

ISLAMIC DWELLING ARCHITECTURE

THE CASE OF MAKINA IN KIBERA SETTLEMENT
CITY OF NAIROBI, KENYA



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DECLARATION

This project design is my original work and has not been presented for a degree in any other University.

It is a project design submitted in partial fulfilment for the degree of Master of Architecture and Building science.

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ABSTRACT

This thesis looked at effective methods to regenerate dwelling and public spaces in Kibera slum. Since nowadays many physical and social problems appear in large housing estates, it is urgent to seek efficient and effective ways to solve these problems. I chose Makina in the district of Kibera in Nairobi as my study object. The aim was to change Makina settlement from a decayed residential area to a safe and attractive neighborhood.

This thesis is started with an illustration of relevant theories about Islamic and green building architecture, which provided guidelines and principles for my further planning proposal. Then, there come some background information about Kibera and Makina based on the official documents, information and statistics from internet and other sources. In the third stage, the focus is on the situational analysis of physical structure of Makina, such as traffic system, spatial layout of houses and public spaces, and etc. These analyses made up a good foundation for my own planning proposal. At last, based on the theories and analyses above, a planning proposal with my suggestions is made to improve the current situations of the area. The proposal contains detailed plans and designs of houses, traffic system, landscape and green areas with also special attention to improve the safety situation in the community.

In general, I find that attractiveness of the area, dignity for the houses and safety are the most important factors in reconstructing Makina residential area. Therefore, I make some improvements and suggestions from these perspectives. I hope my proposal can satisfy residents social needs by improving the physical conditions of Makina.

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INTRODUCTION

AIMS AND OBJECTIVES
ASSUMPTIONS
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SCOPE AND LIMITATION



Fig 1. Kibera settlement (source: <http://oliveredwardsphotography.com>)

AIMS AND OBJECTIVES

According to studies and researches that have been done on the poor people societies in different parts of the world, lots of Muslims are living in slums. Kibera as one of the biggest slums in the world has also the same problem. (Fig2 and 3)

The main goal of this research-design is to rehabilitate Muslim's area of Kibera with regard to principle and ideologies of Islamic architecture.

Islamic architecture has a unity in meaning and spirituality which has driven from Islam and its Shari'a (religious law) and has been always in relation with Muslims lifestyle and has influenced on their culture as well.

In today's common belief, Islamic architecture has an elite image of palaces, old mosques and castles, overflowing gardens and ornamental monuments which is only one dimension of this architecture, while Islam always respond to all human beings demands in any situation around the world. Today's architecture, has forgotten human dignity and his real goals of life; therefore we often see meaningless sculptures come up with no quality, while our past architecture was all for the sake of human's life and his major needs existed at the center of attention.

A revival of Islamic architecture to become a living reality in modern times must respond to the needs of the poor who are overwhelming reality in the world. It should be possible to make a happy blend and a proper fusion between the functional needs of the poor and the aesthetic aspects of an architecture that truly reflects our Islamic culture, tradition and history.

Since Islamic architecture has been very often based on the Islamic orders, it was never apart from logic, reality, and sustainability. So we can simply borrow from its essential designs, concepts, indigenous technology and functional features to even drainage and cooling systems. But we must translate them into an architecture for our century that reflects the spirit of Islam and its values: equality, accessibility, mass participation and cost effectiveness.

To provide an environment which identify a correct way of living and specify human's needs and dignity for the Muslims in Makina and to transform the spirit of Islam and its culture to a tangible reality for this people, it is necessary to study Islamic architecture principles and ideology and its unity. We should also need to study about this architecture in some Muslim countries to see differences according to the environmental changes and lifestyle.

The purpose of this study is to provide an architecture from and for the people, meeting their needs and concerns, providing a suitable and affordable dwelling, such as housing, schools, clinics, markets and urban renewal excellence, as these attempt to solve the most basic and critical issues confronting the poor people of developing nations, to embody the spirit of Islam.

The project suggests an alternative to the soulless apartments being propagated by involving people to be rehabilitated and allowing them an input, using local materials and indigenous skills. Using time-tested traditional technologies, utilizing waste materials and efficient planning make this project cost-effective and environment friendly.

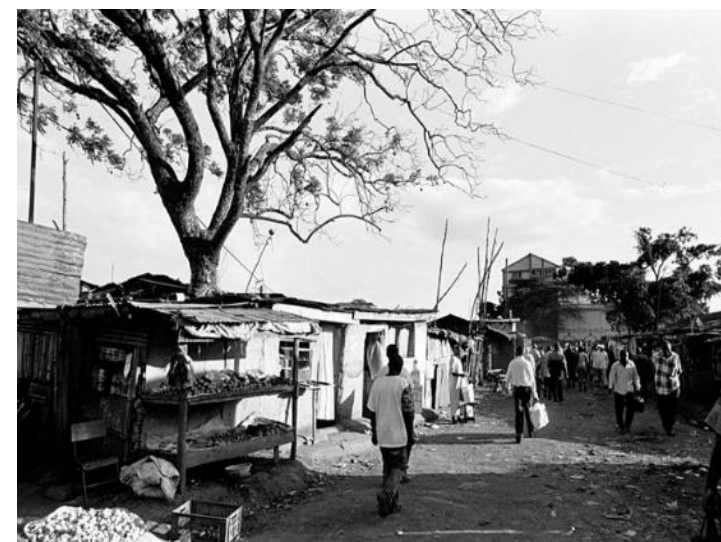


Fig2. Makina settlement (source: <http://www.nubiansinkenya.com>)



Fig3. Makina settlement (source: author photography)

ASSUMPTIONS

- Finding solutions for dwelling of Makina residents according to Islamic architecture approaches.
- And that People living in poor societies also have the right to live with dignity and respect.

JUSTIFICATION

The author acknowledges that research and design into the field of housing for poor people is not entirely new. However, there exists a gap, as previous researches into this field doesn't tackle the issues of Islam and architecture of dwelling in the context of Makina since it's an Islamic area in Kibera settlement. Also, previous researches into this field was done a long time ago and Makina and Kibera has transformed since then.

RESEARCH METHODOLOGY

This design-project carried out with the case study research method as the most appropriate for this kind of study and Makina in Kibera slum purposefully chosen as the primary case study. This study would then pursue three investigative approach: to find out what exists, to find out what is needed and to make recommendations.

SCOPE AND LIMITATION

This study is limited to aspects relating to the planning and design of dwelling. It is specifically deal with issues of Islamic architecture and lifestyle, and hopes to establish a relationship between these two.

the success of this project depend highly on the responses of the residents and other institutions in Makina. The security is also another issue which had affect on my research efforts.

The terms “green building” and “sustainable design” are often used interchangeably to describe any building designed in an environmentally sensitive manner. However, sustainability calls for a whole-systems approach to development that encompasses the notion of green building but also addresses broader social, ethical, and economic issues, as well as the community context of buildings. As an essential component of sustainability, green building seeks to provide healthy environments in a resource-efficient manner using ecologically based principles. (Fig4)

Green building is increasingly governed by standards, such as the Leadership in Energy and Environmental Design (LEED) Green Building Rating System™, which provides a set of measurable criteria that promote environmentally sustainable construction.

The rating system was developed by the U.S. Green Building Council (USGBC) as a consensus among its members—federal/state/local agencies, suppliers, architects, engineers, contractors, and building owners—and is continually being evaluated and refined in response to new information and feedback. In July 2003 Canada obtained a license from the USGBC to adapt the LEED rating system to Canadian circumstances.

GREEN ARCHITECTURE PRINCIPLES

The LEED rating system for new construction addresses seven major areas of development.

1. Sustainable Sites

deals with reducing the pollution associated with construction activity, selecting sites appropriate for development, protecting environmentally sensitive areas and restoring damaged habitats, encouraging alternative modes of transportation to reduce the impact of automobile use, respecting the natural water hydrology of a site, and reducing the effects of heat islands.

2. Water Efficiency

promotes reducing the demand for potable water and the generation of wastewater by using water-conserving fixtures, capturing rainwater or recycled graywater for conveying sewage, and treating wastewater with on-site systems.

3. Energy and Atmosphere

encourages increasing the efficiency with which buildings and their sites acquire and use energy, increasing renewable, nonpolluting energy sources to reduce the environmental and economic impacts associated with fossil fuel energy use, and minimizing the emissions that contribute to ozone depletion and global warming.

4. Materials and Resources

seeks to maximize the use of locally available, rapidly renewable and recycled materials, reduce waste and the demand for virgin materials, retain cultural resources, and minimize the environmental impacts of new buildings.

5. Indoor Environmental Quality

promotes the enhanced comfort, productivity, and well-being of building occupants by improving indoor air quality, maximizing daylighting of interior spaces, enabling user control of lighting and thermal comfort systems to suit task needs and preferences, and minimizing the exposure of building occupants to potentially hazardous particulates and chemical pollutants, such as the volatile organic compounds (VOC) contained in adhesives and coatings and the urea formaldehyde resins in composite wood products.

6. Innovation in Design

rewards exceeding the requirements set by the LEED Green Building Rating System and/or demonstrating innovative performance in Green Building categories not specifically addressed by the LEED Green Building Rating System.

7. Regional Priority

provides incentives for practices that address geographically specific environmental priorities

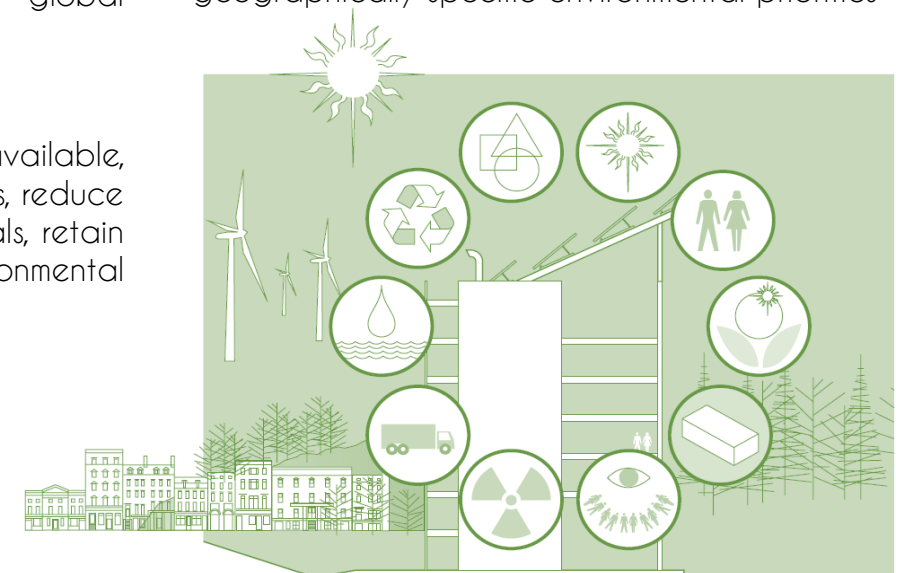


Fig4. Green building goals (source: Green Building illustrated- D.K. Ching)

ISLAMIC ARCHITECTURE

PRINCIPLES

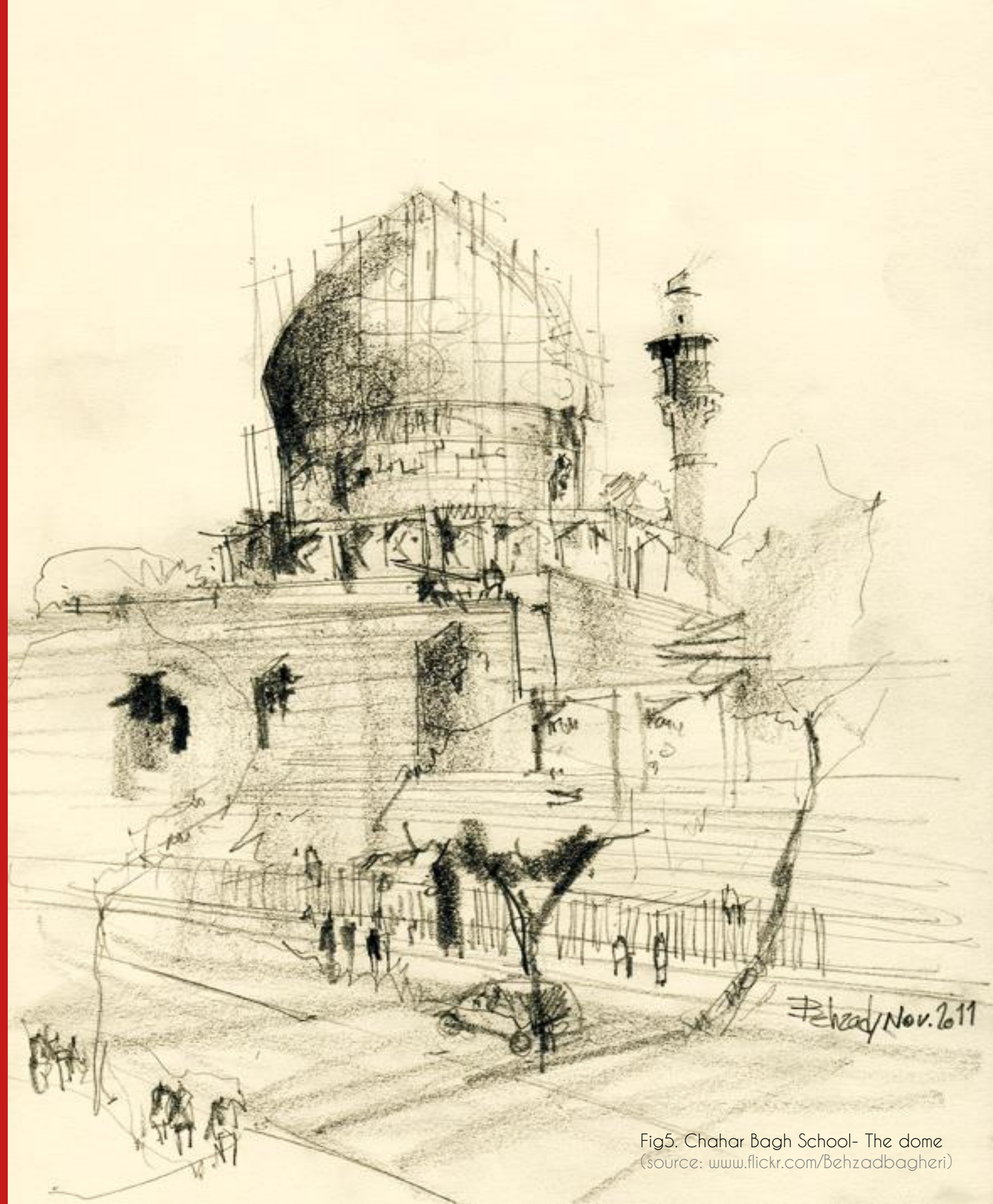


Fig5. Chahar Bagh School- The dome
(source: www.flickr.com/Behzadbagheri)

Houses represent the background or framework for human existence. The Islamic houses with its structural clarity and beauty can be conceived as being generated from the plan, which gave form and order to the space within as well as measured and scaled by the human body and its experience. Islamic houses was also established and based on a series of sustainable-oriented principles. The design concept, problems, and solutions can be traced in many of the existing traditional Islamic architecture, in which forms and spaces were dictated by habits and traditions.

The aim of this study is to examine the architectural vocabulary which governed the design concept of the Islamic house and highlights their distinctive characteristics. It also explores the essential design problems, which affected the shape and the plan form of all traditional Muslim houses, in relation to the physical environment. A discussion of the way that tradition, culture, and religion formed the basis of the Islamic houses design approach

In many parts of the Islamic world, one can realize many distinctive examples of traditional architecture, mainly houses. Although there were socio-cultural differences in each region, the design of houses retained a common architectural language that responded to both the common hot arid zones climate and the common religious needs. For example, the use of courtyard and the employment of the wind catcher or Mashrabiyyah. (Fig6)

The Islamic-Arab house is one of the best examples that express the *Sakina*. The word *Sakina* comes from the word *Sakan*, which is the Arabic name for a house and relates to dwelling in peace and purity. The heritage of traditional Islamic houses includes various forms, which were developed in response to religious, cultural, and traditional factors along with the specificity of the local built environment.

The remarkable traditional houses of medieval Cairo, the stylish facades of Jeddah's townhouses, the wind catcher (Badgir) of the houses of Iran's Yazd district, and the courtyard houses of Yemen, are all evidence to the rich wealth of Islamic residential architecture. Every architectural element in the Islamic houses represented a solution or an answer to a different problem that appeared according to a specific condition. They were a sequence of related problems, which were met successfully to achieve a unified and a harmonious house. In fact, the beauty of these traditional houses represents an art form that has resulted from an understanding of a unique mode of religious and cultural human life.

Fig6. Wind catcher in Yazd, Iran (source: <http://issuu.com>)



The objective of this chapter is to achieve some usable principles of Islamic architecture in order to use them in modern Islamic architecture (contemporary Islamic architecture), as well as to demonstrate these principles on some examples taken from one of the most famous historical cities in Iran (Isfahan). The following major principles of Islamic architecture will help us to understand better its unity and aesthetics in modern Islamic architectural design.

- **Humanism and proportionality**

Humanism in Islamic architecture is the heed of human proportion between building elements and human body and his physical and emotional needs. The past architecture has always been an art that had tangible relation with daily life and respects his beliefs and personal ambitions. This principle concerns the size of different elements of a building both on the plan and façade. It relates to the width and length of rooms, yard, pools, .. and the width and height of entrance, corridors, columns, windows, doors, the height of the major and minor spaces and so on.

- **Abstinence from inanity**

It has been tried to abstain from frivolling and building supernumerary in Islamic architecture. In holy Quran we see: 'believers, who they abstain from inanity.' Everything should be for a certain reason in order to make the space suitable for living. For example colorful windows built in order to prevent sun glare and its heat enter the room. (Fig7)



Fig7. A house in Kashan, Iran, showing the use of colorful windows. For beauty and prevention of sun glare. (source: <http://pinterest.com>)

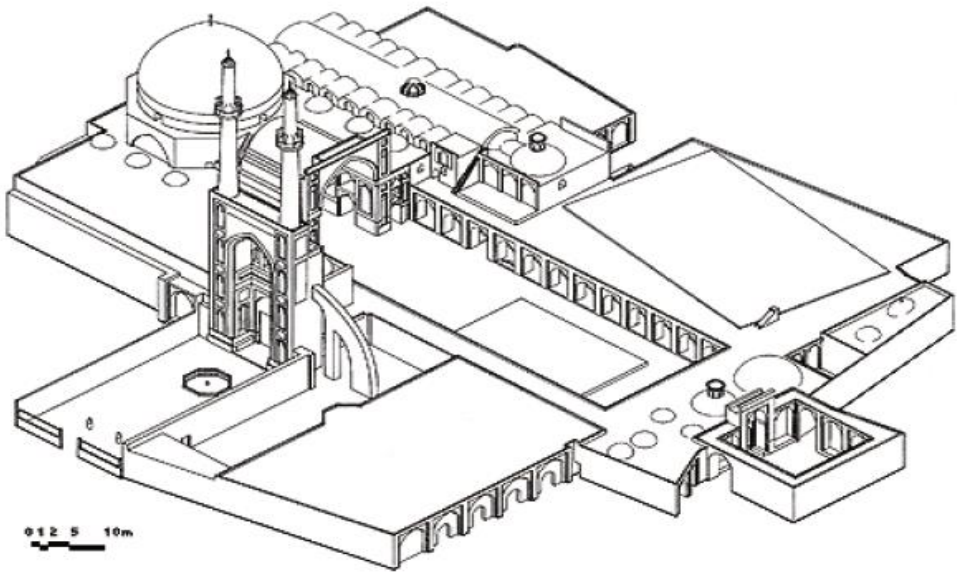


Fig 11. The dimensional projection of Yazd great Friday mosque (source: <https://flickr.com/Owen Young>)

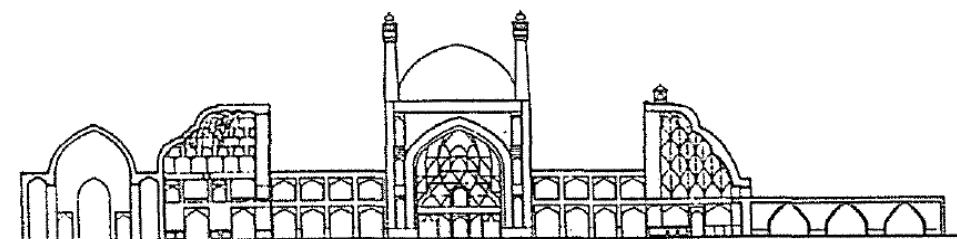


Fig 12. Jamie mosque in Isfahan, section and facade, repetition on the facade, symmetry both on the facade and plan, equilibrium of sections and order on the ornaments and facade (source: principles of aesthetics in Islamic architecture/ M. Foroozani)

• Purity in shapes and volumes

The Islamic traditional architecture had strict regulation in correspondence to using shapes and volumes. In the general form seeking out perfection and achieving the best design is evident in the selection and combination of shapes. Each used element is pure and geometrical. Elements like pool, garden, courtyard, elevation, plan and volumes of building are created with shapes that are geometrical and pure. Even when one could not design in 'right angles' due to the limitations he would skillfully design the interior in a way that every single key space feels like being geometrical.

• Contrast

The nature of human will not like uniformity in general. In Islamic architecture a series of rhythmic elements will always be followed by a higher or bigger element in size (contrast) which provides a nicer form in construction.

• Structural considerations

The knowledge of static, building technology, material science, the common usage of masonry walls, arch-shaped ceilings and the subtle layer vaults are well known in Islamic architecture. (Fig8)

• Self sufficiency

It is important to procure essential materials from local areas and build the building in a way that it would not be dependent on getting material and method from somewhere else. So the building will be more compatible with vernacular nature. And it is always possible to obtain supplementary material in order to repair the building in the case of renovation.

• Introversion

Basically people beliefs had a great impact on establishing unified features in Islamic traditional architecture. The most stable and sturdy point about Islamic architecture is the issue of tendency to the inside and in general introversion. The main aim of the introspection is to divert the attention to the inside and refuse outside. In this status one should stand within the building in order to understand the main story of that building. This organization manner of the buildings decrees some spatial disciplines and that is a central courtyard in Islamic architecture. The order of courtyard in the middle of the building and forming other spaces around it is famous in Islamic architecture for the privacy it brings. But the impact of introversion is not only the privacy it brings; it causes the building to find two different aspects that are totally in contrast with each other.

This contrast is one of the features of Islamic architecture. Eventually it affects the space order for open and closed spaces that finally leads to separation of the buildings in two or in some cases three domains: public, private and in between spaces. As a result the relation between inside and outside get more complicated. (Fig9 and 10)

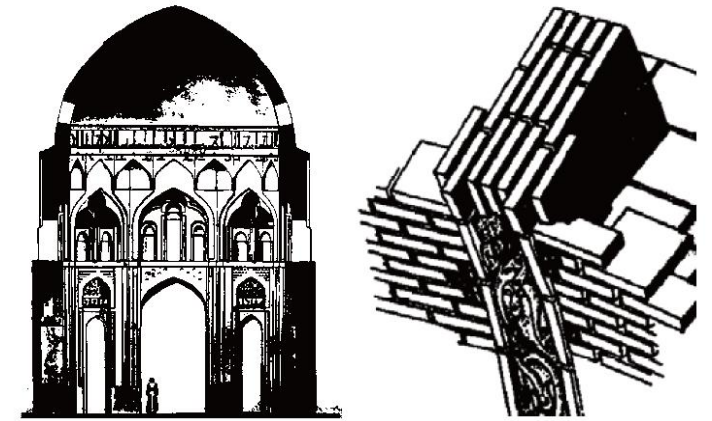


Fig8. Section through a dome showing the building technology (source: principles of aesthetics in Islamic architecture/ M. Foroozani)

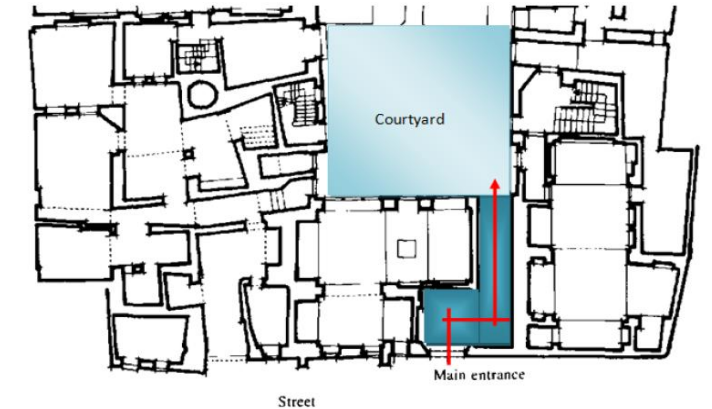


Fig9. The entrance opens into the courtyard, Al-Suhaymi house, Cairo (source: Traditional Islamic-Arab House: Vocabulary And Syntax, Dr. Abdel-Moniem El-Shorbagy)

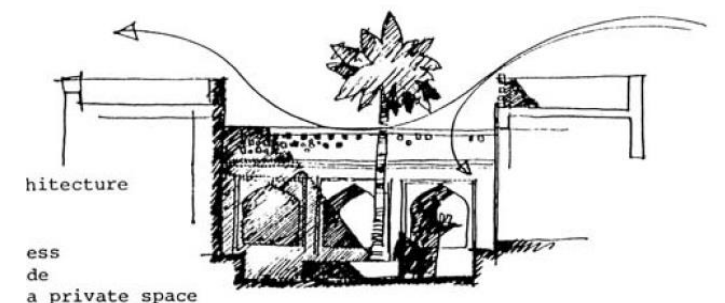


Fig10. Effect of courtyard for cooling the environment of the house (source: the agha khan award for architecture, Shushtar new town, Kamran Diba and D.A.Z. architects)



Fig 13. City of Yazd, Iran (source: <http://issuu.com>)

- **Scale**

It concerns the comparison of the size of monuments and the surrounding residential buildings. In general, different scales have different meanings. The feeling of a big or small entrance is different. The public buildings and especially the holy places and mosques with their high minarets are the landmarks of the biggest height on a city skyline, which stand out high from the cityscape. On the other hand, the scale of residential buildings is in accordance with the human dimensions and needs. (Fig 13)

- **Harmony**

Harmony with nature with expresses another meaning of this word has been produced in Islamic architecture too. The harmony of the public buildings and residential buildings is not only unnecessary but in many cases, it is a conflicting requirement.

- **order**

It comes out clearly on the plan, façade, ornament and structure. On plan, modules are used to obtain a general order in the whole design, on the façade it is used for dividing it into small parts and finding the best proportion for entrance, windows, doors and so on. On ornament, it will be applied to the tile-work, painting the walls and domes and so on. In structure it will be revealed in the better and easier implementation and so on. For example the Islamic gardens can be mentioned, where we can see the realization of this principle with a strong geometry in it.

- **Movement and Tranquility (Approach and Arrival)**

It is useful when you want to arrive at an important space, for instance at a courtyard. Before entering this space, we usually move into a narrow dark corridor where there is nothing interesting, we have no motive to stay, so we move on. Suddenly, we arrive at an interesting wide space where everything is beautiful to see. The first architectural space (the corridor) give the feeling of movement, and the second (courtyard) give the feeling of tranquility.

- **Repetition/ frequency**

This principle was used on the façade and the plan of most of the historical monuments. The repetition of the columns, windows, arches, .. is frequently applied in Islamic architecture. (Fig 14)

- **Symmetry**

We can see the manifestation of this principle with all the mosque yards when we stand facing Mecca. In general in a holy place, the architectural forms should help to tranquilize us for better praying. We can also see the symmetry on the façade of all the Islamic construction (both on the façade facing the street and the courtyard if any). (fig 11)

- **Equilibrium**

It concerns the visual balance of an architectural form. In this case, it is not necessary to have a symmetrical form but it is necessary to have the balance between the right and left sides. Symmetry will always involve equilibrium, but equilibrium will not always involve symmetry. (Fig 12)

- **Centrality**

The best example of it is the 'house of prayer' in mecca. When we want to emphasize something, we will put it in the center. In most of the mosque yards we will see a pool in the center. In Islamic architecture, water has a symbolic meaning of cleanliness, and before you start praying you must make Vozou (washing the face and the hands). Therefore, the pool in the center of yard should be designed in a way to emphasize the symbolic meaning of water and its function. (Fig 15)

CONCLUSION

What has been set down in this chapter was a brief introduction of what is called Islamic architecture and some of its main principles. It is an architecture that pursues tranquil and peace by the means of using spiritualism in the buildings. The thing that led to different style was the diversity of how architects and literally people looked at the space. A Muslim architect worships his god by the means of building. He pursues a space that is perfect, a fault-free and inconvertible space. He utilizes available elements in order to satisfy the hunger of tranquility of the people he builds for. As mentioned the priority of the interior over the exterior, the seeking of the complete and geometric pattern for forming spaces and shapes, the hidden contemplation behind the simplicity of the buildings, being from and for the local environment shows that the architecture is a cultural phenomenon, an art that is in a daily correspondence with the people.

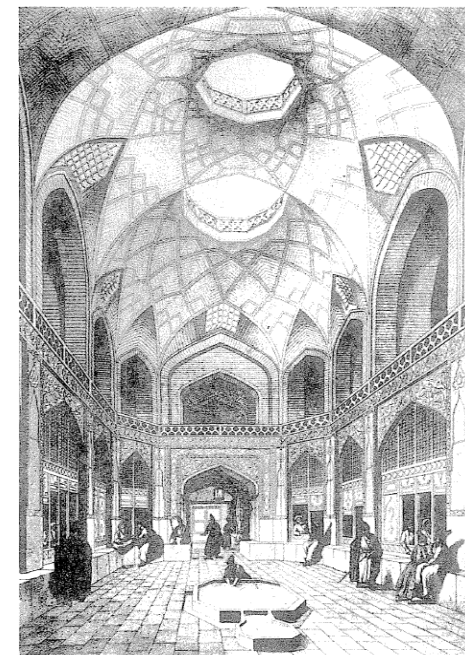


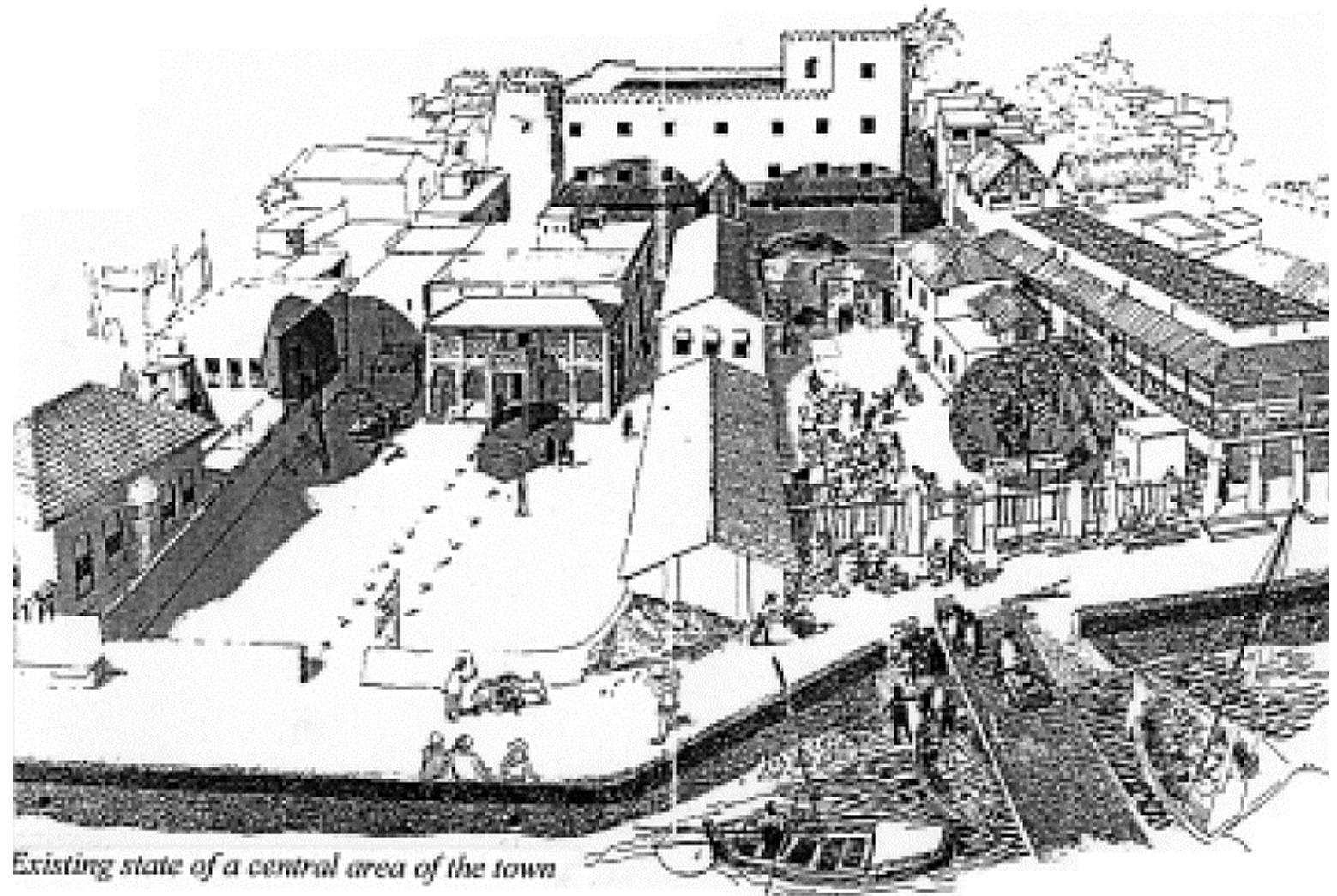
Fig 14. The Bazaar of 'Hadji Seyyed Hossein', in Isfahan, repetition of arches, very clear symmetry, centrality of pool, harmony of roof and facade, similarity between different size of arches, order, culmination by pool, highest point of sky lights (source: principles of aesthetics in Islamic architecture/M. Foroozani)



Fig 15. Imam square. Isfahan, Iran, showing the pure traditional Islamic architecture (source: <http://pinterest.com>)

CASE STUDY - 1

LAMU ISLAND, KENYA



Existing state of a central area of the town

Fig16. Lamu old town, central area (source: conservation of Lamu, National Museum of Kenya)



Fig17. view of Lamu from the boat (source: author photography)

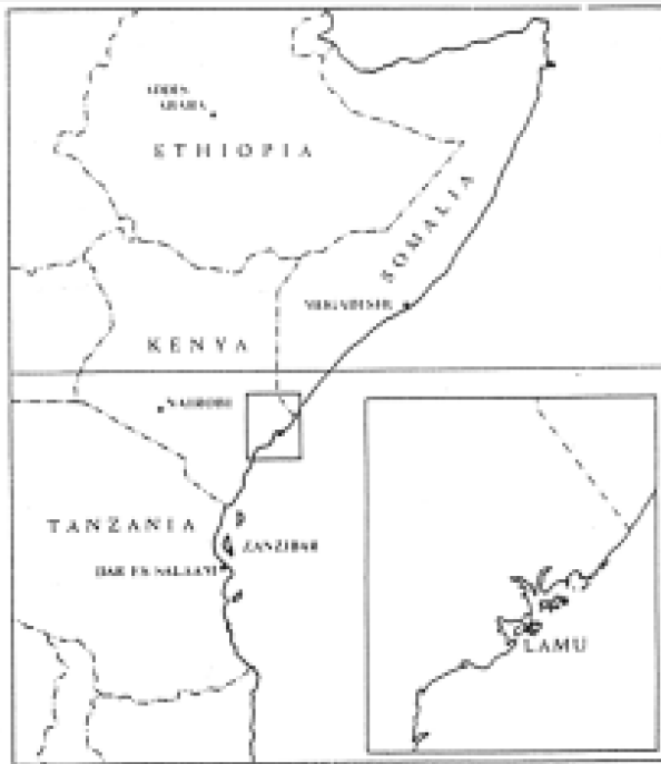


Fig 18. Lamu is located on a crescent-shaped island that lies at the southern end of the Lamu archipelago (source: conservation of Lamu, National Museum of Kenya)

HISTORY

Lamu was an important center of maritime trade on the eastern African coast founded in the fourteenth century. (Fig 18.) It was part of a chain of fiercely independent city-states established by Arab and Shirazi (Persian) traders during the span of a thousand years of Islamic expansion and settlement. The mix of Arabs and Africans produced a distinct culture called Swahili, from the Arabic word Sahil, meaning coast.

Lamu flourished in the eighteenth and early nineteenth centuries as its traders grew rich. They exported ivory, rhino horn, seeds and grains and mangrove poles to Arabia and India, exchanging these for silks, porcelains, and spices from the far side of the Indian Ocean but, as the nineteenth century drew to a close, the town gradually lost its prominence.

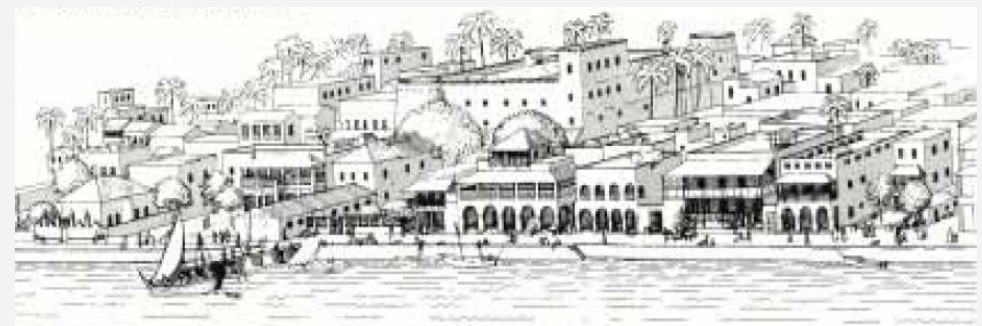


Fig 20. Sea front veranda houses (source: conservation of Lamu, National Museum of Kenya)



Fig 19. House and shop building with a balcony (source: conservation of Lamu, National Museum of Kenya)

INTRODUCTION

Lamu is an island town of 12,000 people located two degrees below the equator on Kenya's northern coast. It is the oldest settlement in Kenya, and the only Swahili town which retains its original structure and still sustains a vital and growing urban community. Lamu's survival into the twentieth century is due to a combination of fortunate circumstances. On one hand, its remoteness and the absence of roads and vehicles have prevented many of the irreversible changes that come with modernization. On the other, Lamu's status as a regional center and active seaport have guaranteed continued economic vitality for the town.

Lamu has kept its centuries-old culture and Islamic traditions. But the preservation of its physical heritage cannot be taken for granted. The town is threatened by modernization and unsympathetic development, and only a conscious effort of planning and management will allow it to be preserved in the future. (Fig 21 and 22)



Fig 21. General view of the town, it has a narrow elongated shape (source: conservation of Lamu, National Museum of Kenya)



Fig 22. Lamu harbor (source: author photography)

Slave labor was vital to the area's agriculture and forestry, and with the abolition of slavery at the end of the century, Lamu's plantation economy declined, the town's fortunes suffered further reverses with the building of the Uganda railroad from Mombasa, diverting most shipping and commerce well to the south. Lamu's harbor was also too shallow for modern steamships. This once powerful city-state was thus pushed further along the road to obscurity. But it was obscurity that served to protect and preserve the old stone town.

Today, Lamu is a compact pedestrian area. From the air, the patchwork of flat roofs looks like an impenetrable maze. When approaching the town from the sea, the solid mass of seafront buildings creates an equally closed impression.

Lamu's physical setting determined the town's narrow and elongated shape. Streets run parallel and perpendicular to the sloping sand dune underneath. Most houses and mosques are oriented along a north-south axis, and are grouped together for religious and family reasons in clusters of related buildings. The growth of the town evolved around these simple requirements and basic rules, and the resulting urban fabric has a complex yet uniform structure. (Fig23 and 26)



Fig23. A group of 19th century façade and street activity along the east side of the market square (source: conservation of Lamu, National Museum of Kenya)



Fig24. Typical ground and first floor plans of a traditional stone house in the oldest section of Lamu town. (source: The Aga Khan award for architecture, conservation of Lamu, National Museum of Kenya)

Inside the stone town, relatively few elements make up the townscape: the color and texture of the coral stone; the simplicity and uniformity of the buildings; and the visual contrast created by the covered passageways, porches and decorated doors. Massive stone buildings, often two stores high, face one another across narrow alleys, rarely more than two and a half metres wide. Their thick coral walls frame the streets and create seemingly enclosed volumes that are shaded, quiet and intimate. (Fig 25)



Fig25. Sketch and the picture showing a Typical Lamu streetscape, a covered passage, carved door and Daka, or porch entrance. (source: Left: The Aga Khan award for architecture, conservation of Lamu, National Museum of Kenya/ Right: Author photography)

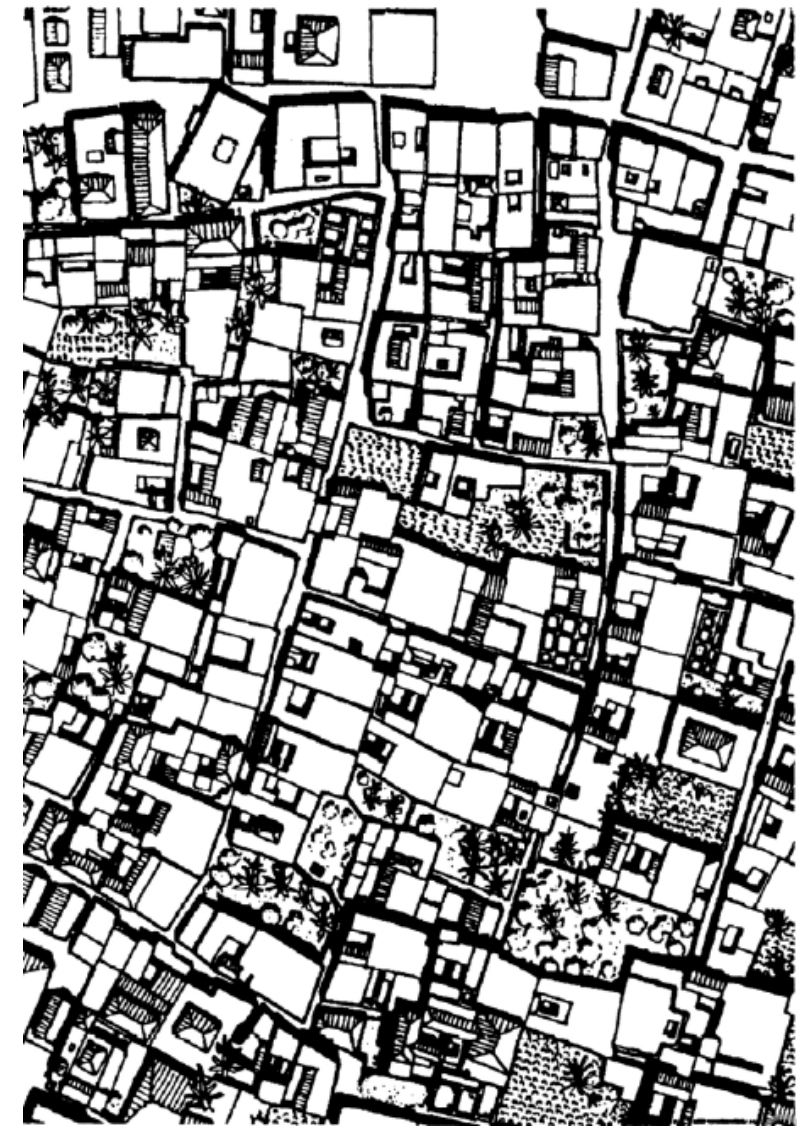


Fig26. Relief plan of the stone town showing the situation as drawn in 1984. (source: The Aga Khan award for architecture, conservation of Lamu, National Museum of Kenya)

ARCHITECTURE

Most of Lamu's houses and mosques date from the eighteenth and nineteenth centuries. Walls are made of undressed coral stone set in thick mortar, and finished inside and out with coral lime plaster. The flat roofs and floors are made of coral rubble and mortar on top of closely laid mangrove pole joists.

Houses are divided into a series of long and narrow galleries facing the interior courtyard. The carved plaster decoration, for which Lamu houses are famous, is found around the archways, at either end of each gallery, and culminates with an entire wall panel in the final gallery. (Fig24)

Lamu buildings are not achievement of individual designers, but the work of skilled artisans and master builders. Hence, it is in the sphere of vernacular buildings, especially houses, that Lamu makes an original contributions to the architecture of the Indian Ocean. Long-established convention played a primary role in the development of building forms, and the result is a town that maintained remarkable stylistic continuity over time. Although much of the historical area is still intact, Lamu's buildings and townscape are beset today by two opposite but equally negative forces: rapid modernization on one hand and neglect and slow decay on the other.

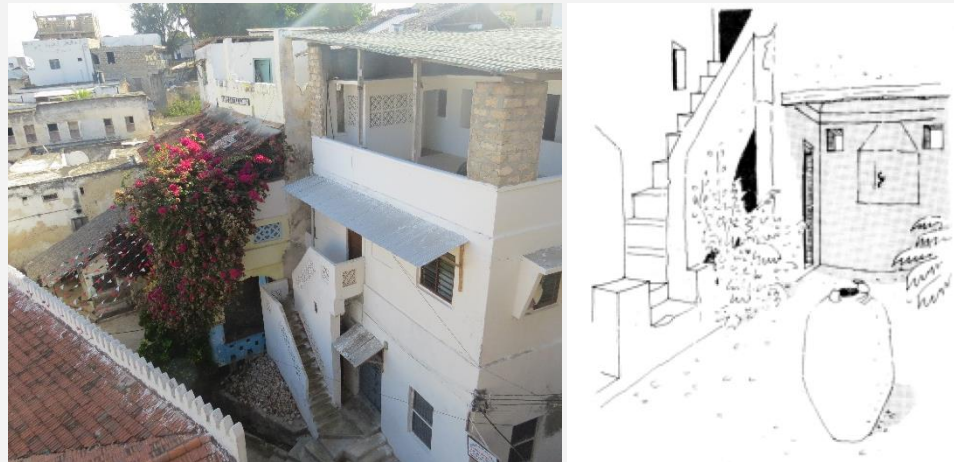


Fig27. view of the interior courtyard or Kiwanda of a stone house. The courtyard is the focus of all daytime activity and it is the building's source of light and air. (source: Right: The Aga Khan award for architecture, conservation of Lamu, National Museum of Kenya/ Left: Author photography)



Fig28. Utalino house: interior view of salon and wooden ceiling after restoration (source: The Aga Khan award for architecture, conservation of Lamu, National Museum of Kenya)

Fig29. Picture showing the Coral stone covered the exterior façade of the house (source: Author photography)

CASE STUDY: LAMU OLD TWON CONSERVATION

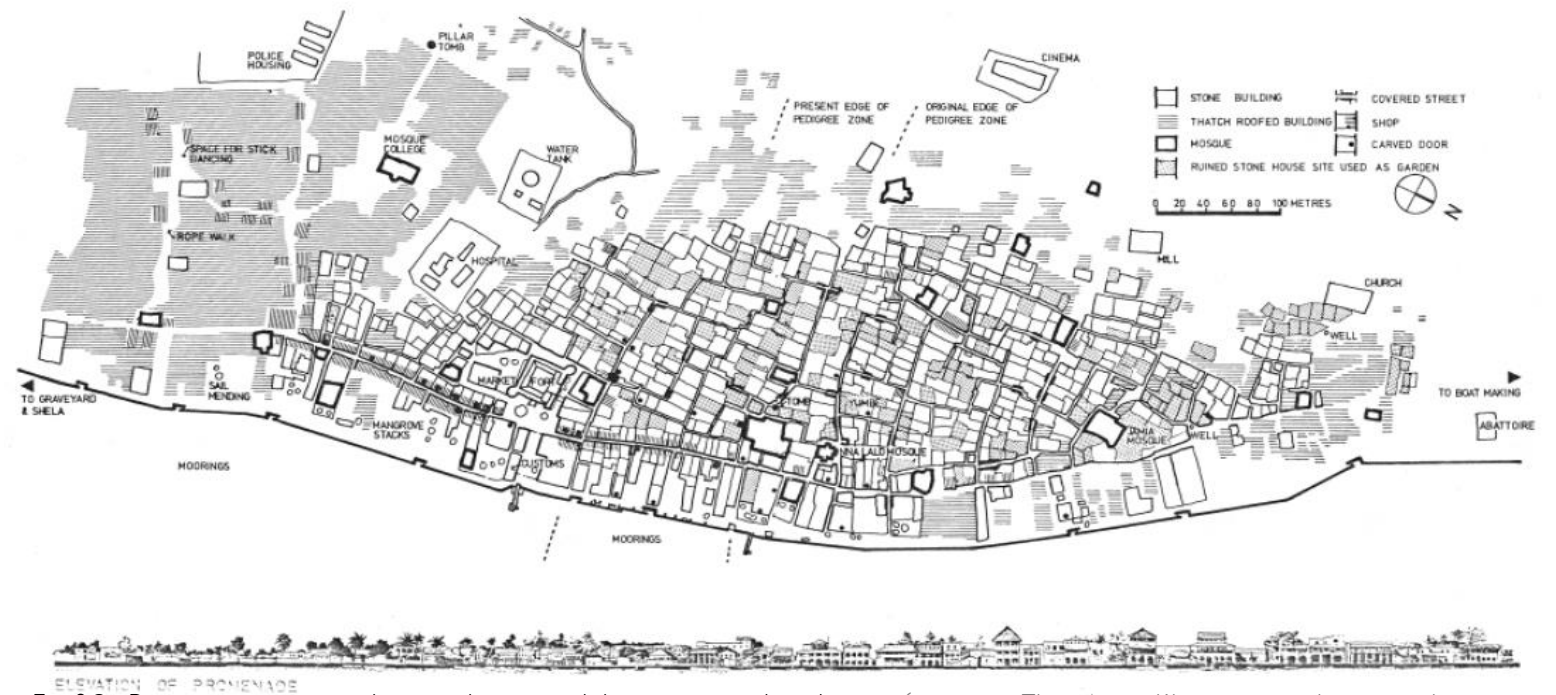


Fig30. Presentation of urban fabric and Lamu town land use. (source: The Aga Khan award for architecture, conservation of Lamu, National Museum of Kenya)

THE CONSERVATION PLAN

The plan for the stone town of lamu was completed and approved in 1986 to counteract the rapid deterioration of the historical area with measures aimed at promoting a form of development in line both with the cultural traditions of the town and the present day needs of its inhabitants. (Fig31)

In the face of uncontrolled transformation, the goal of the plan was to achieve balanced growth in the stone town. Growth that does not compromise the town's historical character and the use of its public spaces, but which does meet the inhabitants needs for better housing and economic opportunities. The planners concentrated on four objectives.

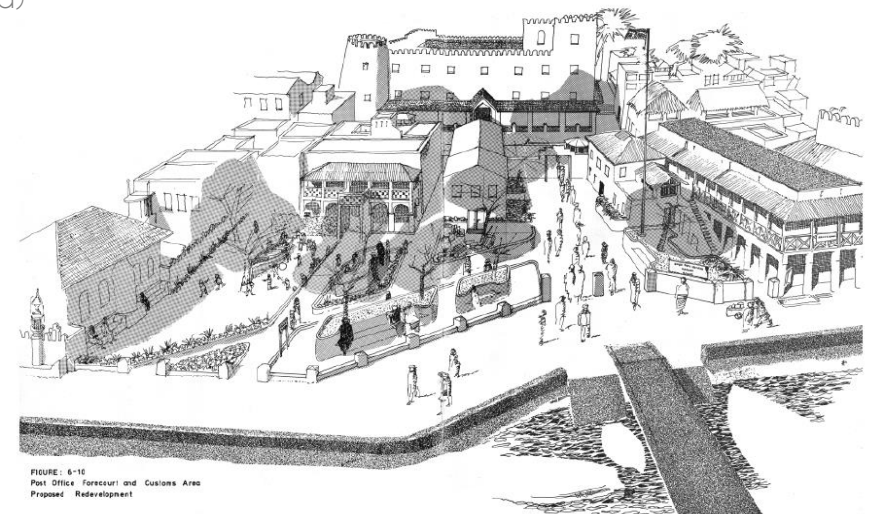


Fig31. Proposal for redevelopment (source: The Aga Khan award for architecture, conservation of Lamu, National Museum of Kenya)



Fig32. view of the town's fort tower from the town square. (source: Author photography)

- A. A comprehensive planning scheme for the historical area, including enabling legislation, land use proposals, local building regulations, and special measures to protect the architectural and historical features of the town. The lack of a legislative and planning framework had been a major stumbling block to previous conservation efforts in the old town.
- B. Detailed plans to protect and improve public buildings and open spaces in the stone town, such as the fort, the seafront, and the dilapidated and congested market and town squares.
- C. Building guidelines with practical guidance for owners and builders making repairs, alterations, and addition to old buildings, or building new houses. The national museums of Kenya set up a local planning office in 1987 to advice, monitor and promote private and public rehabilitation work in the town. Lack of information about building maintenance and traditional construction methods and materials had been one of the main causes of indiscriminate change in the old town.
- D. Establishment of training programs to teach young masons and carpenters traditional building techniques and a matching grant scheme to help owners rehabilitate their buildings.



Fig33. Sea front veranda houses. (source: conservation of Lamu, National Museum of Kenya)

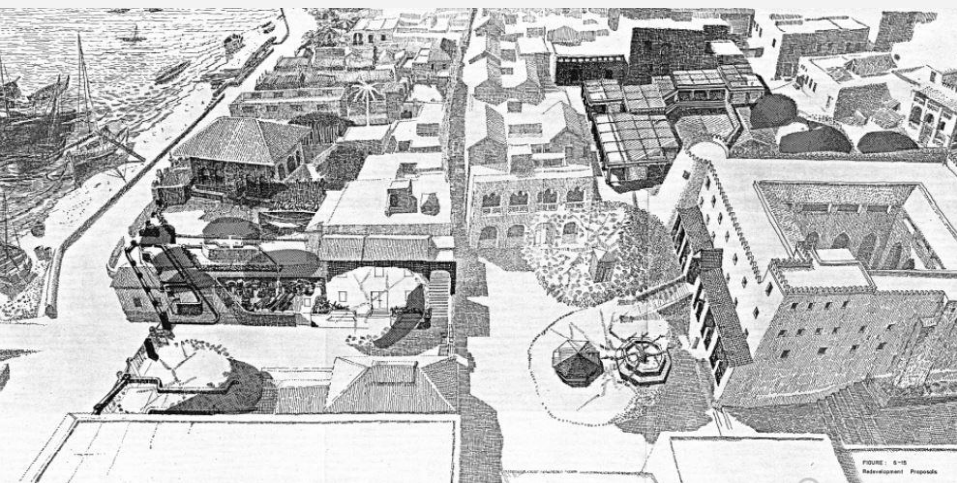


Fig34. Redevelopment proposals for the center of the city (source: conservation of Lamu, National Museum of Kenya)

CONCLUSION

The program to conserve Lamu achieved two important results:

1. It established the institutional and planning framework for the preservation of the old town;
2. And, it inspired a series of special projects stimulating local interest in maintaining the traditional buildings and building industries, and in revitalizing the town's public facilities and open spaces.

The Lamu experience shows that the conservation of a town's cultural and architectural heritage is not an impractical enterprise for countries with long agendas for economic and social development. It also demonstrates that conservation efforts in this part of the world can make an important contribution to the welfare of an entire community if linked to programs that foster economic opportunity and promote development firmly rooted in local traditions and industries.

REASONS FOR CHOOSING / LESSONS LEARNT

Lamu is one of the oldest Islamic community in Kenya which is comparable with Makina and we could take lessons from it in case of towns physical setting, narrow parallel streets, density of buildings, local facilities, social relations, and spatial relationships in buildings and neighborhood as well.

- The first lesson learnt from Lamu related to its spatial network between houses and their context, In case of attention to cultural aspects, environmental condition, natural lighting, local materials and way of construction and other similar issues.
- The next is Islamic items, from life style, social and neighborhood relations to the courtyard houses, buildings spaces, simplicity and uniformity of the buildings, public private areas, vision toward both inside and outside, safety and privacy.



Fig35. Sea front of Lamu town (source: conservation of Lamu, National Museum of Kenya)



Fig36. Left: carved door of a mosque, Right: interior view of Lamu fort. (source: Author photography)

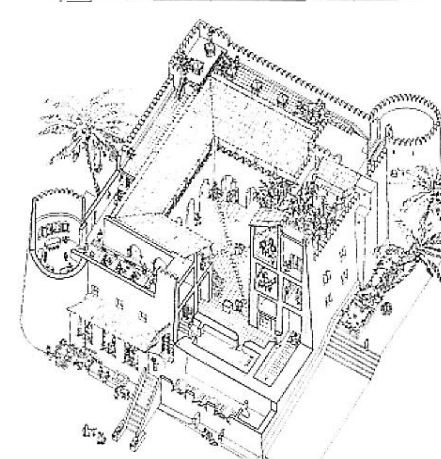
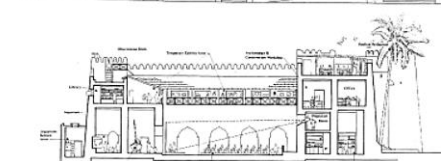


Fig37. East elevation, section looking west and axonometric view of the proposed scheme to re-use the fort (source: conservation of Lamu, National Museum of Kenya)

CASE STUDY - 2

SHUSHTAR NEW TOWN

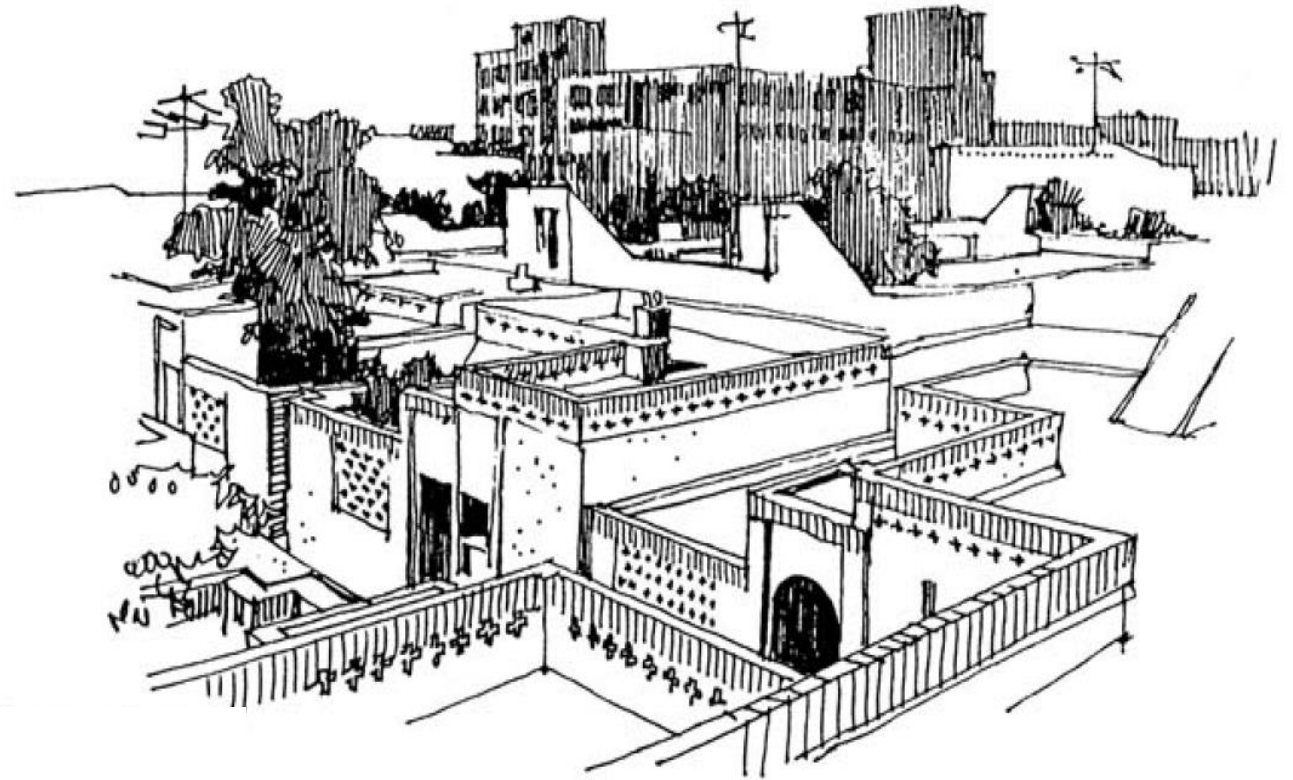


Fig38. Shushtar town, view of the roofs (source: The Aga Khan award for architecture, Shushtar new town, Kamran Diba)

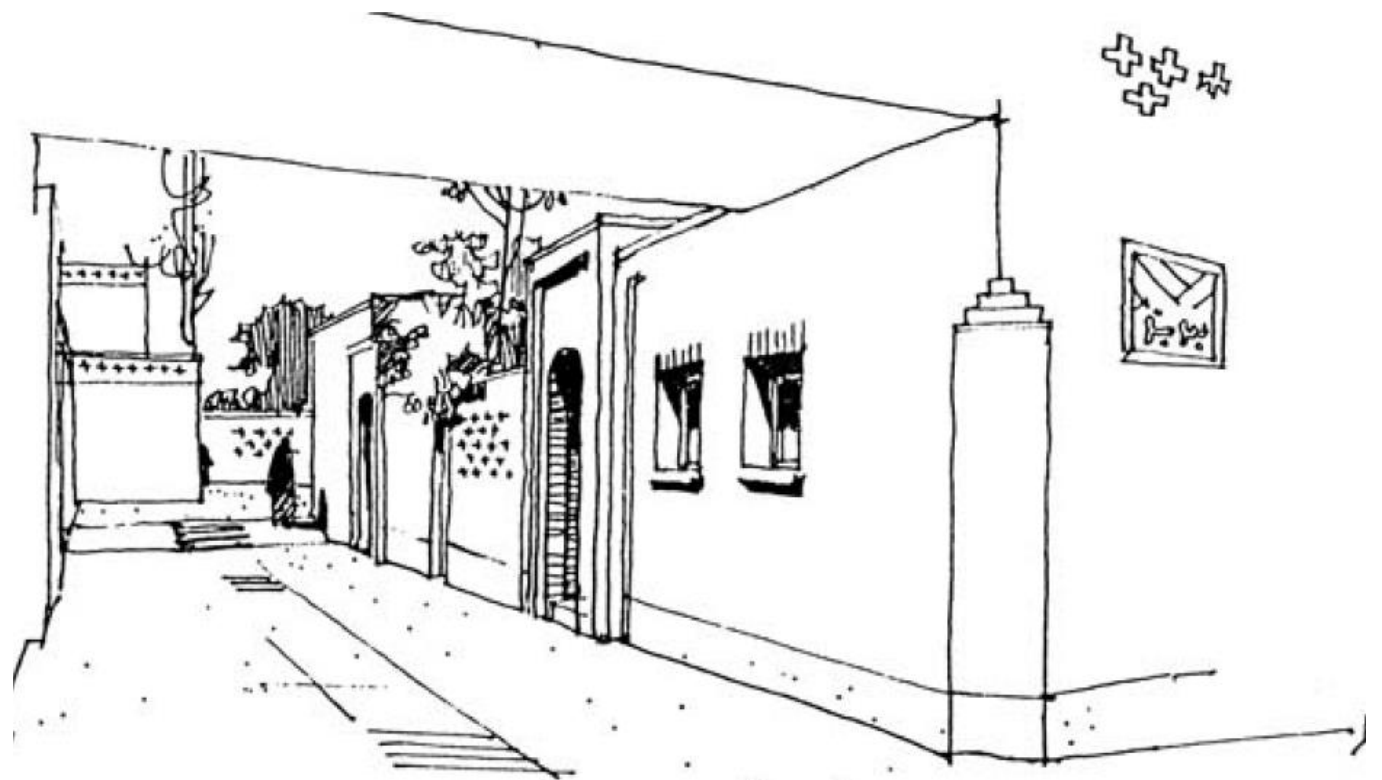


Fig39. Shushtar town, Passageway (source: The Aga Khan award for architecture, Shushtar new town, Kamran Diba)



Fig40. Exterior façade of the houses

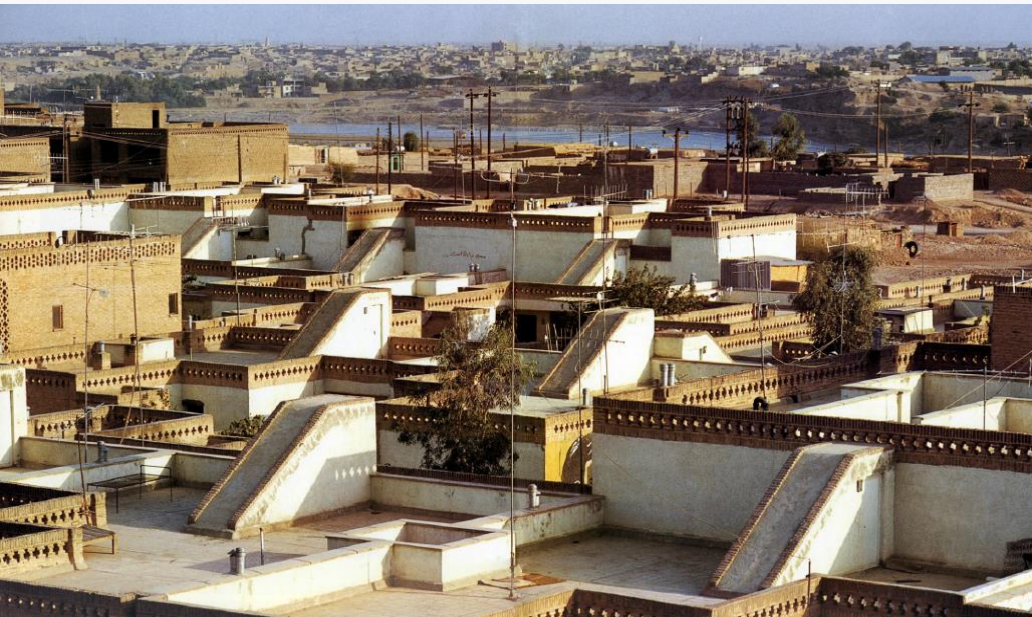


Fig41. The rhythmic geometry of the roofs captures the unifying theme of the underlying composition.

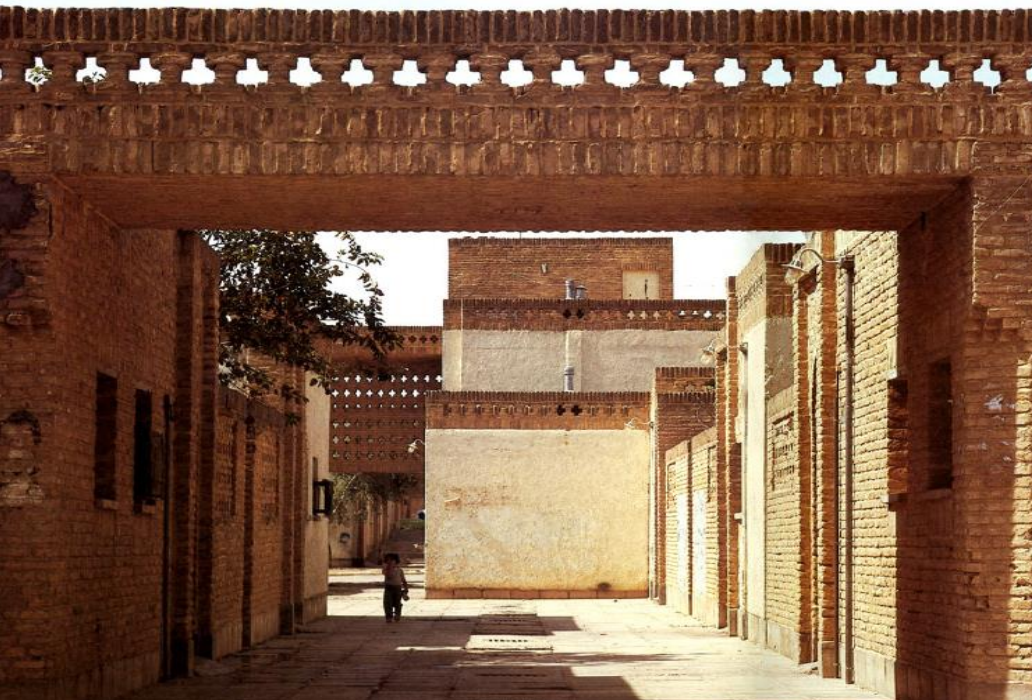


Fig42. The elegant brickwork frames the pedestrian street designed at a human and inviting scale

INTRODUCTION

Completed 1978 (phase 1)

Client: Karoun Agro-industries Corporation, and Iran Housing Corporation.

Architects: D.A.Z. Architects, planners and Engineers.

SITE

Shushtar new town, in the Khuzestan province in southwest Iran, is across the river from the old city. The site is exposed, undulating and bounded on the eastern and southern sides by the Shatit River. Most of the land is desert

OBJECTIVES

In 1973, the Karoun Agro-Industries Corporation decided to build a satellite town to house the employees of a sugar cane processing concern nearby. The inhabitants were to be provided with the advantages of individual housing as well as communal facilities and infrastructural services. Development of Shushtar New Town was also intended to revitalize the old town and to accommodate expansion generated by industrial growth in the region. (Fig43)

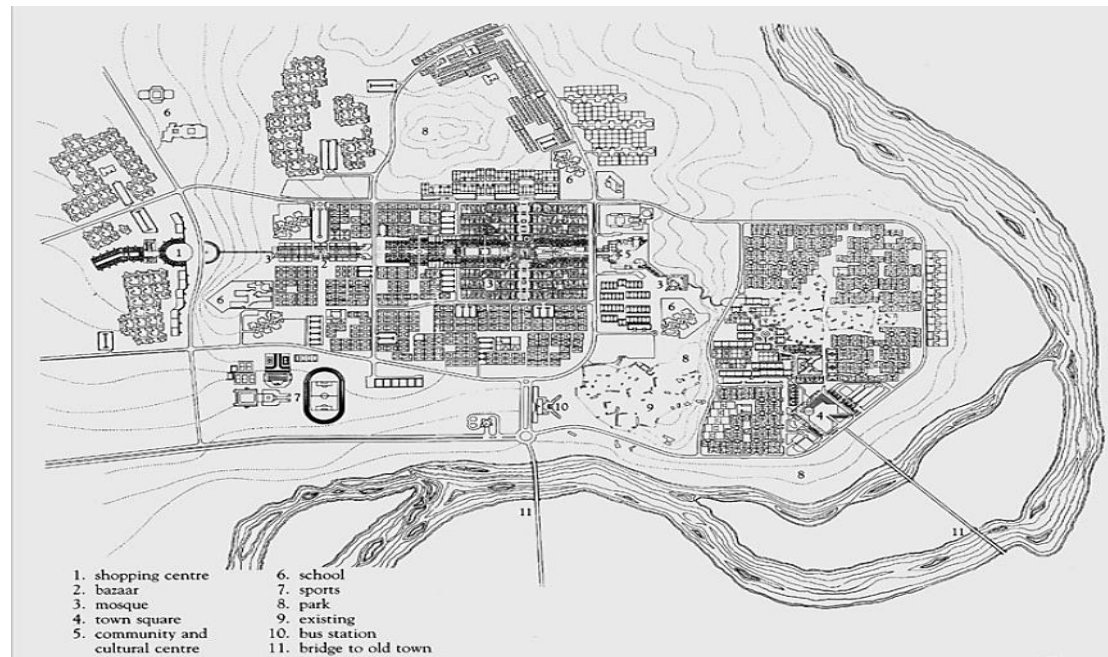
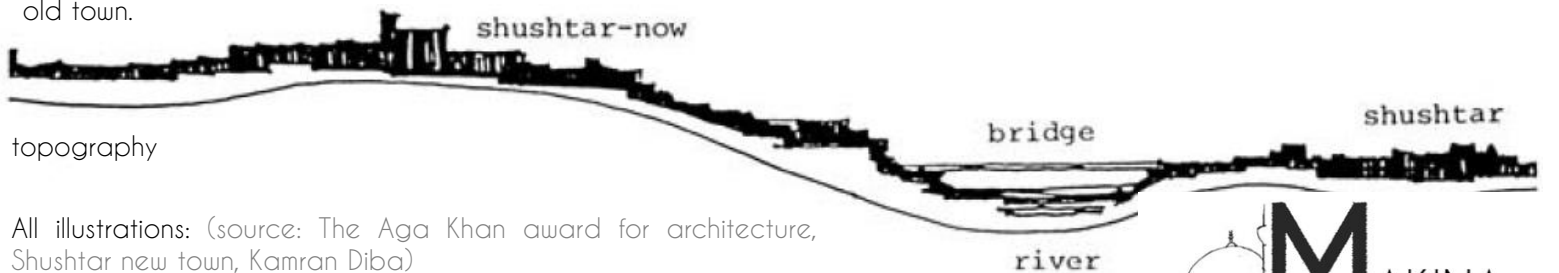


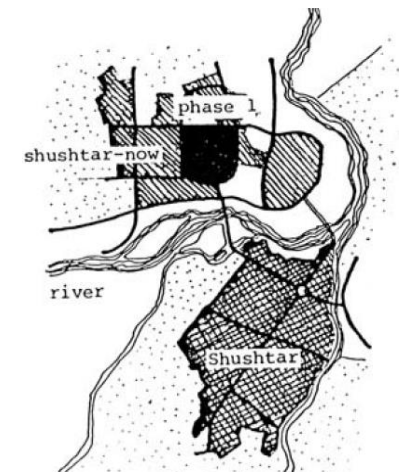
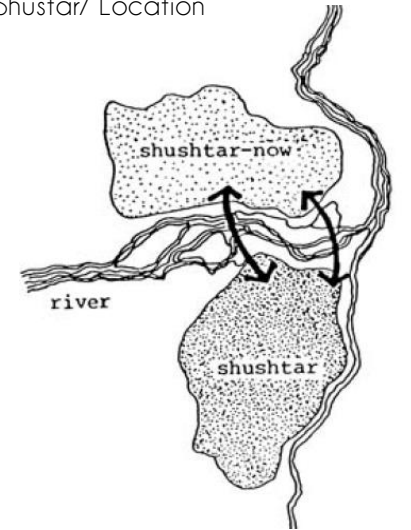
Fig43. general site plan: The new town is planned along a central spine leading to the old town.



All illustrations: (source: The Aga Khan award for architecture, Shushtar new town, Kamran Diba)



Shushtar/ Location



relative situation

Shushtar is one of the oldest fortress cities. It was an island city on the Karoun river during the Sasanian era when it also became the winter capital. The fortress walls were destroyed at the end of the Safavid era from 1502 to 1722 A.D.

The river was channeled to form a moat around the city. Bridges and main gates into the city were built to the east, west and south of the city. Several rivers near Shushtar are conducive to the extension of agriculture. Sugar cane, the main crop, dates back to the Sasanian period, 226 to 641 A.D.

The system of channels and subterranean water, Qanat, supplied water for domestic use and for irrigation. Qanat connected the river to the internal reservoirs of the assembled houses. Traces of these Qanats are in the crypts of some houses. Subterranean channels were used to supply water during the war when the gates were closed.

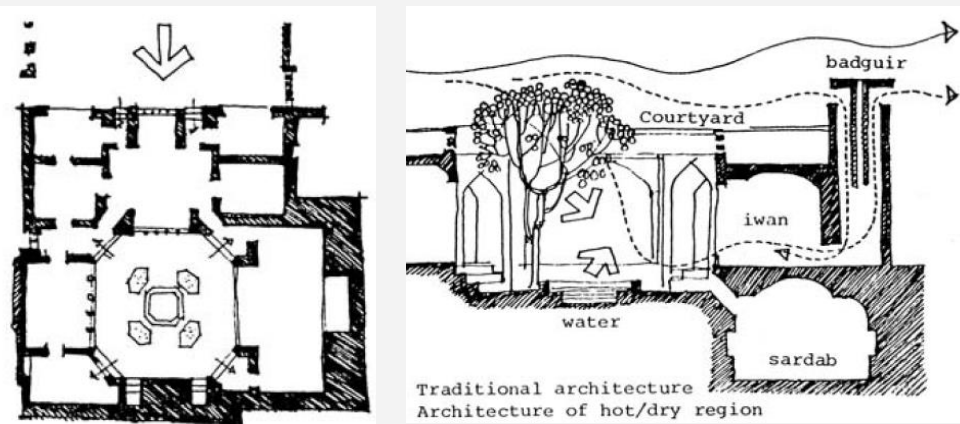


Fig44. Introvert architecture, Zone of coolness, Light and shade, Formation of a private space, air circulation, presence of water and plantations. (source: The Aga Khan award for architecture, Shushtar new town, Kamran Diba)

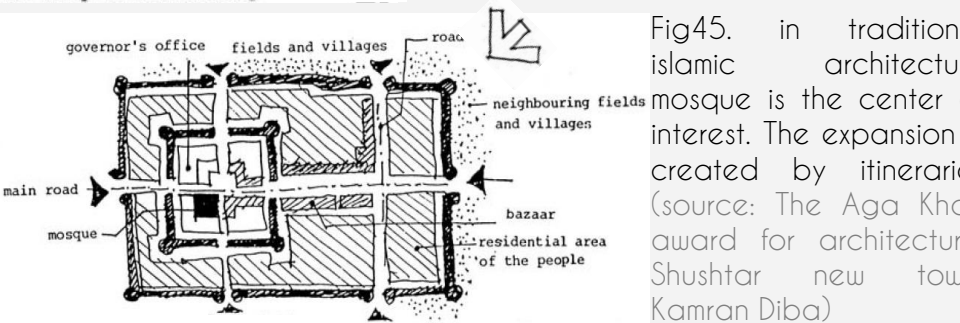
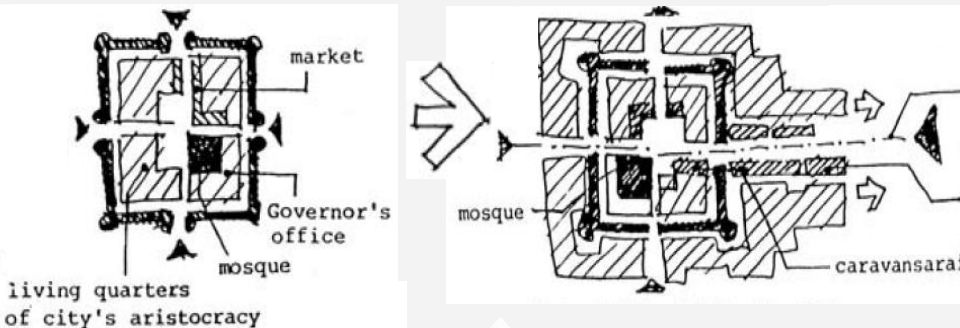


Fig45. in traditional islamic architecture mosque is the center of interest. The expansion is created by itineraries (source: The Aga Khan award for architecture, Shushtar new town, Kamran Diba)

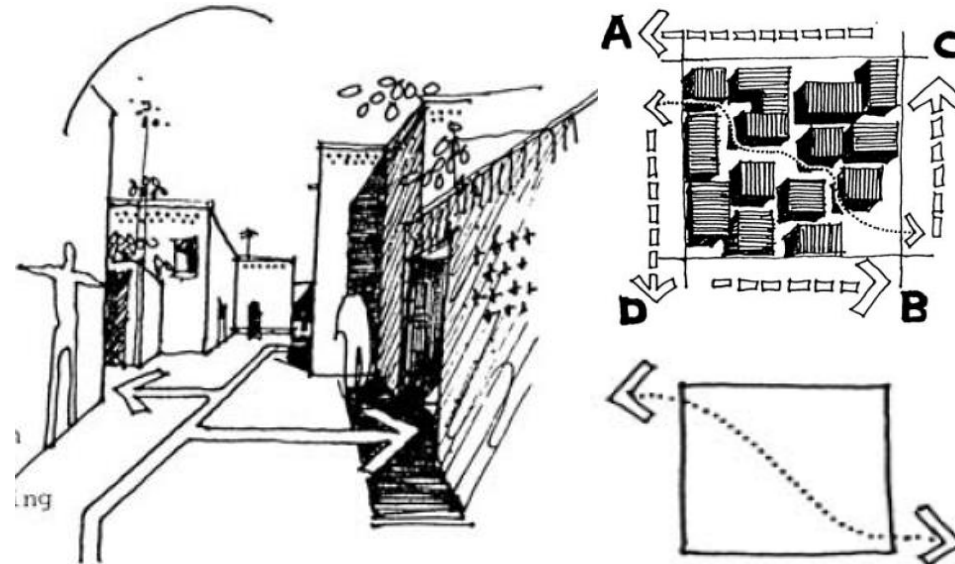


Fig46. Shushtar now, architecture based on free horizontal expansion. Diagonal circulation allowing easy access and offering variegated perspectives while preserving a human scale. (source: The Aga Khan award for architecture, Shushtar new town, Kamran Diba)

LOCAL ARCHITECTURE

Most of the buildings belong to the Safavid era. Buildings are mostly of mud brick. They became a formal arrangement of four rooms separated by the cross-formed barrel-vaulted iwan. The central intersection was an open courtyard. This form was also found in the layout of the fortress city with the fortress walls forming a square. The main streets, the transepts and the houses occupied each quarter. The castle of administrative center, mosque, baths and schools were at the geometric center. The cross form was also the symbol for the ancient Iranians. (Fig45, 47 and 48)

In the desert, it was found that a dome over the central courtyard produced a pleasant cooling effect, the roofed patio Tanabi, became a place of general assembly. Consequently, the courtyard was moved to one side of the house. Depending on the climatic conditions, which vary north and south, the direction of access into the house, and the occupant's wealth, two courtyards were built, one on the hottest side and one on the coolest. The courtyard on the street side was usually lower than the street level.. This facilitated the flow of rainwater into a central pond in the patio that stored water for drinking and irrigation. (Fig44)

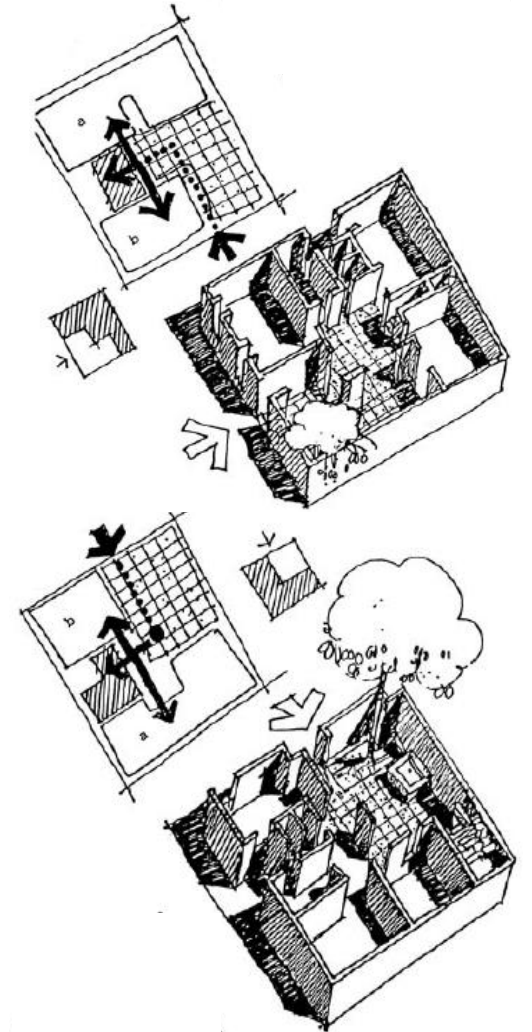


Fig.47 Shushtar now, conception and typology of houses, in each familiar cell two zones coexist: 1. private familial area (Andaruni) 2.area reserved for exterior and social relations (Biruni) (source: The Aga Khan award for architecture, Shushtar new town, Kamran Diba)

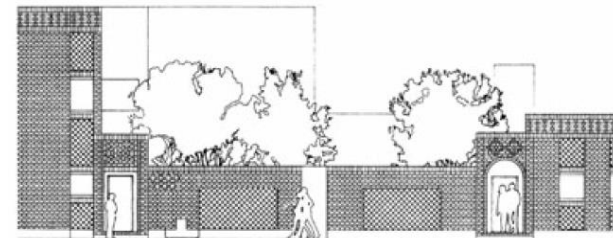


Fig48. Internal street elevation (source: The Aga Khan award for architecture, Shushtar new town, Kamran Diba)

Traditional construction methods were used by the local contractor who used local materials and mostly local, unskilled labor.

Load-bearing walls are built of locally made bricks and footings are of concrete. Roofs are framed with steel beams supported by the walls or by engaged piers. Conventional shallow barrel vaults in brick span four meters between the beams. Ceilings are finished with plaster. Floor finishes are terrazzo tiles on concrete slabs. Wall finishing's are mostly of brick but sometimes in kitchens and bathrooms, cement is used. Door and window openings are circular brick arches or lintels. Streets are paved in patterned brick with tile borders.

AESTHETIC ASSESSMENT

The project is faithful to the traditional architecture of the region. It is reminiscent of traditional Islamic vernacular urban architecture, which encourages social interaction. By the design of its spaces, it generates a communal sense. The contrast between the vast public spaces and the dense fabric of the streets and residential neighborhoods offers visual and spatial diversity.

The topography and slight slope of the ground allow the buildings to be arranged in a harmonious composition displaying an interesting variety of spaces.

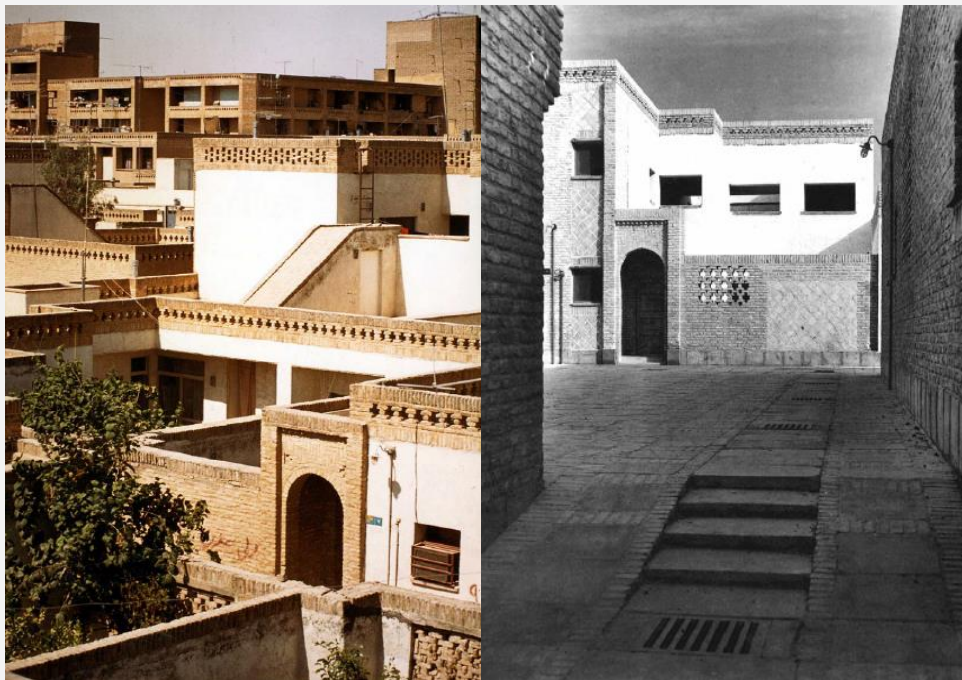


Fig49. Attention to proper use of materials, from street paving to walls and parapets provides a subtle setting in harmony with the climate and the environment. (source: The Aga Khan award for architecture, Shushtar new town, Kamran Diba)

PLAN

The design of New Shushtar follows the pattern of traditional Iranian architecture which is introverted, taking its forms from climatic constraints, available local technology and the country's culture. (Fig46)

The massing of the buildings is a parallel arrangement of mostly one and two storey houses that are clustered along narrow streets following traditional models for privacy. The treeless, narrow streets are paved in bricks. The top floor of the apartment houses is built along the street front to maximize shading. Most residential streets are east/west oriented so that houses catch the prevailing north wind. To further foster privacy and neighborhood activity, automobile traffic is prohibited in the residential areas.

The public buildings grouped along the east/west pedestrian boulevard are designed to give neighborhood identity to each block in the traditional manner. Public buildings are set at an angle to the grid, which organizes the entire plan, to punctuate the dense residential fabric. In the residential with multifunctional rooms arranged around a courtyard and roof terraces for sleeping. Thick walls, small windows and street entry through a small protected space are also traditional features. Parapet walls surrounding the roof provide shade. (Fig50)

CONCLUSION

The project was planned in five stages, to be completed in 1985. construction started in 1976, and most of the first stage was completed by 1978. the first stage was planned to function as an autonomous unit and accommodate about 4,000 inhabitants. During the hiatus in construction, squatters and refugees moved into the complex, over crowding and straining the infrastructure and services.

Shushtar new town is relevant to the cultural values of Iran and maintains a continuity with the past, allowing cultural expression. Its example of urban housing is unique as a large scale new town conceived and produced by local designers and builders attempting to satisfy indigenous life styles and contemporary goals of industrial development.

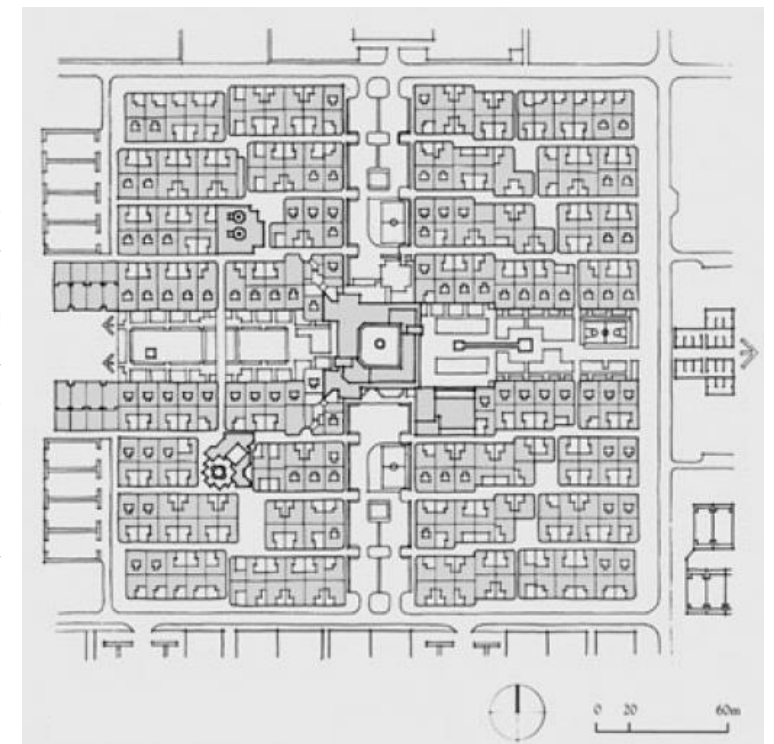


Fig50. Site plan, Phase one. (source: The Aga Khan award for architecture, Shushtar new town, Kamran Diba)

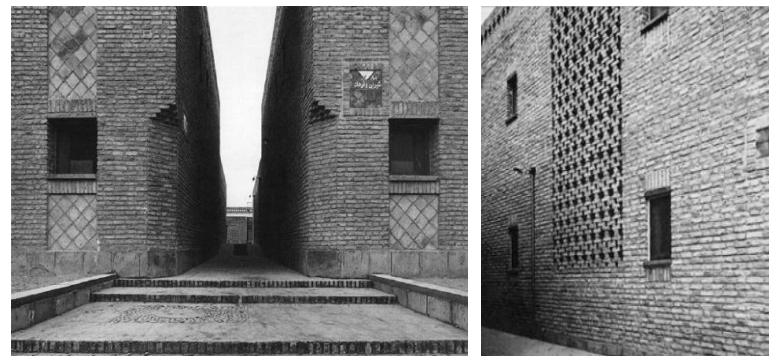


Fig51. individual residences demonstrate the same mastery of scale and massing that are found throughout the project. (source: The Aga Khan award for architecture, Shushtar new town, Kamran Diba)

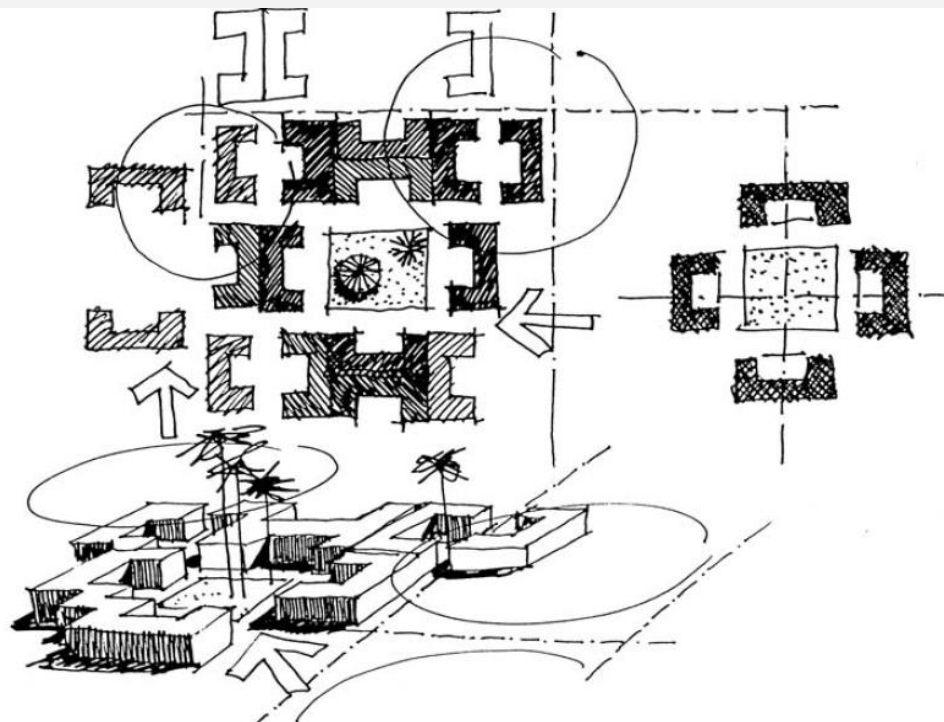
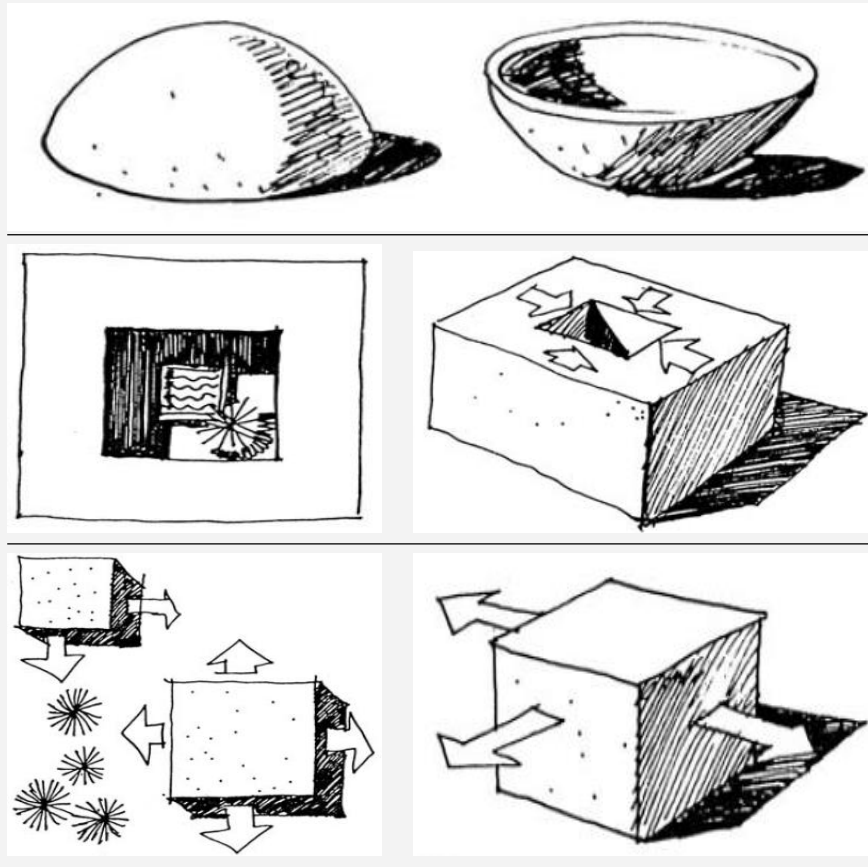


Fig54. Formation and composition of habitation cells generating common neighborhood spaces and representing various micro-cultures. (this conception is reproduced in Shushtar town) (source: The Aga Khan award for architecture, Shushtar new town, Kamran Diba)

COMPARISON OF TWO CONCEPTIONS OF URBAN PLANIFICATIONS

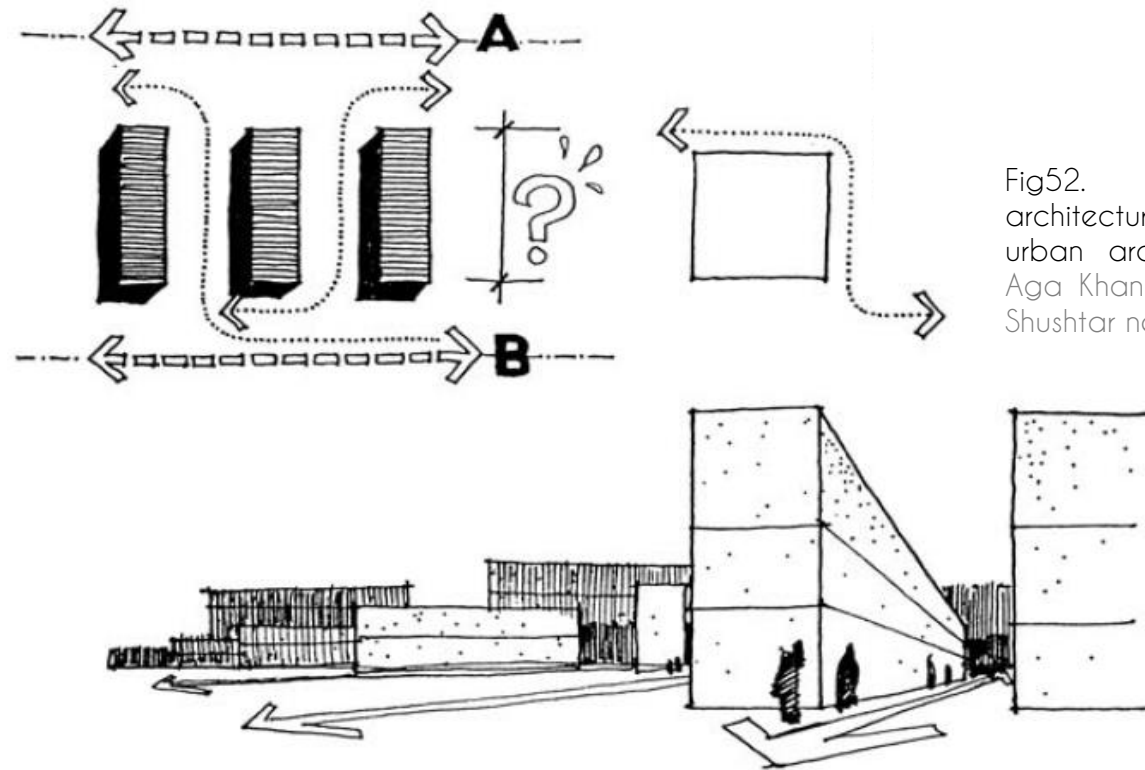


Fig52. Geometry, verticality, architecture in height (modern urban architecture) (source: The Aga Khan award for architecture, Shushtar new town, Kamran Diba)

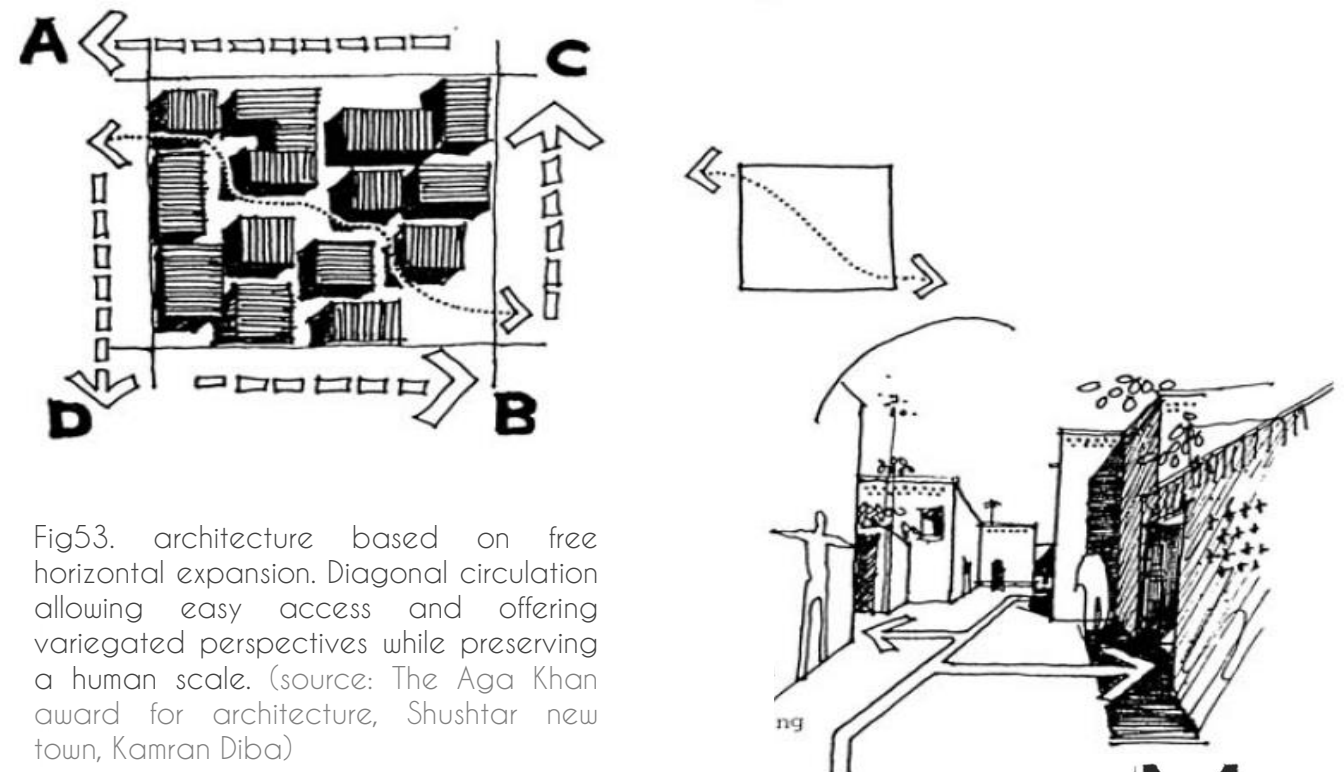
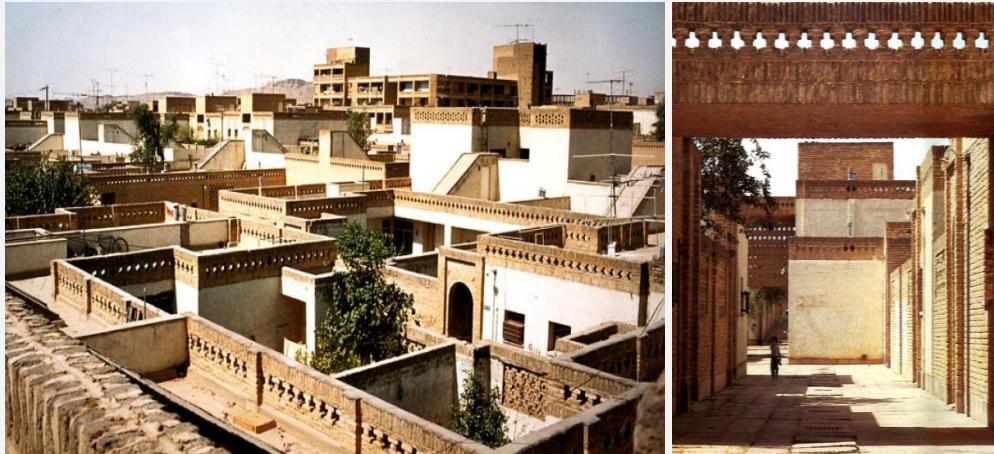


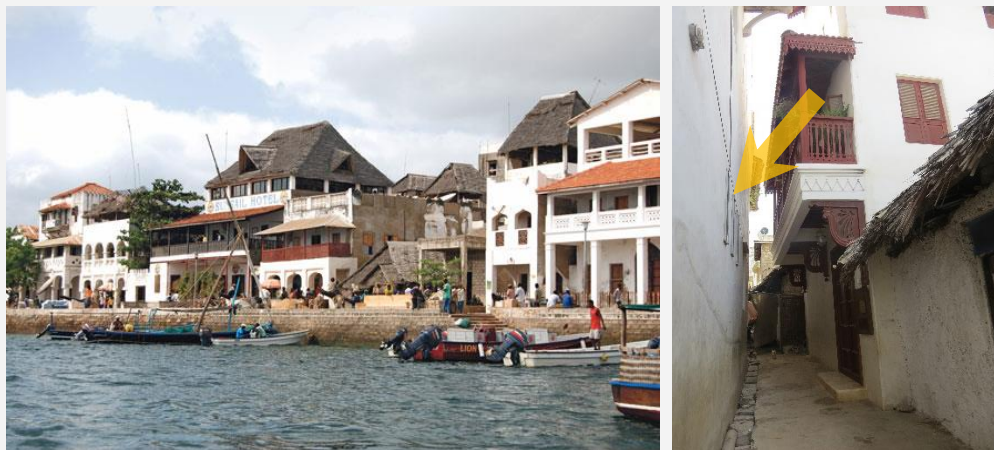
Fig53. architecture based on free horizontal expansion. Diagonal circulation allowing easy access and offering variegated perspectives while preserving a human scale. (source: The Aga Khan award for architecture, Shushtar new town, Kamran Diba)

URBAN TEXTURE



- Dense urban structure – not more than two floor
- Long narrow streets – No openings toward outside

Shushtar town (source: The Aga Khan award for architecture, Shushtar new town, Kamran Diba)



- Dense urban structure- Exceed one and two floor
- Long narrow streets - openings toward outside

Lamu Island (source: Author photography)



- Dense urban structure – Mostly one floor
- Long narrow streets – openings toward outside

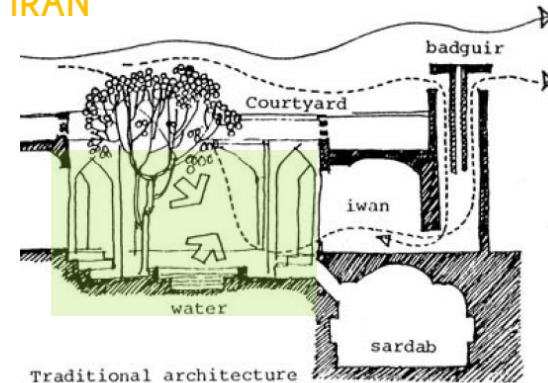
Makina settlement (source: right: Author photography Left: <http://io9.com>)

TRADITIONAL ISLAMIC HOUSES IN IRAN, LAMU AND MAKINA(NAIROBI)

- Material : local mud brick and tile, lime and wood
- Corridor(buffer) at the entrance
- Private and public spaces
- Inward view
- Plantation and pond in the courtyard
- Four room organization around the courtyard
- Thick walls to make a geometrical space
- Using wind catcher and Sardab for hot seasons

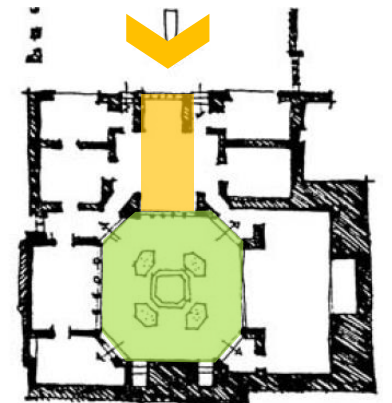
SECTION

IRAN



Traditional architecture Architecture of hot/dry region

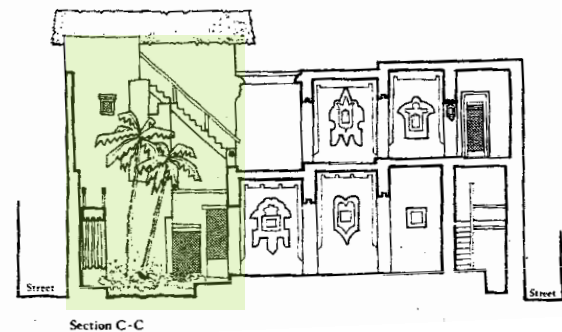
PLAN



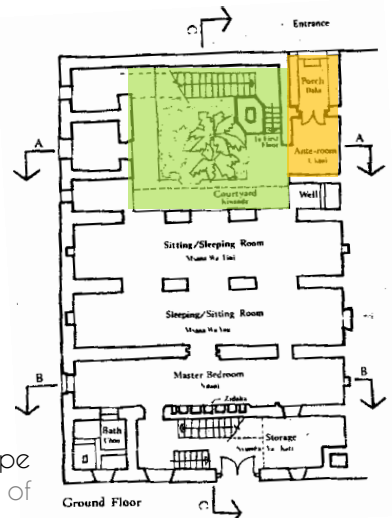
Plan and section of a house in Shushtar town(source: The Aga Khan award for architecture, Shushtar new town, Kamran Diba)

- Material : local undressed coral stone, coral lime plaster, coral rubble, mangrove wood and thatch.
- Corridor(buffer) at the entrance
- Private and public spaces
- Inward, outward view
- Plantation in the courtyard
- Long and narrow rooms along the courtyard
- Thick walls to make a geometrical space

LAMU



Plan and section of a house in Lamu island shape (source: conservation of Lamu, National Museum of Kenya)



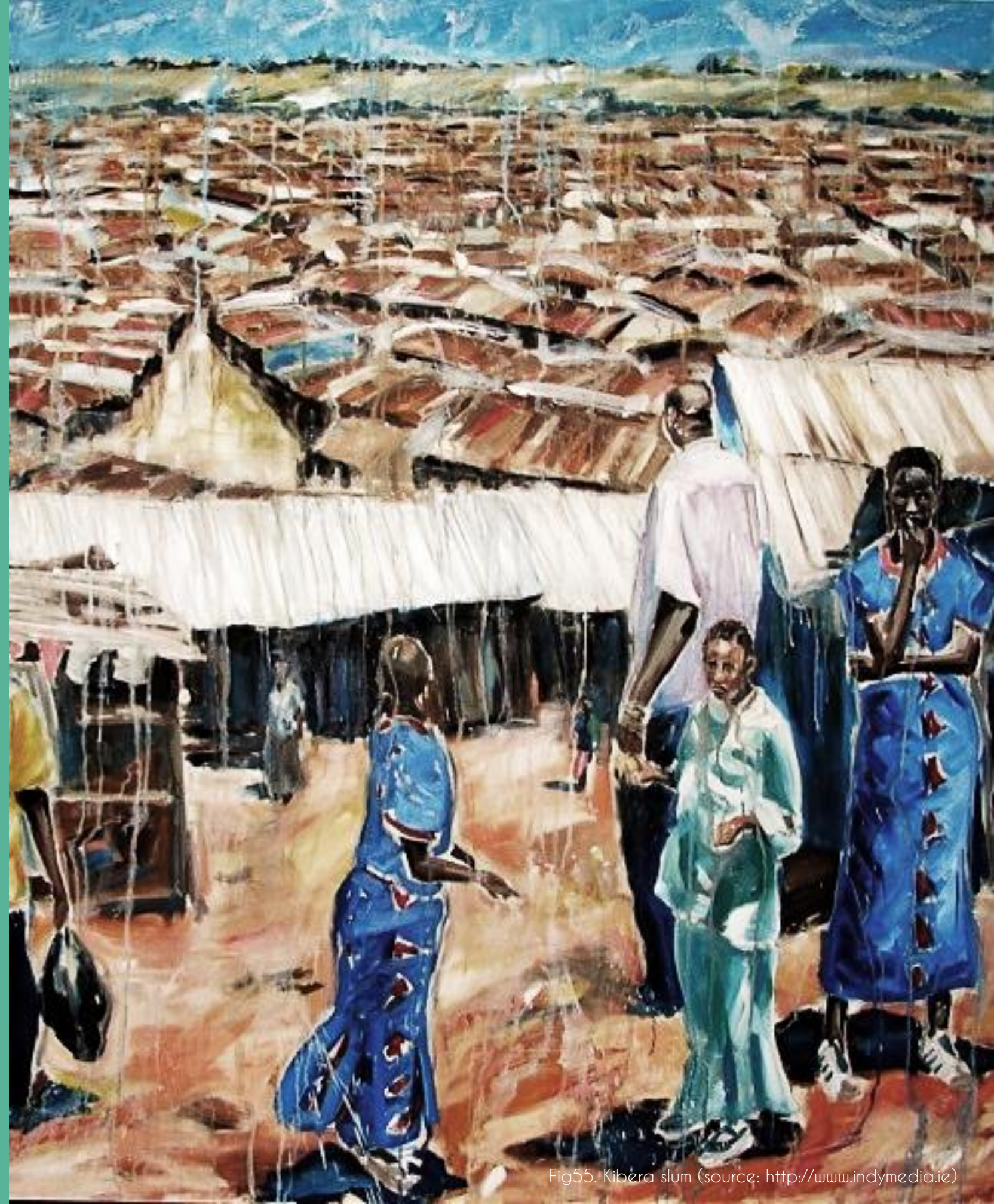
- Material : local mud and wood, iron sheets, cement in some part depend on occupants wealth
- No buffer at the entrance
- No Private and public spaces
- few plantation
- Inward and outward view
- No law for the rooms organization, mostly located around the courtyard

MAKINA



Plan and section of a house in Makina settlement (source: right: Author drawn)





BACKGROUND INFORMATION

KIBERA, NAIROBI, KENYA

Fig55. Kibera slum (source: <http://www.indymedia.ie>)

ETHNIC PATTERNS

(based on ethnic, linguistic, and geographical considerations, in brackets percentage of population over 1%)

A: Central Bantu Cluster (40%)

1. Kikuyu (21%)
2. Kamba (11%)
3. Meru (5%)
4. Embu (1%)
5. Mberè
6. Tharaka
7. Chuka
8. Igoji
9. Miutini
10. Mwimbi
11. Muthambi



B: Western Bantu Cluster (20%)

1. Luhya (13.6%)
Isukka - Idakho - Kabras - Nyala
Tsofso - Wanga - Marama - Kisa
Nyore - Maragoli - Tiriki - Bakhayo
Tachoni - Marach - Samia - Bukusu
2. Kisii (Gusii) (6.6%)
3. Kuria



C: Coastal Bantu Cluster (5%)

1. Mikikenda (4.8%)
Digo - Duruma - Choni
Giriama - Rabai - Ribe
Jibana - Dauma - Kamba
2. Pokomo/Riverine
3. Bajun
4. Swahili/Shirazi
5. Taveta
6. Boni/ Sanyè



D: Luo (13%)

E: Kalenjin- speaking cluster (12%)

1. Kipsigis (4%)
2. Nandi (2%)
3. Tugen (1.1%)
4. Elgeyo (1%)
5. Pokot (suk)
6. Marakwet
7. Sabaot



F: Other Eastern Nilotic Groups (4%)

1. Turkana (2%)
2. Masai (1.5%)
3. Iteso (Wamia, Elgumi)
4. Samburu (Burkeneji)
5. Nderobo
6. Njemps



G: Cushitic Groups (3%)

H: Non-African (1%)

Asian, Arab, European

KENYA

LANGUAGE

English and Swahili are the two official languages of Kenya. Swahili is spoken by about 85% of the population. Besides these two there are a total of 60 spoken languages divided in three major groups: Bantu (spoken by 65% of the people) Nilotic (32%) and Cushitic (3%). (Fig6 1)

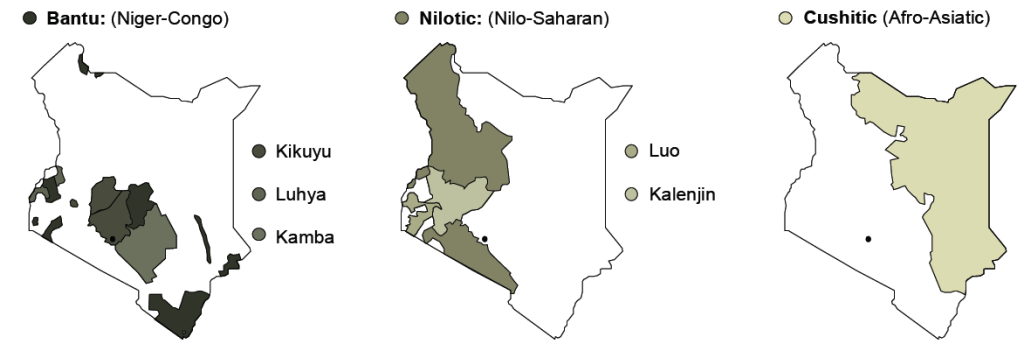


Fig6 1. Language groups, (Source: ETH Studio Basel and Andres Herzog)

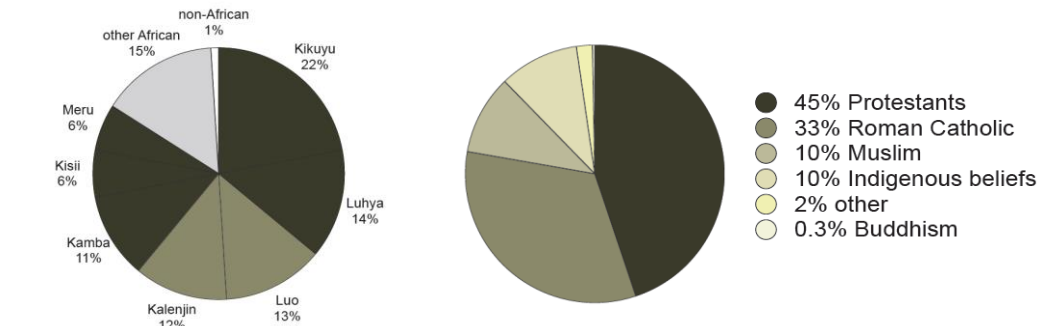
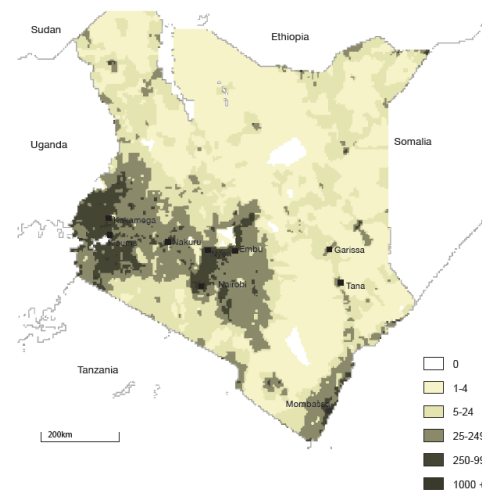
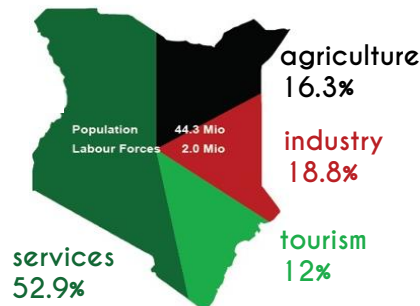


Fig62. Ethnic groups (Source: ETH Studio Basel and Andres Herzog)

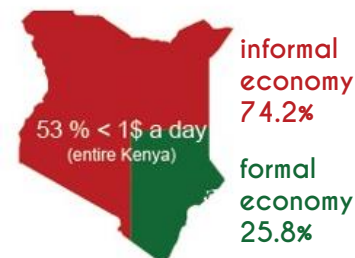
Fig63. Religion (Source: ETH Studio Basel and Andres Herzog)

Fig70. Population density 2005 (Source: ETH Studio Basel and Andres Herzog)

FORMAL ECONOMY



INFORMAL ECONOMY



POVERTY IN KENYA

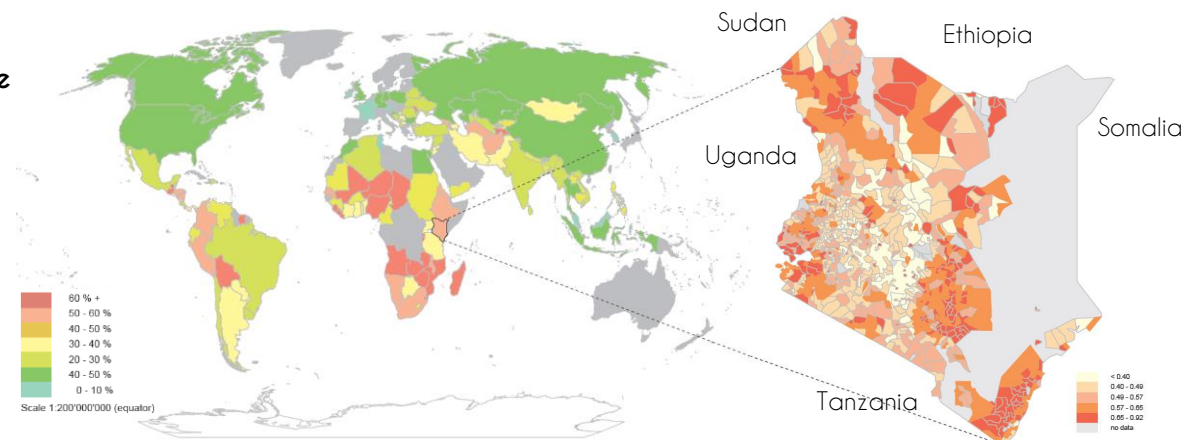


Fig64. Percentage of poverty in the world (Source: ETH Studio Basel and Andres Herzog)

Fig65. Proportion of the population living below poverty line in Kenya, (Source: ETH Studio Basel and Andres Herzog)

Left and above: (Source: ETH Studio Basel and Andres Herzog)

NAIROBI

LOCATION

- Nairobi is the capital and largest city of Kenya. The city and its surrounding area also form the Nairobi County. The name "Nairobi" comes from the Maasai phrase "Enkare Nyrobi", which translates to "cold water".
- Nairobi is situated in the south of Kenya. 36°50' east and 1°17' south. the city lies on the Nairobi river, at a height of 1670 m above sea level. it covers an area of 684 km².
- Nairobi lies on the boundary between two geographical region, the Athi plains and the Kikuyu plateau.
- travelling across the Athi plains and the kikuyu plateau, altitude and rain fall increase and temperature decreases gradually. there is a sudden change in soil, vegetation, land use and population density. this is due to a change of gradient from level to sloping land. a very fertile "red coffee" soil is only to be found where the land slopes enough to allow rain water to drain away. on level land a less fertile, heavy black clay "black cotton" is predominant. (Fig69)

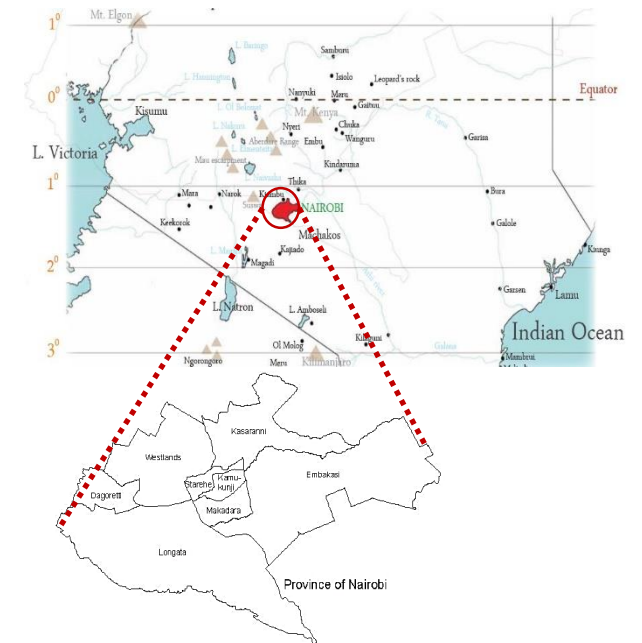


Fig69. map showing Nairobi city in Kenya context (source: passive & low energy building design in Nairobi- research thesis - David Eric Loki)



Fig70. An aerial view of Nairobi, the central business district and Ngong Road (Source: <http://commons.wikimedia.org>)



Fig71. An aerial view of Nairobi central business district and Uhuru park (Source: <http://buzzkenya.com>)

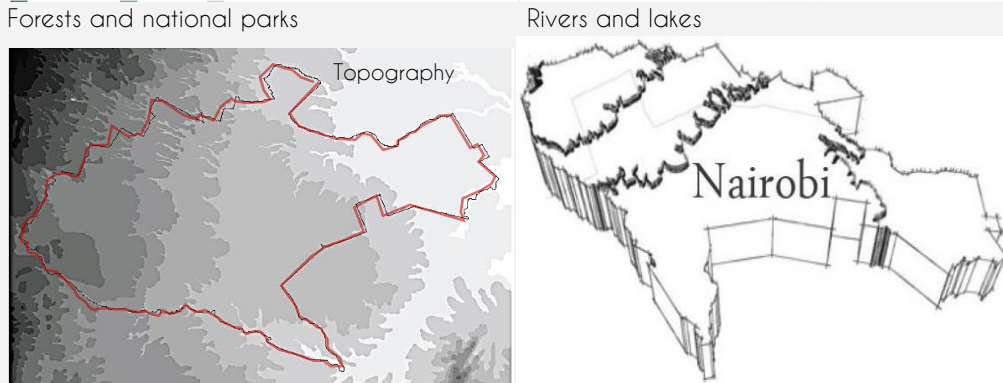
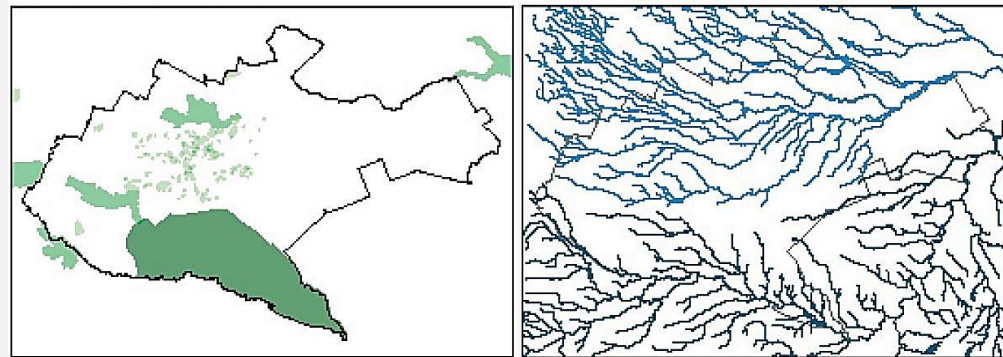
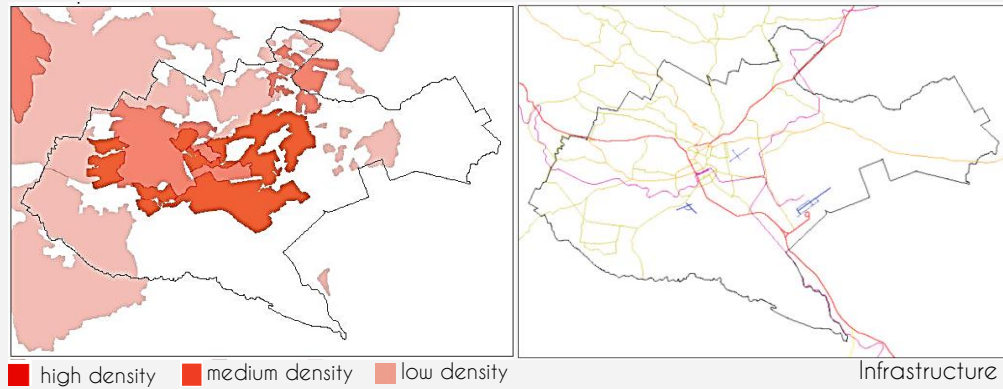


Fig66. The Nairobi region slopes from the Western and Northern sides, where its forested and cooler, and into the lower Athi plain to the East and South. : (All illustrations Source: ETH Studio Basel and Andres Herzog)

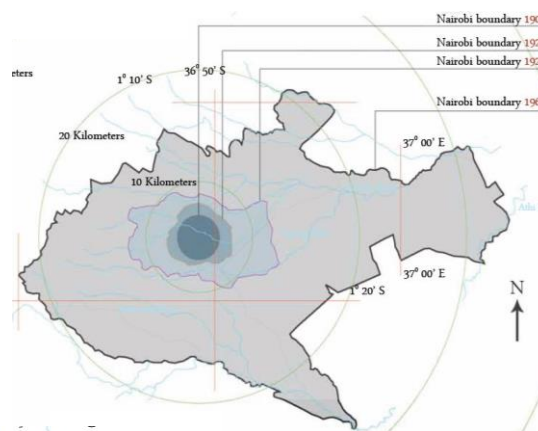


Fig67. city's geographical extends over the years. (source: passive & low energy building design in Nairobi- research thesis - David Eric Loki)

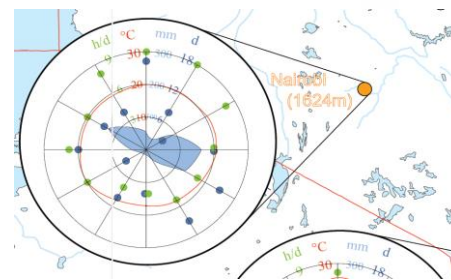


Fig68. map showing a moderate and mid climate because of altitude and winds in Nairobi. (Source: ETH Studio Basel and Andres Herzog)

CLIMATE

- Although Nairobi is situated in the middle of East Africa it has a subtropical highland climate. At 1,795 meters (5,889 ft.) above sea level, evenings may be cool, especially in the June/July season, when the temperature can drop to 10 °C (50 °F). The sunniest and warmest part of the year is from December to March, when temperatures average the mid-twenties during the day. The mean maximum temperature for this period is 24 °C.
- There are two rainy seasons, but rainfall can be moderate. The cloudiest part of the year is just after the first rainy season, when, until September, conditions are usually overcast with drizzle. As Nairobi is situated close to the equator, the differences between the seasons are minimal. The seasons are referred to as the wet season and dry season. The timing of sunrise and sunset varies little throughout the year for the same reason. (Fig68)

The year can be subdivided into four seasons as follows:

1. **Mid-December to Mid-March:** warm, sunny, dry.
2. **Mid- March to May:** main rainy season.
3. **June to Mid-October:** cool, rather cloudy (especially July-August), dry.
4. **Mid-October to Mid-December:** secondary rainy seasons.

Developed without legal claims to the land and/ or permission from the concerned authorities to build, as a result of their illegal or semi-legal status. infrastructure and services are usually inadequate

physical:

"non-legal" status, has services and infrastructure below the "adequate" or minimum levels. such services are both network and social infrastructure, like water supply, sanitation, electricity, roads and drainage, schools, health centers, market places etc. informal networks for the supply of water may also be in place.

social:

belong to the lower income group, either working as wage labor or in various informal sector enterprises. on an average, most earn wages at or near the minimum wage level. but household income levels can also be high due to may income earners and part-time jobs. squatters are predominantly migrants, either rural-urban or urban-urban.

legal characteristics:

lack of ownership of the land parcel on which they have built their house. these could be vacant government or public land, or marginal land parcels like railway setbacks or "undesirable" marshy land. thus when the land is not under "productive" use by the owner, it is appropriated by a squatter for building a house. (Harry Srinivas)

THE CONCEPT OF SLUM BY UN HABITAT

A slum is a settlement made up of households that have one or more of the following five criteria: no access to potable water, no access to hygienic sanitation facilities, insufficient living area per person (more than three people sharing the same room), poor structural quality and no durability of dwellings and no security of tenure (UN-habitat, 2013).

Rapid urbanization has overwhelmed the capacity of municipalities to provide serviced land to accommodate the influx of newcomers. Lower income families and segments of the middle class are progressively pushed out of formal land and the housing market and this fuels demand for lower-priced dwellings in underserviced plot subdivisions outside planning codes, often in hazardous areas (UN-habitat, 2013).

In Nairobi 60% of the population live in slums. the two biggest slums are **Kibera** and **Mathare**. apart from these two there are many other smaller slums distributed mainly in the western and the eastern part of Nairobi. in the east the slums are located near the industrial area where many residents work. in the west people are living next to a high income area which can be explained with the fact that slum dwellers often work in high income neighborhoods. (Fig72)



Fig72. Map above showing the slums of Nairobi (Source: ETH Studio Basel and Andres Herzog)

THE SLUMS OF NAIROBI

The history of slums and informal settlements in Kenya can be traced through three essential periods namely the colonial period, post independence period up to 1974, and mid 1970s up to now.

the evolution of policies and interventions dealing with informal settlements in Kenya fits in five stages, namely :

1. Clearance and forced migration
2. Clearance and public housing
3. provision of minimum services
4. Extension of tenure security and physical upgrading
5. Recognition of the legitimate role of low income settlers and other stakeholders in urban development.

these periods and interventions have introduced shifts in the housing policy that have, in turn immensely contributed to the nature and extent of informal settlements today.

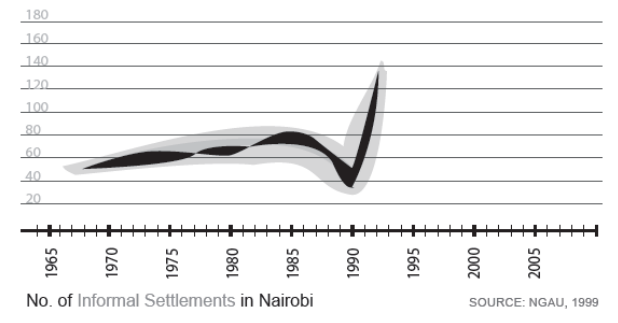
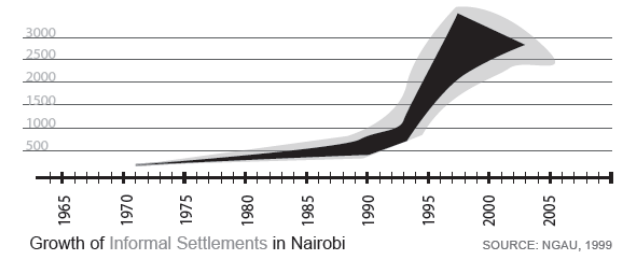


Fig75. (Source: ETH Studio Basel and Andres Herzog)

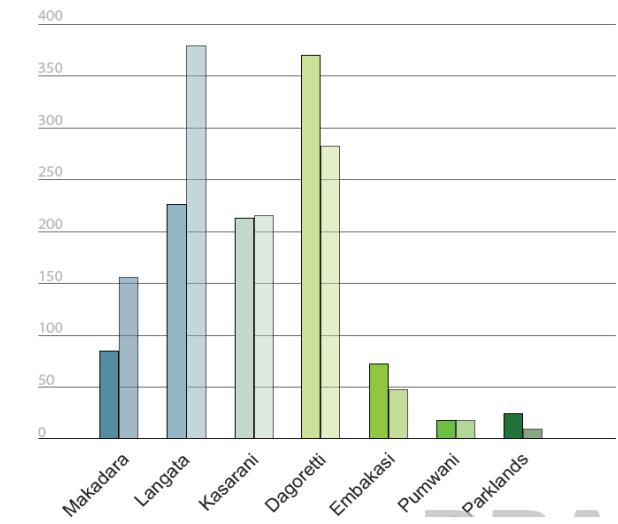


Fig76. Area covered by informal settlements (hectares) Informal settlements population (Source: ETH Studio Basel and Andres Herzog)

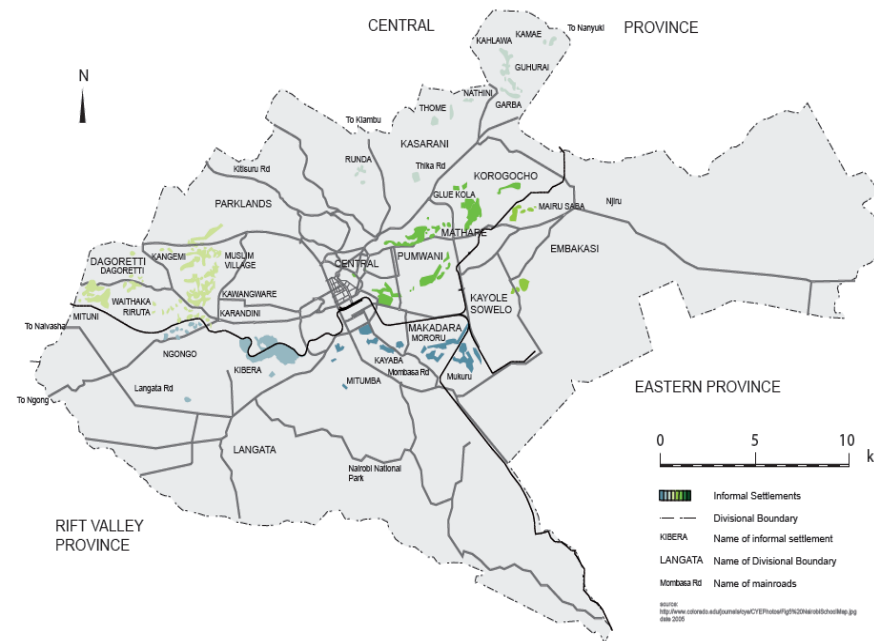


Fig74. Map showing informal settlement in Nairobi (Source: ETH Studio Basel and Andres Herzog)

As shown in tables (Fig75, 76), the informal settlements in Nairobi have continued to grow in number as well as in population due to rural-urban migration and urban population growth without corresponding housing provision, resettlement due to new developments, upgrading or relocating, and the extension of city boundaries.

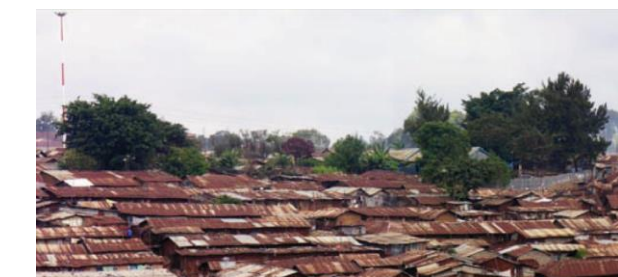


Fig77. Kibera settlement (Source: ETH Studio Basel and Andres Herzog)

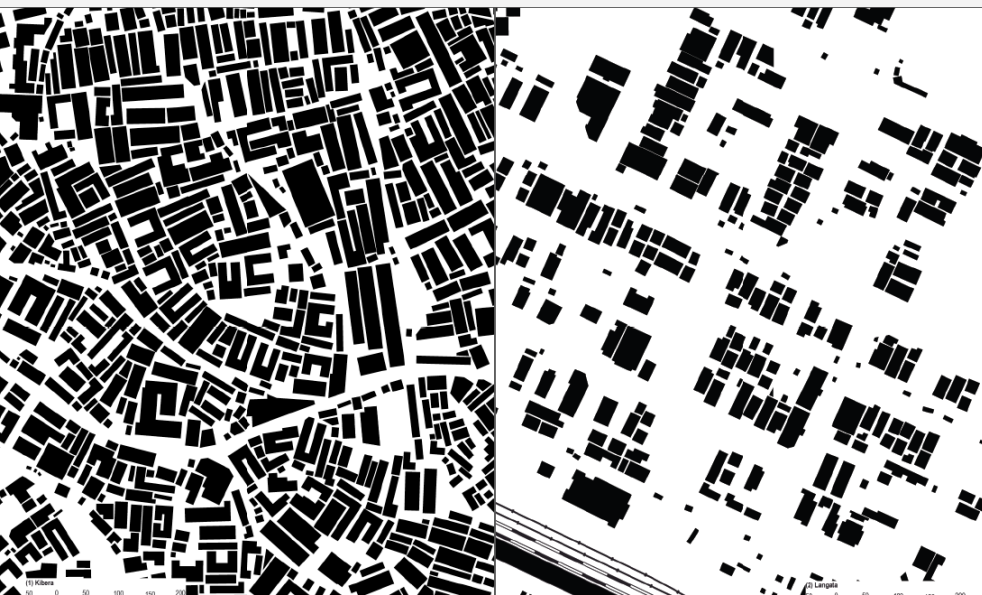


Fig73. comparison of two living settlement in Nairobi, (Source: ETH Studio Basel and Andres Herzog)

	No. of Informal Settlement Villages	Population	% of Population
1971	50	167 000	33
1990	78	500 000	40-50
1993	36	748 991	55
1995	134	1 886 000	60

Growth of informal settlement in Nairobi (Source: ETH Studio Basel and Andres Herzog)

Informal Settlements in Nairobi -Estimated Population and Population Densities			
	Area covered by Informal Settlements (hectares)	Informal Settlements Population	Density (Persons per km ²)
Makadara	0.854	155 943	182 600
Langata	2.292	382 006	166 700
Kasarani	2.150	217 383	101 300
Dagoretti	3.735	283 416	75 900
Embakasi	0.730	48 527	66 500
Pumwani	0.145	18 093	124 800
Parklands	0.244	11 148	45 700

informal settlements in Nairobi- estimated population and population densities (Source: ETH Studio Basel and Andres Herzog)

NUBIAN SETTLEMENT

The Nubians of Nairobi migrated from Sudan to Uganda where they worked for the “crown Britain” imperial adventure in East Africa predominantly as soldiers or police for the colonial administration. From there they moved to Nairobi. They fought as troops in the 1914-18 war on the side of the British against the Germans in present-day Tanzania.

The original Nubian garrison was based at Dandora in East Nairobi. It was then moved towards the hill area of West Nairobi before finally coming to rest in 1913 in the area known today as Kibera.

Since 1970 Kibera started booming with an estimated grow ratio of 17% per year. The rural to urban migration quickened the rapid growth of Kibera’s population. This is because people from rural areas have perception that Nairobi being the capital city, has more job opportunities. Furthermore, overall decline in agricultural productivity combined with a growing population. The density leads to the current estimate of more than 1.000.000 people. (Fig78)

WHY KIBERA

However to those unable to command entry to middle-income housing estates Kibera is seen as one of the better 'unauthorized' settlements in Nairobi. there are three reasons for this. Firstly, is the fact that Kibera's location within Western Nairobi offers easy walking access to Nairobi's industrial area, to affluent ex-European Nairobi for 'service' employment and finally excellent bus and Matatu connections to Central Nairobi. At six in the evening the industrial labor force can be clearly seen walking along Mbagathi way towards Kibera for the night. it is significant to note that much of Nairobi's and Kenya's industrial labor force lives in unauthorized settlements.

PROSPECTS FOR REDEVELOPMENT:

As we have already suggested the site has high alternative use-value which increases the prospects of its redevelopment. That an unauthorized settlement should exist on such a site is surprising, since conventionally squatters are conceptualized as occupying geographical and economically marginal sites such as areas liable to flooding or steep slopes. while the settlement includes such site the majority of the area consists of flat plateau sites.

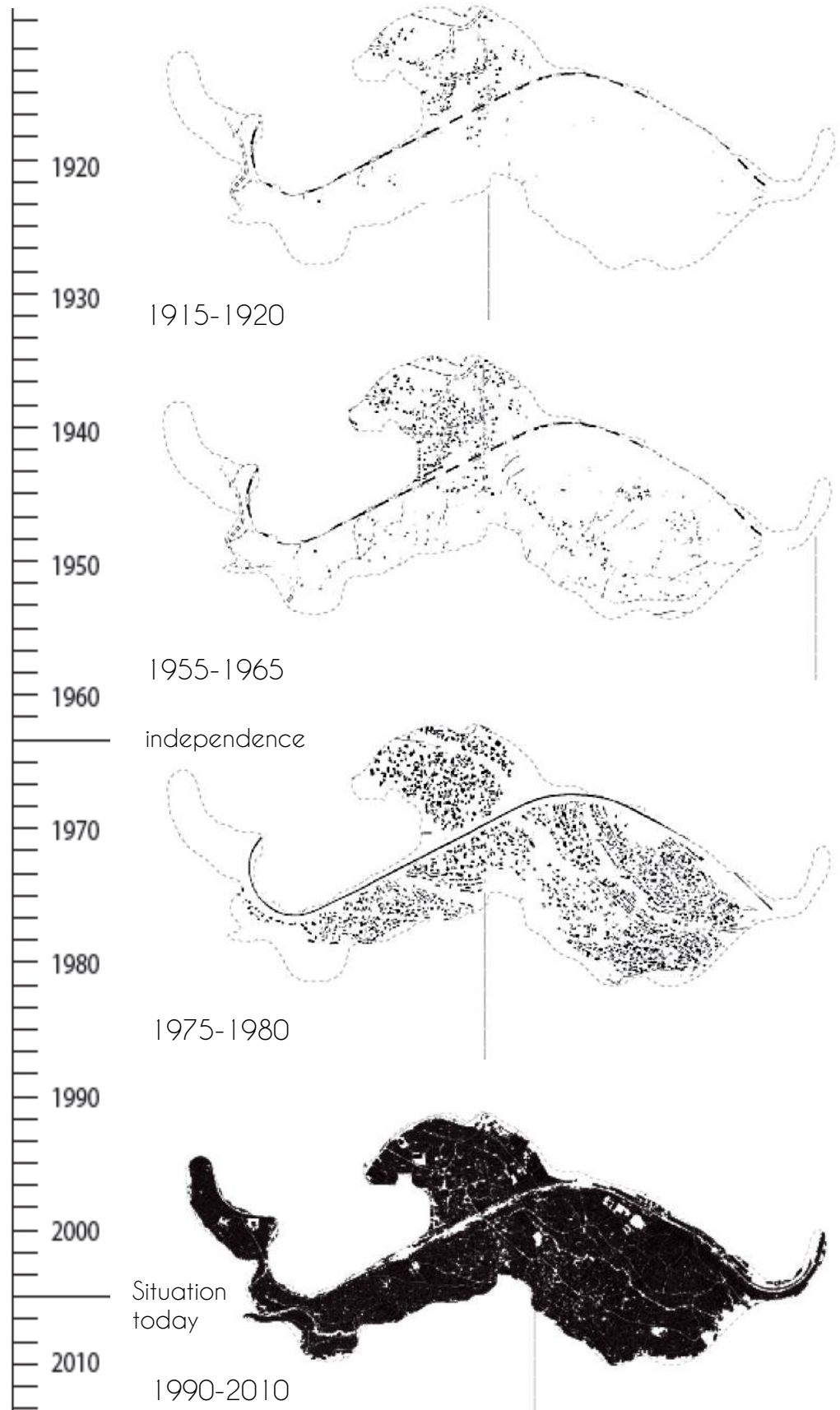


Fig78. Growth of Kibera (Source: ETH Studio Basel and Andres Herzog)

KIBERA

LOCATION

Kibera is located in Kenya in middle eastern Africa. It is in the capital city of Nairobi (Fig81). 60% of residents who live in Kenya live in the slums. It has an estimated population of 600,000 to 1.5 million inhabitants, depending on the season. Its exact location is 5 miles south east of the city center. The density to area ratio is ridiculously high. There is about 1 hectare to every 2000 people. This massive slum is divided into individual villages.

TOPOGRAPHY

The site of Kibera is bisected by the Uganda Railway which serves as the dividing line between Nubian Kibera which is called Makina and the more recent housing development. The railway is also used as a main road within Kibera. The "new" villages lie upon relatively flat ridge plateau which are bisected by two rivers that run roughly eastwards towards the Nairobi dam.



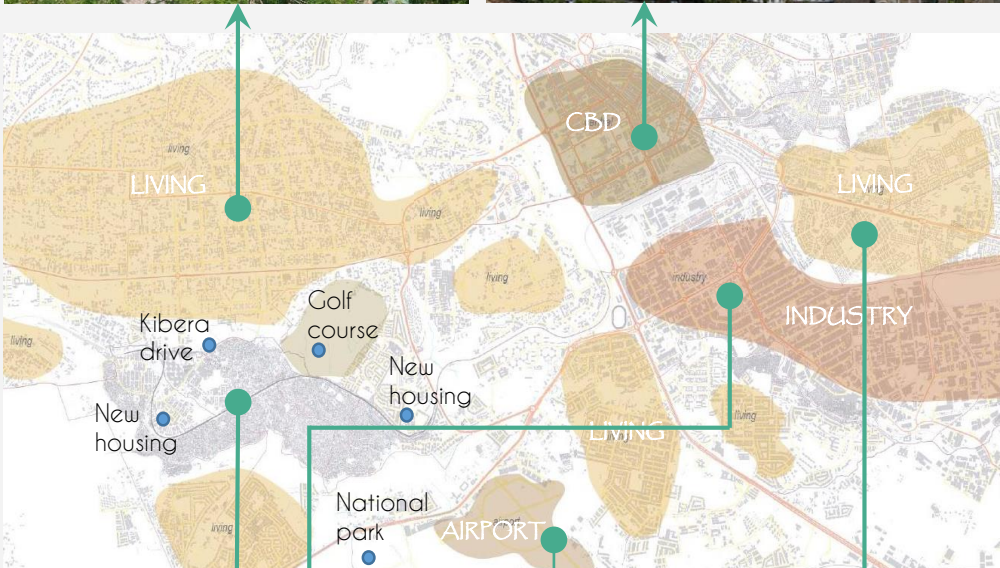
Fig81. Kenya and Nairobi in global context



Living area (Source: google.com/maps)



Nairobi CBD (Source: ledna.org)



Kibera slum (Source: fieldmarshalfoundation.org)



Wilson airport (source: kysit.com/airports)



Industrial area (source: businessdaily.co.ke)



Market (source: nairobi.com)

Fig79. Kibera and its surroundings

As we can see the physical site is bounded by Kibera drive to the north, the Royal Golf course on the East, Nairobi National Park down to the south and some new housing developments to the West. (Fig79)

Kibera's location within Western Nairobi offers easy walking access to Nairobi's industrial area, to affluent ex-European Nairobi for 'service' employment and finally excellent bus and Matatu connections to Central Nairobi.

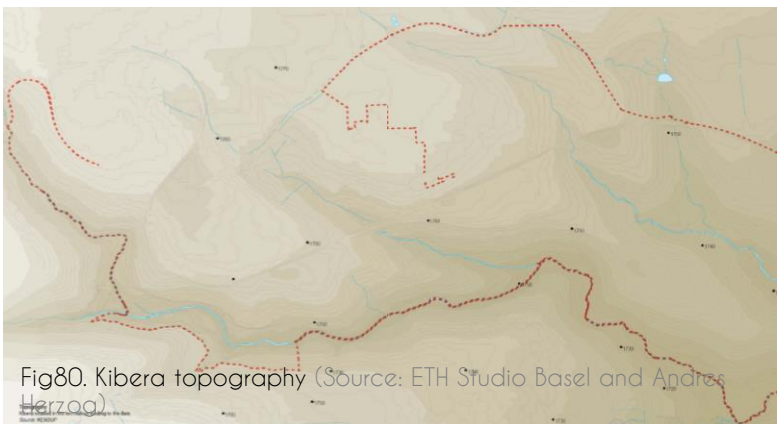


Fig80. Kibera topography (Source: ETH Studio Basel and Andres Herzog)

According to a World Bank study 49% of the site has slopes of 10% and above with 20% slopes fairly common (Fig80). The increasing house construction in the last few years has utilized the steeper valley sides and poorly drained valley floors. Building on such sites is especially dangerous for sanitation and flooding reasons : flash-flooding is quite common in Nairobi during the rainy season. however, in general Kibera is a ridge rather than a valley site. The relative openness of the site partly explains why visually it is not as depressing as the more enclosed Mathare slum.



Fig82. Map showing Kibera location in Nairobi. (source: author drawn, original: googlemap.com)

POPULATION DISTRIBUTION IN KIBERA SLUM

The tables below, summarizes the information collected from the Kibera in terms of population distribution and population density collected from KENSUP and the Provincial statistics officer respectively

Village	No. of Structures	Population estimates	Estimated Area (Ha)	Population Density per Ha
Gatwekera	2217	55425	28.55	1940
Kambimuru	424	10600	7.758	1366
Kianda	1344	33600	15.764	2131
Kisumu Ndogo	1105	27625	16.987	1626
Laini Saba	2130	53250	23.682	2248
Lindi	1818	45450	26.213	1733
Makina	2769	69225	42.666	1622
Mashimoni	905	22625	12.159	1860
Raila	914	22850	7.797	2930
Silanga	1730	43250	22.445	1926
Soweto East	2149	53725	21.379	2512
Soweto West	622	15550	7.088	2193
Totals	18132	453175		

EMPLOYMENT AND ECONOMIC

Within Kibera slums the unemployment rate is well above 55% with those who are employed mainly temporary employed in various industries in Industrial area, the remaining are self-employed with low incomes. This low unemployment mainly affects the youth of the area leading to alternative employment which normally is unlawful.

THE TWELVE VILLAGES OF KIBERA

It is important to understand that the settlement is fairly well differentiated, so that each 'village' almost has a separate character. The main apparent axes of differentiation are level of economic activity, ethnicity and the level of 'owner-occupation'. There is also a high level of intra-settlement residential mobility. Many conditions are similar in every village and are true for all of Kibera. Other things are typical for each village. (Fig87)

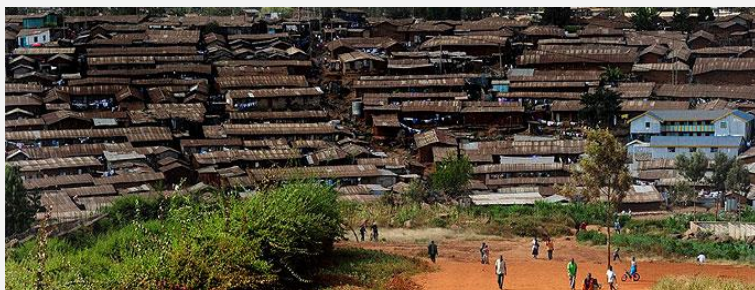
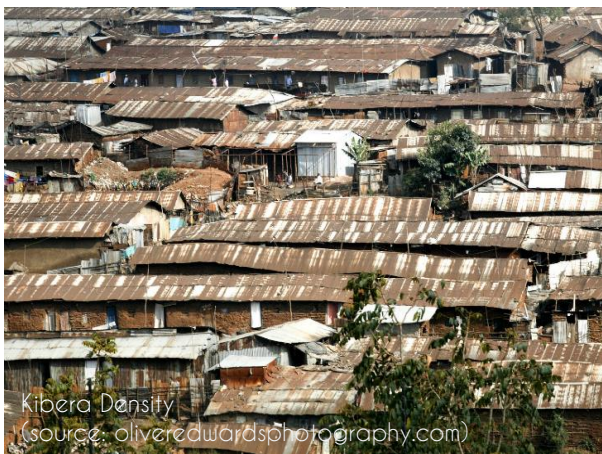


Fig88. Areal view of Kibera, showing the density of the houses (source: africanspicesafaris.com)

KIBERA

DENSITY



Kibera Density (source: olivereidwardsphotography.com)

RELIGION

On Saturdays and Sundays Kibera is full of the noises of religious meetings. This shows the important role of the churches and the strong belief in religions in Kibera's society. Beside Makina where the majority are Muslim most people in Kibera are Christian.

The Muslims constituted around 10% of the population, these are likely to be Nubians who are predominantly Muslims (Fig84).

Churches are spread all over Kibera. The construction of the churches is often the same as the houses. So it is often difficult to distinguish a church from a normal house.

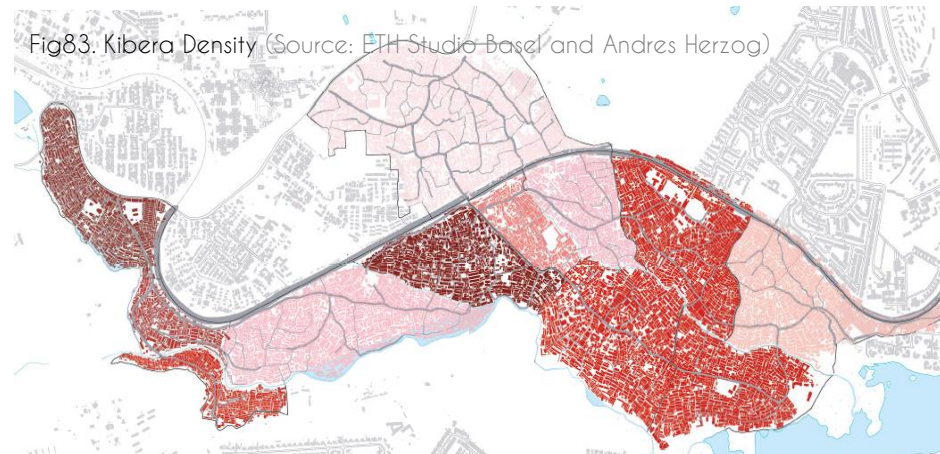


Fig83. Kibera Density (Source: ETH Studio Basel and Andres Herzog)



Fig84. Muslims and Christians distribution over Kibera (Source: ETH Studio Basel and Andres Herzog)



Fig85. Makina Jame Mosque (Source: author photography)

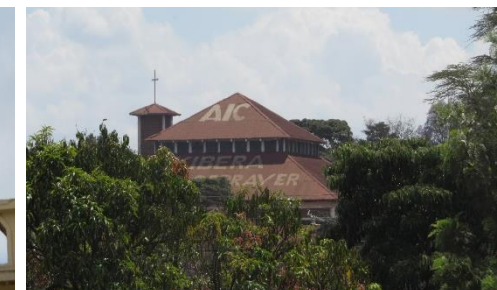


Fig86. AIC Church (Source: author photography)



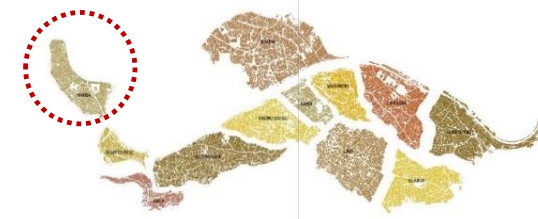
Fig87. Map showing the twelve villages of kibera (Source: ETH Studio Basel and Andres Herzog)

THE TWELVE VILLAGES OF KIBERA

KIANDA



The name Kianda is Swahili and means “ down the river”. Kianda lies at the north west of Kibera next to the Kibera drive road. Most of the people are from a tribe named Kisiu. Next to Kianda is a big fair which sell traditional African food. It is said that Kianda has the best an stable water connection.



Map showing Kianda in Kibera settlement (source: Source: ETH Studio Basel and Andres Herzog)

SOWETO WEST



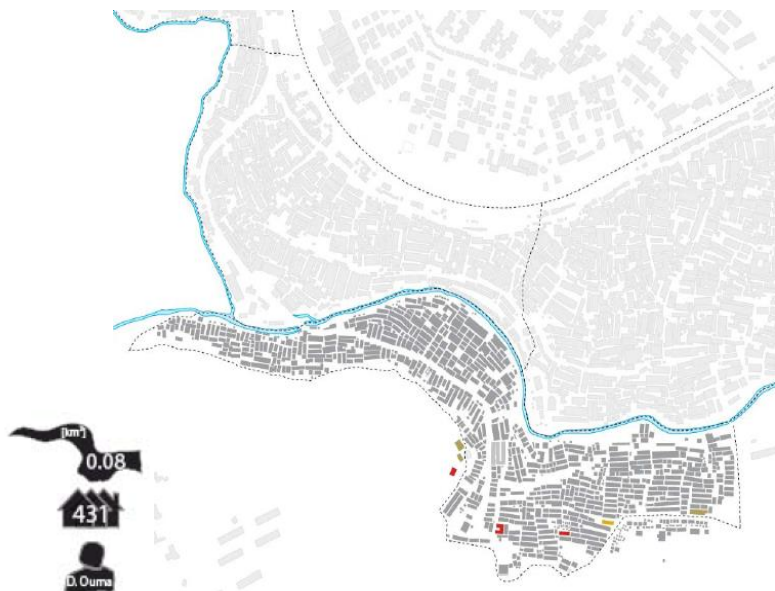
Like Soweto east refers the name Soweto west to a big slum in south Africa.

Soweto west is one of the youngest smallest villages in Kibera. It has steep slopes and is often damaged during the rain season by erosion. It is situated next to the railway.



Map showing Soweto West in Kibera settlement (source: Source: ETH Studio Basel and Andres Herzog)

RAILA



Raila is named after a politician coming from Kibera. It is the youngest village in kibera and situated next to the decanting site (upgrading place). At the moment it is the only place where Kibera can expanse a little, therefore raila is changing and growing very fast. The recent housing development can be found here.

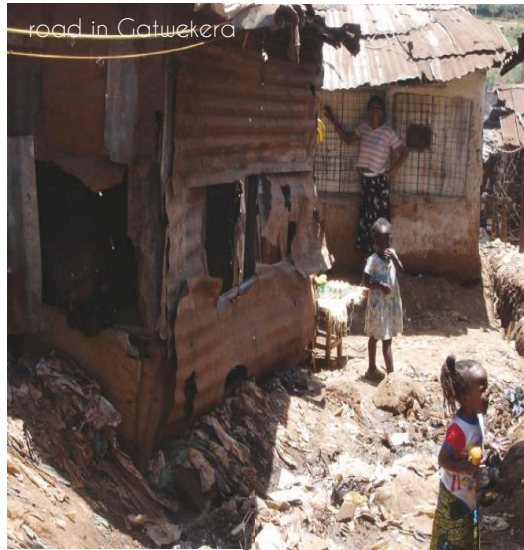


Map showing Raila in Kibera settlement (source: Source: ETH Studio Basel and Andres Herzog)

GATWEKERA

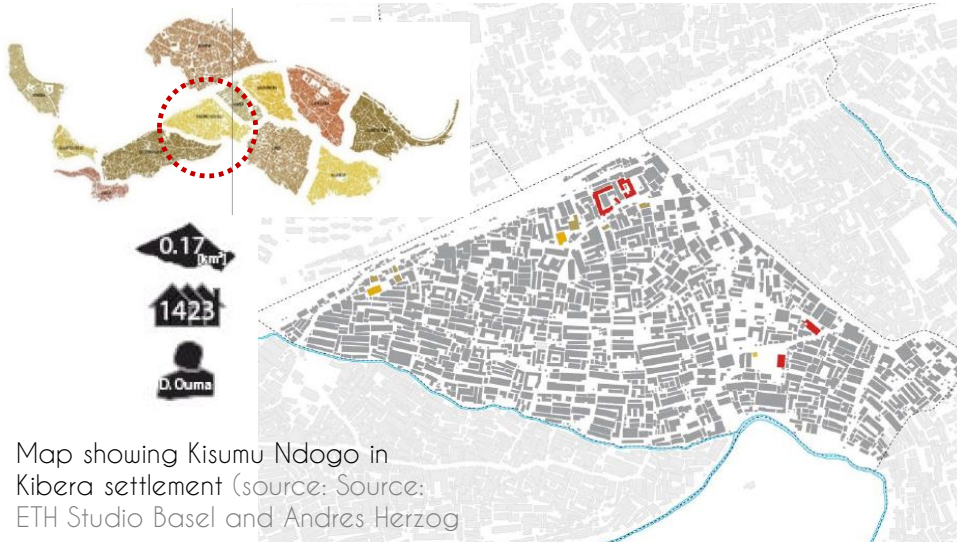


Map showing Gatwekera in Kibera settlement (source: Source: ETH Studio Basel and Andres Herzog)

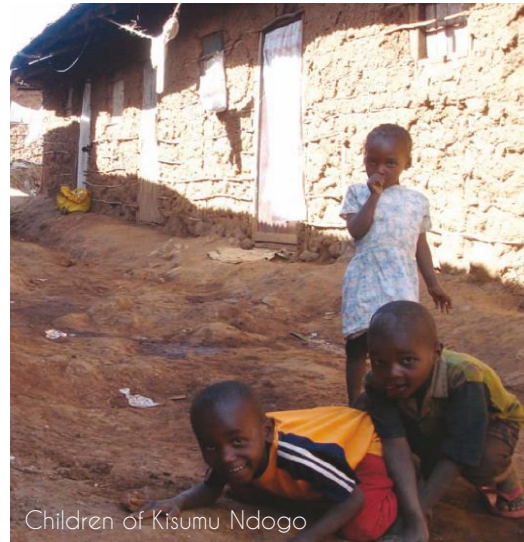


Gatewekera is after Makina one of the biggest villages in Kibera. The village covers almost 0.3 km². according to a census of population made by the KNSUP program in 2005 the village has a population of about 20000 inhabitants. Although the housing conditions seem to be bad in comparison to other villages, Gatewekera is known as a peaceful village.

KISUMU NDOGO



Map showing Kisumu Ndogo in Kibera settlement (source: Source: ETH Studio Basel and Andres Herzog)



The name Kisumu Dogo translated literally means “little Kisumu”. Kisumu being the major urban center in western Kenya associated with the Luos. Kisumu Dogo is socially typical of new Kibera and is situated across a steep slope. In general the area was like a dormitory estate with little commercial activity and there is fairly high level of concentration of property ownership. Despite the area’s name associating it with the Lou community it is interesting to note that only 53% of all the room-units in the area were inhabited by Luos as tenants, while they are the majority it is far from being an ethnic enclave. The size of this village is about 0.17 Km².

MAKINA



Map showing Makina in Kibera settlement (source: Source: ETH Studio Basel and Andres Herzog)



Makina is the Nubian part of the settlement and was first settled in 1913. It is thus one of the oldest areas of continuous settlement within Nairobi. Today it remains as the focus of Kibera. It contains a mixture of fairly large houses which are owner occupied by well-off Nubians, interspersed with 4, 6, 8 room structures built for renting. The big Nubian owner-occupied houses are sometimes built around a central courtyard in an adaptation of some architectural styles that are traditionally associated with the Swahili coast of East Africa.

The Nubian landlords seemed predominantly elderly and were involved in the following occupations: university technician, Kenya Bus Service driver, employment on local golf course, together with those who were professional landlords or were retired.

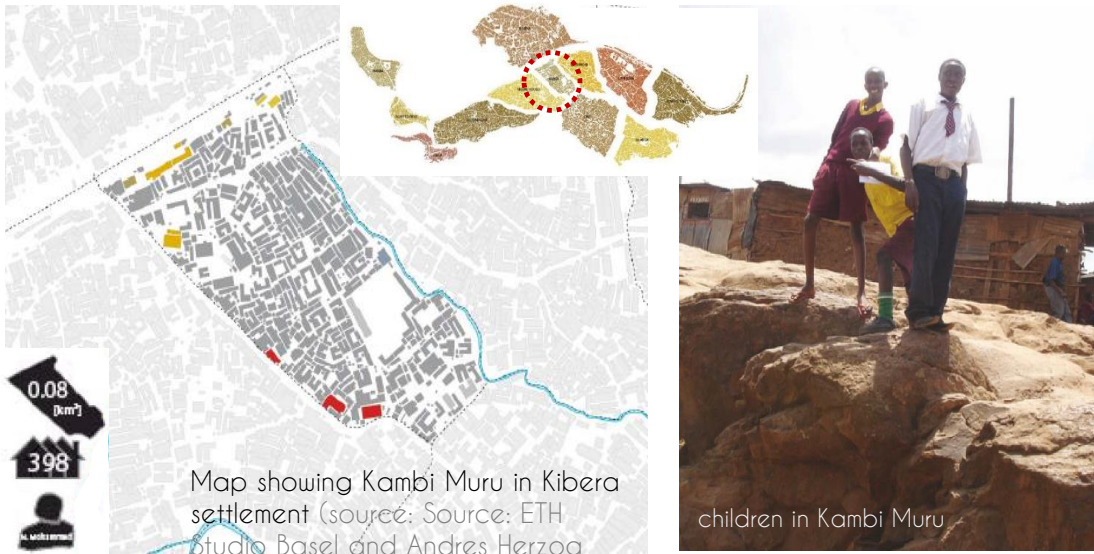
All illustrations (source: Source: ETH Studio Basel and Andres Herzog)





Indeed the visual appearance of Makina is slightly reminiscent of the old Swahili towns within Mombasa, Lamu and Zanzibar. Makina is an area of mixed functional uses which gives it a feeling of activity. In particular it contains shops, a market, bars and a fair amount of informal sector activity, in particular carpenters, tailors and cobblers who often practice in companies with such unlikely names as Biafra or Soweto. Most of this activity is centered along a main street running West-East through Kibera that ends as a square with the Nubians mosque as its focal point. Makina is a lively, bustling urban district containing both commercial and residential uses together with fairly large differences in income. In many ways Makina represents an African version of the classic features of urbanization, neighborhood and community that have spawned an entire school of thought among sociologists and architects in the US and the UK concerning the organic quality of urbanism.

KAMBI MURU



Kambi Muru is with a size of 0,08 km² one of the smallest villages in Kibera. The name Kambi Muru means “camp” in Swahili which gives a hint that Kambi Muru used to be a place where a lot of tents and temporary building where placed. During the harvest period the Nubian farmers needed a lot of workers who where accommodated in this tents.

SILANGA

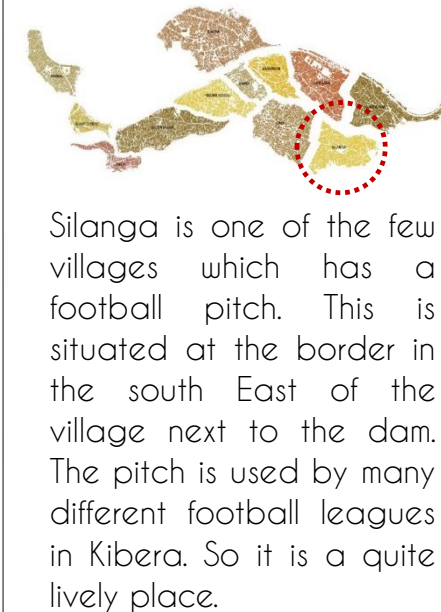


Silanga is named after a tribe in Kenya which comes from the north west. The size is about 0.25 square kilometers. Silanga is situated next to the Nairobi dam. It is known as one of the cheapest villages in Kibera. One reason for cheap rents is that Silanga has a low infrastructure and no direct access to a main road which leads to Nairobi. Except next the main street there are not many shops and markets. As a result Silanga is mainly a sleeping village. Another reason is the dam which contains highly contaminated water and is used as a dump site.

MASHIMONI



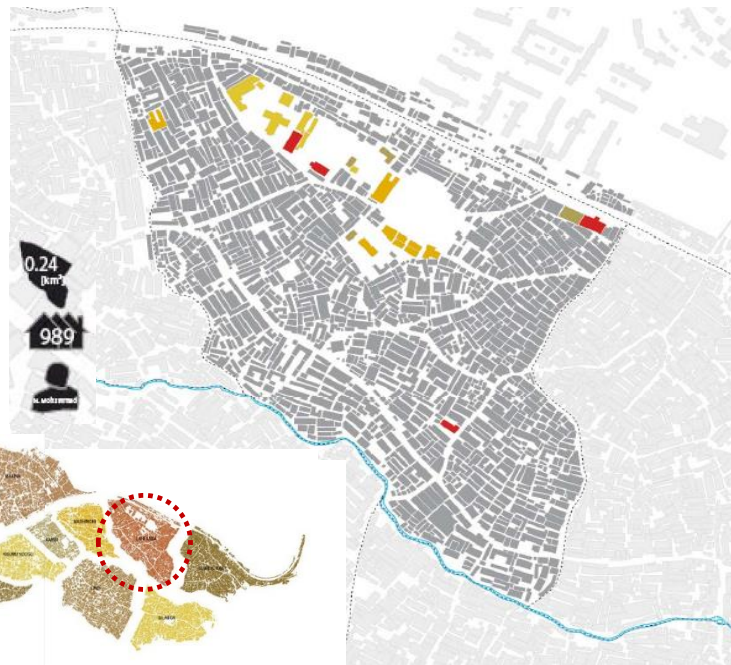
The name Mashimoni translated literally means “hole”. Most of the inhabitant of Mashimoni are from the Luhya tribe. In Mashimoni the concentration of actors like religious groups or NGOs is among the highest in Kibera. This may indicate the intensity of the problems persisting in the village. The area is about 0.13 km².



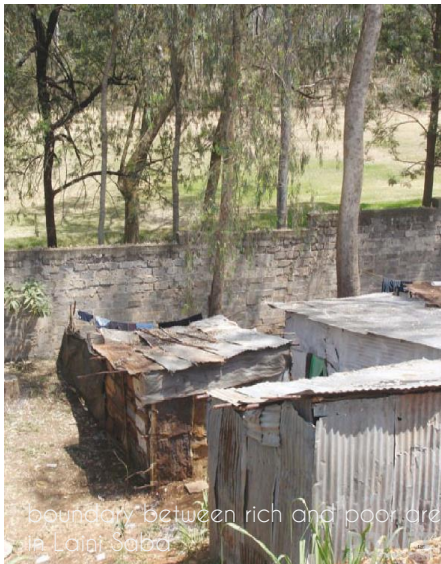
Silanga is one of the few villages which has a football pitch. This is situated at the border in the south East of the village next to the dam. The pitch is used by many different football leagues in Kibera. So it is a quite lively place.

LAINI SABA

Map showing Laini Saba in Kibera settlement (source: Source: ETH Studio Basel and Andres Herzog)



THE TWELVE VILLAGES OF KIBERA



Laini Saba is one of the older and poorest villages in Kibera with the worst housing conditions. Across the border in the north is a golf course. A huge wall with broken glass pieces on the top divides the rich ones from the poor ones. The contrast could not be more intense. Through a few guarded gates it is possible to enter the golf course and pass from one world to the other.

As many other villages Laini Saba is Swahili and means seven line. This refers to an old military drill ground. Similarly as a result of the presence in Laini Saba of commercial activity i.e. retailing and a vegetable market combined with some informal sector activity it is one of the most lively places.

Unlike the purely dormitory residential housing areas of other parts of new Kibera, Laini Saba had the feel of a community. The housing density in the area is extremely high, and there is a minimal provision of latrines by landlords

SOWETO EAST



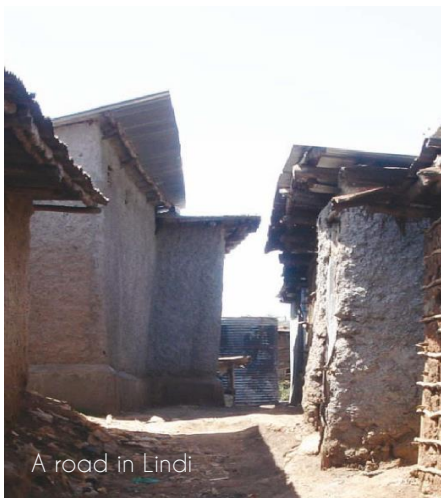
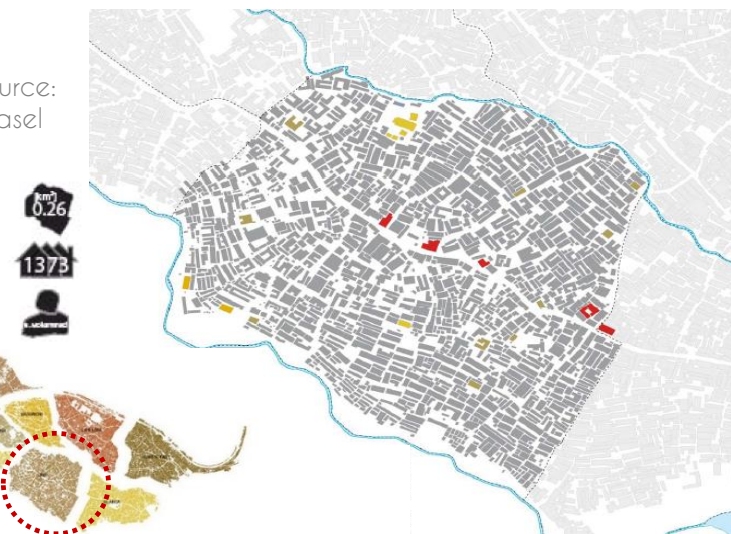
Map showing Soweto east in Kibera settlement (source: Source: ETH Studio Basel and Andres Herzog)



Soweto east is named after a big slum in south Africa. Many inhabitants from all over Kibera are crossing Soweto East to their way to work (especially to the industrial area and the center). As a result little shops and markets along the main streets are in great demand. The KENSUP upgrading project plans to bulldoze Soweto East down and reconstruction it to improve the infrastructure and the living conditions. If this plan is realized this will have a big impact on the appearance of Soweto East.

LINDI

Map showing Lindi in Kibera settlement (source: Source: ETH Studio Basel and Andres Herzog)



The name Lindi translated literally means “deep hole” which tells something about the topography of Lindi. As a result many parts of Lindi are flooded during the rainy seasons. Erosion and the muddy earth often do not give enough support for the bad or sometimes not established fundament. As a reason many houses are destroyed especially in cases of strong rainfall. Lindi is bounded by the Nairobi Dam in the south and a highly polluted river which crosses Kibera in the north. Like Laini Saba the housing density is extremely high in Lindi. The center in Lindi is formed by the main street crossing Lindi in the middle which has a high concentration of private hospitals. The size of Lindi is about 0.26 km2.



Fig89. Kibera slum problems (source: oliveredwardsphotography.com)

8. Poverty and unemployment:

There is a highly unemployment rate in Kibera and many residents live in abject poverty.

9. Flooding during rains:

Earth roads with absence of drainage lead to the roads and paths getting flooded during rainy seasons. Many become impassible.

10. Road accidents and lack of playgrounds for children:

Due to lack of playgrounds, children play on the road, resulting in high accident rates.

11. Poor community organizations resulting from:

Unstable families with high delinquency rates, lack of commitment to community efforts, difficult leadership. The coordination between the villages therefore is difficult and not well organized.

1. Poor access roads:

The roads are impassable most of the time, but worse during the rainy season. This hinders movement of goods, school attendance, use of health facilities, collection of garbage and the emptying of latrines.

2. Poor availability of water:

Kibera is served by isolated water points owned by individual owners who sell it to the residents at about 2 to 5 Ksh per 20 liter measures. The points are served by small caliber pipes resulting in low water pressure and irregular flow.

3. Garbage/sewage disposal:

There is no system of garbage disposal. Refuse litter the whole place. The only toilets available are pit latrines and there is no organized system of emptying when full. Often sewage overflow from the toilets and run along pathways mixing with runoff water from households washing.

4. Lack of educational facilities:

There are not enough primary and secondary schools in Kibera. Although officially, many schools are listed as in Kibera, most of them are actually outside the area.

5. Inadequate health facilities:

There is no health center inside Kibera, except for a few NGO operated dispensaries. People have to travel to Kenyatta Nairobi Hospital for treatment. Several clinics are available but are privately owned, and charge fees for service. Health education to the public is minimal. Public Health Offices do not take action promptly where problems are reported. Food and sanitation is therefore very poor. No ambulance is available to transport sick people to hospital.

6. Poor security:

There is no street lighting in the whole of Kibera. This is a major security risk resulting in severe assaults and even death. This is made worse by absence of a police post.

7. Drunkenness:

Bare are numerous in Kibera, some of which are illegal. All kinds of alcoholic drinks are sold, such as chibuku, nyuki, muratina, beer, busaa and chang'aa. Many people especially men spend most of their time drinking, thus contributing very little to family welfare.



Fig90. KENSUP, Kibera slum (source: <http://ictfire.com>)



Fig91. Soweto east upgrading proposal-kibera (source: muunganosupporttrust.wordpress.com)

Even though the buildings follow some typical Kiberian rules of living the question remains if the people be able to pay the higher rents. Many smaller upgrading projects with the same intent failed because the people sold their right for the flats because they couldn't afford the higher prices.

It is very unsure if the project is successful after all. It is not clear what kind of an impact the houses have on Kibera and its economy. The ecosystem of Kibera may will not cope with these rapid changes.

The two common governmental responses to the existence of slum have been either to burn them or to ignore them. Unfortunately neither of these are acceptable, responsible, or sufficient; thus the problem has multiplied.

Because of Kibera's immensity, the only appropriate response is an attempt at legitimizing it as an "estate" as opposed to a slum. Initially this will require substantial improvement in public health provisions coupled with other basic human services. This should be followed by a well thought out plan of building homes, roads, schools, and marketplaces while systematically and simultaneously removing the existing temporary structures.

The Kenya slum upgrading program (KENSUP) is the result of a meeting in November 2000 between the president of Kenya and the executive director of UN-HABITAT at which the executive Director offered to spearhead a slum upgrading program for Kenya starting with Nairobi's largest slum, Kibera. The program was jointly funded by the UN-Habitat/World Bank Cities Alliance and the Government of Kenya. The grant agreement was signed in July 2002. A memorandum of upgrading was signed between the Minister of Roads, Public Works and Housing and UN-Habitat's Executive Director in January 2003. This marked the starting point of the Preparatory Phase of the program which is jointly funded by the Government of Kenya and the Cities Alliance. The objective of the program is to improve the overall livelihoods of people living and working in slums through targeted interventions to address shelter, infrastructure services, land tenure and employment issues, as well as the impact of HIV/AIDS in slum settlements.

The construction of the Langata decanting site began in 2006 and finished in 2008. In these 5 floor houses residents of Kibera will live temporarily while the part of Kibera where they lived will be upgraded. The first villages which will go through this process is Soweto east.

The floor plans are somehow related to the Kiberian shack. People will be able to rent a 3 by 3 meter large for one family. One unit will comprise three rooms plus shared toilet and kitchen facilities. In 2009, 600 housing units constructed for relocating more than 20'000 people. The whole decanting area gated with a wall around the 24 buildings.



Fig93. Floor plan (Source: ETH Studio Basel and Andres Herzog)

Fig 94, A section of houses (Source: Left-skyscrapercity.com)

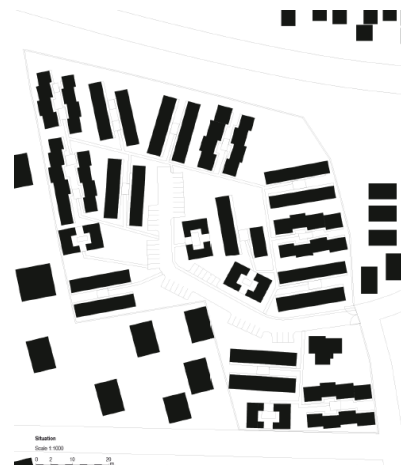


Fig92. Situation (Source: ETH Studio Basel and Andres Herzog)

SITE ANALYSIS

MAKINA, KIBERA

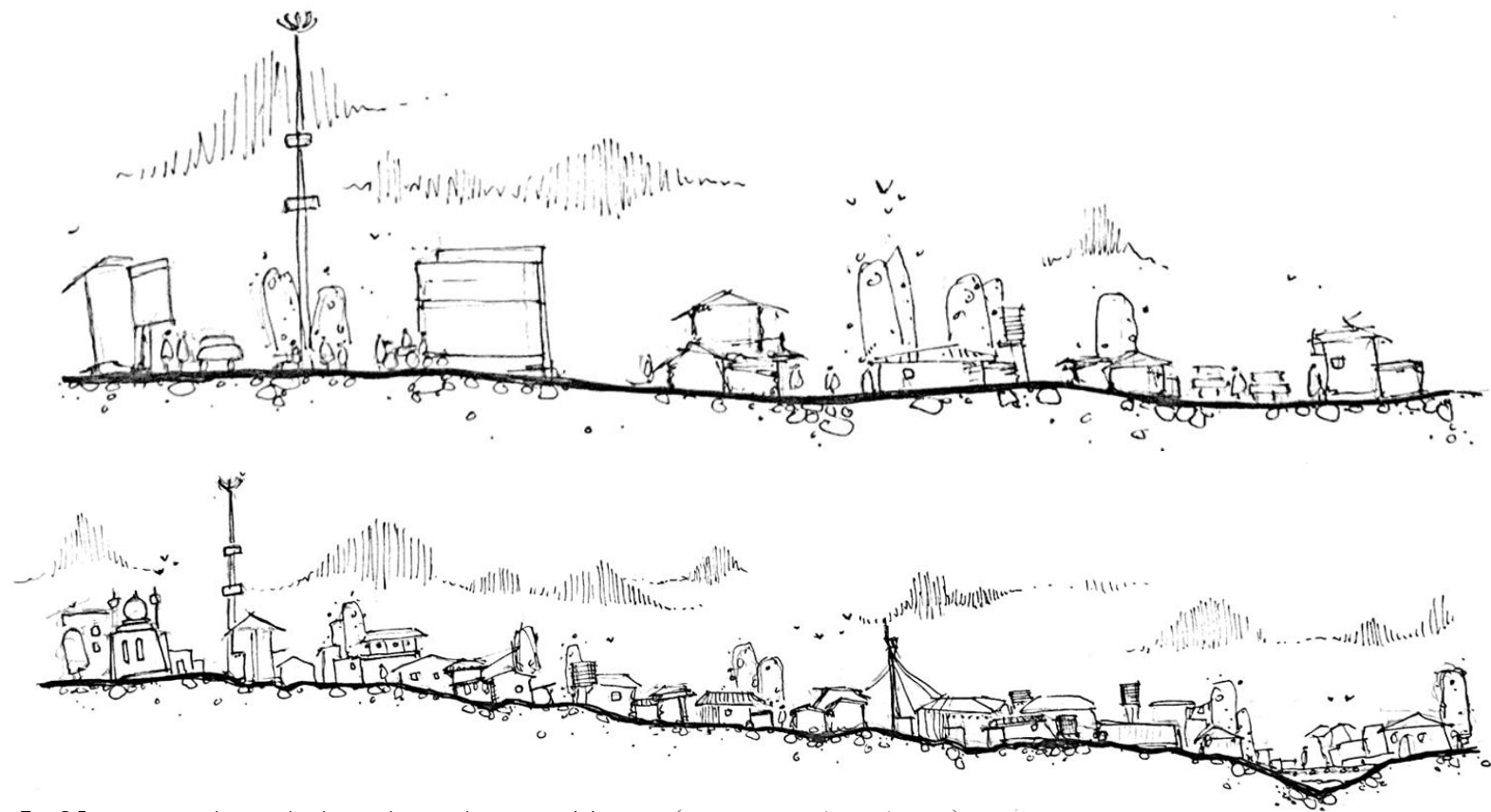


Fig95. section through the selected part in Makina (source: author drawn)

Before it is possible to the plan for the future of a site it is necessary to understand the historical and present context of the site and its surroundings.

Following part analyses the existing context of the Makina settlement and its surroundings. A detailed analysis of existing uses, constraints and opportunities and local characters shown in figures.

Fig96. Makina Boundary

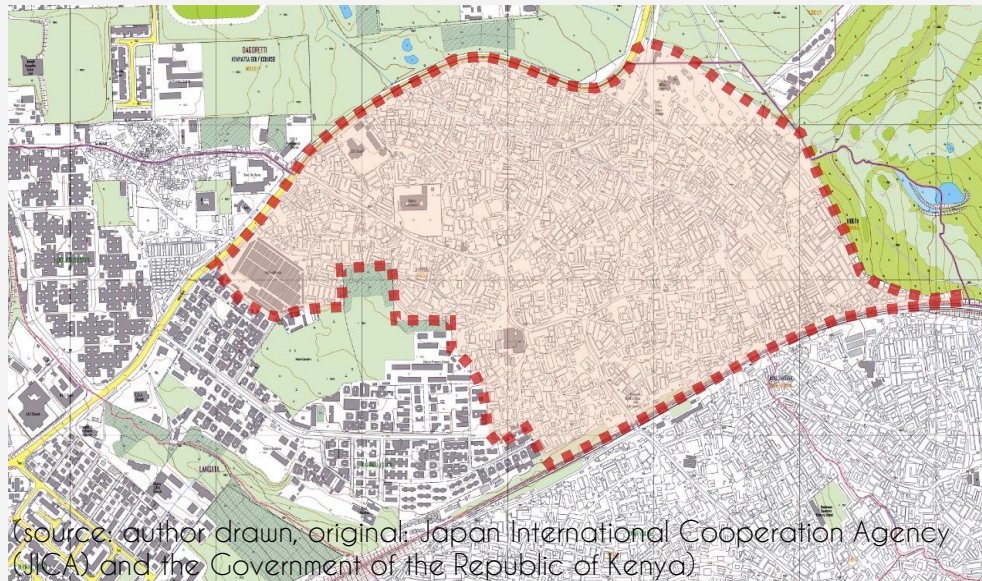
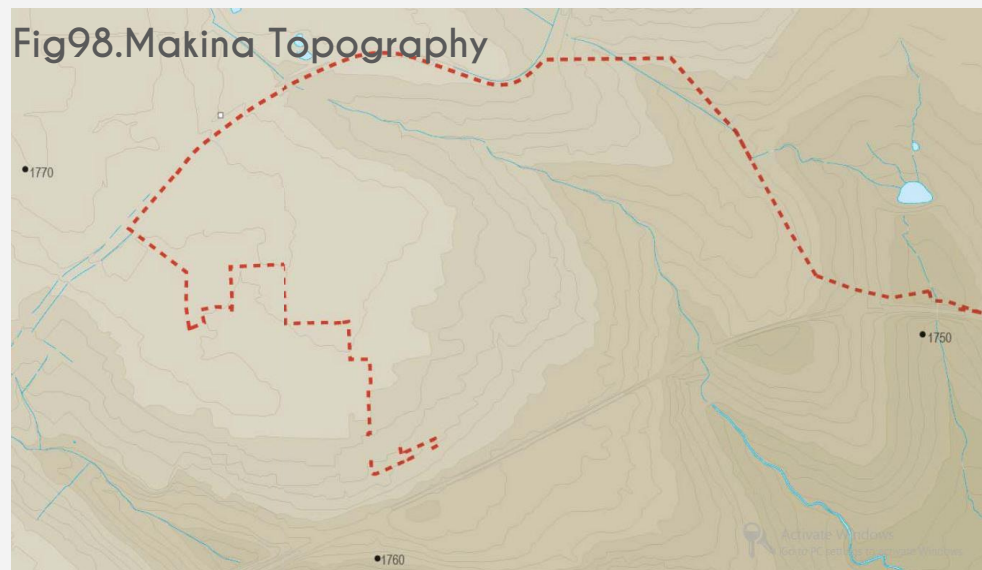


Fig97. Makina Density



Fig98. Makina Topography



MAKINA SITE ANALYSIS

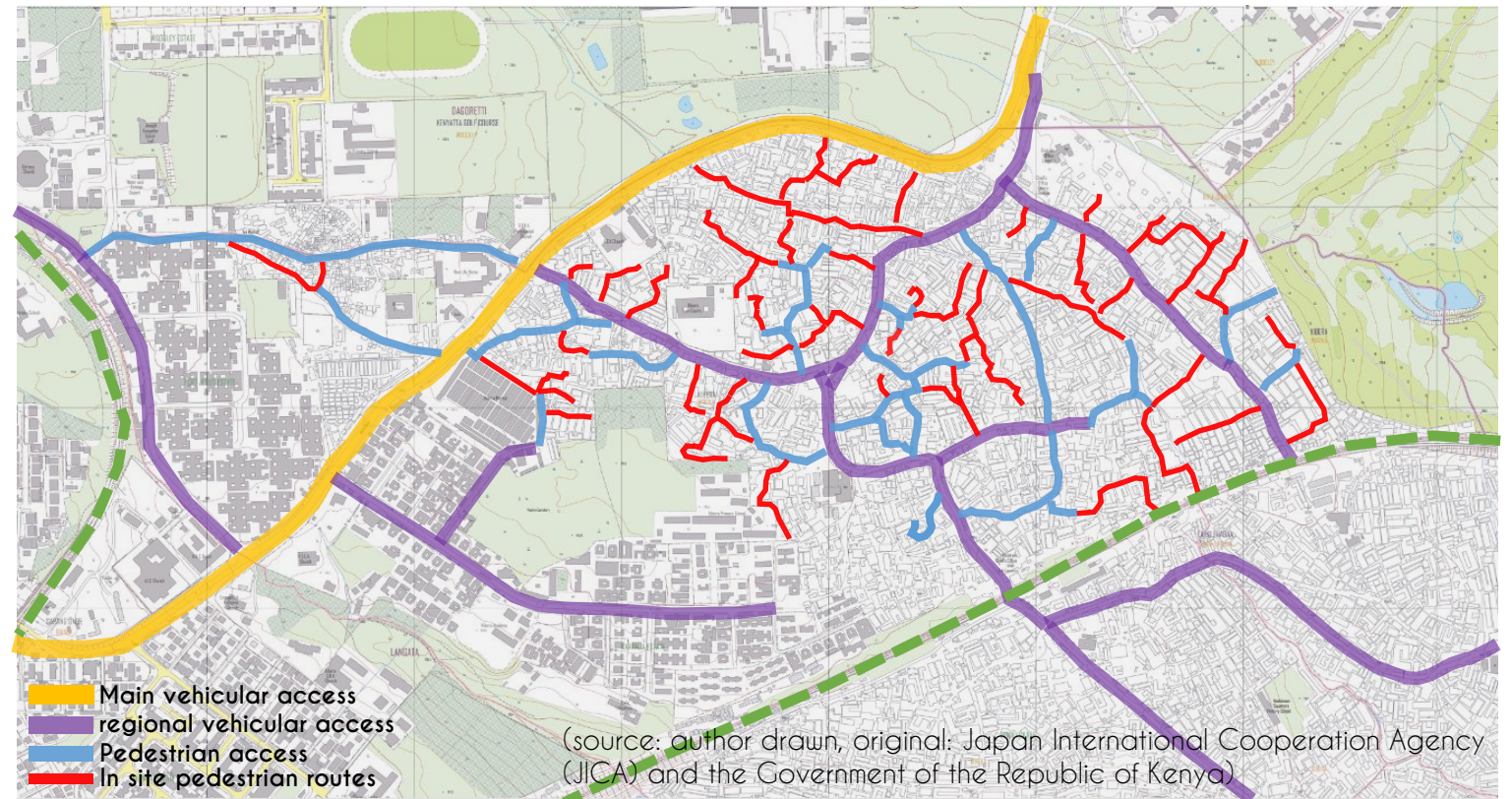


Fig99. Makina Road network

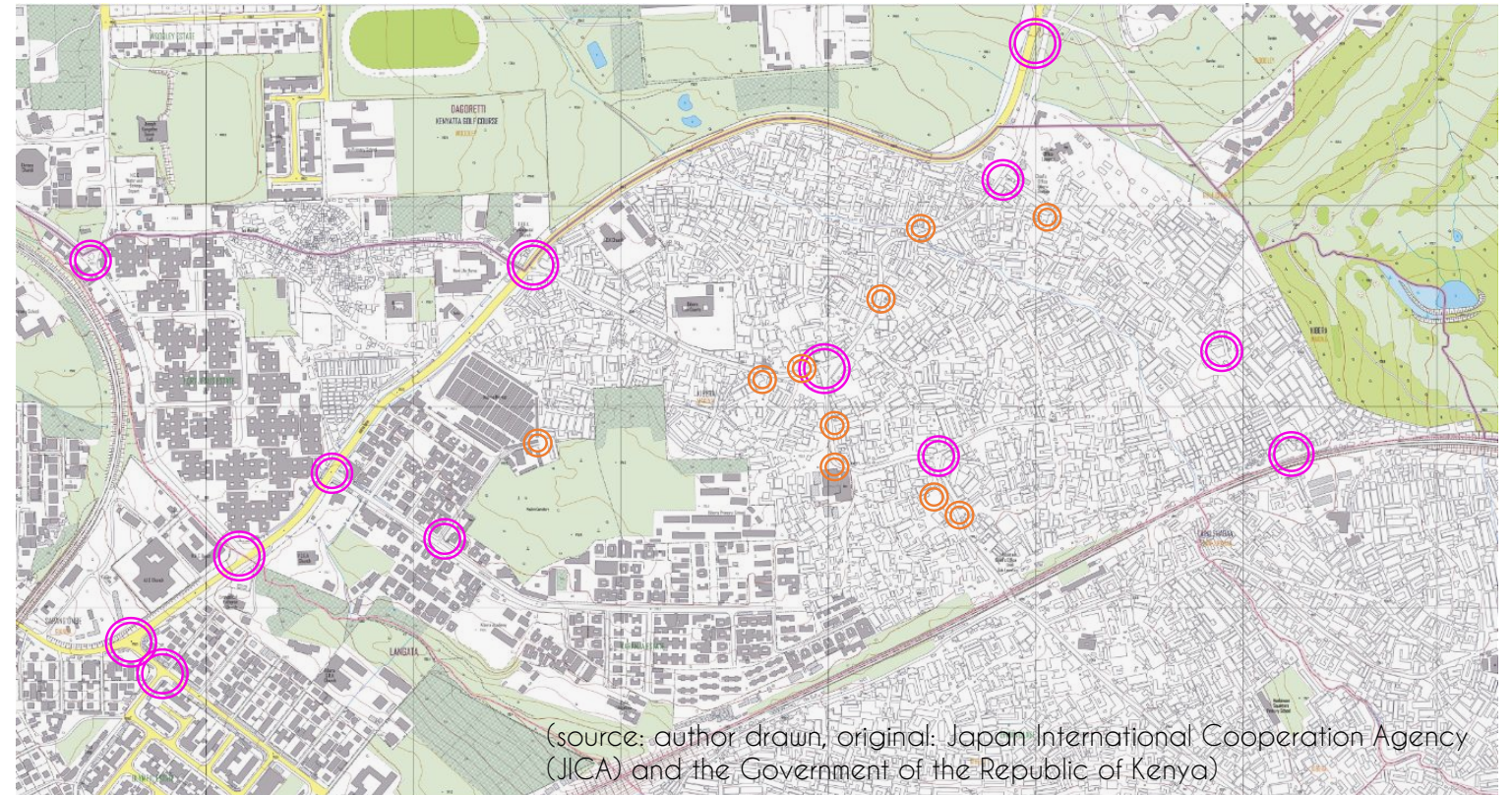
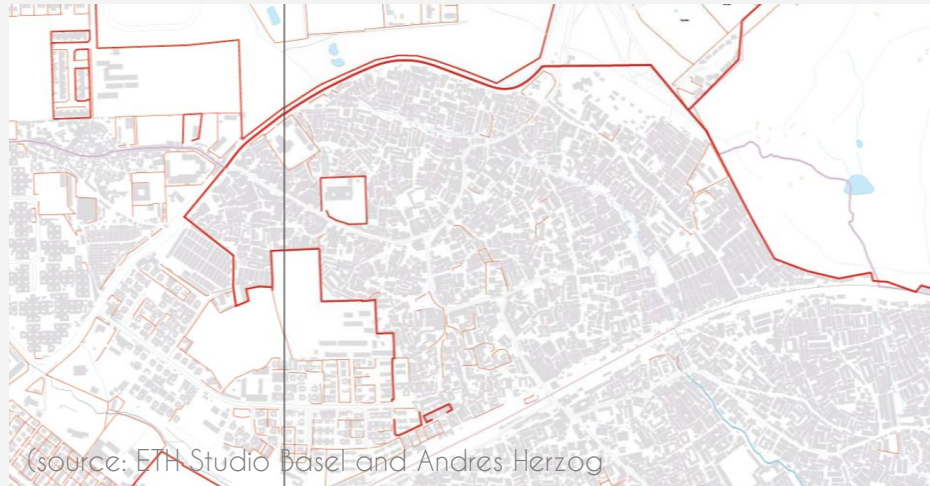


Fig 100. Makina Junctions and public concentrations

- Main junctions / mostly crowded
- Secondary junctions / less crowded

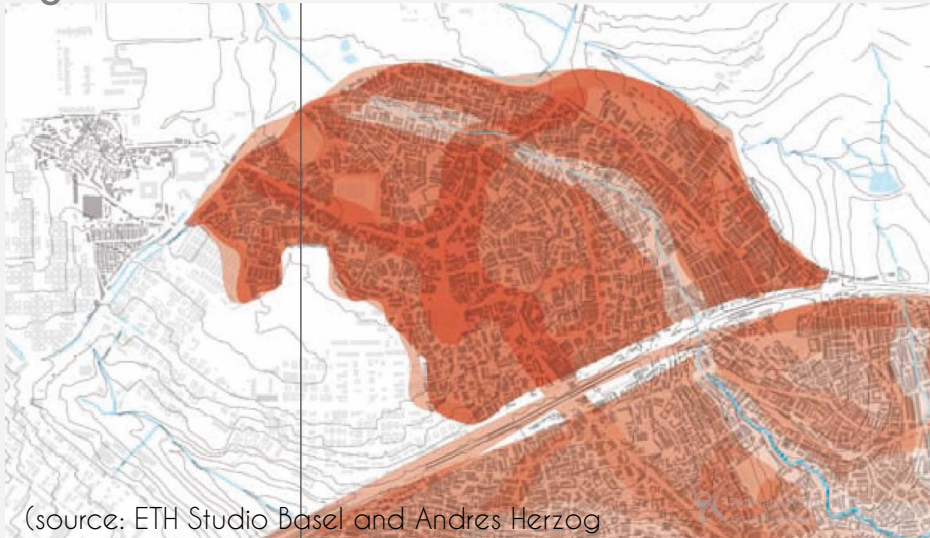


Fig 101. Makina Gated areas



(source: ETH Studio Basel and Andres Herzog)

Fig 102. Rents in Makina



(source: ETH Studio Basel and Andres Herzog)

Fig 103. Religion in Makina



(source: ETH Studio Basel and Andres Herzog)

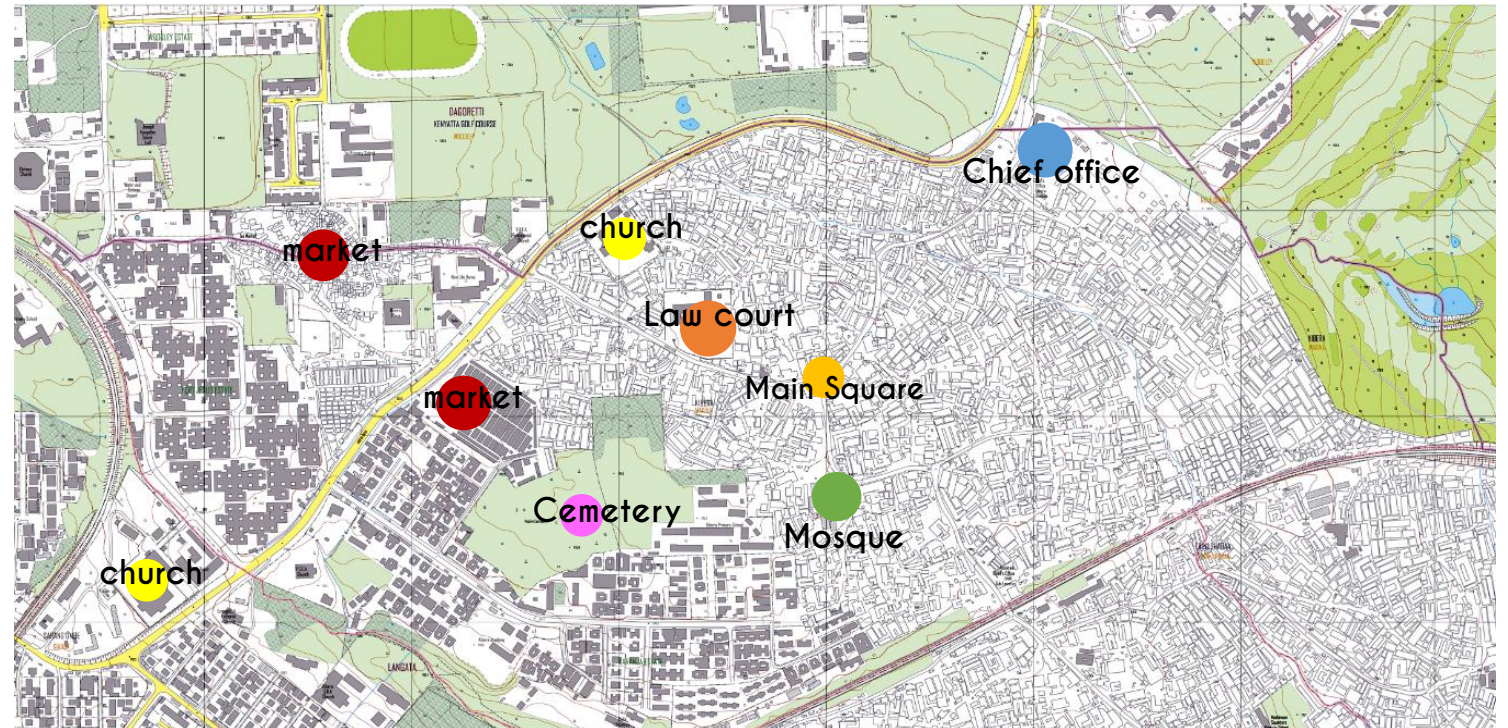


Fig 104. Makina Land marks (source: author drawn, original: Japan International Cooperation Agency (JICA) and the Government of the Republic of Kenya)

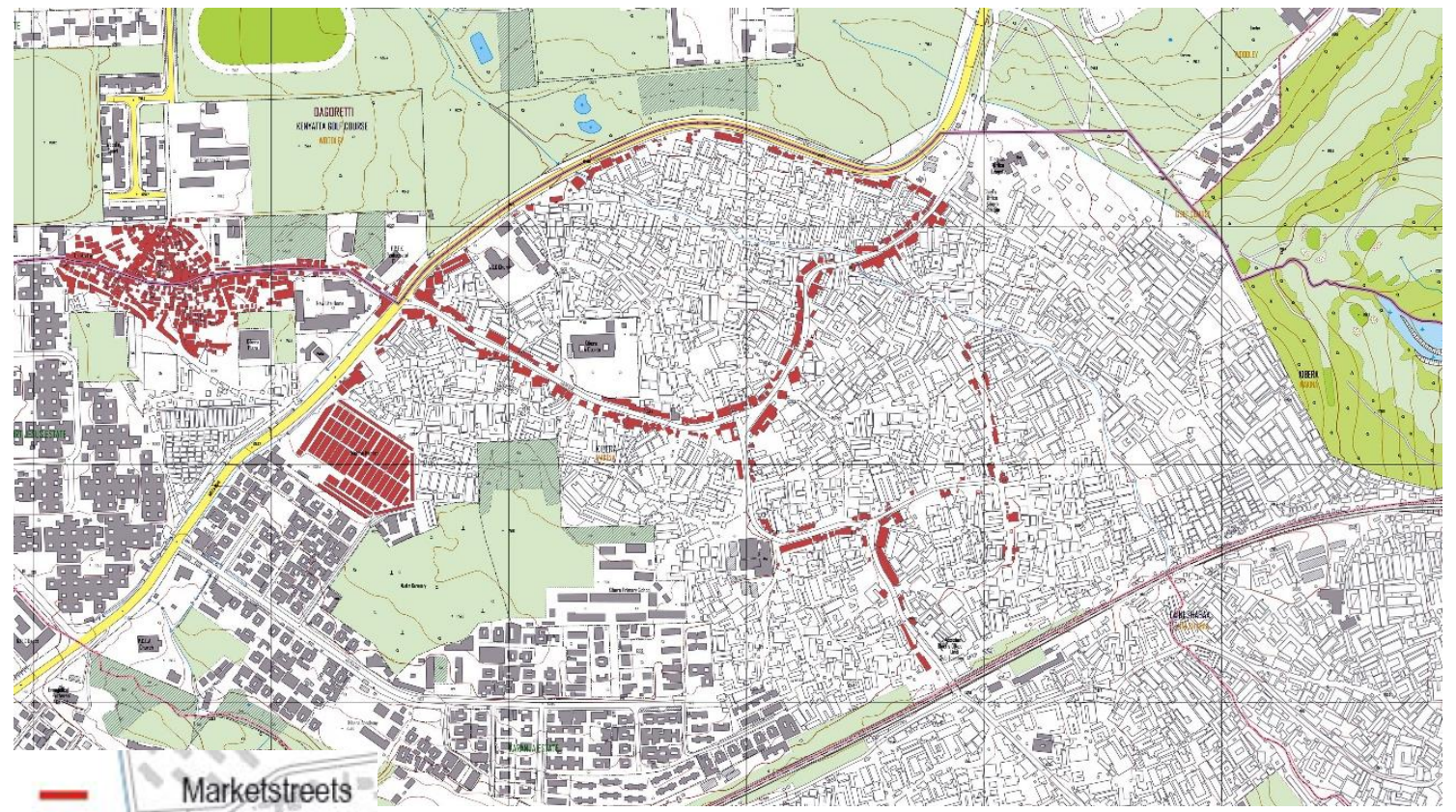


Fig 105. Makina Markets (source: author drawn, original: Japan International Cooperation Agency (JICA) and the Government of the Republic of Kenya)

SITE SELECTION

- Approximately 90% of the occupants includes Muslims
- Appropriate access through the Kibera drive and Karanja road
- Proximity of important centers such as Kibera law court, chief's office Kibera location and Kibera plaza
- Existence of several important religious centers in this area
- More safety and security because of new developments and main roads
- Proximity to some important market such as Toi market and Makina market
- More free lands and low density of buildings compared to other parts of Kibera
- Existence of other facilities such as hospitals, clinics, schools
- Muslims Cemetery



Kibera drive (source: author photography)



House in Makina (source: author photography)



Makina Jame Mosque (source: author photography)



AIC Church (source: author photography)

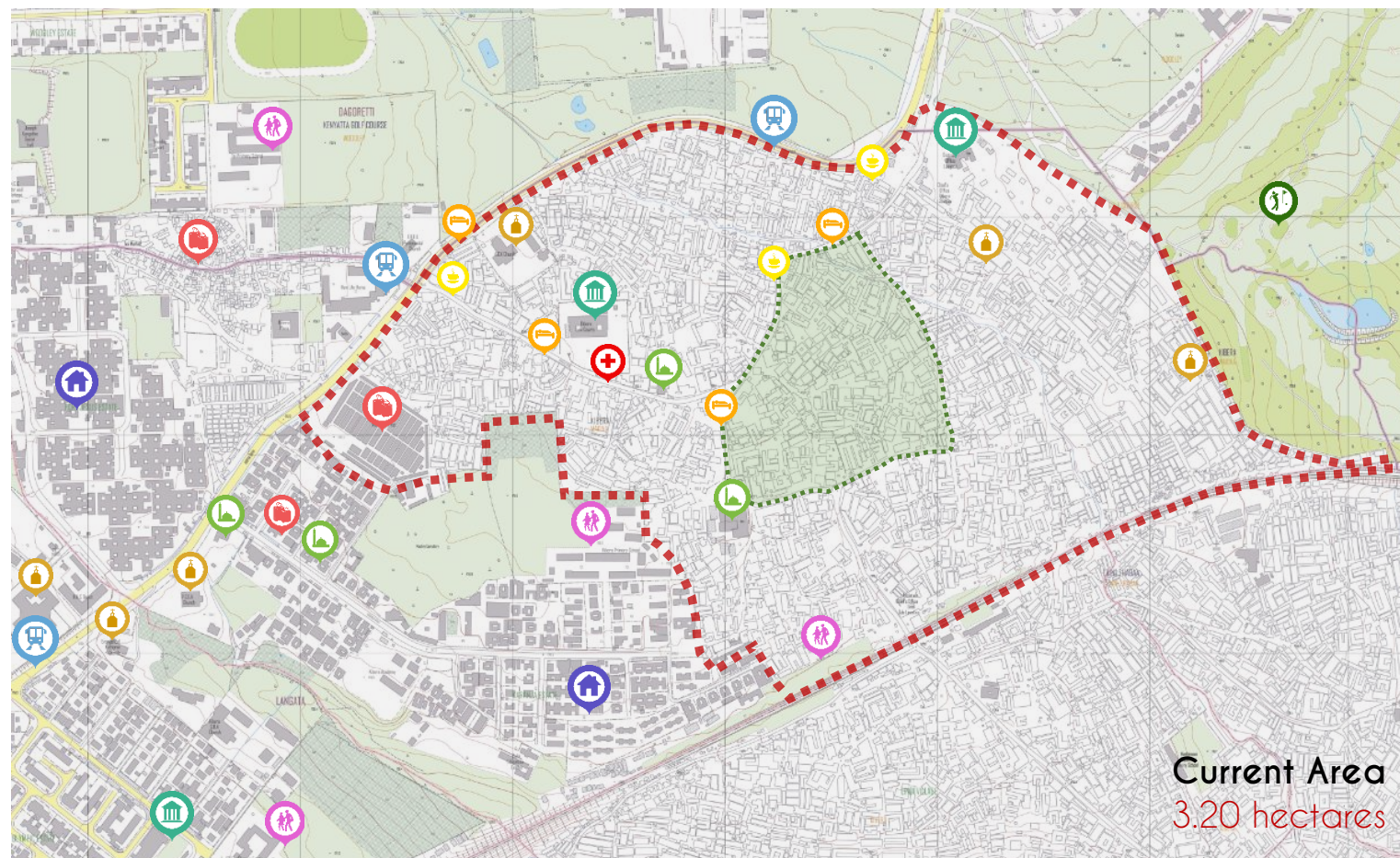


New development along the railway in Makina (source: author photography)



Toi market (source: author photography)

Fig 106. The location and area of the selected site and surrounding

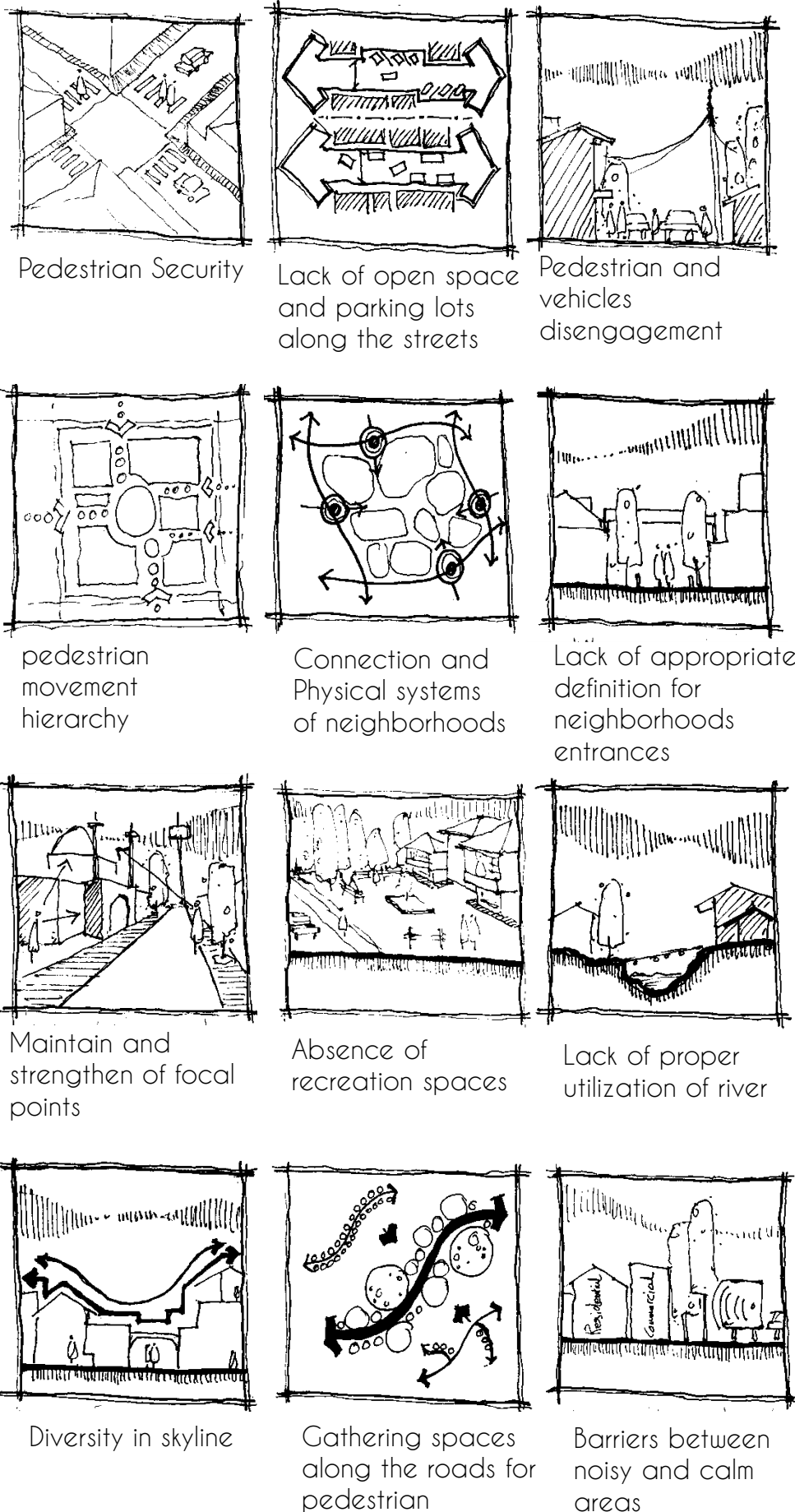


Current Area
3.20 hectares

- Health clinic
- Hotel
- Mosque
- Golf club
- School
- Market
- Church
- New housing
- Official
- Café/restaurant
- Bus stop

(source: author drawn, original: Japan International Cooperation Agency (JICA) and the Government of the Republic of Kenya)

SITE ANALYSIS



Pedestrian Security

Lack of open space and parking lots along the streets

Pedestrian and vehicles disengagement

pedestrian movement hierarchy

Connection and Physical systems of neighborhoods

Lack of appropriate definition for neighborhoods entrances

Maintain and strengthen of focal points

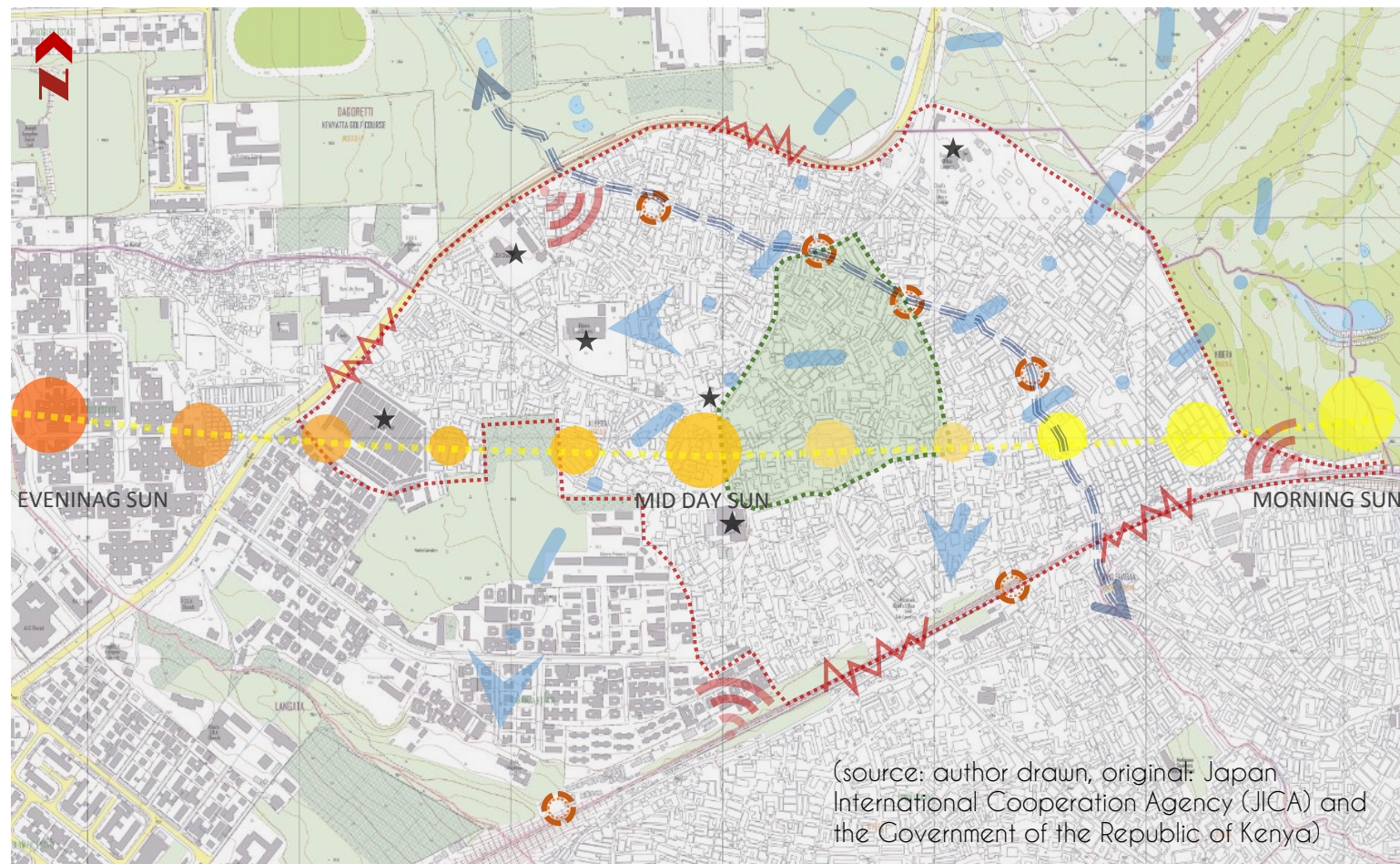
Absence of recreation spaces

Lack of proper utilization of river

Diversity in skyline

Gathering spaces along the roads for pedestrian

Barriers between noisy and calm areas



(source: author drawn, original: Japan International Cooperation Agency (JICA) and the Government of the Republic of Kenya)

-  Makina boundary
-  Plot parcel
-  Sun path
-  River
-  Wind direction
-  Noise
-  Garbage squalor
-  Noise pollution
-  Focal points

SWOT ANALYSIS

STRENGTHS:

- Close to CBD
- Community attraction
- Local bus route
- Makina mosque
- Toi market and Makina market
- Muslim cemetery

OPPORTUNITIES:

- Nairobi river
- New developments
- Employment development

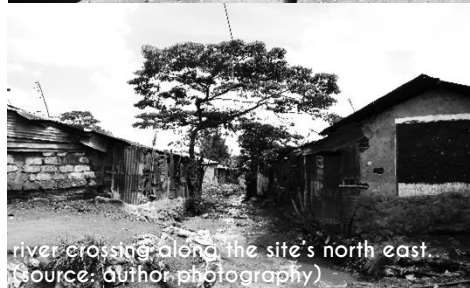
WEAKNESSES:

- Pedestrian disengagement
- Inefficient land use
- Absence of open spaces, park and green lands
- Poor structure of houses

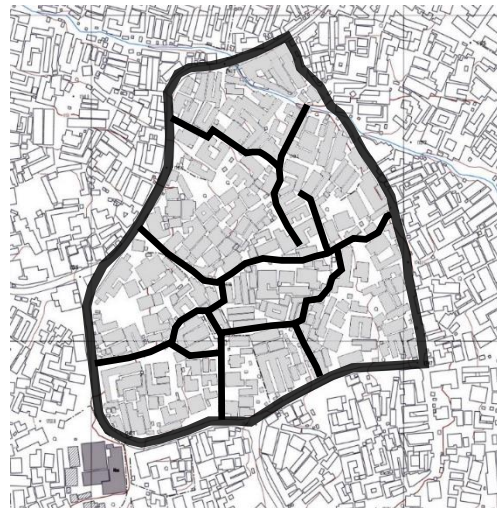
THREATS:

- Garbage sites and pollution
- Lack of sewerage system and services
- Unhealthy environment in poor areas

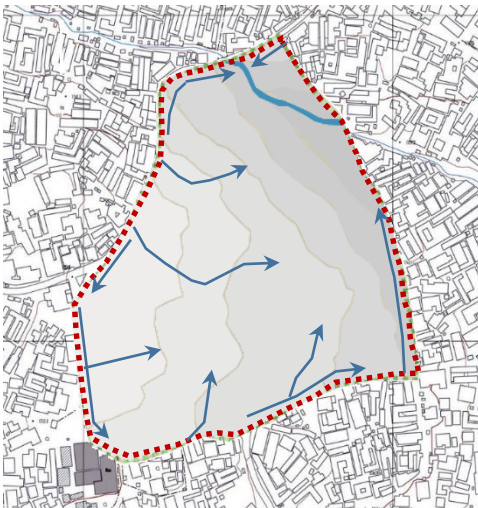
Fig 107. The map above shows the climatic analysis of the region



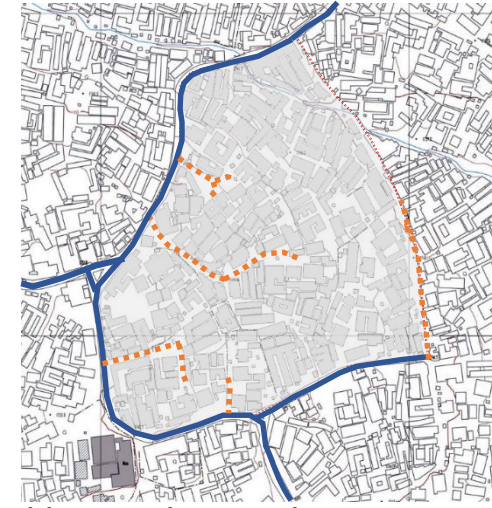
Street pattern



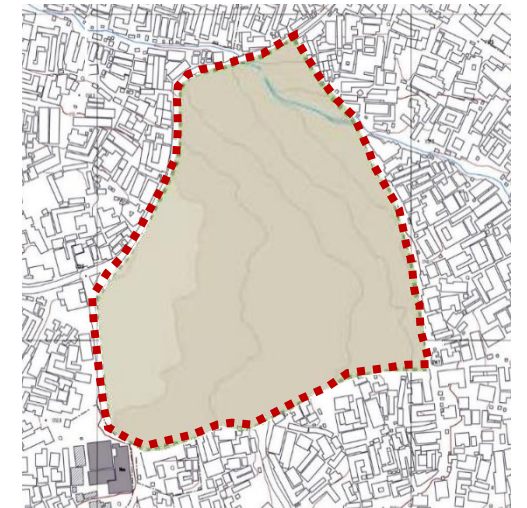
Water flow (Drainage)



Main and secondary Vehicular network



Topography



Building footprint



Open spaces



Main and secondary pedestrian network



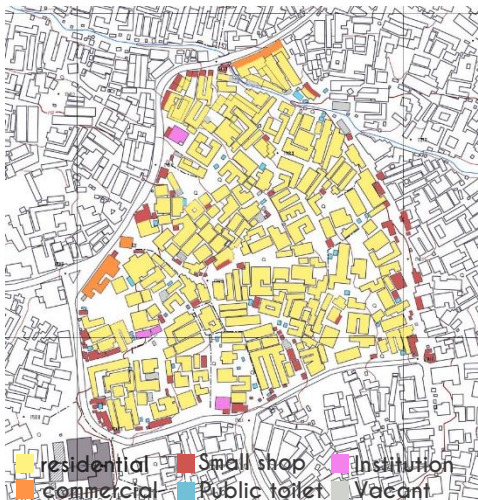
Plantation



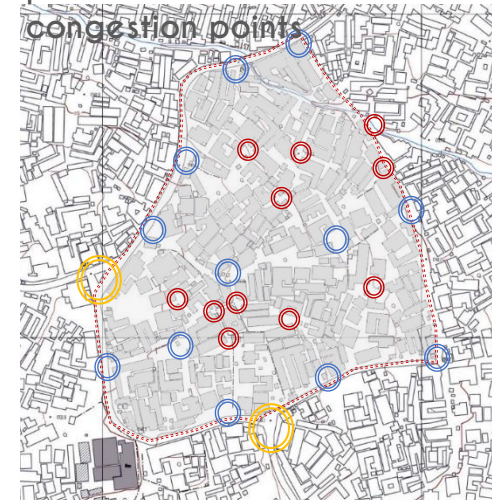
Block pattern



Zoning



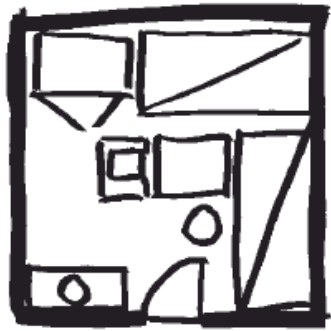
Junctions public concentration and congestion points



Water tank points



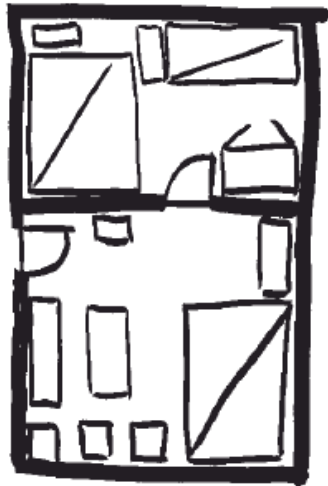
All illustration (source: author drawn, original map: Japan International Cooperation Agency (JICA) and the Government of the Republic of Kenya)



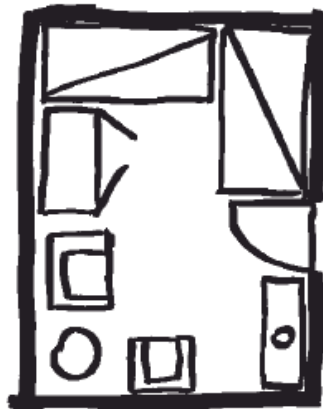
Typical 2 by 2 meter shack for around 500 Ksh per month without electricity and mud floor.



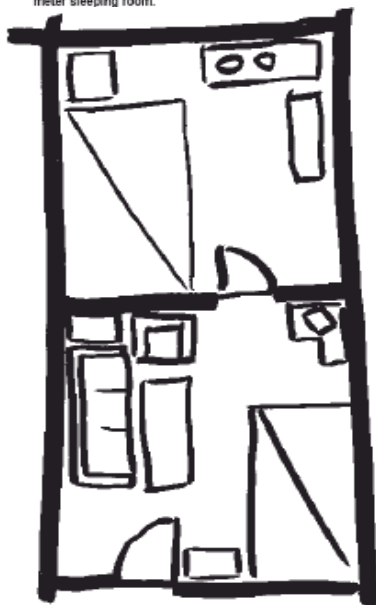
3 by 3 meter standard housing unit inhabited by a family as a multi purpose room.



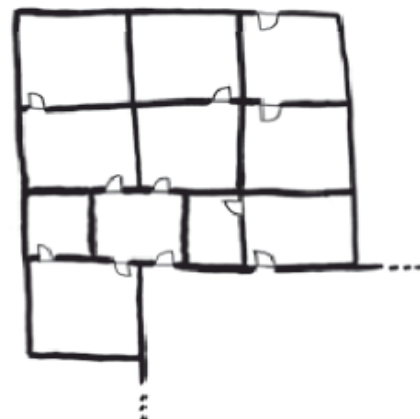
Standard 3 by 3 meter housing unit extended with a small 2 by 3 meter sleeping room.



3 by 4 meter housing unit as an exception in Kibera.



Combination of two higher-class 3 by 3 meter housing units for 1500 Ksh each including electricity.



Cluster of rooms

MATERIAL

As in the whole of Kibera with a few exceptions, houses are built from mud and wattle with a corrugated iron roof. Plaster and concrete for the walls and floor are an optional extra. there are also vast differences within Kibera in building quality and housing conditions.

In Makina generally the rental accommodation was in a moderate state of repair and the landlords own houses were some of the best in Kibera. These often had glass windows, concrete floors, with intern or nearby water and often they have electricity.

The Nubians have been involved in the construction of room-units for rental at least since 1971. The construction of extra houses and room units by individuals who do not intend to live in them themselves or allow their kin to live in them suggests an economic (exchange-value) orientation.

THE CONSTRUCTION

The construction of a building will involve sub-contracting relationships with one or more informal companies which undertake the building of the wooden frame and roof, the application and consolidation of mud walls and the construction and digging of pit latrines. The division of labour in this production process should be noted. The owner is a different person from the builder in direct contradiction of the image of subsistence shelter or self-build. The existence of this specialization is an important pre-requisite for the emergence of capitalist relations of production in building. The structure often consists of ten rooms and it takes about two weeks to construct them. For the construction a permission from the local administration to build and that the Administration Police (i.e. tribal police) is needed. This permission is often checked during construction.

CONDITION OF THE BUILDINGS

The best Nubian homes in Kibera four rooms for the family; they were rather like semi-affluent enclaves' amid poverty and the houses would not look out of place in ex-European Nairobi. However, other houses or blocks were in a state of total disrepair and were often built extremely close to each other, sometimes on swampy sites upon the valley floor.

URBAN STRUCTURE

By looking at the structure and their position to each other we can see the traditional architectural form has been subordinated to the profit motive. The more traditional U-shape with rooms arranged around an internal courtyard that was an adaptation of the Swahili architectural style used in the Nubian area of Kibera has been abandoned, and replaced by simple back-to-back barrack style structures. While these are slightly cheaper to build they are socially inferior since they offer no semi-public space. This is in sharp contrast to the more traditional style where the courtyard offers excellent semi-public space for outdoor use.

Fig 108. Houses condition in Kibera (source: ETH Studio Basel and Andres Herzog)



Fig 109. one of the oldest houses in Makina settlement (source: Author photography)



Fig 110. gated road in Makina settlement (source: Author photography)



Fig 111. interior atmosphere of a house in Makina (source: Author photography)



Fig 112. interior atmosphere of a house in Makina: (Source: Author photography)

FLOOR PLAN

HIGH DENSITY:

due to the high density the single-room houses in Kibera are situated very closely and often there is only a very narrow passageway between the houses called 'bania' or rat roads. In many cases the houses are arranged in clusters forming larger building-complexes. In this situations the lighting conditions are even worse than in a free standing house. In these clusters there is a main entrance room from which all the houses are accessible. In that case the cluster is forming a kind of a gated neighborhood where the access is under a clear control.

FLEXIBILITY:

The floor plans itself are very simple based on a typical 3 by 3 meter room added to form a cluster. Because these type of buildings are very flexible there is no superior building rule. One can just say that every possible square meter that is free will be built. The lack of planning leads to uncontrolled and inhuman urban situations which are very difficult to get rid of because a hole building industry in behind it making good profits.

INTERIOR

FURNISHING:

The closely spaces rooms in Kibera lead to dimly lit rooms. Also that space in the typical 3 by 3 meter rooms is stingy. In most cases all the activities of a house take place in one room, for people with a higher income sometimes in two. In one corner there is a large size bed shared by all the family members. In the next corner there is the kitchen facility consisting of a wooden board plus some plastic pots and a gas cooker. In another corner we can maybe find a cupboard with a radio or a small television. Right next to the entrance there are a few small stools and perhaps a seat around a small table. Often the rooms is only lit through the entrance door and a small window with no direct sun light. The mud and wool walls are very thin and we can hear every noise of the neighbors. Also the roof is not water proof and people try to stop the water from running into the house with some blankets. In some cases we can find an empty bulb holder indicating that electricity even if paid for is often lacking.

ATMOSPHERE:

The atmosphere in the interior space is very soft and in complete contrast to the exterior sun lit and loud Kibera. The transition between these two kinds of worlds is very clear and hard. We open the door, enter the room and find our self in a very small place where all the private belongings of a family are stored. Although the place is lacking many things we get the feeling of a sanctuary or private environment. In the overcrowded Kibera this is the only place where a family can find calmness and shelter. So the meaning such a simple room has for an inhabitant of Kibera should not be underestimated.



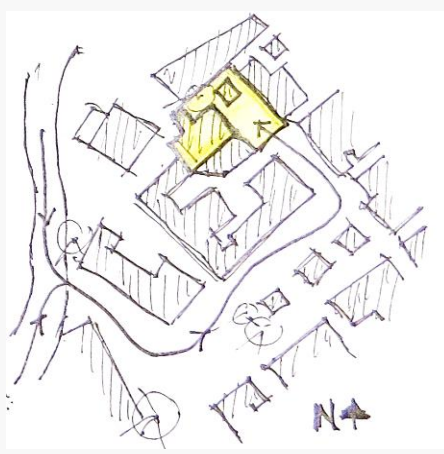
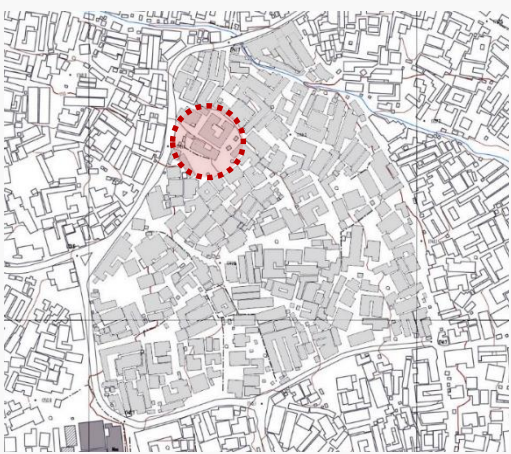
Fig 113. low income condition of living space in Makina (source: Author photography)



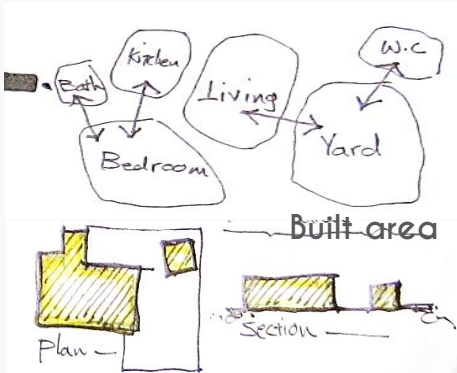
Fig 114. high income condition of living space in Makina (source: Author photography)

HOUSES TYPOLOGY

Neighborhood / main access

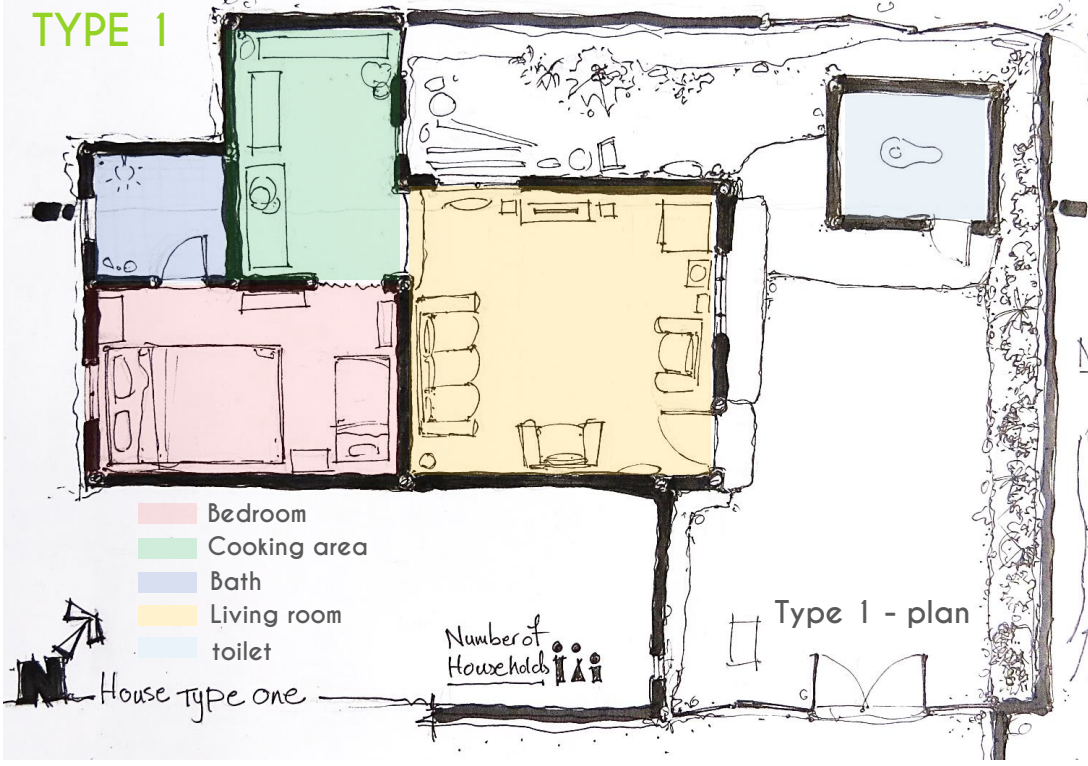


Functional bubble diagram

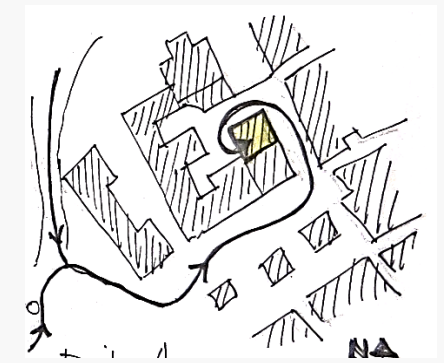
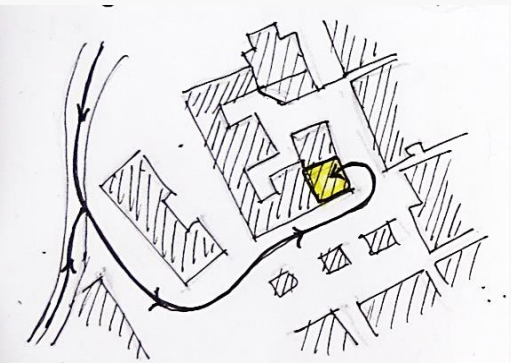
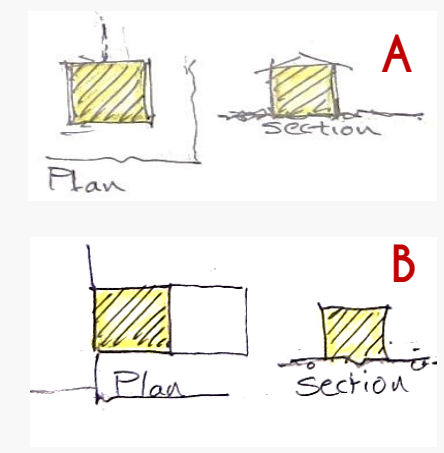
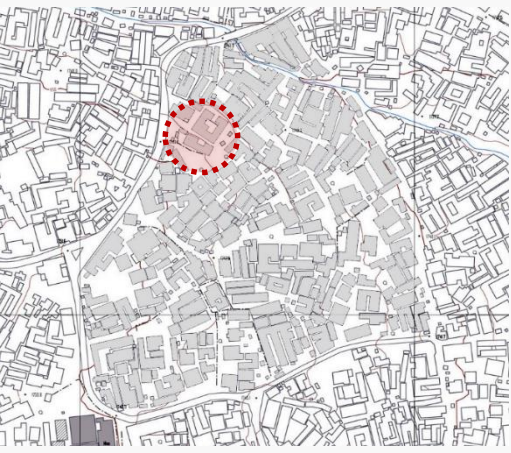


CONDITION
 Good condition house
 Owner: Muslim landlord
 Courtyard with plantation
 Toilet, bath, place for cook
 No access to water pipe

TYPE 1



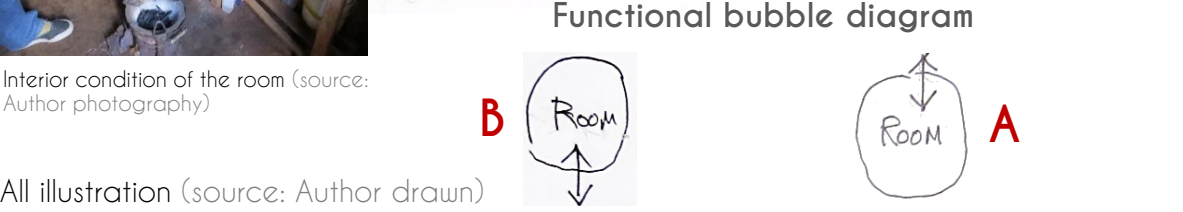
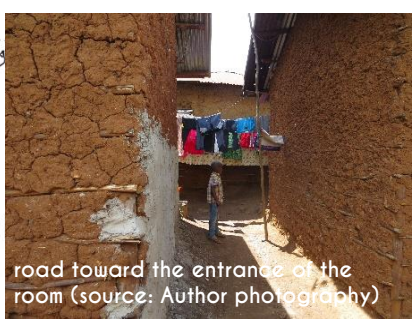
Neighborhood / main access



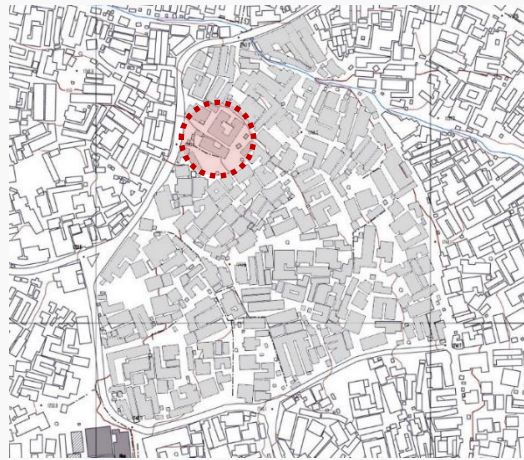
CONDITION
 Poor condition, one room
 Occupant: Christian tenant
 Lack of all services

CONDITION
 Poor condition, one room
 Occupant: Muslim tenant
 Lack of all services

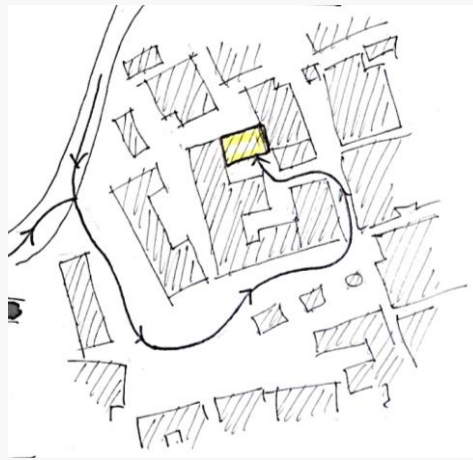
TYPE 2



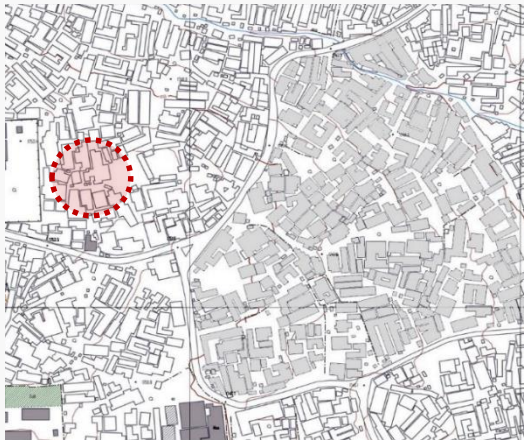
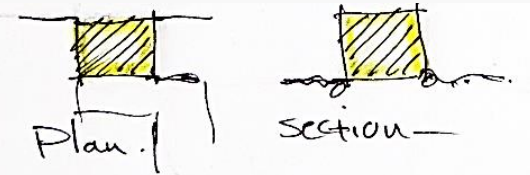
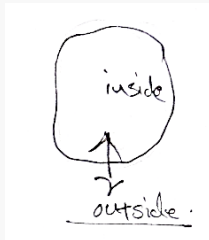
All illustration (source: Author drawn)



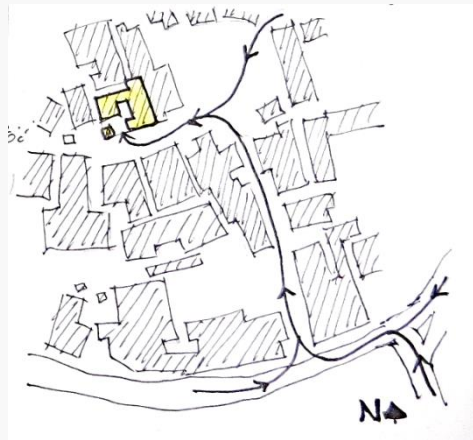
Functional bubble diagram



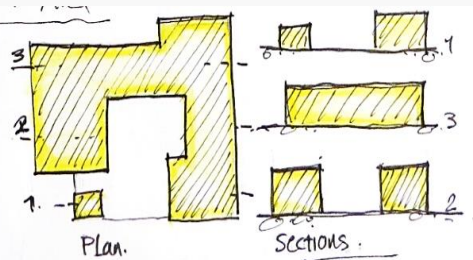
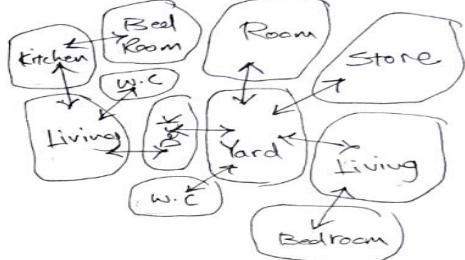
Built area



Functional bubble diagram



Built area

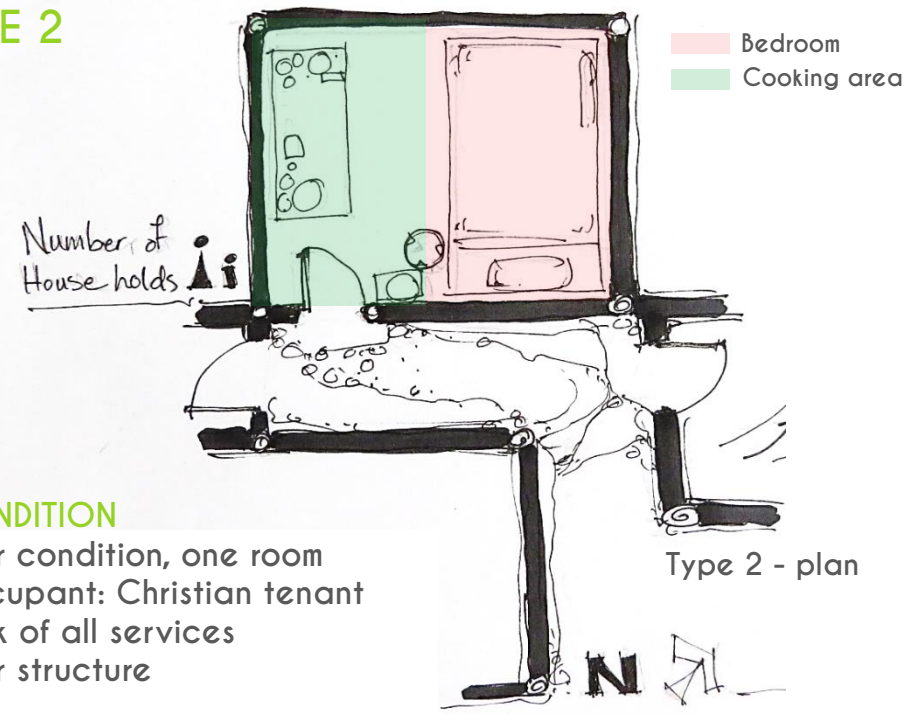


CONDITION
 Good condition house
 Owner: Muslim landlord
 Courtyard with few plantation
 Toilet, place for cook
 No access to water pipe

Two other rooms rented
 With no access to toilet and pipe water
 cooking area in some corner

HOUSES TYPOLOGY

TYPE 2

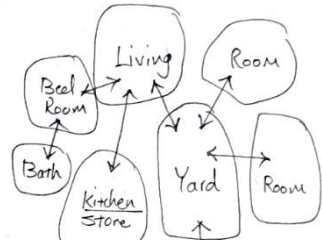
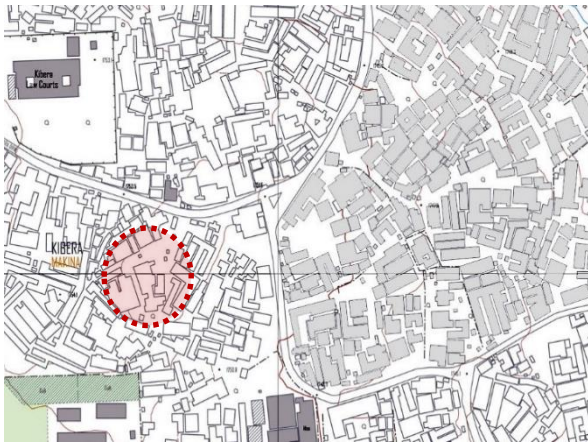


CONDITION
 Poor condition, one room
 Occupant: Christian tenant
 Lack of all services
 Poor structure

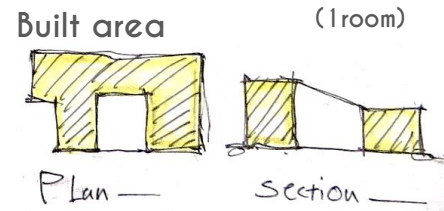
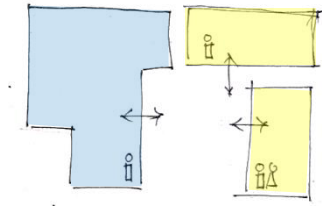


TYPE 3





Households Number



Two other rooms rented
With no access to toilet and pipe water, cooking area located in some corner

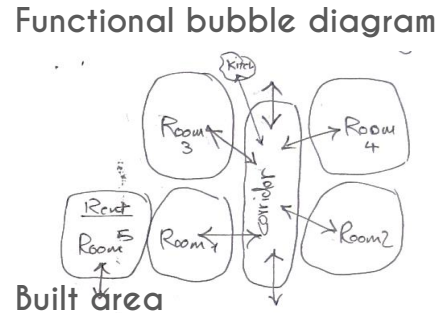
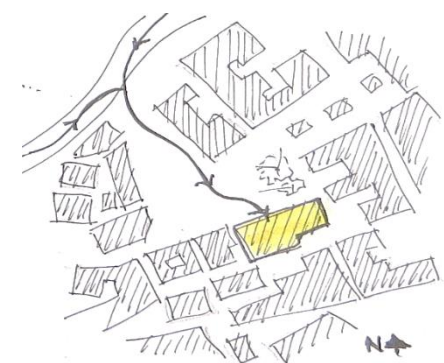
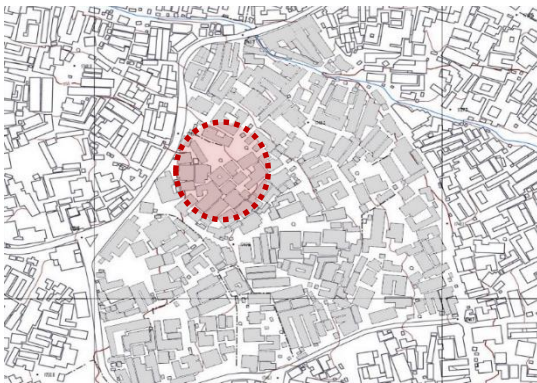
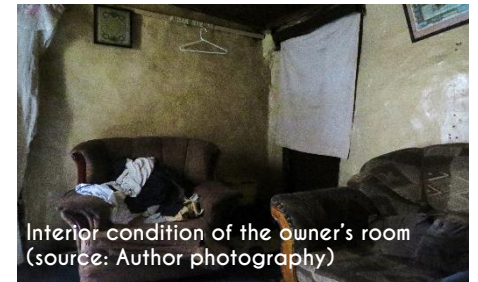
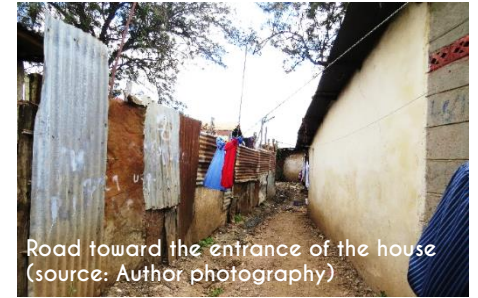
TYPE 4



- toilet
- storage
- Bedroom
- Cooking area
- Sitting area

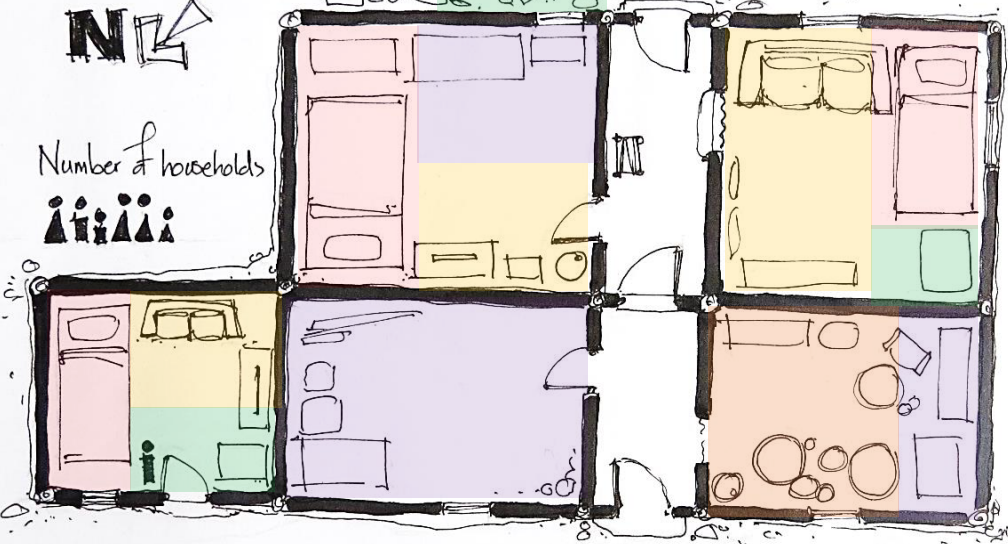
CONDITION
Good condition house
Owner: Muslim landlord
Courtyard / no plantation
Toilet, place for cook and storage

Type 4 - plan



One room rented
With no access to toilet and pipe water, cooking area located in some corner

TYPE 5



- Owner
- Muslim Tenant (1 room)

CONDITION
One room rented
With no access to toilet and pipe water, cooking area located in some corner

- Bedroom
- Cooking area
- Sitting area
- Cloth washing area



CONDITION
average condition, one of the oldest house in the neighborhood
Owner: Muslim
No Toilet and pipe water and no proper cooking area

- toilet
- storage

Material : Asphalt and macadam
Traffic : high – main
Width : 6-9 m
Movement : dynamic

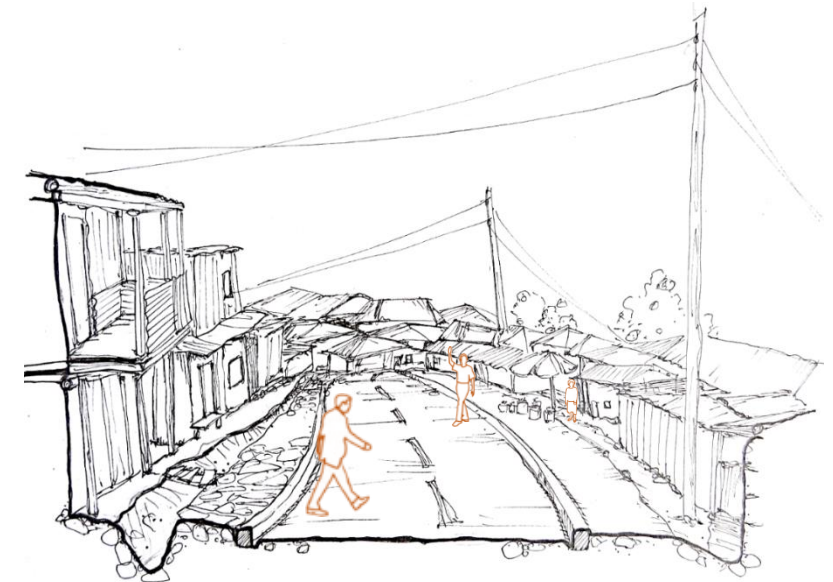


Karanja road toward west
 (source: Author photography)



Karanja road toward east
 (source: Author photography)

TYPE 1



Material : earth, stone
Traffic : average – connection
Width : 3-5 m
Movement : dynamic . Static



one of the main access to the selected site at the north side.
 (source: Author photography)



access road to the selected site from east (source: Author photography)

TYPE 2



Material : earth, stone
Traffic : low – inside the neighborhood
Width : less than 2 m
Movement : dynamic . Static

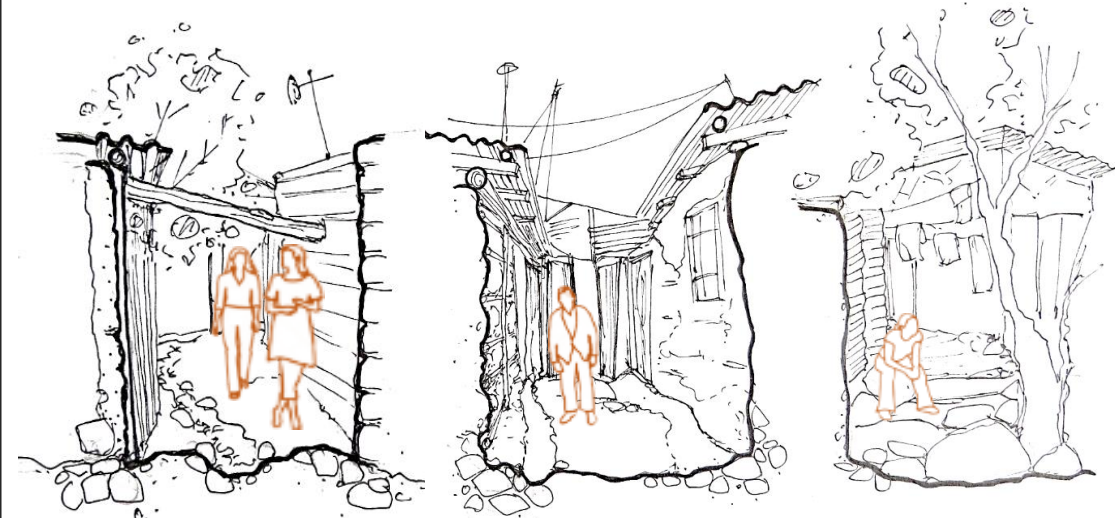


narrow, thin road in the selected area (source: Author photography)



narrow, thin road in the selected area inside the neighborhood (source: Author photography)

TYPE 3



All maps. (source: Author Drawn, Original map: Japan International Cooperation Agency (JICA) and the Government of the Republic of Kenya)

All Sketches. (source: Author Drawn)

THEORETICAL FRAMEWORK

JANE JACOBS
CHRISTOPHER ALEXANDER
HASSAN FATHY

JANE JACOBS ON DIVERSITY IN A NEIGHBORHOOD AND NATURAL GUARDIANSHIP

Jane Jacobs, a world known urbanist and activist, writings came with a new community-based approach to city planning. "The Death and Life of Great American Cities" (1961), introduced innovative ideas about how cities function, progress and fail, that now seem like common sense to generations of architects, planners, politicians and activists. The most special aspect of a city, according to Jacobs, is the public life between the inhabitants on the streets and squares where a functional urban life is showing a good balance between freedom and social control. This in turn leads to diversity (Jacobs, 2005).

To achieve diversity in a neighborhood, four conditions must be met (Jacobs, 2005):

1. **The district must contain several primary functions, the presence of people moving outdoors at different times and for different reasons.**
2. **The blocks must be short so that streets and street corners will come close to each other.**
3. **Neighborhoods must consist of a mix of houses varying in age and condition.**
4. **A sufficiently high concentration of people must be in the area.**

If these four conditions are achieved, then a neighborhood should reach their highest potential and best chance for a rich public life, regardless of where it is. Jacobs believes that many suburbs or semi-urban neighborhoods in the future will be swallowed up by the big city, and they will survive or fail depending on whether they can adapt to serve as an inner city. A neighborhood that is all too effectively separated, for example by physical barriers, risks losing economic stimulus in the form of visitors from other parts of the city (Jacobs, 2005)

Another insight that Jacobs brings to the table is that there is no direct relationship between good housing and well-functioning urban areas. It is obviously good with decent housing quality, but it does not automatically lead to good urban quality. According to Jacobs households creates nor affluent necessarily better urban areas.

Jacobs highlights the streets and its sidewalks as the most important public spaces and the city's most vital organs where people meet. She argues that a main requirement for a functioning neighborhood is that people feel safe and secure on the street among all strangers and the streets needs to care for the task to handle strangers. For mutual security there must always be an eye directed towards the street, apart from housing it should be done from shops and general services. She describes it as an intricate and unconscious system of unwritten rules and laws that the people themselves have created and which they oversee. This is what she calls Natural guardianship.

According to Jacobs are there three main characteristics of a well functioning and vibrant street:

1. **Clear boundaries between public and private space.**
2. **"Natural owners of streets " there must be eyes upon the street.**
3. **Sidewalks are used continuously, more eyes on the street and makes people in houses to look out at the streets.**

Fig 1 | 6. opposite: An original ad for Jacobs' most famous book. (source: blog.preservationnation.org)



Fig 1 | 5. Jane Jacobs (source: en.wikipedia.org)

Comment: *When planning new areas in making, a few of Jacobs ideas can be taken into consideration. First of all, a mix of service and housing is essential. The district must contain several primary functions, the presence of people moving outdoors at different times and for different reasons. Then a sufficiently high concentration of people will be in the area. The blocks are preferable made short so that streets and street corners will come close to each other and sidewalks are have to be implemented into the planning schemes. A mix of houses varying in age and condition is not possible since, apart from the slum dwellings, all the houses are new or a maximum of 10 years of age.*

CHRISTOPHER ALEXANDER ON PATTERN LANGUAGE METHODOLOGY

Christopher Alexander, a mathematician and architect, is a Professor Emeritus of Architecture at the University of California, Berkley. He wrote Notes on the Synthesis of Form in 1964 as an approach to systemic collective design. His early work in mathematics led him to utilize mathematical research for “good design” and his research was the starting point in his creation of a “pattern language” methodology which could be easily understood and empowered anyone to design and build at any scale. (patternlanguage.com, 2014 and Revedin, 2013).

Alexander began to experiment with the methods he had learned from the interdisciplinary orientation of the Anthropology department at Harvard, but within the field of Architecture. It meant living with families in the communities for whom they were designing, so that they could learn about the specifics of culture or community as a basis for the design of their built environment, with the goal of finding better solutions for housing when little money was available. They engaged in experimental construction in order to find the best possible solutions that could actually enhance local economies as well as produce beautiful homes for individuals for very little cost (Alexander, 2014). Alexander’s life’s work includes the realisation by him and his followers of over 200 participatory projects around the globe. The method set out in “Pattern Language” in 1977 made the leap towards the understanding of architecture as a service for all (Revedin, 2013).

According to Alexander towns and buildings will not be able to become alive, unless all the people in society make them, and unless these people share a common pattern language. Furthermore he believes that centralized authority cannot create the large pattern, which gives

structure to a town or a neighborhood, by laws or by masterplan. Instead he believes that they can emerge gradually and organically, almost by their own, if every act of building takes on the responsibility for gradually shaping its small corner of the world (Alexander, 1977).

The research methods led to the development of an even more complex and unique set of methods for architecture. Talking to and learning from the communities they worked with made it clear that one of the essentials elements of good design was community participation. It also became evident that poor communities, taking part in the constantly growing and adapting creation of its own built environment could become the basis for the creation of local, sustainable economies (Alexander, 2014).

By paying attention to human scale and introducing the feeling of belonging to a place and to its structure and materials, Alexander’s built work seeks to create a spatial quality which he calls “wholeness” (Revedin, 2013).

Fig 118. Christopher Alexander pattern writing (source: www.tkwa.com)

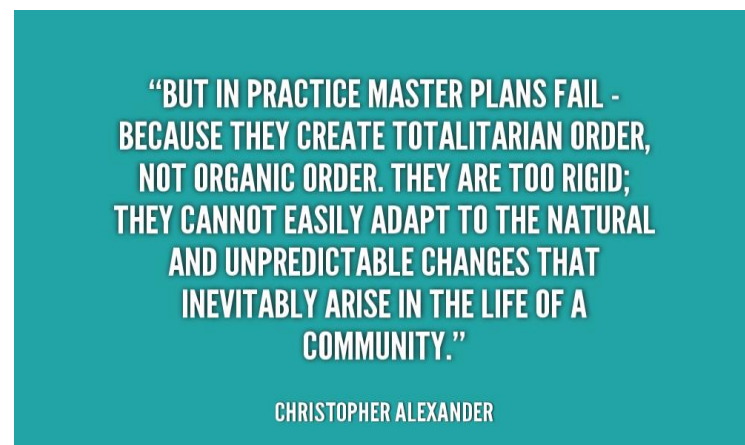


Fig 119. Alexander’s quotes (source: quotes.lifehack.org)

"A building or a town will only be alive to the extent that it is governed in a timeless way. It is a process which brings order out of nothing but ourselves; it cannot be attained, but it will happen of its own accord, if we will only let it."

Christopher Alexander



Fig 117. Above: (source: rugusavay.com) Right: Christopher alexander (source: pinterest.com)

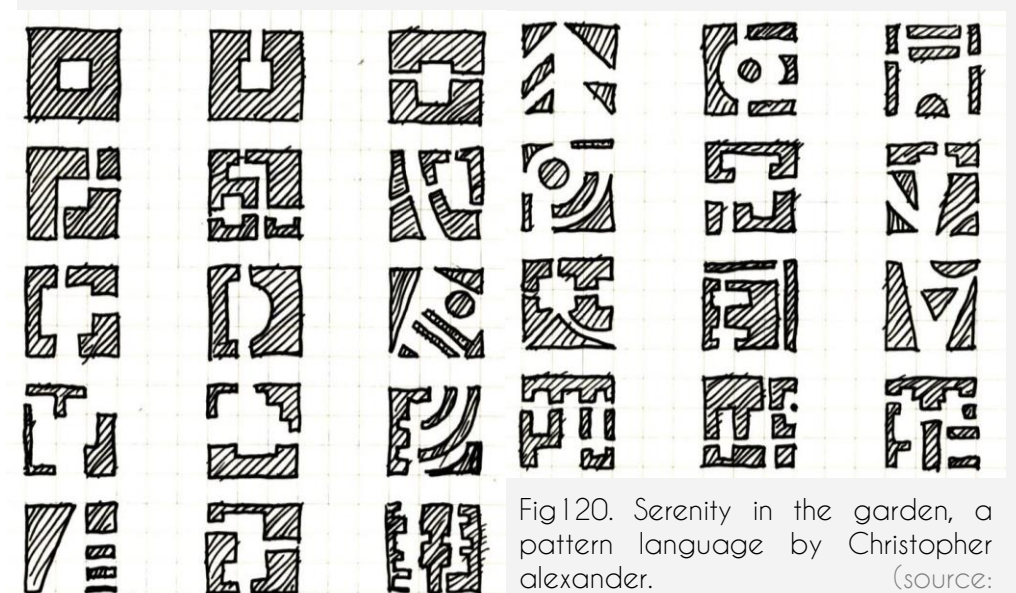


Fig 120. Serenity in the garden, a pattern language by Christopher alexander. (source: serenityinthegarden.blogspot.com)

HASSAN FATHY ON TRADITIONAL ARCHITECTURE FOR THE POOR

The Egyptian Architect Hassan Fathy was chosen for the assignment of creating a new village for the inhabitants of Gournā, outside Luxor in Egypt. The village of Gournā was built upon tombs of the Nobles and the 7000 inhabitants lived on tomb robbing because the surrounding farmland was not sufficient to support them all. The uncontrolled tomb robbing was a problem for the Government in Egypt and a ministerial decree was issued to expropriate the houses and to rehouse the Gournis away from the tombs (Fathy, 1973).

Fathy had a clear idea of what material to use in the rehousing project, he had discovered that mud bricks was the appropriate building material for both the walls and the roofs. The inspiration for the roof was collected from the Nubians, who used a traditional vaulted roof that was cheap to construct and could be locally manufactured without the use of an engineer. The roof was constructed without the use of timber framework which is ideal for locations where wood is not an abundant resource and where harvesting timber can cause erosion. Fathy also cleverly used traditional courtyard forms and that together with the dense brick walls provided passive cooling in the summer (Fathy, 1973).

For Fathy, this assignment was not going to be easy. Fathy realized that Gournā was a delicately balanced social organism intimately integrated with the typography, with the very bricks and timber of the village. And this organism was to be dismantled and put together in another setting. Fathy had a clear idea that the design should be traditional, with traditional layout, traditional lamps, mashrabiya screens (wooden window screens) colored glass and domes. But the villagers did not want to move, their livelihood came from robbing the tombs, and Fathy therefore involved the villagers to tailor his

designs to their needs. For their lively hoods, Fathy had imagined that the tourist coaches would stop at the New Gournā and the Gournis would sell local crafts to the tourists (Fathy, 1973).

Comment: *Hassan Fathy's project of rehousing the poor in New Gournā, Luxor was on paper set out for success due to a cultural adaption of the layout of the buildings, the materials used and the involvement of the inhabitants in the design process. The fact that the inhabitants did not want to move contributed largely to the failure of the rehousing project. A few of the inhabitants moved but did not settle and the project was never finished. A few of the new settlers went into the tourist business but it was not enough for all 7000 inhabitants to survive from. The project did involve building a mosque, a souk, a school and an open air theatre, but the funding for the project was not sufficient for public buildings and spaces which also could be a factor causing the project to fail. The project also most likely failed due to the lack of space for the animals.*

The New Gournā project has many similarities to our project in Kibera. The government in Nairobi has issued a program, similar to the Egyptian decree, to rehouse the inhabitants of Kibera of which many do not want to move. The newly built areas in Kibera also lack public buildings and spaces. The newly built areas do not contain spaces for trade or allow the inhabitants to trade from home which is causing them to lose a source of income and forcing them to commute to make a living.

Fig124. proposed plan for new Gournā by Hassan Fathy (source: www.pinterest.com)

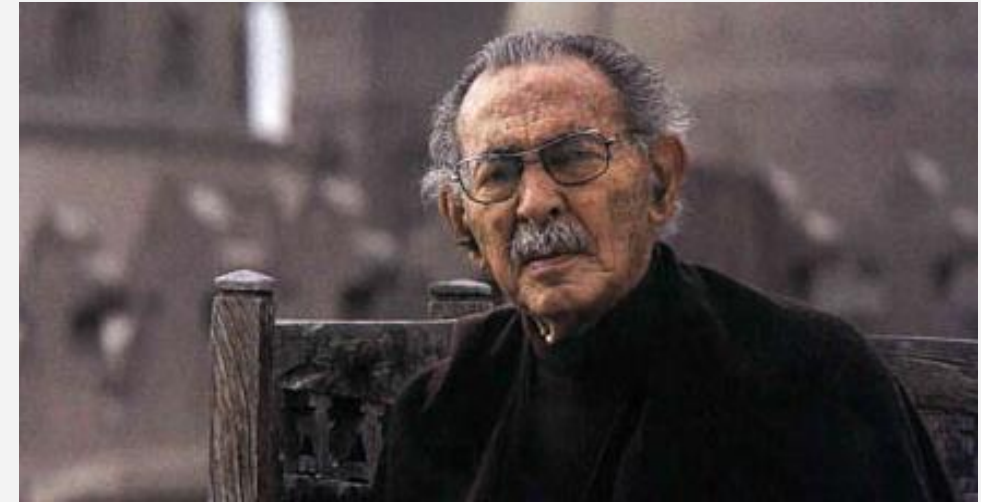


Fig121. Hassan Fathy (source: islamic-arts.org)

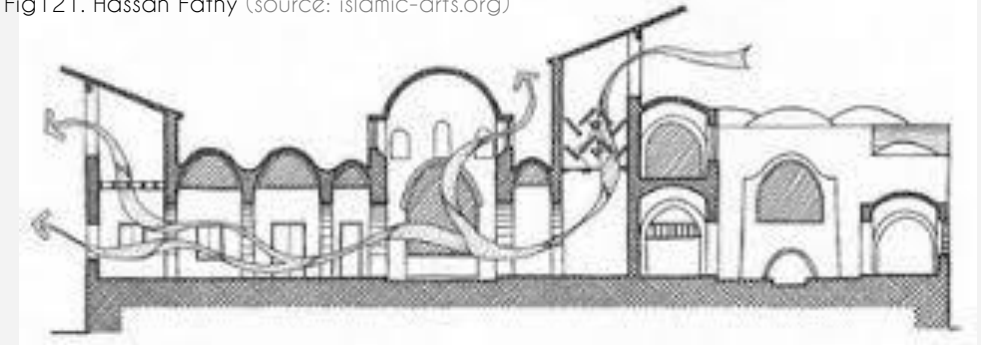
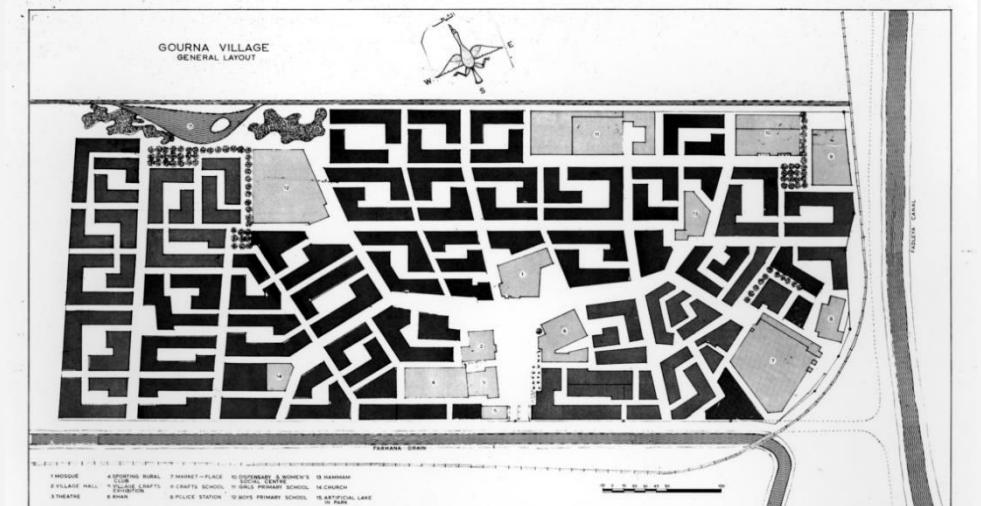


Fig122. Hassan Fathy sketches for environmental design (source: blog.dip16.net)



Fig123. Village of new Gournā (source: whc.unesco.org)



DESIGN BRIEF AND CONCEPTS

URBAN RENEWAL
CONCEPTS FOR
MAKINA

People living in Makina confronting lots of problems since they migrated to this area. Poverty and lack of services has led them away of standard living conditions. Houses and lifestyle are related to each other and were always the criterions of human beings identity. So what we have to notice in our architecture is that; just providing shelters for poor people wont solve slums problem if it don't make it bigger and worst.

Today the way we define and build our houses prevent us from finding answer for our inside demands. What is our existence stages and dignity and how should our architecture, buildings and houses respond to it are the key issues and questions along the sense of belonging which we have to reach and find the best answers and solutions for it.

So the effort in these design project would focus on relationship between the human beings dignity, qualitative understanding of life and Islamic way of living, to help the world's slum dwellers to attain lives of dignity, prosperity and peace. To finally provide a secure, affordable, sustainable and environmentally friendly housings which would serve the spiritual needs of human beings. In other word the effort would be on **transformation of spirituality to a tangible reality.**

The stated objectives of this project-design is to investigate how is the life style of Muslims in Makina, and what's the main problems they're confronting; to find affordable solutions and improve the living standards and quality in Kibera which- by providing basic facilities will lead to better sanitation, education, living and work condition for its occupants.

It is a self-supporting project with a sustainable design approach aiming to reduce costs of life for the poor population. It focused on sustainable strategies and climatic design, using renewable energies, local materials, to reduce construction and conservation costs and make it affordable.

Providing recreational spaces to improve the healthy way of living, which attained through creation of accurate open spaces and landscapes to relate human and nature, and improving environmental conditions are among other objectives of the project.

The project gives a proposal of a new low cost housing scheme that focuses on community cohesion, sustainability of the project while empowering economic of inhabitants and employing workable planning concepts.



Fig 125. A dwelling in Makina (source: Author photography)

VISION FOR THE AREA

Development in the Sustainable Urban Neighborhood will transform a shanty settlement and unattractive area into a vibrant, inclusive community that is integrated with adjacent areas and provides access to employment, services and facilities in a high quality environment.

Development will maximize the opportunities presented by the river across the site, the central location and linkages to the central business district. It will be a place that will grow and develop in the future, where people take pride in where they live and they feel part of the community.

HOUSING

Provide market and affordable homes to meet local housing needs. Which use less energy and water to create a development that is an exemplar of sustainability.

It consist of a variety of housing types and tenures which support a mix of households of a range of sizes, and incomes

HIGH QUALITY DESIGN

The design of new buildings, street layout and public spaces will make the development a place where people feel proud to live and work.

OPEN SPACES AND ENVIRONMENT

A network of playing fields, small parks, play areas, tree planting will contribute to a healthy attractive environment.

RETAIL

Small-scale retail facilities will provide goods and services for the local community.

THE RIVER

The public will have greater access to and along the river for recreational use and movement through the area.

EMPLOYMENT

New land for employment use will enable businesses to take advantage of the opportunities in area and help create new jobs.

SUSTAINABLE TRANSPORT

A network of walkways and cycle ways will provide convenient access to local facilities and services. Local bus routes will serve the development to provide an alternative choice of transport.

INFRASTRUCTURE

New infrastructure will support and benefit new residential and employment development

KEY PROPOSALS

- new homes
- employment land
- a new primary school
- a small local retail center
- public open spaces and play facilities
- leisure facilities such as dining and drinking establishments near the river
- pedestrian / cycle routes near the river

COMMUNITY FACILITIES

- Residential**
 - House-shop
 - Courtyard houses
 - Cluster units
- Commercial**
 - Local retail center
 - Mixed use
 - Small kiosks
- Services**
 - Religious Mosque
 - Health care Clinic / day care
 - Education Primary school / Library
- Recreation**
 - Restaurant and café
 - Cyber café
 - Open spaces
 - Park and playing area
 - Cycle and pedestrian route
- Transportation**
 - Bus stop
 - Motorbike/ taxi station
 - Public parking



Fig 126. Bubble diagram of the facilities for new settlement (source: Author drawn)

KEY DEVELOPMENT CONCEPTS

Streets and transport

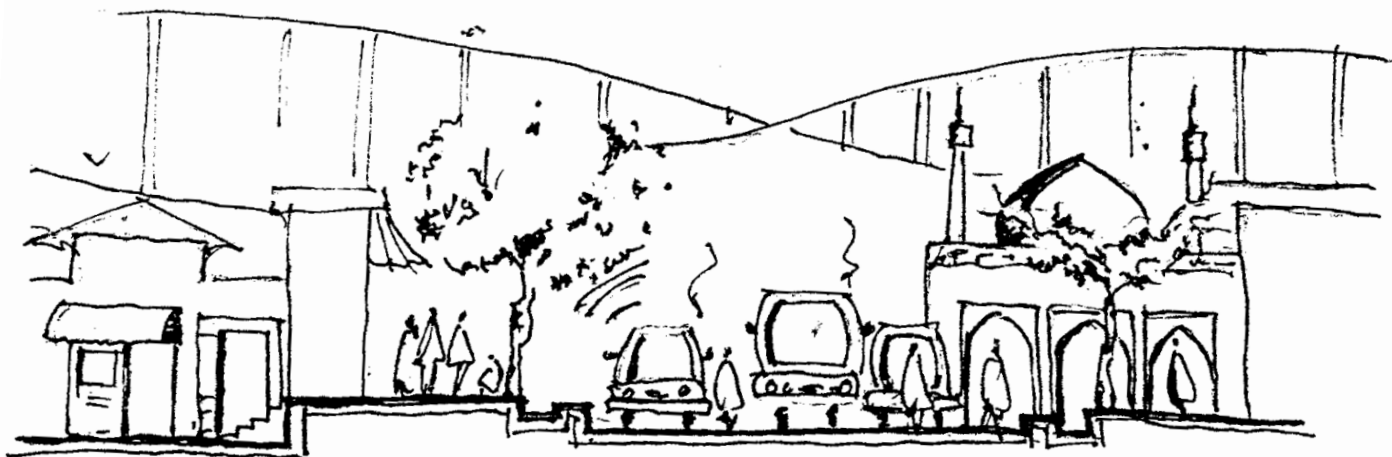
A network of pedestrian and cycle friendly streets and paths that are well defined and easy to navigate will need to be provided to allow easy movement through the site. New routes will need to link with the other existing community and reduce the need to travel by vehicle.

Open space

A network of new public open spaces, will need to be provided across the site to complement new housing and places of work. Facilities will need to support a range of interests and activities undertaken by individuals and groups including leisure, relaxation, play and public events.

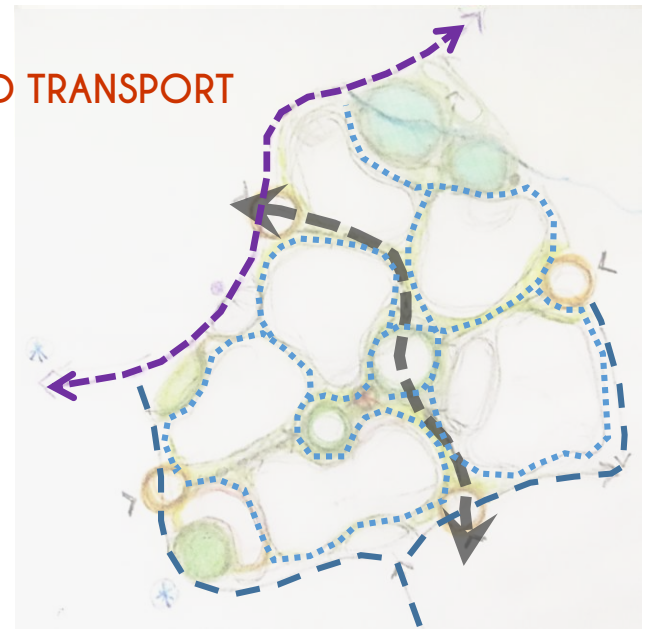
Design

The development will need to exhibit sustainable and affordable urban design in terms of layout, new buildings, public spaces, views and landmarks. Views of the river should be maximized through the layout of streets and buildings. Landmark buildings and public art should create focal points at key movement junctions within the development.

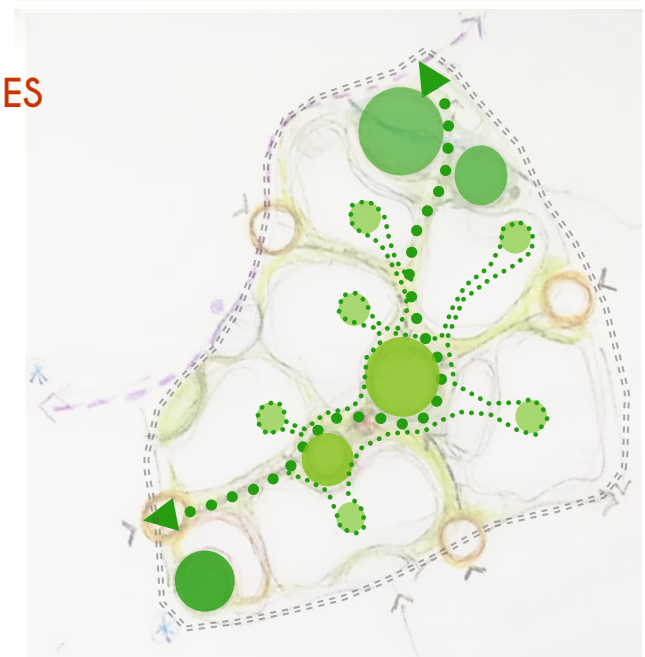


(source: Author drawn)

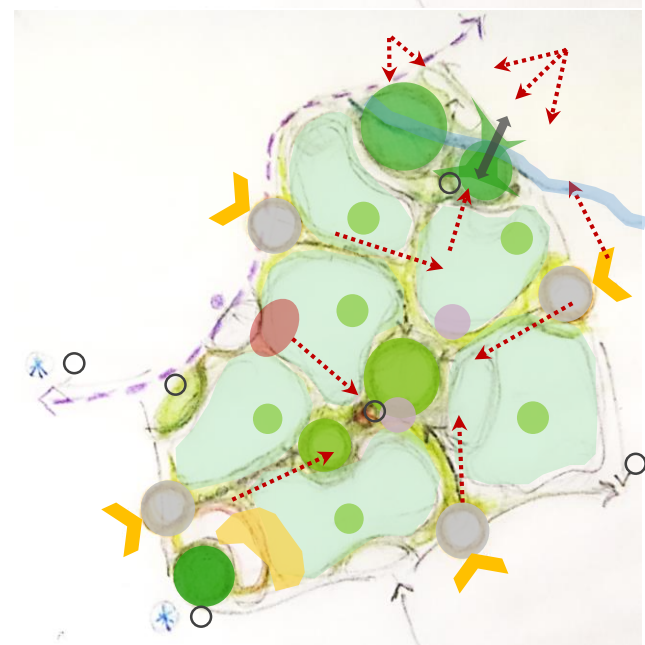
STREETS AND TRANSPORT CONCEPT



OPEN SPACES CONCEPT



DESIGN CONCEPT



All illustration (source: Author drawn)

In a 3 hectares of Land that is located in Makina – Nairobi, it is considered to design 450 dwellings as low cost houses for low income families and people of Kibera.

The existing land has been divided schematically into 7 sectors, and for each part, around 10 extra dwellings has been added to the design in addition to the counted number of actual houses.

The process of the construction will take place step by step in 7 phases according to the proposed design. For this purpose the government of the area and other agencies who take part in this project will dedicate a land nearby the site as a temporary residential area, therefore by starting the construction in each sector people will be shifted over there.

Providing the infrastructures for each part i.e. ground preparation, water supply and waste water management, electricity supply and etc, each sector will be self-sustaining and can be used by the habitants. This process will continue the same way for the other sectors, completing the project. (Fig122)

KENSUP project in Kibera (as it explained before) also considered as a temporary shelters for relocating residence from the site until the project getting completed.

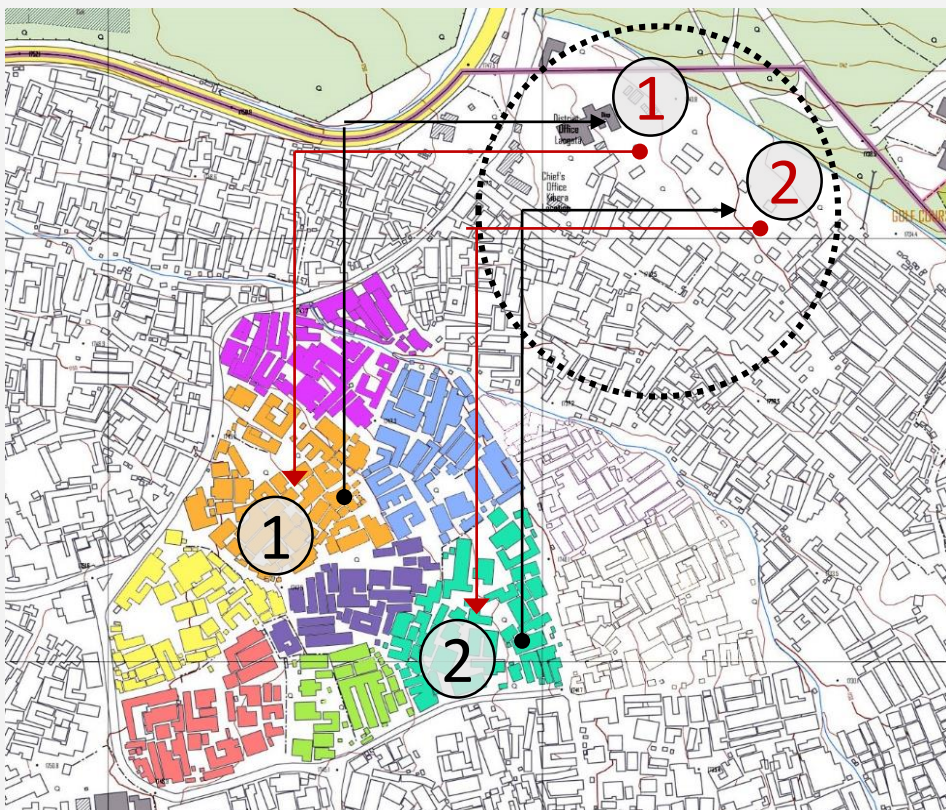


Fig127. map showing the concept for relocating residence of Makina to the temporary shelters and bringing them back to new housing (source: Author drawn)

RENOVATION CONCEPTS

HOUSING CONCEPTS

- The inhabitants must be made a main actor in the “Cities without slums” program
- Introduce the new Public Private Partnership (PPP) courtyard-housing typology which is a mix of traditional housing and the popular social housing typology individual housing
- The residents must be allowed to trade from their houses/workshops/shops
- The temporary shelters must be located near the original location of the demolished informal settlements
- The residents should chose their own neighbors, with whom they will share buildings, courtyards, roof top terraces, stables and workshops/shops. This will ensure maintenance and security
- The apartments must be made larger in size, around 60 square meters is the actual need

CONCEPTS FOR PUBLIC PLACES AND GREEN SPACES

- “Green corridors” through the site with sustainable landscaping and permeable paving which will improve the air quality, create shaded communication areas and generate places to socialize
- Integrate land for agriculture with new courtyard typology housings
- Create smaller “pocket parks” for picnics and where small children can play, but also huge green spaces for sports, music, gatherings and active recreation.

CONCEPTS TO SMART TRANSPORT

- Transform the neighborhood into a car free eco-friendly area, served by low-energy public transport as well as by bicycle
- bike-sharing, machine sharing, shared short-distance bus- and taxi connections to improve the existing public transport network

CIRCULAR ECONOMY PROJECTS

- Get the local inhabitants involved in cleaning their neighborhood.
- Create waste recycling posts all over the site.
- Reutilization of garbage materials, such as plastic for example, could be used in a project about “Garbage Design”
- Create centers where students can get academic help and motivation, situated next to the schools or in new libraries and social centers.
- Each neighborhood should have one library and exchange/internet café to reduce illiteracy.

CONCEPTS TO REACH A SUSTAINABLE NEIGHBORHOOD

- Natural ventilation, use of daylight and sustainable materials adopting building management systems, passive solar design and solar hot water collectors, solar photovoltaic, geothermal cooling and rooftop energy recovery units.
- Adopt sustainable landscaping, rainwater harvesting, permeable paving and the creation of lagoon systems and urban agriculture
- Wastewater treatments, rainwater harvesting and lagoon systems in parks and public spaces, but also in private communities



Fig128. Rendering through the site (source: Author drawn- software: Revit architecture- Photoshop)



Fig129. Rendering- street view from south (source: Author drawn- software: Revit architecture- Photoshop)

DESIGN PROCESS

PROPOSED DESIGN
FOR RENOVATION
OF MAKINA

INTRODUCTION

Hassan Fathy defined culture as “the result of the interaction between man and his environment when man attempts to satisfy his physical and spiritual needs.” This is true of the preindustrial architecture of any given region. At the physical level, it embodied knowledge with regard to orientation, climate, building materials, and construction methods. At the spiritual level, preindustrial architecture facilitated the religious life-style in its daily rituals, “unifying the socio-cultural and religious aspirations of the individuals and the community.” Since the Industrial Revolution, ways of living around the world have undergone considerable change. Subsequent emphasis on industrialization has given rise to different patterns of both building and living. These models were not conceived on the basis of social needs, life-style, or religion.

Muslims around the world practice a long-established religion that involves teachings, practices, and rituals that encourage and lend structure to society in all aspects. Islam shaped specific ideas and styles about dwellings and other architectural forms. The house was once considered a typology within Islamic architecture, as it facilitated the religious life and was a space for daily prayer rituals at home. It was created based on religious prescriptive regarding hospitality, spirituality, family, and privacy. The Qur’an, the central religious book of Islam, and the hadith, regarded as a body of authoritative statements or acts from or about the Prophet Muhammad (pbuh), both embody Islamic discourses about domestic space that emerged during the historical formation of the religion.

In the case of Islam, actual human dwellings and verbal images of houses have obtained rich and diverse variations in different contexts and cultures since the religion’s inception. This is due to the effect of varying cultures and conservatism within Islamic civilization throughout the world. No culture or tradition remains unchanged over a period of fourteen centuries and in forty Muslim-majority countries. However, ethnographic research suggests that “Muslims widely attribute religious significance to their houses today, even when their dwellings happen to be apartments designed according to European and American prototypes.”

PROGRAM

The proposed design is a dwelling that physically manifests the varied needs of the Islamic system and religious prescriptions with clear separation of private life. The program is based on the requirements of the poor and middle class Muslim family that comprises several generations under one roof that widely vary in their social and religious practices. This is set up in order to create a flexible design that accommodates diversity and to acknowledge the varying domestic routines of Muslims throughout the world.

The underlying organization principle lies in solving the paradigm of seclusion and exposure, as exhibited in a hierarchy of spaces—public, semi-public, and private. Again, it should be made clear that this proposal is not meant to prescribe a certain view of Islamic domestic life for all Muslims, but to accommodate Islam’s diversity with a flexible design.

Much of the program requirements are set by the basic needs of a general family: social gathering space, kitchen, bedrooms, and bathrooms. However, the subtleties of the program are formulated by interpretations from the Islamic texts.

The Qur’an and authoritative hadith collections hold a position of primary importance here for several reasons. First, they contain the earliest surviving statements of Islamic ideas about God, humans, and the nature of existence. Second, Muslims regard the Qur’an as the literal word of God, and the hadith as statements containing the divinely inspired words and actions of his messenger, Muhammad (pbuh). Muslims believe these works express timeless truths that should inform human thought and action, they have studied and used them for guidance throughout history.

“Allah has made your homes the place for your rest, and animal skins for tents as houses so that you may find them light when you travel and easy to pitch when you stop; while from their wool, fur, and hair, He provides you household items and articles of convenience for you prescribed term of life... Thus He completes his favor to you, so that you may become Muslims. If they still give no heed to you O Muhammad, you need not worry, for your duty is only to convey the message clearly.” (16 Nahl: 80-83)

These surah verses maintain that houses and domestic furnishings are more than just material things. They are provided to humans by God. Recognizing this leads to Islam—submission. “To this extent, all houses can have religious significance; Houses are the objects of regulatory discourse in the Qur’an. These commands provide guidelines to worshipping in houses, matters connected with visitation and commensality, the roles of women, and purity in the house.

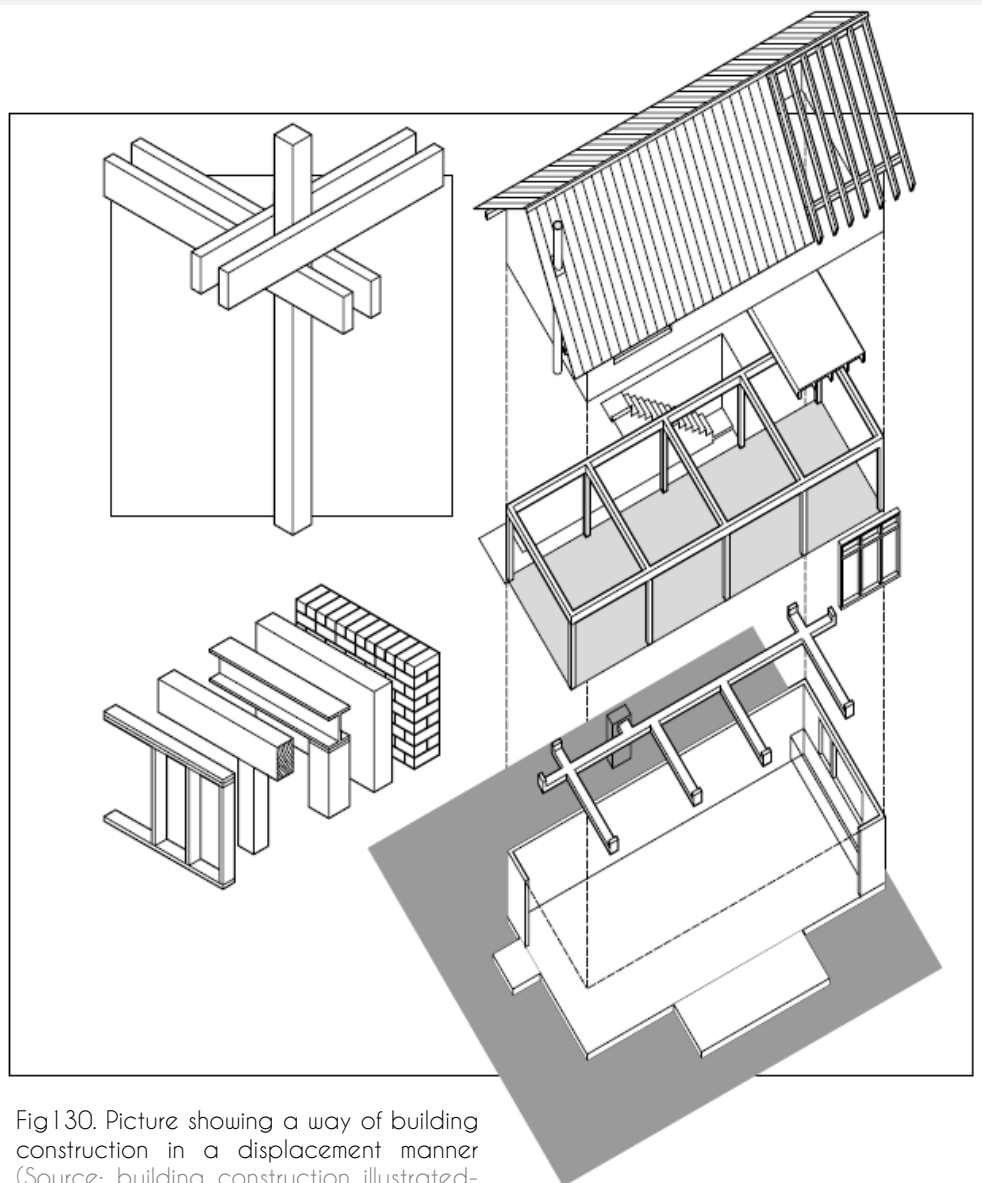


Fig 130. Picture showing a way of building construction in a displacement manner (Source: building construction illustrated-D.K. Ching)

When we speak of architecture as the art of building, we should consider the following conceptual systems of order in addition to the physical ones of construction:

- The definition, scale, proportion, and organization of the interior spaces of a building
- The ordering of human activities by their scale and dimension
- The functional zoning of the spaces of a building according to purpose and use
- Access to the horizontal and vertical paths of movement through the interior of a building
- The sensible qualities of a building: form, space, light, color, texture, and pattern
- The building as an integrated component within the natural and built environment

The manner in which we select, assemble, and integrate the various building systems in construction should take into account the following factors:

Performance Requirements

- Structural compatibility, integration, and safety
- Fire resistance, prevention, and safety
- Allowable or desirable thickness of construction assemblies
- Control of heat and air flow through building assemblies
- Control of migration and condensation of water vapor
- Accommodation of building movement due to settlement, structural deflection, and expansion or contraction with changes in temperature and humidity
- Noise reduction, sound isolation, and acoustical privacy
- Resistance to wear, corrosion, and weathering
- Finish, cleanliness, and maintenance requirements
- Safety in use

Aesthetic Qualities

- Desired relationship of building to its site, adjacent properties, and neighborhood
- Preferred qualities of form, massing, color, pattern, texture, and detail

Regulatory Constraints

- Compliance with zoning ordinances and building codes

Economic Considerations

- Initial cost comprising material, transportation, equipment, and labor costs
- Life-cycle costs, which include not only initial cost, but also maintenance and operating costs, energy consumption, useful lifetime, demolition and replacement costs, and interest on invested money

Environmental Impact

- Conservation of energy and resources through siting and building design
- Energy efficiency of mechanical systems
- Use of resource-efficient and nontoxic materials

Construction Practices

- Safety requirements
- Allowable tolerances and appropriate fit
- Conformance to industry standards and assurance
- Division of work between the shop and the field
- Division of labor and coordination of building trades
- Budget constraints
- Construction equipment required
- Erection time required
- Provisions for inclement weather

design principles which derived from studied literatures and used in design are as follows:

Typically, the courtyard is one step lower than the interior space. This prevents water seepage and marks the place where shoes are removed. (Fig 132)

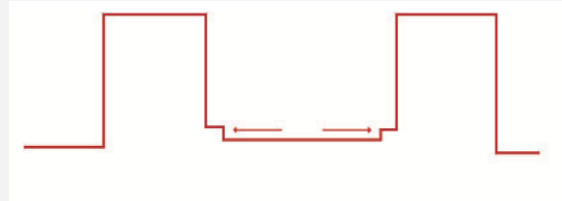
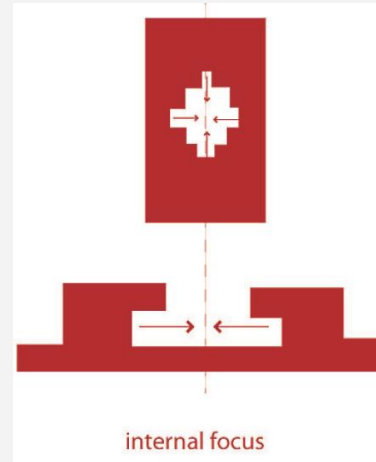


Fig 132. sunken courtyard (source: The Contemporary Islamic House / Hanna Ibrahim)



internal focus

1. INTERNAL FOCUS

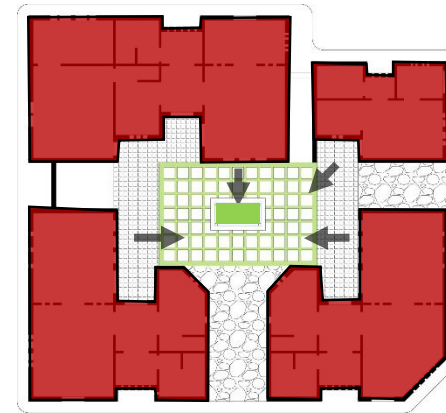


Fig 131. map showing the Internal focus of cluster housing (Source: Author drawn)

Traditionally, the Islamic house has always been associated with the courtyard type dwelling. "Admittedly the courtyard house is the most common form in many parts of the Muslim world, especially in the traditional heartlands of Islam... There are those, consequently, who have maintained that it is particularly Islamic, that its design has a cosmic, or archetypal, significance in Arab Muslim environments."¹⁰ But there is no strong evidence to support the validity of such an interpretation. However, the courtyard house has recognized value as a dwelling type for its inclusion of nature into the home without the sacrifice of private life. (Fig 131)

2. EXTERIOR WALLS OPENINGS

The external walls have few and little openings. This allows protection from noise and dust and privacy from any passerby. (Fig 133)

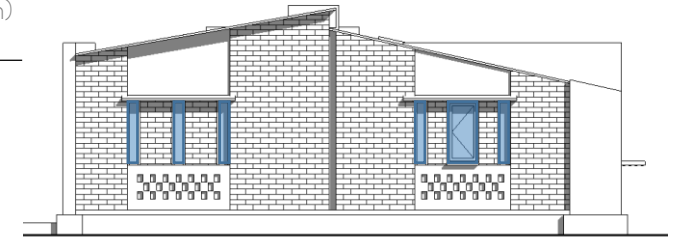


Fig 133. minimal external opening (source: Author drawn)

3. ENTRY

The entrance is designed to obstruct any view of the interior: a bent entrance faces a blank wall. This provides privacy and further protects the house from noise. Within the Islamic house, It does not give immediate access to the living spaces of the family. there are several different levels of entrance throughout the house. (Fig 134)

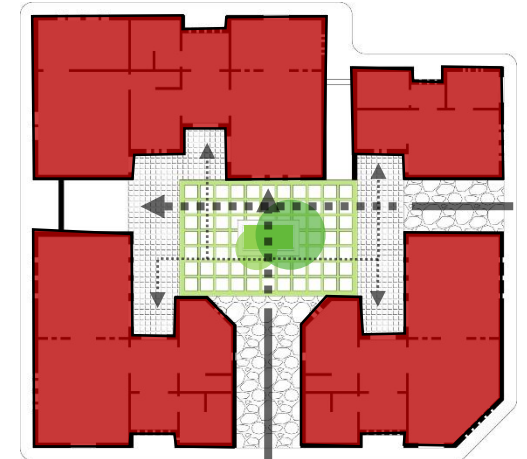
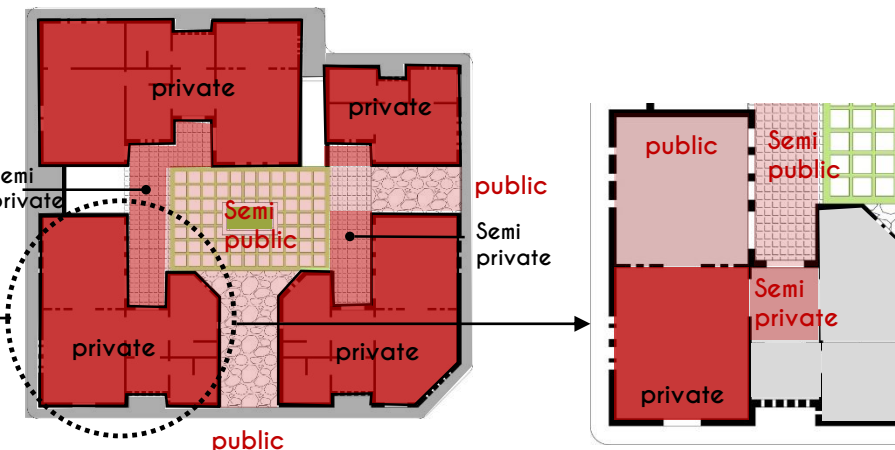


Fig 134. protected entrance (source: Author drawn)

4. ORGANIZATION



The importance of privacy in the Muslim life is seen in the clear division of the different areas of the house. only select visitors are allowed into the private domain of the house.

Fig 135. division of public and private spaces (source: Author drawn)

5. IWAN / PORCH

The Iwan is a three-sided room that opens onto the courtyard. The Iwans give onto loggias which provide shade. (Fig 138)

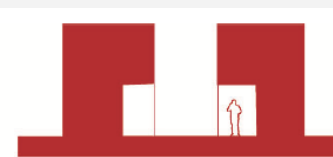
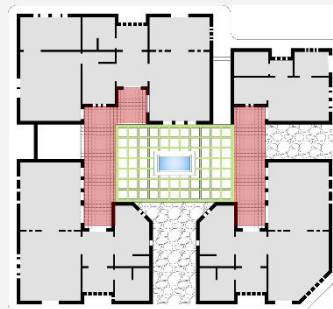
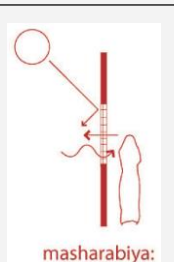


Fig 138. plan showing the porch area (source: above: author drawn, down: The Contemporary Islamic House / Hanna Ibrahim)

6. RETICULATED WALLS

These wooden screens or brick walls create private views as well as provide ventilation and prevent glare from the sun. (Fig 137)



masharabiya:

Fig 137. use of reticulated walls (source: The Contemporary Islamic House / Hanna Ibrahim)

Hospitality is strongly encouraged in Islam. A separate reception area distinct from the private family living is traditional. It has a public component for men and women to freely intermingle and a private component for the use of women. As such they are connected for women to travel freely from one to the other but separate to prevent male intrusion. (Fig 136)

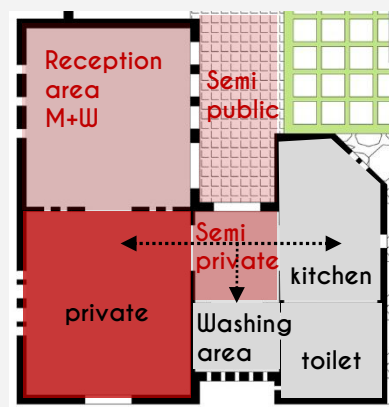
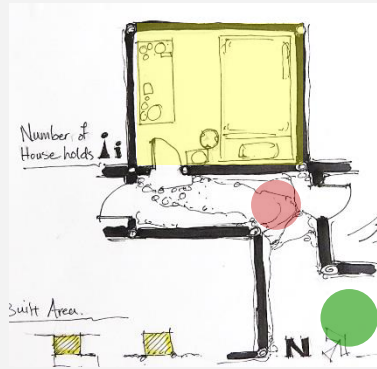
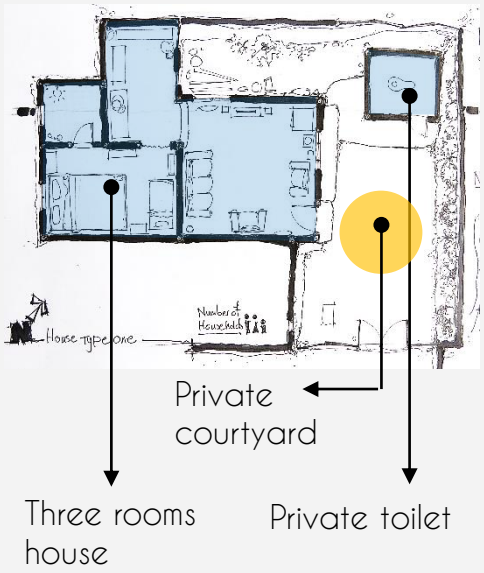
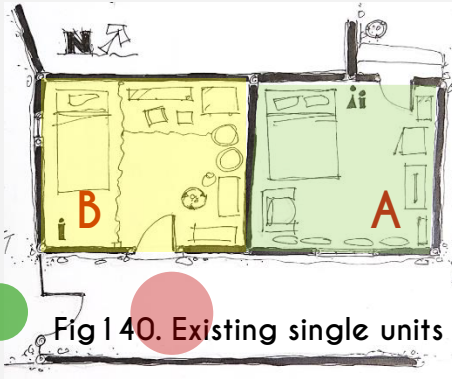


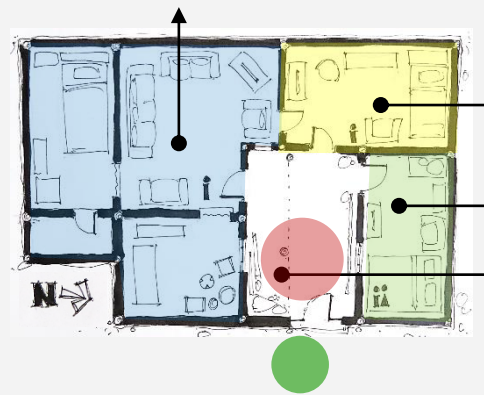
Fig 136. organization of spaces (source: Author drawn)



Existing single units



Three rooms unit



One room units

Shared courtyard

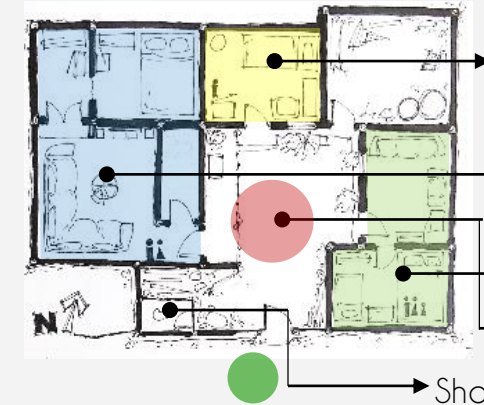
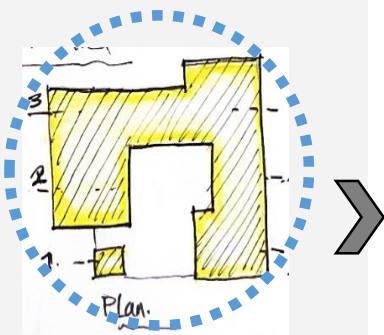


Fig 141. Existing cluster units

- Semi private area
- private area
- public area



DESIGN EVOLUTION



Fig 142. Proposed Courtyard house

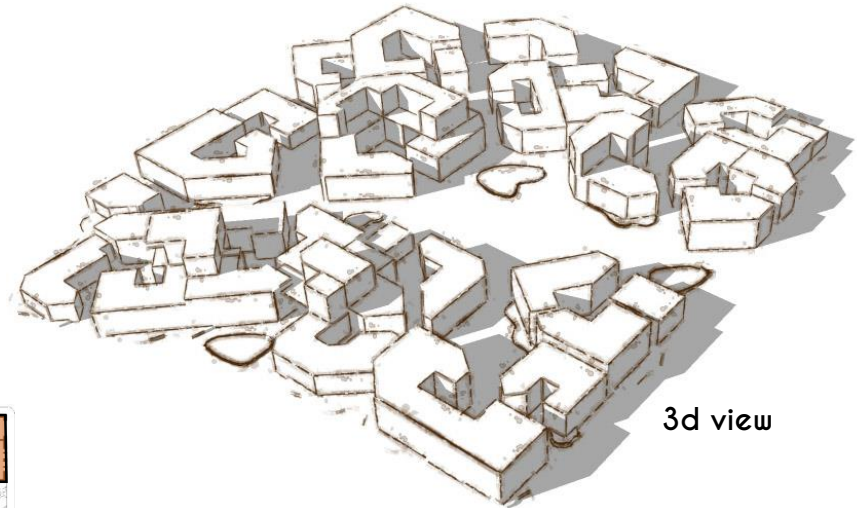


Fig 143. proposed cluster units- shared courtyard

GOALS FOR THE DESIGN DEVELOPMENT

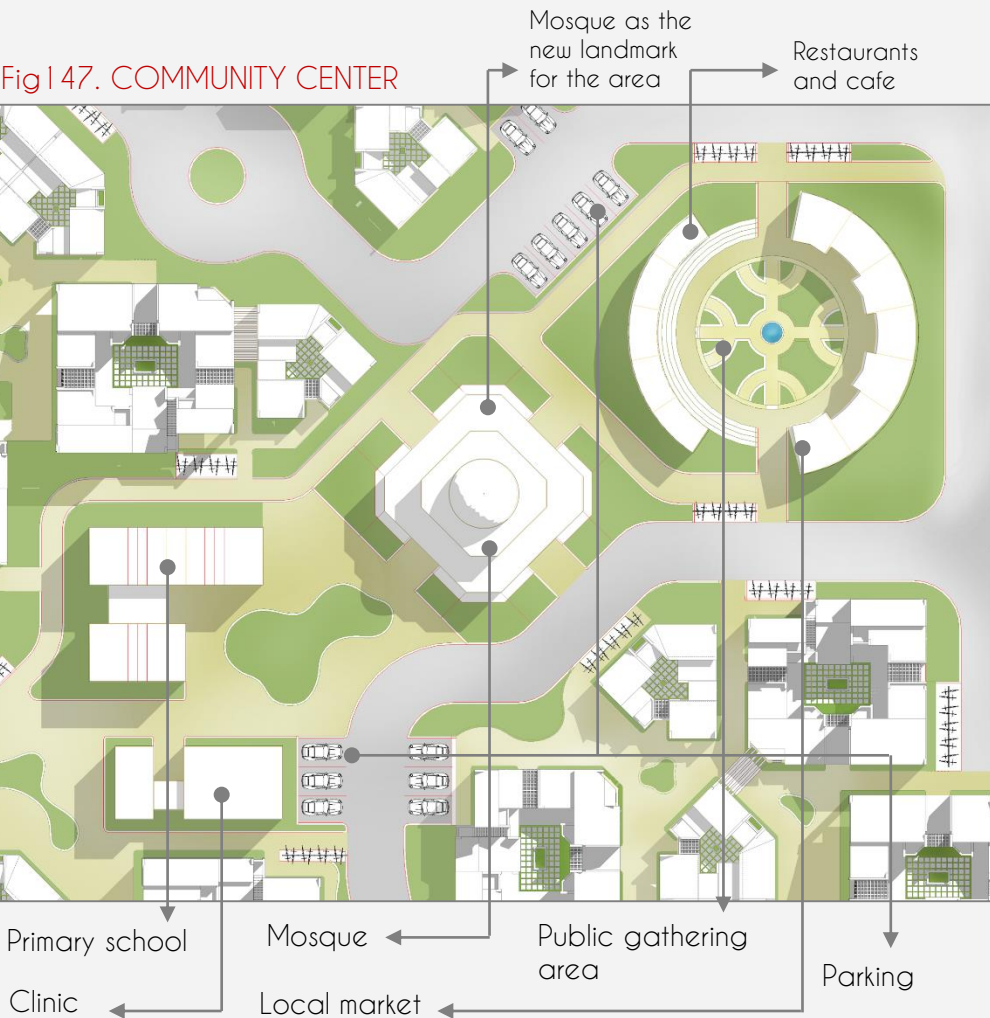
1. Lower density
2. More mixed environment
3. Better connection with the surroundings
3. Better connection between the living areas
4. Enclosed courtyards
5. Open space - for everybody's needs

EXPECTED RESULT:

Mixed neighborhood with functions spread within a walking distance. The renovation proposal for the area should fix such problems like over density and lack of public spaces, dull and monotonic architecture, lack of public services and facilities and the lack of outdoor activities.

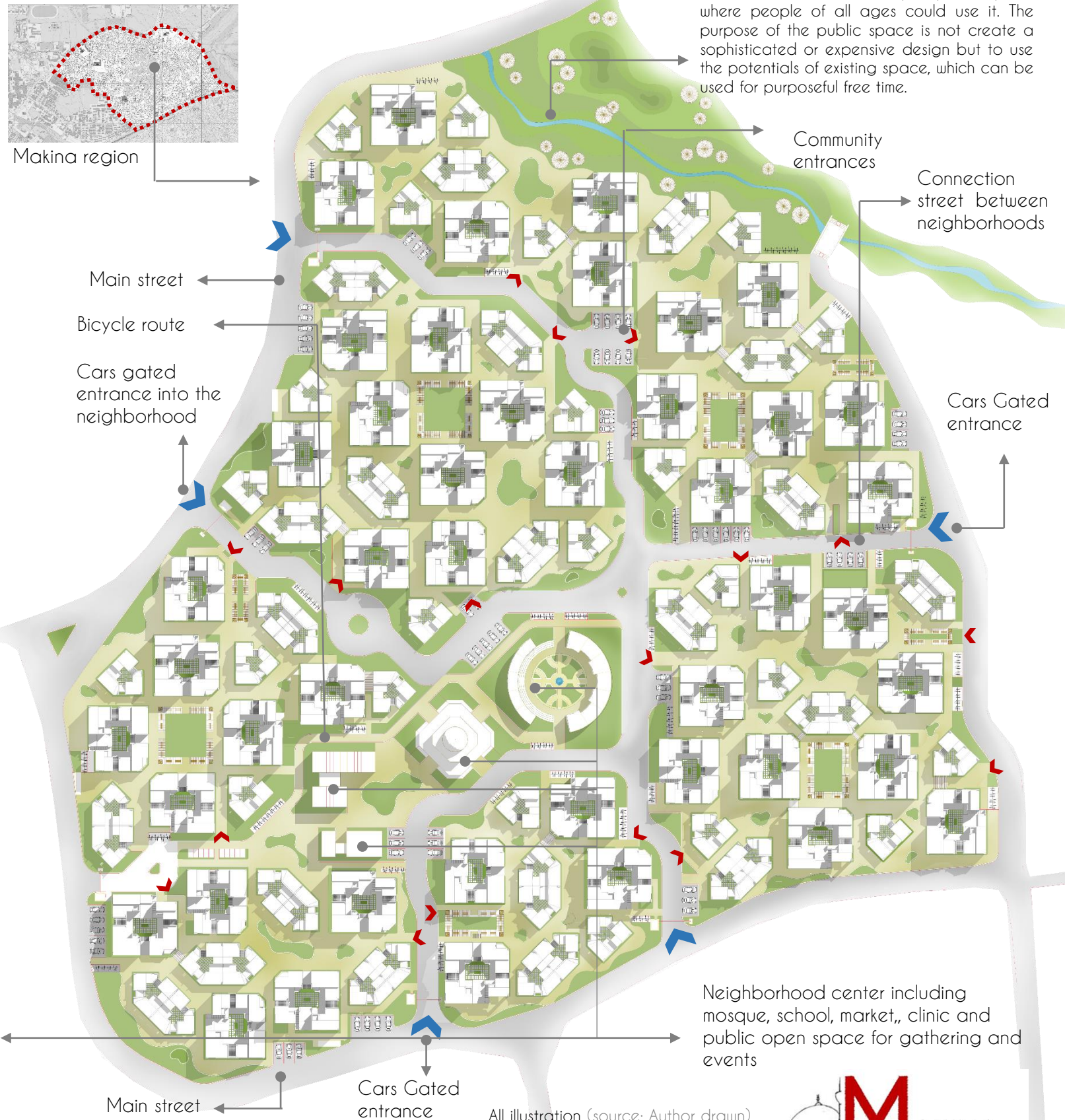
The proposed revitalization project created 450 new living spaces, Some of them are private single family houses and some are cluster courtyard units of 7 flats. Flats can be use for various purposes - for rents, as affordable accommodation for students, accommodation for young families and etc. The implementation of new housing in the area also reduces density which creates a cozy atmosphere. As mentioned in design brief, new housings will provide businesses and creates a diverse living environment. It means that unemployed inhabitants have possibilities to create working space for themselves. There is a possibility to convert these spaces into living areas as well to rent or to use them for community purposes.

Fig 147. COMMUNITY CENTER



PROPOSED DESIGN

Fig 146. ILLUSTRATED MASTER PLAN



All illustration (source: Author drawn)



Fig 1 48. PROPOSED NEIGHBORHOOD



Open spaces for children to play, families to gather and commercial aspects as well (source: Author drawn- software: Revit architecture)

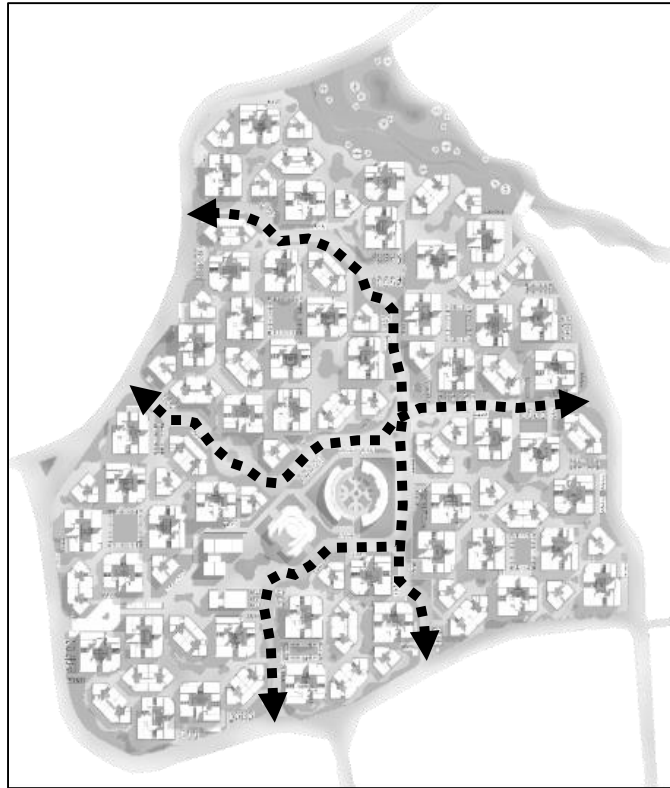


All illustration (source: Author drawn)

Left, street view of the neighborhood from the north (source: Author drawn- software: Revit architecture)



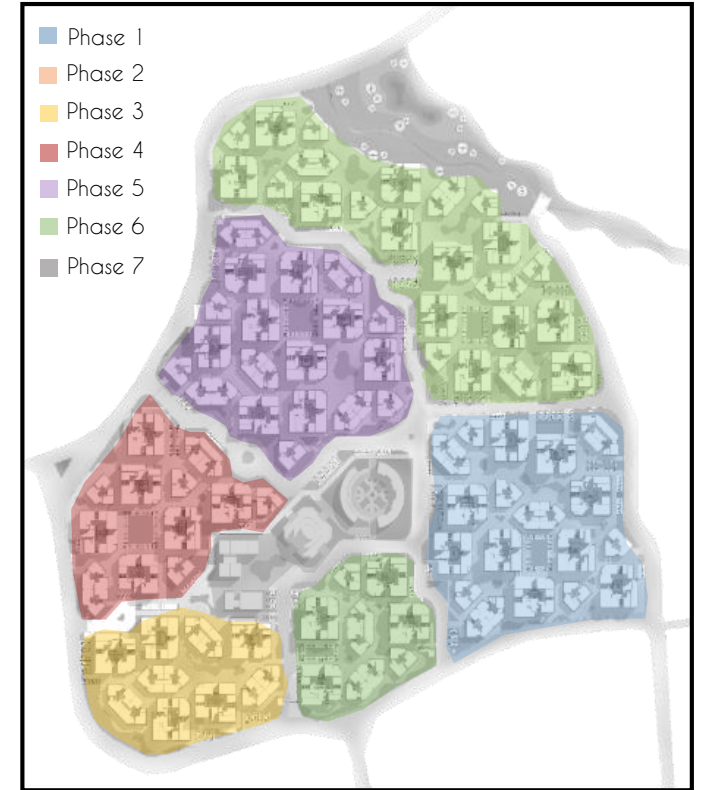
Left, street view of the neighborhood from the south (source: Author drawn- software: Revit architecture)



Regional roadways



Connections - Junctions



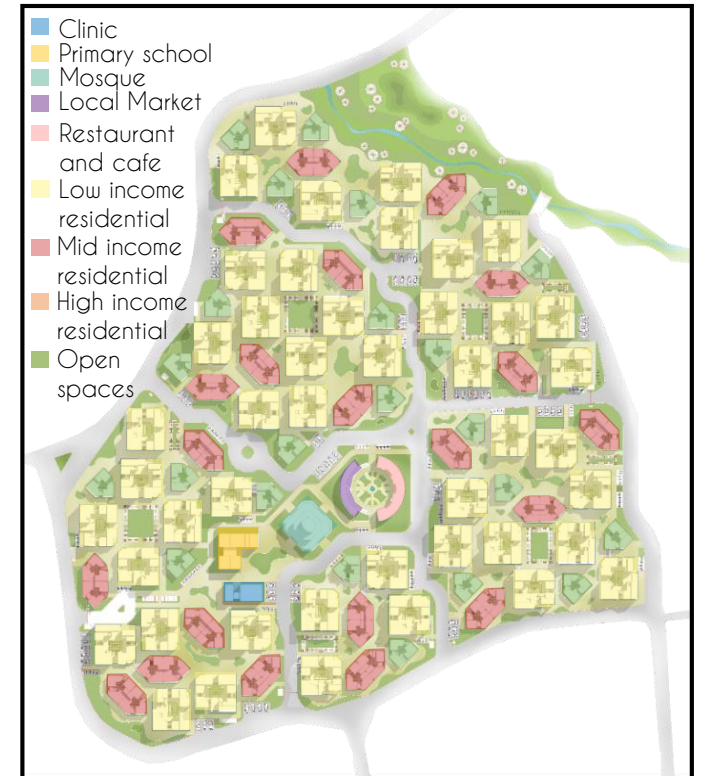
Neighborhoods - Phases



Public gathering spaces - green route - park

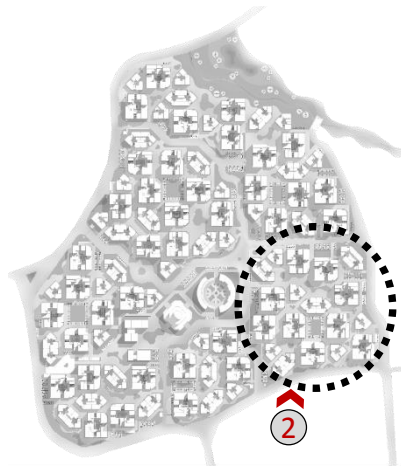


Pedestrian pathways



Zoning

All illustration (source: Author drawn)



plan showing where 3d view of the neighborhood is taken



Semi-public yards

Most of the housing blocks in the proposal have a semi-public yard which is intended for people living in connection to the yard but it is also open for other people in the neighborhood. A semi-public yard has many advantages as it increases the ability for the residents to naturally supervise the area. The yard is also an area for the residents to take common responsibility for, which creates fellowship between the residents and occasions for people in the neighborhood to meet. In the proposal, eleven semi-public and public yards are to be found.



Since the proposal contains several semi public yards, there are a lot of natural areas for children to play in. The social control makes it easy to let children play safe and therefore it is not necessary to build special playgrounds in these yards.

Plan showing location of public and semi-public yards

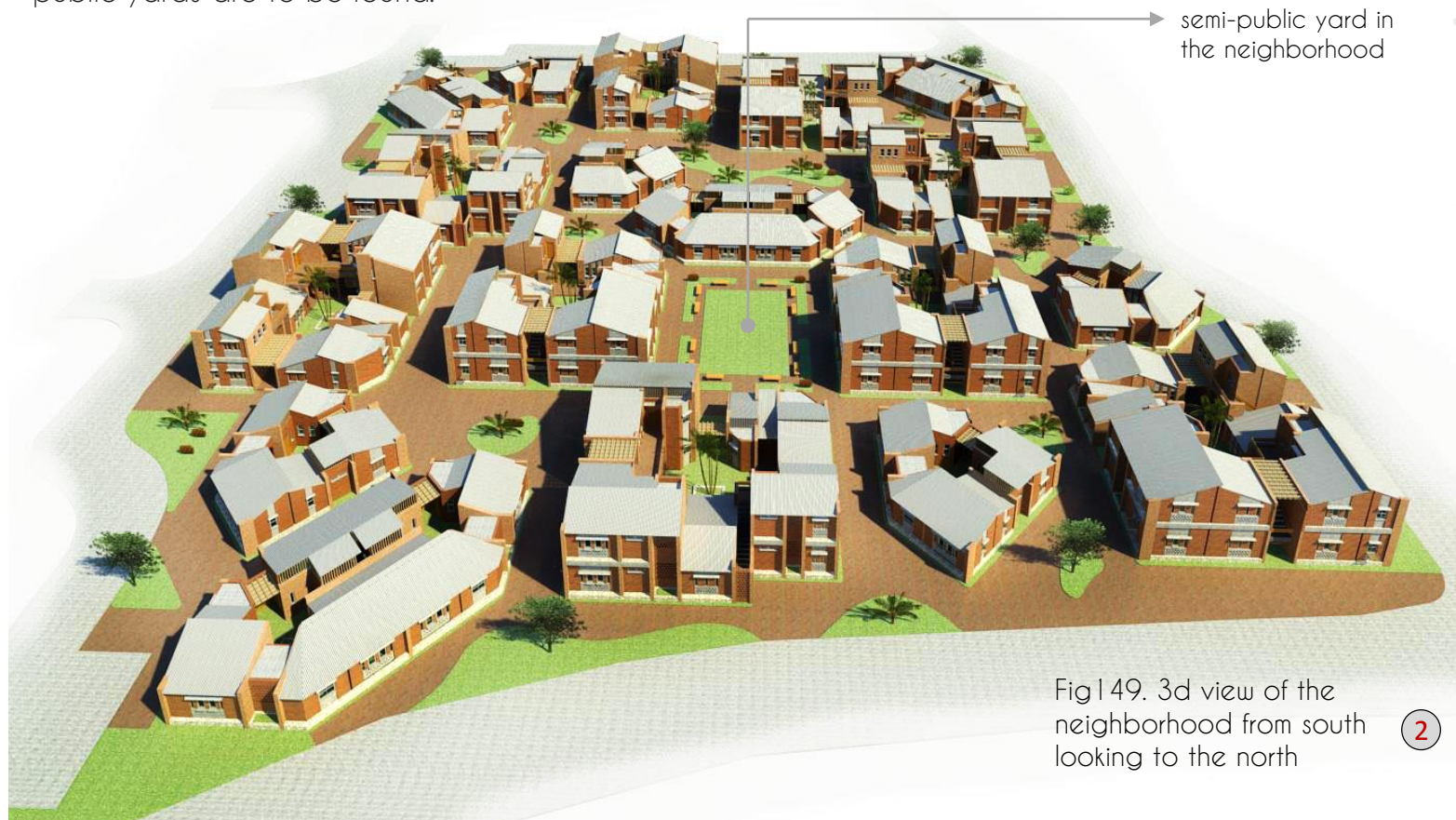
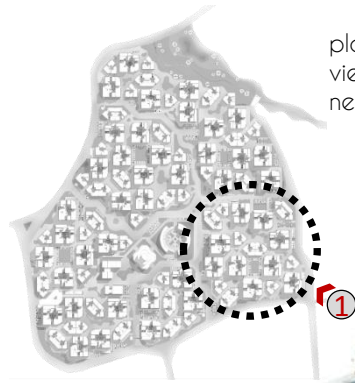


Fig 149. 3d view of the neighborhood from south looking to the north



All illustration (source: Author drawn)



plan showing where 3d view of the neighborhood is taken



Fig 150. 3d view of the neighborhood from south east looking to the north west



Sections and views key plan



Interior section of the site from east to the west looking north

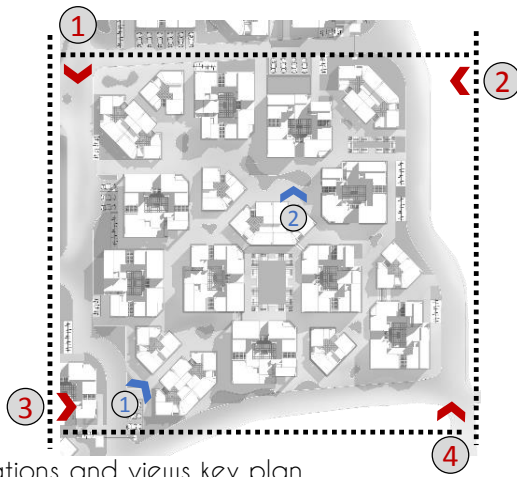
1



Interior section of the site from north to south looking east

2

All illustration (source: Author drawn)



Elevations and views key plan



North elevation of the neighborhood

1



East elevation of the neighborhood

2



West elevation of the neighborhood

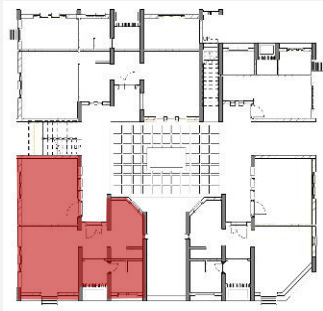
3



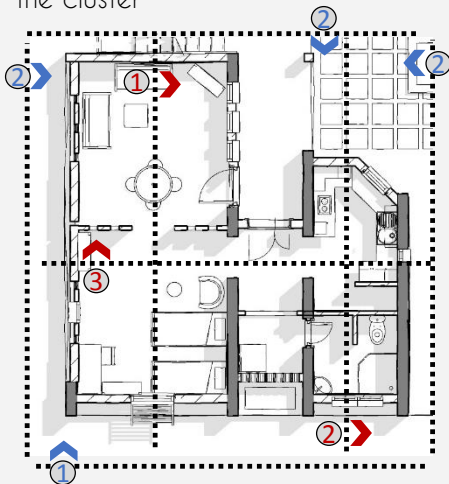
Sought elevation of the neighborhood

4

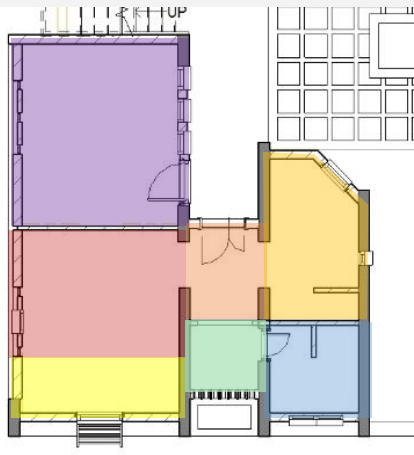
All illustration (source: Author drawn)



plan showing location of type 1 in the cluster

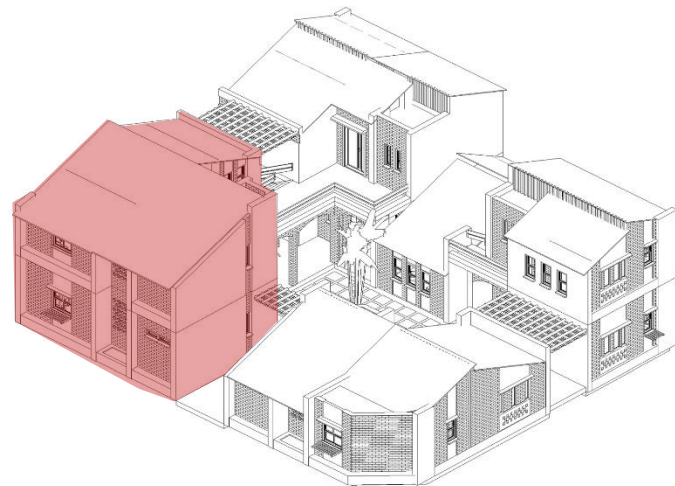


Sections and Elevations key plan



The functions

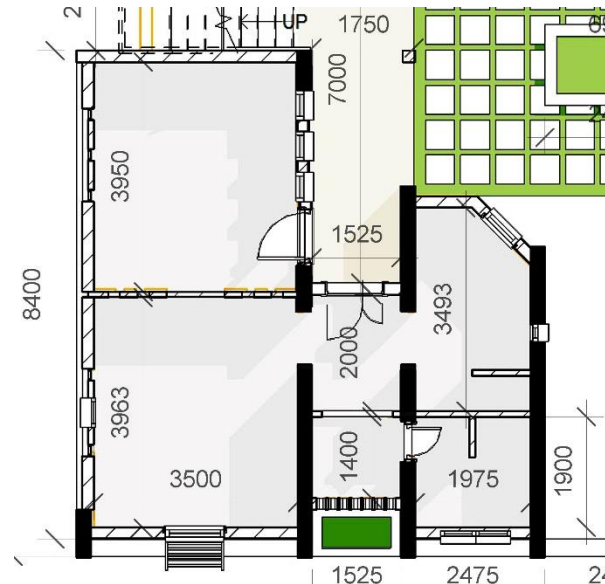
- Buffer
- Reception area,
- Private
- Cooking area
- toilet
- Washing area
- Working area



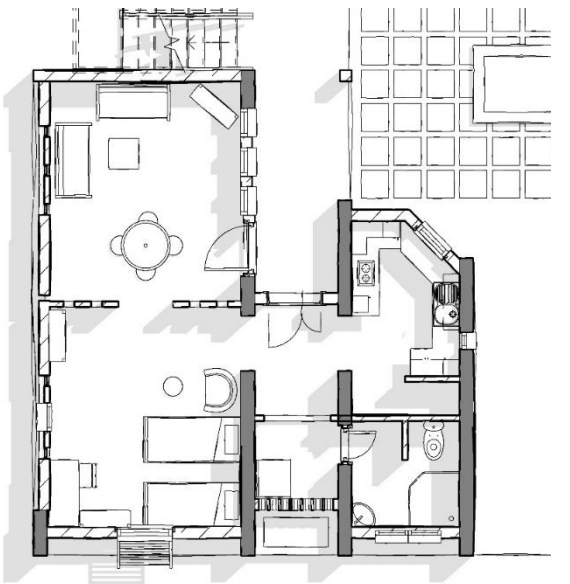
view showing location of type 1 in the cluster



The modules volume

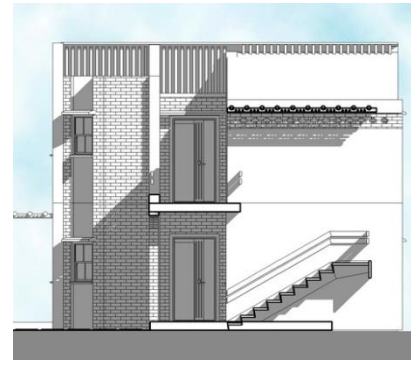


Ground floor plan - Dimension

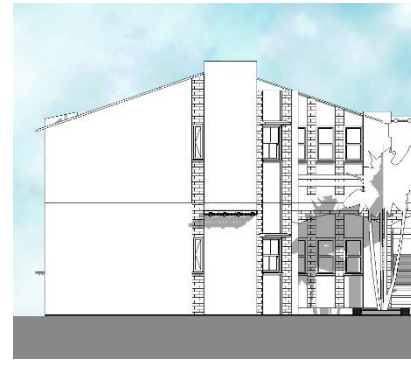


Ground floor plan - Furniture

Both ground and first floor are as the same type



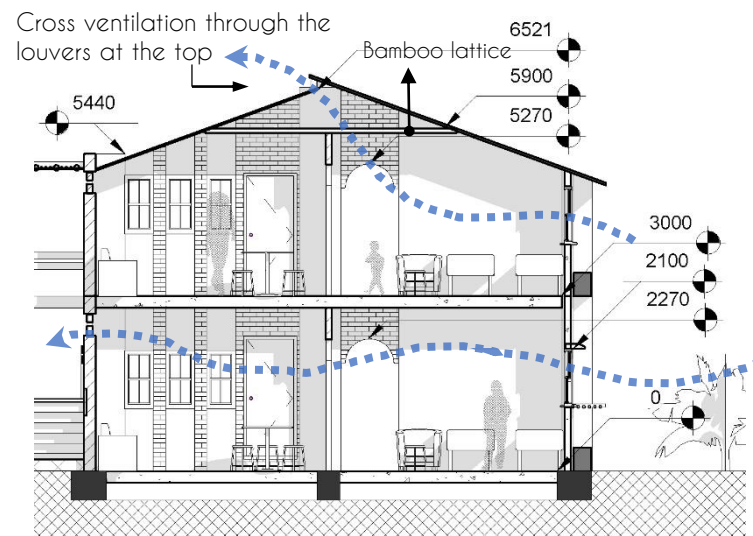
North Elevation - 1



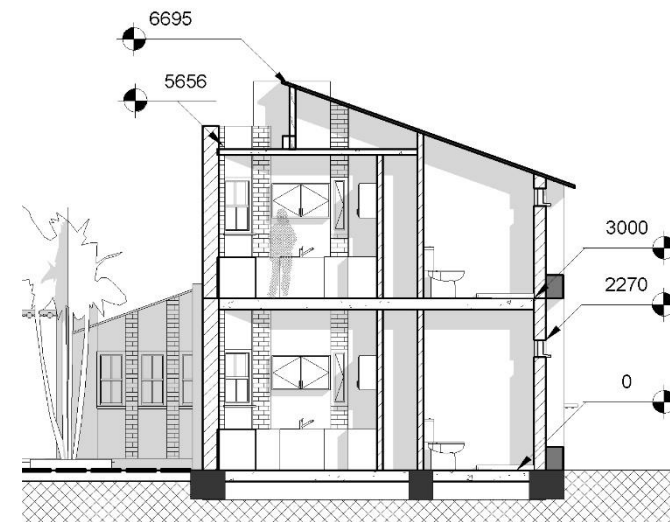
South Elevation - 1



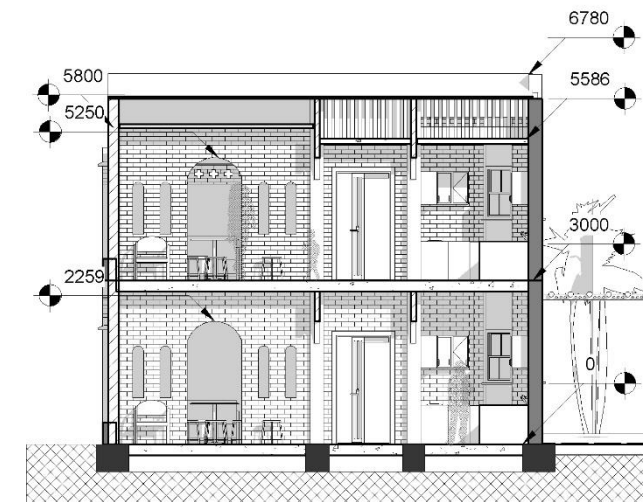
West Elevation - 2



Section 1

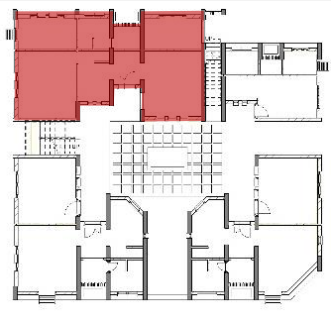


Section 2

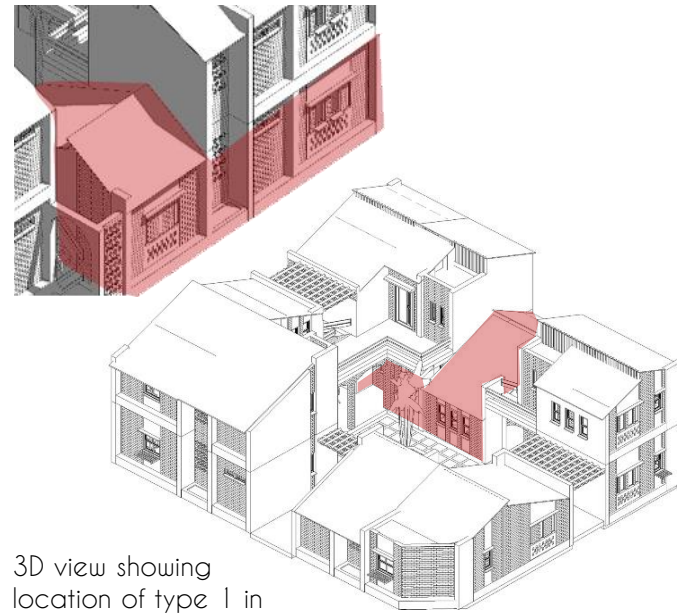


Section 3

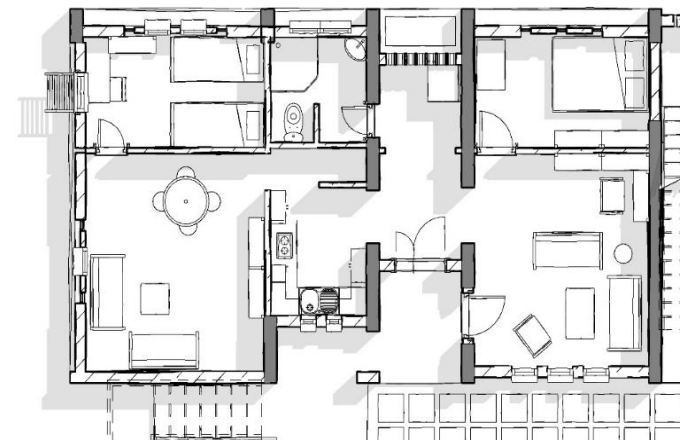
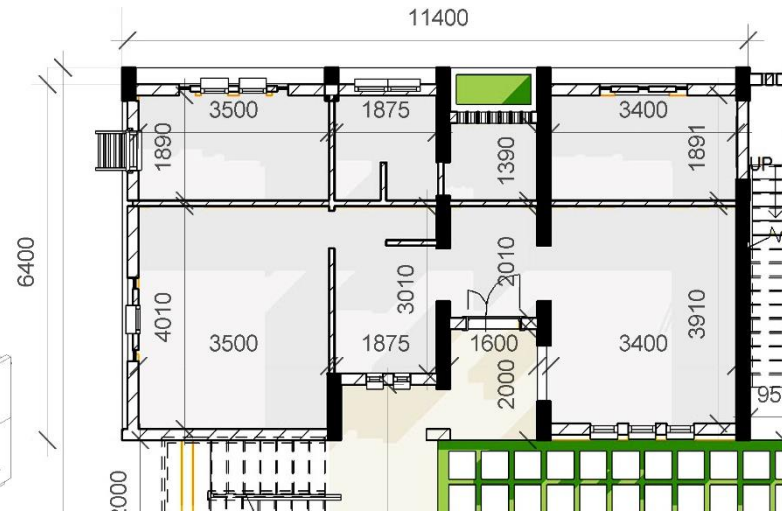
All illustration (source: Author drawn, Software: Revit architecture)



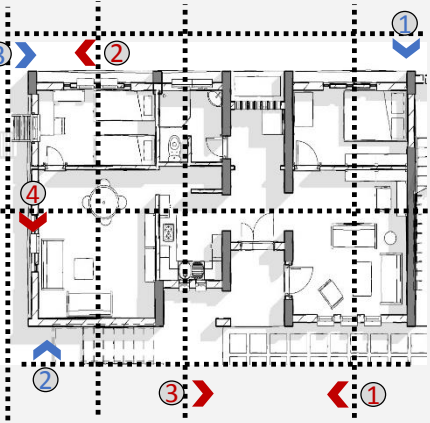
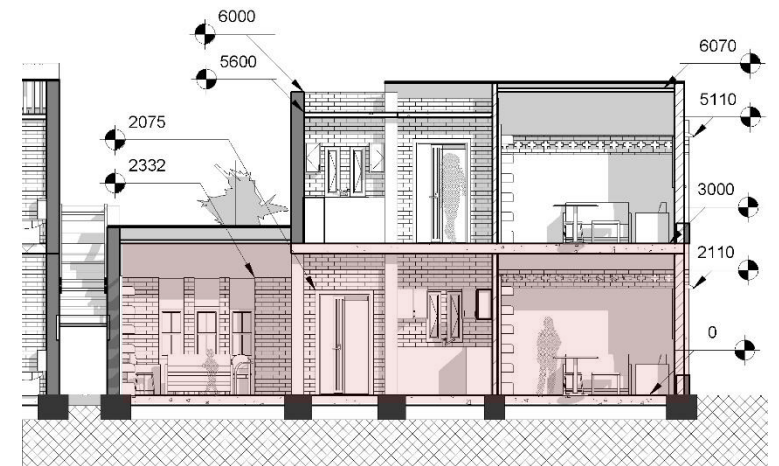
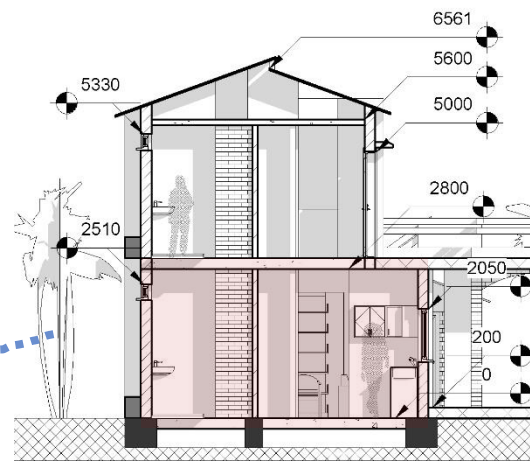
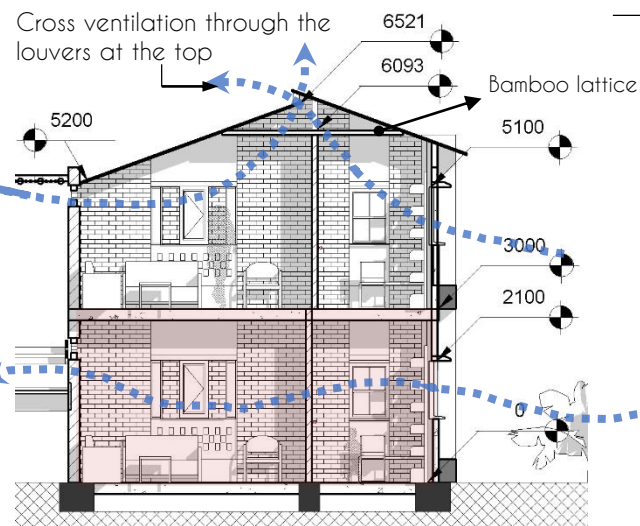
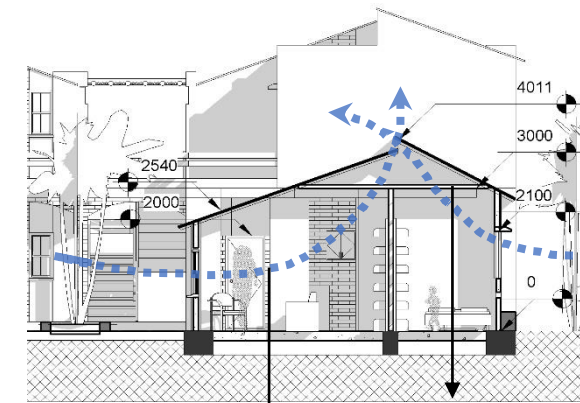
plan showing location of type 1 in the cluster



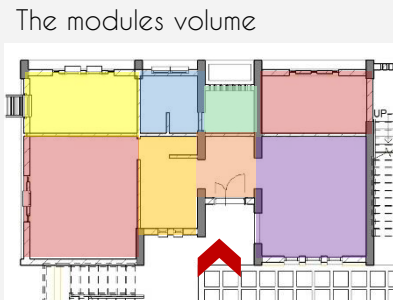
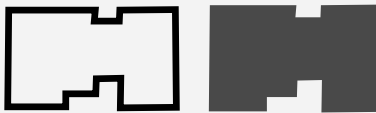
3D view showing location of type 1 in the cluster



Ground floor elevations are the type 2



Sections and Elevations key plan



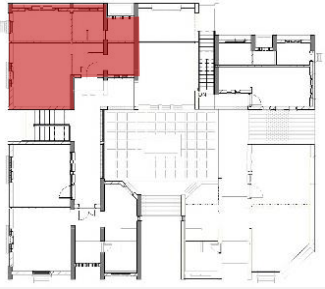
The functions

Section 2

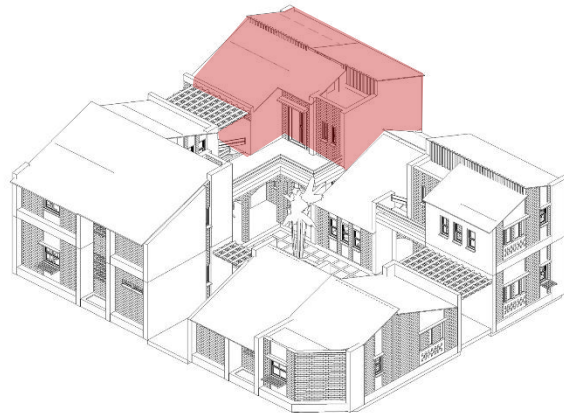
Section 3

Section 4

All illustration (source: Author drawn, Software: Revit architecture)



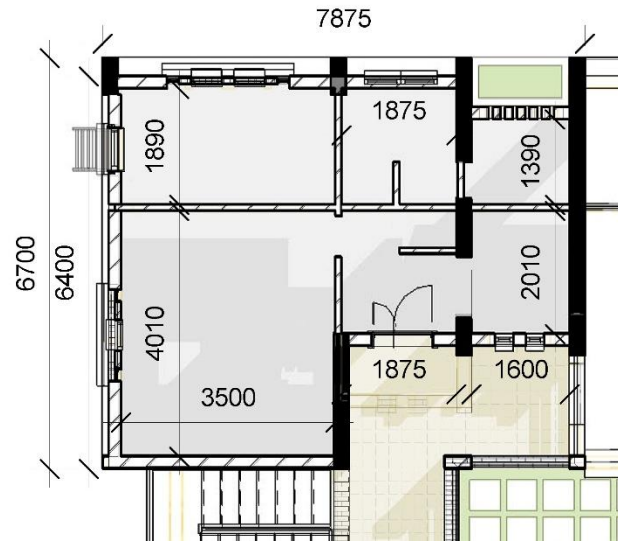
plan showing location of type 1 in the cluster



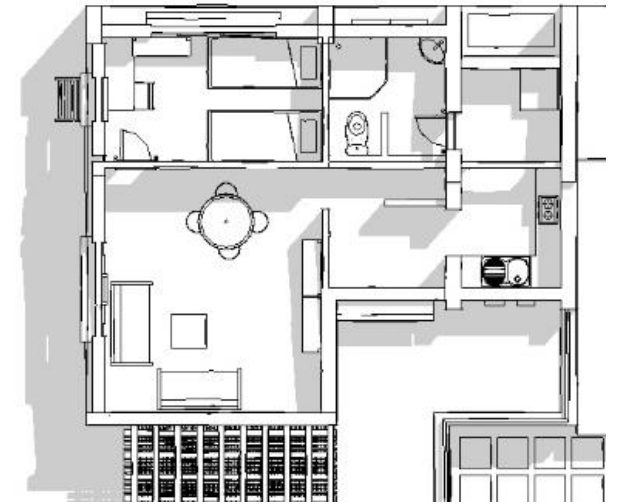
3D view showing location of type 1 in the cluster



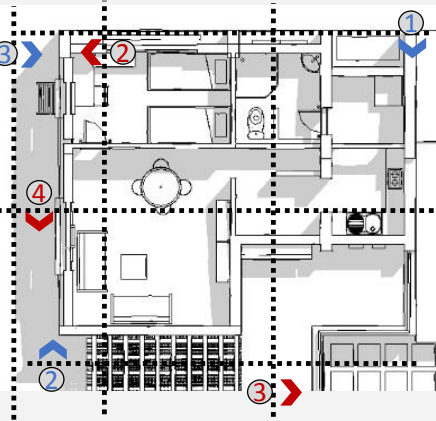
The modules volume



First floor plan - Dimension



First floor plan - Furniture



Sections and Elevations key plan

3D view showing type 3 on first floor



First floor elevations are the type 3



North Elevation - 1



South Elevation - 1

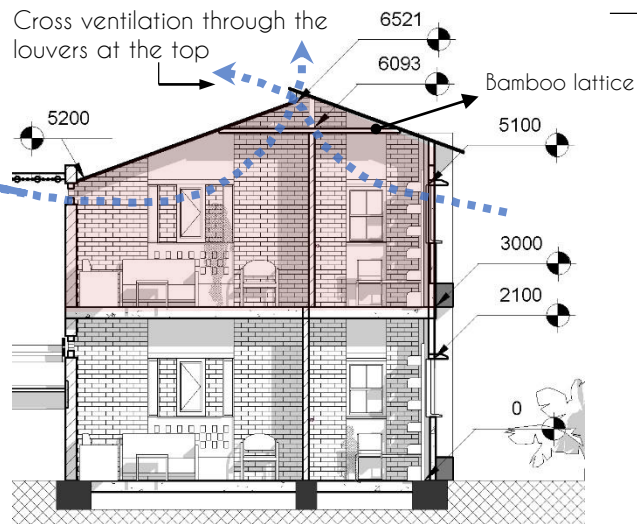


west Elevation - 2

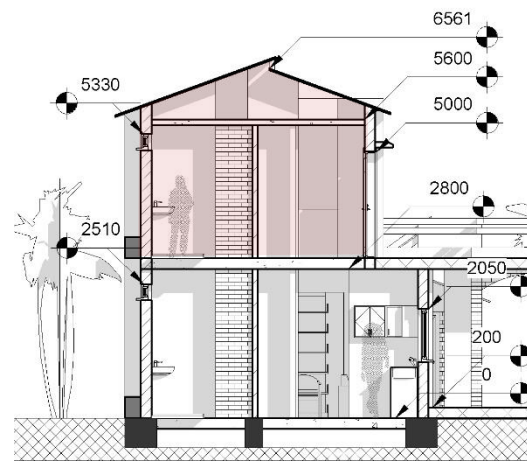


The functions

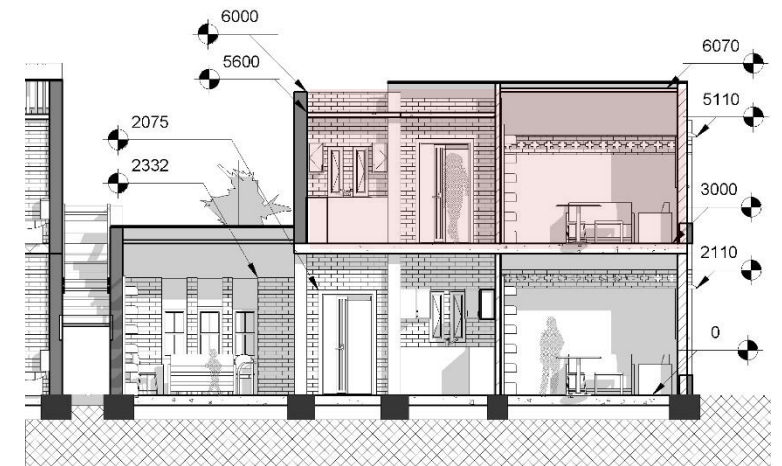
- Buffer
- Reception area,
- Private
- Cooking area
- toilet
- Washing area
- Working area



Section 2

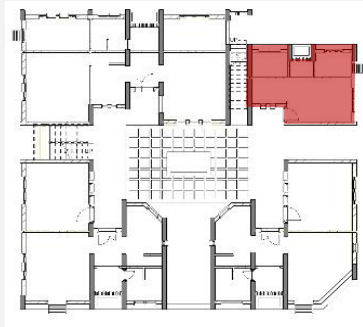


Section 3

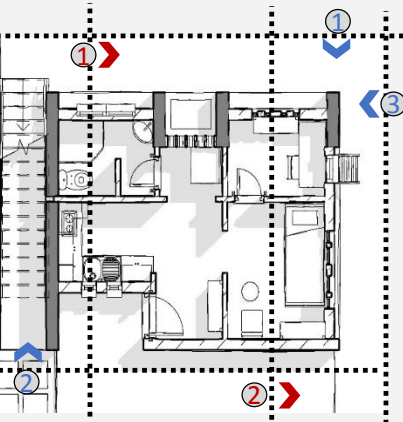


Section 4

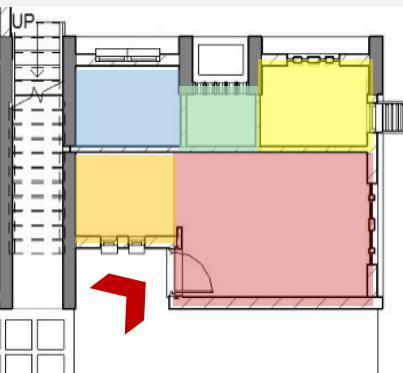
All illustration (source: Author drawn, Software: Revit architecture)



plan showing location of type 1 in the cluster

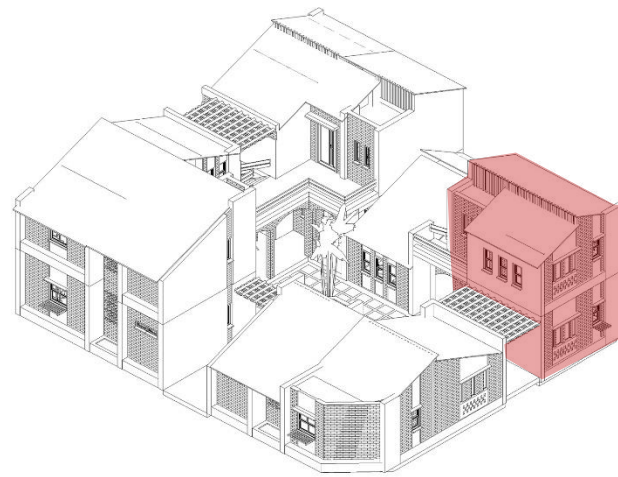


Sections and Elevations key plan

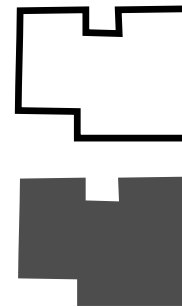


The functions

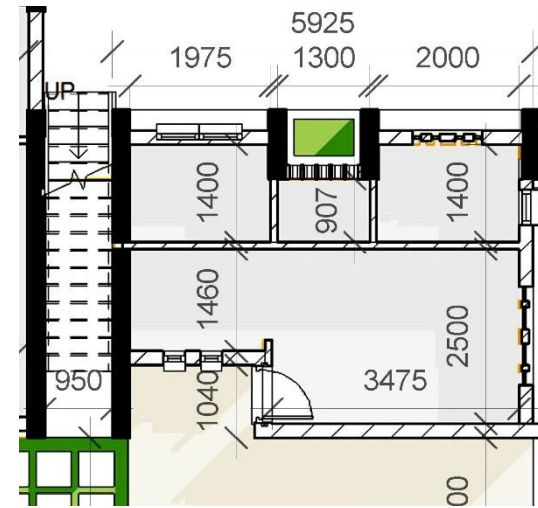
- Buffer
- Reception area,
- Private
- Cooking area
- toilet
- Washing area
- Working area



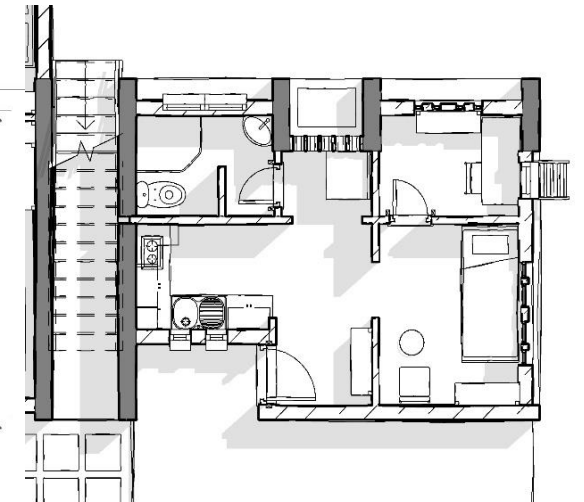
3D view showing location of type 1 in the cluster



The modules volume



Ground floor plan - Dimension

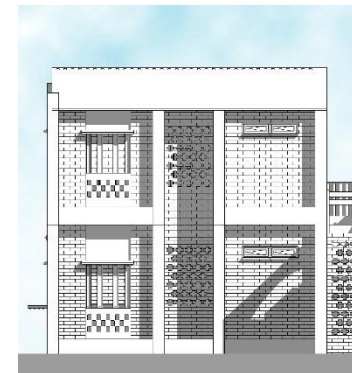


Ground floor plan - Furniture

Rendered Elevations



Both ground and first floor are as the same type



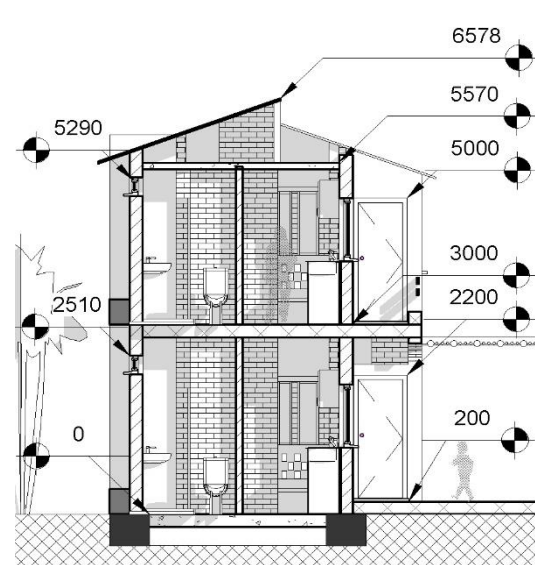
North Elevation - 1



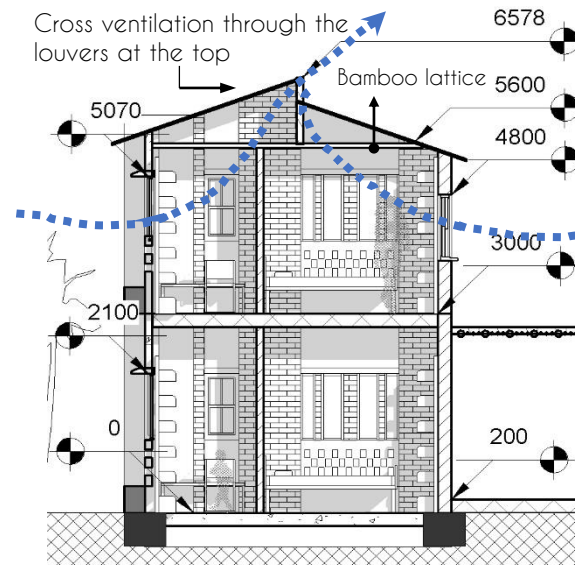
South Elevation - 1



East Elevation - 2



Section 1



Section 2

3D view showing type 4 on both ground and first floor



All illustration (source: Author drawn, Software: Revit architecture)

3D views of the courtyard house

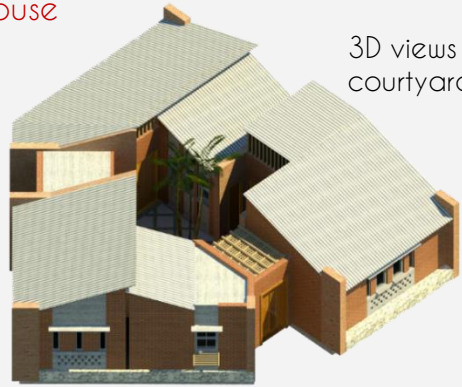
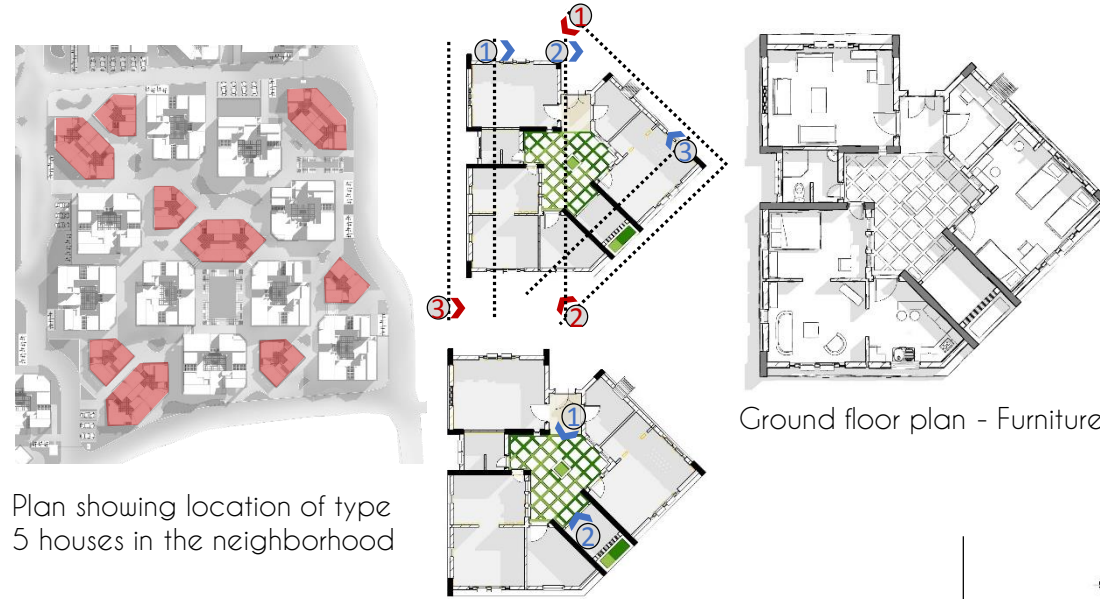


Fig 151. PROPOSED COURTYARD HOUSE



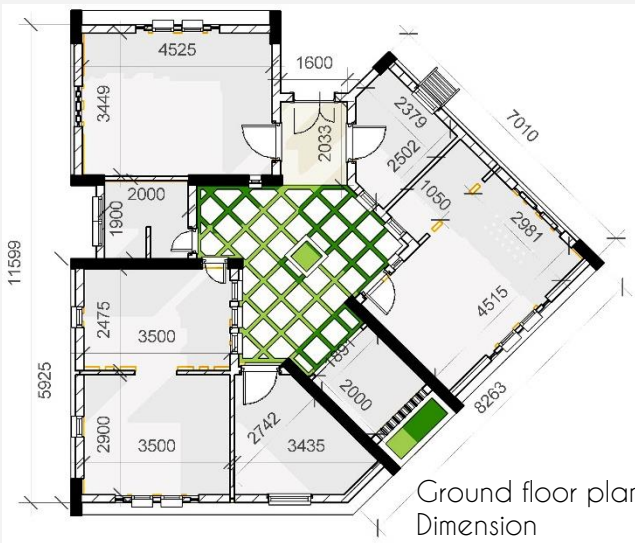
Plan showing location of type 5 houses in the neighborhood

Ground floor plan - Furniture

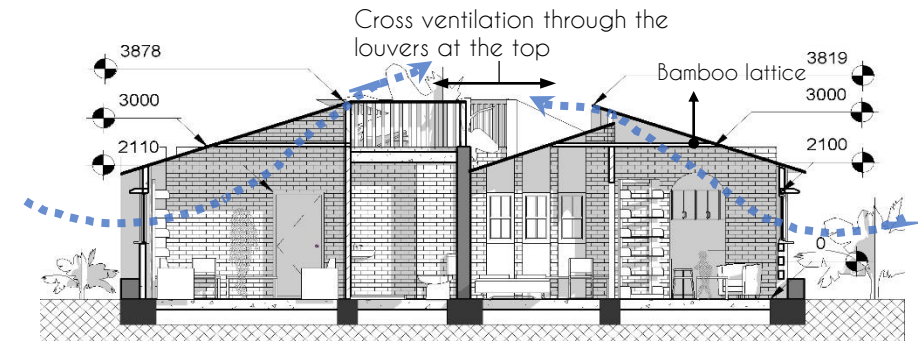


View-1

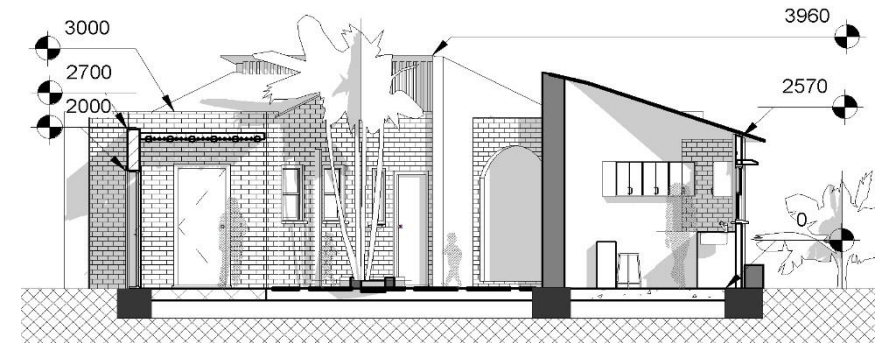
View-2



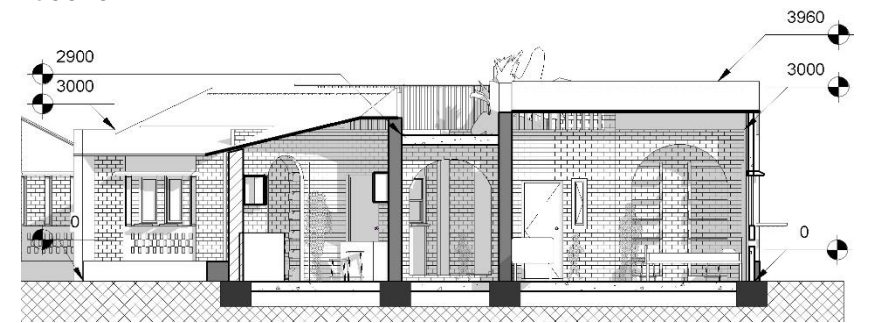
Ground floor plan Dimension



Section-1



Section-2



Section-3
Section-3



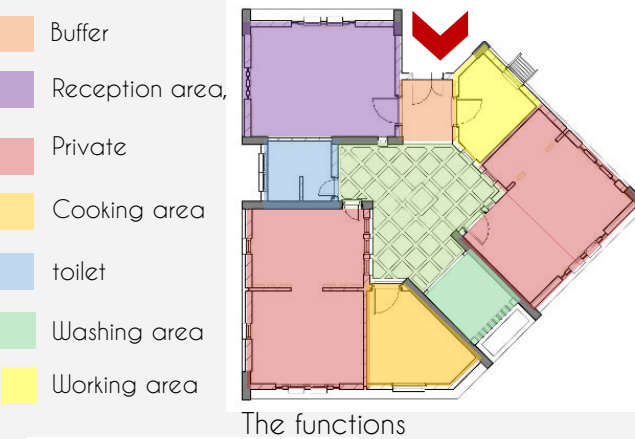
North-east Elevation - 1



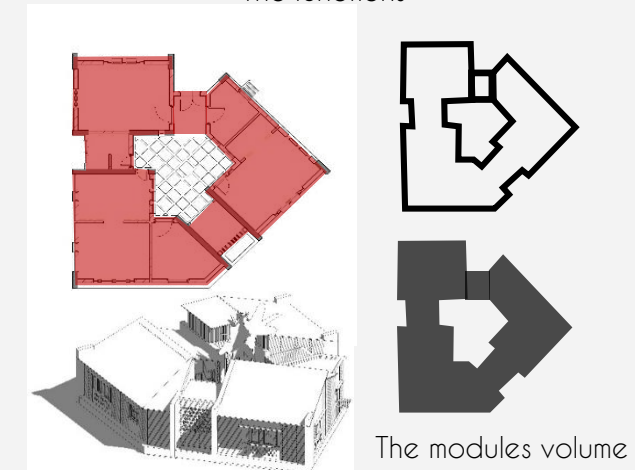
South-east Elevation - 2



West Elevation - 3

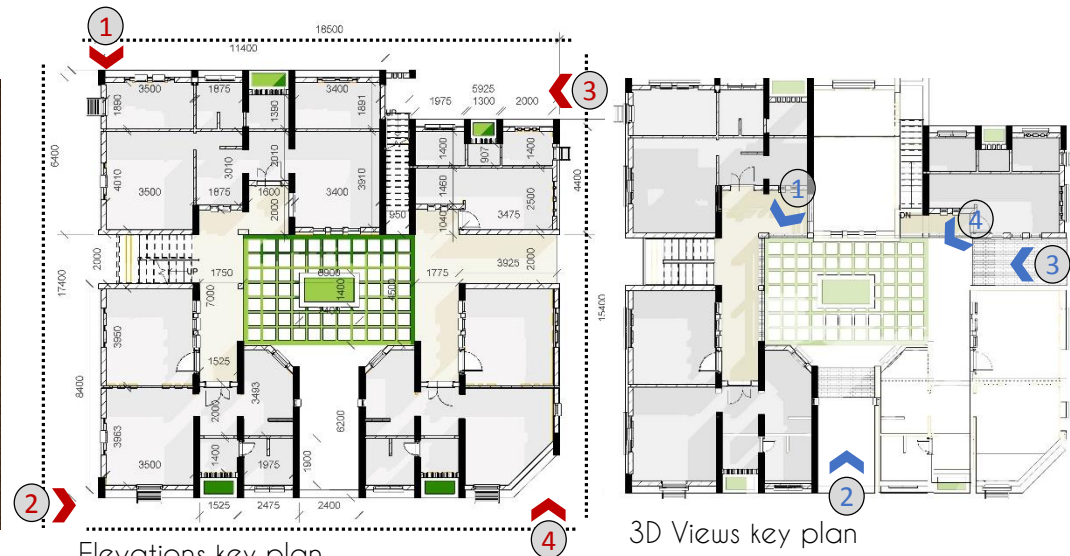
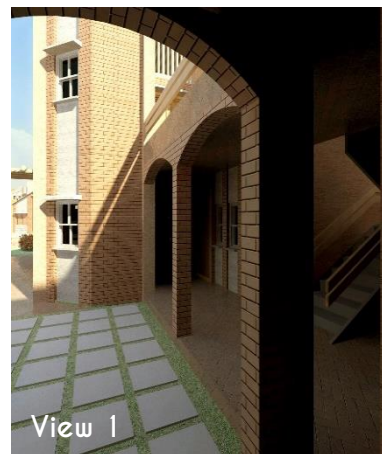


The functions



The modules volume

Fig 152. PROPOSED CLUSTER UNITS



Plan showing location of cluster units in the neighborhood

Elevations key plan

3D Views key plan



3D views of cluster units



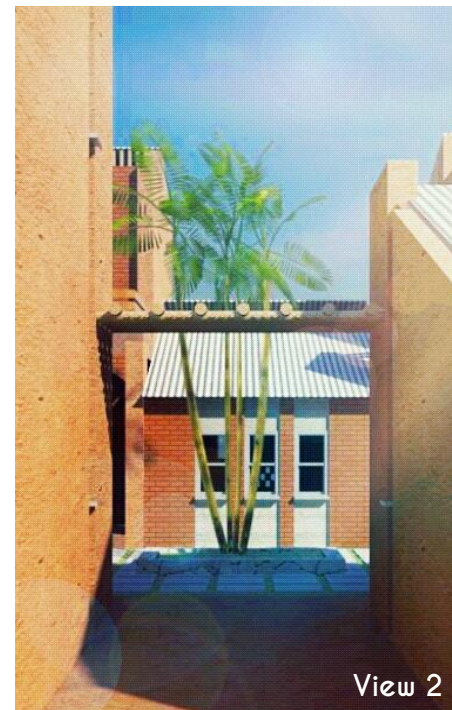
North elevation - 1



West elevation - 2



East elevation - 3



View 2



View 3



South elevation - 4



View 4

All illustration (source: Author drawn, Software: Revit architecture)

Reyhaneh Sh. Shakib - reg. no. B52/69992/2013 - University of Nairobi

The critics

TYPE 1

The relations

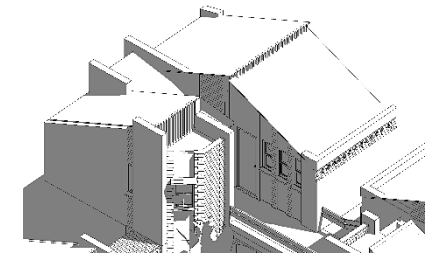
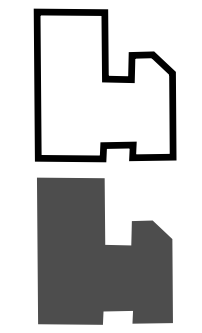
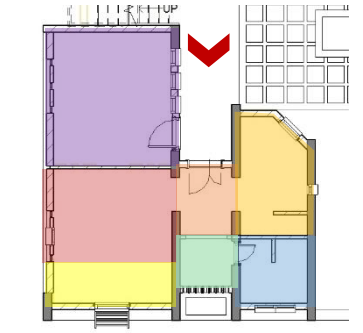
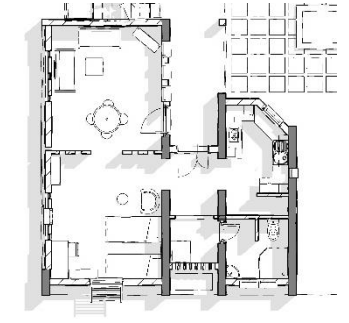
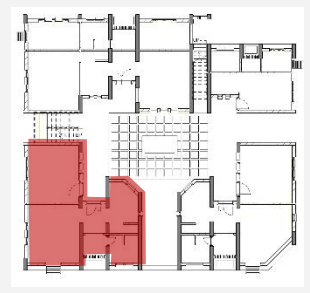
The types furniture plan

The functions

The modules

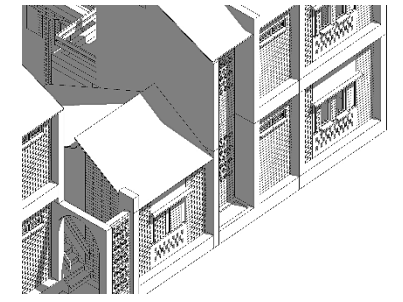
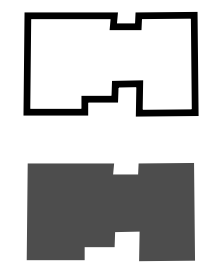
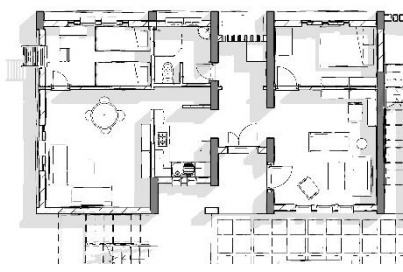
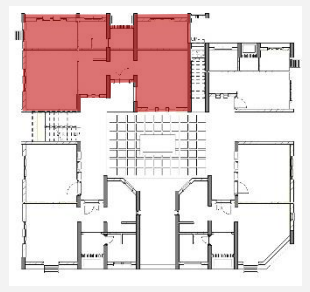
3d views

Area : 50 m2
Two rooms, kitchen, toilet, storage and washing area, with the possibility to have working area for commercial aspects
Up to 4-5 person



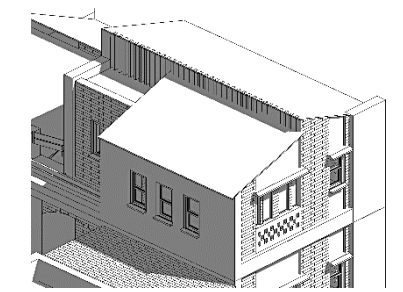
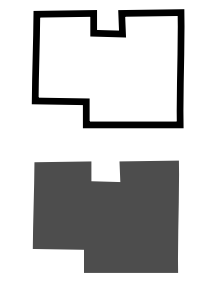
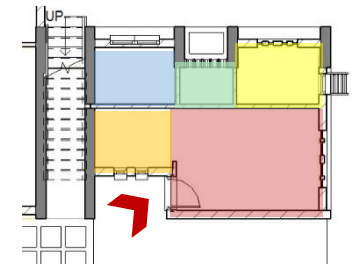
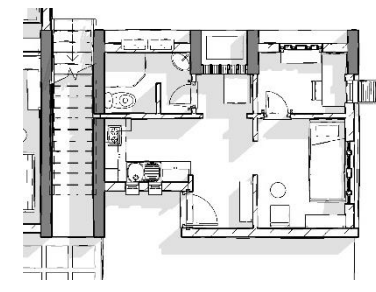
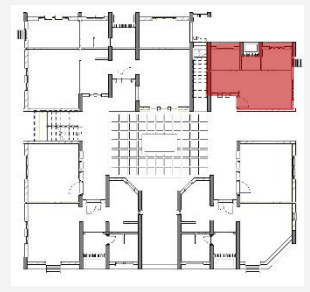
Area : 67 m2
Four rooms, kitchen, toilet, storage and washing area with the possibility to have working area for commercial aspects
up to 6-7 person

TYPE 2



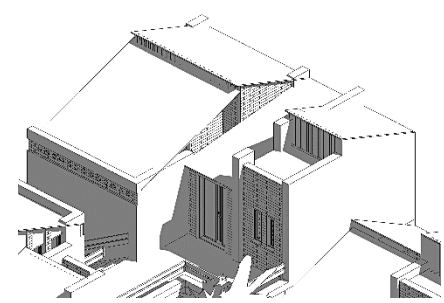
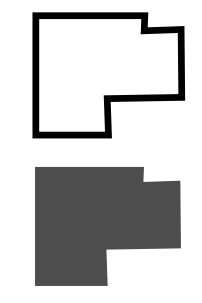
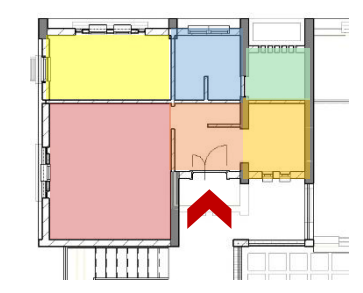
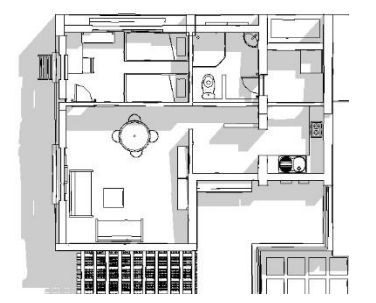
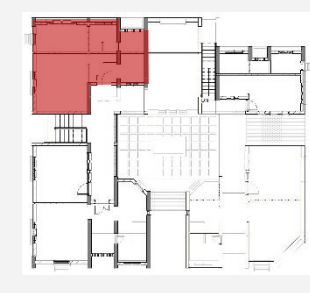
Area : 25 m2
One room, kitchen, toilet, storage and washing area with the possibility to have working area for commercial aspects
Up to 3 person

TYPE 3



Area : 43 m2
two rooms, kitchen, toilet, storage and washing area
Second floor
Up to 4-5 person

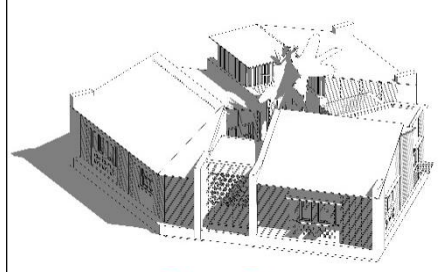
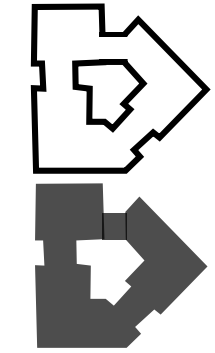
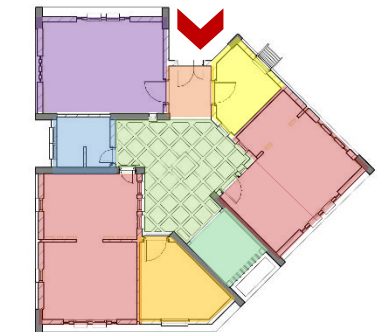
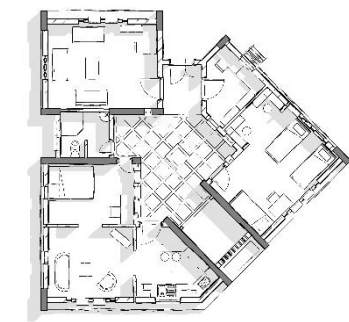
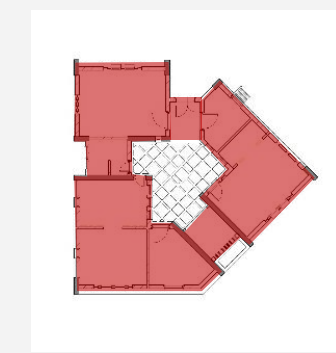
TYPE 4



TYPE 5

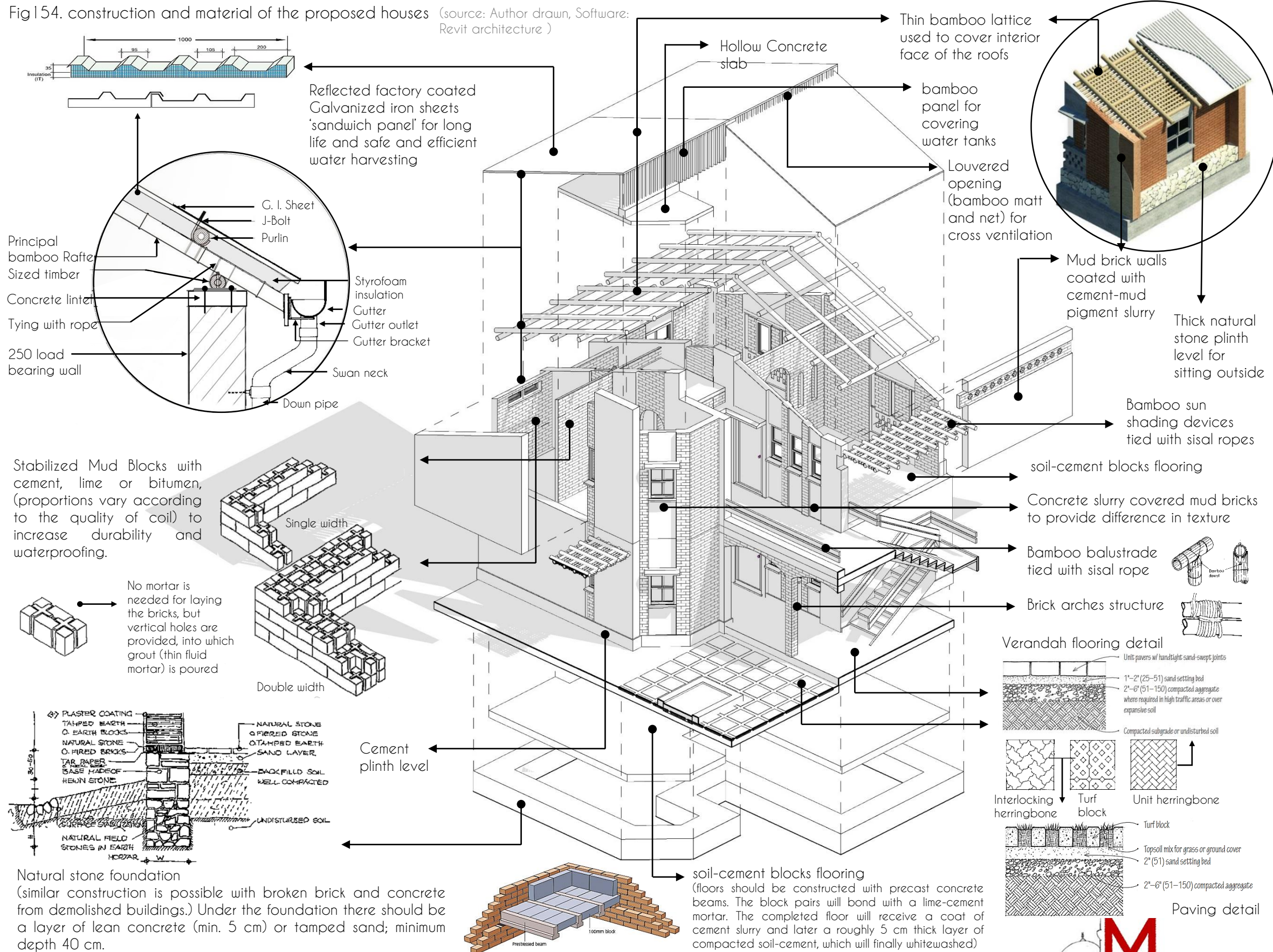
Area with courtyard: 100 m2
four rooms, kitchen, toilet, storage and washing area, with the possibility to have working area for commercial aspects, up to 10 person

- Buffer
- Reception area,
- Private
- Cooking area
- toilet
- Washing area
- Working area



All illustration (source: Author drawn, Software: Revit architecture)

Fig 154. construction and material of the proposed houses (source: Author drawn, Software: Revit architecture)



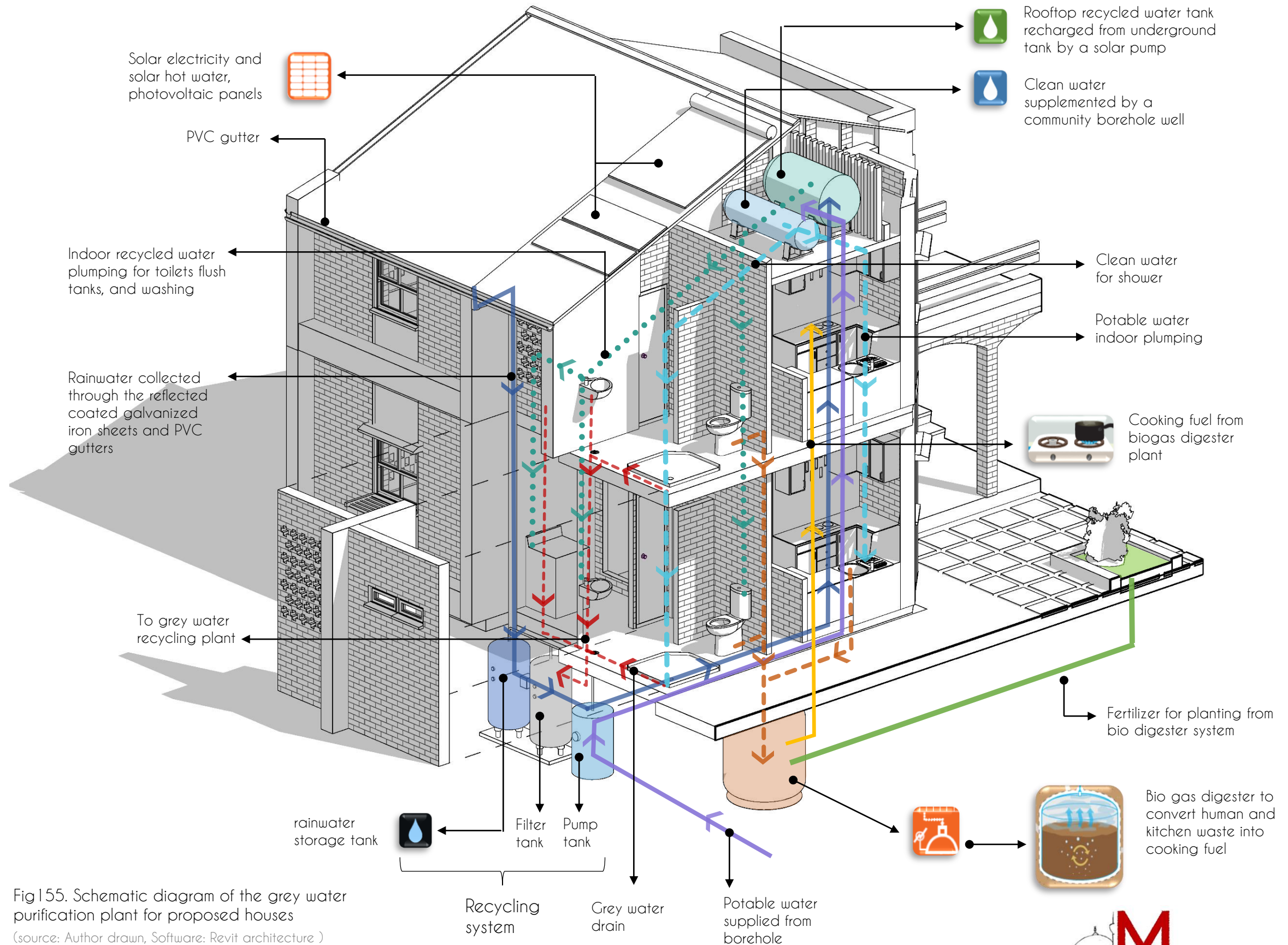


Fig 155. Schematic diagram of the grey water purification plant for proposed houses
(source: Author drawn, Software: Revit architecture)



DESIGN ACHIEVEMENTS

- Privacy
- Safe and security
- Cheap and durable
- Environmental friendly
- Locally available cheap renewable materials
- Socially supportive
- More open spaces for air to flow and children to play
- Units is modular thus repetition is easy
- Maximum utilization of man power
- Cluster development according to local life style
- Separation between public and private areas
- Built in furniture
- solar power electricity
- Courtyard system for cross ventilation
- Water storage tank to harvest rain water
- Using biogas system

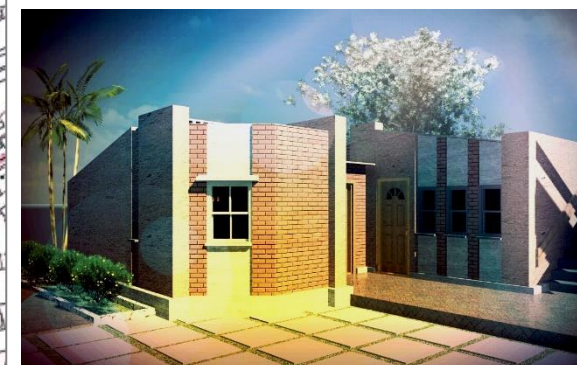


Fig 156. THE PLAN ABOVE SHOWING THE PROPOSED SITE PLAN IN MAKINA REGION

The research for this thesis has been focused on one main question “how can Makina transform from a slum to an open City and how can we propose an upgrading process that is culturally adapted?”

To be able to find answers to this questions I chose the interdisciplinary research of the place, culture of living in Makina and the needs and aspirations of its inhabitants.

It is clearly apparent that a good home should be given high priority. It is of decisive importance, when a housing construction project is about to be set in motion, that the new dwellings be adapted to the real needs of the people involved and to the available resources. The demands and expectations placed on a dwelling differ from region to region, depending upon tradition and individual means of support. While available resources in the form of local building materials must, for natural reasons, vary, there is always the resource of the local population’s own labor input.

In order to create regionally adapted dwellings, it is necessary first to carry out an inventory of local conditions and secondly to develop dwelling types. The cost for such work is motivated by the improved results which can be achieved. Similar development costs have also gone into the standardized house types which are employed today but which are not regionally adapted.

In this project the effort was to accommodate residents of Makina in an affordable and sustainable housing which at the end do not cost much for them to rent. A housing project with use of natural energies, sustainable local materials and technology to finally achieve a healthy environment with a low cost way of living.

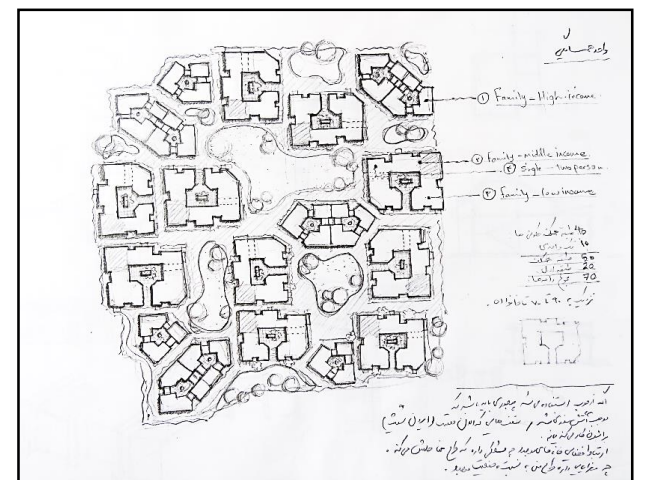
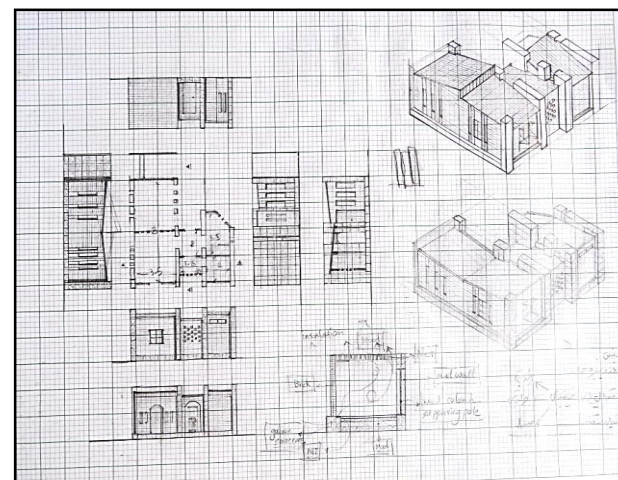
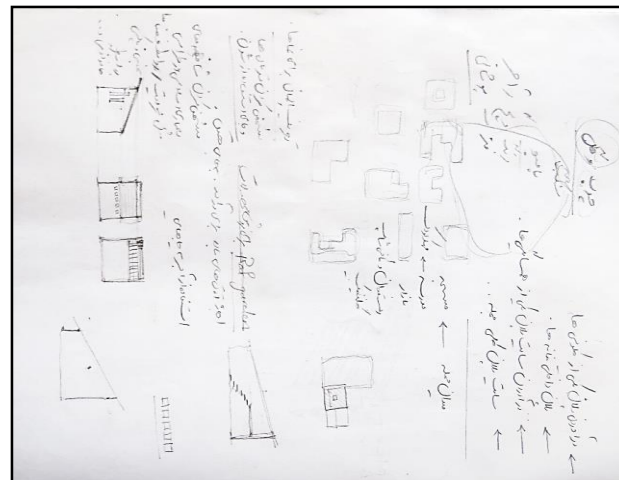
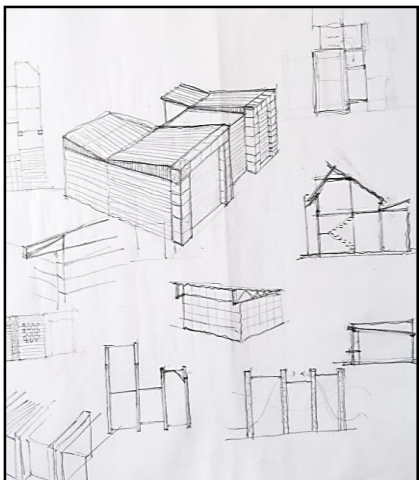
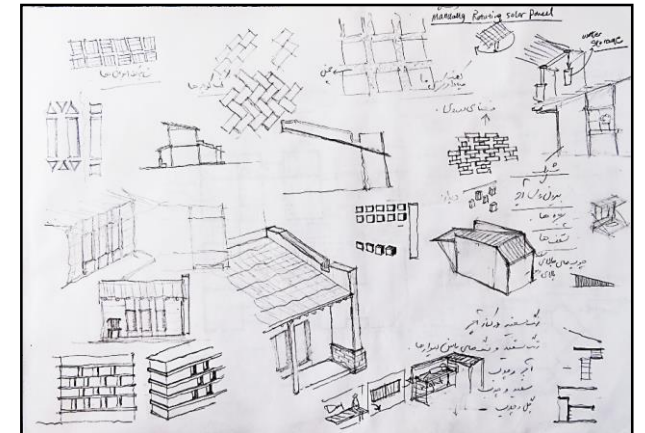
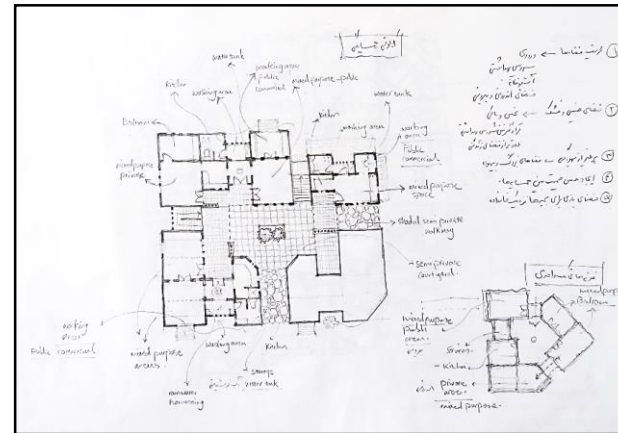
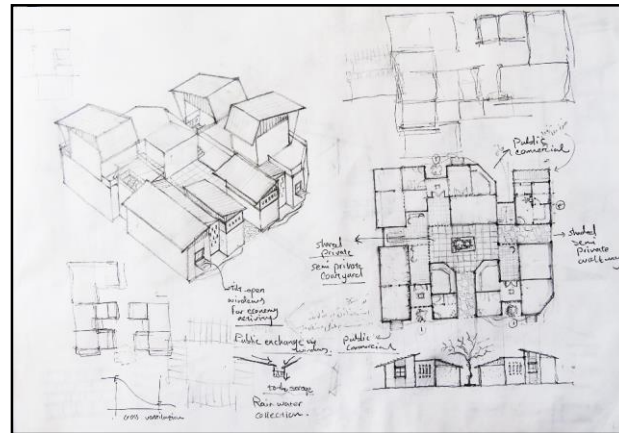
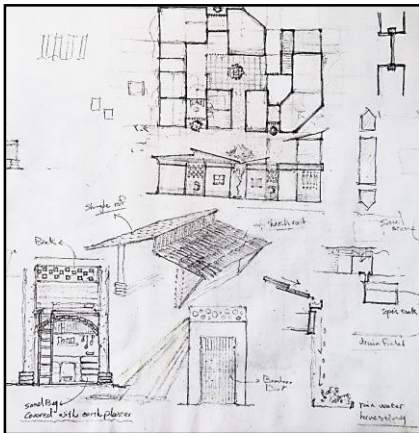
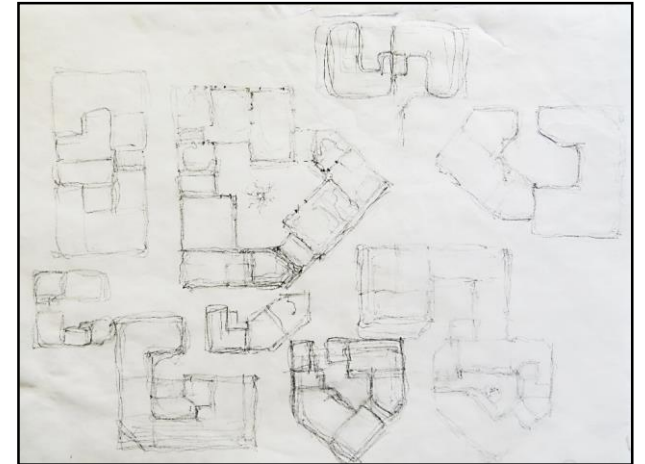
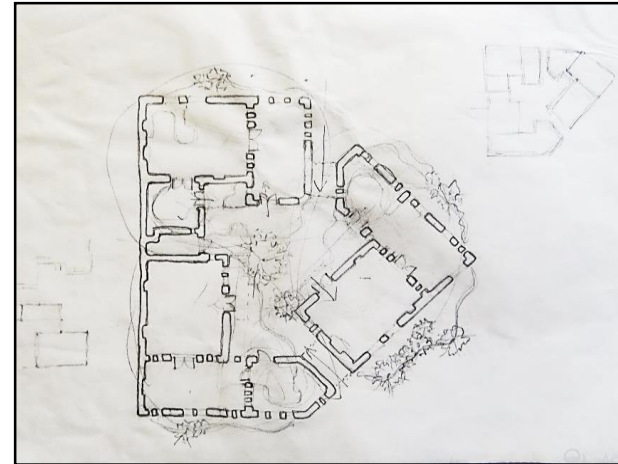
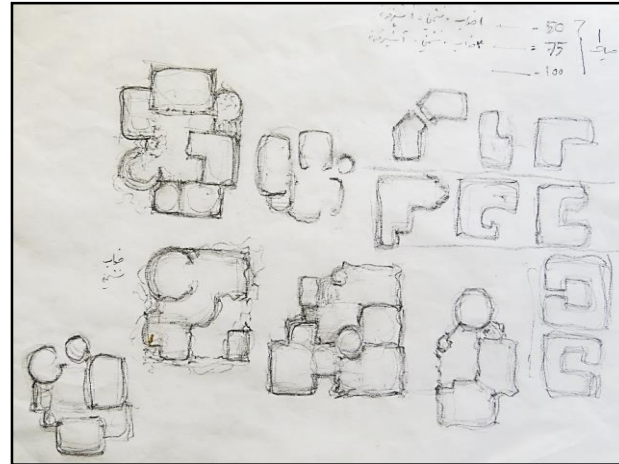
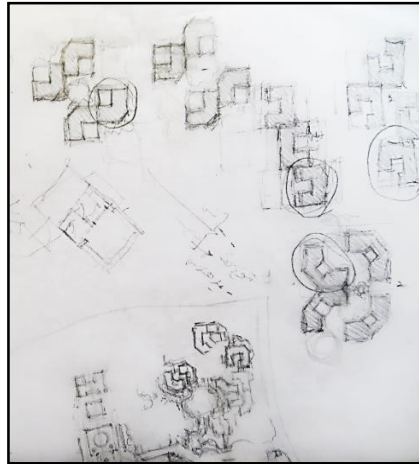
According to studies that have been done about populations per hectare in Makina and the average of families in selected site, the way of living and the local architecture, in a 3 hectares of Land it is considered to design 450 dwellings as low cost houses for low income families and people of Kibera. The proposed design consist of courtyard houses for higher income families and cluster houses up to two floors for lower income families which has the ability to go up to 4 floors in case of higher density.

The KENSUP project as it mentioned before considered as temporary shelters for accommodation of residents during construction of the site.

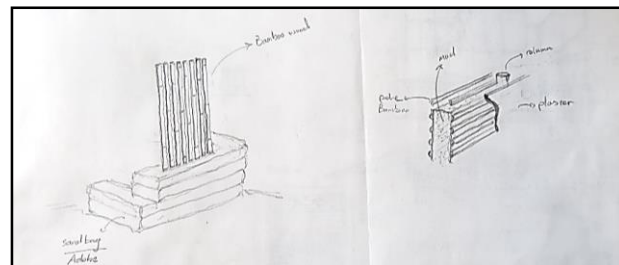
The main conclusions being drawn from this work is the importance of the presence of the inhabitants in the planning process. Without the presence of the inhabitants, the “Cities without slums program” will never be a success and new mass housing areas as well as new slum areas will continue to form.

An improvement of the housing conditions is of vital importance in work involved in poor areas development. It has many favorable effects for the population who amongst other things , enjoy a keen stimulation in their daily work. (Abdelhafid Chabbi)

The employment of local building materials and the implementation of local building traditions is the only way of applying at least some form of brake on the accelerating housing shortage in greater parts of the third world. Continued expensive imports of technology and materials favoring a few and neglecting the majority will rapidly lead to disaster. (Olle Bengtzon)



All illustration: (source: Author drawn,)



- Fig1. Kibera settlement
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 Fig51. Individual residences demonstrate the same mastery of scale and massing that are found throughout the project.
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 Fig53. Architecture based on free horizontal expansion. Diagonal circulation allowing easy access and offering variegated perspectives while preserving a human scale.
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 Fig60. Kenya rivers and lakes
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