning as a ceiling are timber reeds further diffusing the light ,giving the impression of being under a tree.



## Final design:

Design principles from precedents as well as those that emerged as the design progressed helped to keep the design true to its end goal (creating a contemporary African sacred space). These principles are :

1. The approach to nature and the relation between man made and natural (nature venerated as sacred)
2. The manipulation of material and structure (solid versus void ,heavy versus light etc)
3. Use of earth materials (local materials , local labour)
4. The use of light as emotive power

These principles coupled with the 4 essences of Islamic architecture and essences of sacred space give rise to a modern African mosque architecture.

What makes Islamic architecture Islamic (the essences)?:

1. An Architecture that is in harmony with its surroundings.
2. An architecture that makes for beauty yet discourages waste and conspicuous consumption.
3. Makes for privacy of the home and family and the protection of modesty.
4. That facilitates worship and will not detract from the remembrance of God.

After various design approaches the inevitable outcome was to create courtyard spaces feeding off the pedestrian pathway in a way that the site is respected and celebrated .So instead of covering the entire site ,the program is bulked up at the top with a cascading feel as one descends .This said a major portion of the topography remains undisturbed. The buildings open onto courtyards ,the courtyards create an internal environment of hustle and bustle while also protecting the interiors from the noise of vehicles and excessive heat.





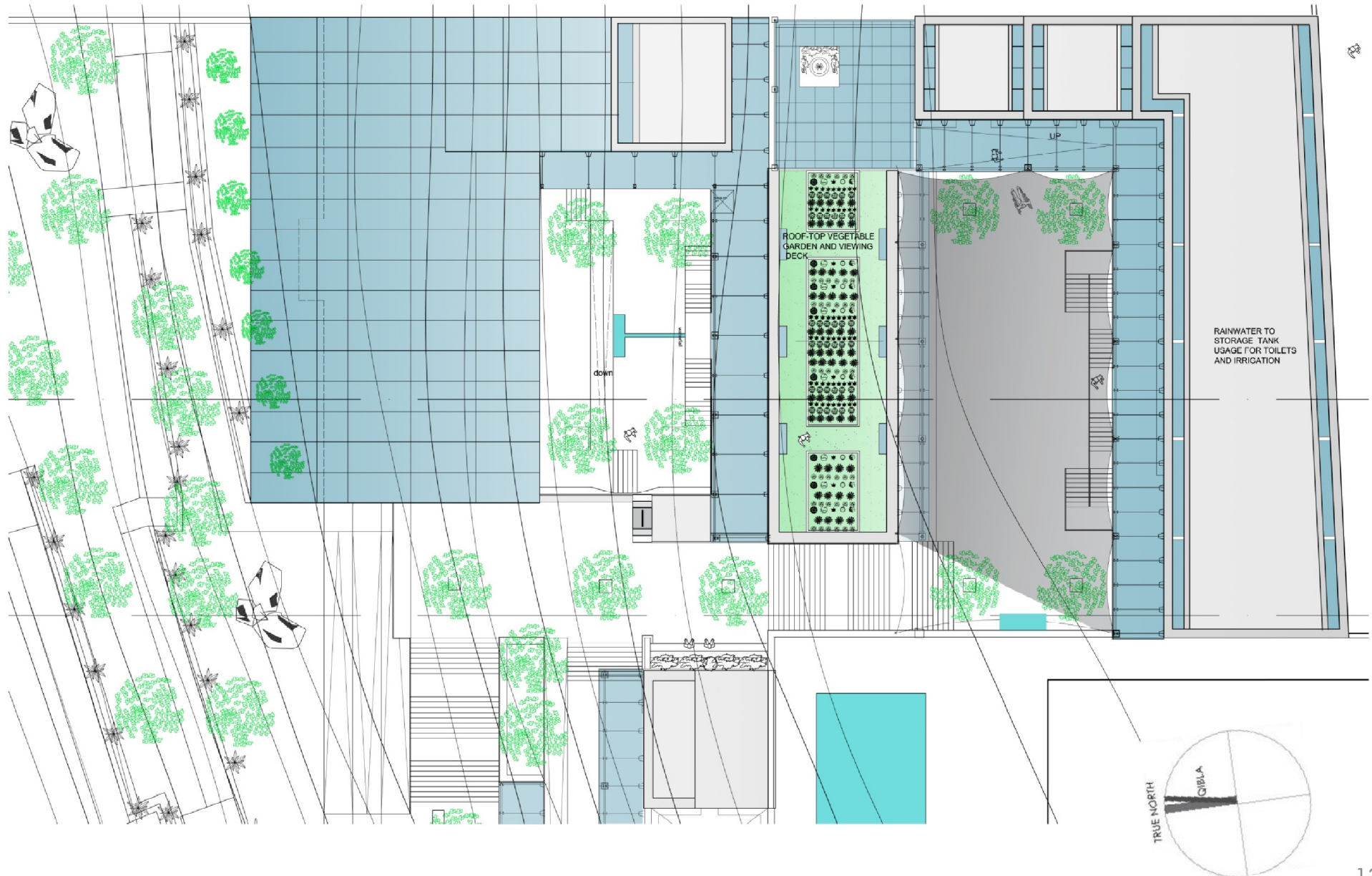
**Final design:**

**Site plan 1:500**  
Showing zoning

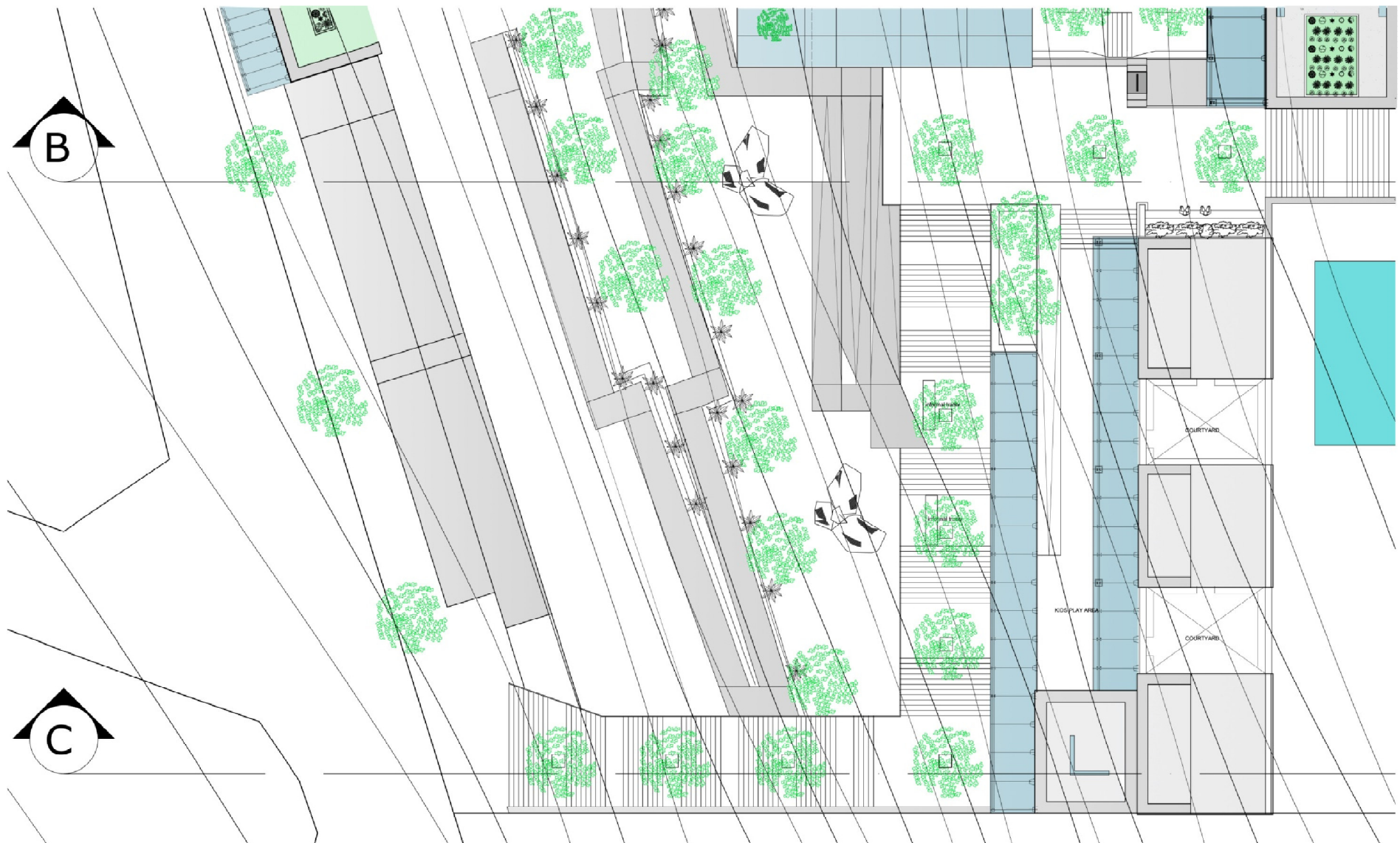
Final Design

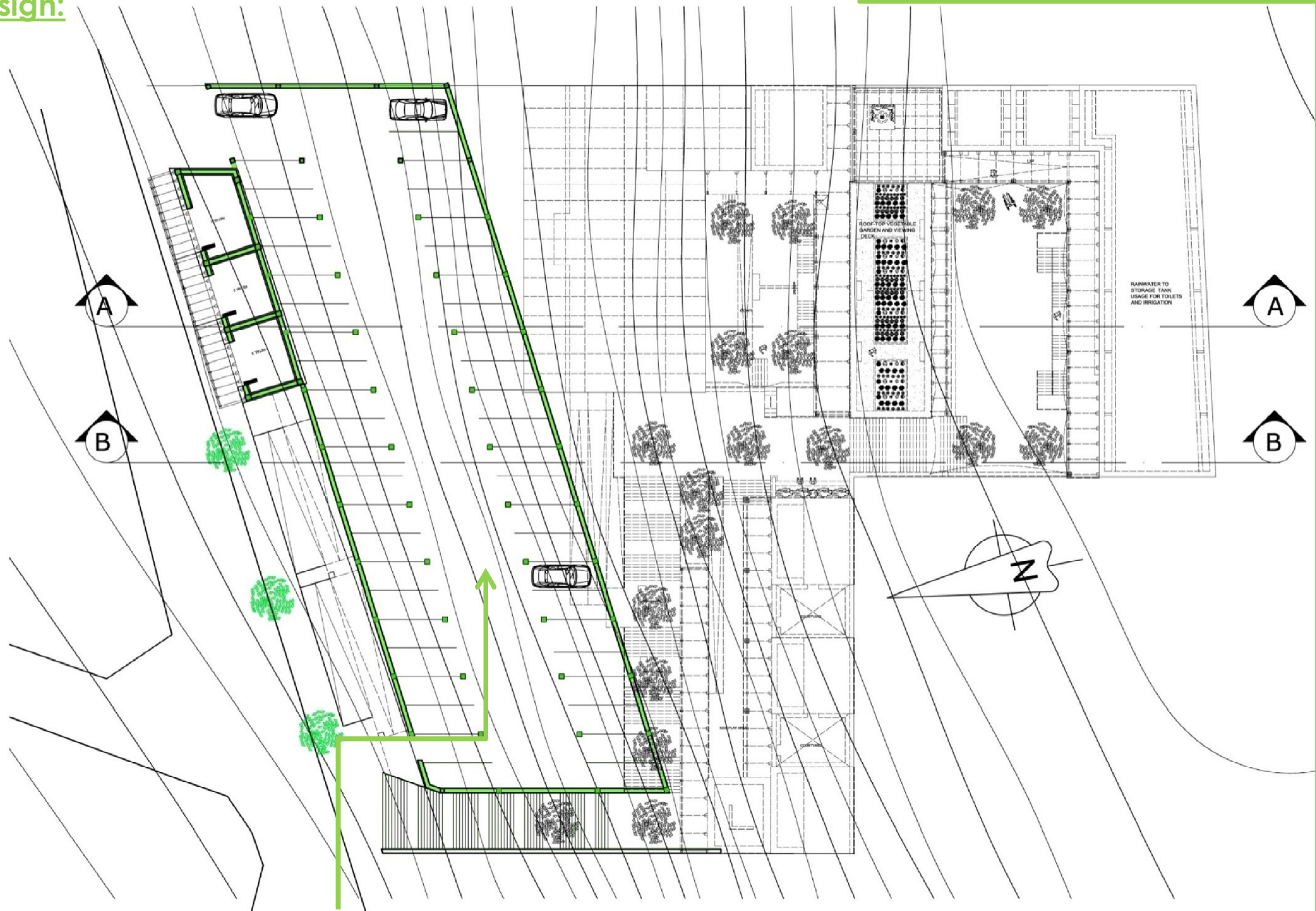
The three buildings consist of firstly a community facilities block ,secondly the youth centre /Madresa /accommodation and lastly the mosque ,all connected by a prominent pedestrian pathway .The functional organisation of spaces is in keeping with the concept of flexibility .The overriding concern is however to create spaces that offer Hurst hill/ Corronationville /Crosby / Westbury and Westdene residents the opportunity for empowerment and social interaction. The idea being that the young help the old, the rich the poor ,the able bodied the disabled and so on. The centre allows for a Muslim to fully worship God by being proactive in ones community .



Final design:



Final design:

Final design:

Parking for 45 cars have been provided , on street parking will fulfill the centre's other parking needs.



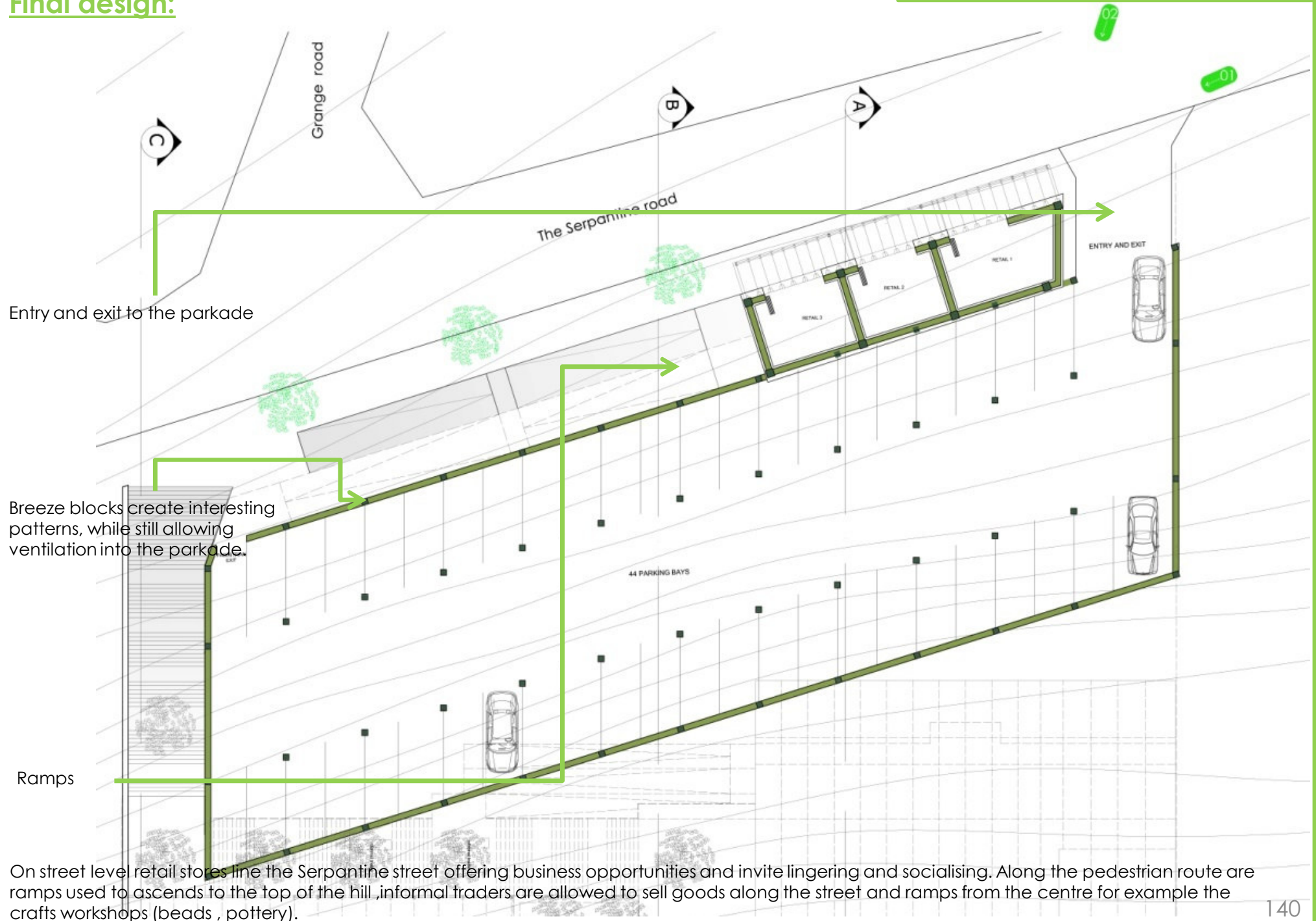
Final design:



IMAGE 01 (REFER TO PLAN)

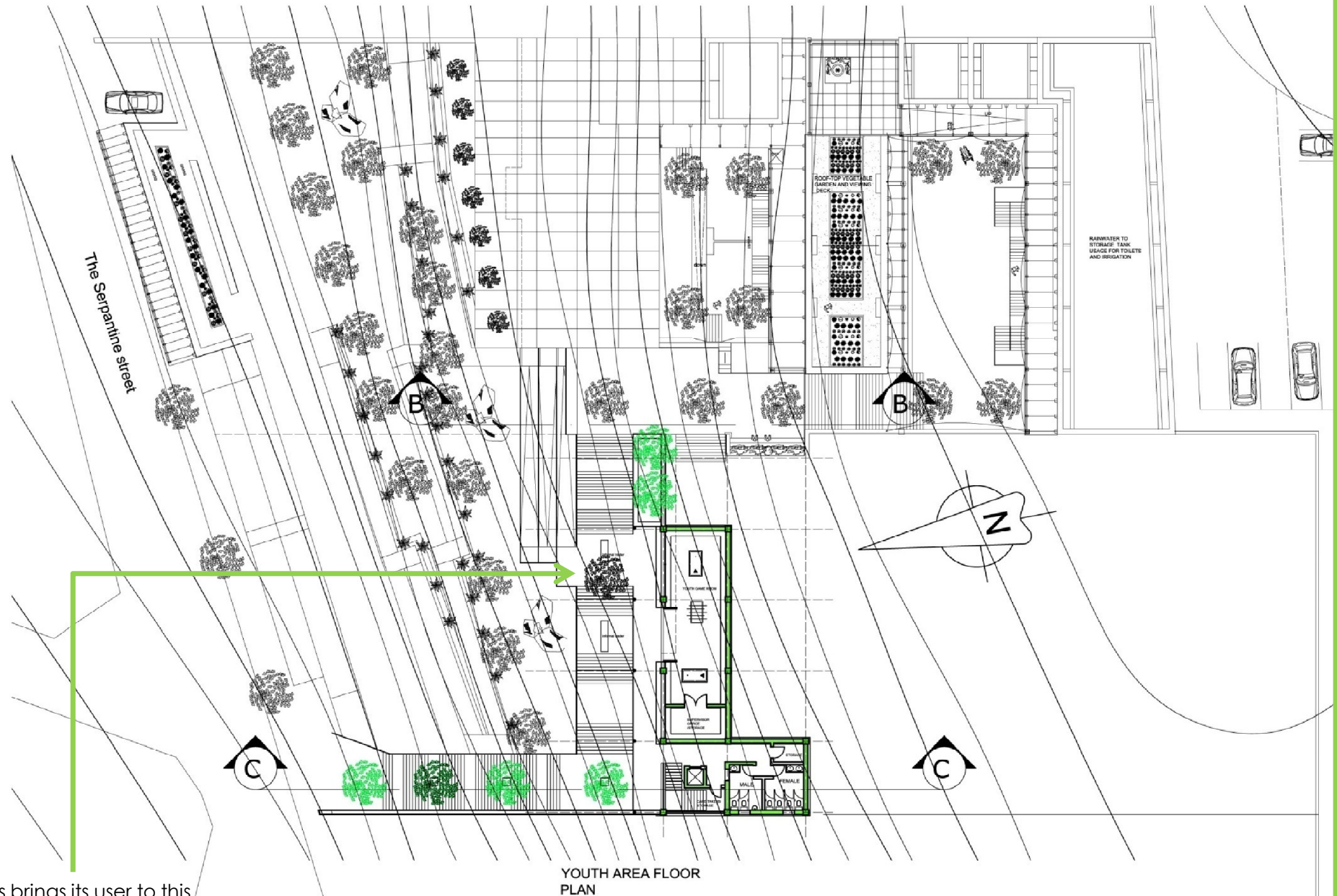


IMAGE 02 (REFER TO PLAN)

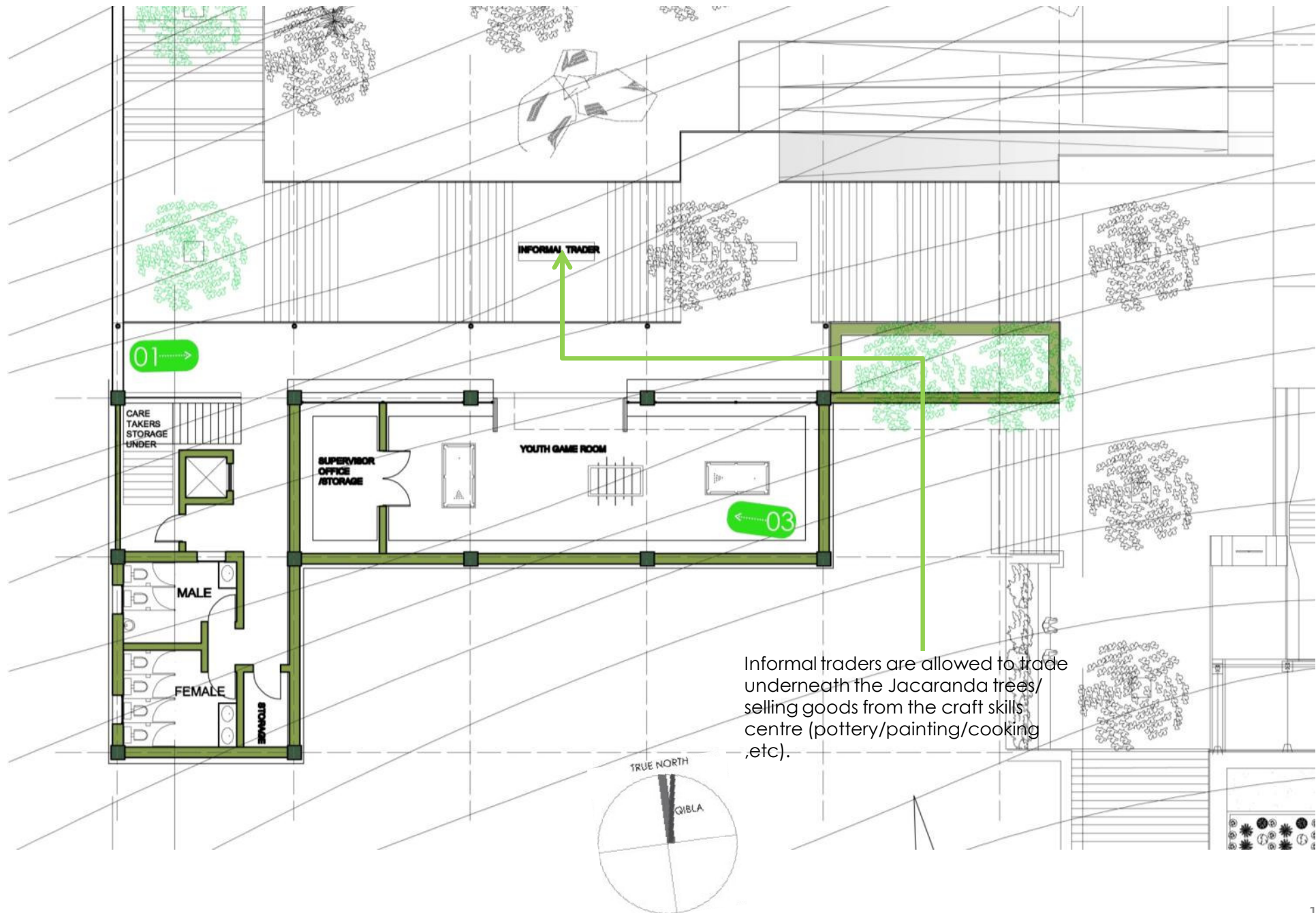


TYPICAL VIEW OF RAMPS AND CONTEMPLATION SPACE



Final design:

The ramps brings its user to this level .This junction also becomes a spill out space for the multi purpose youth room.

Final design:



**Final design:**



IMAGE 01



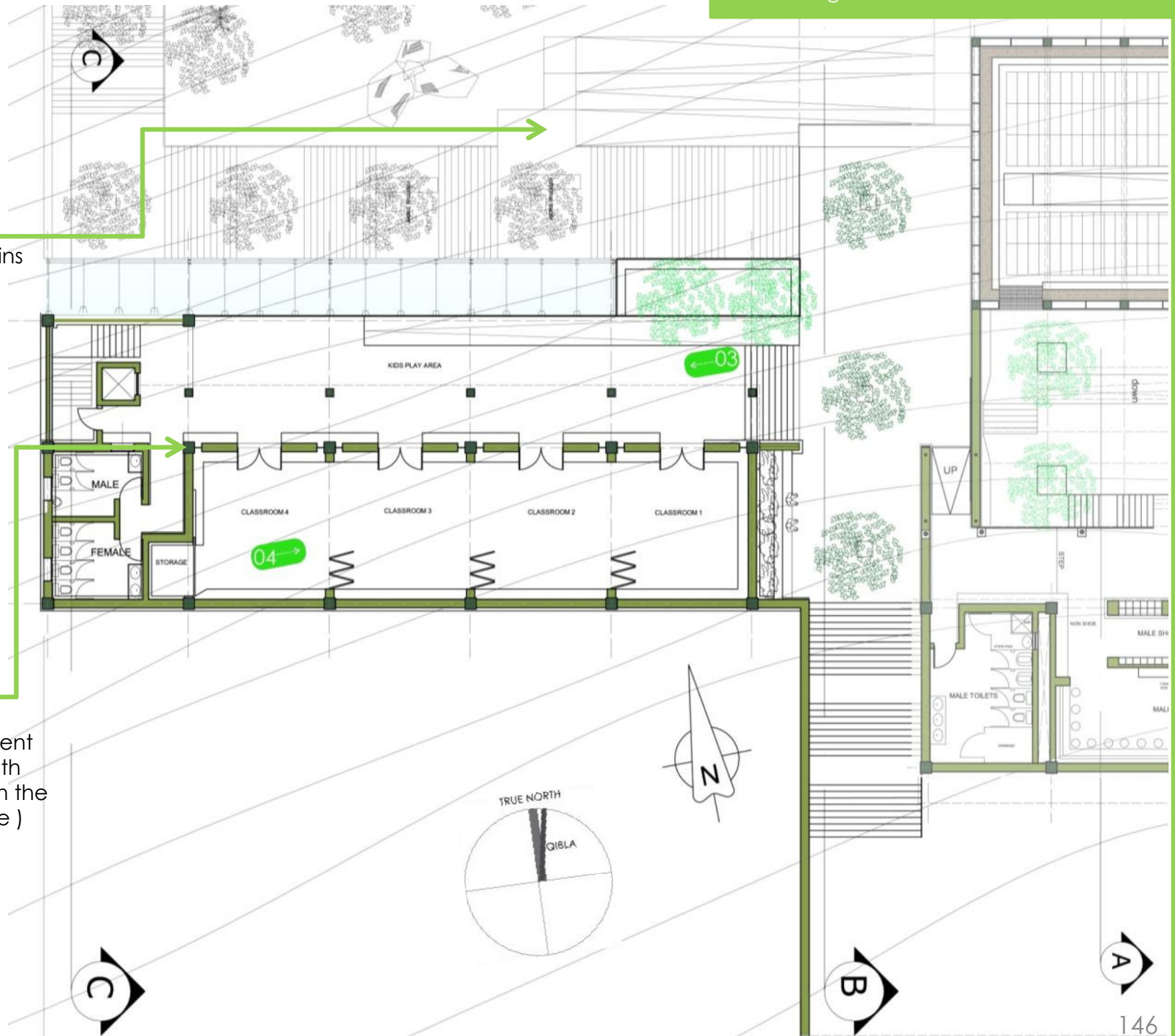
IMAGE 03





The ramp and staircase gains one access to the main knuckle of the scheme .

The elements (floor ,wall ,column and roof) are evident ,with the floor built as a plinth one can sit on .Necessary in the classroom( gathering space )



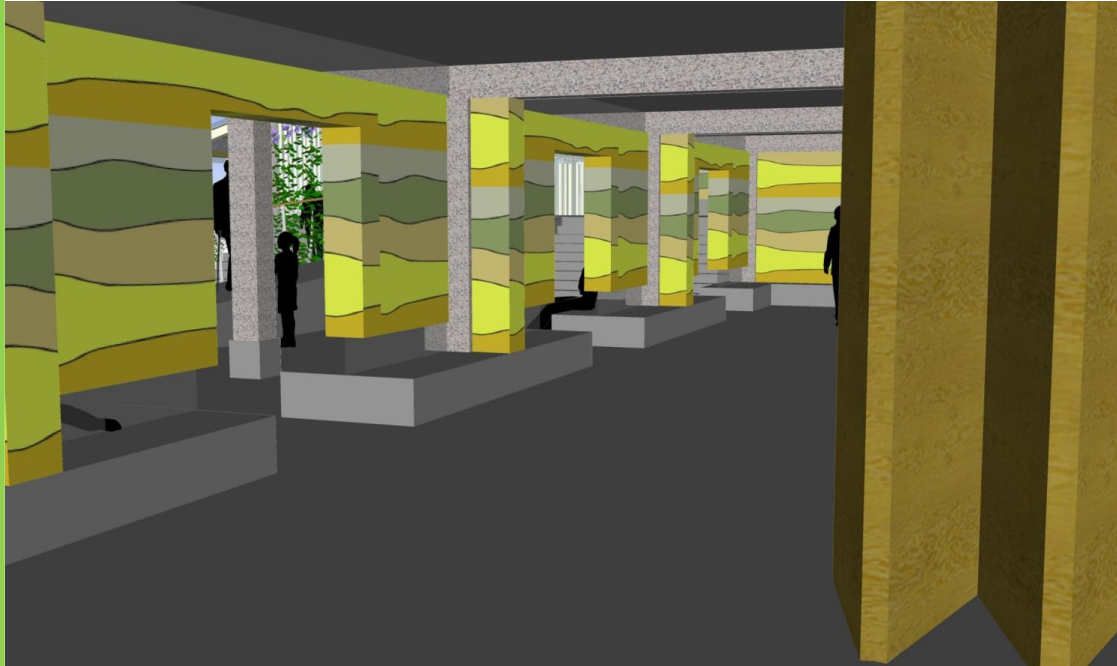


IMAGE 03

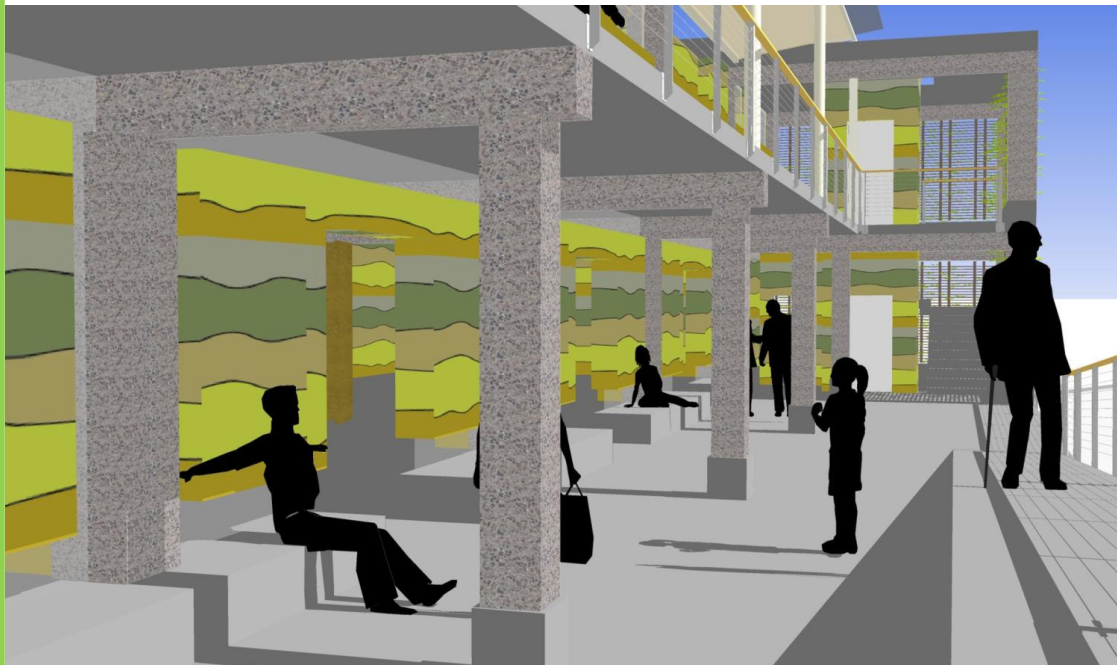
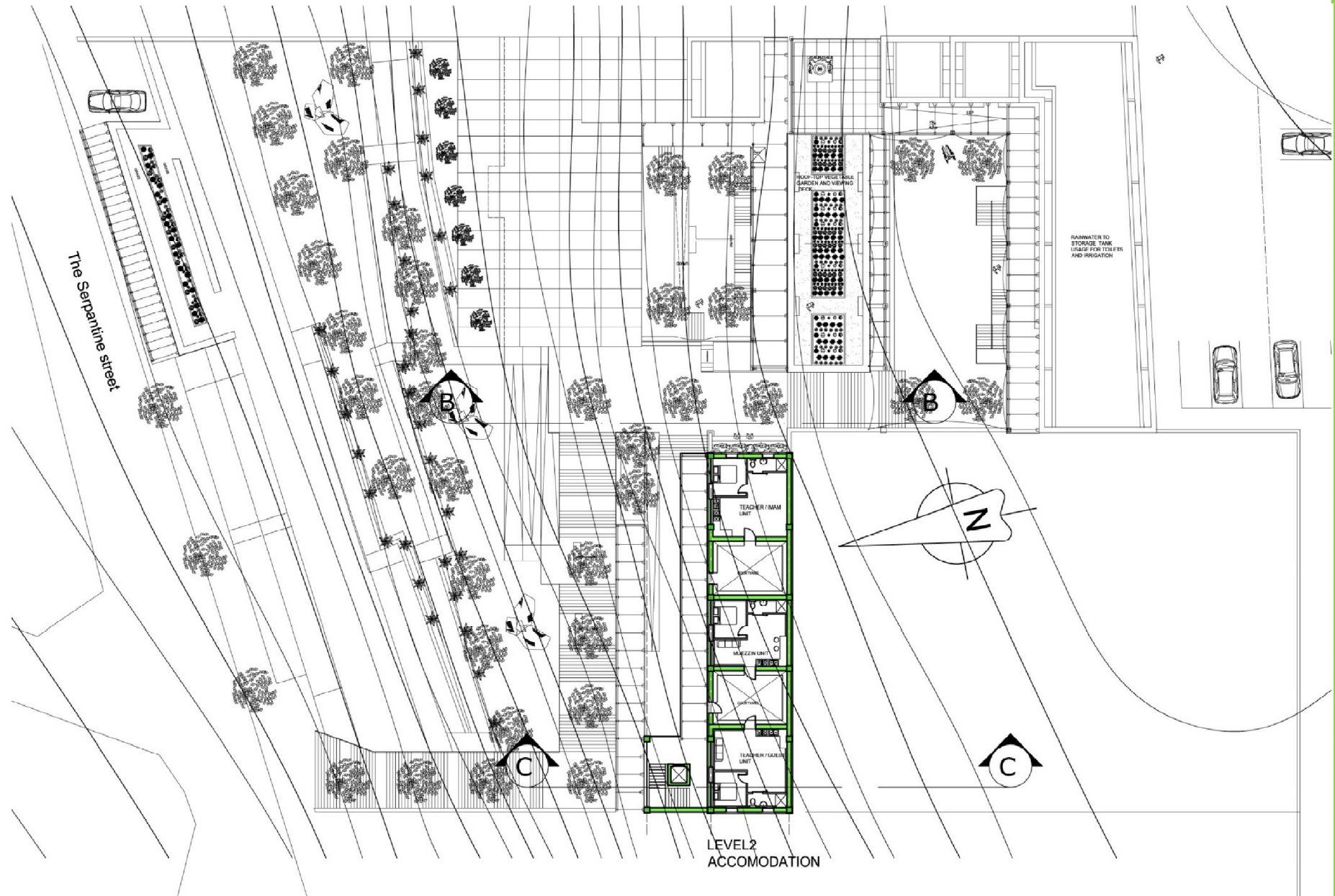
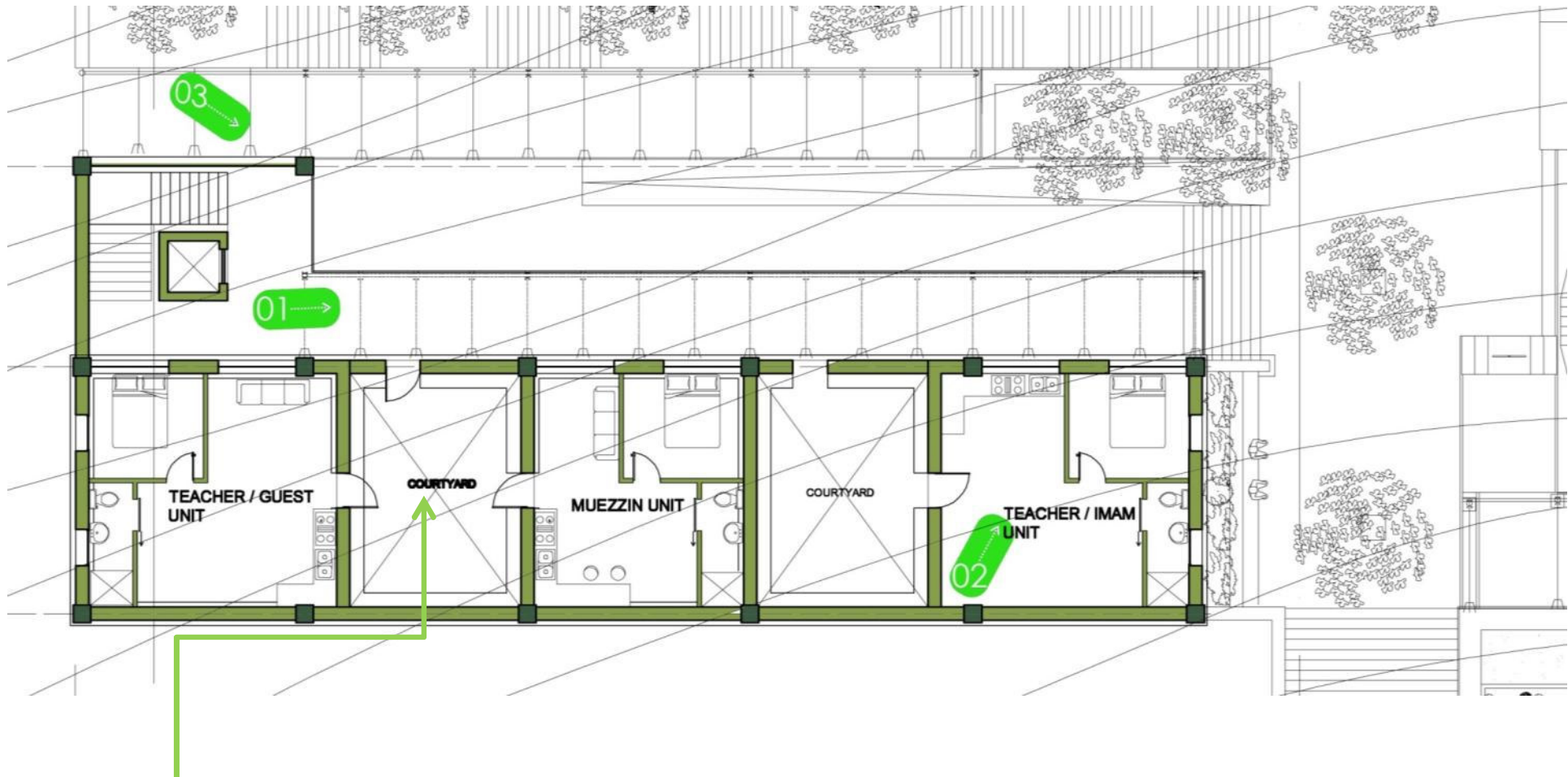


IMAGE 04





Final design:

Small enclosed courts give the units a transition space before the private space is entered .

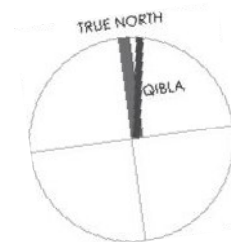






IMAGE 01

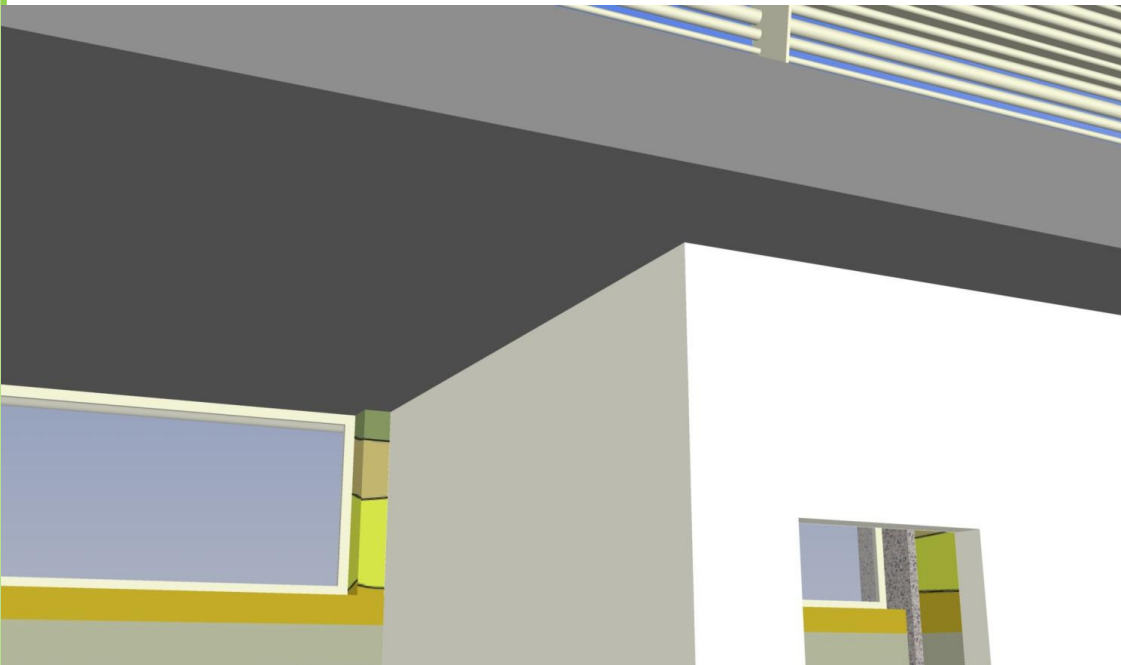


IMAGE 02

**Final design:**

The mosque breaks away from tradition and is not a proud monumental building .It does not have any special prominence in the scheme but yet allows its user a sacred tranquil space to pray or gather .The mosque embraces the exterior landscape with its big glass walls relating the building to the outside.





## Final design:

The plan of the mosque is simple, the floor plane is offset from the structure and enclosure, venerating it as the sacred, females pray on a higher level separated from the males by a perforated timber screen. Females enter the mosque using a separate stair/lift. The males however have the minaret as a beacon, men enter underneath the minaret off the knuckle where one emerges into the beautifully landscaped mosque courtyard and its facilities (shoe store, ablutions, toilets, kitchen and facilities to wash the dead)

With the exception of sandblasted robe patterns on the glass walls (robe patterns are universal Islamic patterns thus no ethnic elitism) there is a lack of ornament in the mosque. The emphasis is on the worshippers and God's creation (nature).

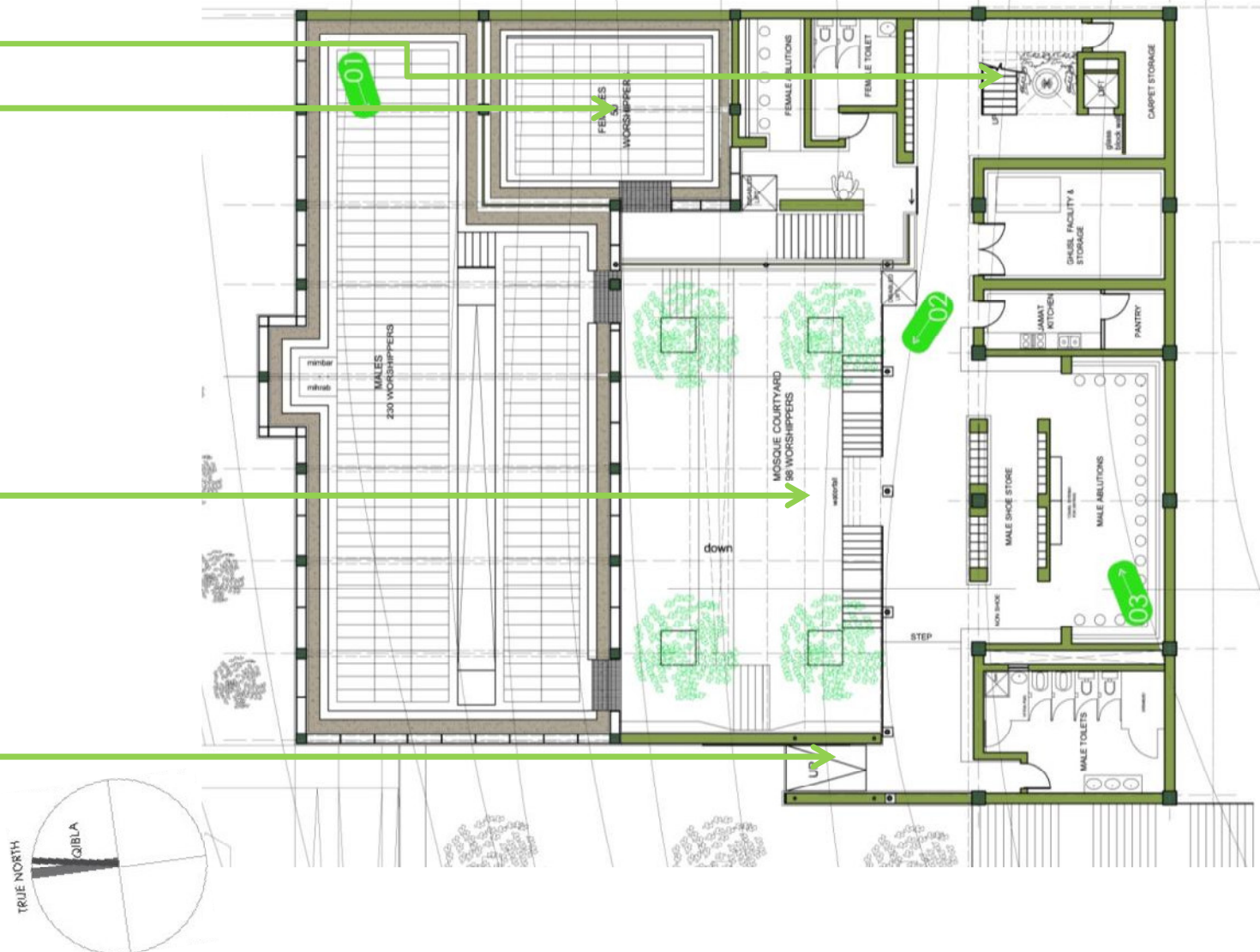
West sun protection is achieved through the use of stinkwood timber lathing's placed within the argon filled cavity between the double glazed wall.

Female entrance

Female prayer space is separated from the males by a timber screen and height difference

Mosque courtyard is planted with sweet smelling trees and filled with the sound of falling water from the waterfall.

Males enter underneath the minaret, after the toilets is non shoe area.



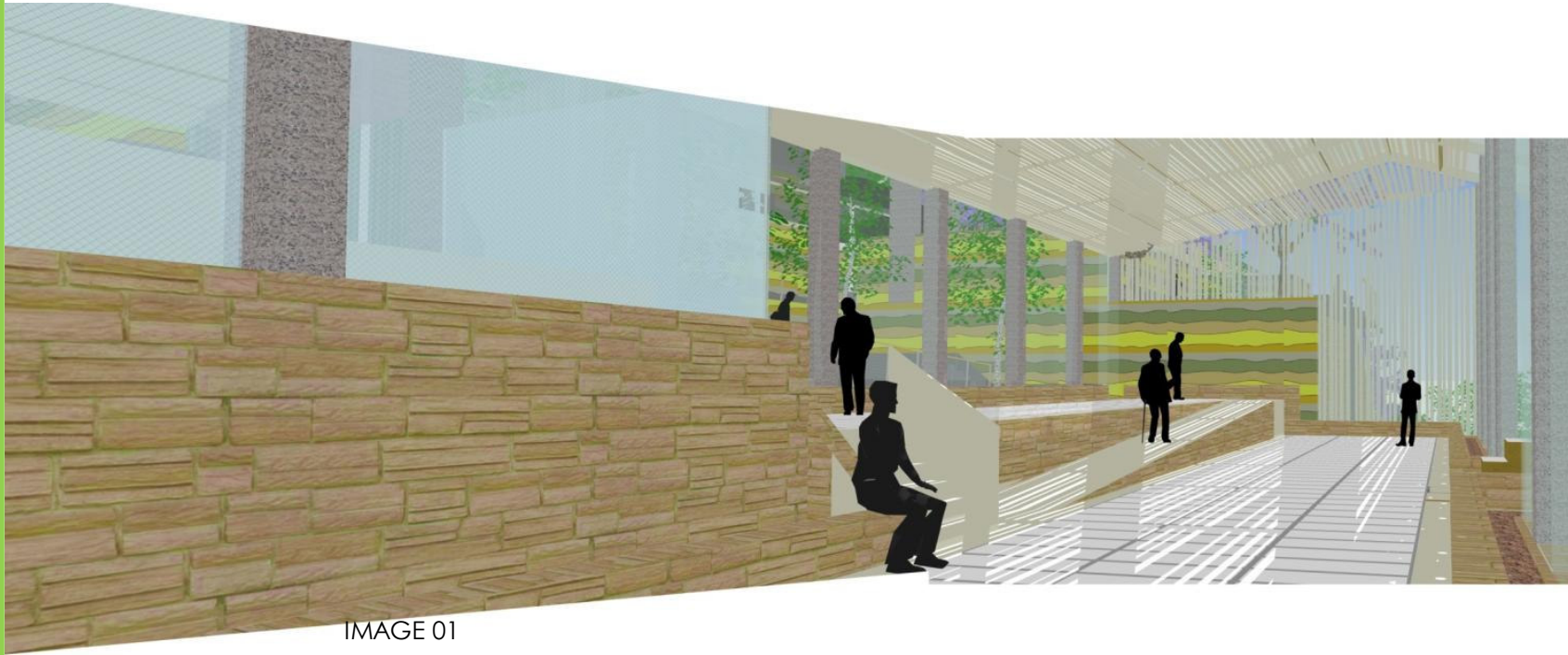


IMAGE 01

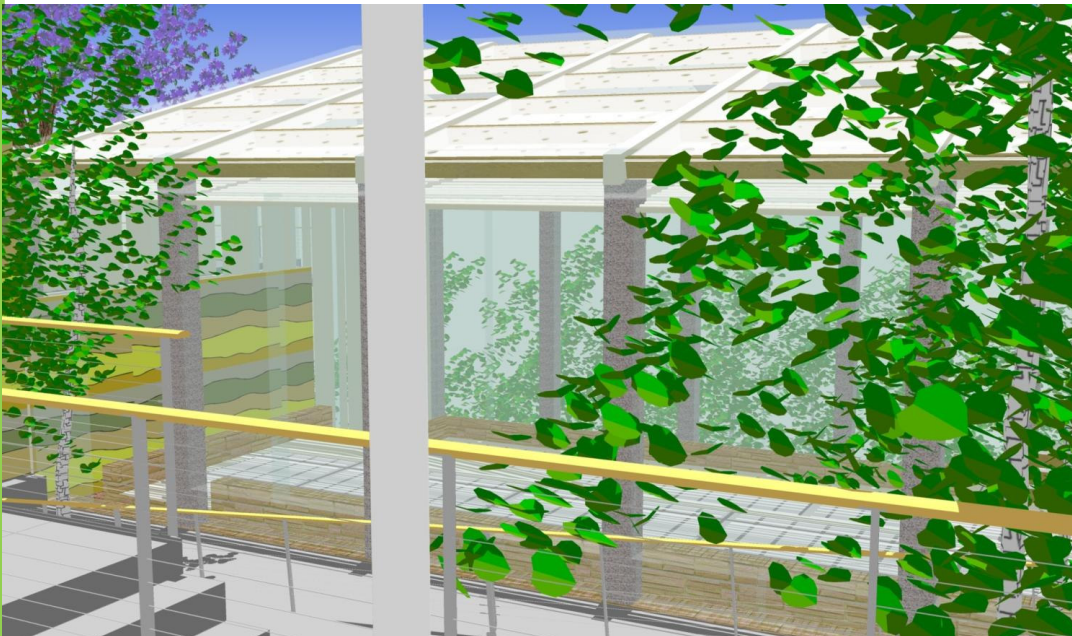


IMAGE 02



**Final design:**

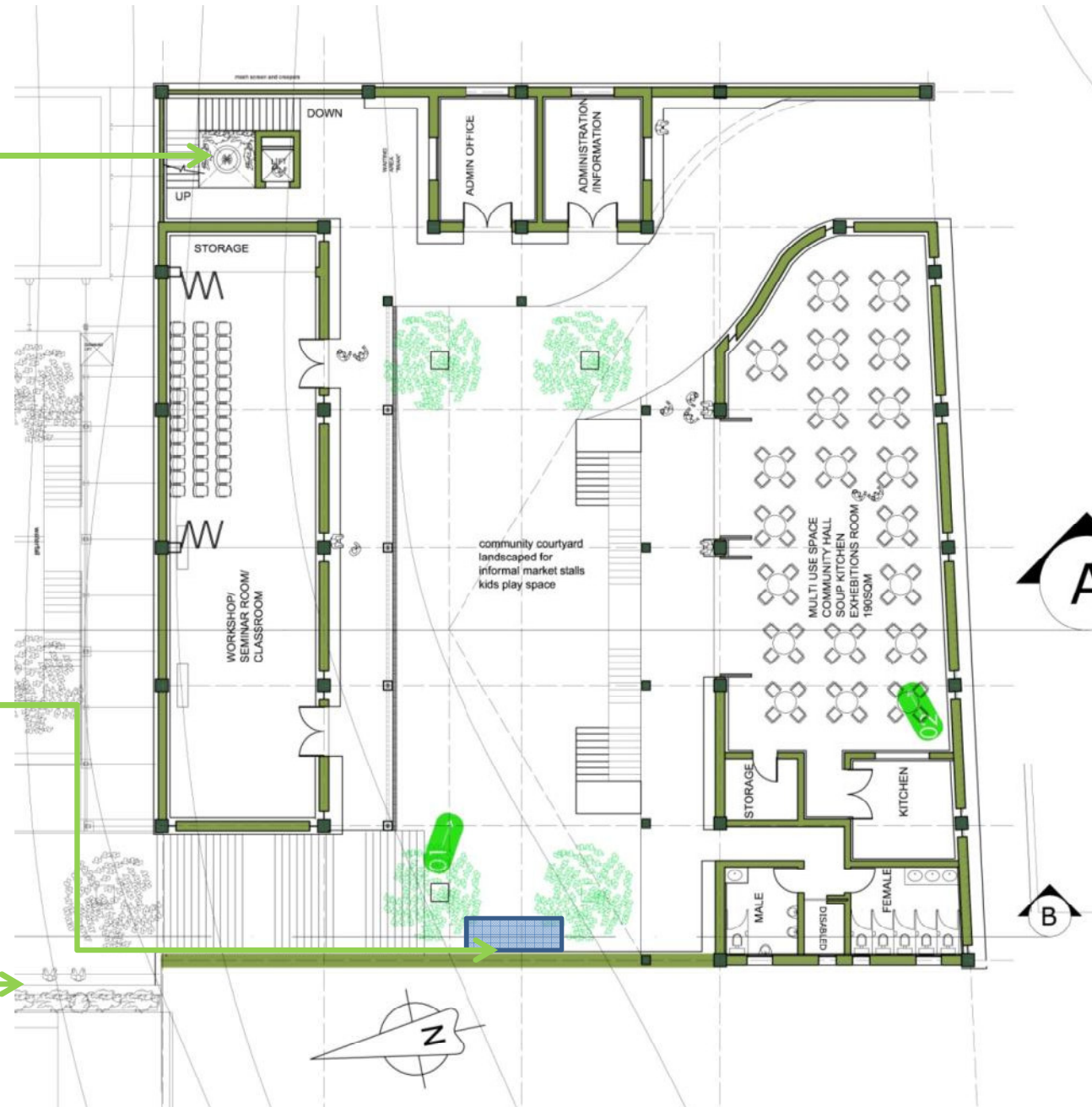
The knuckle of the scheme, allows access to the mosque, Madresa, and community facilities

Final design:

This stair gains the females access to the mosque and is designed to be a landscaped area with a stair in it

A waterfall along the west wall becomes the feature of the community courtyard

Seating and planting give the user a pause space to enjoy the view.





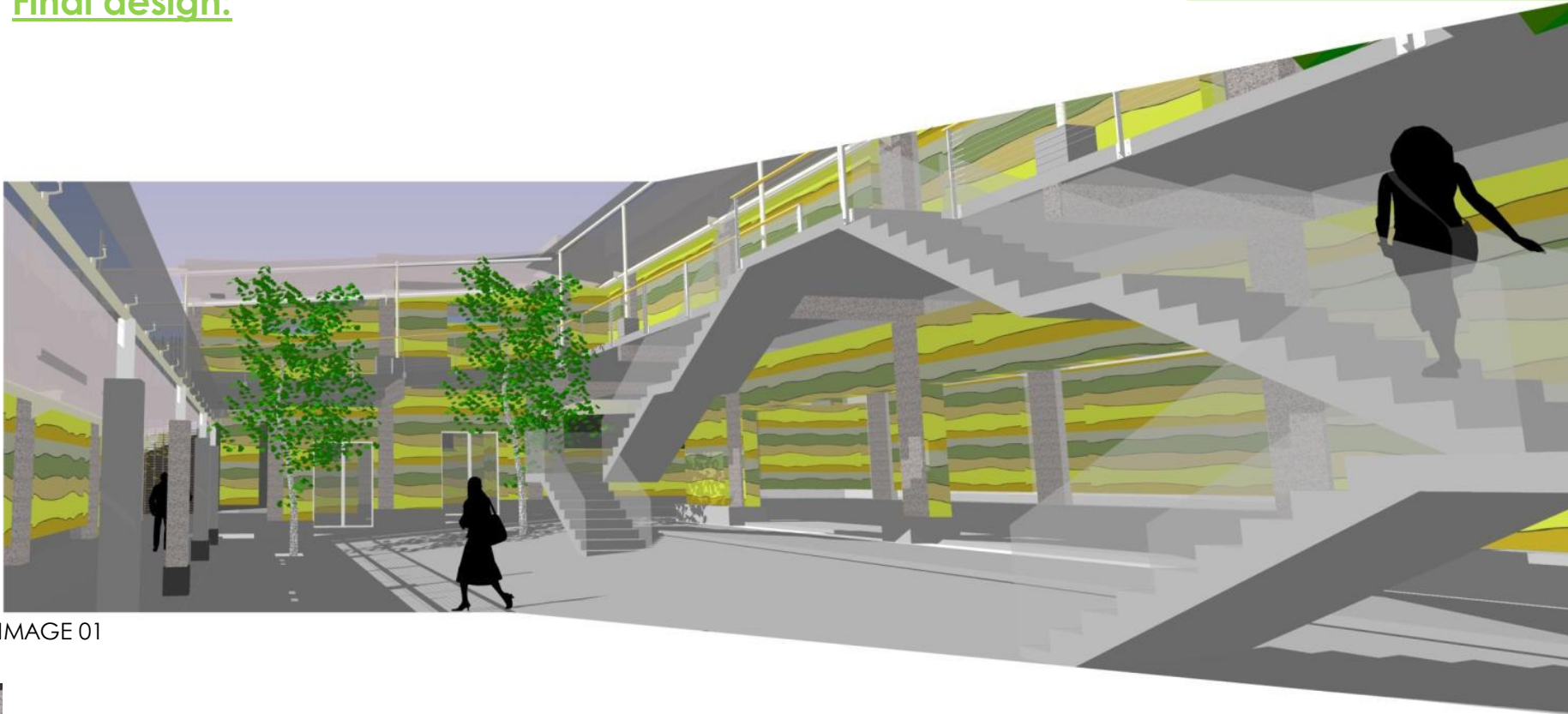


IMAGE 01

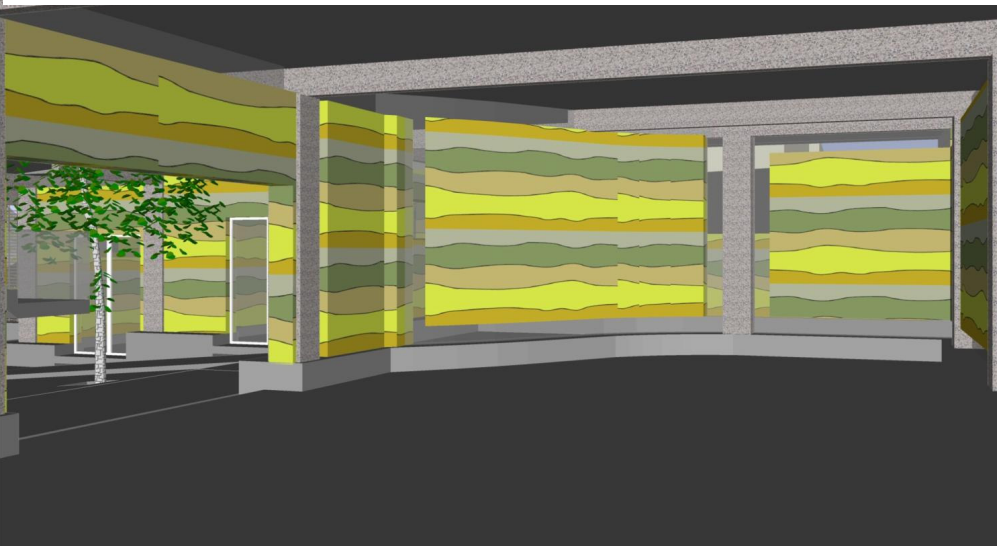
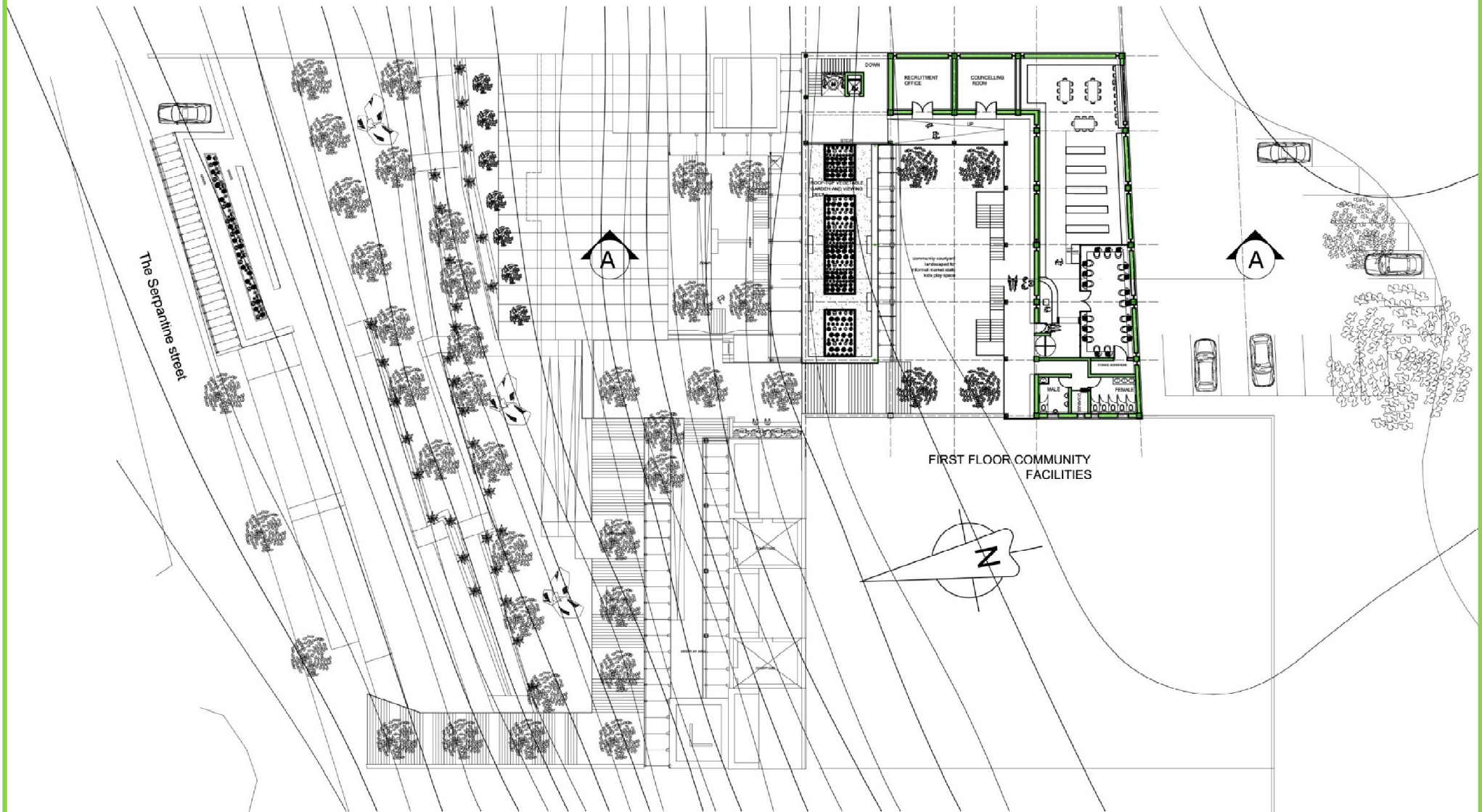


IMAGE 02

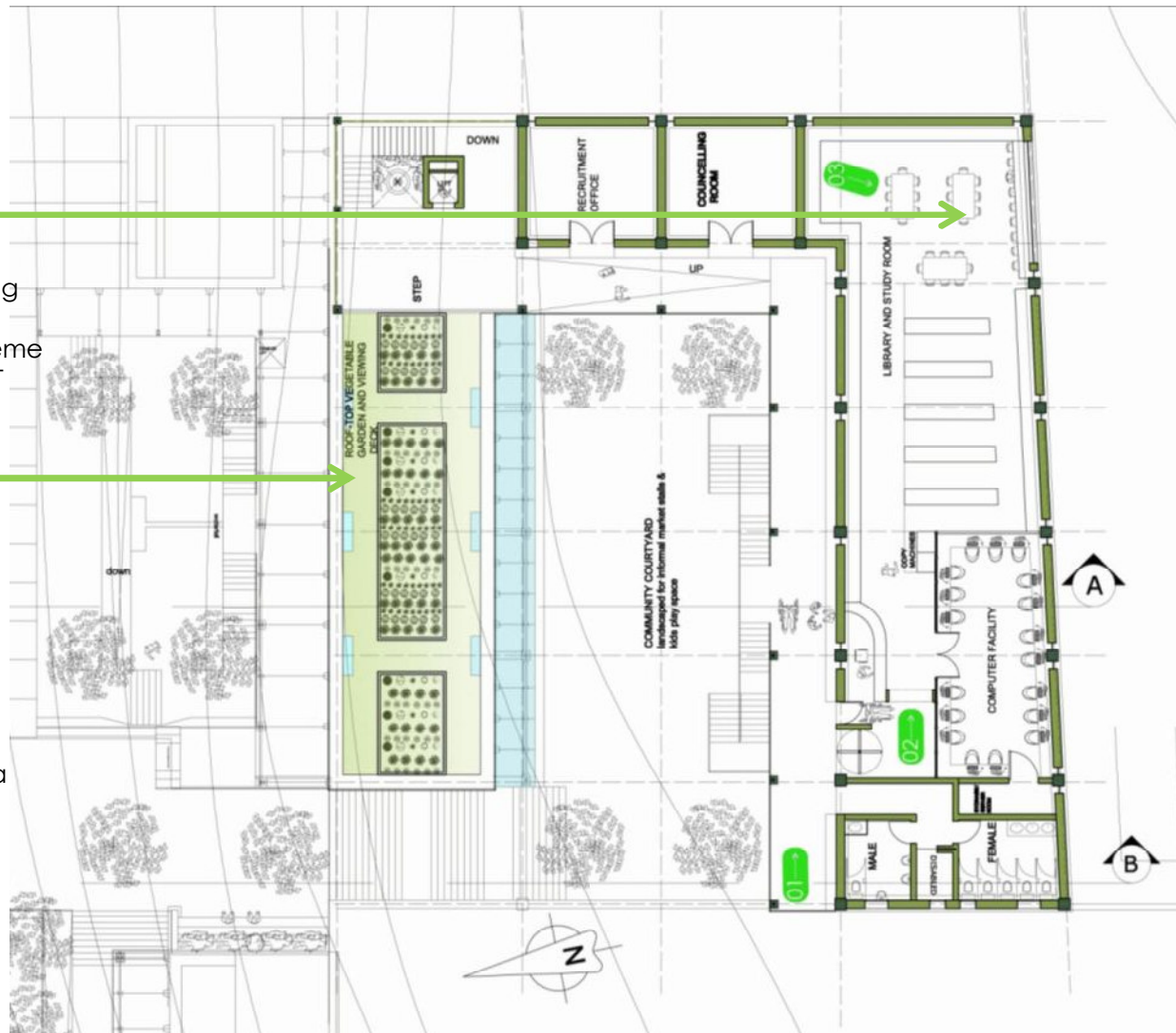
Final design:



Final design:

Library ,computer facilities, reading room .and homework area. This speaks about the crux of the scheme :EDUCATION AND EMPOWERMENT

A grass roof with a vegetable garden is a viewing deck as well. The garden is managed and maintained by the kids in the area with produce being used in the soup kitchen.



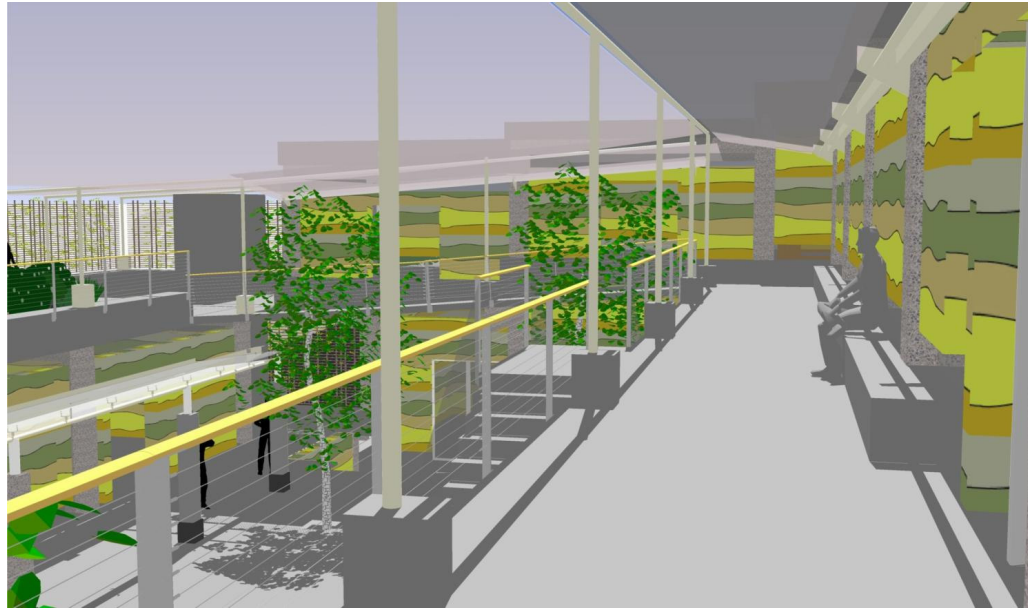


IMAGE 01



IMAGE 02



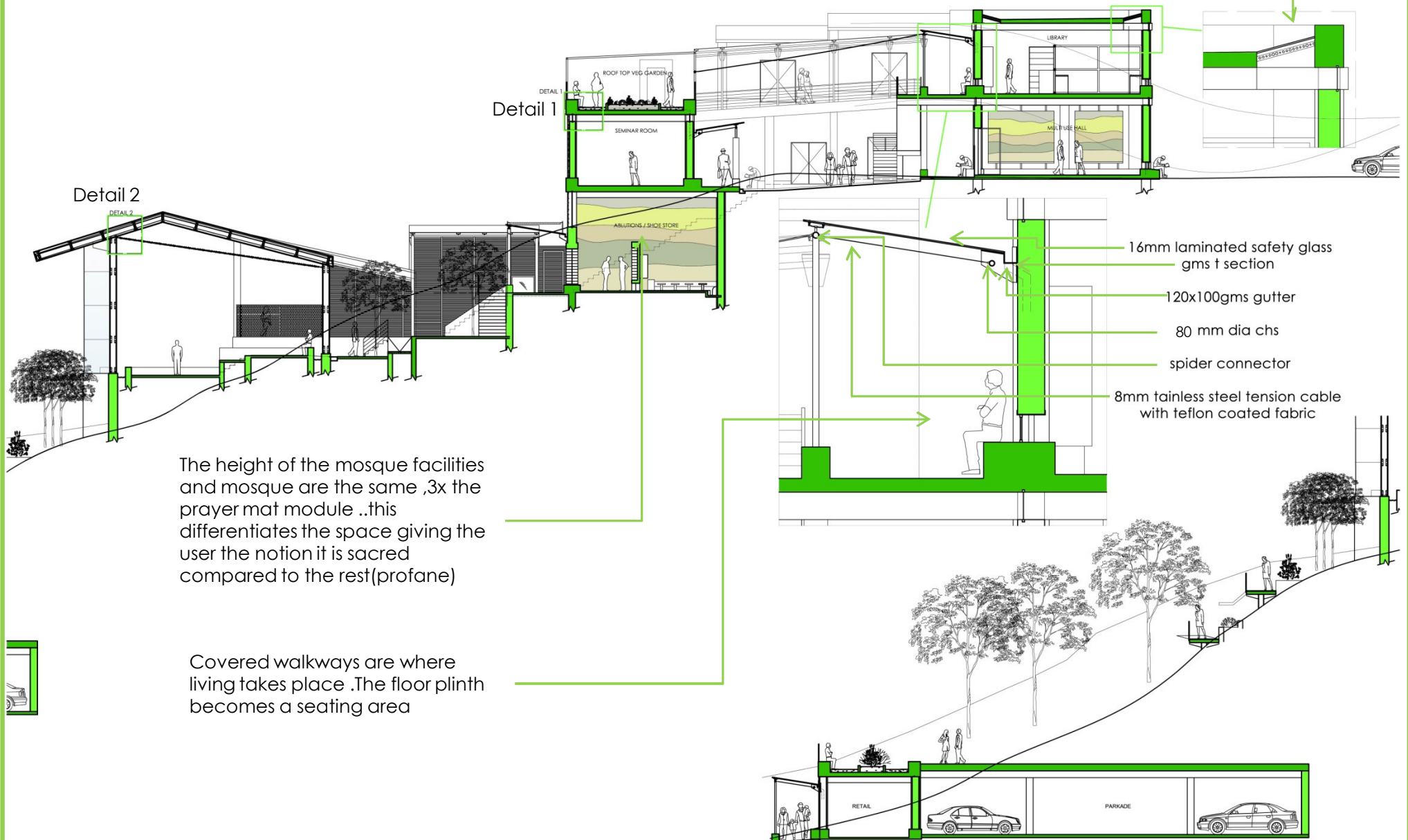
IMAGE 03

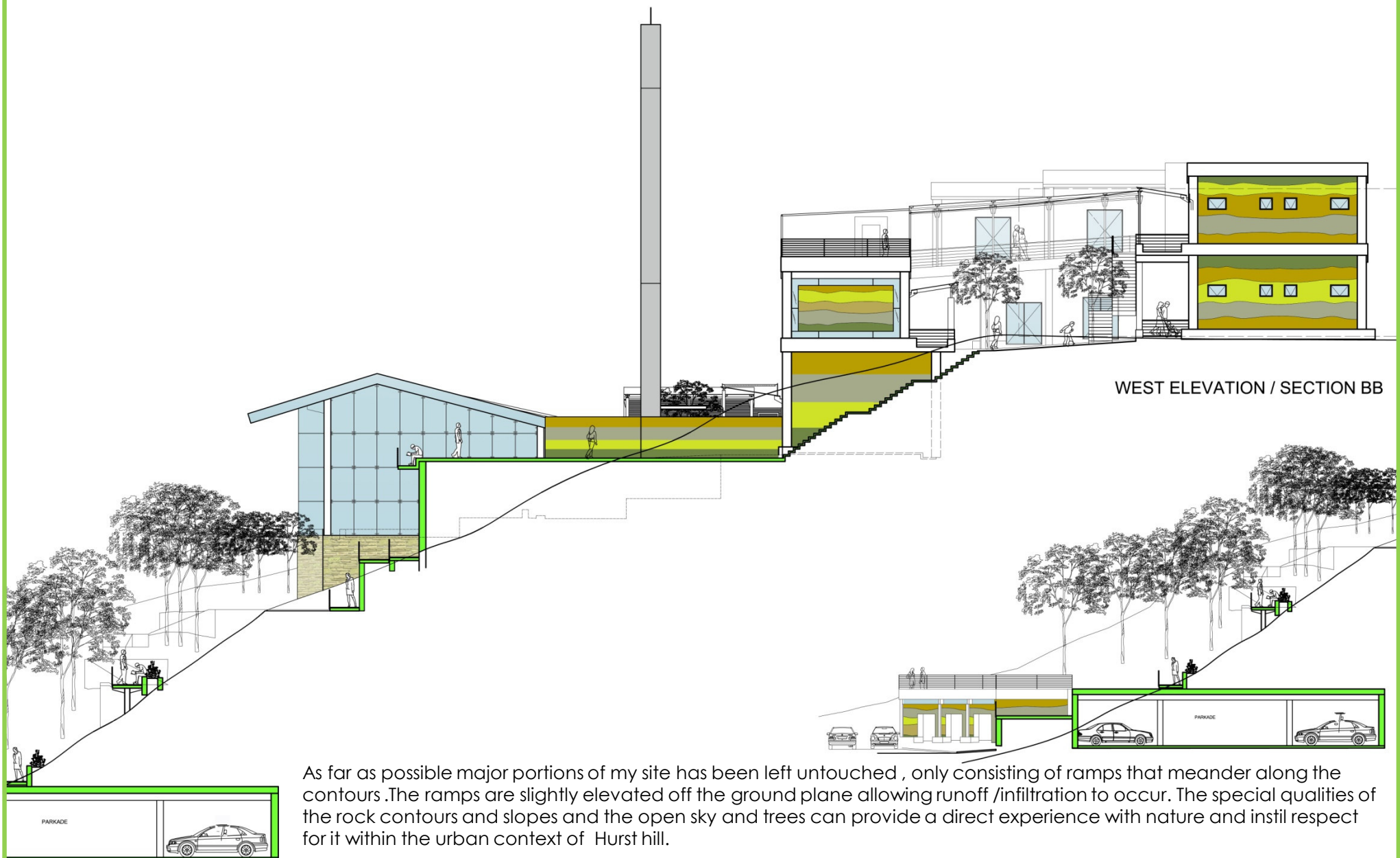


**Final design:****1:250 Section AA**

Final Design

Laminated safety glass skylight with timber lathes. exposes beams and floor slab

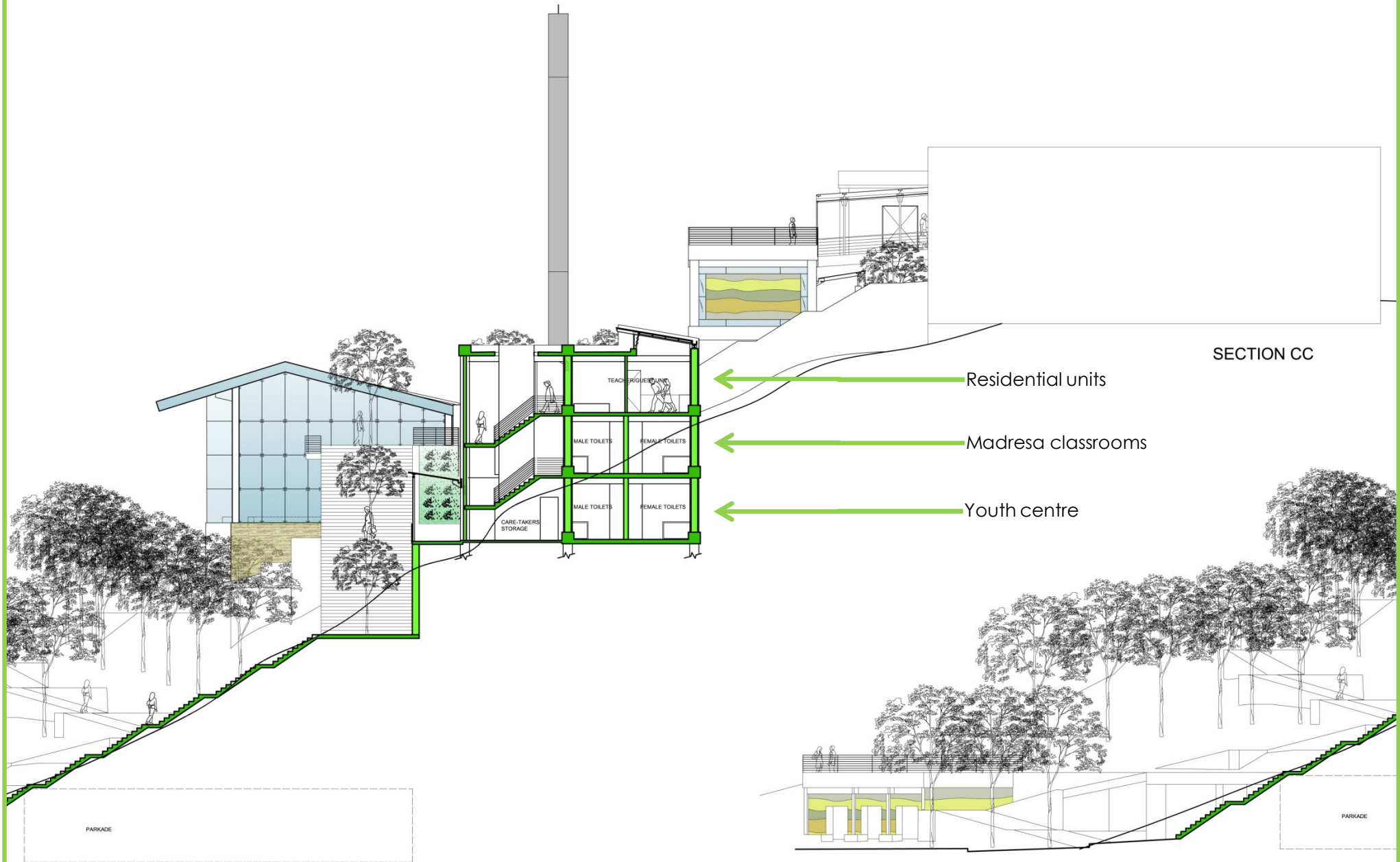




As far as possible major portions of my site has been left untouched , only consisting of ramps that meander along the contours .The ramps are slightly elevated off the ground plane allowing runoff /infiltration to occur. The special qualities of the rock contours and slopes and the open sky and trees can provide a direct experience with nature and instil respect for it within the urban context of Hurst hill.

Trees are planted to create a transition from man made to the natural or vice versa as one ascends or descends the pedestrian path. The end goal is for the trees to be larger than the buildings ,thus clearly signalling God's creations superiority over that which is man made.





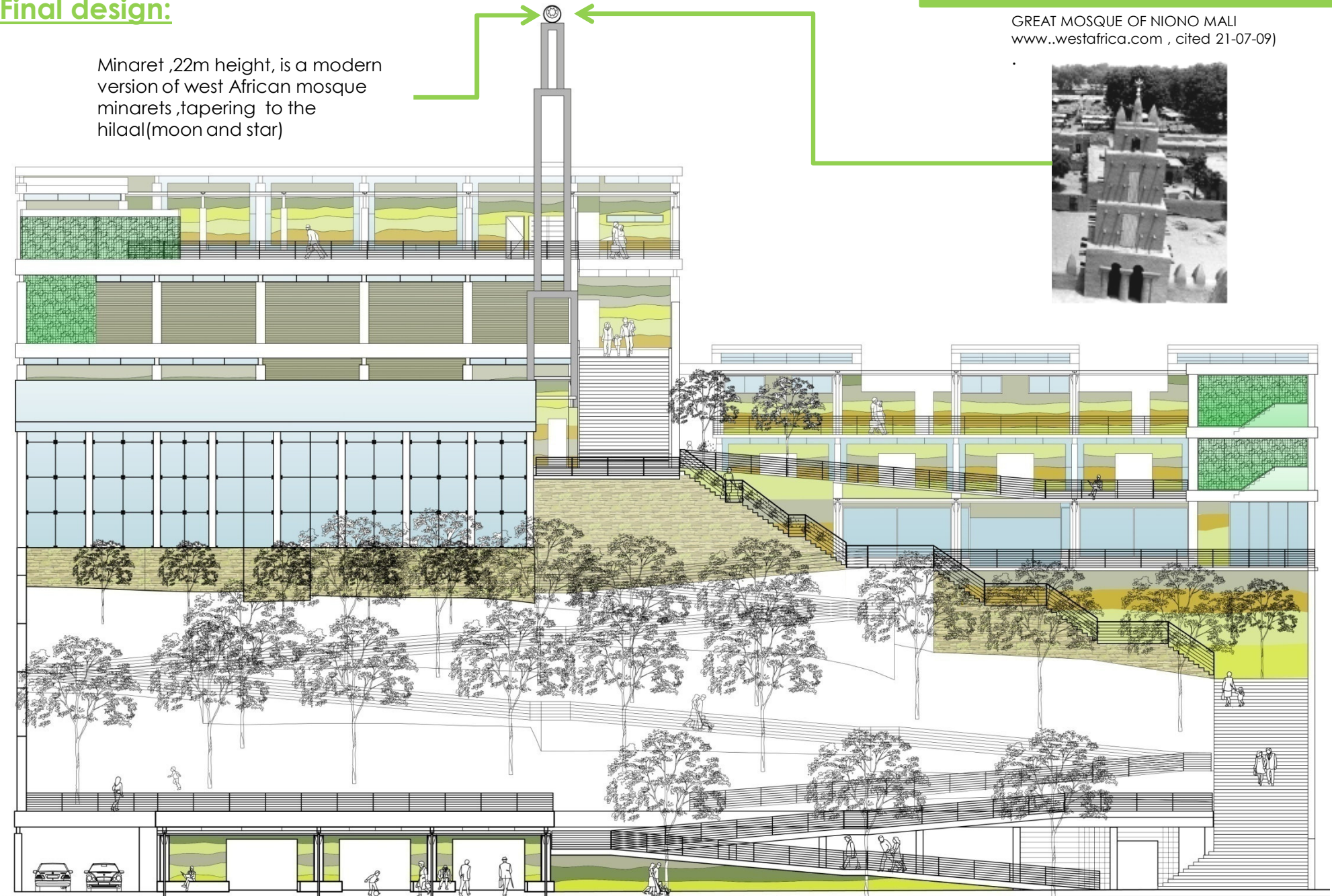
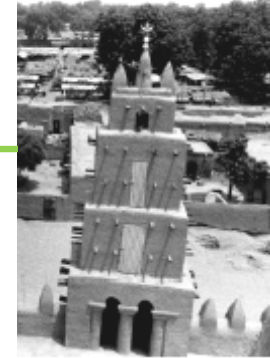
**Final design:**

Minaret ,22m height, is a modern version of west African mosque minarets ,tapering to the hilaal(moon and star)

North elevation 1:250

Final Design

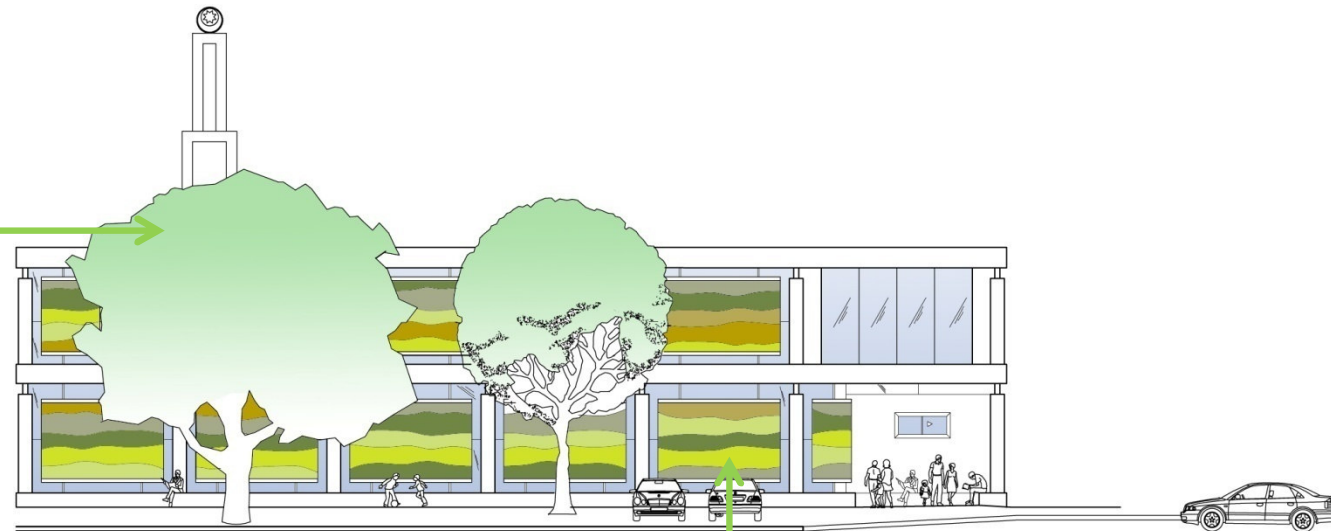
GREAT MOSQUE OF NIONO MALI  
www..westafrica.com , cited 21-07-09)





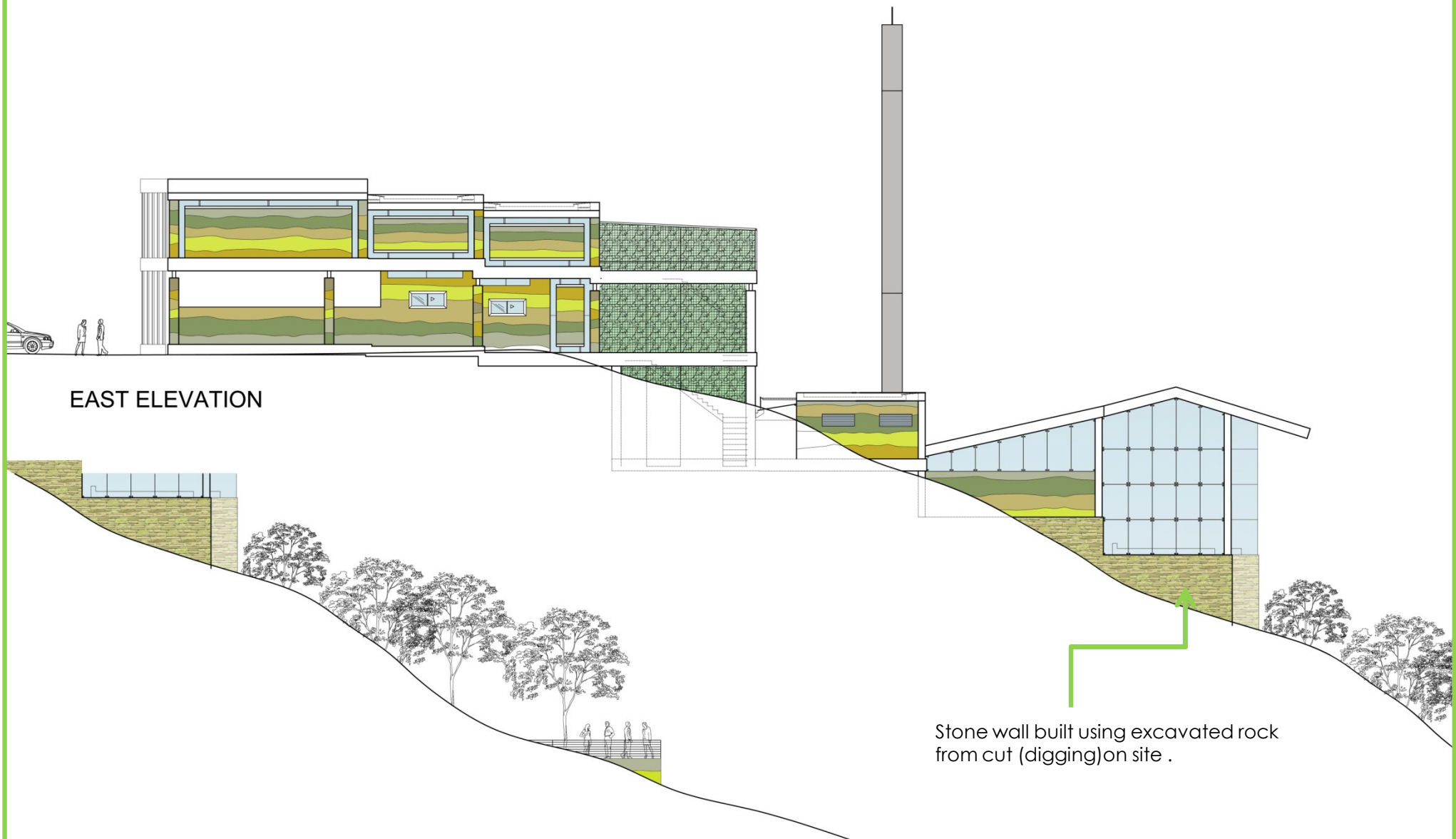
Final design:

In keeping with Frank Lloyd Wright's principles, 'Gods' creation takes precedent over what is man made.



SOUTH ELEVATION

Rammed earth walls built on steel C channels separate the element of wall from floor. The column, wall, floor and roof are all seen as separate.





**Final design:****The visual beauty of the location of sacred sites:**

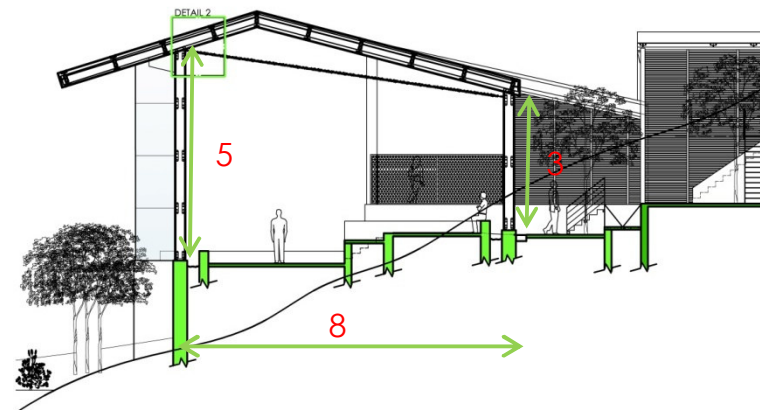
This thesis views the site to be Gods creation and therefore the sacred , the mosque floor plane is venerated by raising it. The enclosing structure is secondary and merely gives protection from the elements.

**The visual beauty of the structures at the sacred sites**

This thesis breaks away from the conventional mosque typology with its kit of parts(mimbar ,domes minarets mihrab etc) , the mosque is designed to allow for inclusivity and openness .the centre is open to all faiths with non Muslims having the opportunity to look down into the mosque from the knuckle or even venture into the courtyard and watch the prayers happen.

**The sacred geometry used in the structures**

The mosque is designed using the Fibonacci sequence , using the prayer mat as a module namely 1.3m .The mosque has a proportion of 3:5:8 and a width of 13 with the minaret at 22 x the module.



### The building materials used in the structures at the sacred sites

Earth materials are used extensively. Rammed earth is used throughout for columns and walls. They firstly have thermal insulation advantages (cool in summer, warm in winter). They also give the design an African feel, majority of the traditional domestic architecture of the South African region were mud walls. Indigenous timbers are another material used, stinkwood and glu-lam pine are easily available, being timber they have a low embodied energy. Local labour and materials will be used wherever possible, the centre being about empowerment and education can use the construction of the centre to train the unskilled.

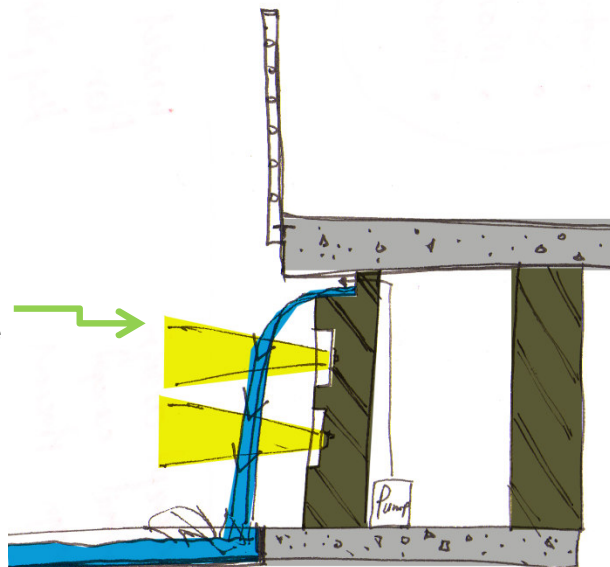
### The influence of light and colour

Light is symbolic of God residing above, Light within the mosque enters from all sides, sand blasting filters light on the north side, the west has a dappled light filtered by timber reeds found within the wall cavity. The roof however has a Teflon coated fabric with random sized holes cut-out filtering the light. That light is then further diffused by a timber reed ceiling. The ambience created is one of sitting under a tree. This speaks of the African idea of sacred space where nature is venerated as the sacred. Refer to detail 2.

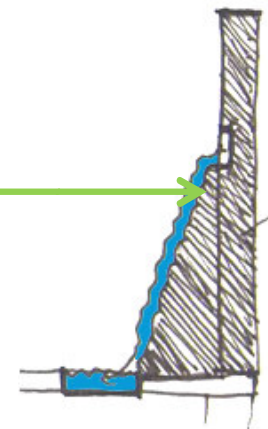
### The influence of sound and music

The sound of falling water soothes the soul and creates a tranquil environment. Water falling within the mosque courtyard help in masking out any ambient noises and cool the space down with evaporative cooling (taking advantage of the prevailing winds).

Water feature /waterfall underneath staircase in mosque courtyard. Recessed lighting behind the water stream make the water feature a feature at night.



Water feature /waterfall within community facilities courtyard, the undulating surface of the rammed earth wall rustles the water creating a tranquil sound that masks out any outside noises.





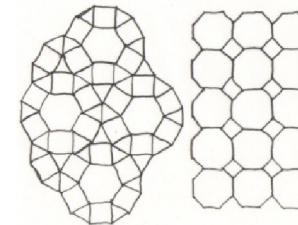
**The ceremonial and therapeutic use of aromatic substances:**

As discussed smell is our most acute sense, this said the floor of the mosque being sacred is enhanced by adding scent. In the same way that admixtures are added to concrete to make it cure faster or have a pigment, the concrete floor (sacred raised space) of the mosque will have aromatic substances added to it. In this way the mosque will be known for its sweet smell. Stinkwood/rosewood/ alder wood all indigenous timber have sweet smells and will be used as the timber reed ceiling of the mosque or as light diffusers in other areas of the design.

The mosque courtyard is planted with jasmines and sweet smelling trees adding to the power of aromatic substances in enhancing the sacred.

**The influence of the 'visual scriptures' which beautify the shrines**

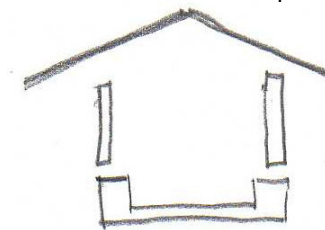
Ornamentation is kept to a minimum, the only ornament found is sandblasting of robe patterns on the glass, diffusing the light and making reference to the Islamic principle of unity within multiplicity.

**Intention**

This community development centre mosque is intended to be a small community centre fulfilling the needs of the community. The mosque itself breaks away from being a monumental showpiece to being used by its community and having a mix between tranquil and hustle and bustle spaces.

**Eight elemental forms**

The elements that make up a building are clearly seen in the design, this makes reference to north African earth mosque architecture as well as traditional African sacred spaces. Floor, wall, column, roof etc are all seen as separate elements to create space.

**Sacred coolness or heating**

With trees and fountains within the courtyards, transpiration and evaporative cooling make the courtyards a pleasant place to spend one's time. With the prevailing winds from south to north this cool air in the courtyard is drawn into the interior spaces. On the other hand the use of rammed earth means that heat is kept out of the interiors by day (hot), the heat is retained in the thick walls and radiated into the interiors at night when heating is needed.

**Thresholds of entry**

Entering the mosque from the top of the site> one passes from light to dark to emerge into the light again (main community courtyard labelled 1). One then navigates down the staircase, meanders underneath the minaret and emerges in the mosque courtyard. Here the sweet smells and sound of water capture one's senses immediately. Moving down ramps or the stair one emerges into the mosque with its sacred floor and roof as tree canopy.

Entering from the bottom one ascends to the mosque creating anticipation, the jacaranda trees form a canopy shading the user, one passes underneath the minaret up a step symbolising a change in space (profane to sacred).

**Courtyards:**

1. Community facilities
2. Mosque court
3. Residential units light courts







AIR MOVEMENT

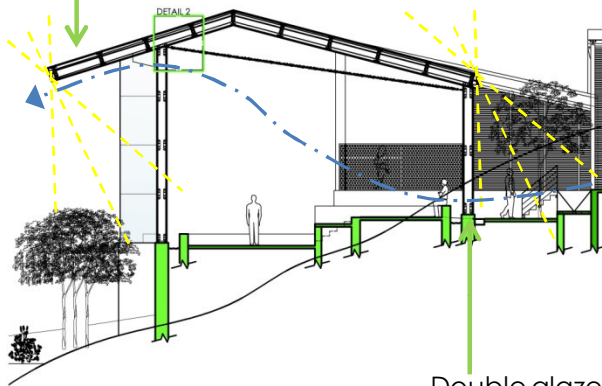


ENERGY FLOWS



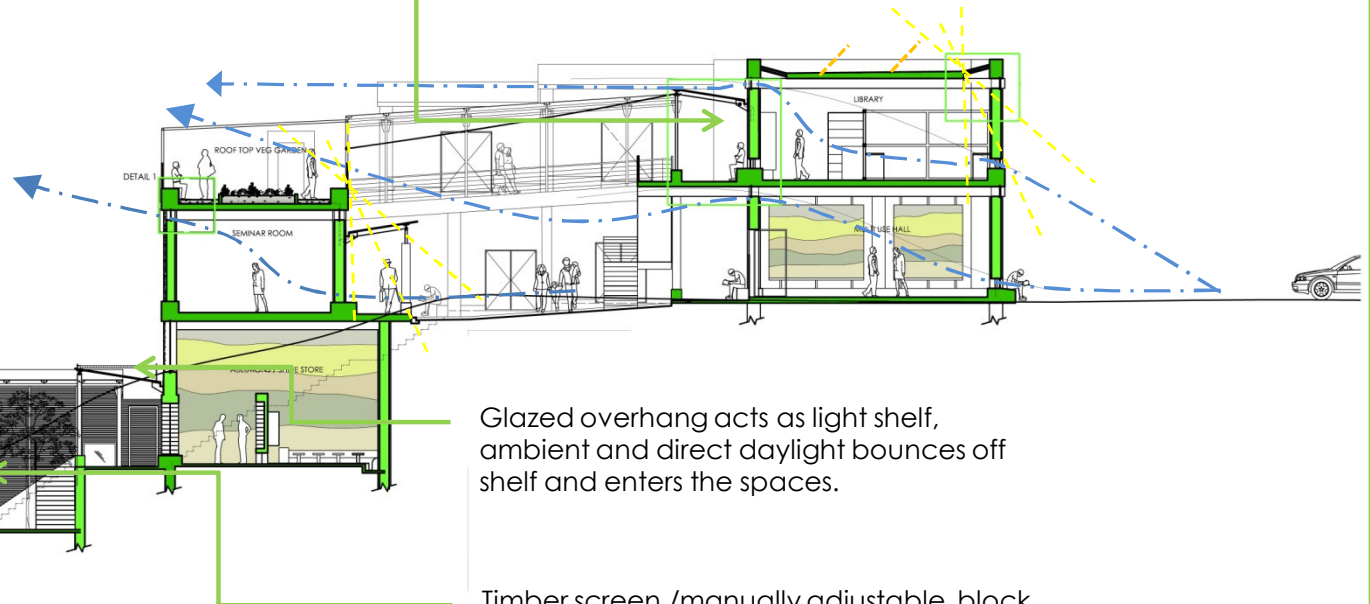
LIGHT + SHADING

Glazed overhang with Teflon coated membrane provide horizontal shading from northern sun



Double glazed louver window

Rammed earth walls retain heat during the day and radiate that heat into the spaces at night when it is needed.



Glazed overhang acts as light shelf, ambient and direct daylight bounces off shelf and enters the spaces.

Timber screen /manually adjustable ,block direct low angle sun and create privacy barrier between male and female spaces.



**Final design:**

AIR MOVEMENT



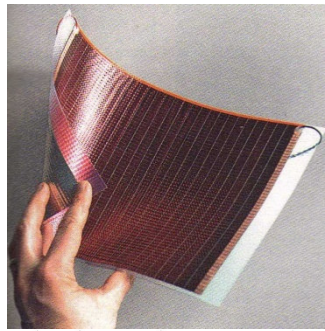
LIGHT + SHADING



ENERGY FLOWS



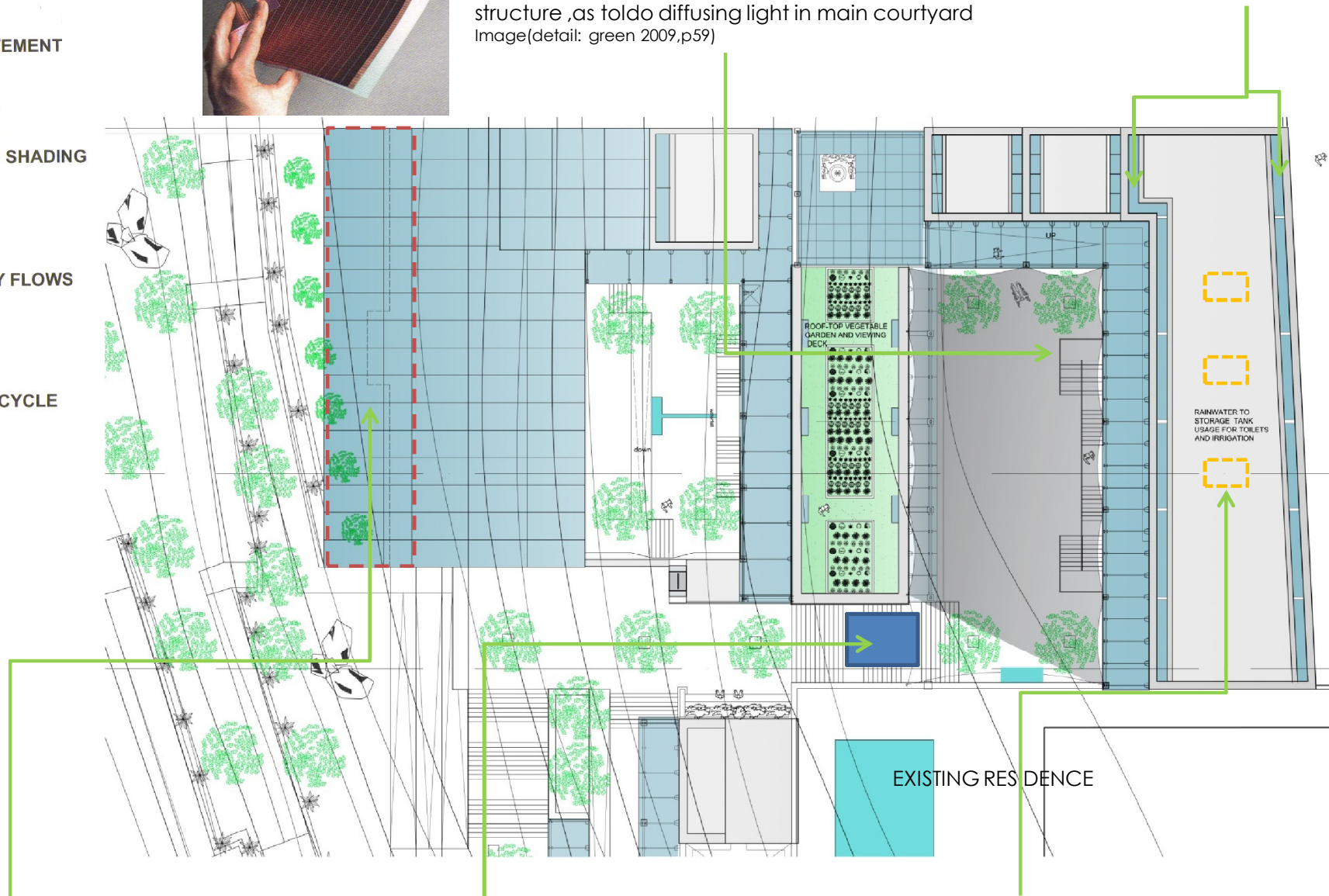
WATER CYCLE

**Sustainability:**

Pv rolls applied to pneumatic membrane structure ,as toldo diffusing light in main courtyard  
Image(detail: green 2009,p59)

## Final Design

Double glazing ,low E glass throughout



Erteck solar glass photovoltaic cells ,any excess energy is sold back to the grid for a rebate.

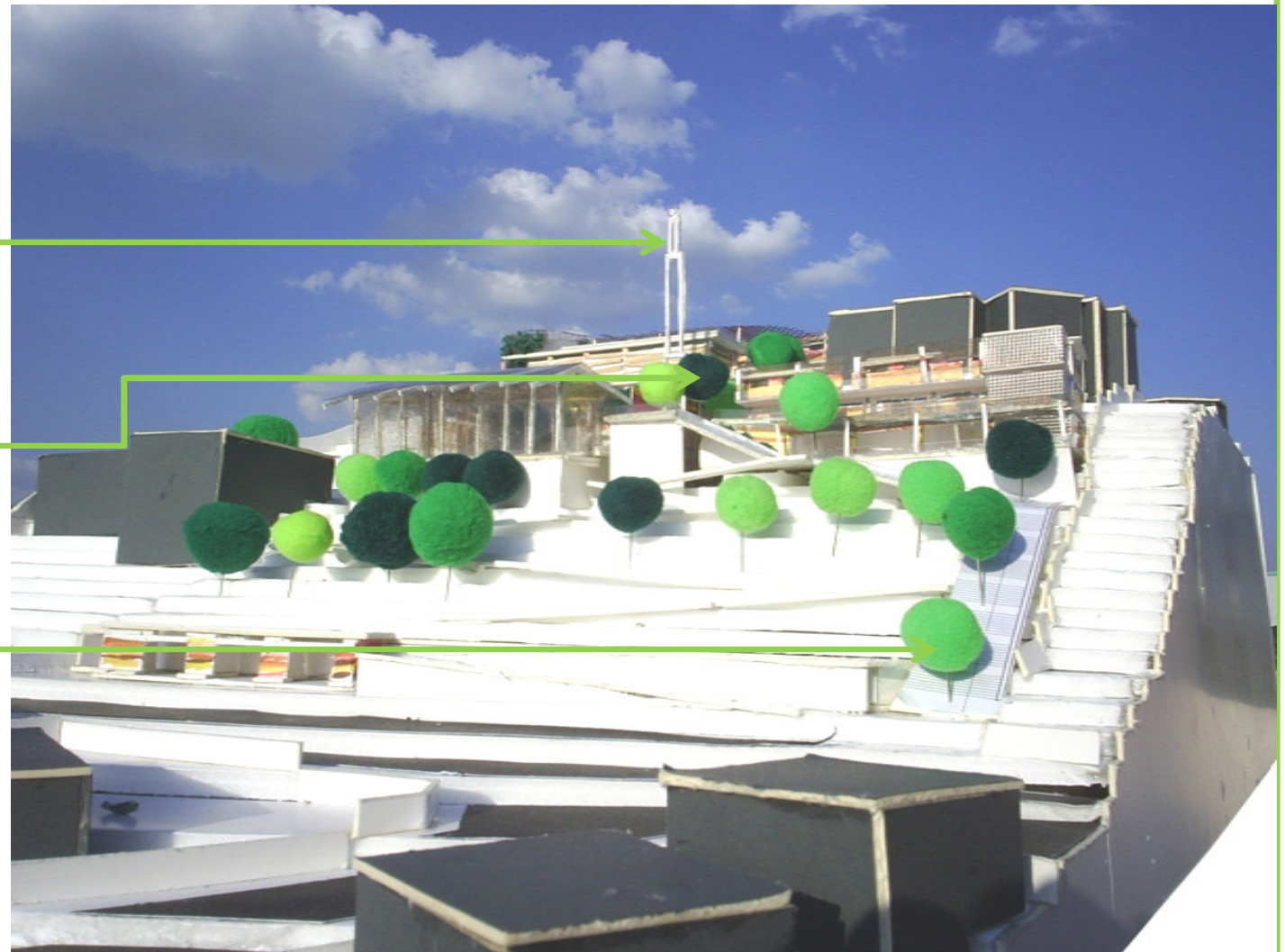
All roofs are rain water collectors linking to rain water storage tank buried under staircase , grey water and rainwater is used for irrigation of landscaping and toilet flushing

High parapets allow solar water heaters to be hidden on roof .

Final design:

Minaret

Jacaranda trees are extended off California street ,making the pedestrian path a literal extension of the street



MOSQUE

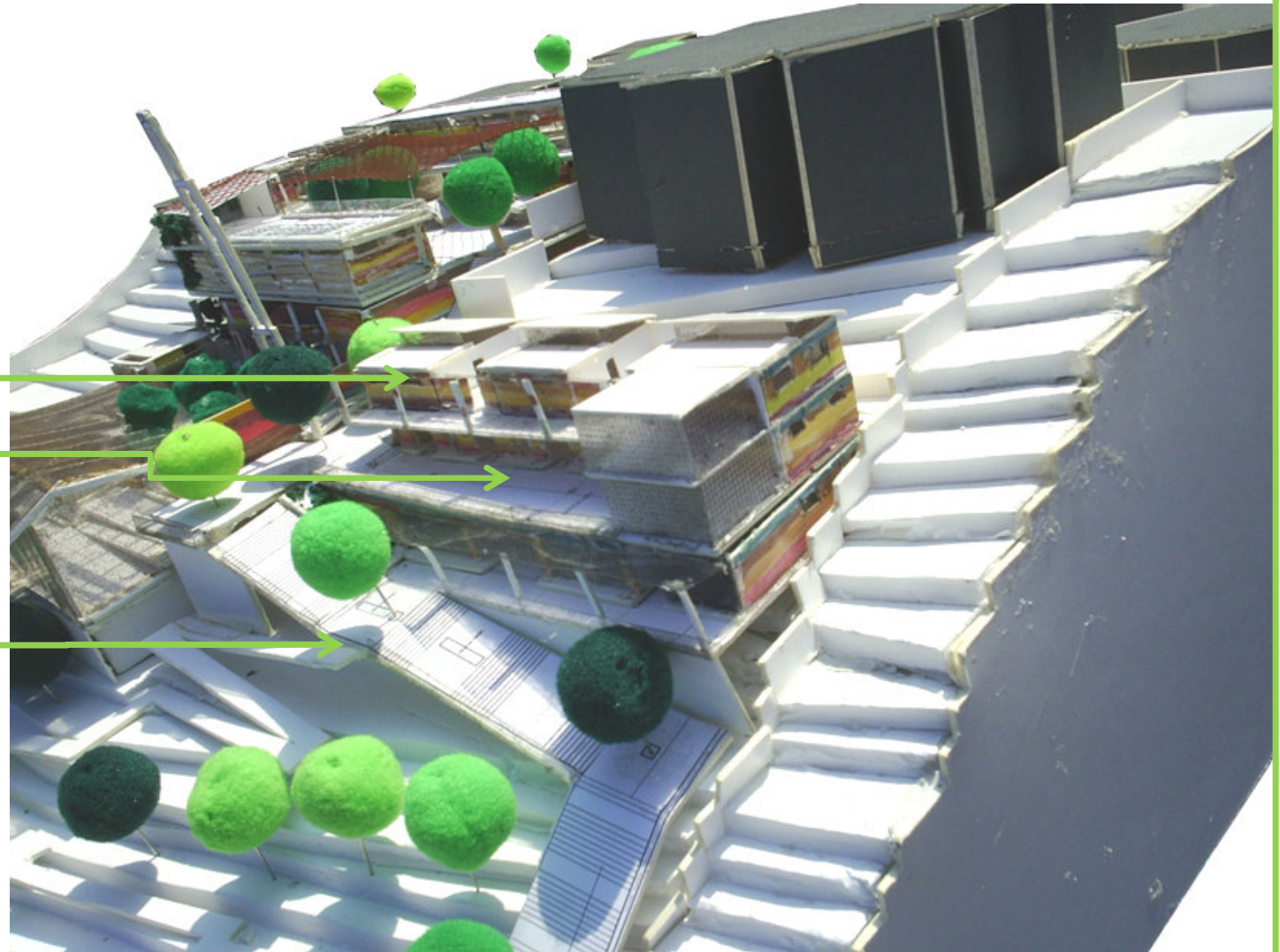


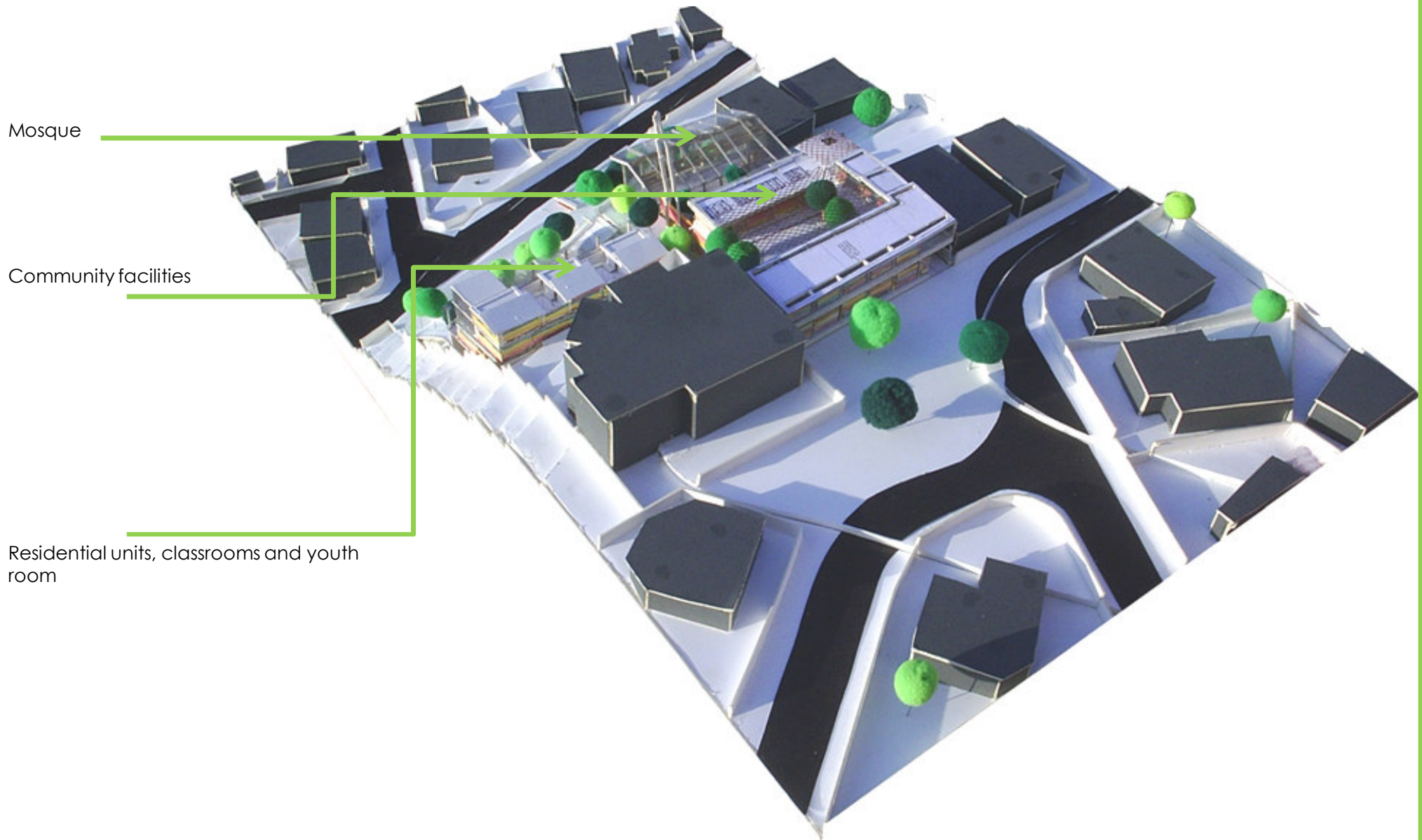
Final design:

Residential units.  
All rammed earth walls  
,constructed with local labor

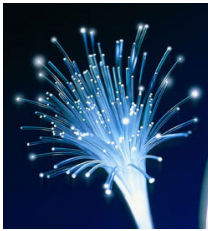
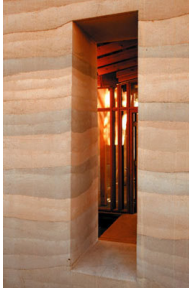
Madresa (classrooms)

Pedestrian path and  
ramps meet







Final design:

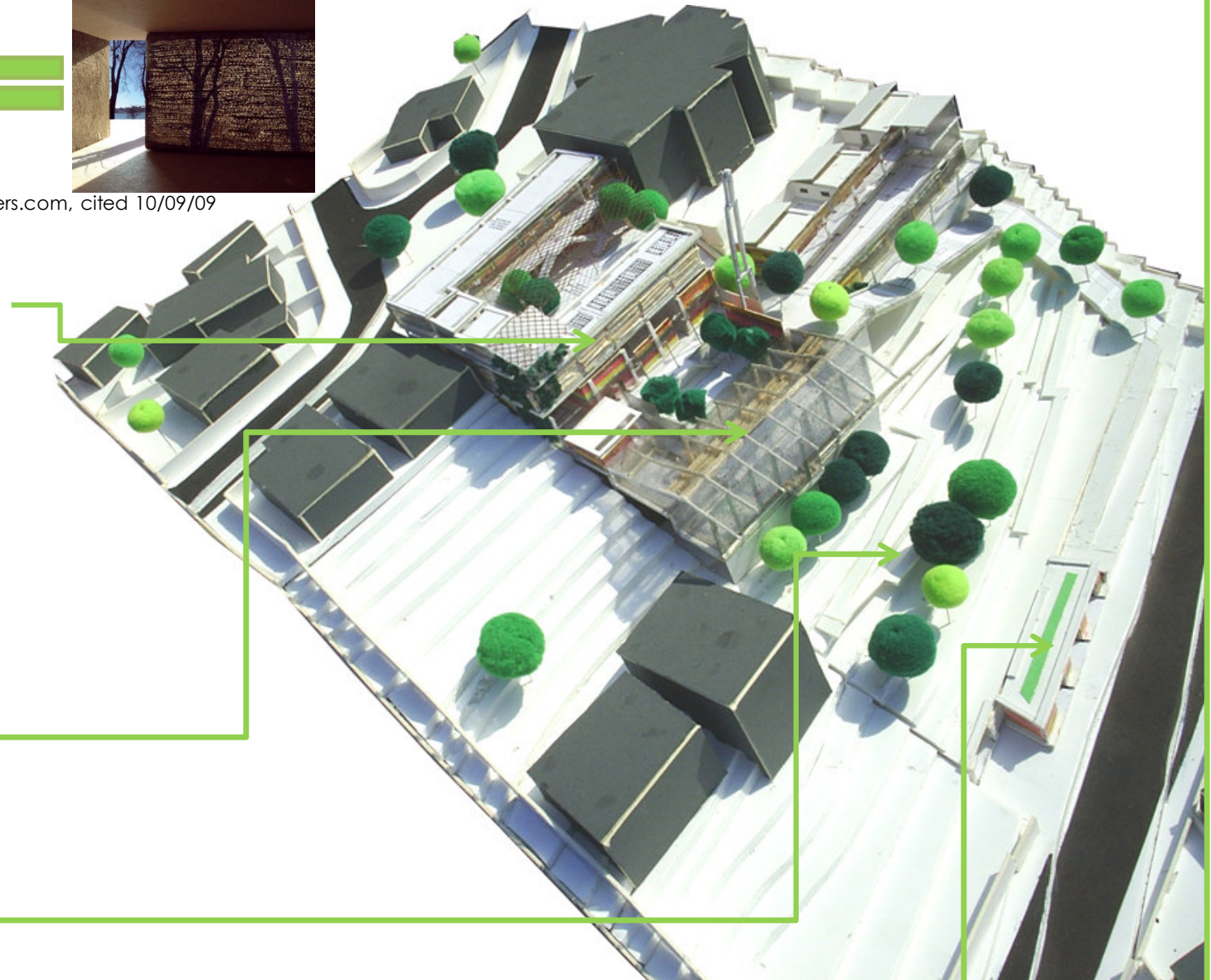
[www.tanglefootmasterbuilders.com](http://www.tanglefootmasterbuilders.com), cited 10/09/09

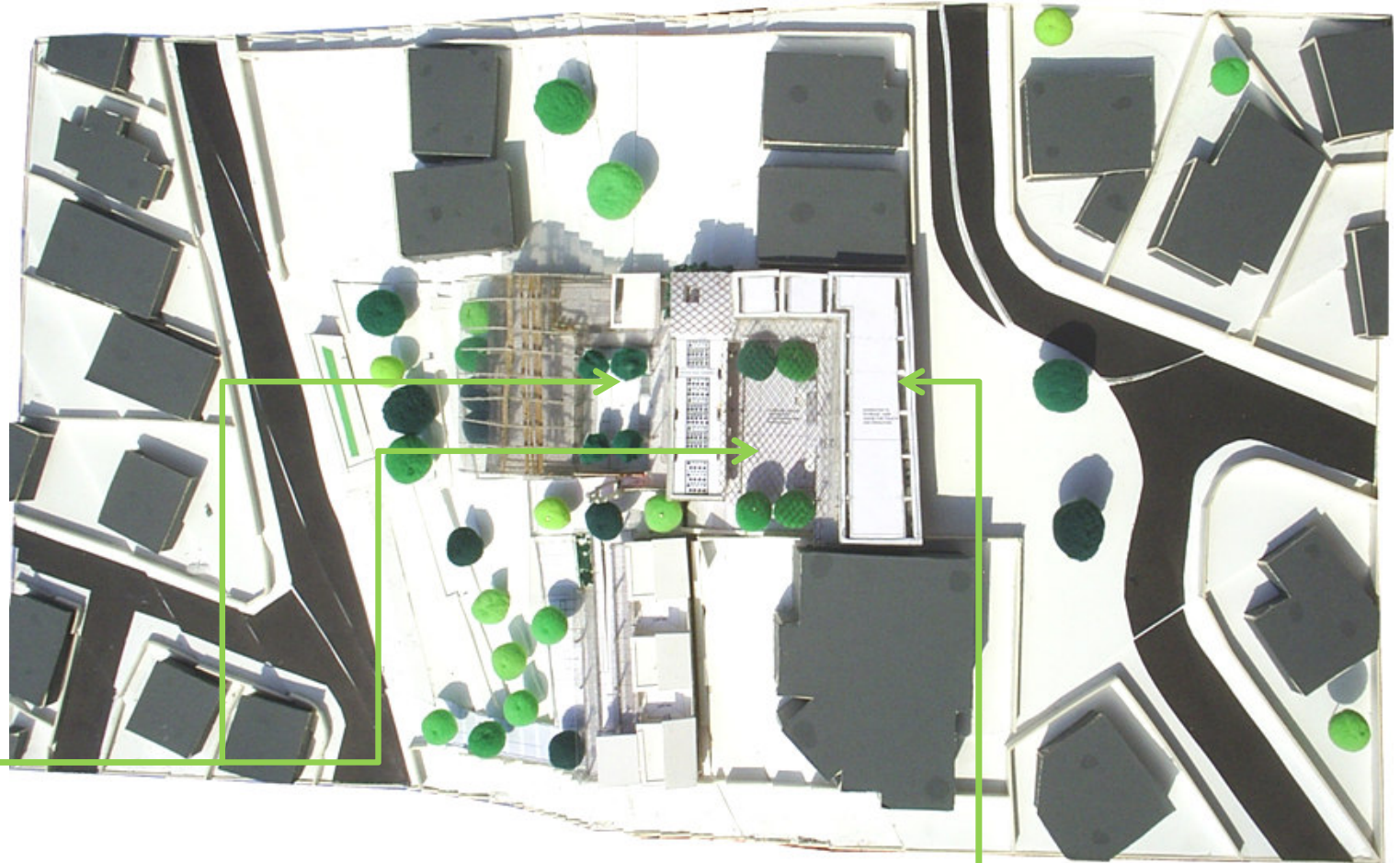
Optical fibers are places in the rammed earth, allowing one to view shadows passing the surface the light is shining from. Timber lathes are fixed on the outer surface of the wall creating a pattern that's visible by day

Timber reeds dapple light entering the mosque

Ramps follow the contours of the site.

Retail ,roof is landscaped as a viewing deck

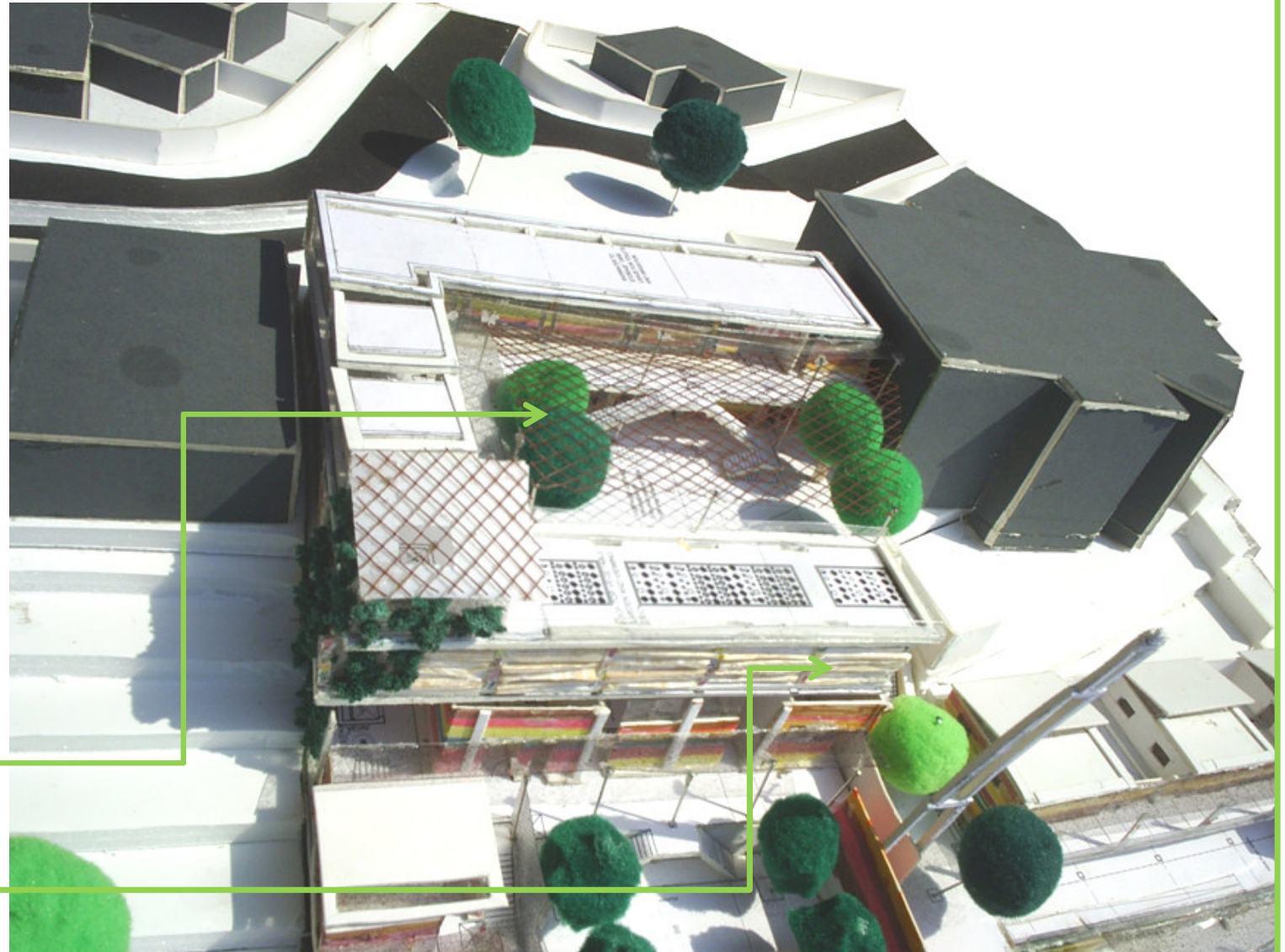


Final design:

Removable covering over courtyard

Skylights with timber reeds, also allow the beams of the roof to be exposed adding to the theme of building with elements



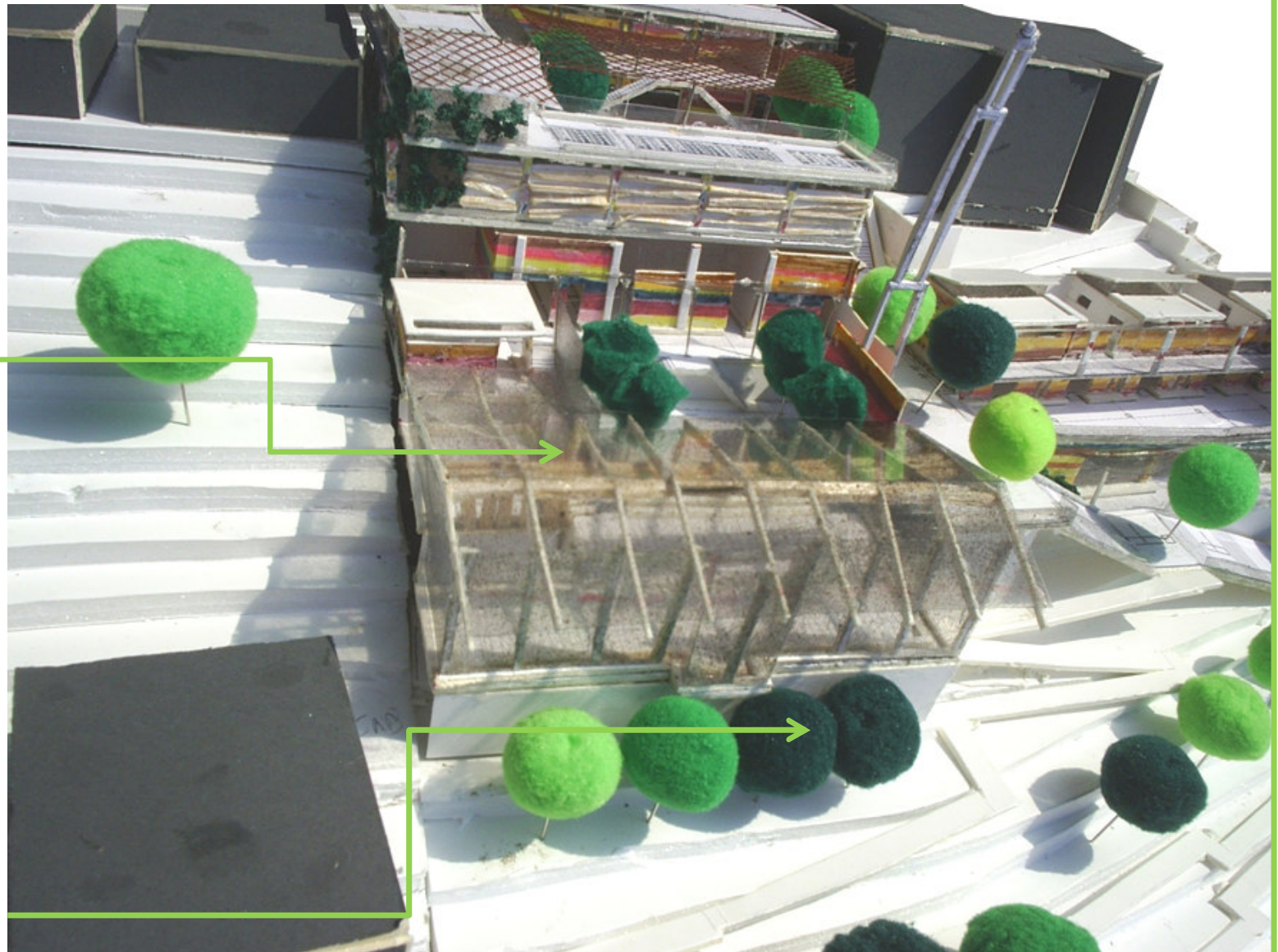


Removable covering over  
courtyard

Rammed earth wall with optical  
fibers as a binding agent

Final design:

Structural rammed earth columns support steel beams which support the double glazed roof. Light is dappled firstly with a tent like fabric and secondly a timber reed roof.



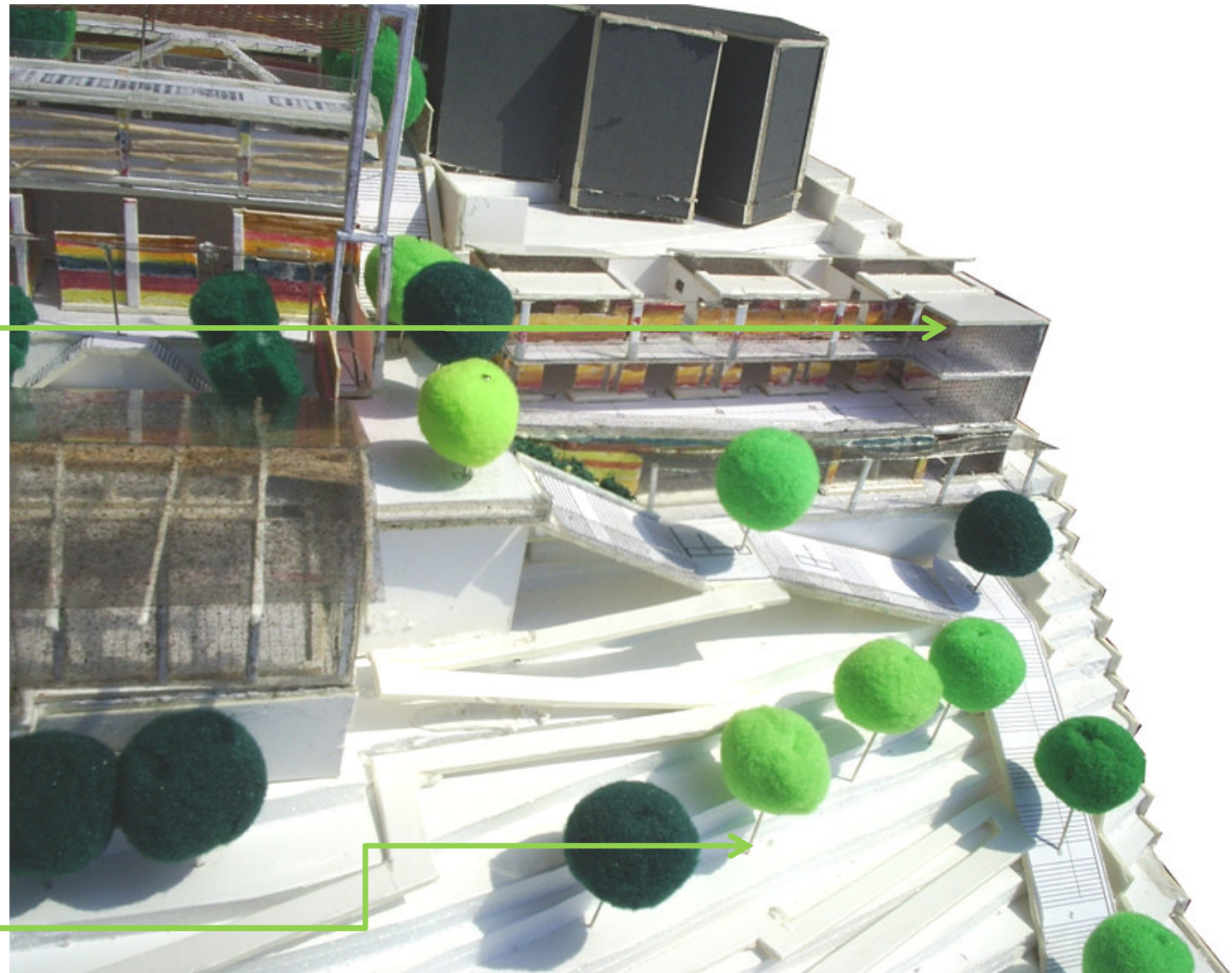
Trees are planted to frame the view from the mosque.



Final design:

Circulation core is clad with a steel mesh with vines. Nature is brought onto the facades to tie the natural to the man made.

Landscaped garden will be more resolved at the pin up presentation .



Final design:





Final design:







Final design:

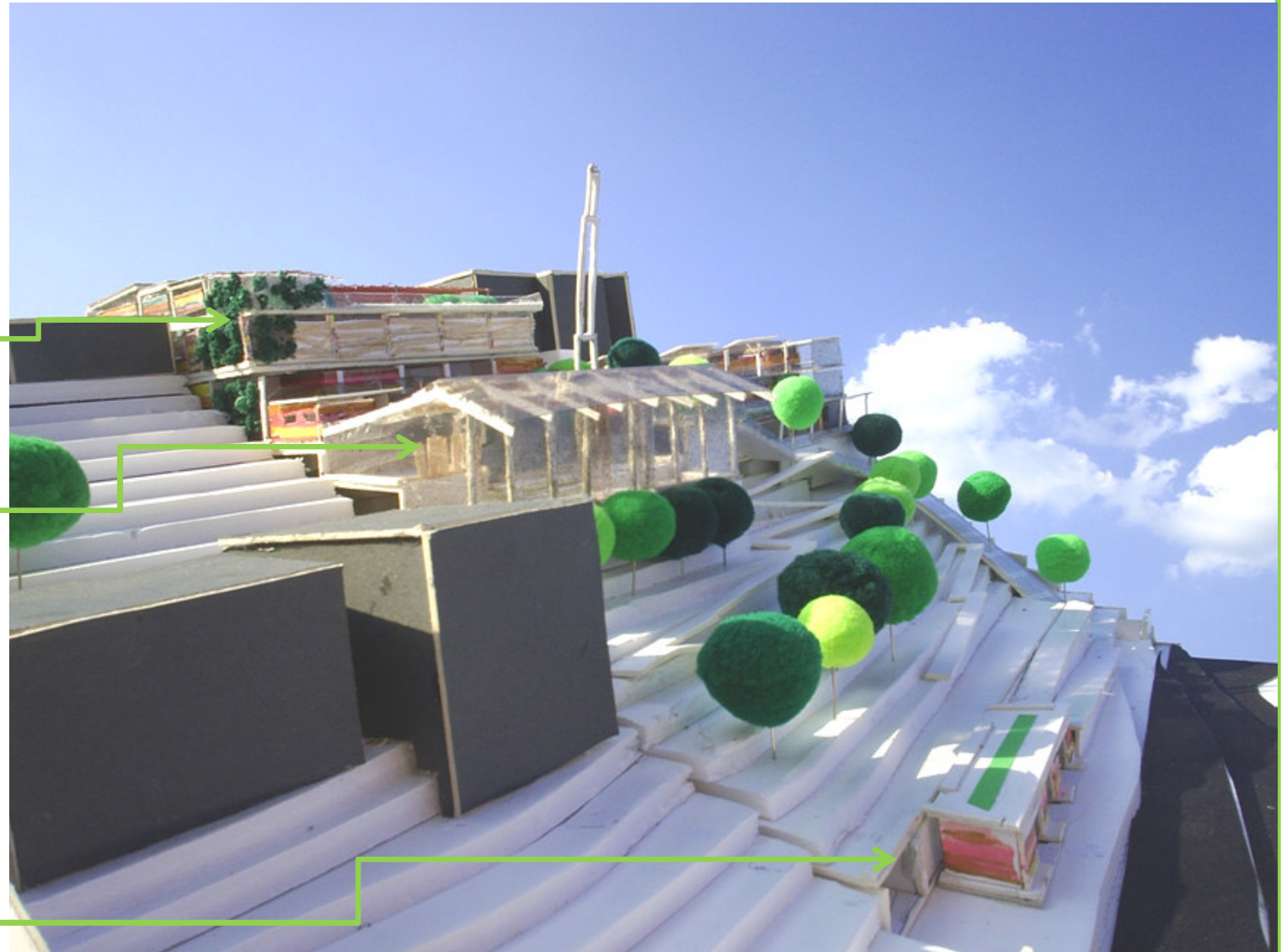


Final design:

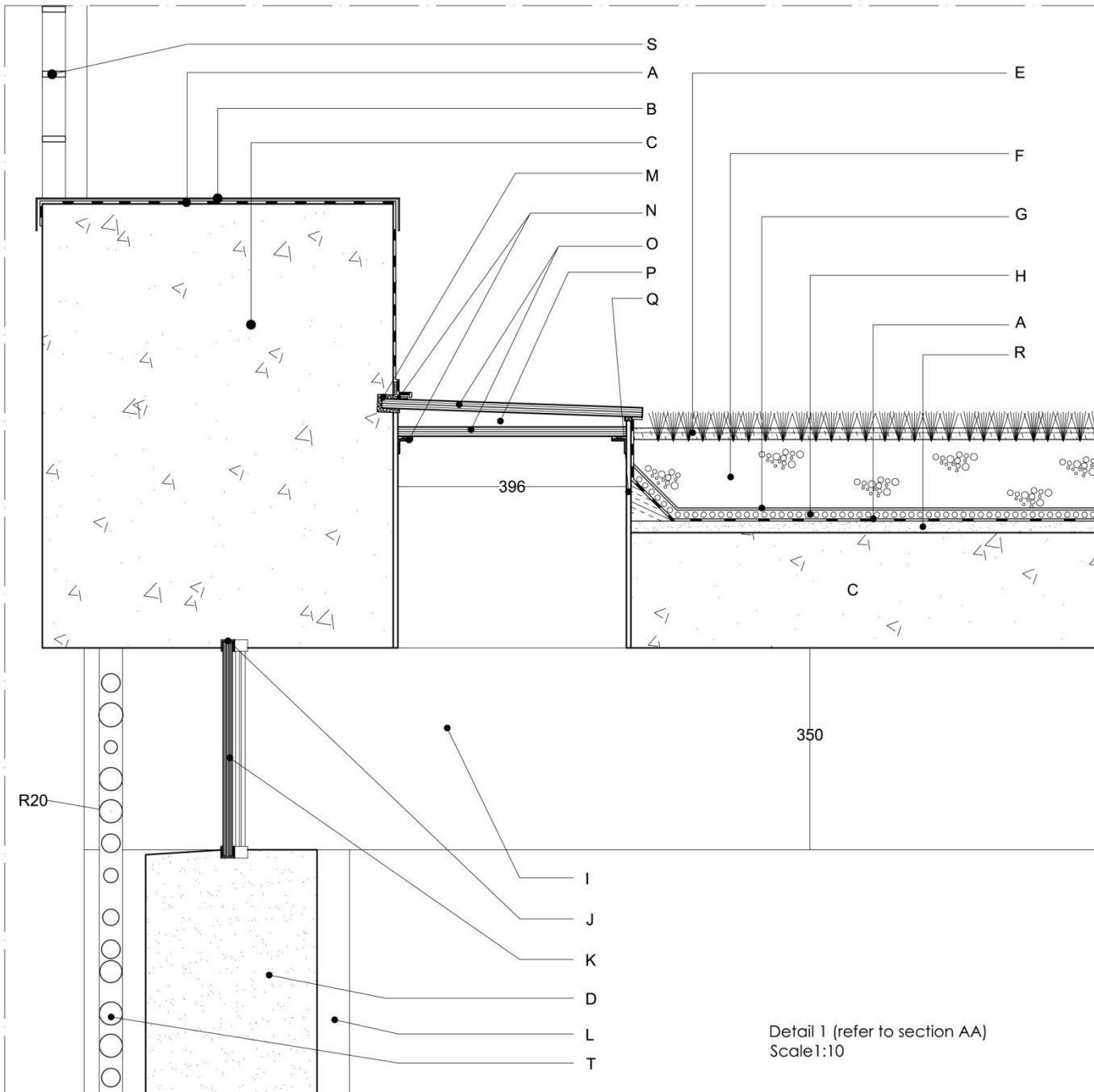
Circulation core is enclosed with mesh screen and creepers, thus allowing nature and the building to merge.

Timber screen separates male and female prayer spaces

Parkade entrance

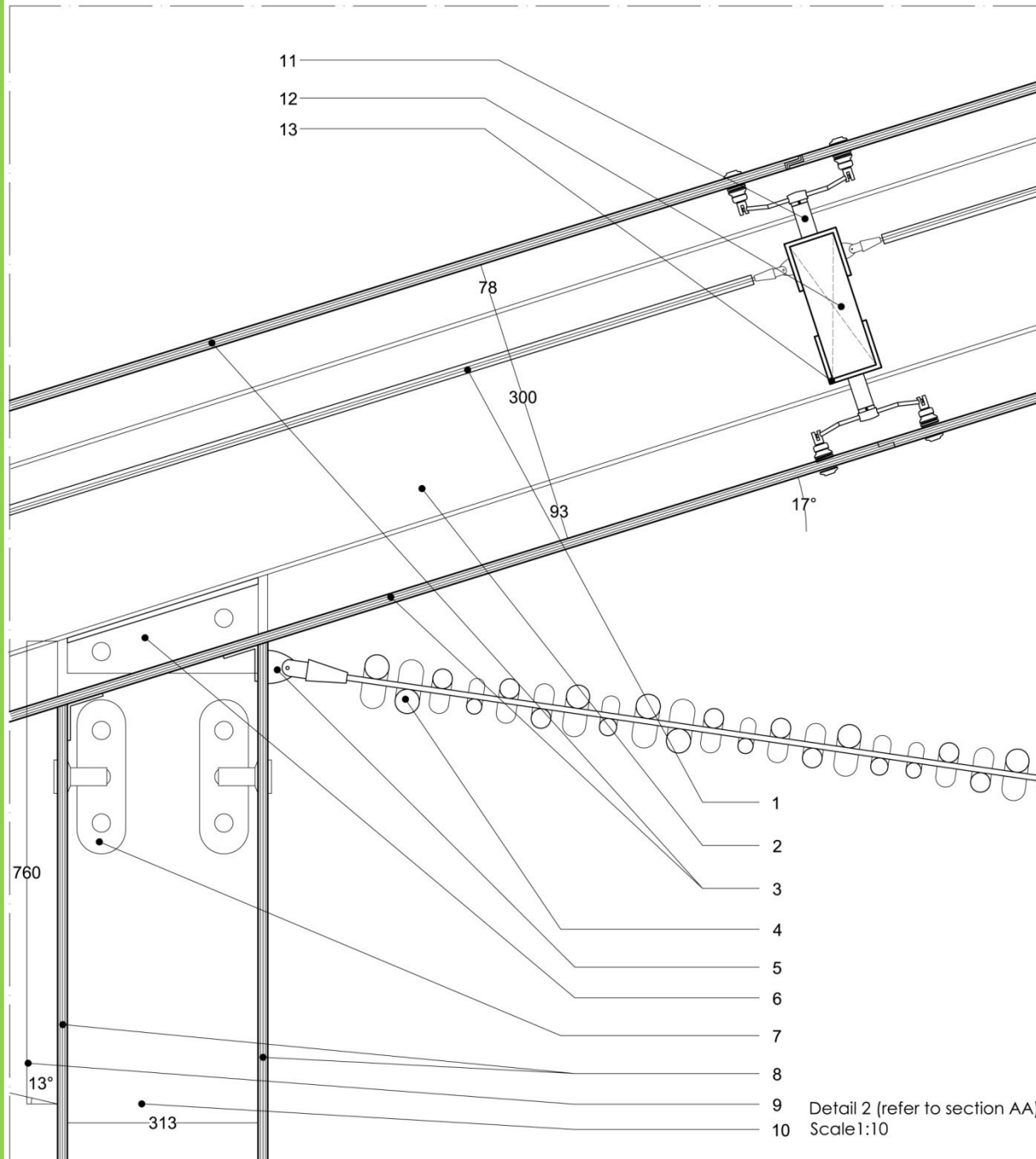






All structure dimensions and connections to engineers detail and spec

- a ABE waterproofing 4mm defend h antiroot
- b 2mm sheet metal capping
- c 220mm reinf concrete stiffening beam and slab (off shutter finish) to engineers detail and spec
- d 300mm rammed earth wall with optical fibres as binding agent
- e mulch layer with erosion protection textile just under the surface
- f plant bearing layer
- g filter sheet (non woven fabric)
- h drainage mat (kalzip linear drainage system KD33)
- i reinf concrete beam 350x280 to engineers detail and spec
- j 30x25mm recessed aluminium frame to specialists detail and spec
- k Sliding window :2x6.8mm toughened glass with solar coating + 3mm cavity :U value =1.3W/m²K
- l 400mm structural rammed earth column to eng detail and spec
- m 5mm seal neoprene profile to specialist detail
- n 30x30x3mm gms L section support
- o 2x8mm laminated safety glass with solar coating, top @ 2°fall
- p argon filled cavity
- q frame , 398x8mm steel plate to eng detail and spec
- r 10-30mm screed to 1:60 fall
- s Balustrade :3x40mm gms plate welded to 40x5x900mm gms plate @150 c/c
- t 2 coats clear penetrol oil(non toxic) sealant / finish on random sized (15-30dia)stinkwood timber lathings fixed to 25mm gms L section



All structure dimensions and connections to engineers detail and spec

- 1 teflon coated polyethelent fabric with random sized holes (25-60mm) cut outs supported by 2.5mm dia stainless steel cable to 13 to specialists detail
- 2 300x200x5 I beam to engineers detail and spec within argon filled cavity
- 3 13.6mm laminated safety glass with solar coating to specialists spec
- 4 untreated stinkwood lathings 25-70mmØ randomly spaced and weaved through 8mm SS cables
- 5 SS connector with tensioner to engineers detail and spec fixed to structural rammed earth columns (10)
- 6 310x50x8mm gms connects columns and glass fins to (2)
- 7 SS spider fitting fixed to 313x12.5mm laminated safety glass fin to specialists detail and spec
- 8 12.5mm toughened safety glass outer pane with solar coating)  
,300mm argon filled cavity
- 9 760x910x285x76 T section to engineers detail and spec
- 10 313x12,5mm laminated toughened safety glass, silicone or equivalent sealed connection to (8)
- 11 stainless steel spider connector to eng detail and spec
- 12 Glulam timber beam 75x228 to eng detail and spec
- 13 82x89x5mm SSteel C section bolted to 12