

VERNACULAR MODERNITY IN BALOCHISTAN

Sustainable urban fabric for the emerging city of Gwadar

MSc. Sustainable Architecture and Landscape Design

Students: Babar Khan, Salman Sadeghi

Supervisor: Prof. Karin Hofert



Department of Architecture and Urban Studies

ABSTRACT

Balochistan region is divided by the international borders of Pakistan, Iran & Afghanistan, each parts built environment has been influenced by the country it lies in, however there are still similarities when seen as a whole, which could be because of the factors like same climatic and geographic situation. There could be seen extraordinary examples of Vernacular architecture and urbanism in fragments around the region, however at present it mainly seems chaotic and unresponsive.

Gwadar being one of the cities in Balochistan, having the deepest seaport in the world, is attracting worlds attention towards itself, countries are investing in it to make geographical, political and economical connections, aiming for another capital city with lack of identity and vernacularism.

This thesis looks into the possibility of developing a sustainable urban Fabric for the city of Gwadar, based on vernacular principles and aesthetics of the region, as an effort to stop it from becoming another city with lack of identity, and ultimately to work as a precedent for the future growth of the city and the Region.

KEYWORDS: vernacular, sustainable, grid, resilient, native, windcatcher, shade, aesthetics, identity, ecological , passive, architecture, urbanism, fabric, native, ecosystem, biodomes, piegontower, wellbeing, courtyards, communalpockets.

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DOHA



KUWAIT CITY



ABU DHABI



SYDNEY



AUKLAND



VANCOUVER

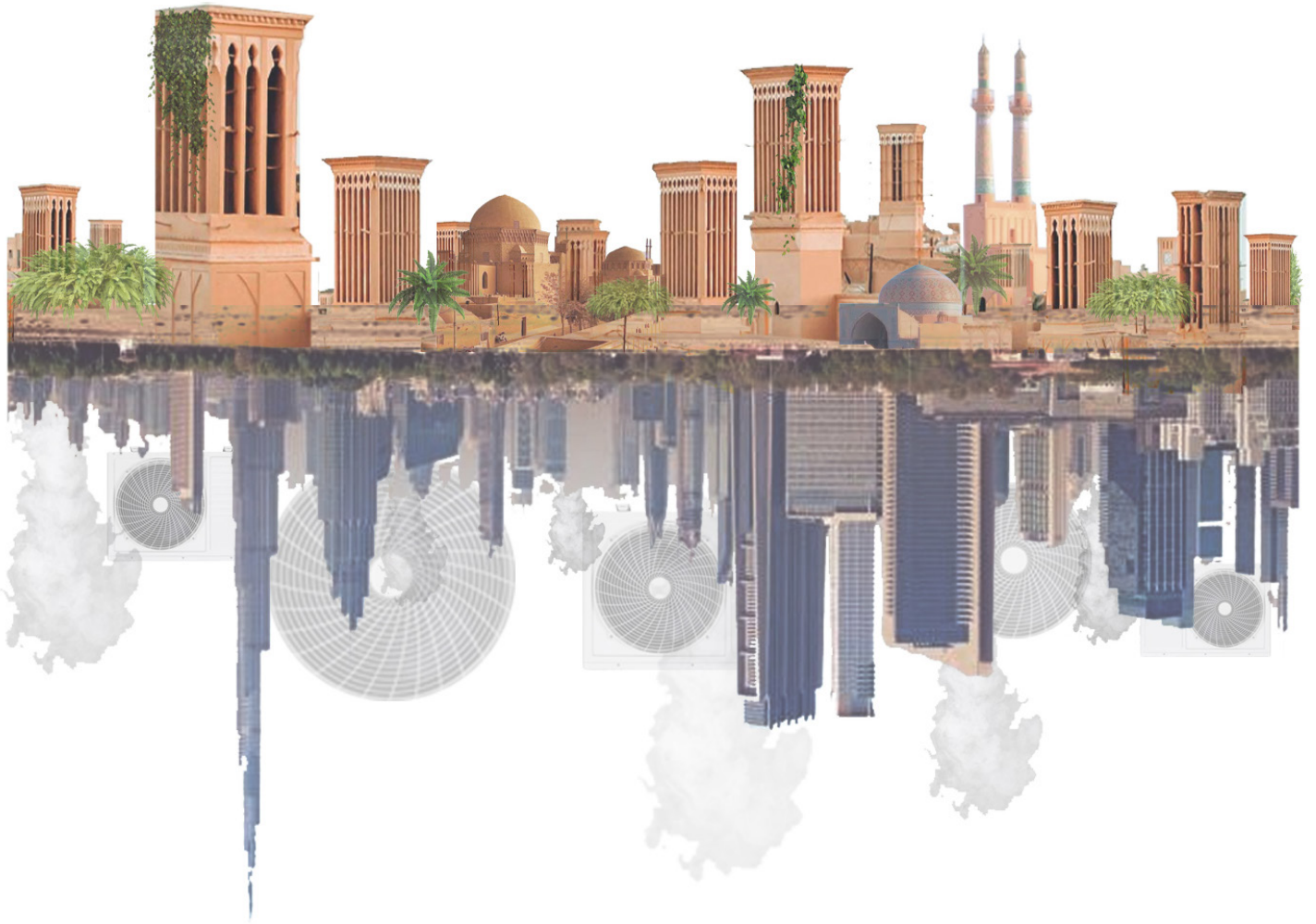


Introduction

In the past three decades, the world witnessed great awareness toward environmental dilemmas such as globalwarming, resources depletion, energy, air and water pollution, waste, population growth, and globalization.

These issues come within the responsibility of arguments on sustainability indicating the necessity for sustainability integration in the ways we live, act, use of resources, and build.

In meeting the human needs, sustainable architecture represents the interrelationship between natural, cultural, social, and economic,resources to create optimum relationships between people and their environments.



The word “sustain” means “to hold up” or “to support from below,” a society needs to be supported by its populations in the present and future. Most traditional societies took care of their community through the amalgamation of natural and physical environment with cultural, social, and mystical values. These are the societies where sustainability is evident and livable as daily practices.

When discussing sustainability, we need to go beyond definitions, looking for the essence of the meaning. Sustainability is not merely the integration of environmental, social, and economic issues and improving quality of life. The idea of sustainability is to make sure that our decisions and actions today do not compromise the future generations to meet their own needs. Re-evaluating and analyzing vernacular architecture support the interrelation between policy makers and the society. We must make sure that our actions go along with our environmental systems not in opposition to them. Sustainable design implies responsibility, and it implies a far-reaching respect for natural systems and resources, respect for people and cycle of life.

Sustainability is by nature “a design process.” If we are to achieve it, we must concretely engage the daily life issues associated with ambient environment resources. We must address, more fully, the underlying influence(s) of political, economic, and social issues comprising the cultural and spiritual background in which the desire to achieve sustainability in itself reflects such a significant value shift. Sustainable design is a philosophical approach to design that seeks to maximize the quality of the built environment.

Whereas Vernacular architecture and urbanism is the result of constraints on resource availability. Historically and without modern means, extraordinary enterprise produced architecture often of the most distinctive character and identity with only limited means available. Vernacularism in design was based on inherently sustainable principles such as resource limitations imposed by economic or natural factors yet succeeded in offering rational solutions to harsh climates and human need. Elements of sustainable design are integral to every established form of vernacular architecture and urbanism, that are tried and proven solutions and have evolved over long periods of trial and error using local materials and technology emerging from ambient natural and cultural environment.

This kind of evolution in architecture and urbanism can be defined as unpretentious, simple, indigenous, traditional typology made of local materials and following well-tried forms and types.

For us, vernacularism in design is the built environment (city, architecture, and interior spaces) created based on the society needs. It is built in accordance with the natural environment (geography, topography, site, climate, local building materials, labor experience, and building techniques) fulfilling people’s physical, economic, social, and cultural norms. Vernacular architecture is a sign of identity; it is the “mirror” of nations that reflects place, time, and culture.



MASHHAD-IRAN



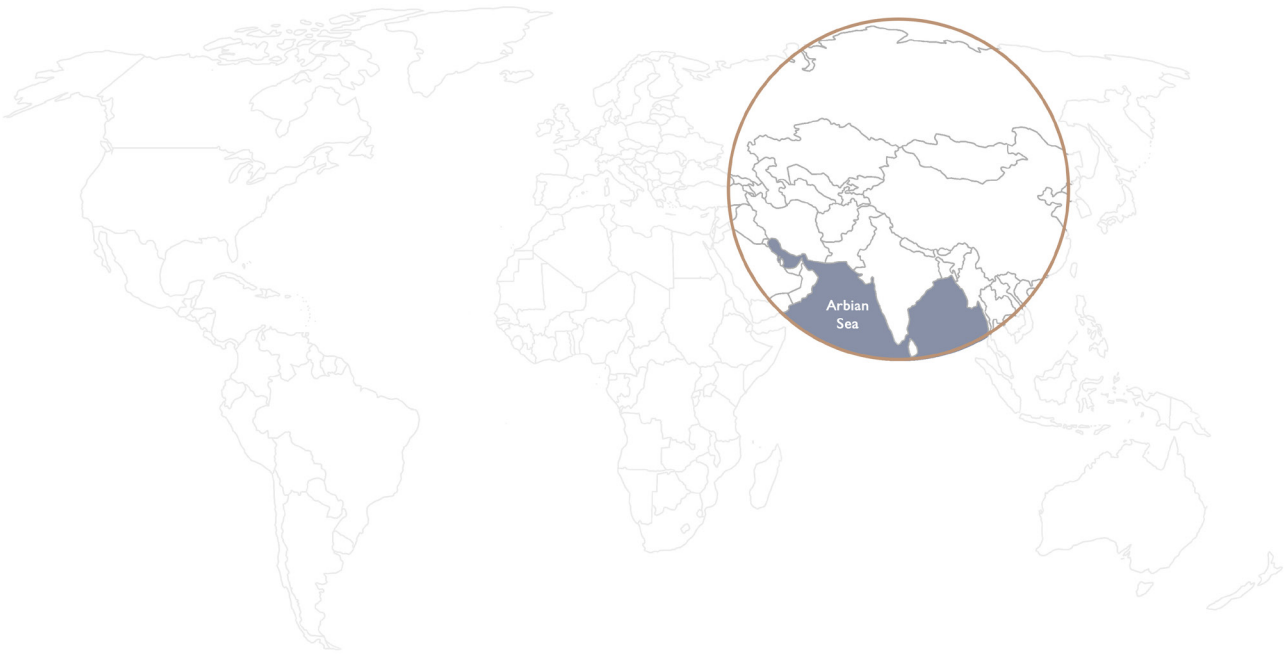
QUETTA-PAKISTAN

Regions Introduction

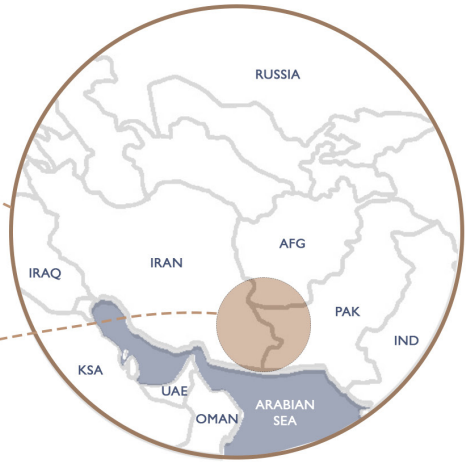
Balochistan also Baluchistan, often interpreted as the Land of the Baloch is an arid desert and mountainous region in south-western Asia. It comprises the Pakistani province of Balochistan, the Iranian province of Sistan and Baluchestan, and the southern areas of the Afghan provinces of Nimruz, Helmand, and Kandahar.

Balochistan borders the Pashtun region to the north, Sindh to the east, Punjab to the northeast, and Persian regions to the west. Across its southern coastline lies the Gulf region.

Fragments of Vernacular architecture and urbanism in Balochistan could be called a model for sustainability; as they embody different cultural values, which may be applied in the conceptual design of buildings and cities today. These values are about the way of building, which is responsive to the climate and suits the style of living, traditions, customs, social values, and culture of people; it is of a great sustainability potential. Sustainable settlements and dwellings are built on the idea of regionalism; however, they do not ask us to return to the old ways of living, they inspire us for the responsible, long-term use of technology and design.



Arabian
Sea





region



international borders



existing boundaries



human settlements around



historical boundaries



Yazd & Gwadar

Borders

Baluchistan, the homeland of the Baluch people, is located at the eastern edge of the Iranian plateau occupying an area bounded by Bandar Abbas and Bam in Iran in the west, the Punjab and the Kirthar range of mountains of Pakistan in the east, the Arabian Sea to the South, and in the north the Afghan province of Chankhansur (Nimroz) and the Iranian province of Sistan. There are large Baluch settlements in Sind, Western Afghanistan, Khoransan and the Marv district (Konieczny, 1979).

Baluchistan's geographical location makes it a strategic area. It is a mountainous land with vast barren wastelands. It has common borders of 832 km with Iran in the west and northwest and 1,160 km with Afghanistan in the north. Baluchistan is bordered by the provinces of Punjab and NWFP and in the east by the province of Sind. It has 560 km of coast on the Arabian Sea in the south (Shah, 2007).

The majority of the Baluch people live in the Pakistani province of Baluchistan, which is considered as Pakistan's largest province and comprises 43% of the total land mass. However, it only provides 8% of the total population of Pakistan

The population of Baluchistan is low due to its geographical location and as it is a harsh, mountainous, desert region suffering from a shortage of water.

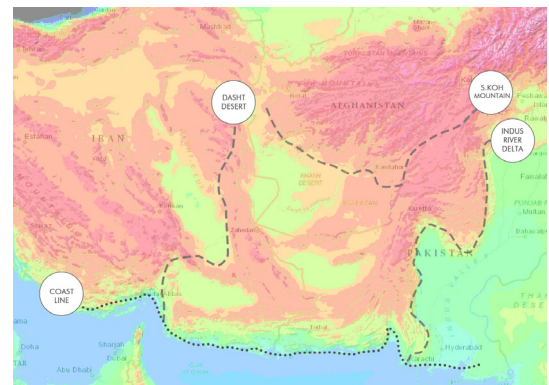
Baluchistan's boundaries have not been static towards the western side and have seen changes throughout history, to an extent the historical city of Yazd was once considered a settlement inside the premises of Baluchistan.



old map showing Yazd as a part



old map showing most Balochistan as Iran



topographic borders



Case study

Yazd is one of the largest earthen cities in Iran and is mostly known to be the driest major city of the country. Situated in the centre of the Iranian plateau, the city is situated at an altitude of 1200m above sea level, with summer temperatures frequently exceeding 40°C.

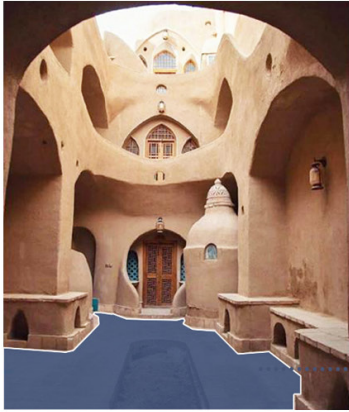


Its proximity to the vast Iranian dry salt desert “Kavir-e Namak”, its harsh terrain and the dry climate of its surrounding, low precipitation combined with intense evaporation as well as huge daily temperature oscillations, led its inhabitants to a frugal and nature-friendly lifestyle. Relying on their ingenuity, the generations who inhabited this area have adapted their lifestyle to the desert, managing the functional water system “Qanât” to gather water from mountains, transfer it through underground tunnels and bring it to the surface.

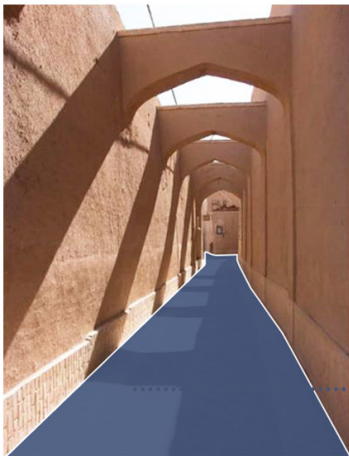
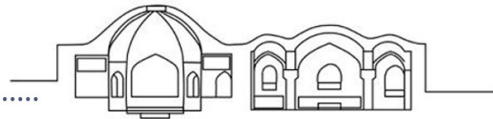
The built environment of Yazd is an outstanding example of adaptation to a harsh climate, with its wind-catchers “Bâdgir”, its water cisterns “Âban-bar”, its mud-brick houses with halls “Tâlâr”, balconies “Eyvân and Soffes”, as well as its domes and cool breezing alleys and arched corridors and alleys “Sabât”.

Elements

A passively sustainable adobe collection of wonders, the city of narrow alleyways and domed-shaped roofs had been relatively unapproachable due its remote location before industrialization in Iran. Thus, it used to be protected from any changes from the new developments and city's expansions.



Inward planning.

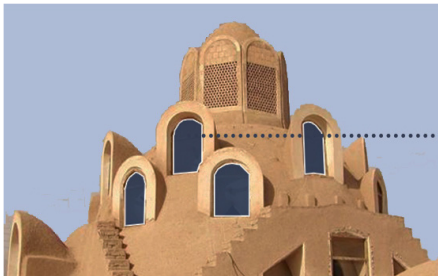


shaded st.

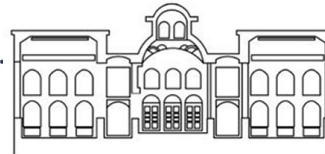




reseed openings

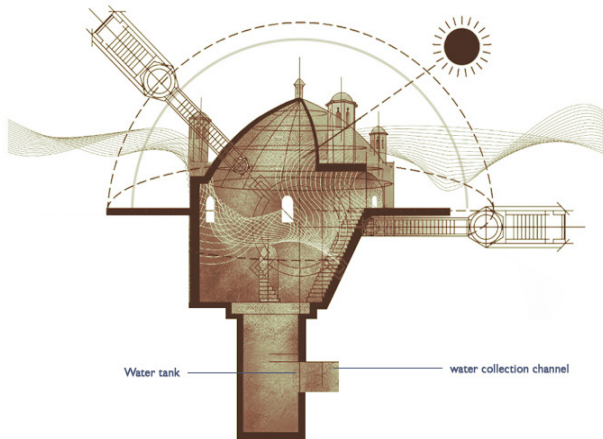
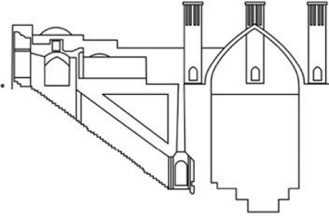


ventilators

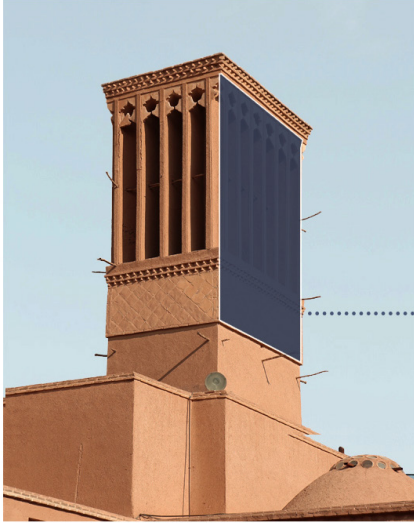




water storage

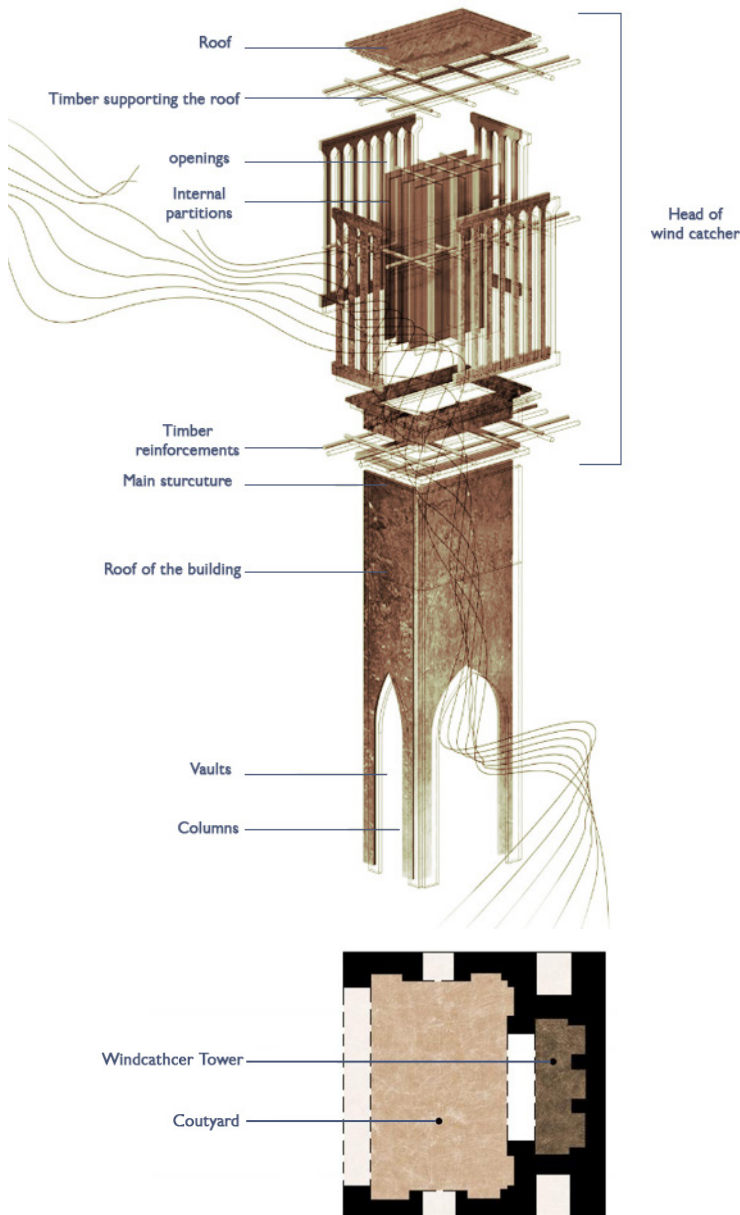


Yazd being a desert is always in water scarcity, vernacular methods to cope up with the scarcity tops with the use of water reservoirs which also work as wind moisturizers and coolers. Water is collected from the catchment areas, mostly mountains in the near vicinity and brought to the reservoirs placed in urban areas, which then works to bring down the temperatures to a certain level by letting the dry hot wind pass thru its towers with narrow channels and eventually cools down the wind by moisturizing it.



wind catcher





It is one of the building components that has an important role in the spatial qualities of Yazd's vernacular architecture there are four to six of them in a water reservoir and at least one in each residential unit in the city. Although there are many shapes of wind-catcher towers around the city, there are three general groups of them: one sided, two sided, and four sided towers. In the one sided type, the wind-catcher and the chimney are separated and located in different spaces of the building to provide a better air circulation in the interior spaces. One-sided windcatchers are more resistant to the storm than other types of windcatchers and are bigger than two sided type. On the other hand, in the two sided and four sided types, the wind-catcher and chimney are usually designed in a single tower, they are mostly taller than other types and were used for wealthy people.

Regardless of the shape and geometry of the Wind towers, most of them have same components which allow for a better performance in bringing fresh air and reducing the temperature of the air flow. Traditionally, each tower has a number of elements that participate in cooling the air flow during day; Head of the tower that brings fresh air to the tower, main structure that plays the cooling role, and bottom structure of the tower that transfer the cooled air to the interior spaces.





City Selected

Gwadar is located on the southern coast of the Arabian Sea of Pakistan, in the district of Gwadar, in the province of Balochistan. Gwadar sits on a natural hammer-shaped peninsula that forms two almost perfectly semicircular bays on either side. The city is located on a 12-kilometer narrow and sandy isthmus which reaches an altitude of 160 meters and stretches for approximately 10 km from east to west with a width of one and a half kilometers.

The city of Gwadar is located at 0 meters (0 ft)–300 meters (984 ft) meters above sea level, features dry and hot arid climate. The oceanic influence keeps the temperature lower than that in the summer and higher in winter.

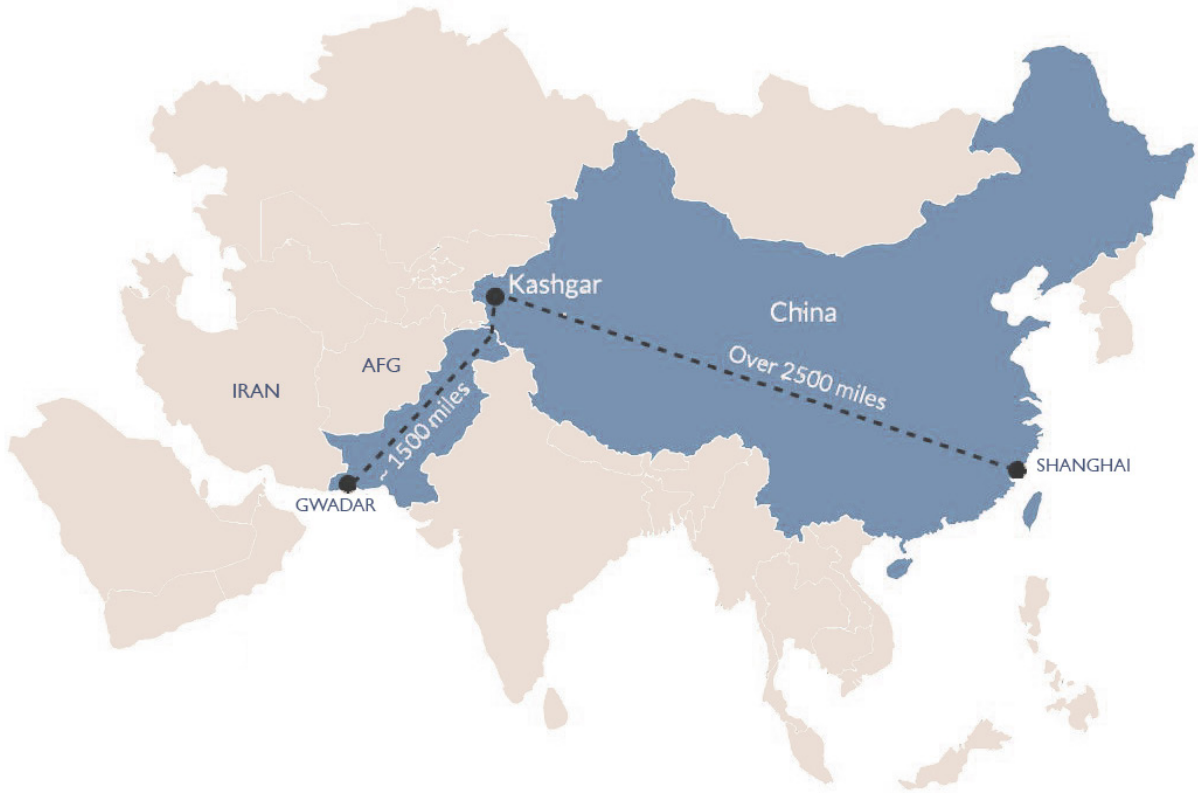
The uniformity of temperature is a unique characteristic of the coastal region in Balochistan. Occasionally, winds moving down the Balochistan plateau bring cold spells, otherwise the winter is pleasant. In Gwadar, winter is shorter than summer. Gwadar's weather is identical to that of the Middle East as most rain occurs from December till January.

Importance

The deep-water port lies at the convergence of three of the most commercially important regions of the world, the oil-rich Middle East, Central Asia, and South Asia. The aim is to link Gwadar to landlocked western China, including its Muslim-majority Xinjiang region, giving it access to a shorter and secure route through Pakistan to global trade. The port will also provide the shortest route to landlocked Central Asian countries, including Afghanistan, through transit trade and offering transshipment facilities.

Future

It is said that Gwadar would be a new Dubai by the end of the 3rd decade of 21 century, Hence it is very crucial for a city that must grow immensely in a very short period, to maintain its vernacular identity in its architecture and urbanism.



Kashgar

China

AFG

IRAN

GWADAR

SHANGHAI

1500 miles

Over 2500 miles





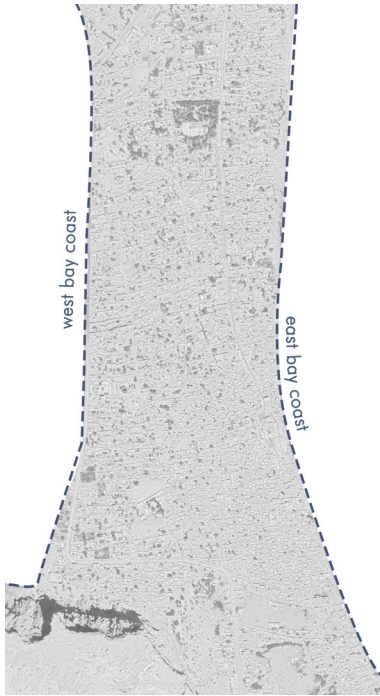
Shape

The surreal shape of the coast of Gwadar makes it stand out in the entire coastline of Balochistan, it is often referred to as hammerhead.

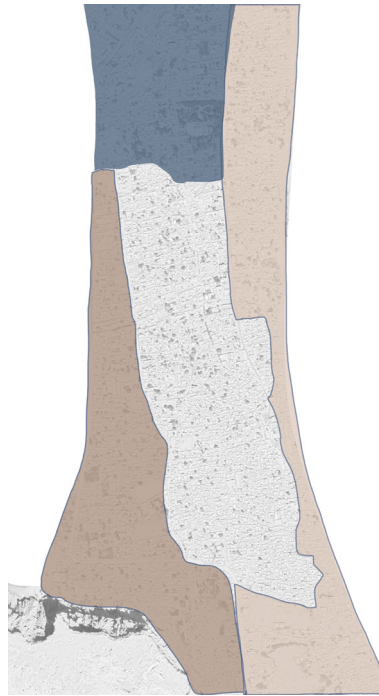
Most of the population is based in the neck, surrounded by the water on east and west bay, the mountain-like structure in the south and the plains on the northern side.

Vernacularism in Gwadar

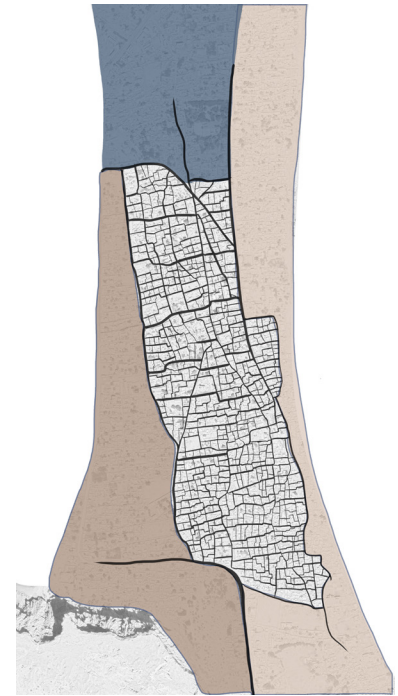
In order to design a system for a sustainable growth of Gwadar, it is crucial to understand and analyse the existing urban fabric and more importantly to learn from it.






existing coastlines



new settelements



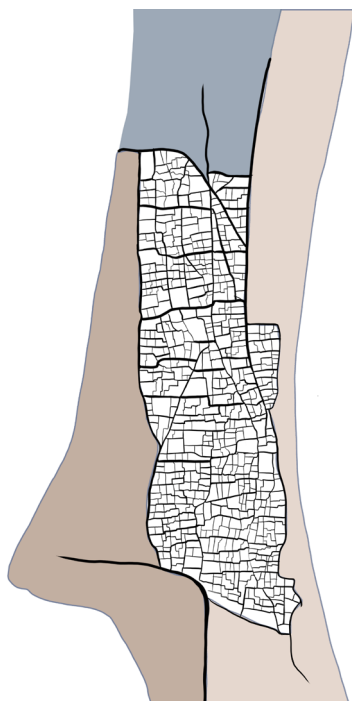
old town streets

-  old town extention
-  east bay settlements
-  west bay settlements

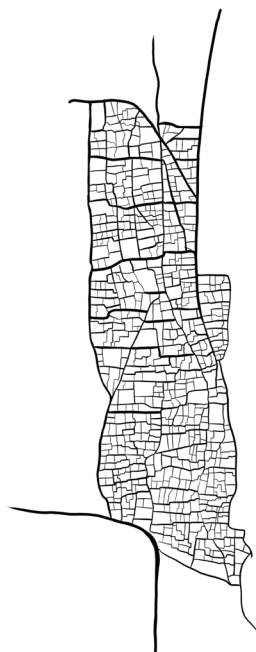
Studying the existing urban fabric

Urban zones

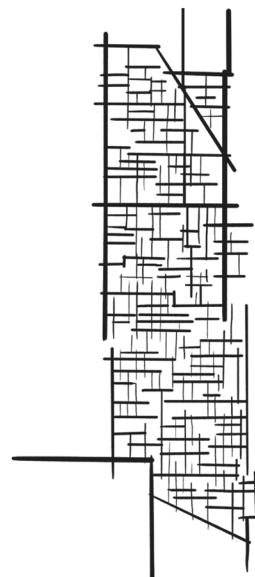
Oldest settlements are located in the middle of the peninsula, surrounded by settlements that were built later on next to east and the western bay.






*residential use
morphology*



street morphology

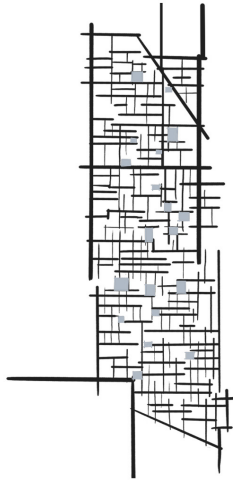


simplified

-  old town extention
-  east bay settlements
-  west bay settlements

Streets morphology

At first the street network of the old town looks complex and random, but once analyzed a well working system could be seen.



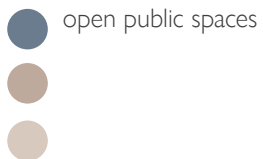
*simplified
with public spaces*



zooming in

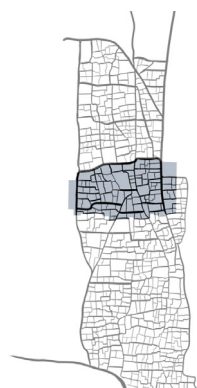


common occurrence

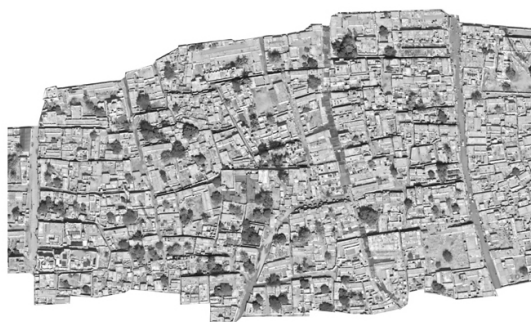


Streets morphology

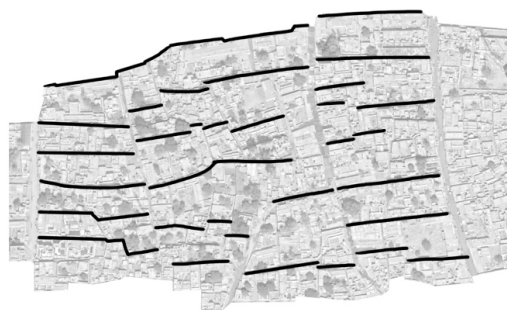
Most of the streets that are placed horizontally (east-west) are wider in width than the streets that run vertically (north-south)



key plan



dense section



horizontal shades



high and low roof buildings



building street relation

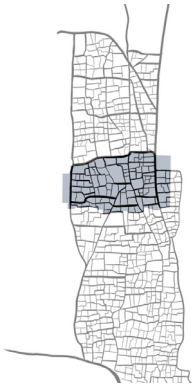
- low hieght buildings
- higher buildings
-

Buildings and Streets

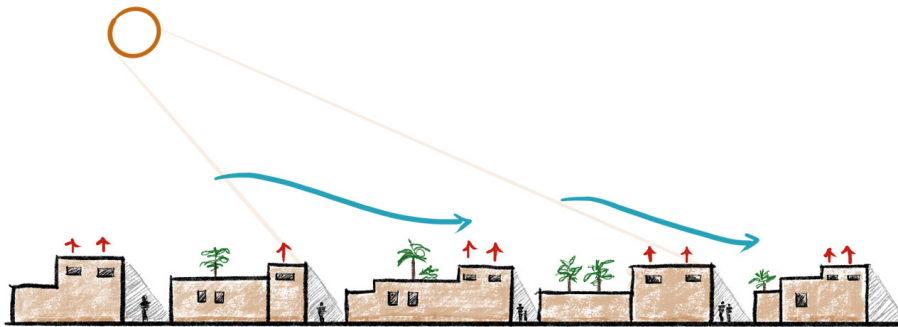
Hierarchy of the buildings and hieght of the build-ings create densely shaded horizontal streets, which are wider probably because of the provision of the shade.



building street relation



key plan



building street relation

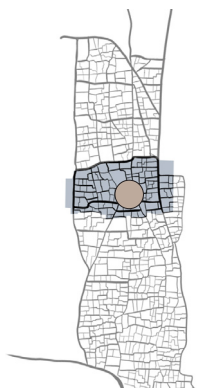
Wind and Sun

Arrangement of lower blocks of spaces in the south and higher blocks of spaces in the north also works according to the ecological context of the city, bringing winds from the south thru courtyards and letting the hot air out from the ventilators on the northern side.

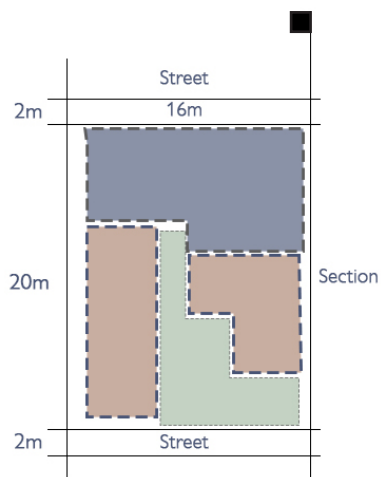
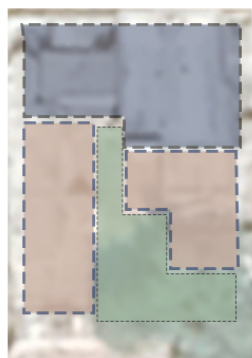




typical house plans

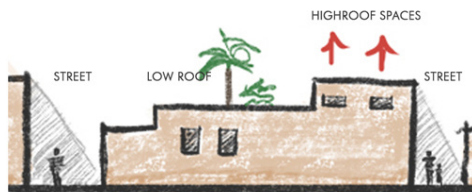


key plan

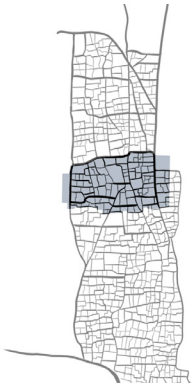


typical spaces system

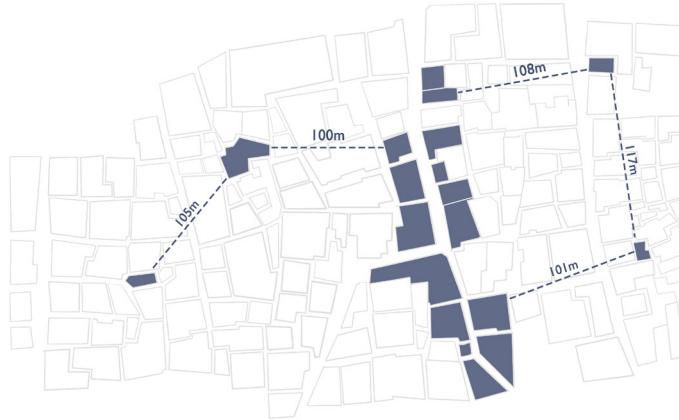
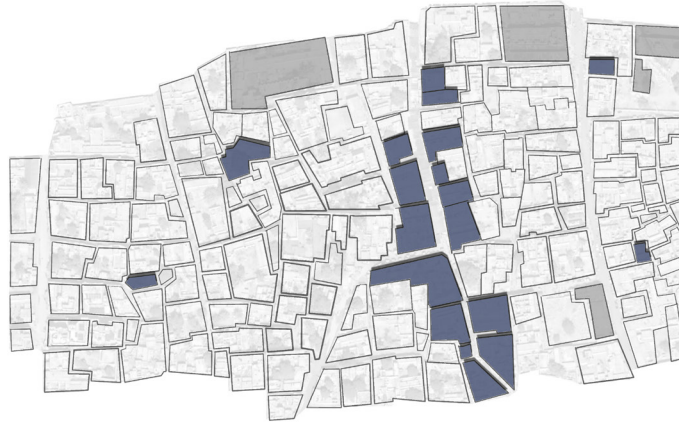
- high volume spaces
- low volume spaces
- courtyards



typical spaces system



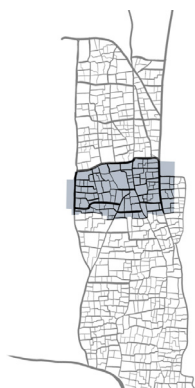
key plan



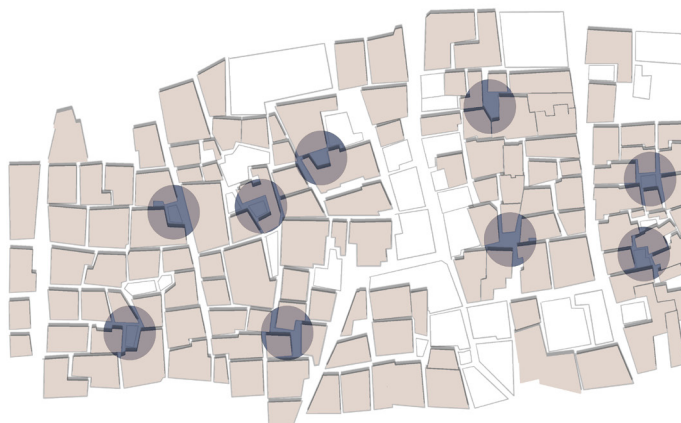
- commercial/ communal pockets
-
-




Native Scale and frequency

Small commercial settlements occur on an average of every 100m, in the existing fabric of the old town



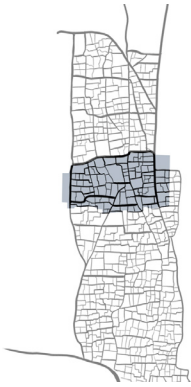
key plan



-  communal pockets
-  residential
- 

Native Scale and frequency

Communal pockets are interactive spaces mostly with chai khana's (tea houses) occurring averagely on 100m distance from each other.



key plan

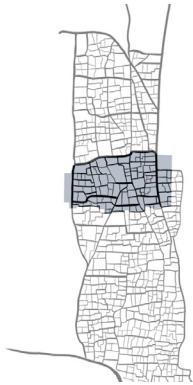


residential buildings

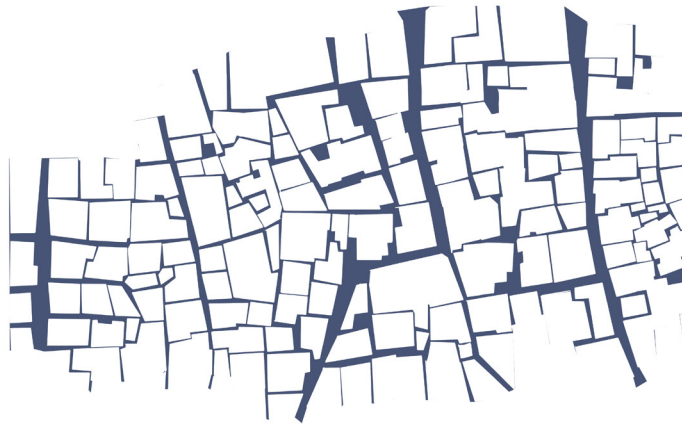
green spaces

Native Scale and frequency

Green spaces are mostly working as a communal pockets, if not they are always attached to the communal pocketsw

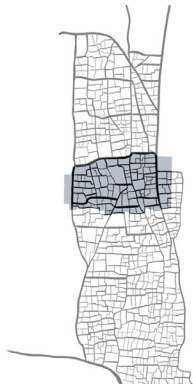


key plan



Native Scale and frequency

Street network of the old town is very well connected and dense, which allows more walkability.



key plan

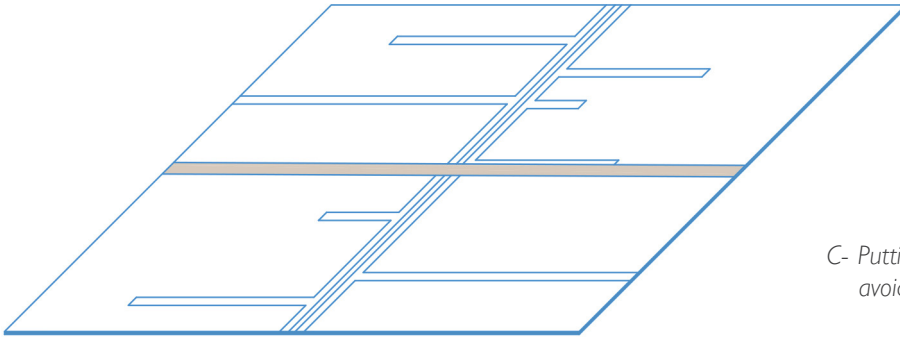


Native Scale and frequency

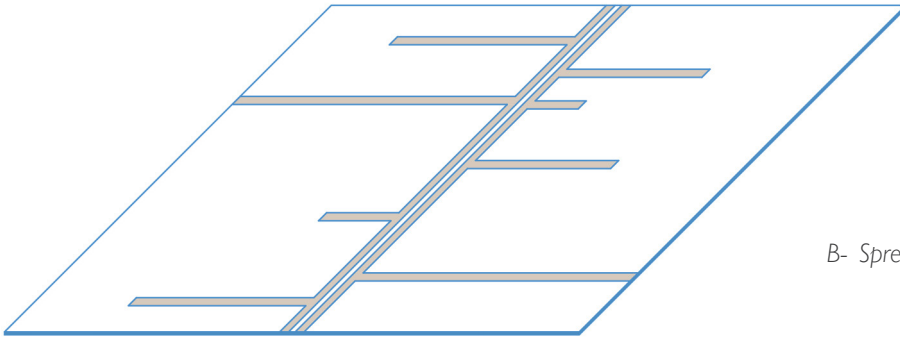
The bazaar that stretches from on a longitudinal axis has created an interesting mark on the map to provide shade for the visitors.

Design process

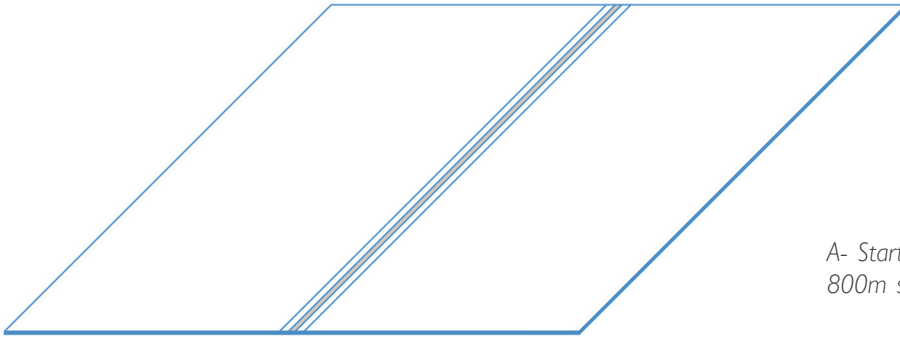
Everything analyzed in the previous scale helped initiating the design process and led evolution of the process.



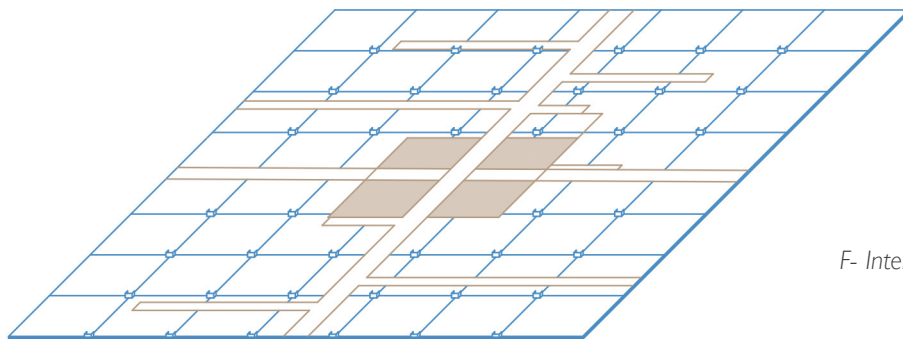
C- Putting Bazaar on X-axis to provide shade and to avoid extra cost of providing a roof over Bazaar.



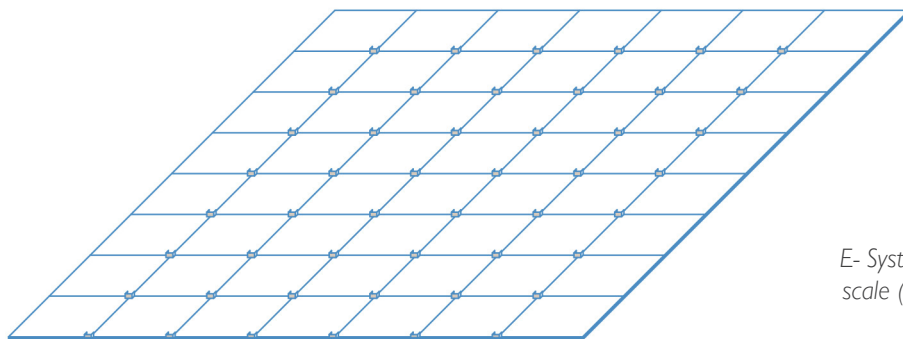
B- Spreading green on X-axis to make any possible connections while replicating the fabric



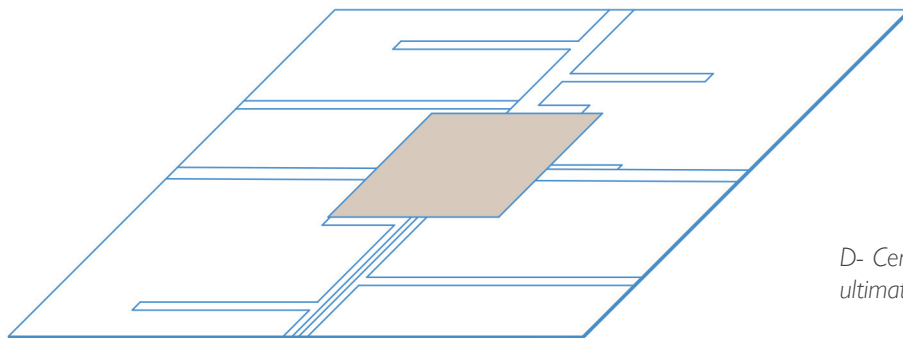
A- Starting with an ideal 5 minute walking, 800m X 800m square and intersecting the site with seasonal water channel, along with green



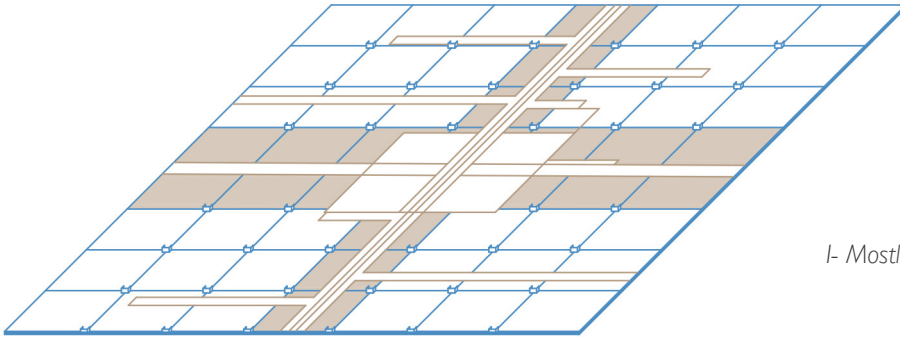
F- Intersecting of public space with green, bazaar and system of communal pockets



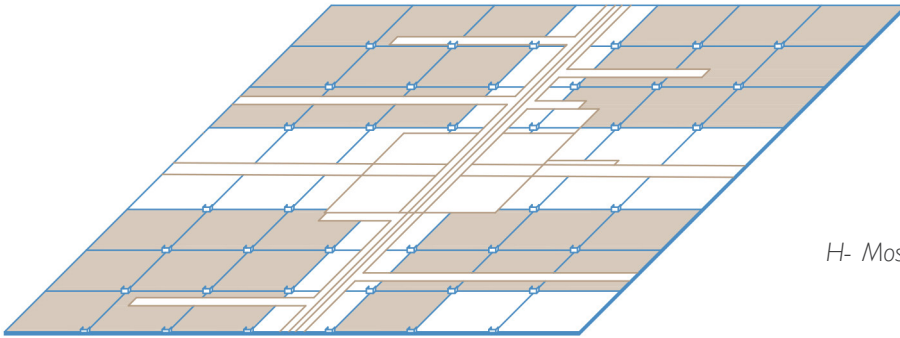
E- System of communal pockets, inspired by vernacular scale (100m) of distance between communal pockets



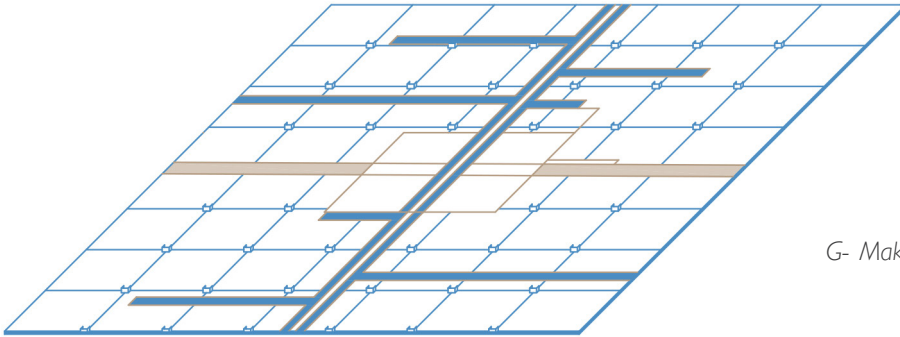
D- Centralized public space, to keep walkability to its ultimate use, and to make it accessible for everyone



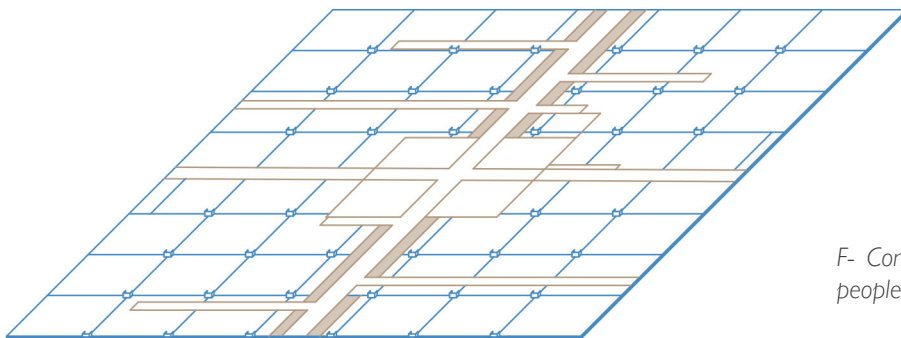
I- Mostly mixed use blocks in between mostly residential and Bazaar and Public spaces



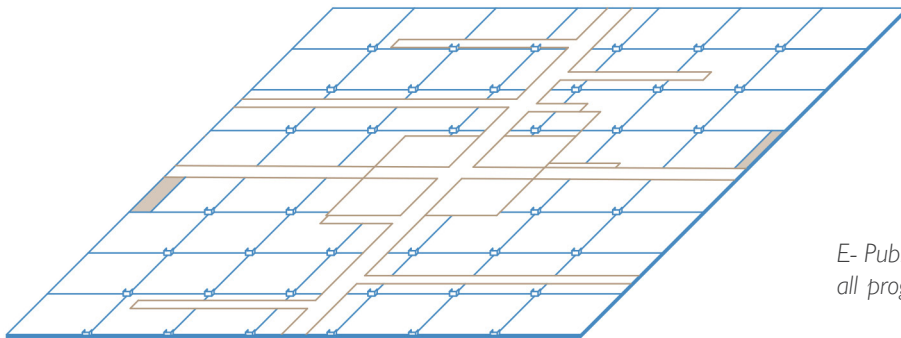
H- Mostly residential blocks with communal pockets and streets



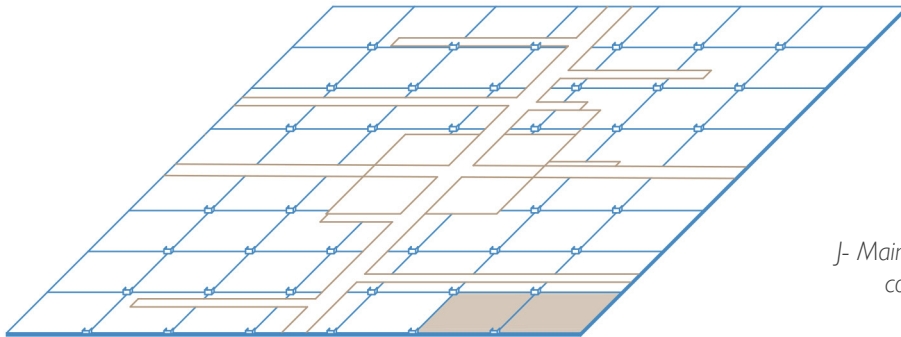
G- Making the connection better between the green corridor, public space and Bazaar



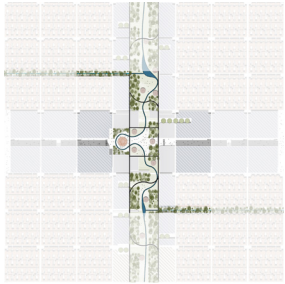
F- Communal date palm orchards, to support native people with some extra income and to create green eco system.



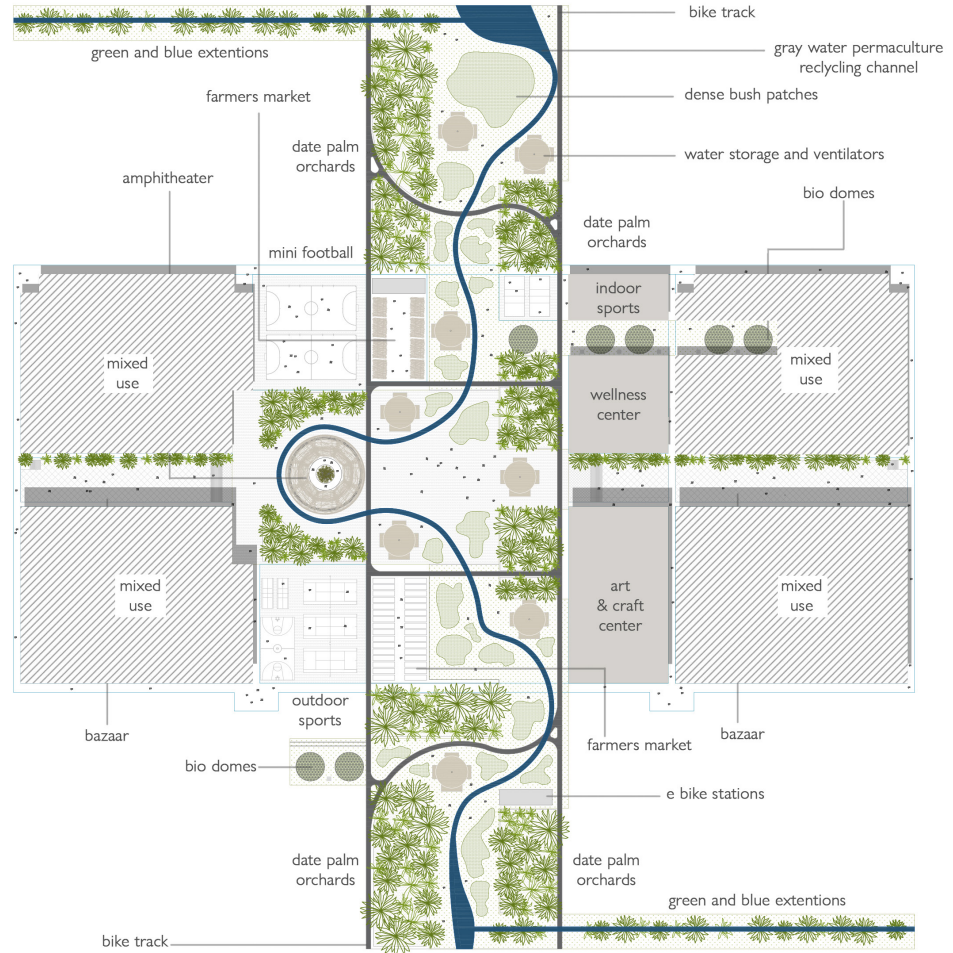
E- Public transport stops placed centrally so its close to all programs and to create another one for the other way, when replicated

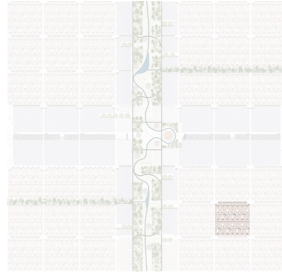


J- Maintainance and recycling blocks in the south east corner of the fabric, for natural flow of water



key plan

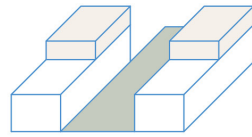




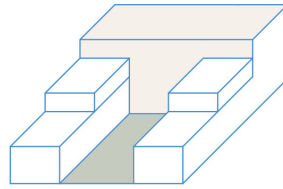
key plan



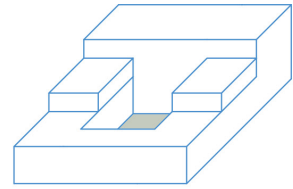
starting with a communal courtyard and placing lower volumes first towards south



placing mid high volumes next towards north

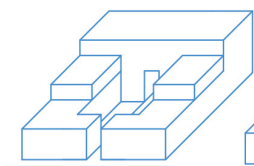


placing highest volumes at the end to create shadow in the north

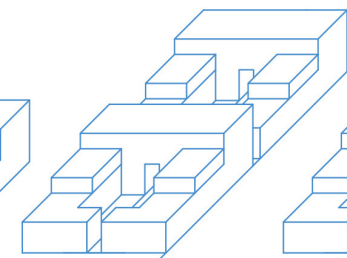


encapsulating the courtyard to make it usable and to define it

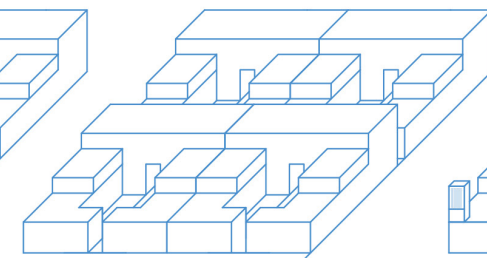
- Building volumes
- Courtyard



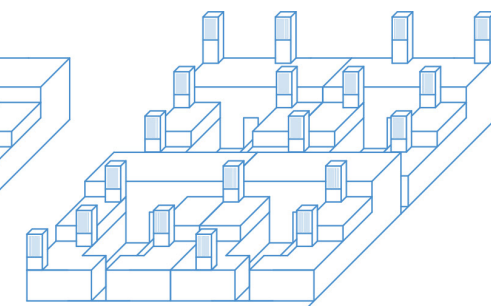
*using courtyard as a
vertical street*



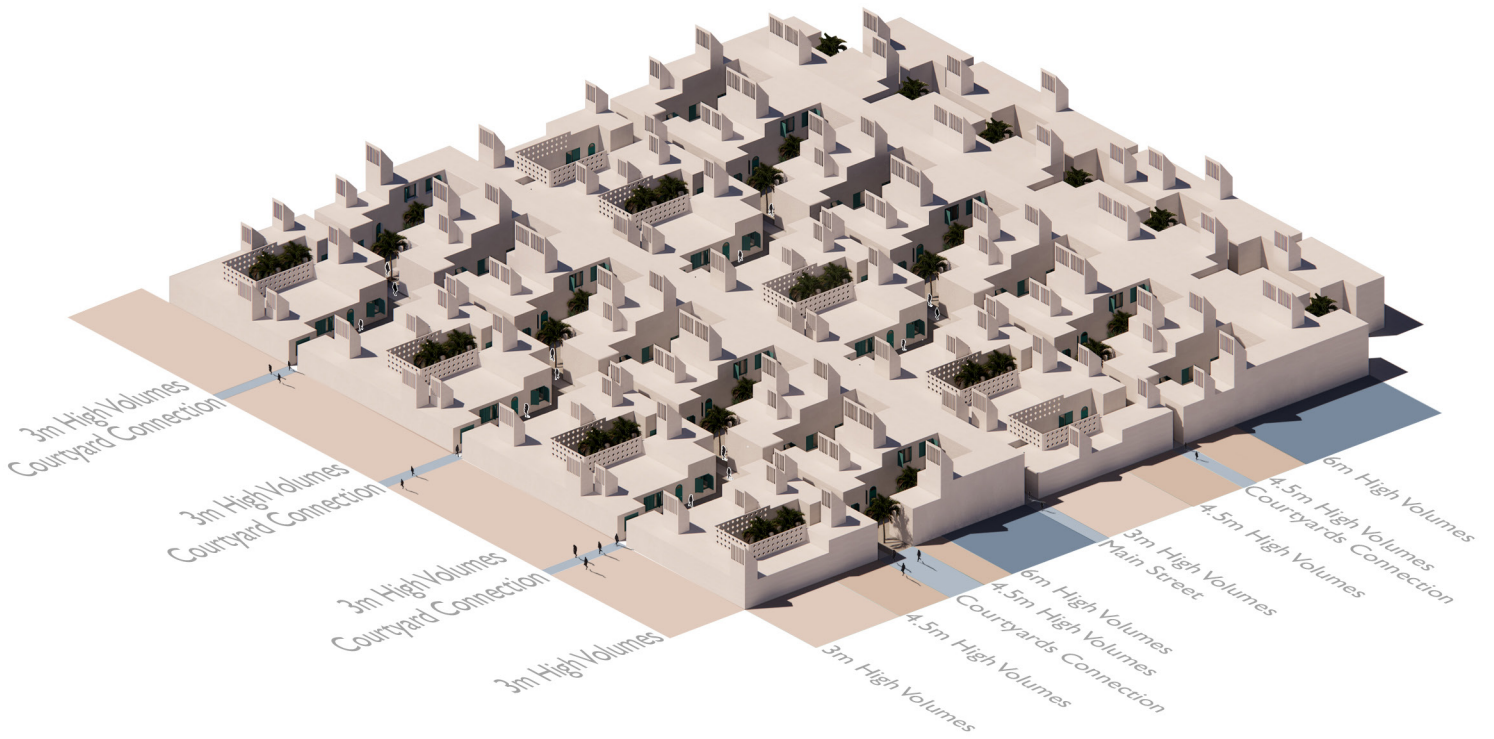
*replicating vertically
to create connections
through courtyards*



*replicating horizontally
to form horizontal
streets*

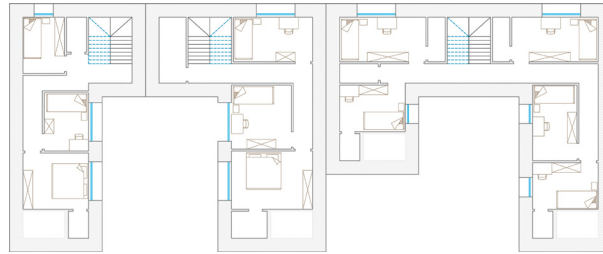


*adding unidirectional
windcatchers facing
south to catch the de-
sired wind*

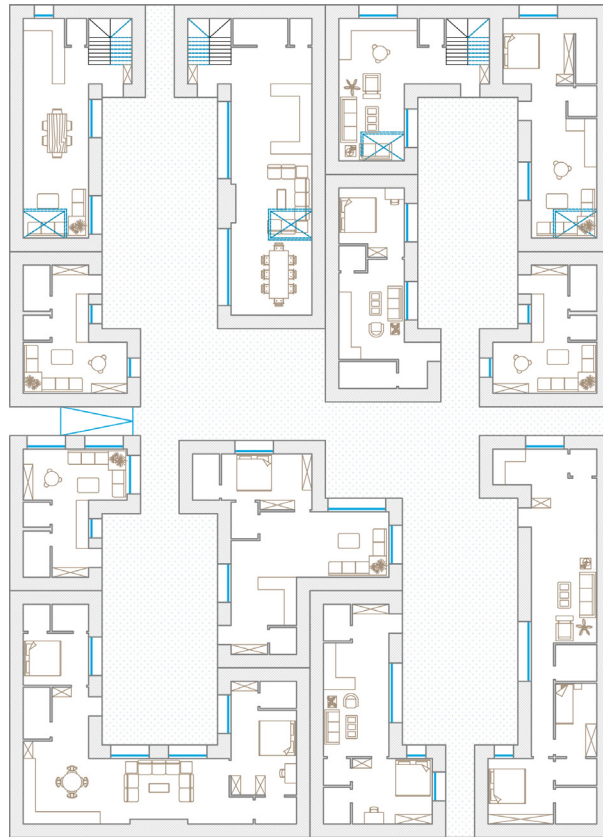




Module plan
Level 3 (roof at 6m)



Module plan
Level 1 (roof at 3m)
Level 2 (roof at 4.5m)







**Communal
Pockets**





Courtyard
(highest volume)





Courtyard
(lowest volume)





**Courtyard
&
Street
Intersection**





**Courtyard
&
Street
Intersection**

Thanks