

PLANNING FOR CLIMATE CHANGE AND RAPID URBANISATION

CONTINUING PROFESSIONAL DEVELOPMENT, LECTURE SERIES FOR PROFESSIONALS

Thank you for joining!

This lecture will begin shortly, at 11:00am UTC, 12:00noon BST



Image credit:
Morley von Sternberg for Allies and Morrison

Lecture Series

Overview of the seven lectures forming part of this series:

- 1. Introduction to the UN 2030 Sustainable Development Goals**, Mina Hasman, SOM
Provides an overview of the UN 2030 SDGs together with other related international agreements, and describes the importance of the Goals for Built Environment Professionals.
- 2. Planning for Rapid Urbanisation**, Ben Bolgar, The Prince's Foundation
Outlines a framework for use in secondary cities which are experiencing rapid growth but which may have little or no access to professional planning expertise.
- 3. Planned City Extensions**, Alfredo Caraballo, Allies and Morrison
Provides a reminder of key master-planning and urban design principles such as: site analysis, micro-climate design, density, mixed use, walkability etc.
- 4. Resilient Infrastructure**, Ian Carradice, Arup
Explains the context, relevance and drivers to develop resilient infrastructure by adopting an integrated design approach and considering planetary solutions to address climate related challenges..
- 5. Climate Responsive Design**, Peter Clegg, Isabel Sandeman and Rachel Sayers from FCB Studios, and Rafiq Azzam, Shatotto
Part one is focused on 'A Manifesto for delivering Climate Responsive Design', and Part Two, entitled 'Collaborating for Sustainable Development', provides a case study of how the principles of Climate responsive design have been used on a project in Bangladesh to create an inspiring and comfortable educational environment for the Aga Khan Academies Unit.
- 6. Heritage-led Regeneration**, Geoff Rich, Feilden Clegg Bradley Studios
Describes the value of heritage led regeneration in terms of the reuse of existing buildings, and the potential to generate social and economic development.
- 7. Sustainable Outcomes Guide**, Gary Clark, HOK London Studio
Provides a practical explanation of the outcomes that need to be delivered if we are to achieve development which is sustainable. Includes meaningful, measurable targets and associated metrics.

Planned city extensions

Case study:

MADINAT AL IRFAN

Muscat, Oman



A MODEL FOR THE NEW URBAN AGENDA IN THE AGE OF CLIMATE CHANGE:

'Humanity faces the greatest wave of urbanisation in its history, with 60% of the global population expected to live in urban areas by 2030 and 70% by 2050.'

This presents both a challenge and an opportunity – to lock new urban expansion into a new development model towards climate-resilient and low-carbon societies.'

A FRAMEWORK FOR SUSTAINABLE URBAN DEVELOPMENT



RAPID URBANISATION POSES A DESIGN DILEMMA



**MANY CITIES ARE STILL NOT BEING
DESIGNED WITH PEOPLE IN MIND.**



**THEY ARE INCREASINGLY HOMOGENEOUS
AND PLACELESS.**



**RAPID URBANISATION IS OFTEN
ILL-CONSIDERED, SPRAWLING
AND ENERGY INTENSIVE**



**WHICH IN THE ERA OF CLIMATE CHANGE,
INCREASINGLY PUTS US AT RISK.**



MADINAT AL IRFAN

The Brief: 11 Principles



PRINCIPLE 1: LEARN FROM THE PAST TO INFORM THE FUTURE



PRINCIPLE 2: CREATE PLACES OF DISTINCT CHARACTER



PRINCIPLE 3: CREATE A COMFORTABLE ENVIRONMENT FOR PEDESTRIANS



PRINCIPLE 4: PROVIDE AN INTEGRATED TRANSPORT SYSTEM



PRINCIPLE 5: CREATE ACTIVE MIXED-USE PLACES



PRINCIPLE 6: CREATE AN INTEGRATED, SUSTAINABLE COMMUNITY



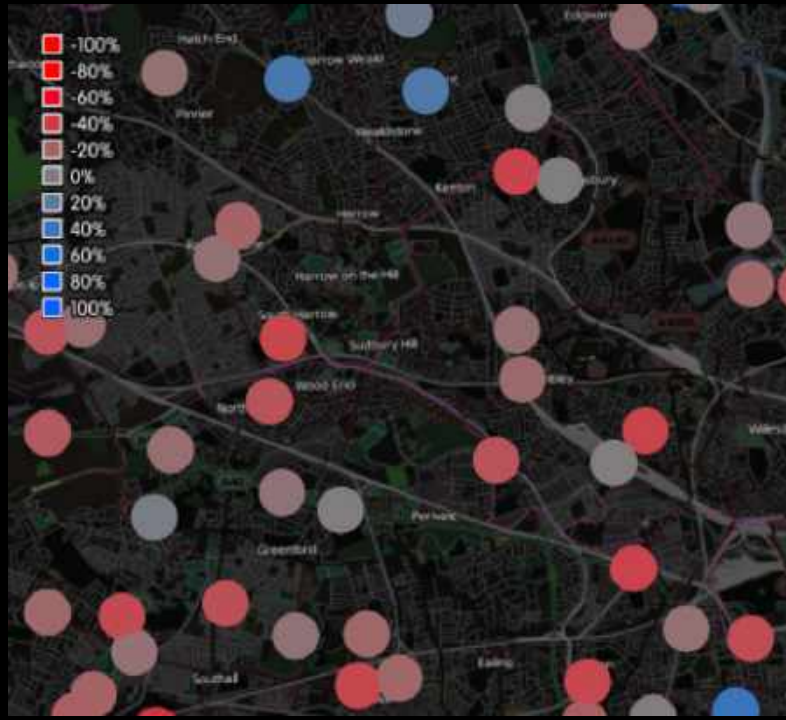
PRINCIPLE 7: CELEBRATE THE NATURAL LANDSCAPE



PRINCIPLE 8: EMBRACE QUALITY AND DIVERSITY IN ITS BUILDINGS



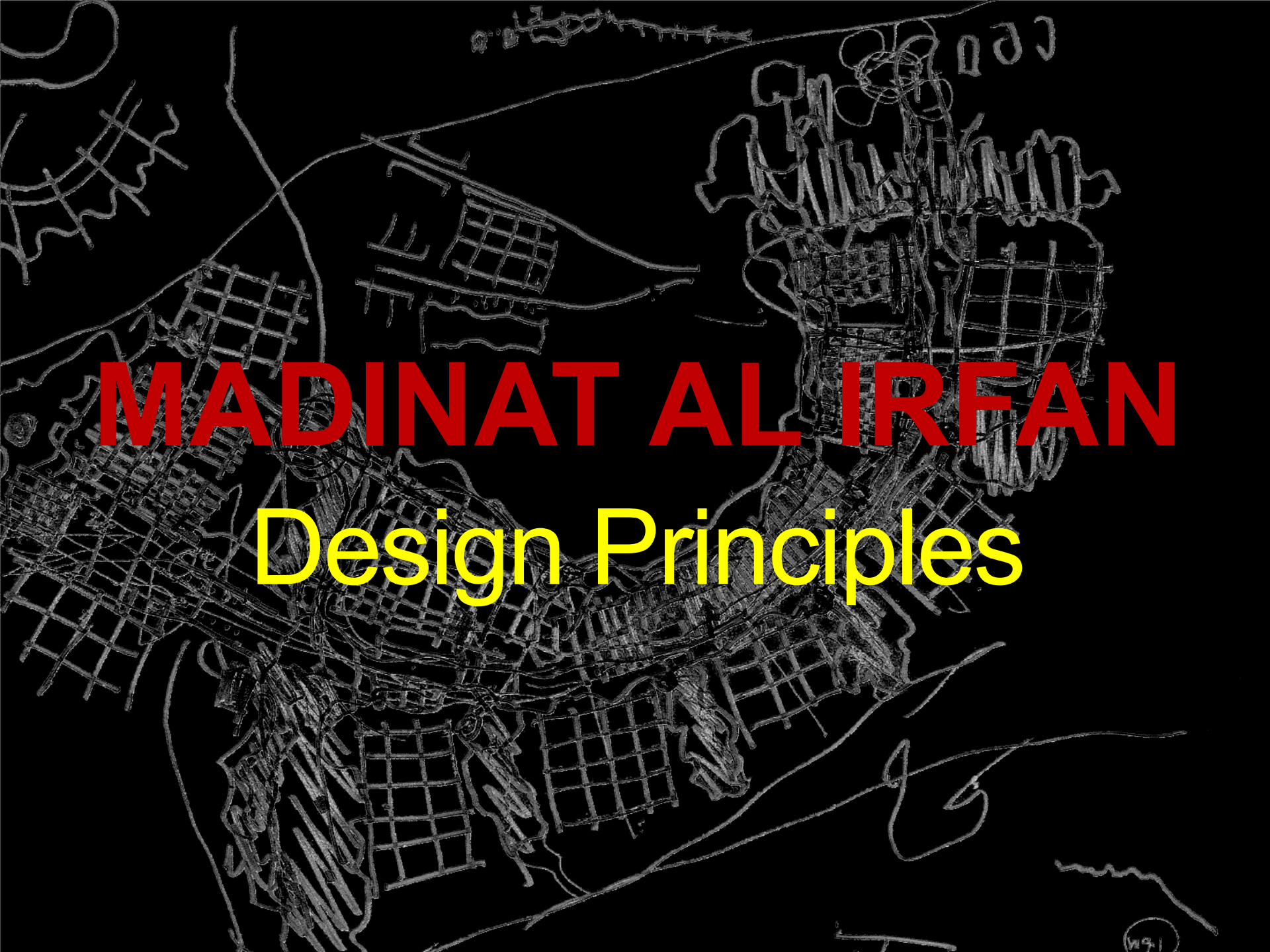
PRINCIPLE 9: COMPLETE AT EVERY STAGE



PRINCIPLE 10: SMART CITY CONCEPT

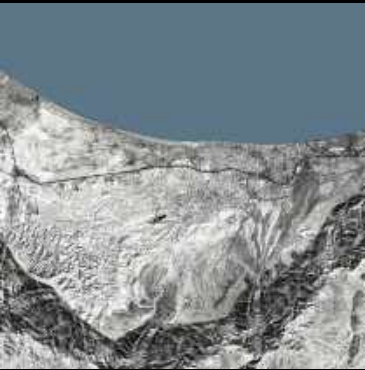


PRINCIPLE 11: PROVIDE A CATALYST FOR CHANGE



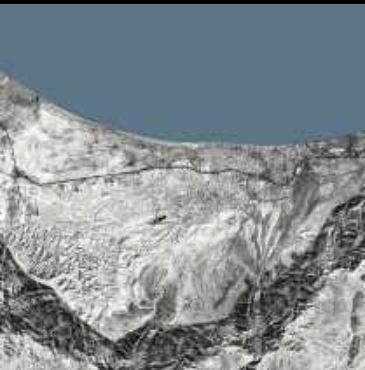
MADINAT AL IREAN

Design Principles



Between the Sea and
the Mountain

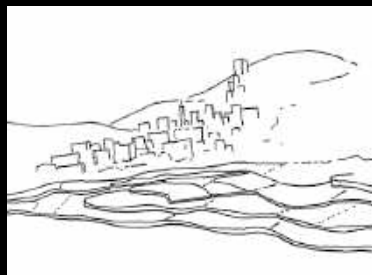


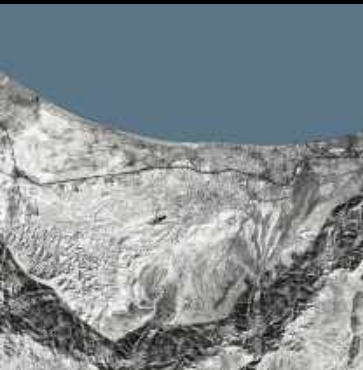


Between the Sea and
the Mountain



Design with Nature





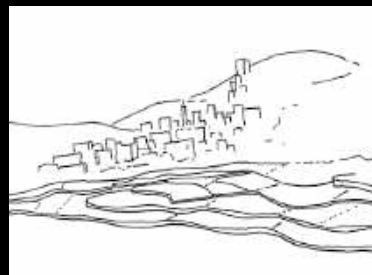
Between the Sea and
the Mountain

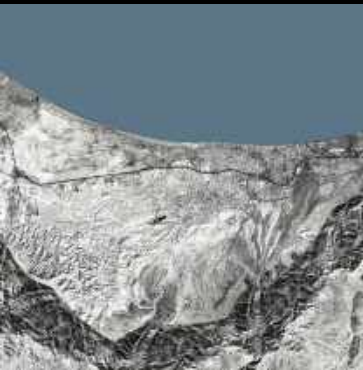


Design with Nature



Gateway to Oman





Between the Sea and the Mountain



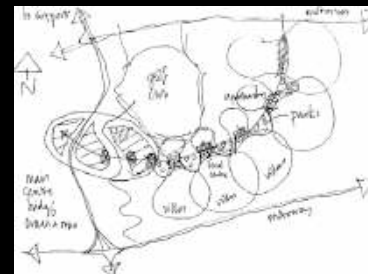
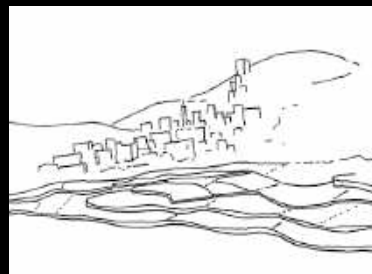
Design with Nature

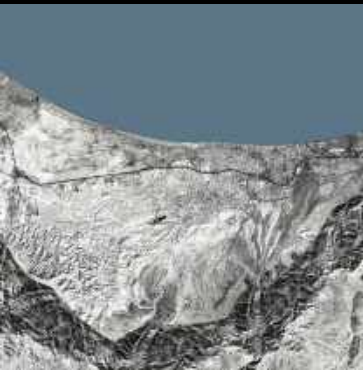


Gateway to Oman



Pearls on a String





Between the Sea and the Mountain



Design with Nature



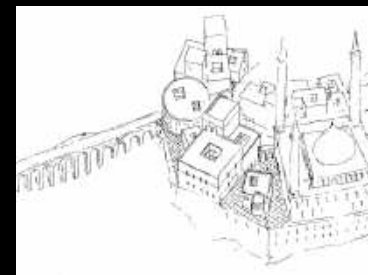
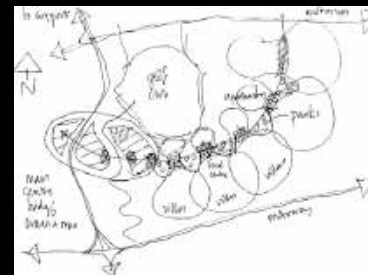
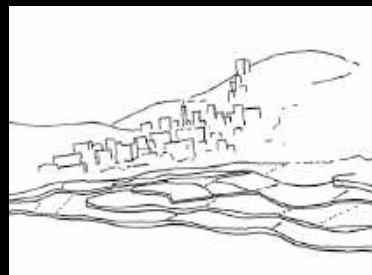
Gateway to Oman



Pearls on a String



Memorable Places



MADINAT AL IRFAN

Sustainability: five key themes



1 Appropriate Design

Responding to the
climate – Learning
from the vernacular



1 Appropriate Design

Responding to the
climate – Learning
from the vernacular

2 Landscape - Ecology

Protecting the natural
environment –
Enhancing biodiversity



1 Appropriate Design

Responding to the climate – Learning from the vernacular



2 Landscape - Ecology

Protecting the natural environment – Enhancing biodiversity



3 Resources

Responsible consumption – efficient use



1 Appropriate Design

Responding to the climate – Learning from the vernacular

2 Landscape - Ecology

Protecting the natural environment – Enhancing biodiversity

3 Resources

Responsible consumption – efficient use

4 Public Transport

Connecting the city – Changing behaviour



1 Appropriate Design

Responding to the climate – Learning from the vernacular

2 Landscape - Ecology

Protecting the natural environment – Enhancing biodiversity

3 Resources

Responsible consumption – efficient use

4 Public Transport

Connecting the city – Changing behaviour

5 Governance

Setting standards – safeguarding the future

An aerial photograph of a coastal city, likely Madinat Al Irfan, showing a grid-like urban layout along a shoreline. The city is surrounded by rugged, mountainous terrain. The image is in grayscale, with the text overlaid in white and yellow.

MADINAT AL IRFAN

Understanding the site

Irfan is strategically placed in the Muscat metropolitan corridor...



SEEB

MUTRAH

AIRPORT

GHALA

RUWI

7 KM

...sitting in close proximity to the airport and major roads...



SEEB

MUTRAH

AIRPORT

Sultan Qaboos Street

GHALA

RUWI

Muscat Expressway

7 KM

...on a comparable scale to Mutrah and Ruwi...

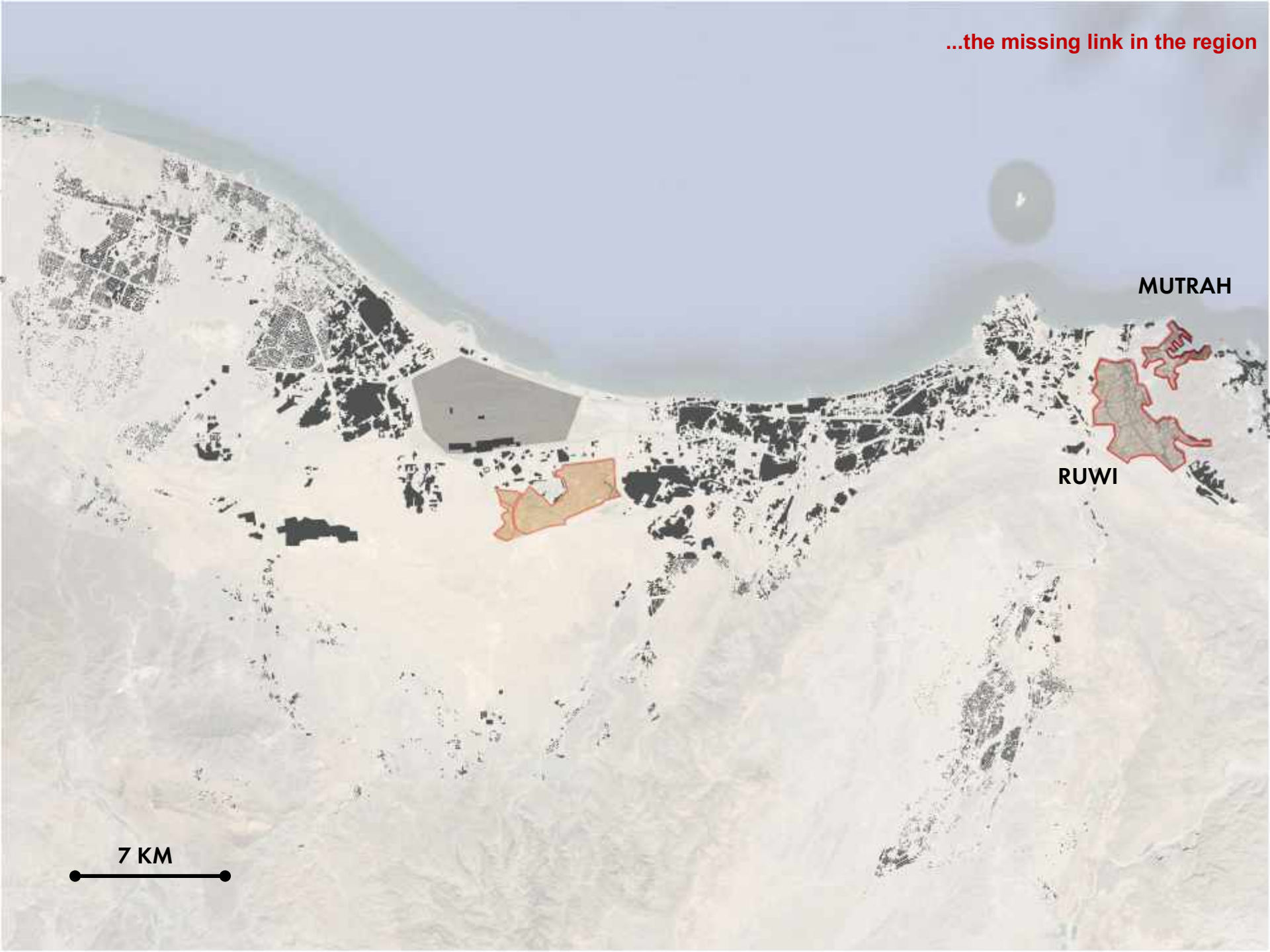


MUTRAH

RUWI

7 KM

...the missing link in the region



MUTRAH

RUWI

7 KM



AIRPORT

GHALA







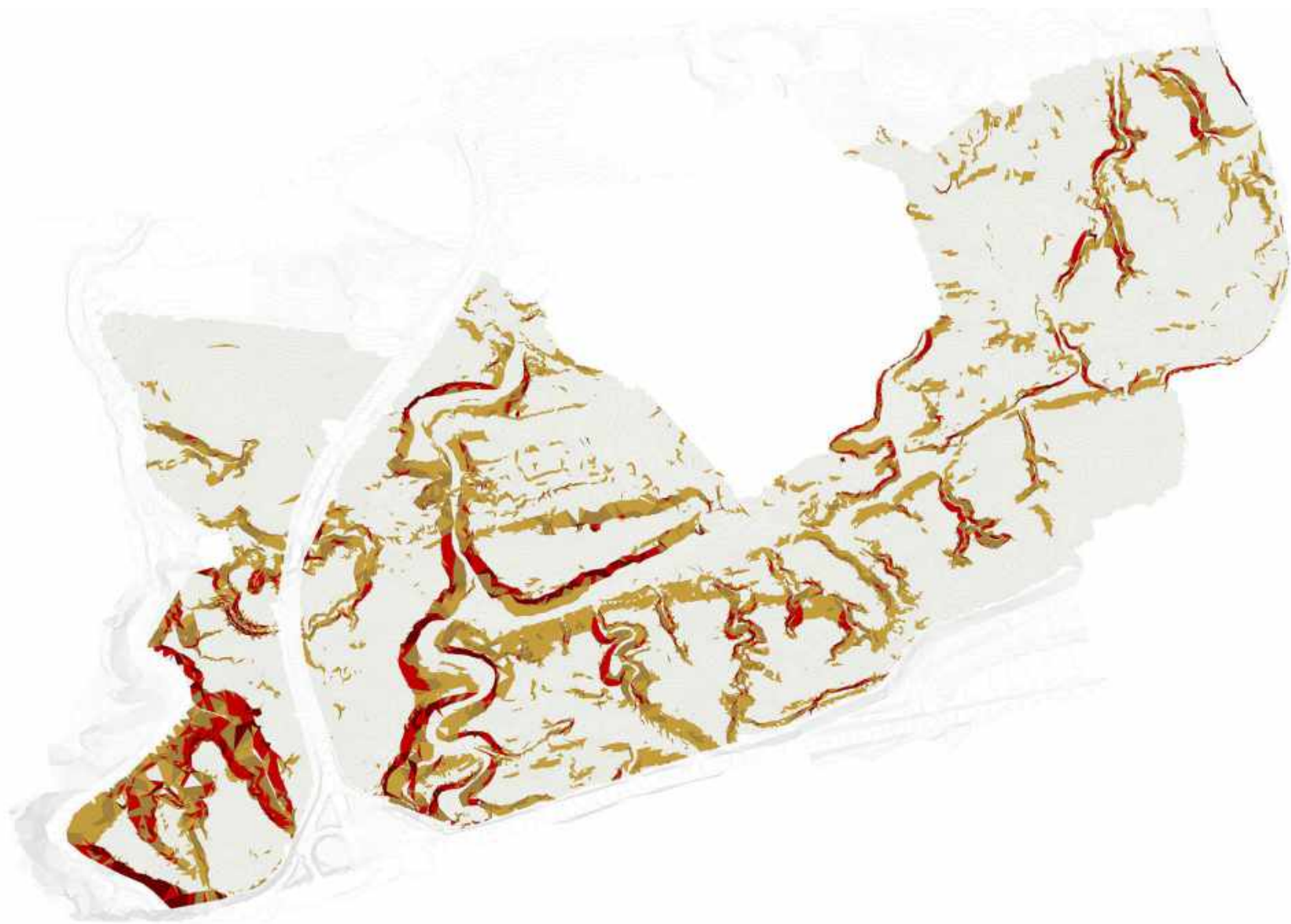




MADINAT AL IRFAN

Responding to the site





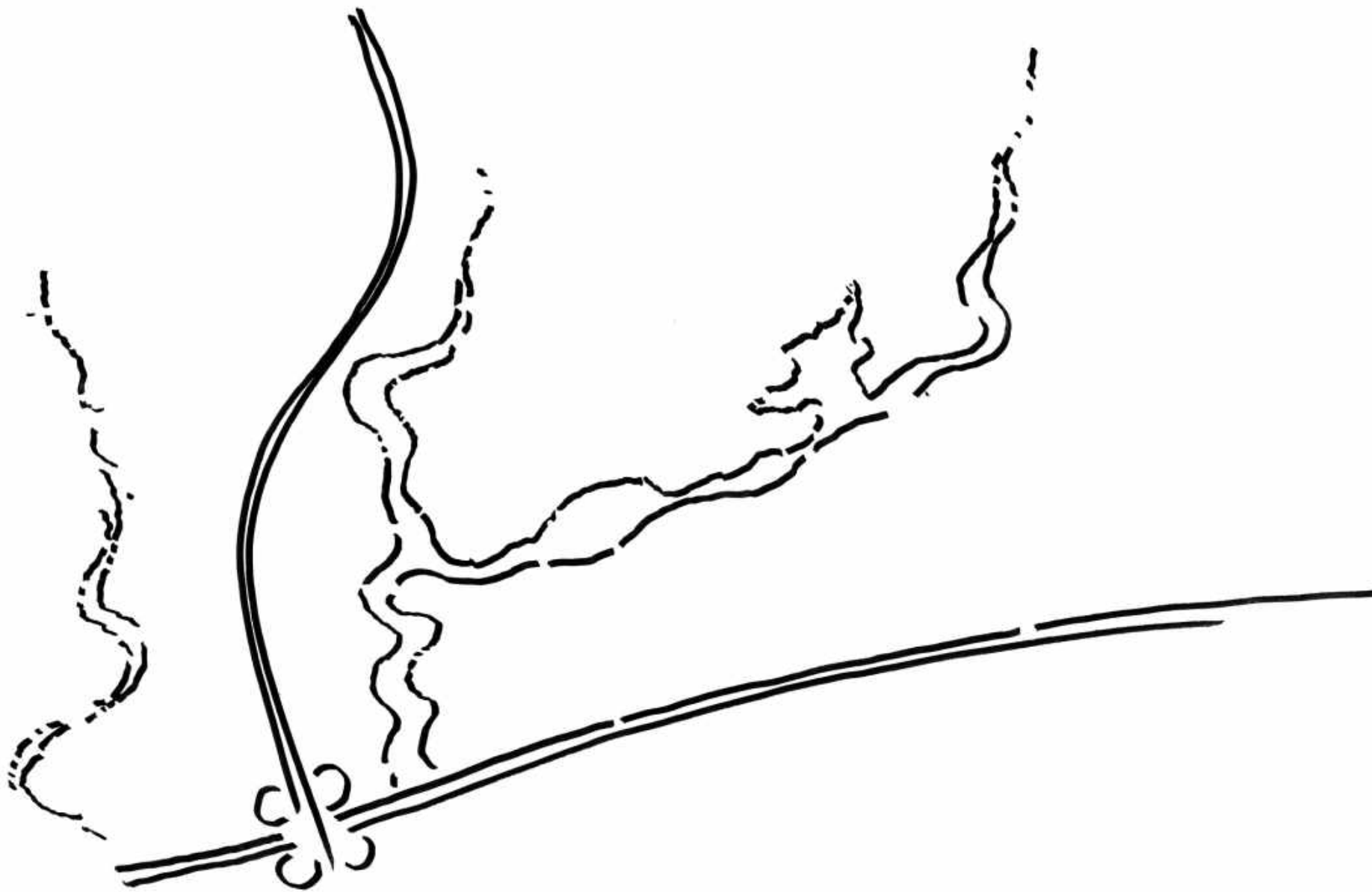
SLOPE ANALYSIS



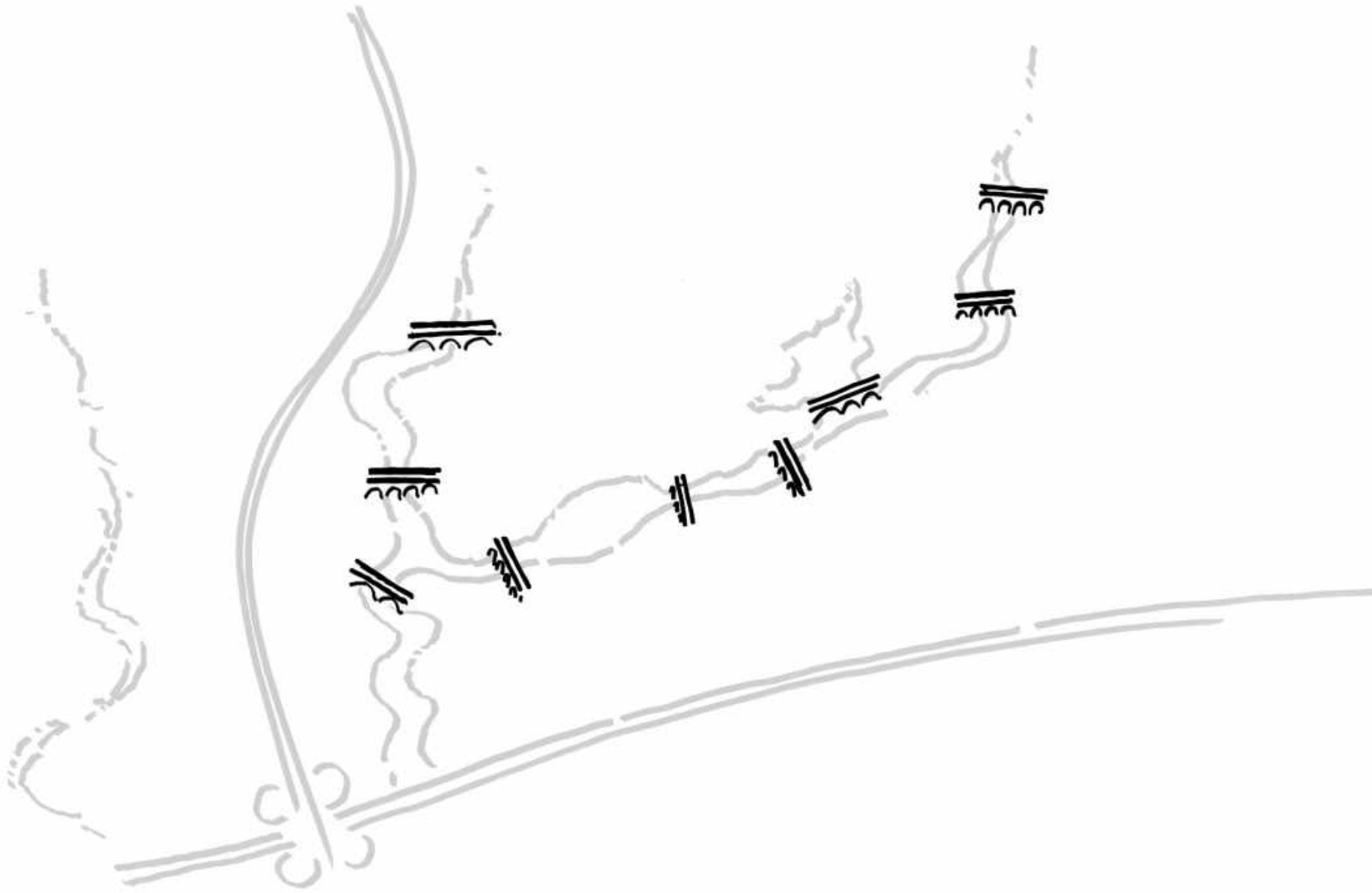
... DETERMINES WHERE TO BUILD



AN ORGANIC FIGURE



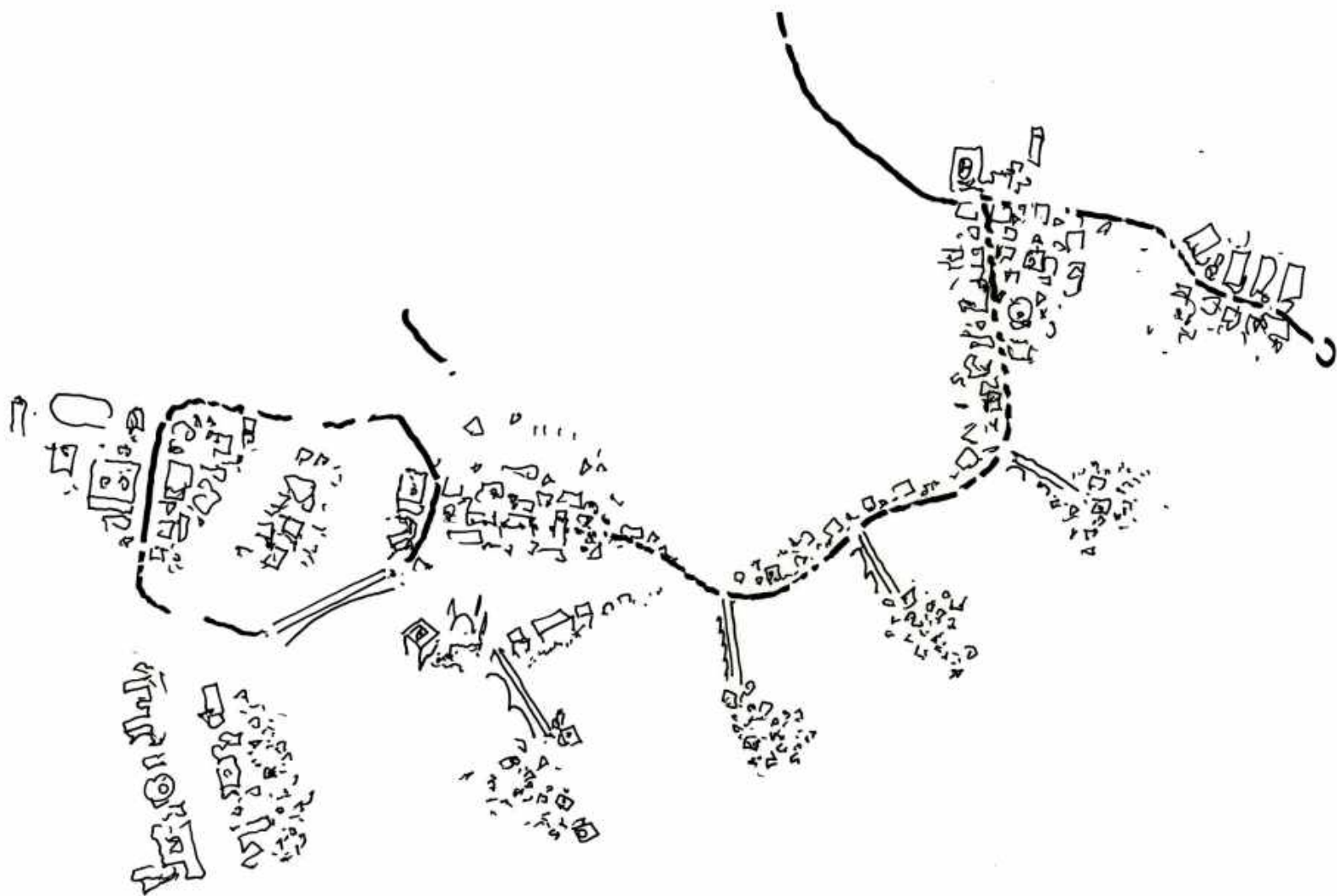
TWO SIDES OF THE CITY



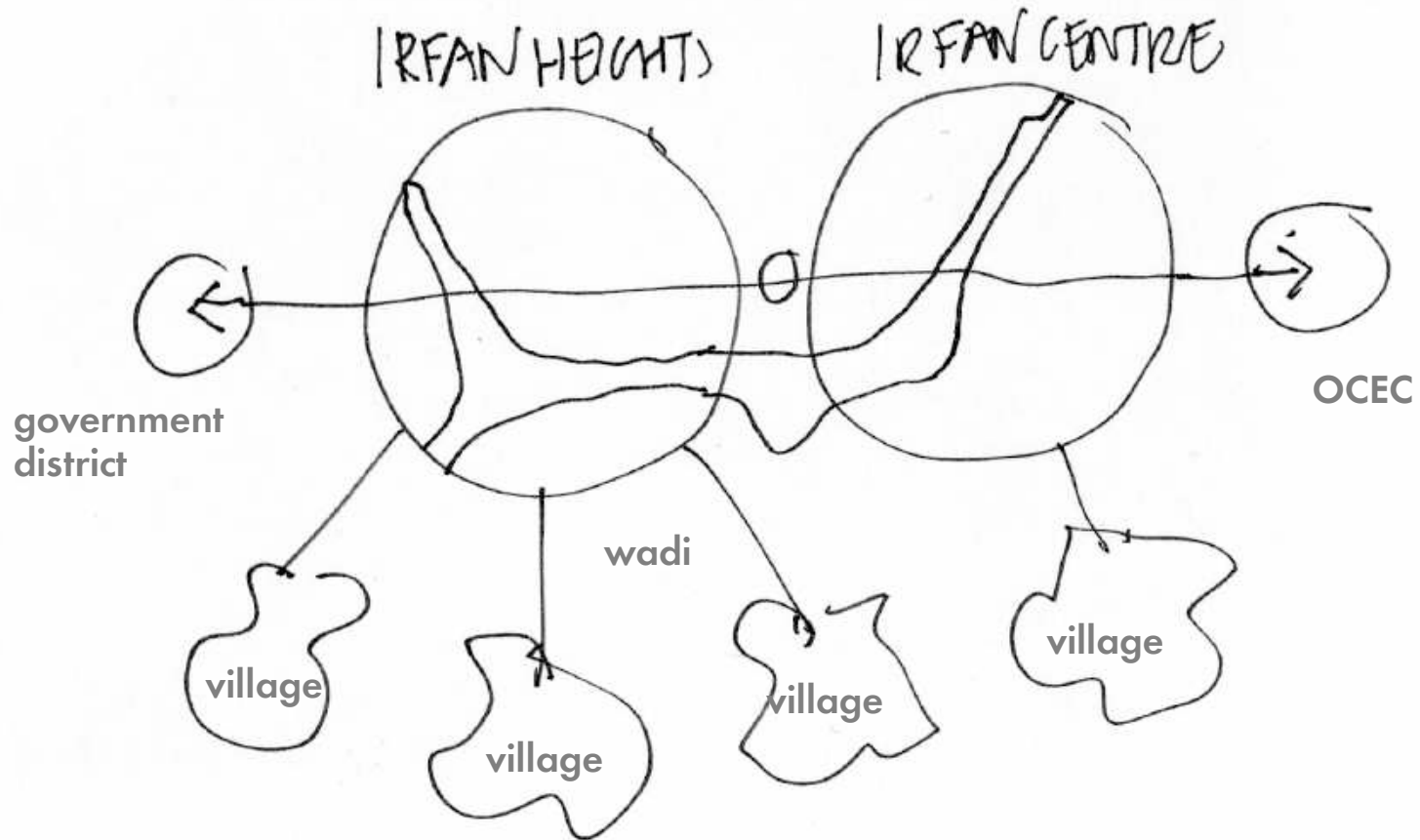
...JOINED BY A SERIES OF BRIDGES



THE DOWNTOWN AND THE HILL TOP VILLAGES



Irfan has two urban centres and a series of villages...



ILLUSTRATIVE MASTERPLAN



13 HECTARES OF URBAN SQUARES
46 HECTARES OF PROMENADE
15 HECTARES OF AGRICULTURE TERRACES
14 HECTARES OF URBAN PARKS
11 HECTARES OF DIWAN GARDENS

9.75 KM LRT ROUTE
15 LRT STOPS
17.4 KM BUS ROUTE
22 BUS STOPS
10.7 KM CYCLEPATH

31,100 TREES

RESIDENTIAL: 2,778,204 SQM
COMMERCIAL: 1,525,190 SQM
RETAIL: 260,272 SQM

118 HECTARES WADI

GOVERNMENT/CIVIC: 874,435 SQM

17 SCHOOLS
1 HIGHER EDUCATION
14 MOSQUES
2 SOUKS
1 CIVIL DEFENCE/POLICE

10 HOTELS
1 THEATRE/CONCERT HALL
3 MUSEUM/GALLERY
2 HOSPITAL
4 HEALTHCARE

HOTELS: 177,269 SQM
CULTURAL: 85,300 SQM

54 HECTARES OF FOOTPATH
13 HECTARES SQUARES
17 HECTARES OF SHARED SURFACES
12 HECTARES OF INTERNAL PEDESTRIAN ALLEYS

2016 BUILDINGS

5,700,670 Sqm OF BUILT UP AREA

15 BRIDGES

ILLUSTRATIVE MASTERPLAN

31,100 TREES

OVER 55 SPECIES



TREES PLAN


Site boundary

- Existing trees
- Proposed trees
- Proposed trees (Phase 1)

ILLUSTRATIVE MASTERPLAN



WADI PLAN

- | | | | | | |
|---|----------------------|----------------------|------------------------|----------------------|--------------------------|
|  Site boundary | 1 Irfan Central Wadi | 4 Irfan West Wadi | 7 Irfan Park Gardens | 10 Oases | 13 Date Palm Plantations |
| | 2 Irfan Heights Wadi | 5 Key Wadi Locations | 8 Terraced Gardens | 11 Agriculture sheds | |
| | 3 Irfan Village Wadi | 6 Wadi Promenade | 9 Agriculture Terraces | 12 Maintenance huts | |

ILLUSTRATIVE MASTERPLAN

131,672 SQM URBAN SQUARES

46,394 SQM PROMENADE

151,389 SQM AGRICULTURE TERRACES

147,493 SQM URBAN PARKS

110,066 SQM DIWAN GARDENS

59 HECTARES TOTAL



LANDSCAPE PLAN

Site boundary	Mosque square	Urban Primary space	Private courtyard	Playground	Buffer zone
	Promenade	Urban Secondary space	Sikkat	Private garden	Urban Parks
	Diwan Guest Palace	Shared surface	Rest point	Terraces	Wadi Park

ILLUSTRATIVE MASTERPLAN

539,337 SQM (APROX. 130KM) FOOTPATH

131,672 SQM SQUARES

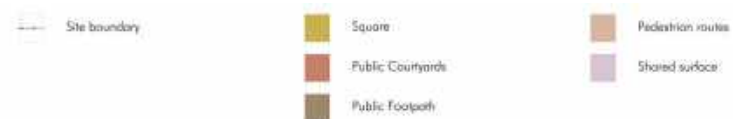
176,925 SQM SHARED SURFACES

119,805 SQM INTERNAL PLOT LINK

97 HECTARES



PEDESTRIAN NETWORK



ILLUSTRATIVE MASTERPLAN

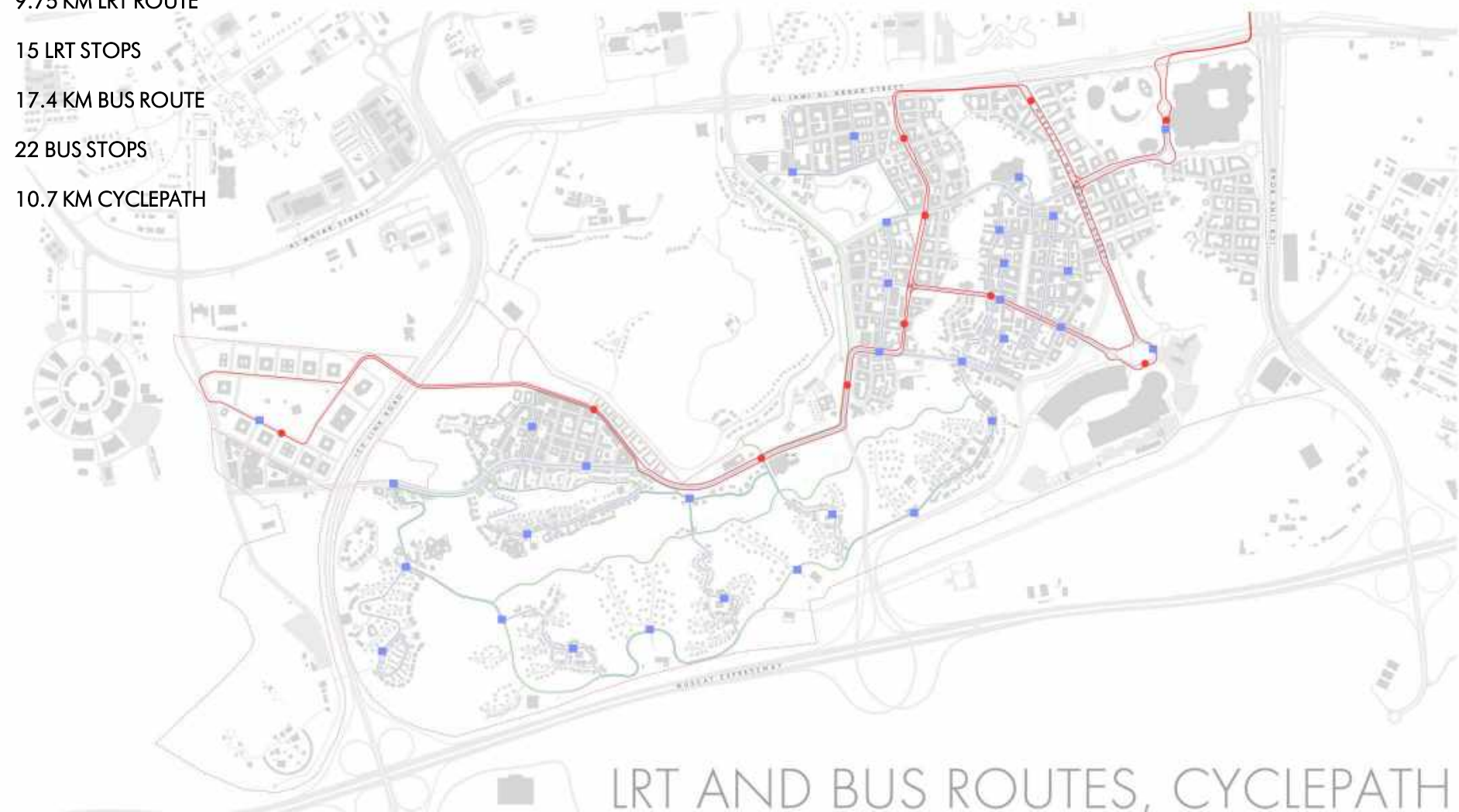
9.75 KM LRT ROUTE

15 LRT STOPS

17.4 KM BUS ROUTE

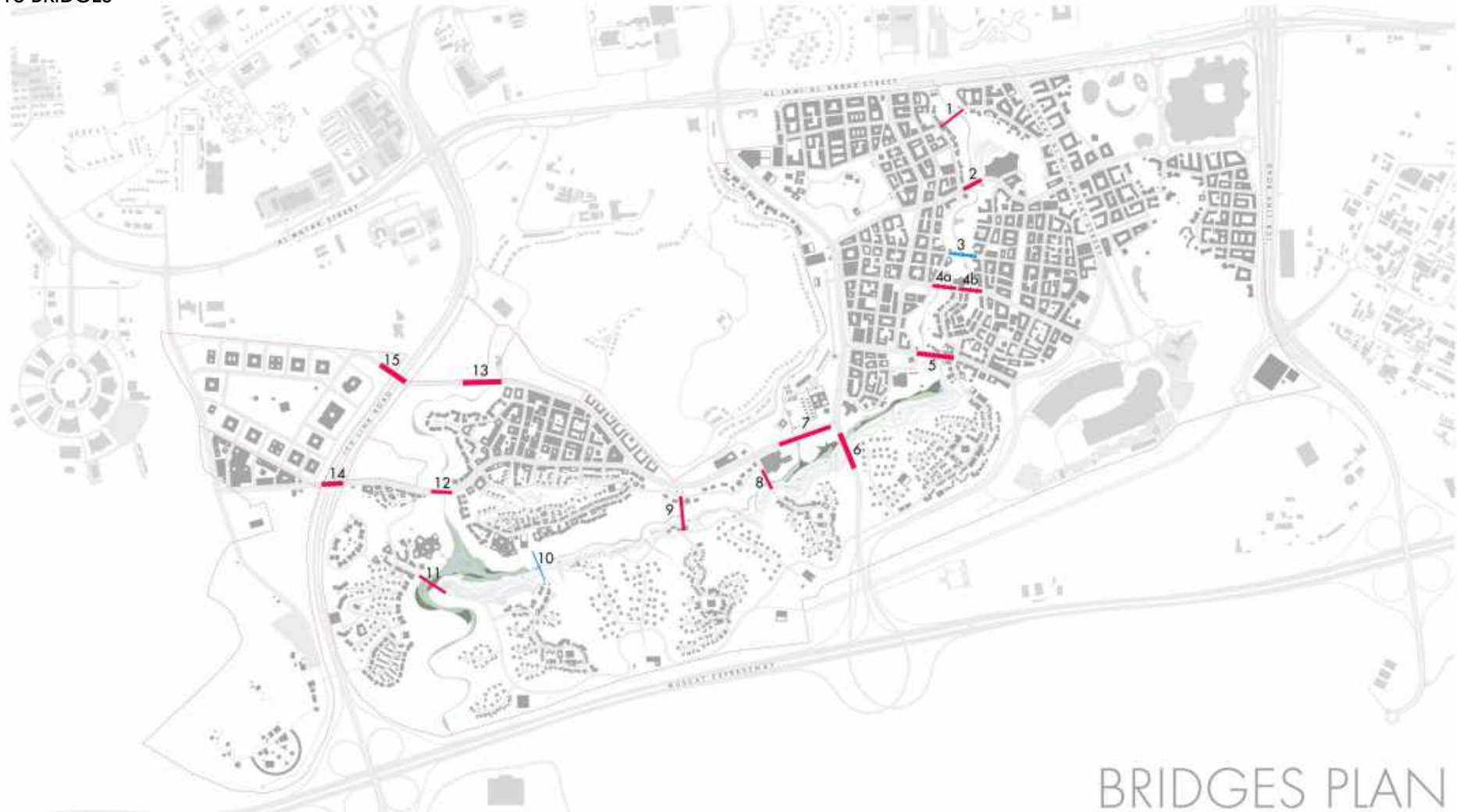
22 BUS STOPS

10.7 KM CYCLEPATH

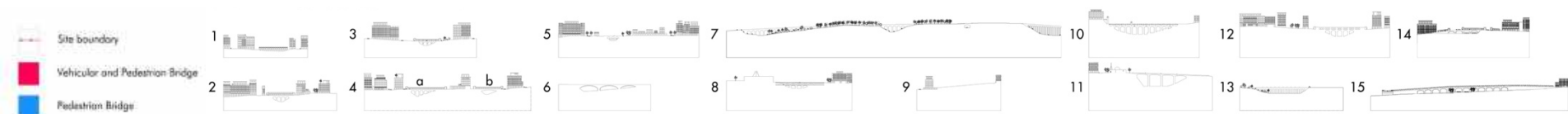


ILLUSTRATIVE MASTERPLAN

15 BRIDGES



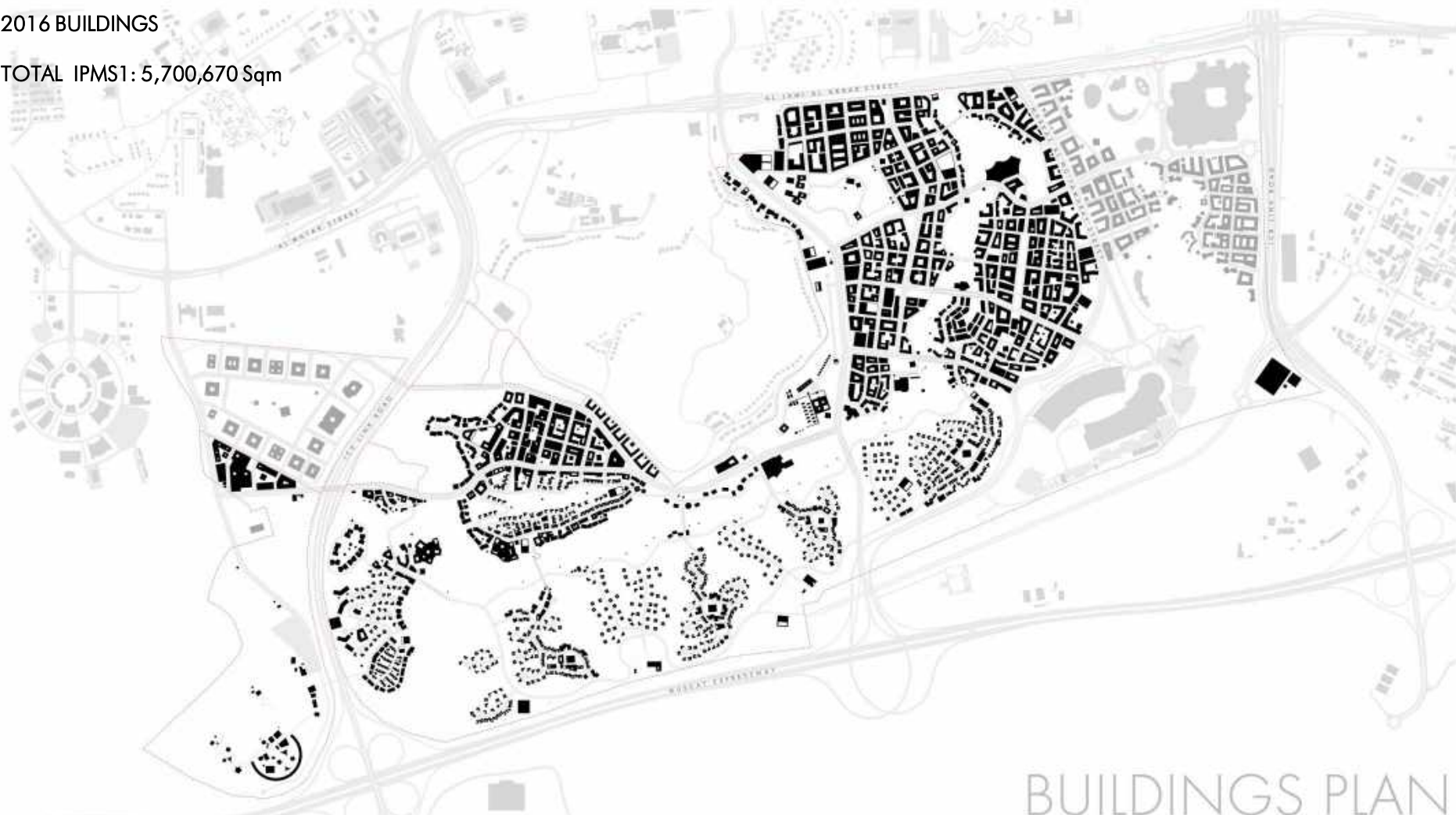
BRIDGES PLAN



ILLUSTRATIVE MASTERPLAN

2016 BUILDINGS

TOTAL IPMS1: 5,700,670 Sqm



BUILDINGS PLAN

ILLUSTRATIVE MASTERPLAN

RESIDENTIAL: 2,778,204 SQM

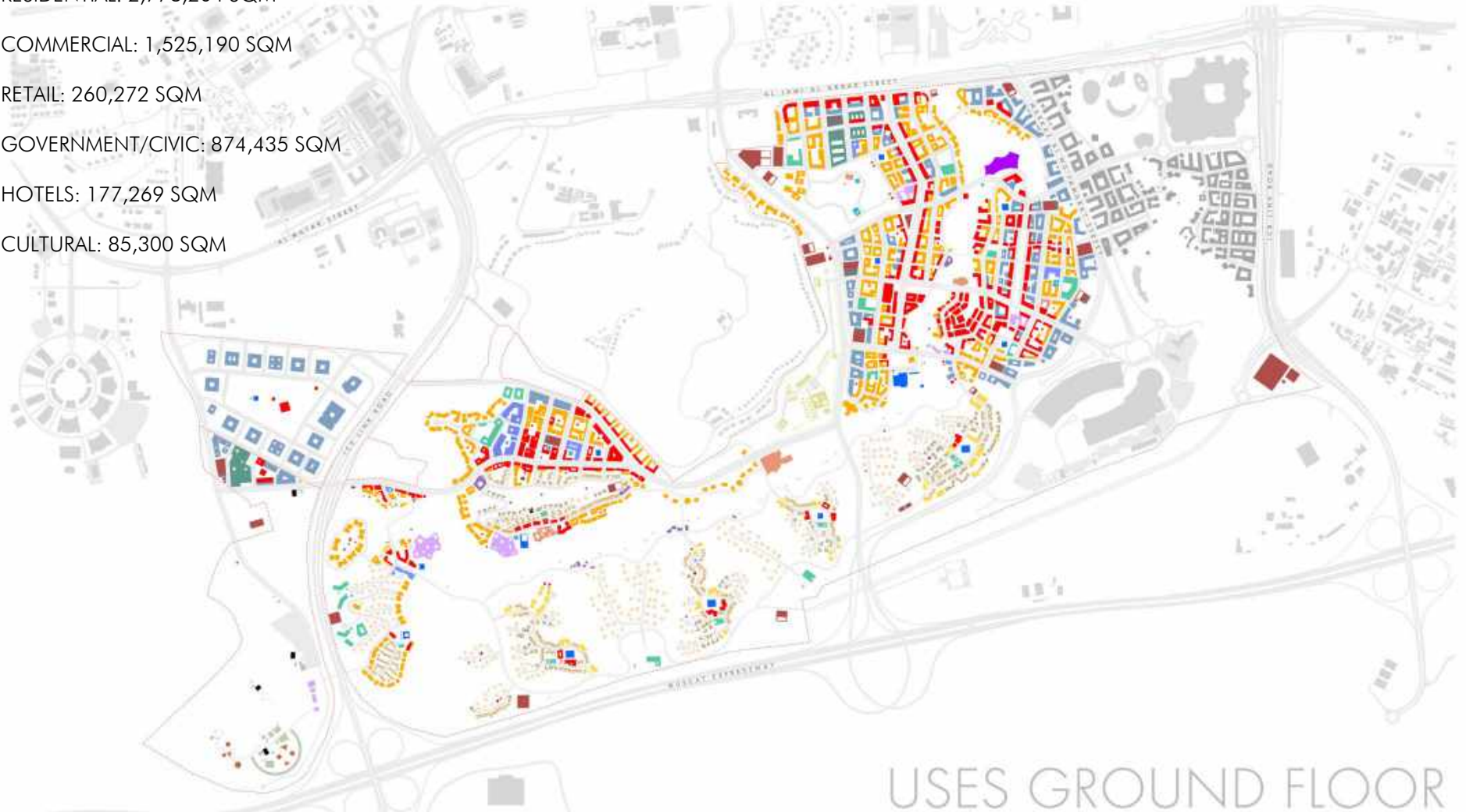
COMMERCIAL: 1,525,190 SQM

RETAIL: 260,272 SQM

GOVERNMENT/CIVIC: 874,435 SQM

HOTELS: 177,269 SQM

CULTURAL: 85,300 SQM



USES GROUND FLOOR

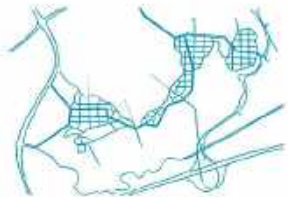




MADINAT AL IRFAN

The Anatomy of the City

ANATOMY OF THE CITY



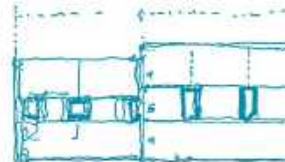
City scale



District scale



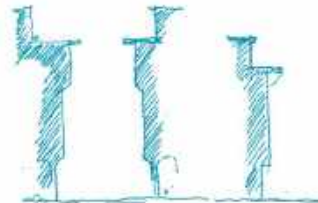
Block scale



Plot scale



Building scale



Building elements

ANATOMY OF THE CITY

1. THE DISTRICT WITHIN THE CITY:

- Topography
- Climate
- Orientation

2. THE BLOCK WITHIN THE DISTRICT:

- Block size
- Character / grain
- Flexibility of land use and building types
- Open spaces and walkability

3. THE PLOT WITHIN THE BLOCK:

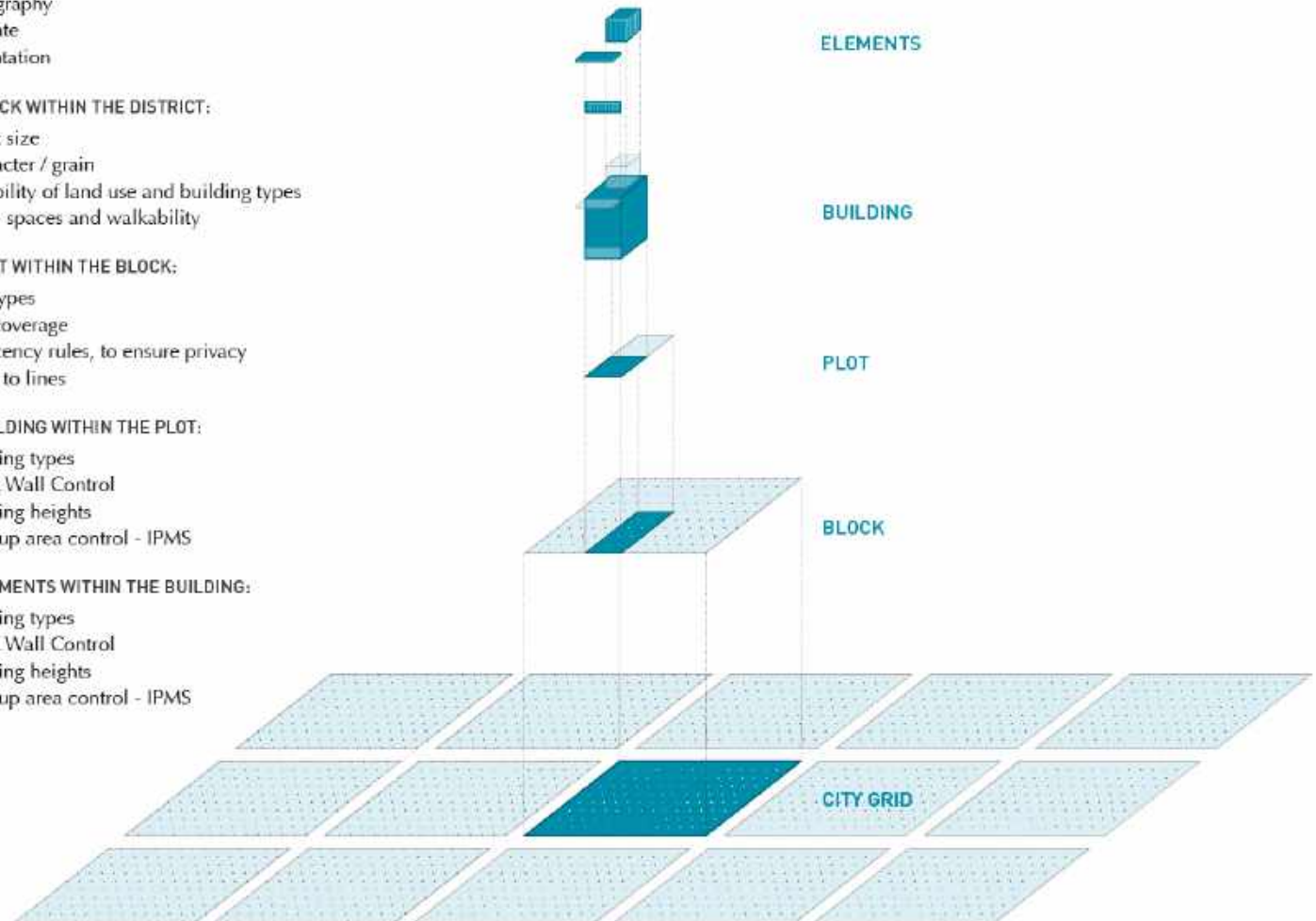
- Plot types
- Plot coverage
- Adjacency rules, to ensure privacy
- Build to lines

4. THE BUILDING WITHIN THE PLOT:

- Building types
- Street Wall Control
- Building heights
- Built up area control - IPMS

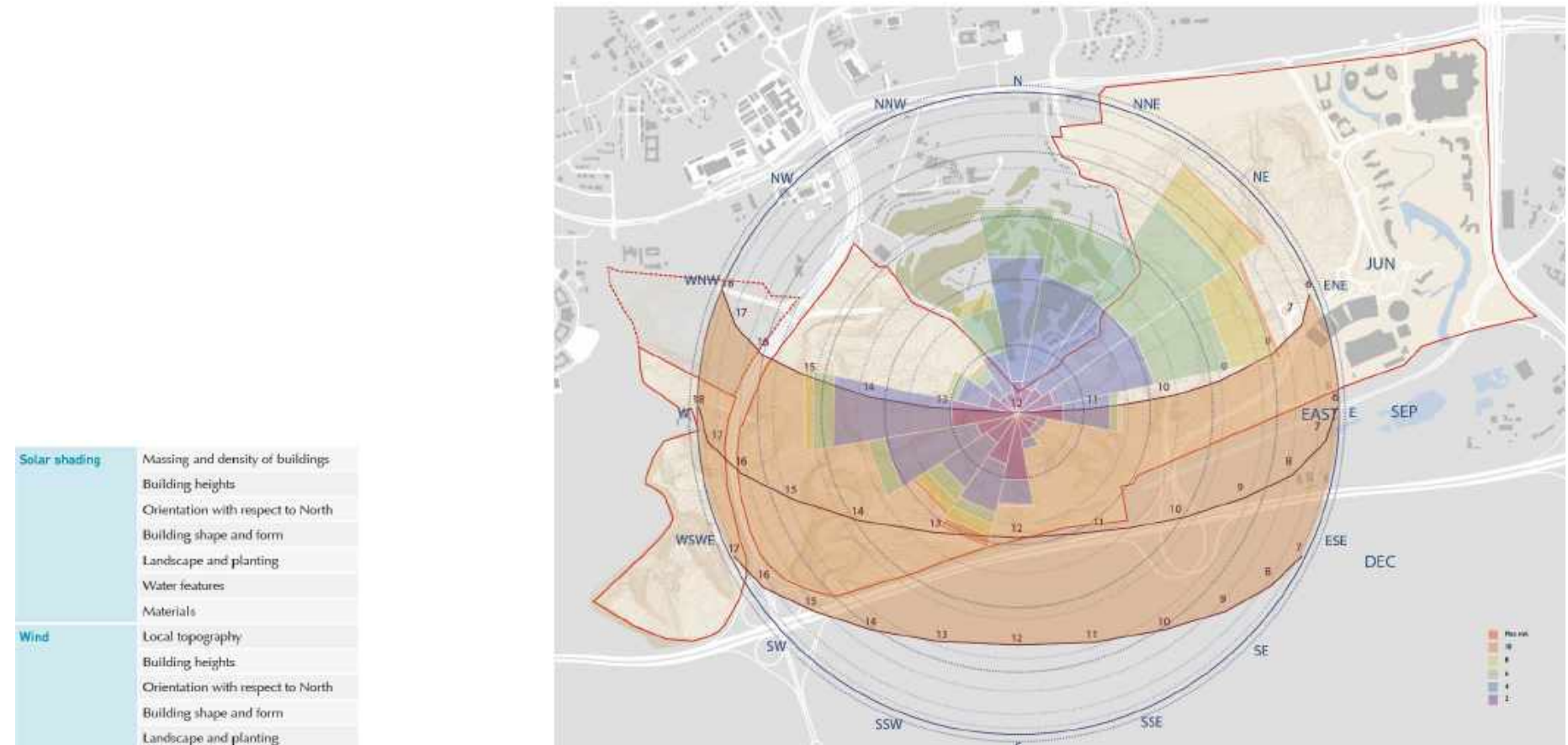
5. THE ELEMENTS WITHIN THE BUILDING:

- Building types
- Street Wall Control
- Building heights
- Built up area control - IPMS



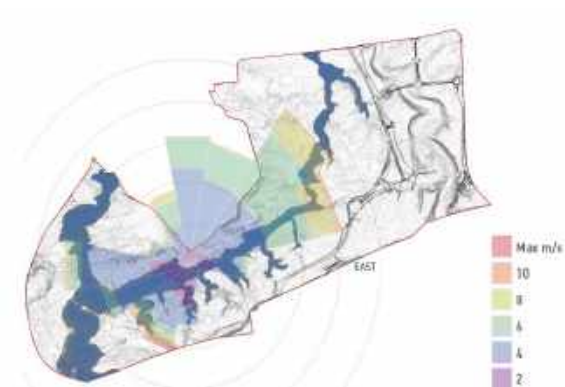
DISTRICT WITHIN THE CITY

MICROCLIMATIC DESIGN FACTORS



DISTRICT WITHIN THE CITY

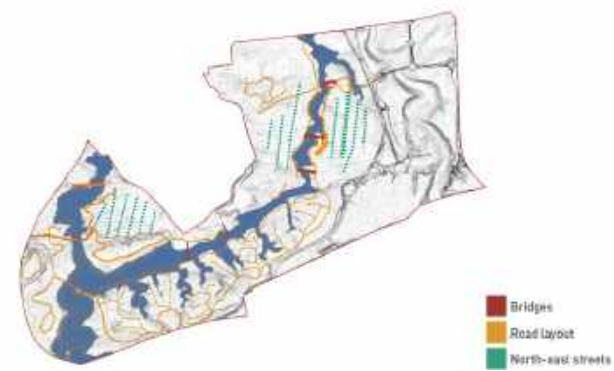
MICROCLIMATIC DESIGN FACTORS



Wind diagram for Madiant al Irfan



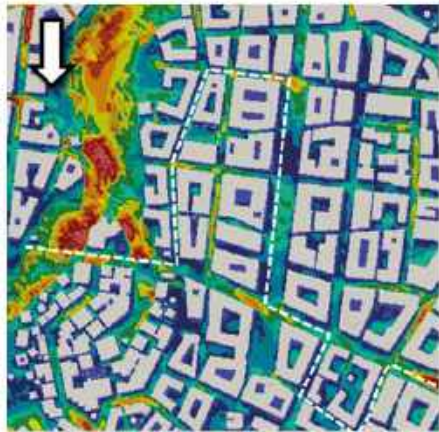
Street following the north-east breeze



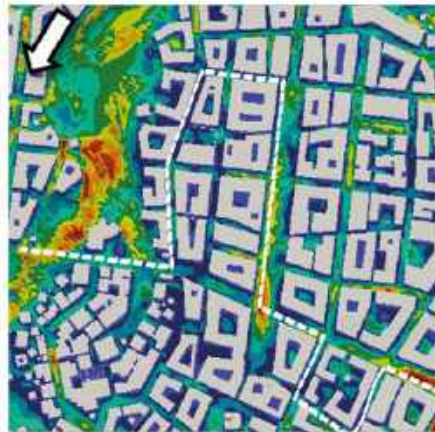
Result of topography and wind in the structure of the masterplan

DISTRICT WITHIN THE CITY

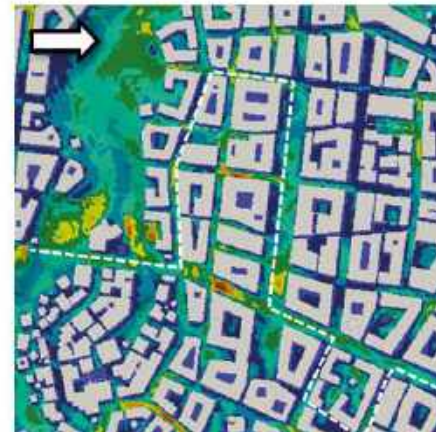
MICROCLIMATIC DESIGN FACTORS



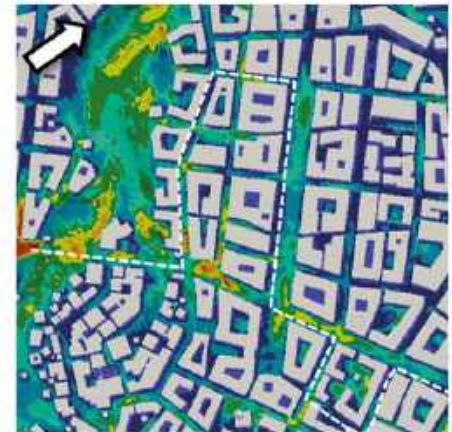
North winds (Irfan Central)



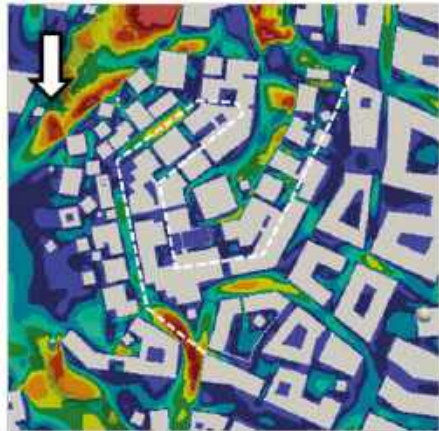
Northeast winds (Irfan Central)



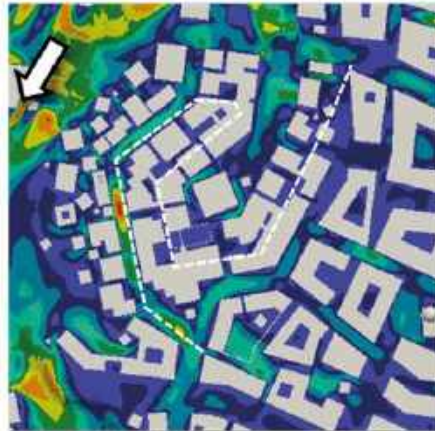
Westerly winds (Irfan Central)



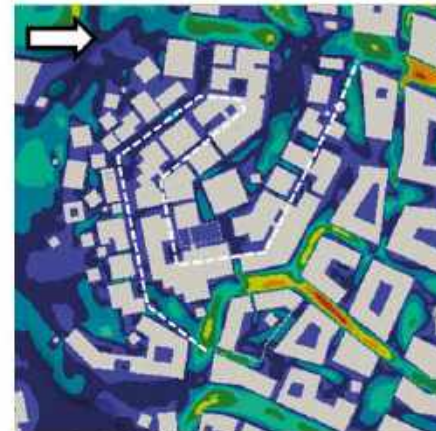
South-westerly winds (Irfan Central)



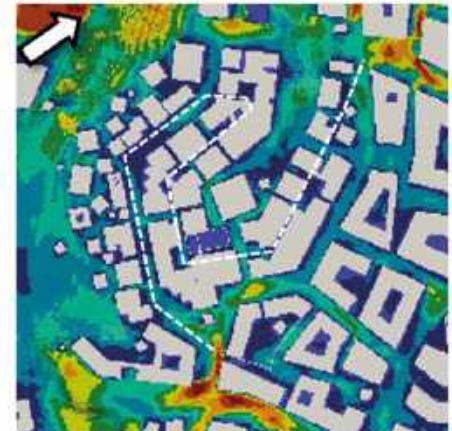
North winds (Souk)



Northeast winds (Souk)



Westerly winds (Souk)



Example analysis - northerly wind direction (Souk)

Fig.5.2-07 Afternoon (left, north-easterly) and early morning (right, south-westerly) winds.

NORTH WINDS

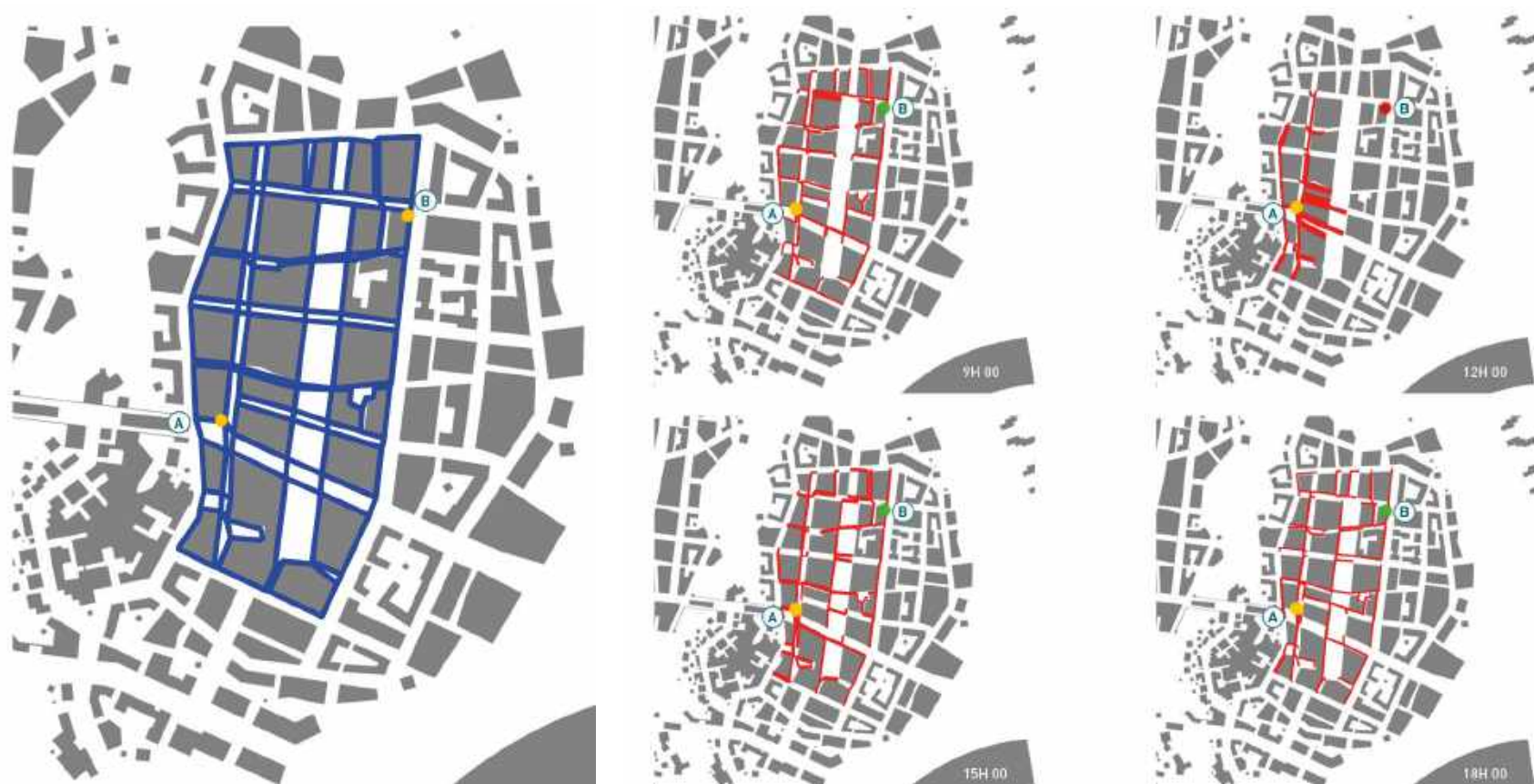
NORTHEAST WINDS

WESTERLY WINDS

SOUTH-WESTERLY WINDS

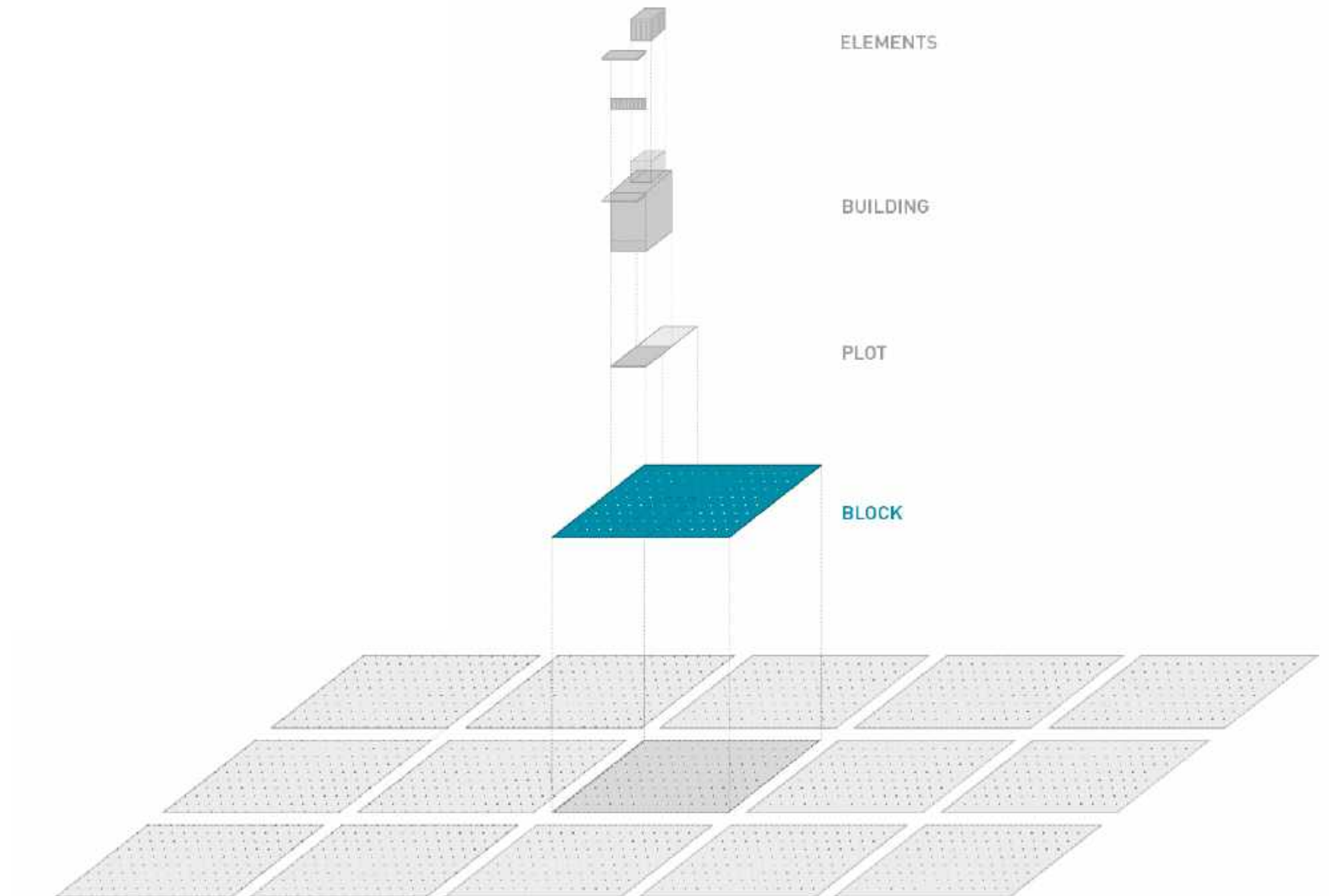
DISTRICT WITHIN THE CITY

MICROCLIMATIC DESIGN FACTORS



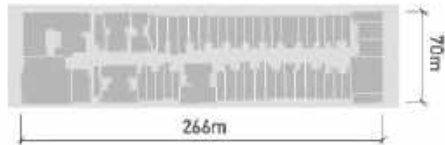
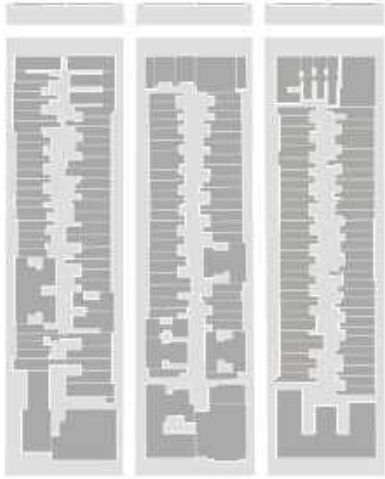
Walkable routes from point A to point B at different times of the day.

BLOCK WITHIN THE DISTRICT

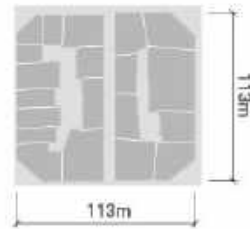


BLOCK WITHIN THE DISTRICT

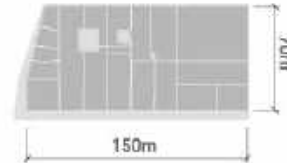
NEW YORK, MANHATTAN:



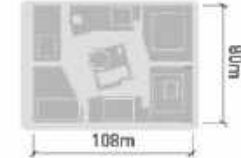
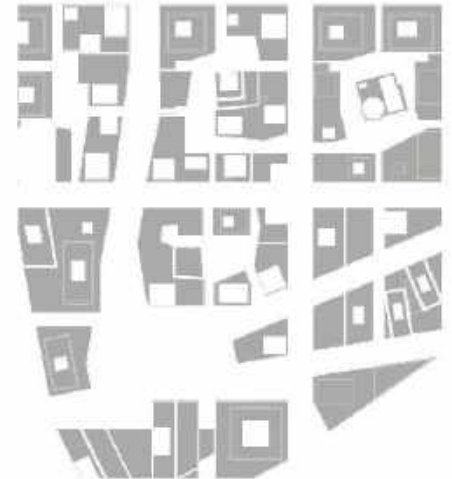
BARCELONA, CERDÀ:



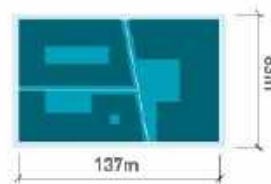
PARIS, HAUSSMANN:



DOHA, MSHEIREB:



OMAN, MADINAT AL IRFAN:



137m

83m

BLOCK WITHIN THE DISTRICT

BLOCK SIZE

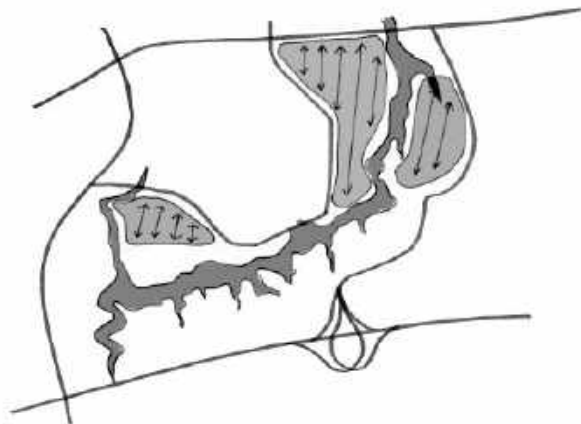


Fig.5.3-02 Shape of the urban settlements and north-south orientated streets

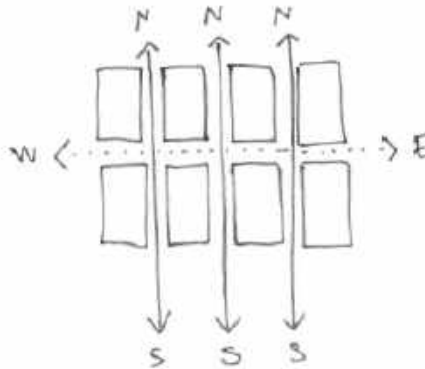


Fig.5.3-05 Maximise façades facing north-south orientated streets

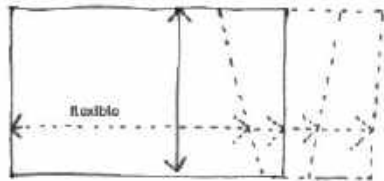


Fig.5.3-03 Flexible length, fixed width

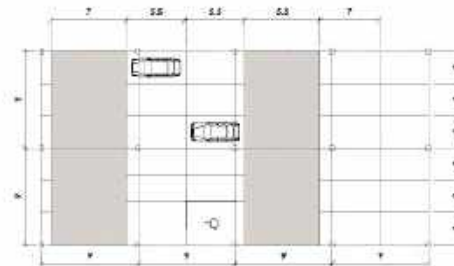


Fig.5.3-06 9x9 grid for basement car parking

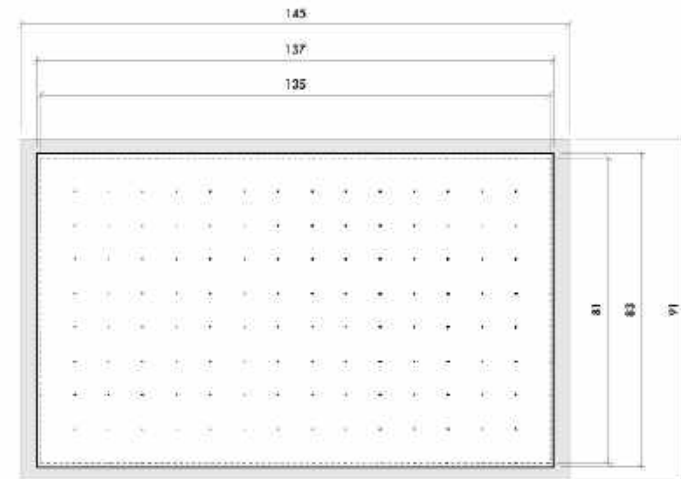


Fig.5.3-04 Dimensions of a generic block in Madinat Al Irfan

BLOCK WITHIN THE DISTRICT

BLOCK SIZE

GENERIC BLOCK: 83X137M

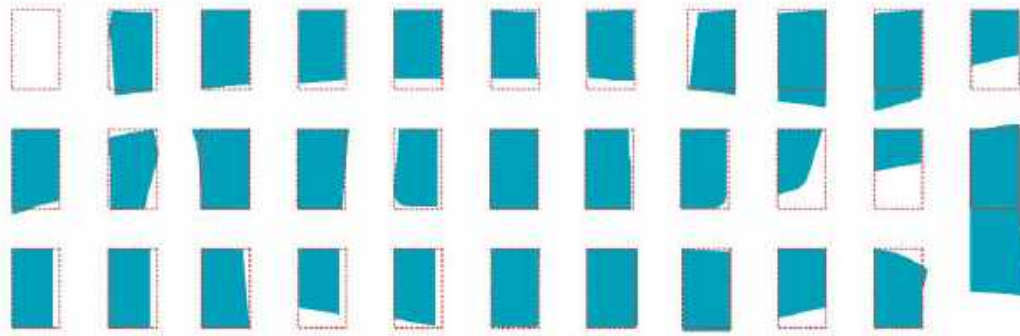


Fig.5.3-07. Generic block in Madinat Al Irfan, and a catalogue of blocks taken from the Concept Masterplan overlaid with the generic block



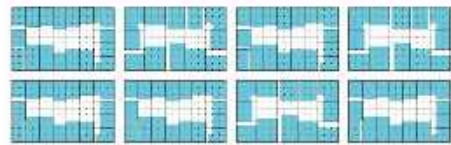
Fig.5.3-08 Blocks of the Concept Masterplan

BLOCK WITHIN THE DISTRICT

URBAN GRAIN

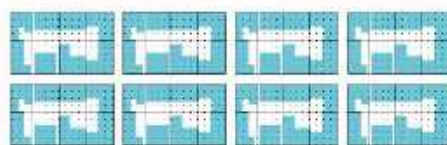
SMALL GRAIN

Typical plot sizes: 400 - 1,300 sqm



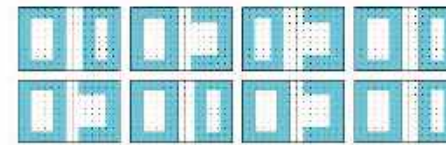
MEDIUM GRAIN

Typical plot sizes: 1,000 - 2,500 sqm



LARGE GRAIN

Typical plot sizes: 2,300 - 11,371 sqm



MIXED GRAIN

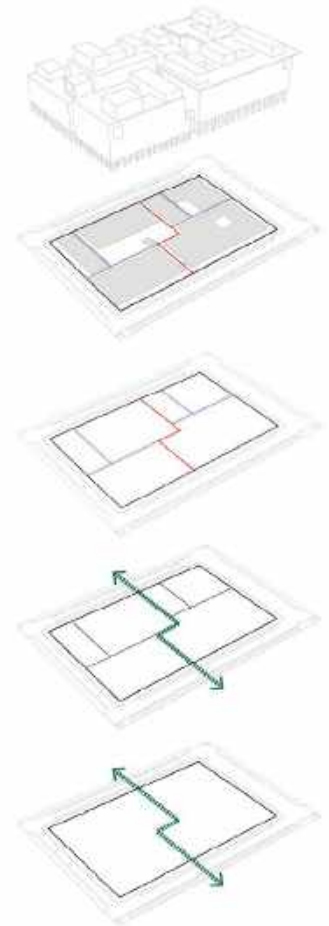
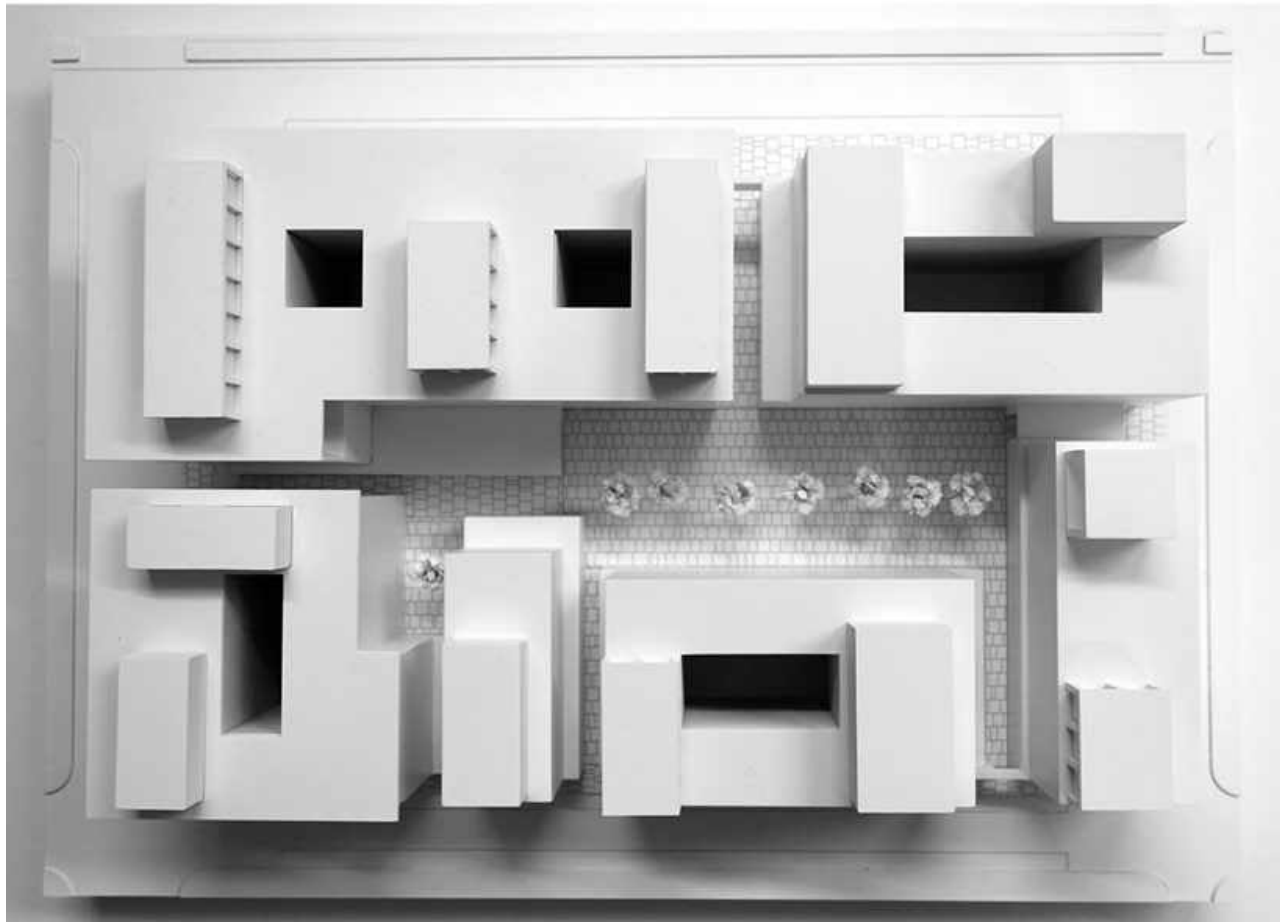
Typical plot sizes: 400 - 11,371 sqm



Fig.5.3-09 Photographs of models showing a variety of urban grains in Madinat AL Irfan

BLOCK WITHIN THE DISTRICT

BLOCK SUBDIVISION CRITERIA



BLOCK WITHIN THE DISTRICT

MICROCLIMATIC DESIGN FACTORS

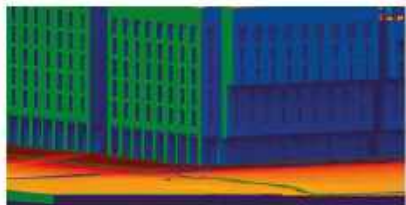


Fig.5.3-15 SW façade with shading elements

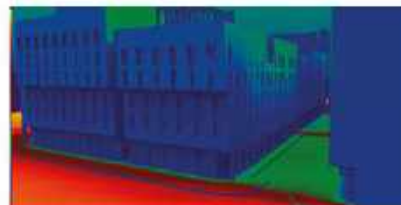


Fig.5.3-17 SE façade with shading elements

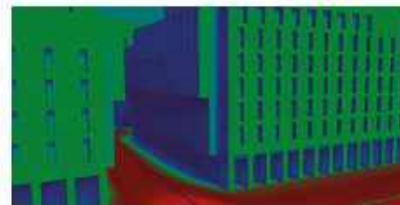


Fig.5.3-19 NW façade with shading elements

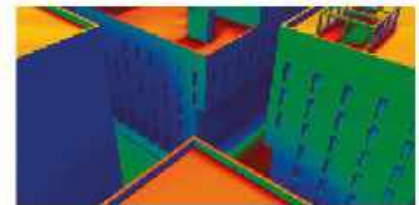
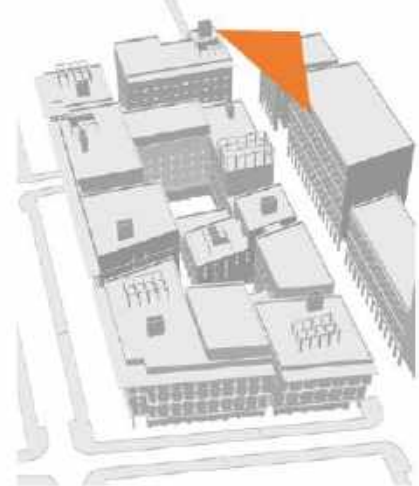


Fig.5.3-21 NE façade with shading elements

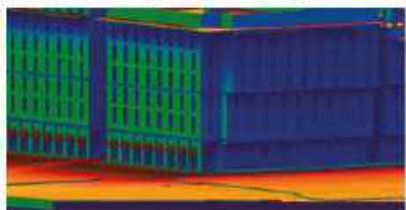


Fig.5.3-16 SW façade without shading elements

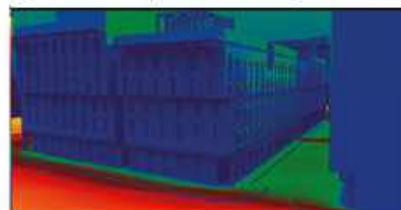


Fig.5.3-18 SE façade without shading elements

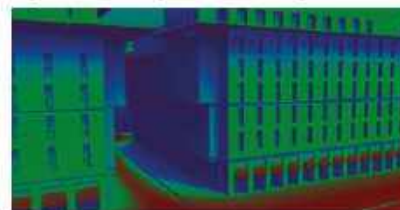


Fig.5.3-20 NW façade without shading elements

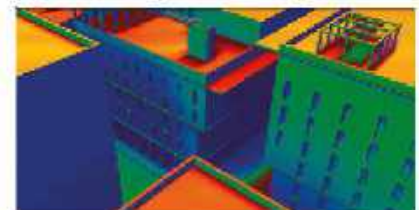
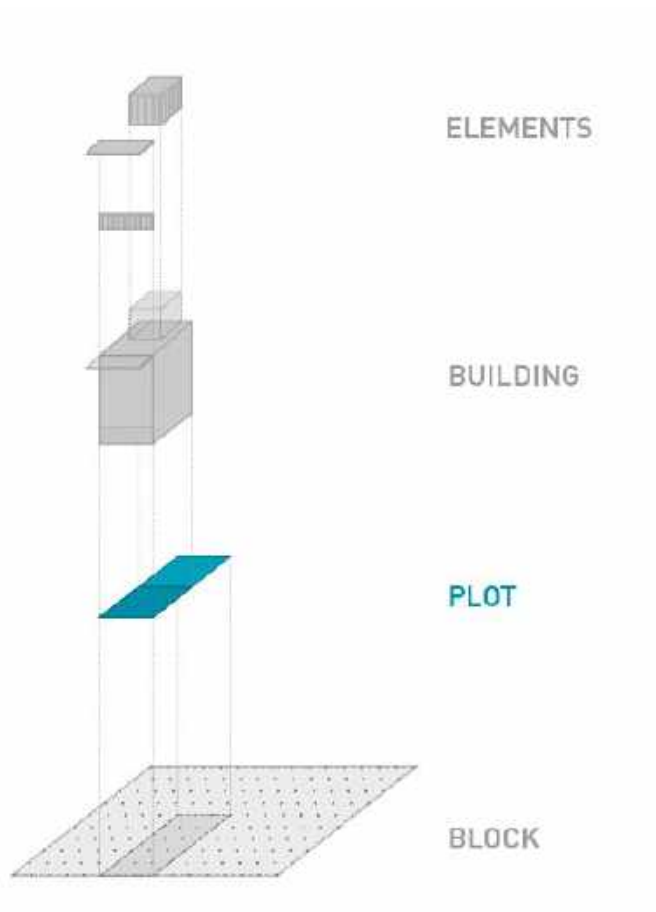


Fig.5.3-22 NE façade without shading elements

PLOT WITHIN THE BLOCK



PLOT WITHIN THE BLOCK

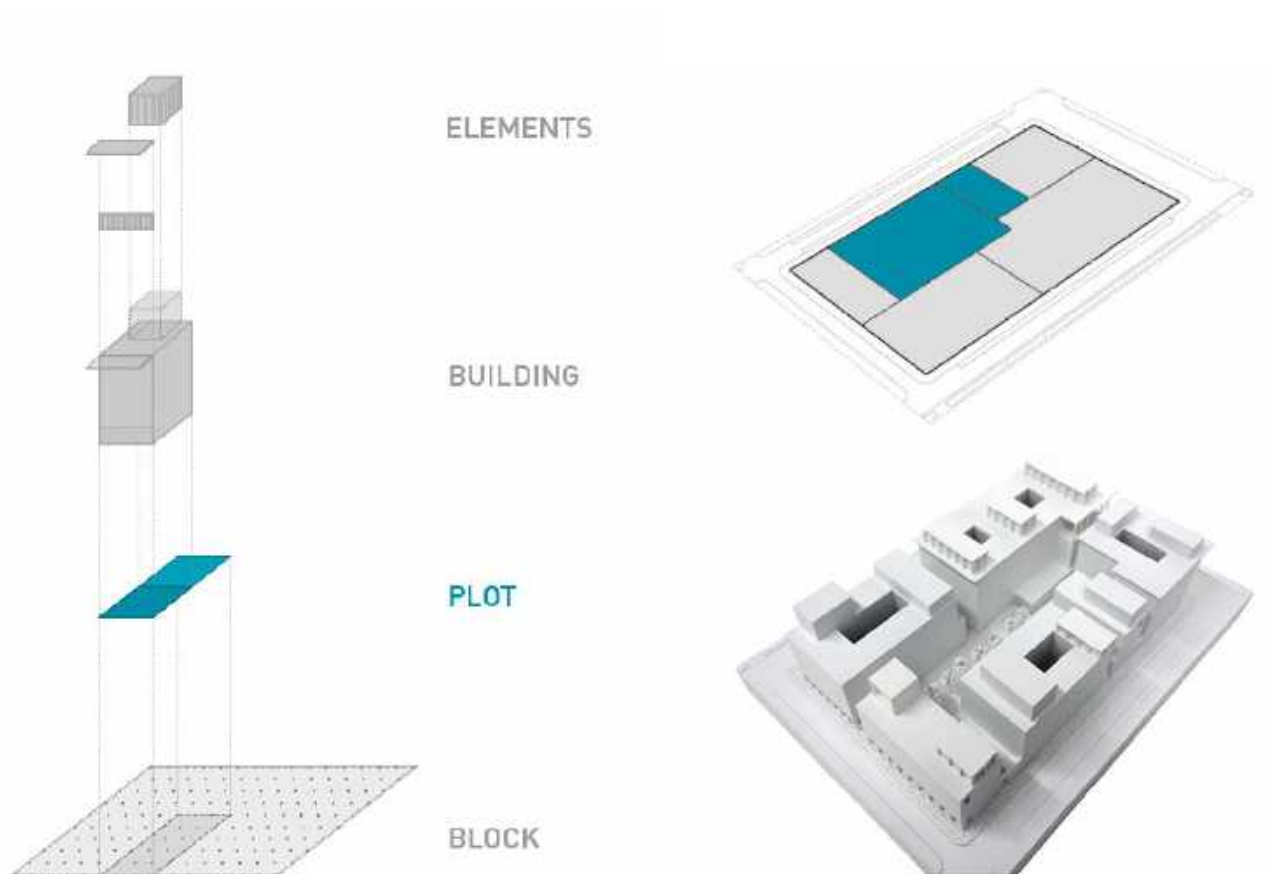
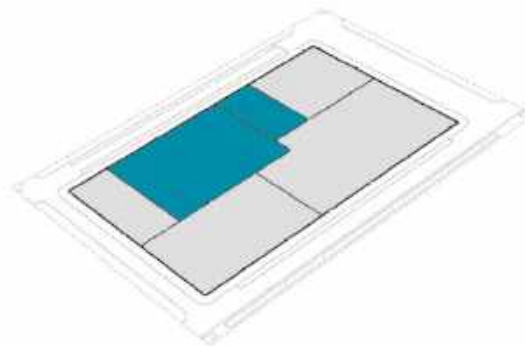
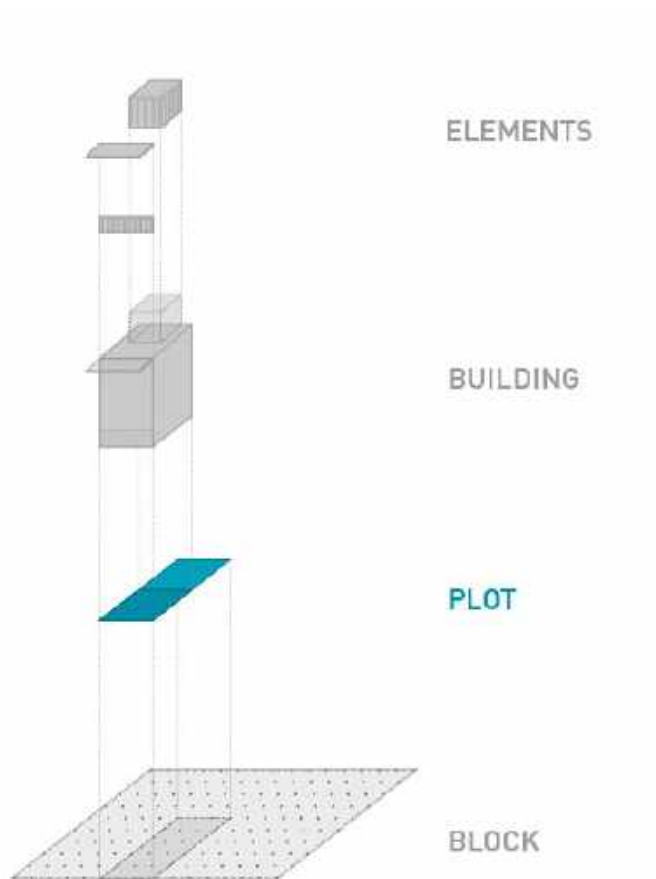
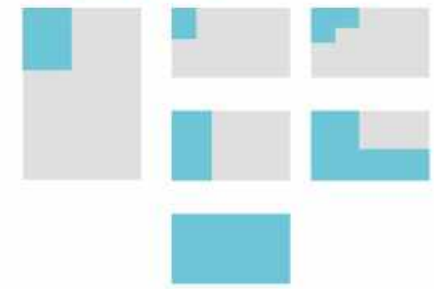


Fig.5.4-01 Study of type of blocks in sample block

PLOT WITHIN THE BLOCK



CORNER PLOT



FILLER PLOT

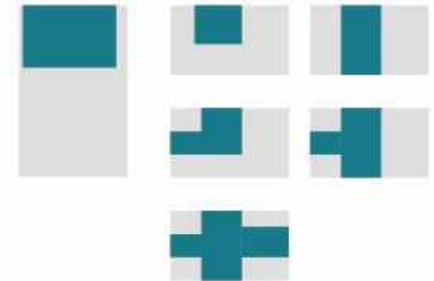


Fig.5.4-01 Study of type of blocks in sample block

PLOT WITHIN THE BLOCK

PLOT - BASEMENT CAR PARKING

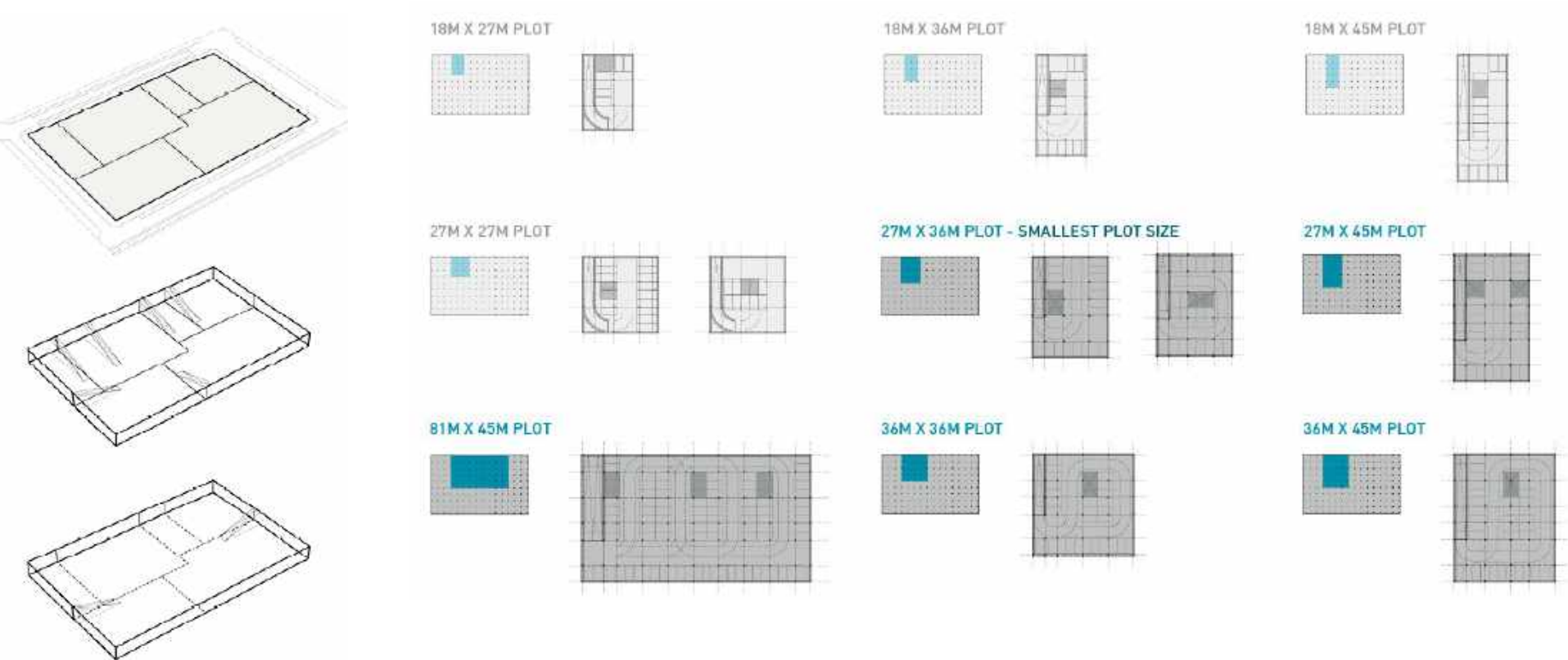


Fig.5.4-05 Individual and shared basement car park

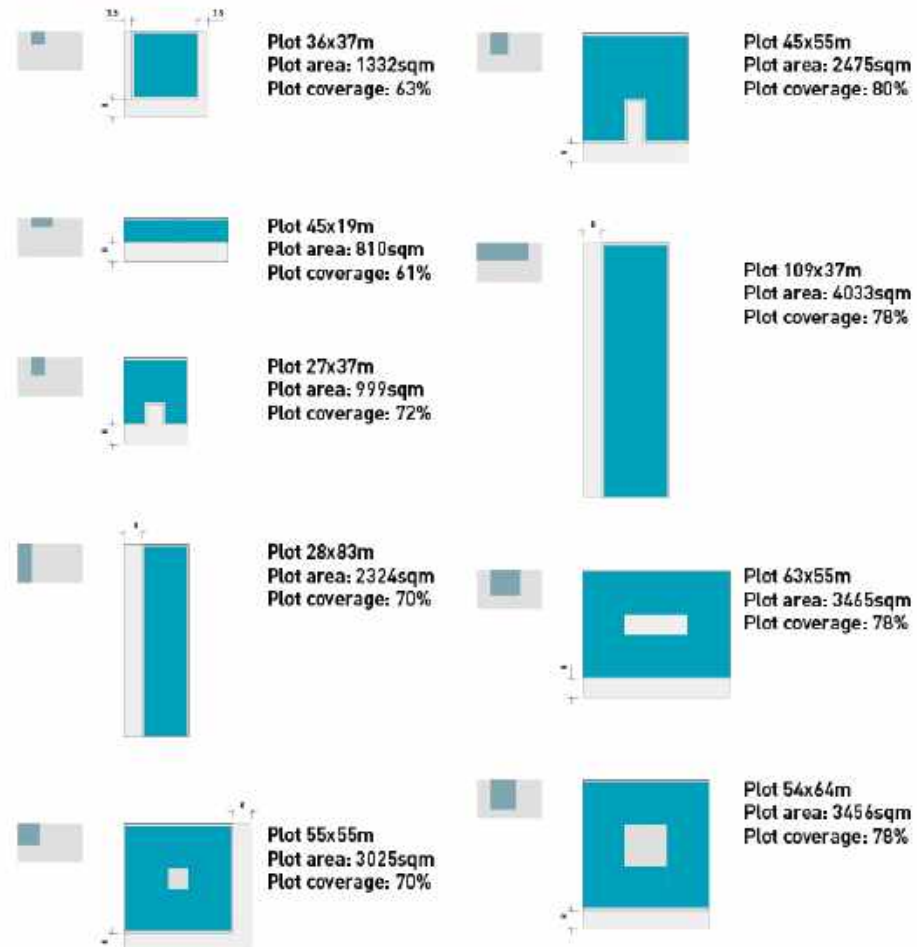
PLOT WITHIN THE BLOCK

PLOT- BUILDING TYPOLOGIES

RESIDENTIAL:



COMMERCIAL:



PLOT WITHIN THE BLOCK

PLOT- BUILDING TYPOLOGIES

GENERIC BLOCK: 83X137M

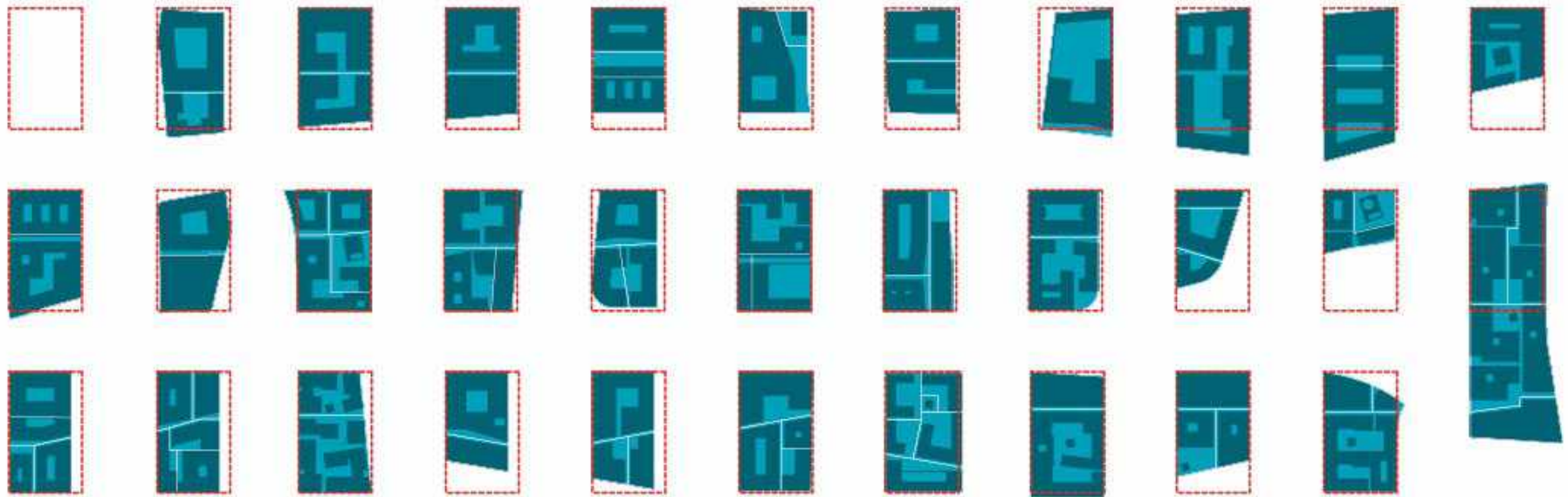


Fig.5.4-07 Combination of different typologies in Madinat Al Irfan plots

ANATOMY OF THE VILLAGE

PLOT WITHIN THE CITY



Fig.5.5-08 Village plot depths

ANATOMY OF THE VILLAGE

PLOT WITHIN THE CITY

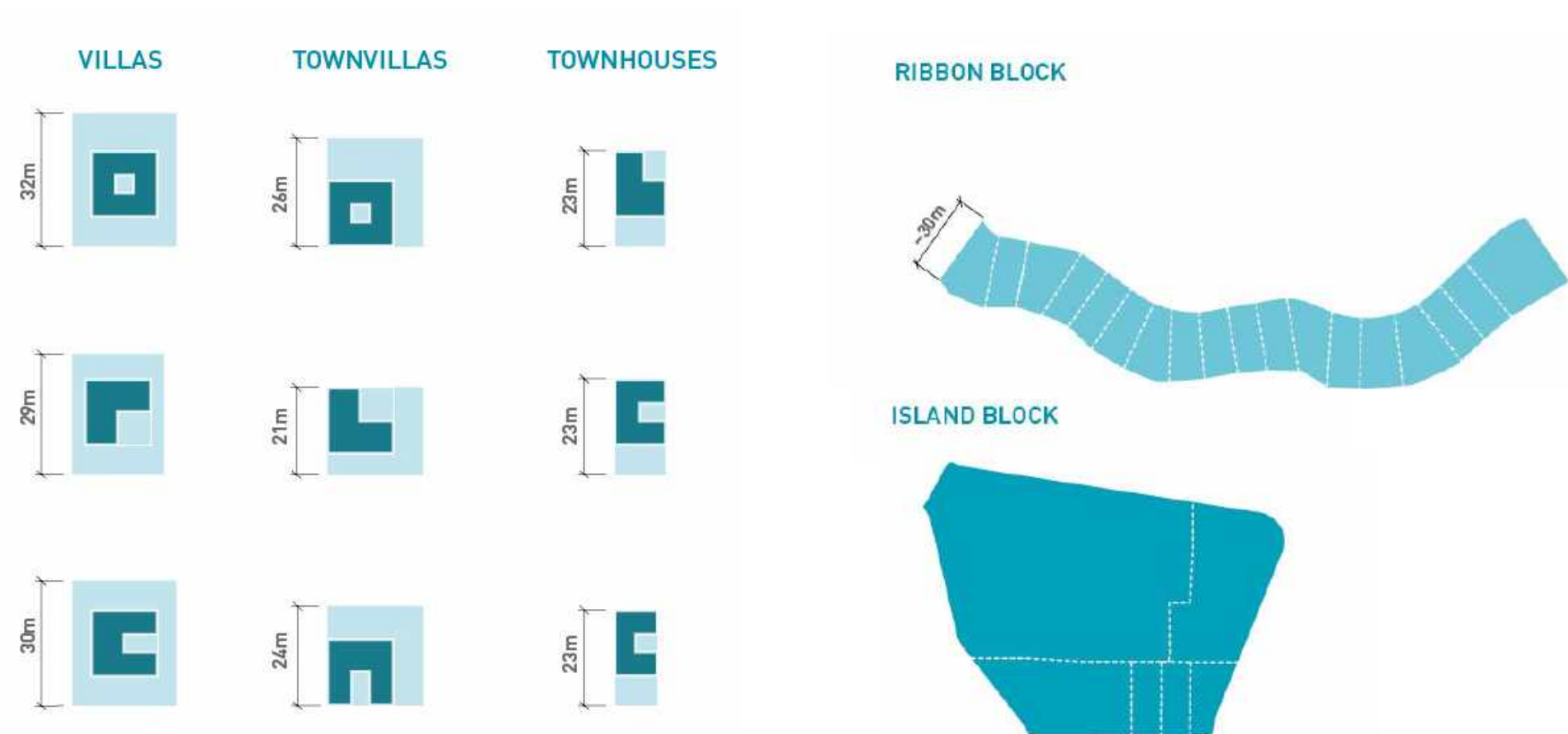


Fig.5.5-08 Village plot depths

ANATOMY OF THE VILLAGE

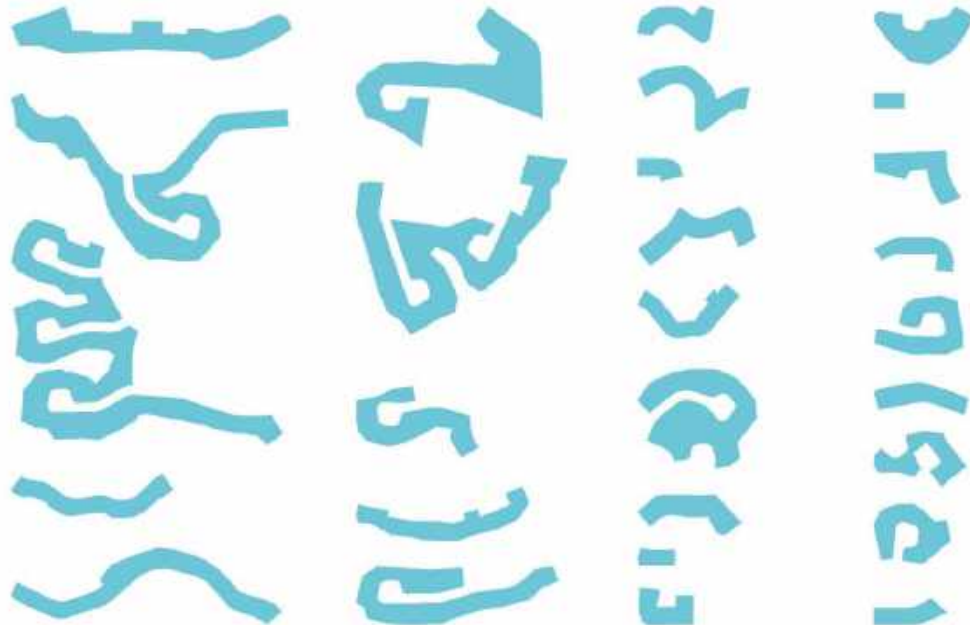
PLOT WITHIN THE CITY

VILLAGE BLOCKS

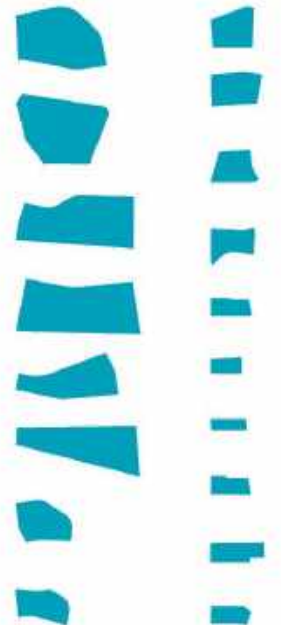


Fig.5.5-10 Blocks in villages and hamlets of Madinat Al Irfan.

RIBBON BLOCKS



ISLAND BLOCKS



ANATOMY OF THE VILLAGE

MICROCLIMATIC DESIGN FACTORS

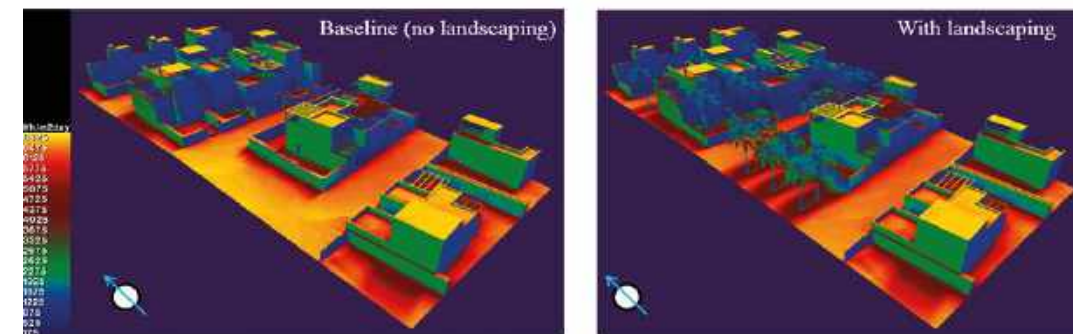


Fig.5.5-20 Village Block in summer with and without landscape planting

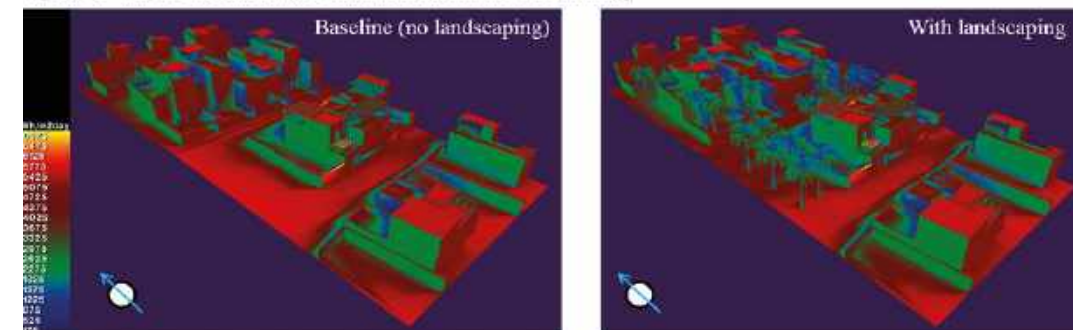


Fig.5.5-21 Village Block inter with and without landscape planting

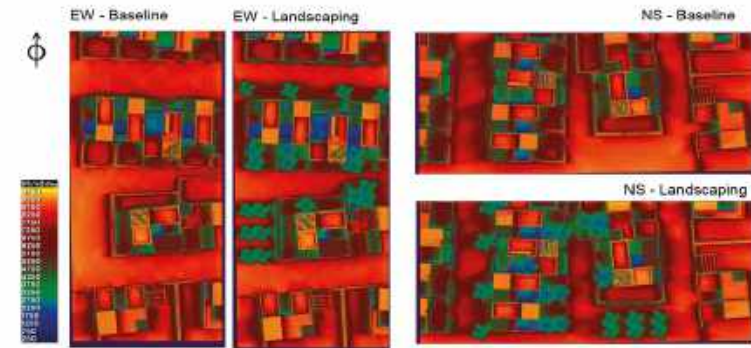


Fig.5.5-24 Village orientation studies in summer

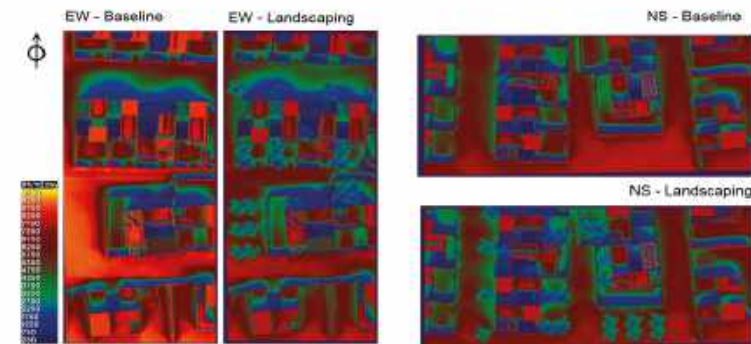
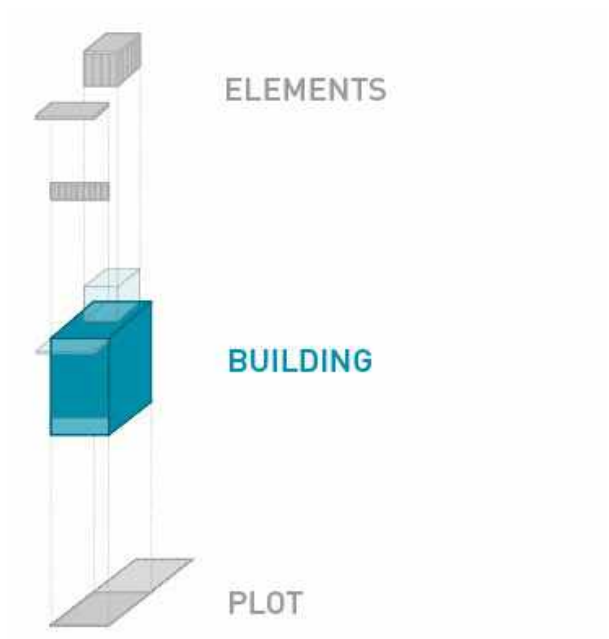


Fig.5.5-25 Village orientation studies in winter

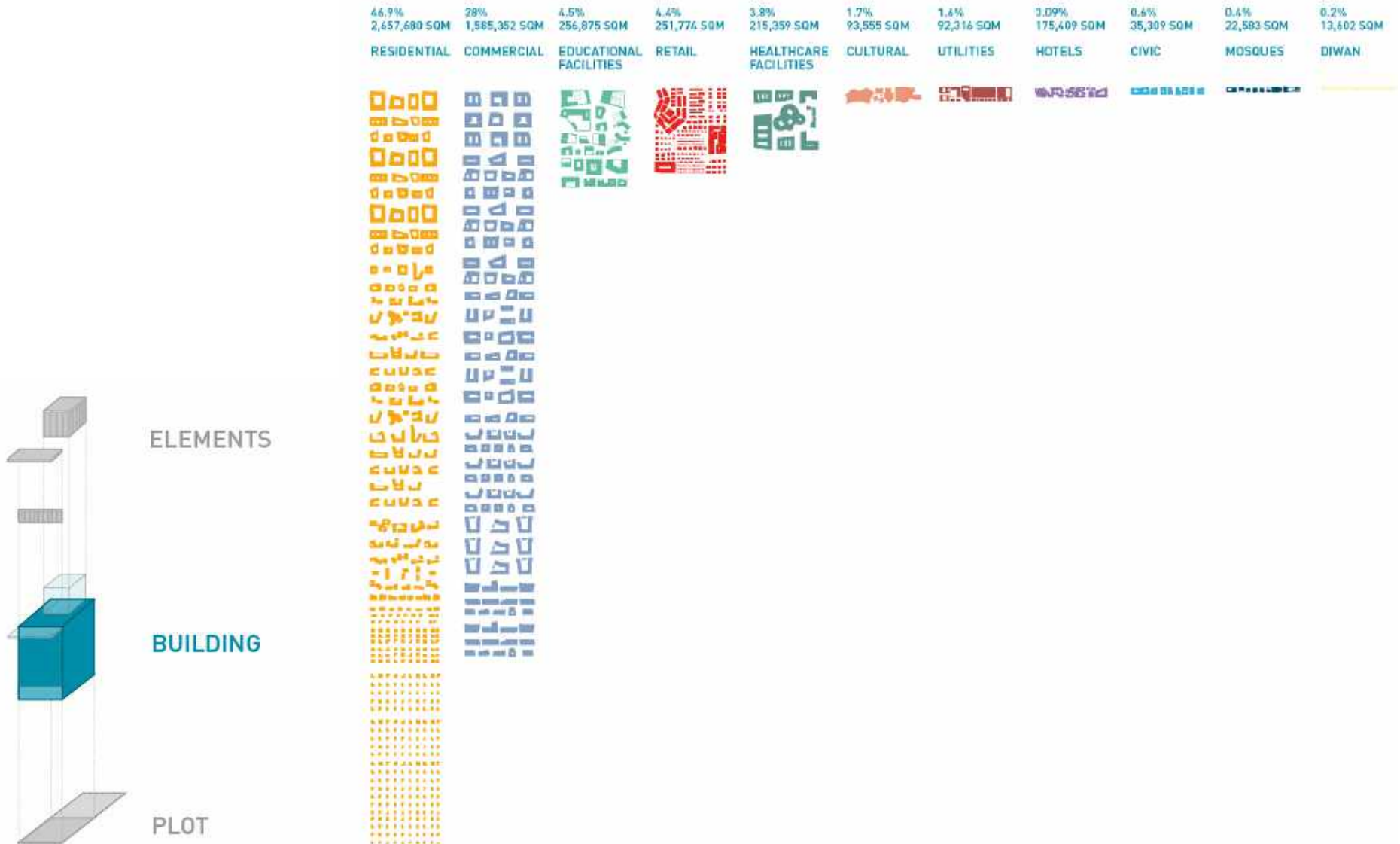
ANATOMY OF THE CITY

BUILDING TYPOLOGIES



ANATOMY OF THE CITY

BUILDING TYPOLOGIES



BUILDING TYPOLOGIES

VILLAS AND TOWN VILLAS

Location	villages, suburban
Average unit size	300 Sqm ⁽¹⁾
Unit sizes	3 bedroom: 250-280 Sqm ⁽²⁾ 4 bedroom: 280-310 Sqm ⁽²⁾ 5 bedroom: 340 - 370 Sqm ⁽²⁾
Plot coverage	Villa: 30% Townvilla: 40% ⁽¹⁾
No. floors	2 ⁽¹⁾

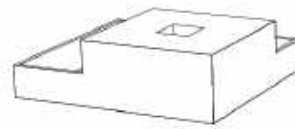


Fig.5.6-11 Town villa



Fig.5.6-12 Villa

⁽¹⁾ Data provided by Omran / Baoz&Co.

⁽²⁾ IPMS3B

Location	villages, suburban
Average unit size	240 Sqm ⁽¹⁾
Unit sizes	3 bedroom: 200-230 Sqm ⁽²⁾ 4 bedroom: 230-260 Sqm ⁽²⁾ 5 bedroom: 260 - 290 Sqm ⁽²⁾
Plot coverage	60% ⁽¹⁾
No. floors	2-3 ⁽¹⁾

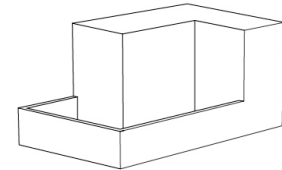


Fig.5.6-19 Townhouse

⁽¹⁾ Data provided by Omran / Baoz&Co.

⁽²⁾ IPMS3B

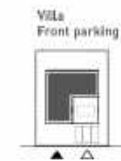
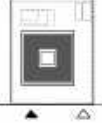
Plot: 30x25m
Footprint: 226sqm ⁽¹⁾
Plot coverage: 30%



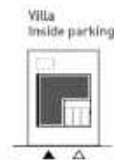
Plot: 24x22m
Footprint: 192sqm ⁽¹⁾
Plot coverage: 30%



Plot: 32x25m
Footprint: 240sqm ⁽¹⁾
Plot coverage: 30%



Villa
Front parking

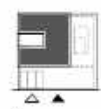


Villa
Inside parking



Villa
Side parking

C type townvilla
Plot: 23x24m
Footprint: 226sqm ⁽¹⁾
Plot coverage: 40%



L type townvilla
Plot: 23x21m
Footprint: 192sqm ⁽¹⁾
Plot coverage: 40%



O type villa
Plot: 32x25m
Footprint: 240sqm ⁽¹⁾
Plot coverage: 40%



Townvilla
Front parking



Townvilla
Inside parking



Townvilla
Side parking



C type townhouse
Plot: 23x12m
Footprint: 148sqm ¹
Plot coverage: 60%



L type townhouse
Plot: 23x12m
Footprint: 140sqm ¹
Plot coverage: 60%

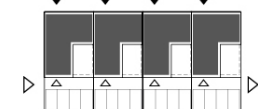


C type townhouse
Plot: 23x10m
Footprint: 140sqm ¹
Plot coverage: 60%



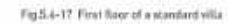
C type townhouse
Plot: 23x10m
Footprint: 139sqm ¹
Plot coverage: 60%

¹ IPMS1



⁽¹⁾ IPMS1

VILLAS AND TOWN VILLAS



BUILDING TYPOLOGIES

TOWN HOUSES

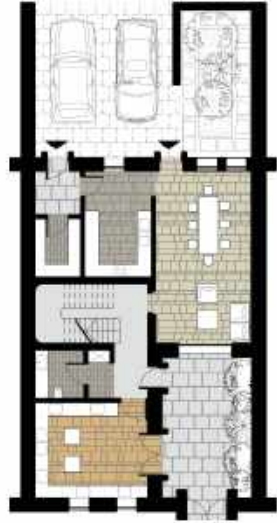


Fig.5.A-27 Ground floor of a standard townhouse with formal area



Fig.5.A-28 First floor of a standard townhouse

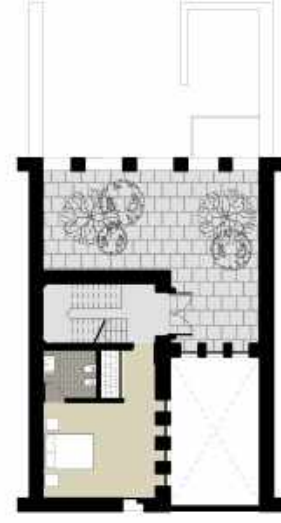


Fig.5.A-29 Second floor of a standard townhouse

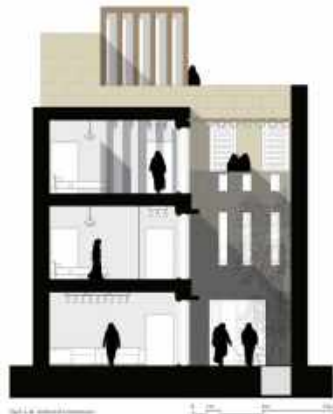
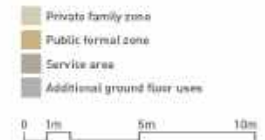


Fig.5.A-30 Ground floor of a townhouse with informal layout



Fig.5.A-31 Ground floor of a townhouse with a shop/office facing the street



BUILDING TYPOLOGIES

APARTMENTS

Table 5.4-03

urban and villages
4-6 apartments per core ⁽¹⁾
Average floorplate size: 1,340 Sqm ⁽¹⁾⁽²⁾
1-2 apartments per core ⁽¹⁾
Average floorplate size: 675 Sqm ⁽¹⁾⁽²⁾
Perimeter block: 200 Sqm ⁽¹⁾⁽²⁾
Point block: 250 Sqm ⁽¹⁾⁽²⁾
4-10

⁽¹⁾ Data provided by Omran / Booz&Co.

⁽²⁾ IPMS1



Fig.5.6-24 Mid-rise apartment in Irfan Heights.

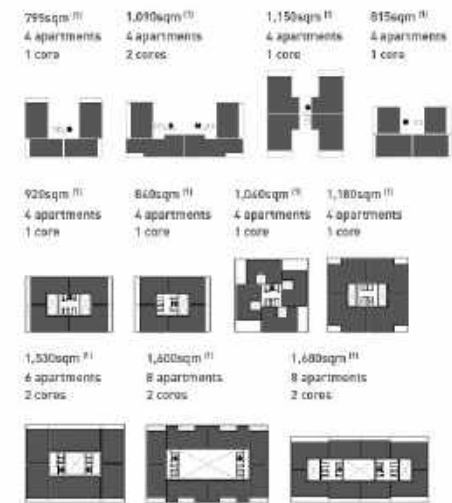


Fig.5.6-33 Residential perimeter blocks, floorplate sizes, number of apartments and cores

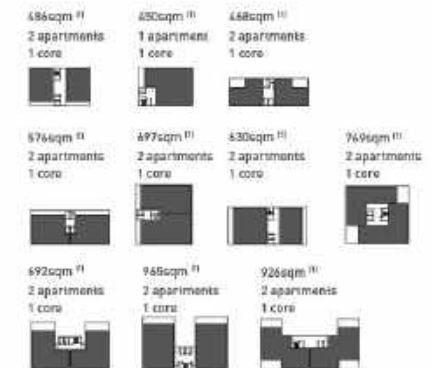


Fig.5.6-35 Residential point blocks



Fig.5.6-36 Clusters of point blocks

⁽¹⁾ Floorplate IPMS1

BUILDING TYPOLOGIES

APARTMENTS

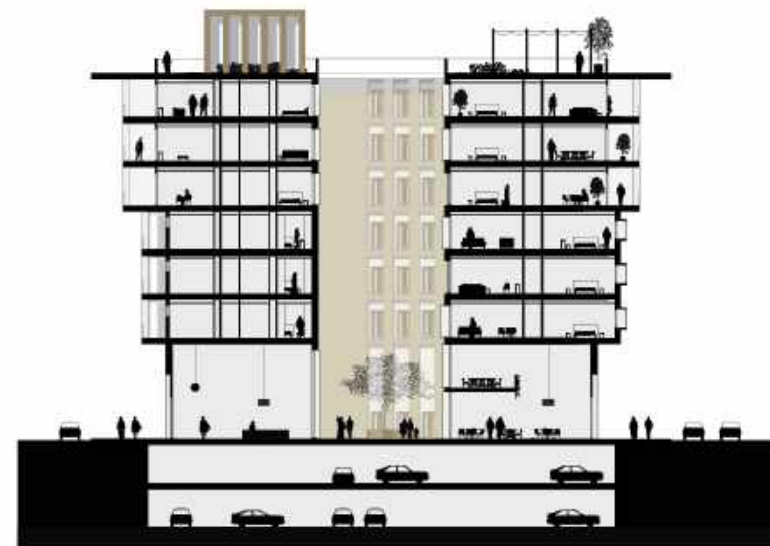


Fig.5.4-27 Section of a Mid-rise apartment building



Fig.5.4-28 Floorplan of a Mid-rise apartment building



Fig.5.4-29 Floorplan of a low-rise apartment building

- Private family zone
- Public family zone
- Service area
- Hall - corridor - exterior space
- Common areas

- Private family zone
- Public family zone
- Service area
- Hall - corridor - exterior space
- Common areas

0 5m 20m

BUILDING TYPOLOGIES

APARTMENTS



Fig.5.6-42 2 bedroom formal apartment - 215 Sqm (IPMS3B)



Fig.5.6-43 1 (left) and 2 (right) bedroom informal apartment - 98 Sqm and 150 Sqm (IPMS3B)



Fig.5.6-43 3 bedroom formal apartment - 250 Sqm (IPMS3B)



Fig.5.6-44 3 bedroom informal apartment - 215 Sqm (IPMS3B)



Fig.5.6-44 3 bedroom formal apartment - 325 Sqm (IPMS3B)



Fig.5.6-47 4 bedroom informal apartment - 256 sqm (IPMS3B)

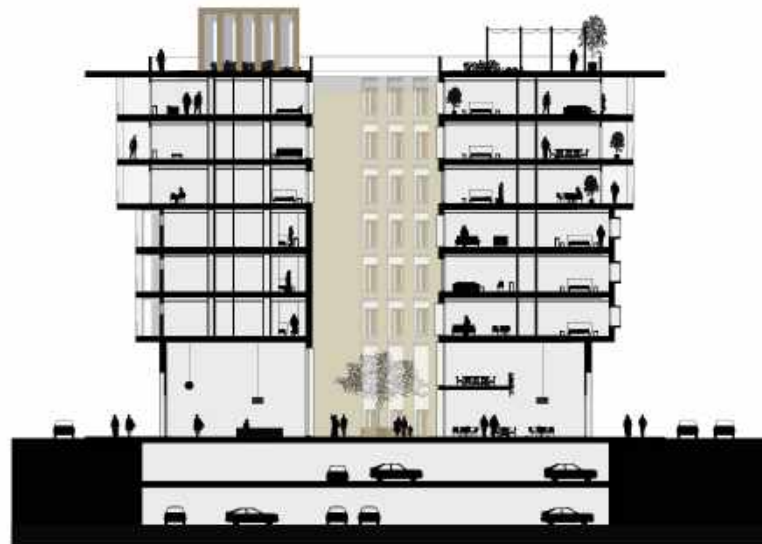


Fig.5.6-27 Section of a Mid-rise apartment building

BUILDING TYPOLOGIES

OFFICES



Fig.5.6-51 Central Business District Square



Fig.5.6-53 Office building in Irfan Central boulevard



Fig.5.6-52 Office building in Irfan Central

Table.5.6-05

Small office building	300 - 1,500 Sqm ^{(1) (2)}
Medium office building	1,500 - 2,500 Sqm ^{(1) (2)}
Large office building	2,500 - 4,500 Sqm ^{(1) (2)}

⁽²⁾ Data based on Information provided by Omran / Booz&Co.

⁽³⁾ Floorplate IPMS1



Fig.5.6-49 Office building categories - benchmarking.

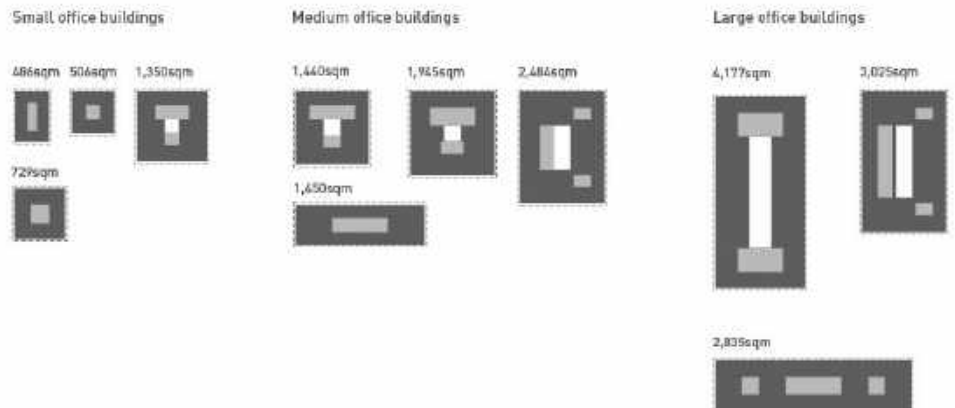


Fig.5.6-50 Office building categories - Madinat Al Irfan typologies.

BUILDING TYPOLOGIES

RETAIL

PRIMARY AND SECONDARY RETAIL SHOPS

Location	urban/village in ground floors only
Unit size (sqm)	Primary: 150 - 300 Sqm ⁽¹⁾ Secondary: 50 - 200 Sqm ⁽¹⁾
No. Floors	1-2

⁽¹⁾ IMPS3B

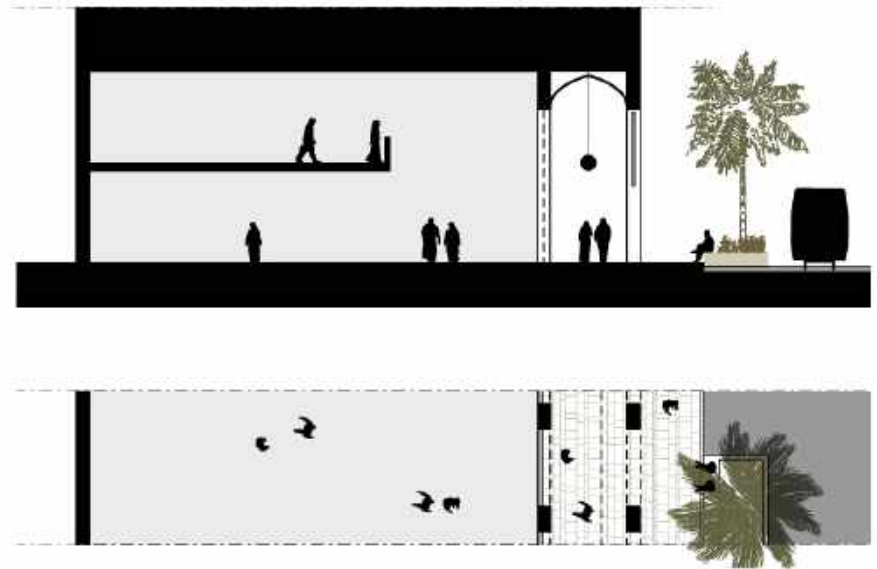
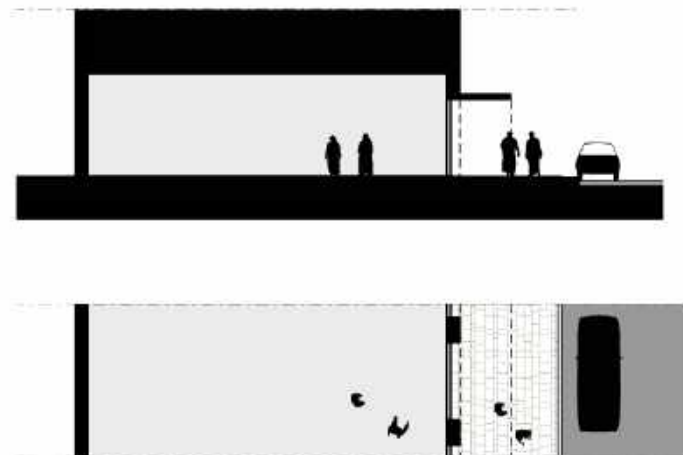


Fig.5.6-67. Primary retail illustrative section and plan



BUILDING TYPOLOGIES

RETAIL

DEPARTMENT STORE

Location	urban
Target no. units	2
Unit size [sqm]	30,000 Sqm ⁽¹⁾ 4,000-7,000 Sqm ⁽²⁾
No. Floors	5-8

⁽¹⁾ IMPS1 excluding basements

⁽²⁾ IMPS1 floorplate size

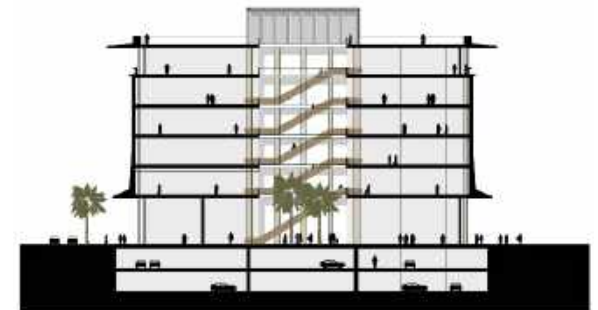
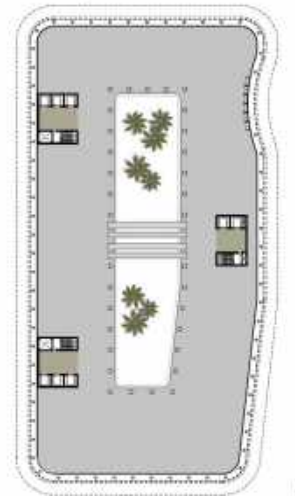
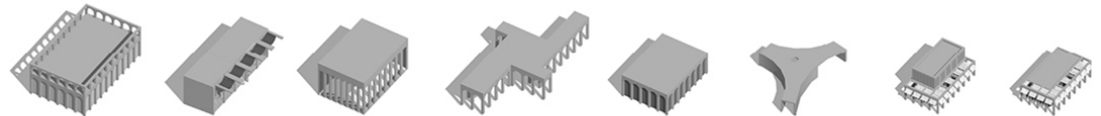


Fig.5.6-74 Section of the Department Store in Iran Central

PAVILIONS

Location	urban and suburban street and rooftops
Unit size [sqm]	4 - 2,600 Sqm ⁽¹⁾
No. Floors	1

⁽¹⁾ IMPS1



BUILDING TYPOLOGIES

RETAIL

SOUK

Location	urban
Target no. units	2
Unit size (sqm)	150-300 Sqm ⁽¹⁾
No. Floors	1-3

⁽¹⁾ IMPS3B



BUILDING TYPOLOGIES

MOSQUES

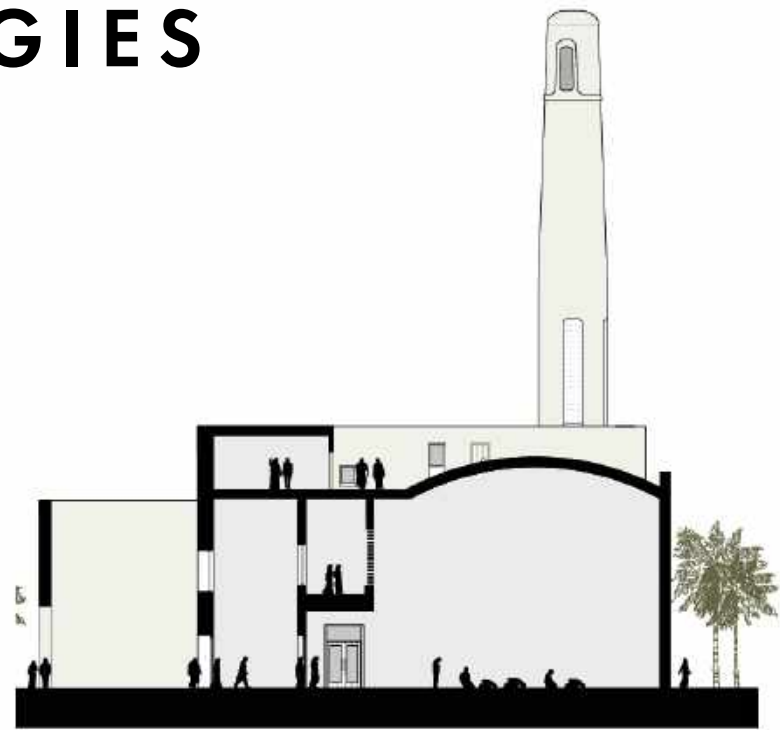


Fig.5.6-88 Section of a Mosque

Location	urban/village
Target no. units	16 ⁽³⁾
Unit size (sqm)	820 Sqm ^{(1) (2)}
No. Floors	1-3

⁽¹⁾ IPMS1 excluding basements

⁽²⁾ Data provided by Omran / Booz&Co. report

⁽³⁾ Based on catchment areas defined by Abu Dhabi Community Facility Planning Standards

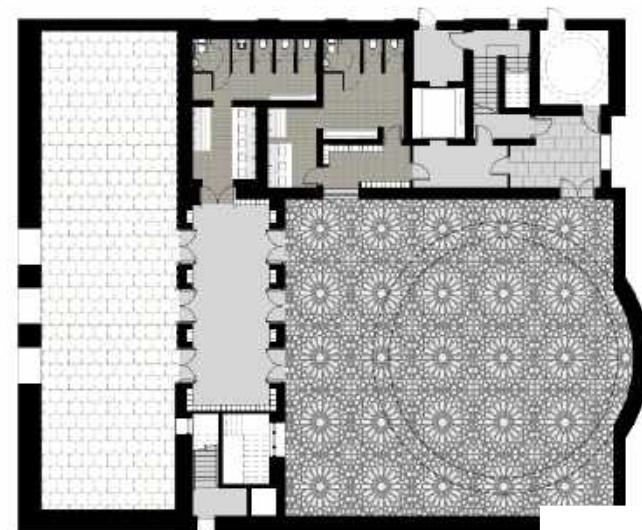


Fig.5.6-89 Ground floor plan of a Mosque

BUILDING TYPOLOGIES

HOTELS

Location	urban
Unit size (sqm)	12,000-38,000 Sqm ⁽¹⁾ 2,500-8,500 Sqm ⁽²⁾
Standard room size (sqm)	30 Sqm
No. Floors	4-8

⁽¹⁾ IPMS1 excluding basements

⁽²⁾ IPMS1 building footprint

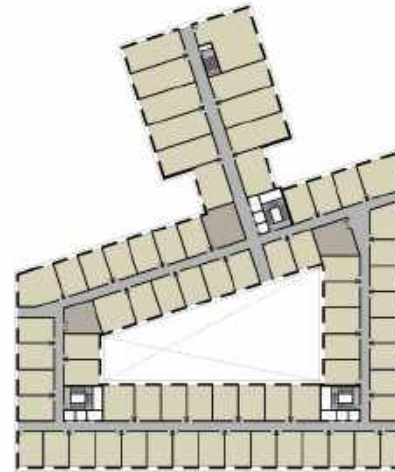


Fig.5.6-98 Typical floor of the 4-5* Hotel in Irfan Central Boulevard



Fig.5.6-97 Section through the 4-5* Hotel in Irfan Central Boulevard

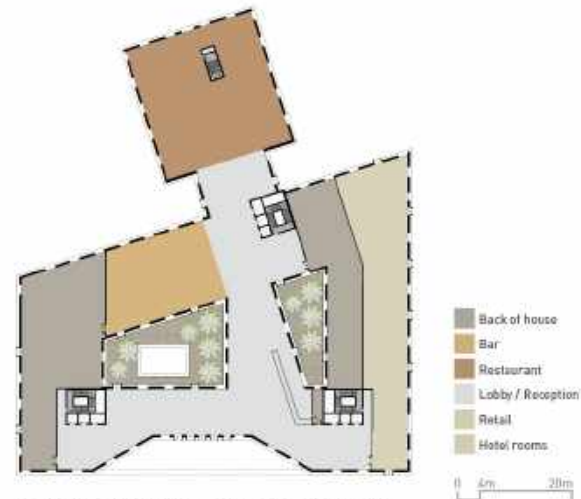


Fig.5.6-99 Ground floor of the 4-5* Hotel in Irfan Central Boulevard

BUILDING TYPOLOGIES

BRIDGES

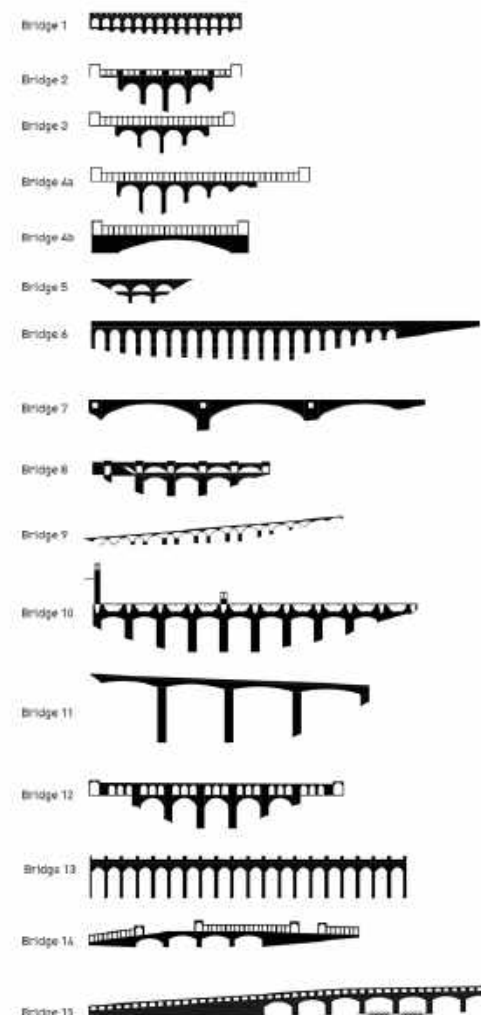


Table.5.6-29: Catalogue of bridges of Madinat Al Irfan

Bridge 1	Height: 4m Length: 75.4m
Bridge 2	Height: 23 Length: 73m
Bridge 3	Height: 15m Length: 62.2m
Bridge 4a	Height: 20m Length: 100m
Bridge 4b	Height: 17m Length: 70.2m
Bridge 5	Height: 10m Length: 40.4m
Bridge 6	Height: 15.7m Length: 257m
Bridge 7	Height: 16m Length: 197m
Bridge 8	Height: 14.7m Length: 115m
Bridge 9	Height: 7.2m Length: 154.3m
Bridge 10	Height: 28.7m Length: 198m
Bridge 11	Height: 31.1m Length: 180.5m
Bridge 12	Height: 16m Length: 113.1m
Bridge 13	Height: 15.1m Length: 160.1m
Bridge 14	Height: 14m Length: 121m
Bridge 15	Height: 15m Length: 417m

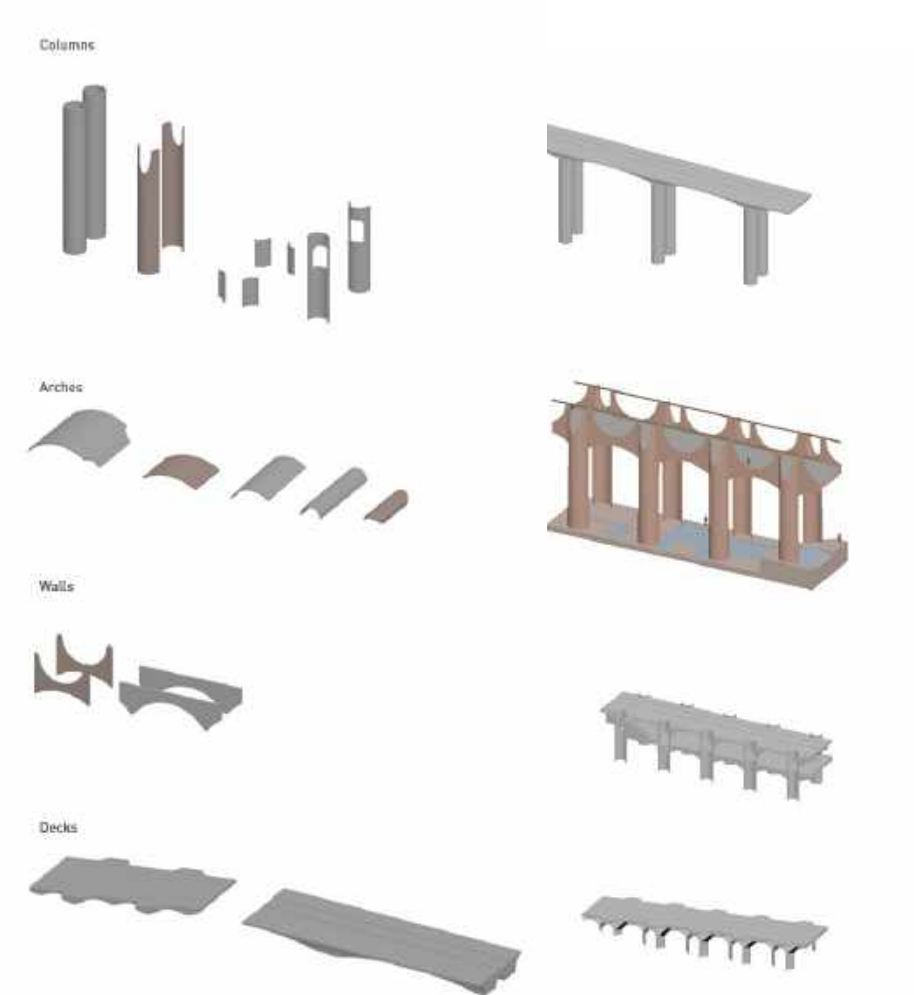


Fig.5.6-139: Kit of parts

Fig.5.6-140: Examples of bridges built with the kit of parts

ANATOMY OF THE CITY

BUILDING ELEMENTS

COLONNADES



Fig. 2.7-100. Colonnade with arcade in Baghdad at 100m.



Fig. 2.7-101. View of colonnade in Baghdad at 100m, showing a series of arches.

COURTYARDS



Fig. 2.7-102. View of courtyard in Baghdad at 100m, showing a series of arches.

ENTRANCES

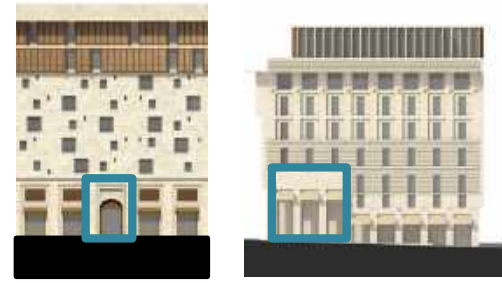


Fig. 2.7-103. View of entrance in Baghdad at 100m, showing a series of arches.

WINDOWS



Fig. 2.7-104. View of window in Baghdad at 100m, showing a series of arches.



Fig. 2.7-105. View of window in Baghdad at 100m, showing a series of arches.



Fig. 2.7-106. View of window in Baghdad at 100m, showing a series of arches.

CANOPIES



Fig. 2.7-107. View of canopy in Baghdad at 100m, showing a series of arches.

OVERHANGS



Fig. 2.7-108. View of overhang in Baghdad at 100m, showing a series of arches.



Fig. 2.7-109. View of overhang in Baghdad at 100m, showing a series of arches.

CORNICES



Fig. 2.7-110. View of cornice in Baghdad at 100m, showing a series of arches.

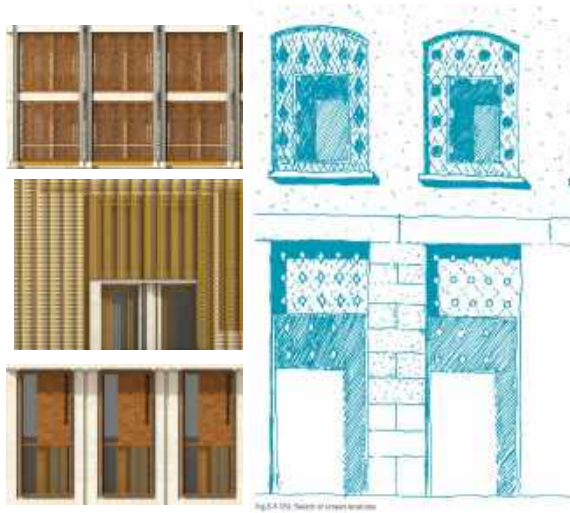


Fig. 2.7-111. View of cornice in Baghdad at 100m, showing a series of arches.

ANATOMY OF THE CITY

BUILDING ELEMENTS

SCREENS



TERRACES



FACADE DEPTH - LAYERING

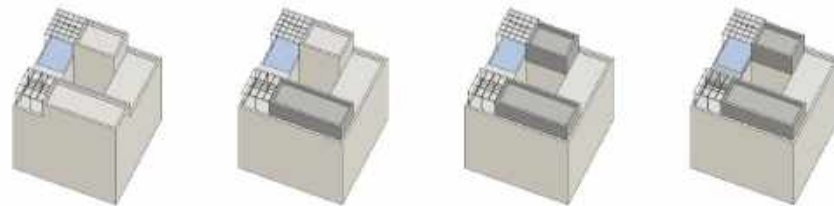
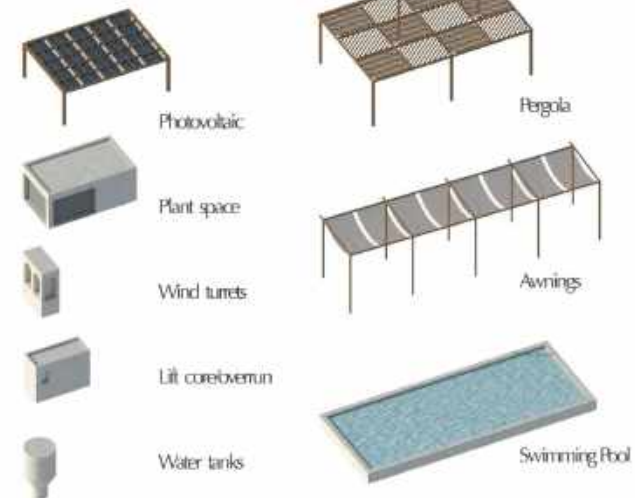
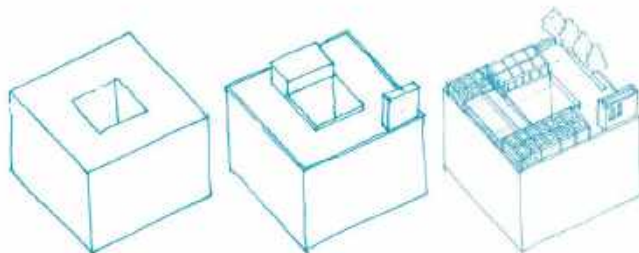


Fig. 5.4.13. Roof composition variations





MADINAT AL IRFAN

Places

WADI LANDSCAPE



WADI LANDSCAPE

IRFAN CENTRAL WADI



WADI LANDSCAPE

IRFAN CENTRAL WADI



GARDEN WALK



URBAN OASIS



URBAN TERRACES



PICNIC & PLAY

WADI LANDSCAPE

IRFAN HEIGHTS WADI



WADI LANDSCAPE

IRFAN VILLAGE WADIS



WADI LANDSCAPE

IRFAN VILLAGE WADIS



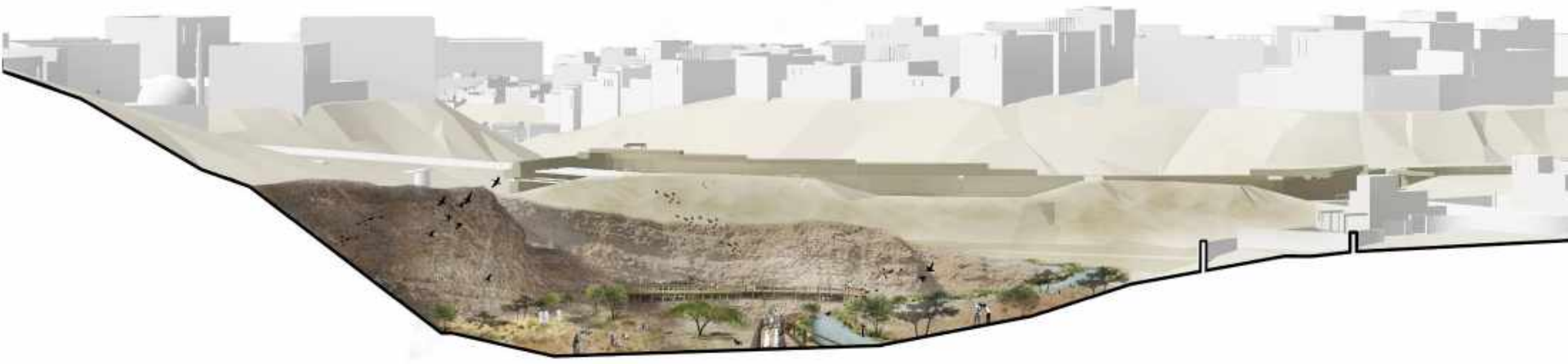
WADI LANDSCAPE

IRFAN WEST WADI



WADI LANDSCAPE

IRFAN WEST WADI

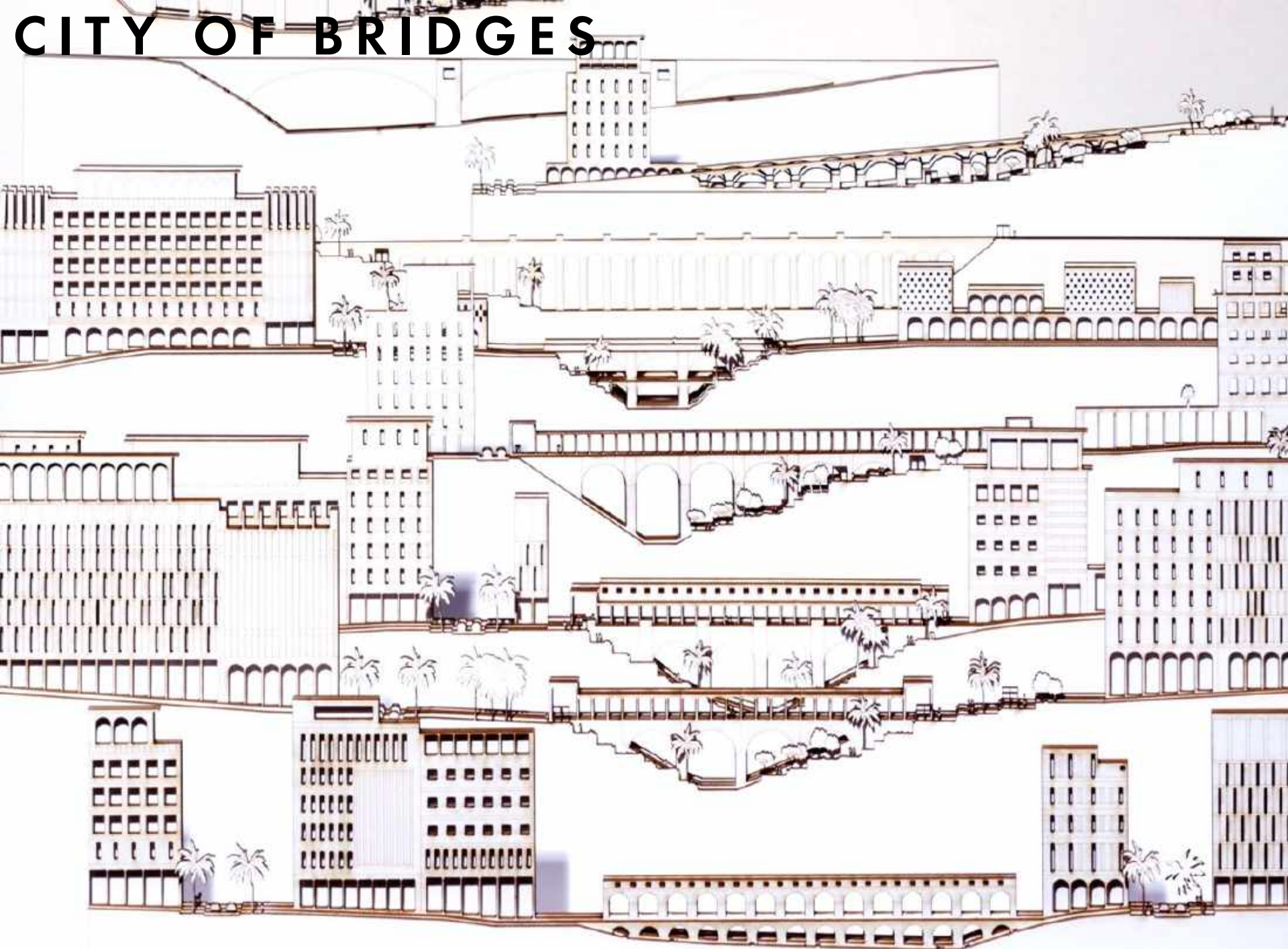


WADI PARK

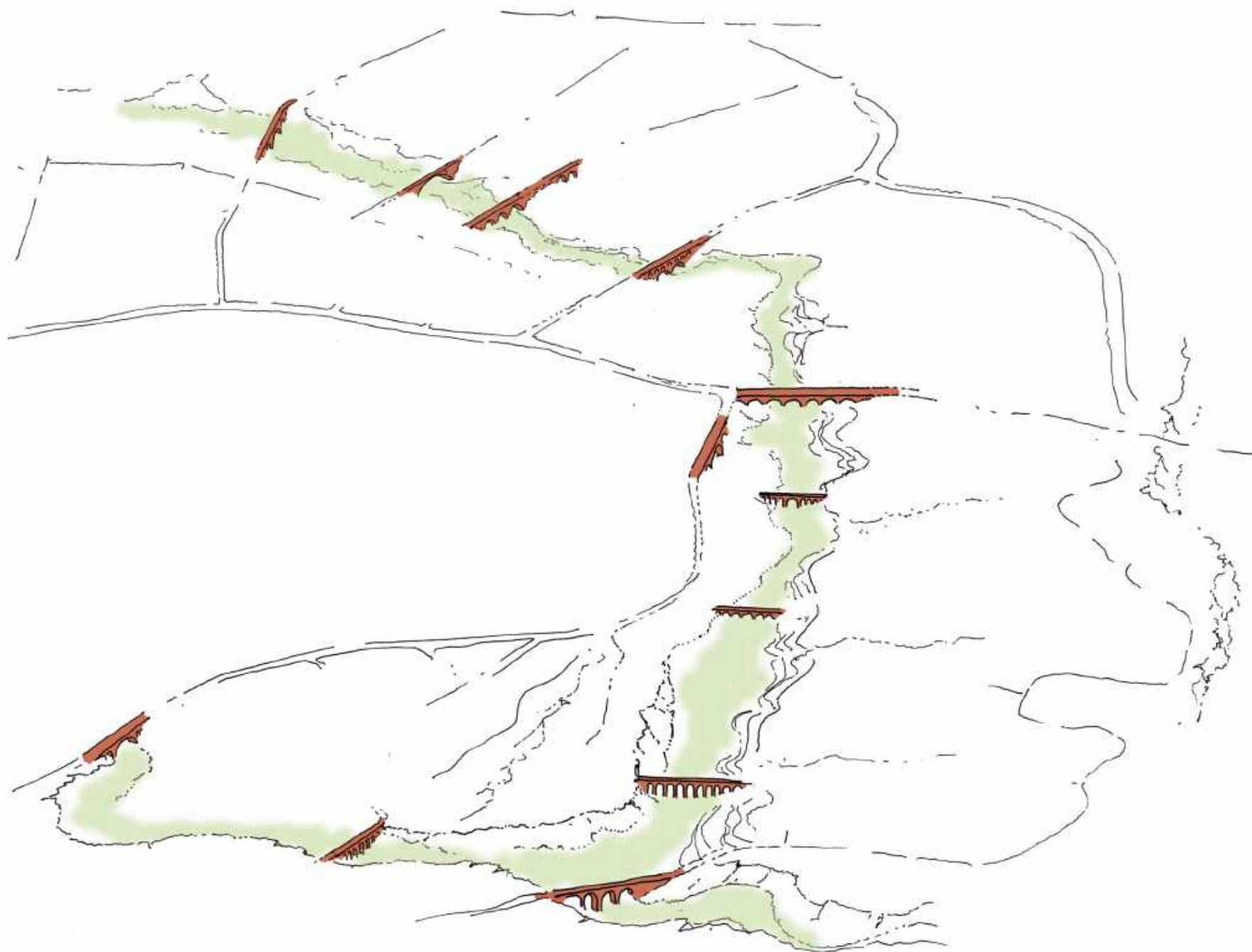




CITY OF BRIDGES

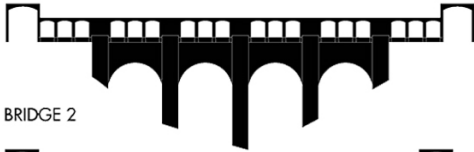


CITY OF BRIDGES





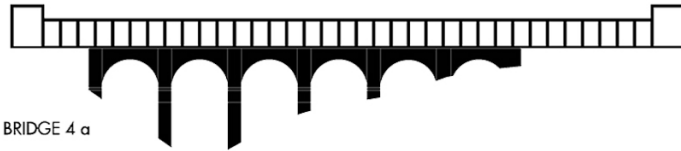
BRIDGE 1



BRIDGE 2



BRIDGE 3



BRIDGE 4 a



BRIDGE 4 b



BRIDGE 5



BRIDGE 8



BRIDGE 9

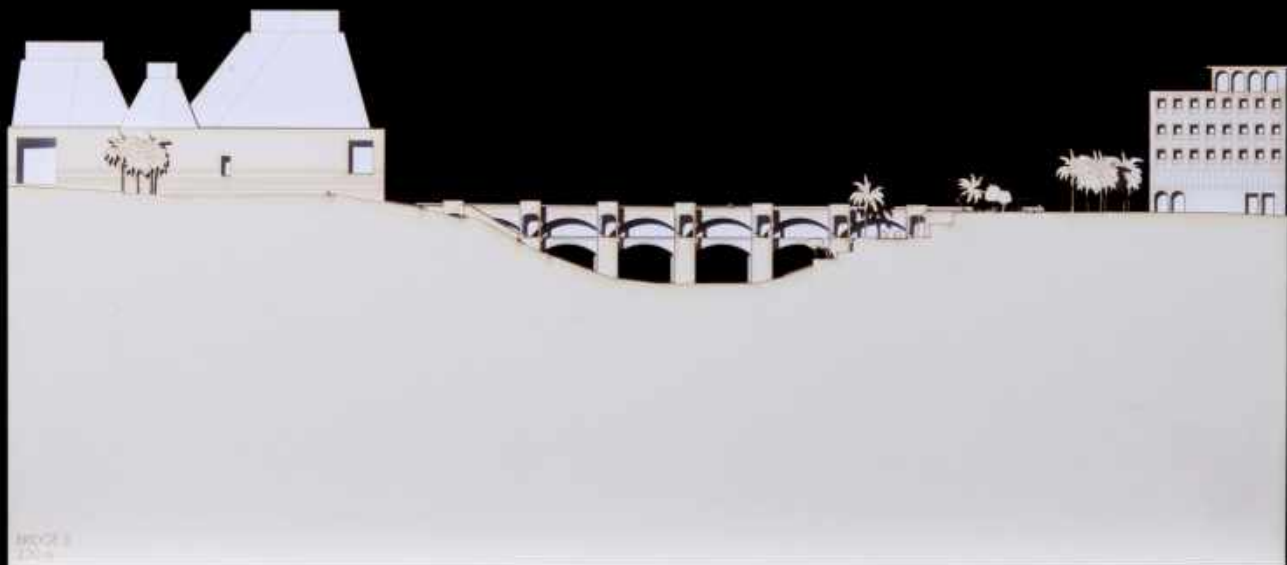


BRIDGE 12















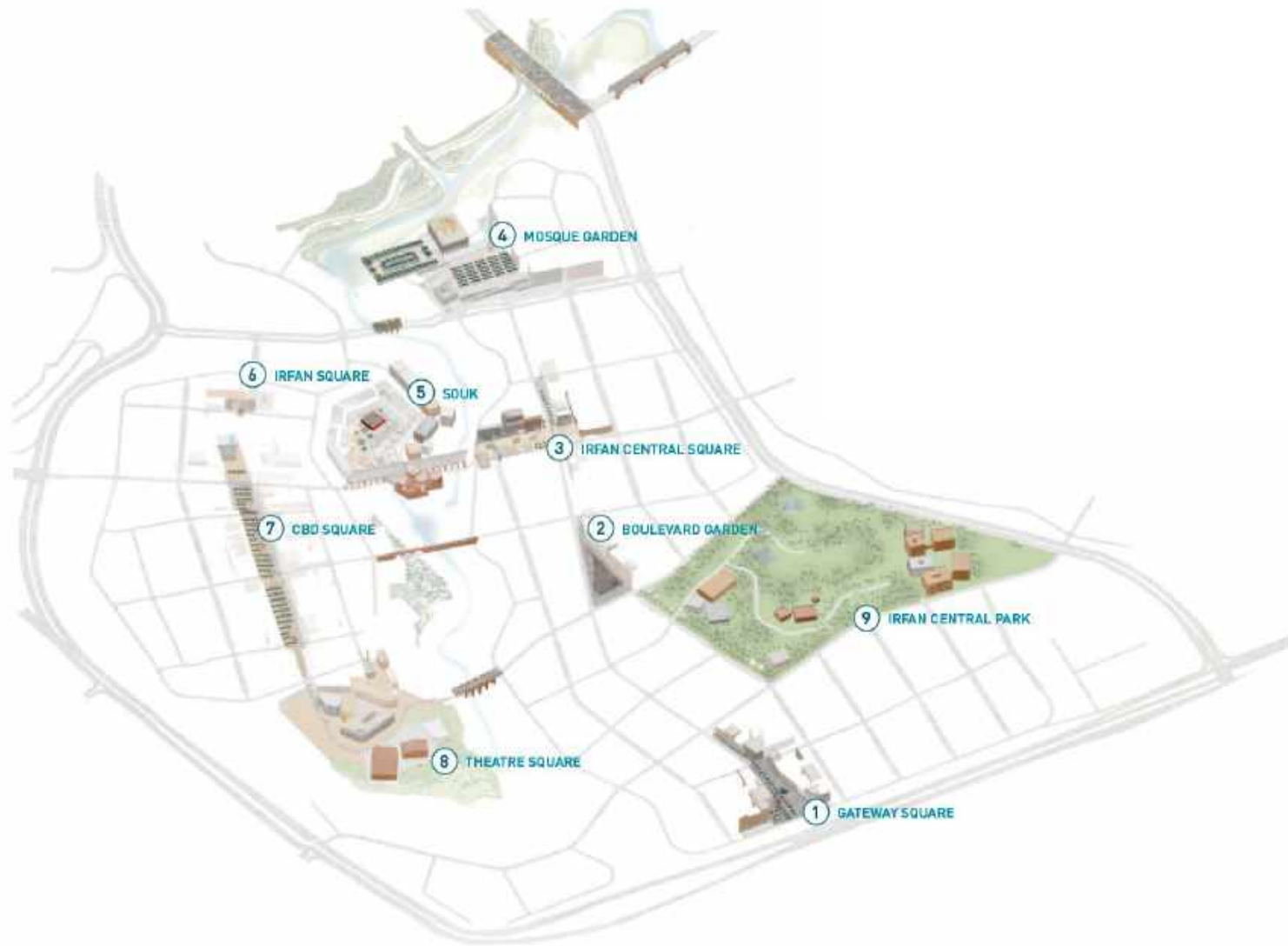


IRFAN CENTRAL



IRFAN CENTRAL

KEY SPACES AND BUILDINGS



CBD SQUARE



GATEWAY SQUARE

CBD SQUARE



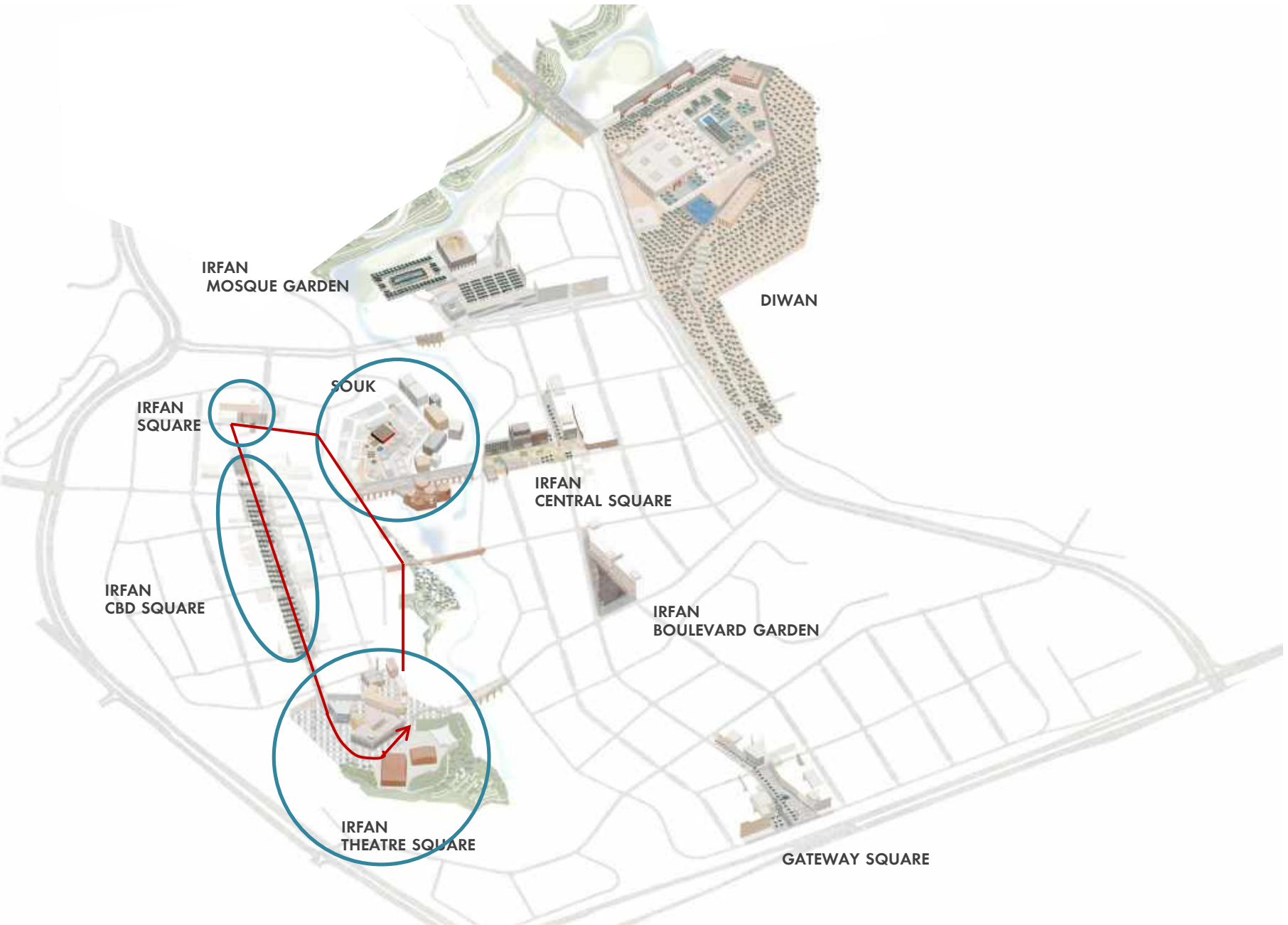


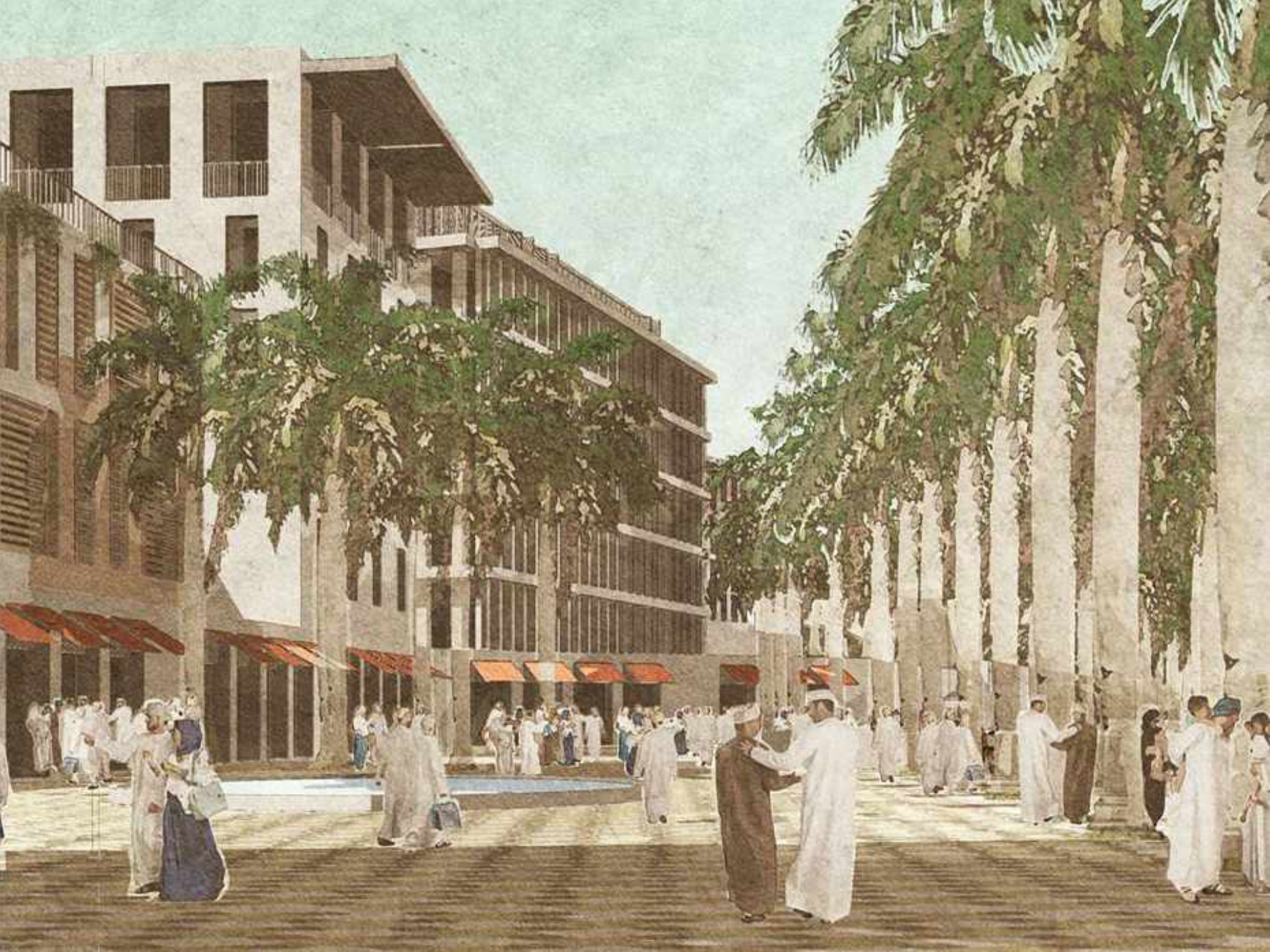




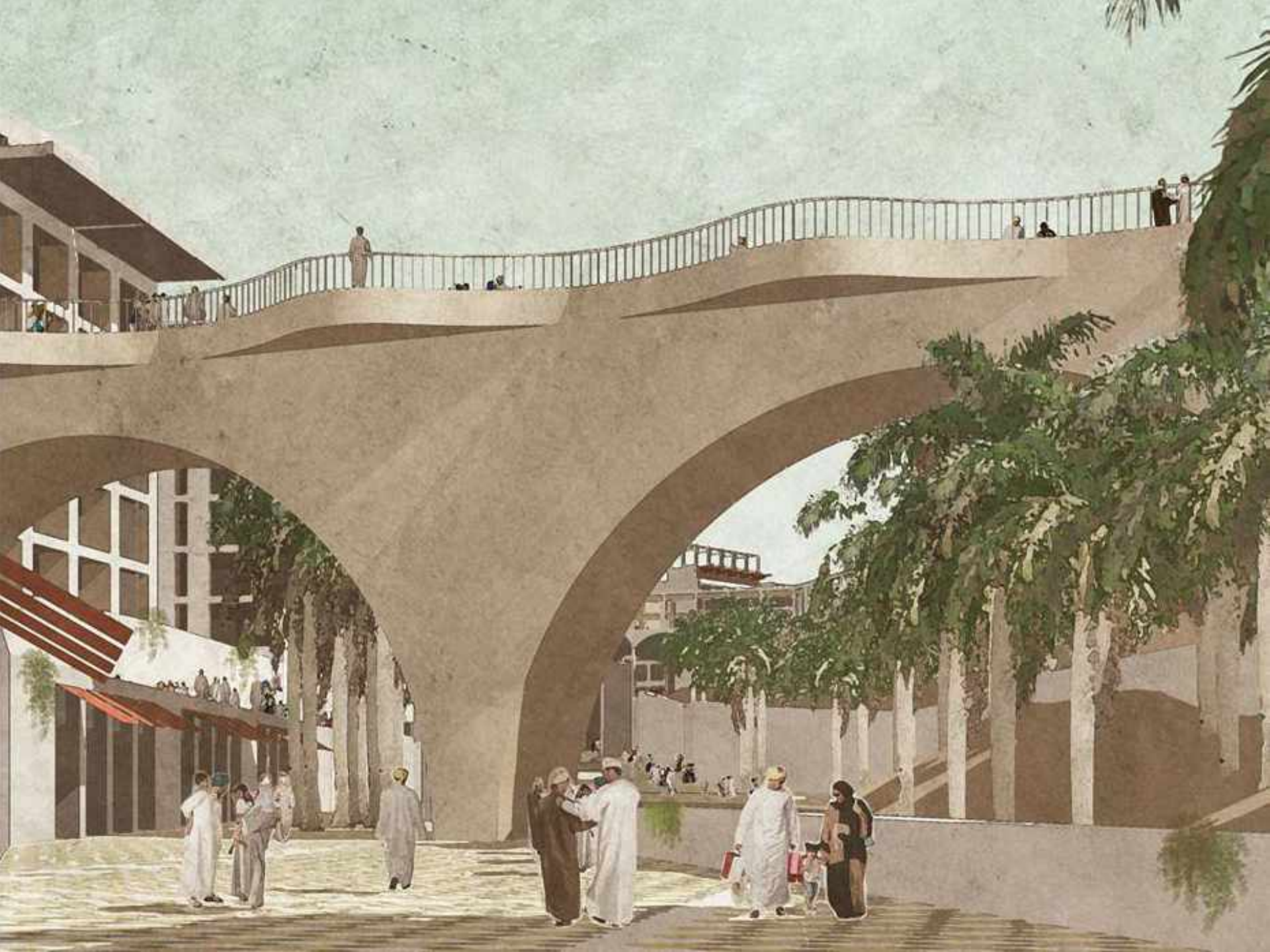


IRFAN CENTRAL



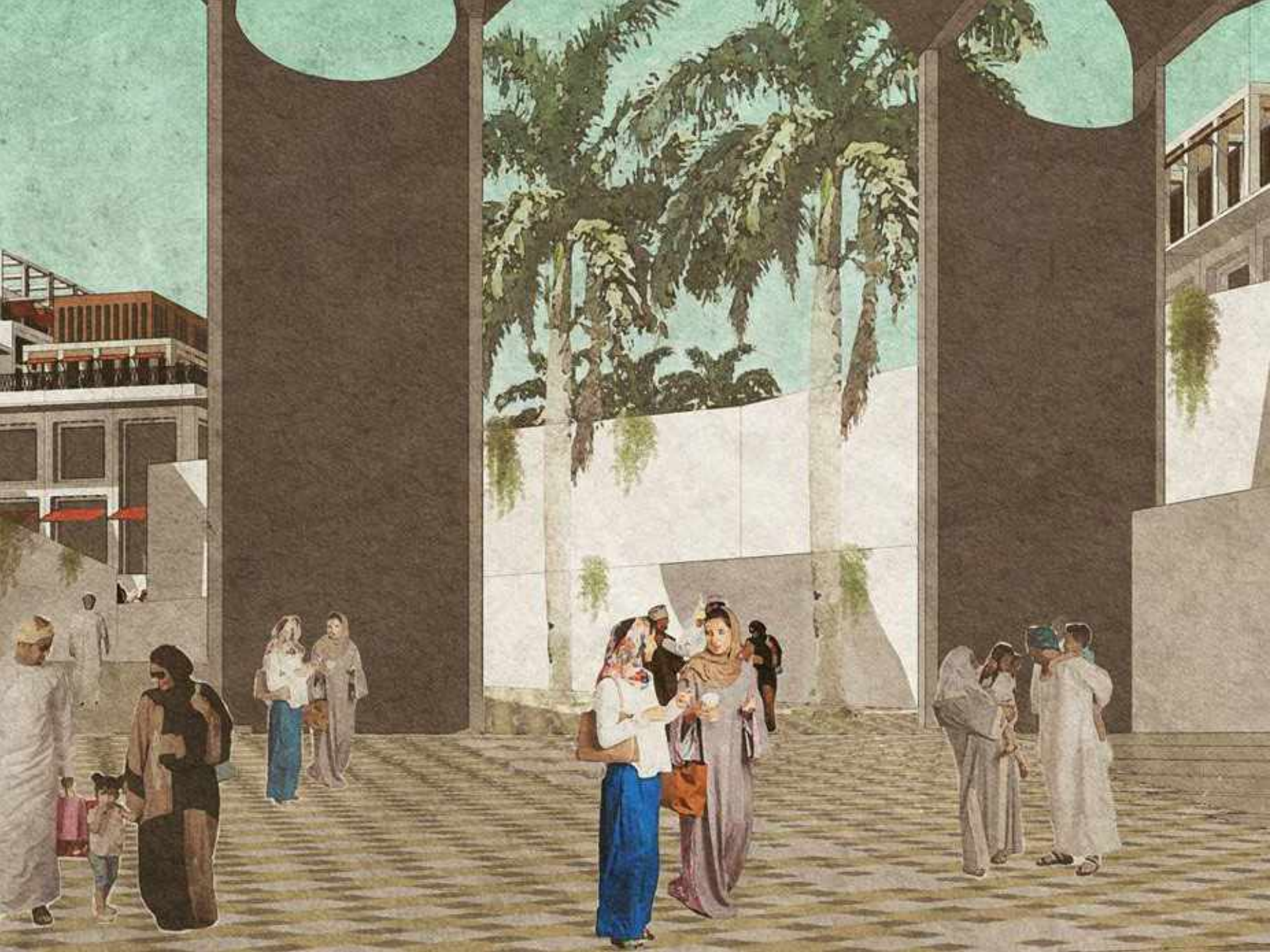








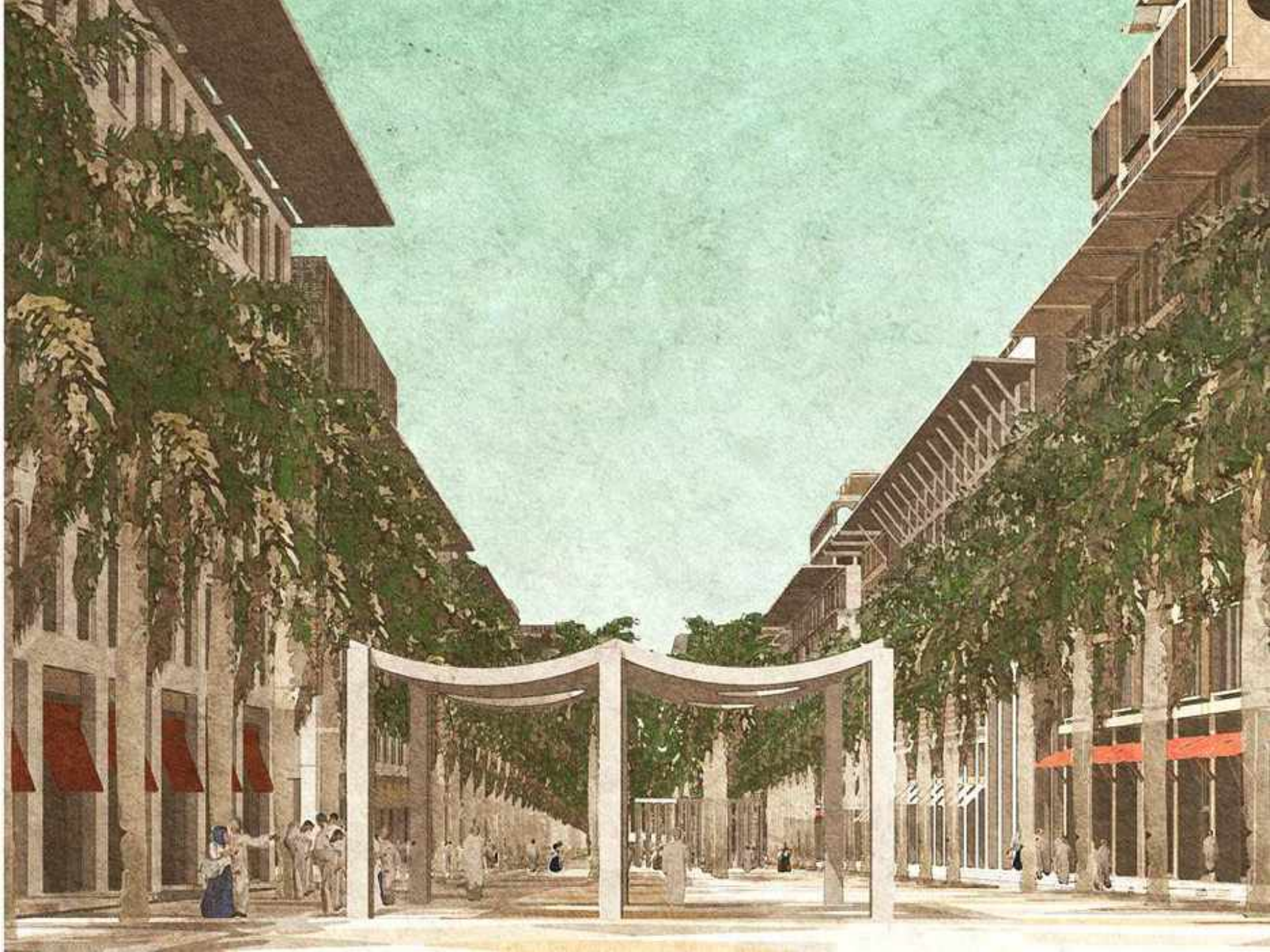












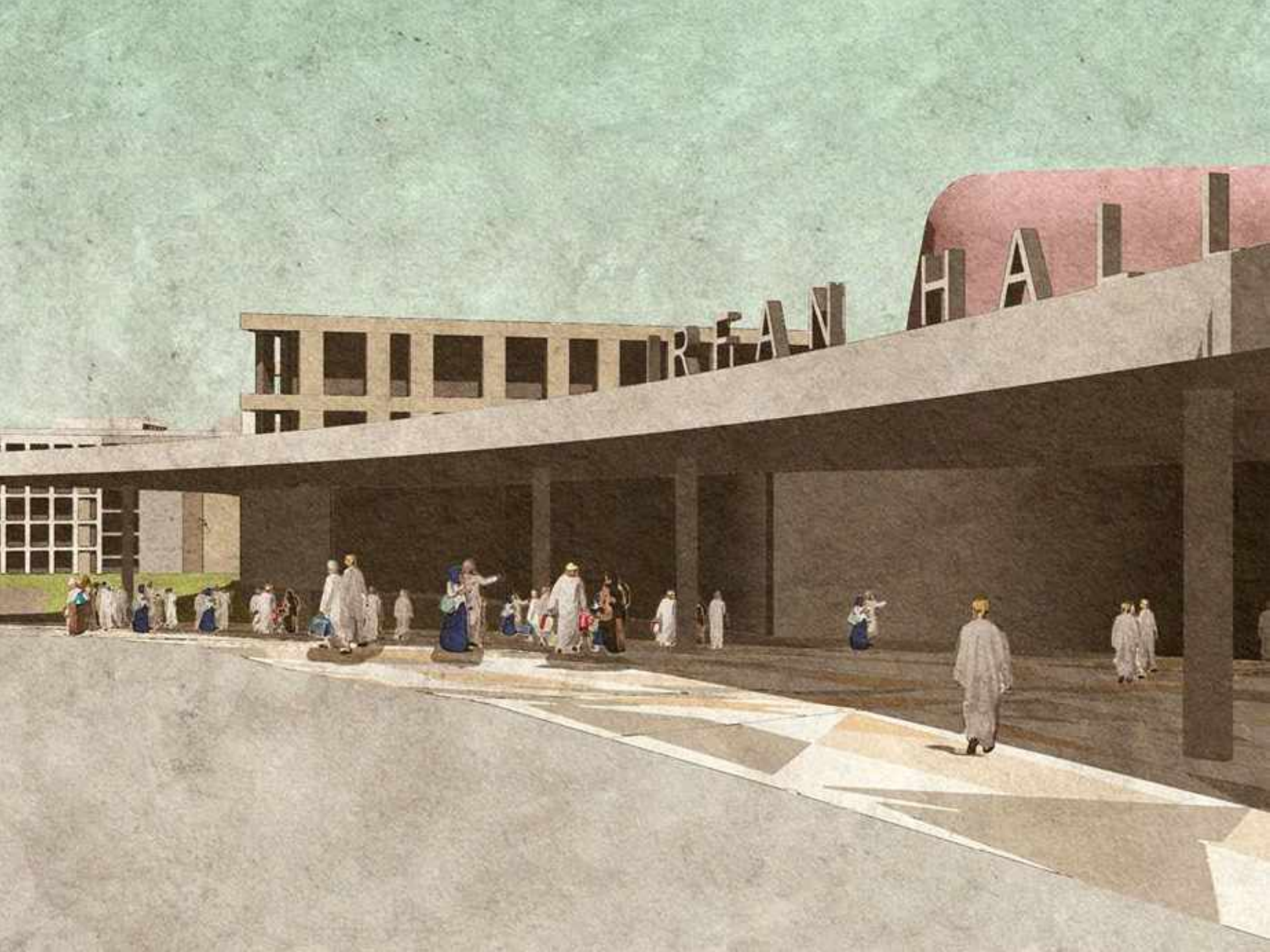












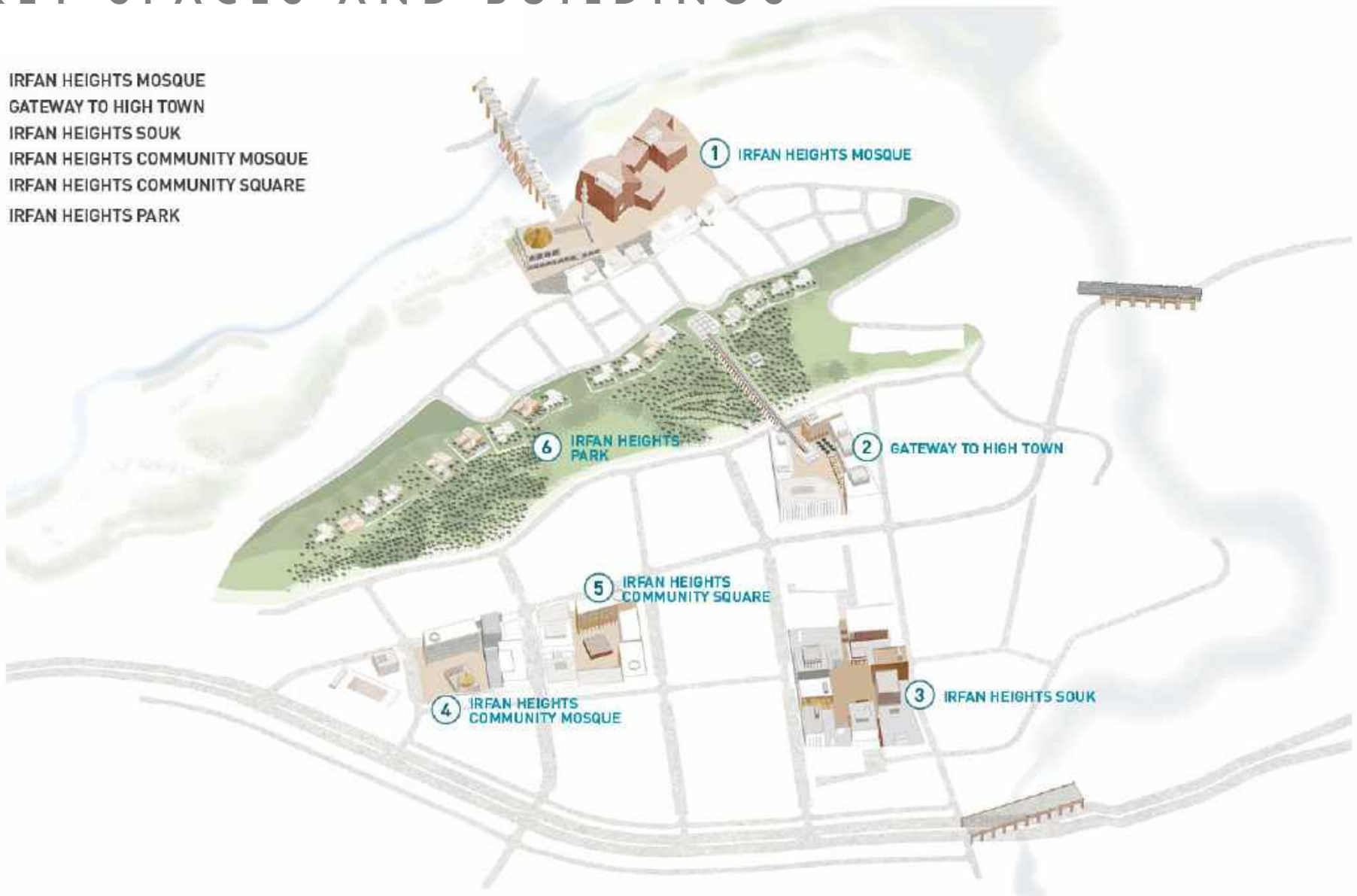
IRFAN HEIGHTS



IRFAN HEIGHTS

KEY SPACES AND BUILDINGS

1. IRFAN HEIGHTS MOSQUE
2. GATEWAY TO HIGH TOWN
3. IRFAN HEIGHTS SOUK
4. IRFAN HEIGHTS COMMUNITY MOSQUE
5. IRFAN HEIGHTS COMMUNITY SQUARE
6. IRFAN HEIGHTS PARK





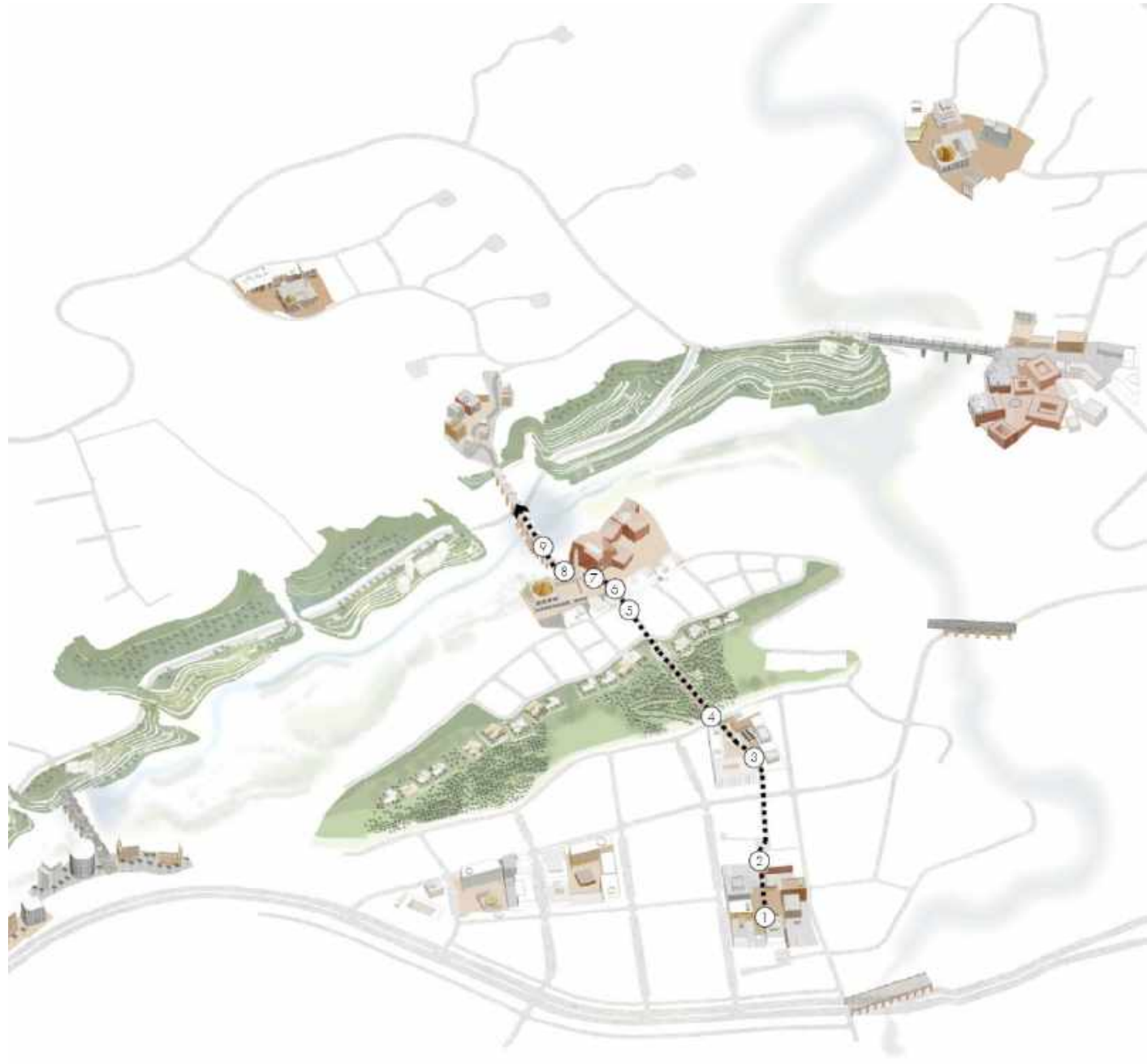




IRFAN HEIGHTS



IRFAN HEIGHTS















VILLAGES AND HAMLETS

















VILLAGES AND HAMLETS



















MADINAT AL IRFAN

Landscape

URBAN LANDSCAPE

KEY SPACES

- ① MOSQUE GARDEN
- ② MADINAT AL IRFAN CENTRAL SQUARE
- ③ BOULEVARD GARDEN
- ④ GATEWAY SQUARE
- ⑤ THEATRE SQUARE
- ⑥ CBD SQUARE
- ⑦ SOUK SQUARE
- ⑧ MADINAT AL IRFAN SQUARE
- ⑨ DIWAN
- ⑩ PROMENADE



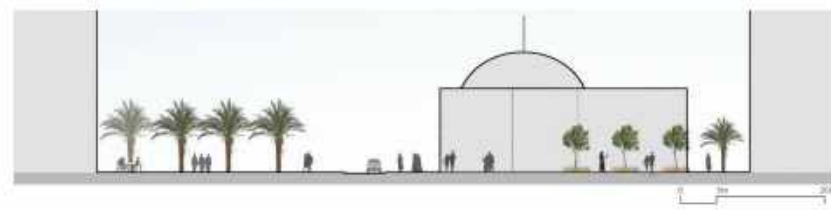
URBAN LANDSCAPE

MOSQUE GARDEN



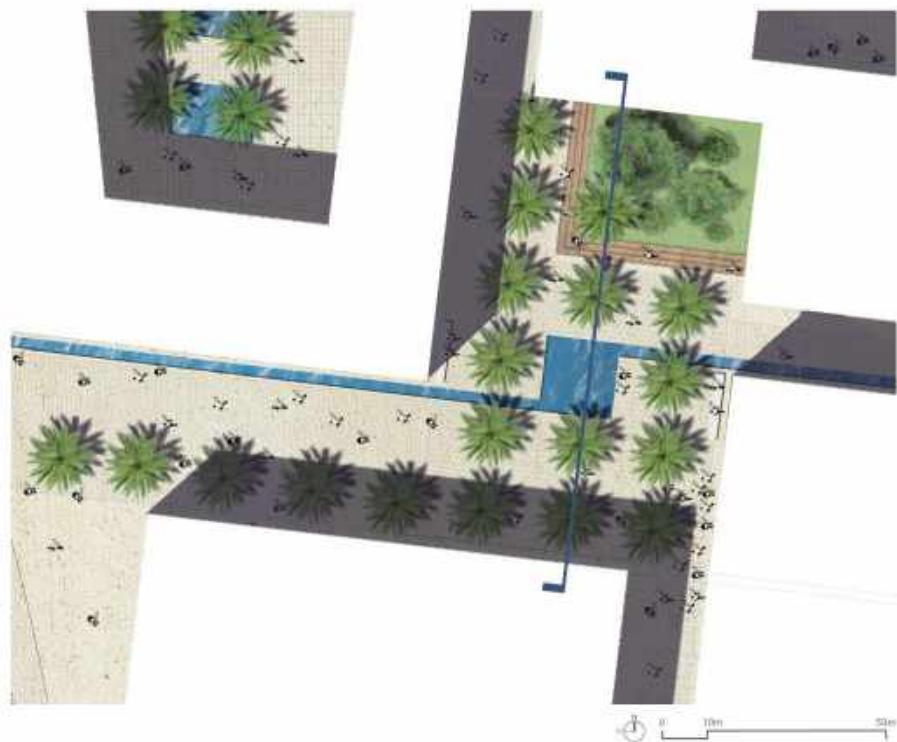
URBAN LANDSCAPE

MADINAT AL IRFAN SQUARE



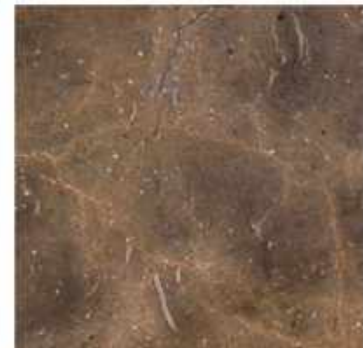
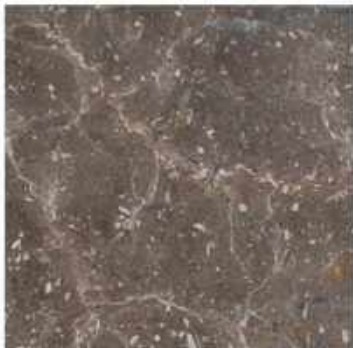
URBAN LANDSCAPE

SECONDARY PUBLIC SPACES



URBAN LANDSCAPE

HARDSCAPE STRATEGY



MATERIALS

URBAN LANDSCAPE

HARDSCAPE STRATEGY



FURNITURE

WAYFINDING

SHADE STRUCTURES

SOFTSCAPE STRATEGY



URBAN LANDSCAPE

SOFTSCAPE STRATEGY



URBAN LANDSCAPE

LIGHTING STRATEGY



URBAN LANDSCAPE

LIGHTING STRATEGY



L A N T E R N S



L A N D M A R K S



I N T E G R A T E D

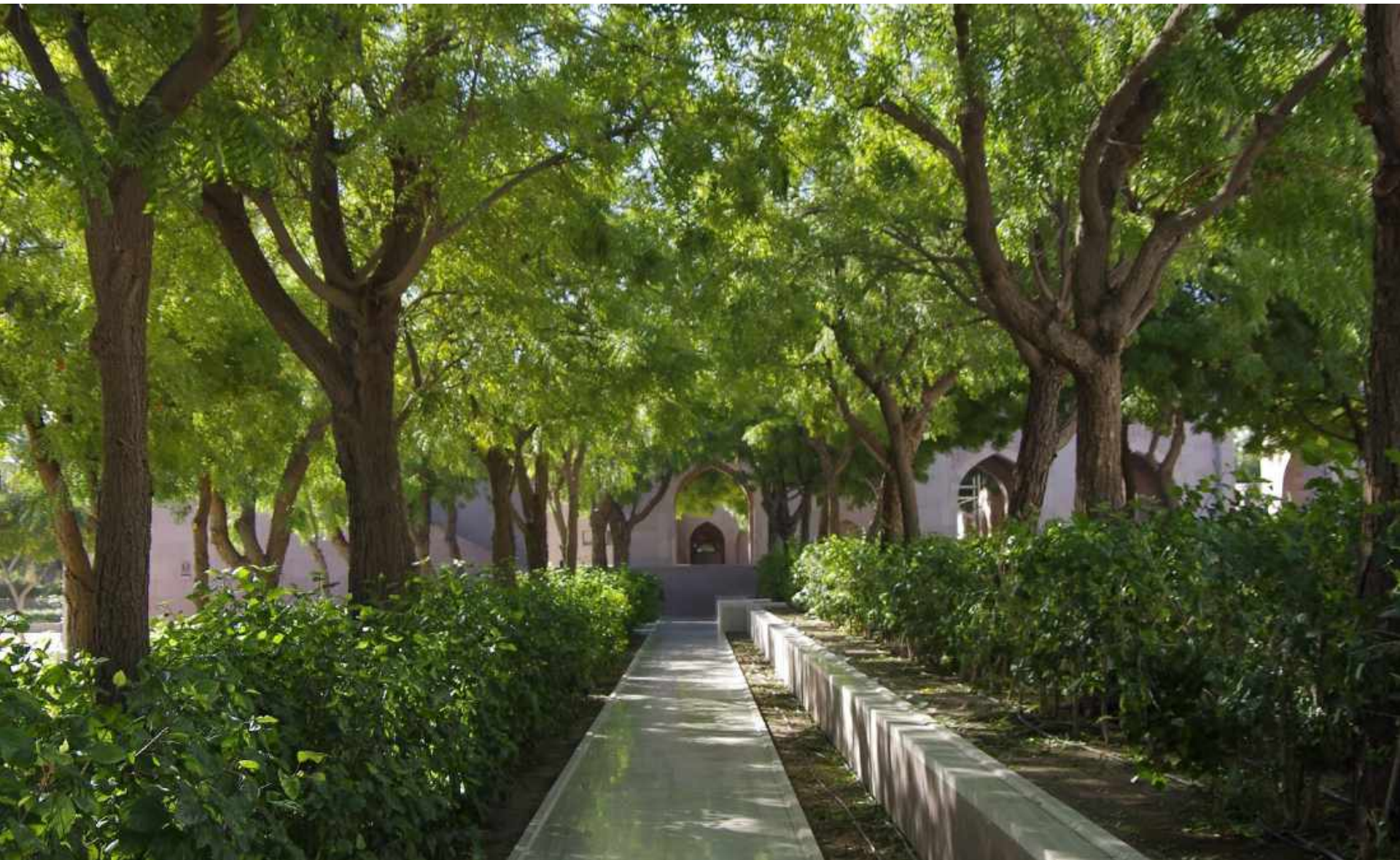
VILLAGE & HAMLET LANDSCAPE

MOSQUE SQUARE



VILLAGE & HAMLET LANDSCAPE

MOSQUE SQUARE



WADI LANDSCAPE

TYPES



WADI LANDSCAPE

TYPES



WADI LANDSCAPE

T Y P O L O G I E S



W A D I B A S I N



T E R R A C E S

WADI LANDSCAPE

T Y P O L O G I E S



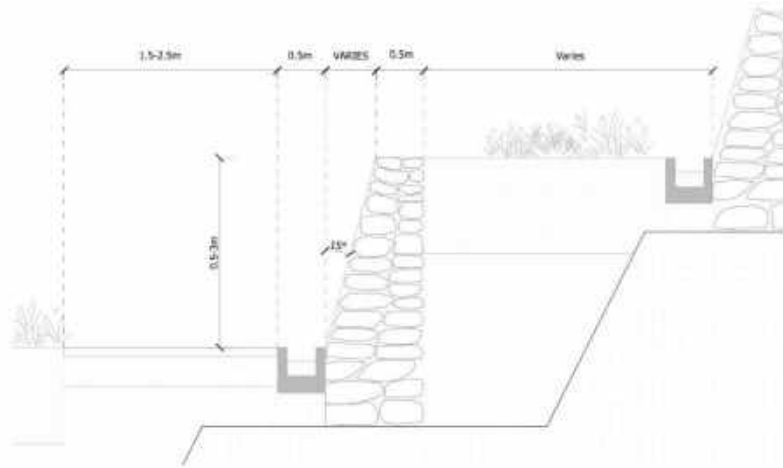
C O R N I C H E



D A T E P A L M P L A N T A T I O N S

WADI LANDSCAPE

T Y P O L O G I E S



M A T E R I A L S

WADI LANDSCAPE

T Y P O L O G I E S



F U R N I T U R E



W A Y F I N D I N G



S H A D E S T R U C T U R E S



MADINAT AL IRFAN

Design codes

DESIGN CODES

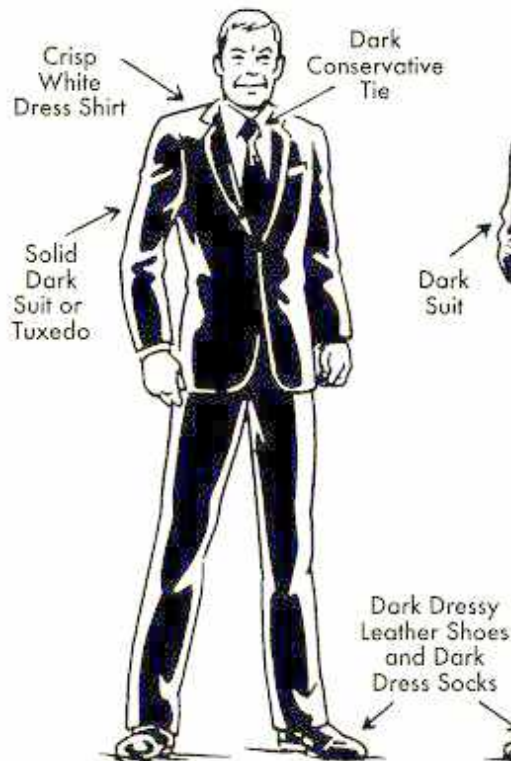
WHAT ARE THEY FOR?

DESIGN CODES

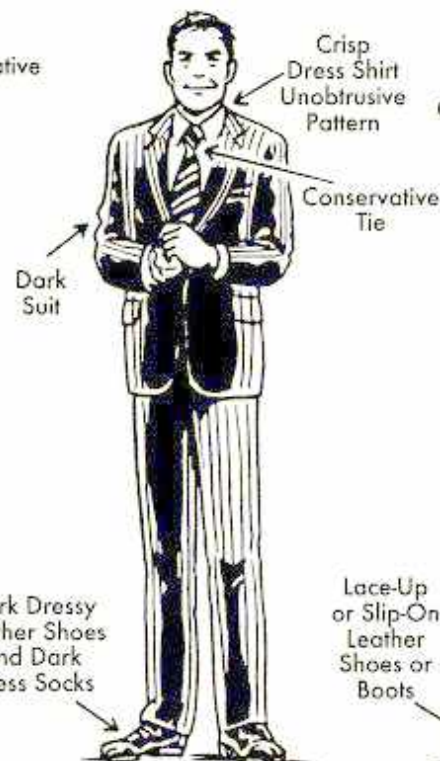
WHAT ARE THEY FOR?

Deciphering the Invitation: Dressing for the Occasion

Black Tie Optional



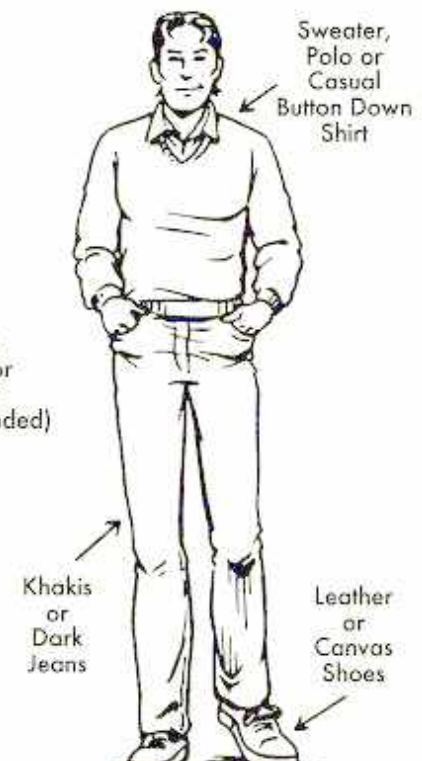
Semi-Formal



Business Casual

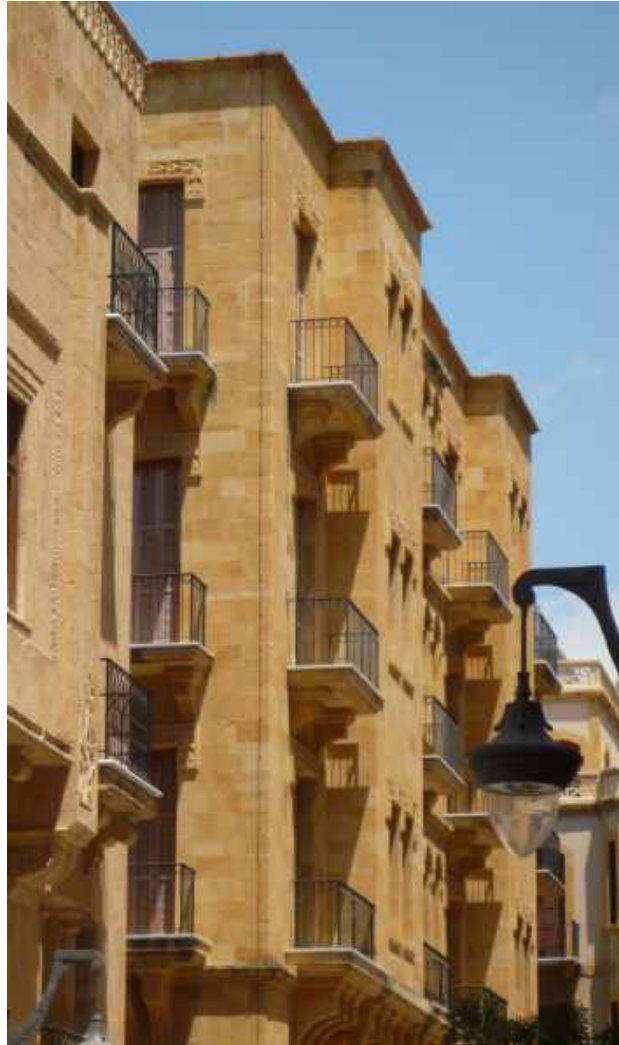


Casual



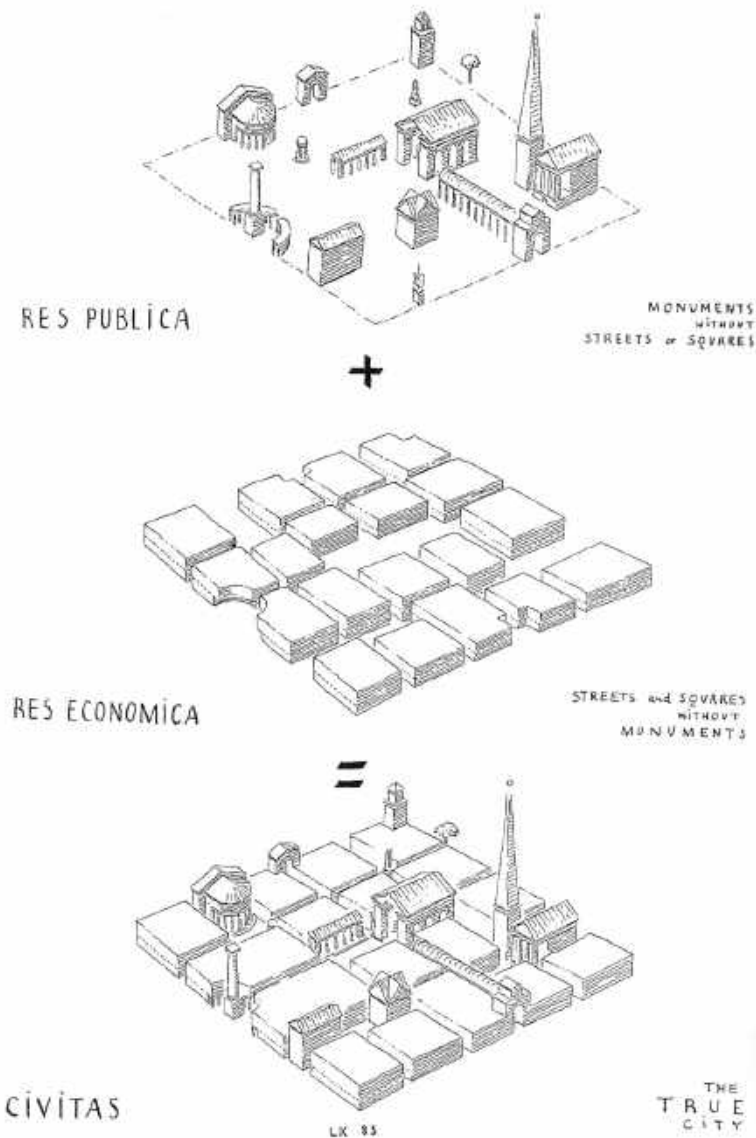
DESIGN CODES

WHAT ARE THEY FOR?



DESIGN CODES

WHAT ARE THEY FOR?



DESIGN CODES

HOW DO THEY WORK?

Vision / Parameter plans

Site

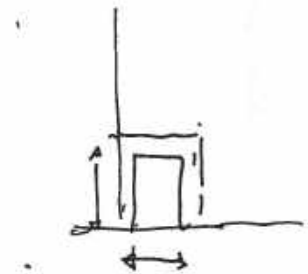


Phase 1



Design Codes / Guidelines

Urban Building Elements



Mandatory



Open to Interpretation



Recommendation

DESIGN CODES

HOW DO THEY WORK?

VISION / PARAMETER PLANS

SITE



PHASE 1



DESIGN CODES

HOW DO THEY WORK?

DESIGN CODES / GUIDELINES

URBAN



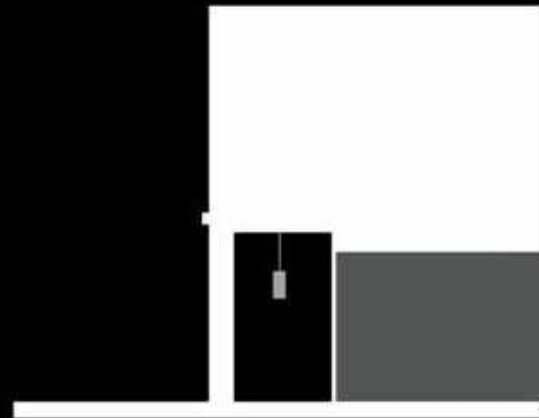
Street type

BUILDING



Street Wall Control

ELEMENTS



Type of Colonnades

DESIGN CODE

CODE PRECEDENTS

King's Cross, Olympic Legacy, Dohaland, Lusail, Seri Tanjung Pinang, Solidere...

12 codes

7 countries

from 2007-2015

from 12 to 3,600 hectares

KEY FACTORS

Scale of Project

Land Ownership

Local Development Context

Implementation

Time Frame

DESIGN CODE

SELECTIVE MATRIX

LEGEND
Introduction
Site-wide, Public Realm
Landscape
Sustainability
Other Site-wide Policies
Architecture Massing, Uses
Architecture Material & Detail
Support documents

Consultant
oriented axis >

User
oriented axis >

	1.1	1.2	2.1	2.2	2.3	2.4	2.5	2.6	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	4.5	4.6	5.1	5.2	5.3	5.4	5.5	5.6	6.1	6.2	6.3	6.4	7.1	7.2
Site-wide	•		•	•					•	•			•	•	•				•						•	•	•		•	•
Area 1	•	•		•	•	•	•		•	•	•	•							•	•					•				•	
Area 2	•			•	•	•				•	•		•			•			•	•		•			•	•	•		•	
Area 3	•			•	•				•	•	•		•	•	•	•	•		•						•	•				
Area 4	•			•	•	•					•				•	•	•		•	•		•	•		•	•	•		•	
Area 5	•	•		•	•		•												•	•	•	•	•	•	•	•	•	•	•	
Area 6	•	•				•			•							•	•	•		•					•	•	•			
Area 7	•					•			•						•	•	•	•							•	•	•			
Area 8	•						•				•				•	•	•	•						•	•	•	•			
Area 9	•											•			•	•	•	•						•	•		•			
Area 10	•											•			•	•	•	•						•	•		•			

DESIGN CODE PROPOSAL

SELECTIVE MATRIX

	1.1	1.2	2.1	2.2	2.3	2.4	2.5	2.6	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	4.5	4.6	5.1	5.2	5.3	5.4	5.5	5.6	6.1	6.2	6.3	6.4	7.1	7.2	8.1	8.2	9.1	9.2
Site-wide	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Area 1	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Area 2	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Area 3	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Area 4	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Area 5	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Area 6	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Area 7	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Area 8	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Area 9	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Area 10	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*

Area 1 (Urban)
1.1
1.2
2.2
2.3
2.4
2.5
3.1
3.2
3.3
3.4
5.1
5.2
6.1
7.1
9.1

Area 3 (Resi)
1.1
2.2
2.3
3.1
3.2
3.3
4.1
4.2
4.3
4.4
4.5
5.1
6.1
6.2
9.1

Area 5 (Key Landscape)
1.1
1.2
2.2
2.3
2.5
5.1
5.2
5.3
5.4
5.5
5.6
6.1
6.2
6.3
6.4
7.1
8.1
9.1

DESIGN CODE PROPOSAL

IRFAN UDC TABLE OF CONTENTS

GENERIC CODE ELEMENTS

300 elements

5 basic types

Intro, Context, Vision	Public Realm, Circulation	Landscape	Building Massing, Uses	Architecture Material & Detail	Sustainability	Support documents
Context And Structure Of This Document A Standard A Tool For Delivery An Illustrative Worked Example Associated Documents Character Areas Context Departures From The Guidelines Design Ambition: Nature Design Ambition: Sustainability Framework Golden Rules Guideline Hierarchy Guidelines Summary Illustrative Schemes Introduction Key Plan Masterplan Metaphor And Imagery Organisation Origins, Context Parameter Plans Purpose Requirements Sequential Build-Out Plans Setting Standards To Deliver The Vision Site Wide Architectural Vision Standards, Regulations And Access Status Synergy (Regional Context) The Purpose Of This Document Towards Implementation Visions Of Place Walkthrough	Active Streets Building Frontage Car Parking Connections Cycle Routes Developments Earthworks And Grading Edges Enclosure General Parameters Geometry Grain Hard Landscaping High Street Highway Design Standards Illustrative Street Typologies Infrastructure And Road Design Layout Levels Local Views New Streets And Existing Streets Microclimate Movement & Street Grain Neighbourhoods Neighbourhood Streets Network Of Routes Open Space Parking Provision Pedestrian Routes Plazas Primary Open Spaces Enclosures Primary Routes Property Walls And Fences Public Car Parking Public Routes Road Hierarchy Roads Routes Scale Setbacks Site Furniture Strategic Views Street Data Sheets Street Enclosures Street Frontages Street Hierarchy Street Sections Street Typologies Streets Streetscape Surfaces And Street Furniture Traffic Management Transitions- Private And Public Realm Transport Transport Interchange Typical Street Sections Urban Squares And Main Squares Vehicular Circulation Views Walking Water Features Weather Protection Wider Area	Baseline Canal Side City Gardens Communal Roof Garden Component Palettes - Planting Culture And Art Electrical Cable Landscape Food General Planting Guidelines General Strategies Green Roof: No Amenity Access Green Roof: Private Roof Terrace Hard Landscape Details Individual Plot Landscape Irrigation Landscape Landscape Character Landscape Elements Landscape Lighting Landscape Masterplan Landscape Materiality Landscape Specifications Landscape Street Types Landscape Treatment Landscaping Aims And Objectives Maintenance And Management Parks- Community Park Parks- Nature Parks Parks- Neighbourhood Parks Primary Open Spaces Public Realm Recreation And Play Roof Terraces And Green Roofs Soft Landscape Details Specific Planting Guidelines Tree Strategy Urban Landscape Character Vegetation Village And Hamlet Landscape Character Wadi Landscape Character Water Water Sensitive Urban Design	A Family Of Building Types Anatomy- Blocks Anatomy- Building Typologies Anatomy Of The City Anatomy Of The District Anatomy Of The Villages Block Structure Brief- Community And Civic Buildings Brief- Cultural Buildings Brief- General, All Types Brief- Hotels Brief- O&M Buildings Brief- Offices Brief- Religious Buildings Brief- Residential Brief- Retail Brief- Schools Building Base Building Briefs Building Edges Building Form Building Height Building Lines Building Massing Building Profiles Building Thresholds Building Uses Building Vertical Subdivision Built Form Built Form- Scale Of The Podium Built Form- Size And Articulation Built Form- Spatial Separation Built Form- Transition In Scale Built Form- Typology City Block With Parking Components Schedule- Spaces Design Districts Flood Resilience Frontage General Height Distribution Illustrative Space Typologies Interface With Buildings Interface With Public Realm Land Uses Neighbourhood Layout Plot Edges Public Realm: Access & Privacy Residential Accommodation Residential Building Types Residential Density Residential Development Residential Quality Roof Profile Roofs Scale Secondary Elevations Service Access Servicing- Car Parking Servicing Setbacks, Roofscape Space Typologies Taller Built Elements Tops Of Blocks Townscape Transitions Use And Amount Uses, Ground Floor Frontage	Accessibility And Inclusive Design An Architectural Language Architectural Character Architectural Design Architectural Elements Balconies Building Appearance Building Elements Building Materials Building Signage Building Types Character Areas Children's Play Space Component Palettes For Building Frontages Concierge Lobby Courtyard Entrance Courtyards Design Parameters Design Context Entrances Facades- Facades- Ground Level Facades- Characteristics Facades- Materials Facades- Parking Structures Facades- Rear And Sides Fenestration And Glazing Frontage Furniture And Lighting Ground Floors Massing Materials Nonresidential Frontages Organisation And Accessibility Other Elements Parking Retail Frontages Roof- Barren Roof- Brown Roof- Green accessible Roof- Green non-accessible Roof Lines Roofscapes Rooftop Equipment Rooftops Use Of Colour Uses And Finishes Variety Way-Finding Guidelines Way-Finding- Sign Numbers Way-Finding- Types Of Signs Permitted Windows/Openings	Business Community and Tourism Cultural Resonance Ecology Energy Environment ICT and Comms Innovation Landscape Material Public Transport Solid Waste Sustainability Transport Strategy Trip Generation Urban Design Utilities Walking and Cycling Water Water Management Water- Storm Water Water- Supply Water- Waste Water	Basement Masterplan Glossary Illustrative Masterplan Parameter Plans Phasing Plot Boundaries Protocol For Code Revision Reference Documents And Standards Stakeholder Consultation Technical Standards And Codes

DESIGN CODE PROPOSAL

IRFAN UDC TABLE OF CONTENTS

1. Front Matter
2. Site-wide Codes
3. Sector Codes
4. Block Level Codes
5. Building Level Codes
6. Element Level Codes
7. Key Area Guidance
8. External References

Administrative

General

Specific



DESIGN CODE PROPOSAL

IRFAN UDC TABLE OF CONTENTS

1. Front Matter	Masterplan Vision
2. Site-wide Codes	Character Area/Sectoral Visions
3. Sector Codes	Instructions:
4. Block Level Codes	Purpose of the Code
5. Building Level Codes	How to use the Code
6. Element Level Codes	Relationship to other Documents
7. Key Area Guidance	Monitoring and Approvals Process
8. External References	Code Revision Protocol
	Roadmap for the Code:
	Selective Matrix
	Version Tracker
	Glossary



DESIGN CODE PROPOSAL

IRFAN UDC TABLE OF CONTENTS

1. **Front Matter**
2. Site-wide Codes
3. Sector Codes
4. Block Level Codes
5. Building Level Codes
6. Element Level Codes
7. Key Area Guidance
8. External References

Masterplan Vision
Character Area/Sectoral
Visions

Instructions:

Purpose of the Code

**How to use the
Code**

**Relationship to
other Documents**

**Monitoring and
Approvals Process**

**Code Revision
Protocol**

Roadmap for the Code:
Selective Matrix

Version Tracker

Glossary



DESIGN CODE PROPOSAL

IRFAN UDC TABLE OF CONTENTS

- 1. **Front Matter**
- 2. Site-wide Codes
- 3. Sector Codes
- 4. Block Level Codes
- 5. Building Level Codes
- 6. Element Level Codes
- 7. Key Area Guidance
- 8. External References

Masterplan Vision
Character Area/Sectoral
Visions
Instructions:
Purpose of the Code
How to use the Code
Relationship to other
Documents
Monitoring and
Approvals Process
Code Revision
Protocol

**Roadmap for the Code:
Selective Matrix**

Version Tracker
Glossary

	1.1	1.2	2.1	2.2	2.3	2.4	2.5	2.6	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	4.5	4.6
Site-wide	*		*	*					*	*			*	*	*			
Area 1	*	*	*	*	*	*	*		*	*	*	*						
Area 2	*		*	*	*	*	*		*	*	*	*	*	*	*	*	*	*
Area 3	*		*	*	*	*	*		*	*	*	*	*	*	*	*	*	*
Area 4	*		*	*	*	*	*		*	*	*	*	*	*	*	*	*	*
Area 5	*	*	*	*	*	*	*		*	*	*	*	*	*	*	*	*	*
Area 6	*	*	*	*	*	*	*		*	*	*	*	*	*	*	*	*	*
Area 7	*		*	*	*	*	*		*	*	*	*	*	*	*	*	*	*
Area 8	*		*	*	*	*	*		*	*	*	*	*	*	*	*	*	*
Area 9	*		*	*	*	*	*		*	*	*	*	*	*	*	*	*	*
Area 10	*		*	*	*	*	*		*	*	*	*	*	*	*	*	*	*

•

•

DESIGN CODE PROPOSAL

IRFAN UDC TABLE OF CONTENTS

- 1. Front Matter**
2. Site-wide Codes
3. Sector Codes
4. Block Level Codes
5. Building Level Codes
6. Element Level Codes
7. Key Area Guidance
8. External References

Masterplan Vision
Character Area/Sectoral Visions
Instructions:
Purpose of the Code
How to use the Code
Relationship to other Documents
Monitoring and Approvals Process
Code Revision Protocol
Roadmap for the Code:
Selective Matrix
Version Tracker

Glossary

Active Frontage	A building front that promotes activity and encourages cross-movement between the building at ground level and the adjacent public realm by the way the building is designed or orientated. (Gascoigne UDC)
Building Frontage	Portion of the building envelope facing the public realm, such as a street or a public square.
BUA	Built-up Area.
Liwan	A long narrow-fronted hall or vaulted portal found in Levantine homes that is often open to the outside living space for men guests. (Abdelmonem)
Majlis	Rooftop spaces. (Dohaland MDS)
Malquaf	Wind turret or wind-trap. The malquaf is a shaft rising above the rest of the house, placed on the northern end of the Qa'a. The north and the west sides of this malkaf are left open at the upper end to catch the prevailing cool breeze. (Fathy)
Mushrabeya	A window fitted with a lattice screen made of small wooden bars. These bars are circular in section, so that they have the effect of breaking up the light which falls on them; thus... the glare is softened and the eye is not dazzled. (Fathy)
Sablah	A place in the home where guests are formally received.
Parameter Plans	A set of plans that describe the parameters of the development in terms of its general use, height, access, and layout. (Gascoigne UDC)

DESIGN CODE PROPOSAL

IRFAN UDC TABLE OF CONTENTS

1. Front Matter
 - 2. Site-wide Codes** — **Parameter Plan based guidance**
Street Hierarchy, Highway Design
 3. Sector Codes
 4. Block Level Codes
 5. Building Level Codes
 6. Element Level Codes
 7. Key Area Guidance
 8. External References
- Sector Locations*
 - Land Uses*
 - Streetwall Control Locations*
 - Movement Networks*
 - Vehicular*
 - Cycle*
 - Pedestrian*
 - Public Transport*
 - Landscape*
 - Open Space Network*
 - Infrastructure*
 - Parking Strategy*

Type 1: Parameter Plan Based Codes



Parameter Plan

DESIGN CODE PROPOSAL

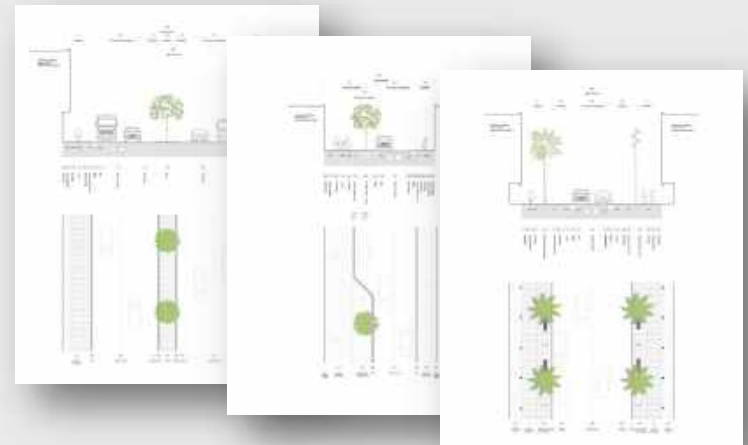
IRFAN UDC TABLE OF CONTENTS

1. Front Matter
 - 2. Site-wide Codes** — **Parameter Plan based guidance**
Street Hierarchy, Highway Design
 3. Sector Codes
 4. Block Level Codes
 5. Building Level Codes
 6. Element Level Codes
 7. Key Area Guidance
 8. External References
- Sector Locations*
Land Uses
Streetwall Control Locations
Movement Networks
Vehicular
Cycle
Pedestrian
Public Transport
Landscape
Open Space Network
Infrastructure
Parking Strategy

Type 1: Parameter Plan Based Codes



Parameter Plan



DESIGN CODE PROPOSAL

IRFAN UDC TABLE OF CONTENTS

1. Front Matter
2. Site-wide Codes
3. Sector Codes
- 4. Block Level Codes**
 - Perimeter block assembly**
 - Building massing
 - Building density
 - Building Setbacks...
 - Street Wall Controls
 - Townscape Principles
 - Special buildings
 - Special frontages
 - Prominent corners...
 - Village Fabric Principles
5. Building Level Codes
6. Element Level Codes
7. Key Area Guidance
8. External References

Type 3: Tutorial Codes

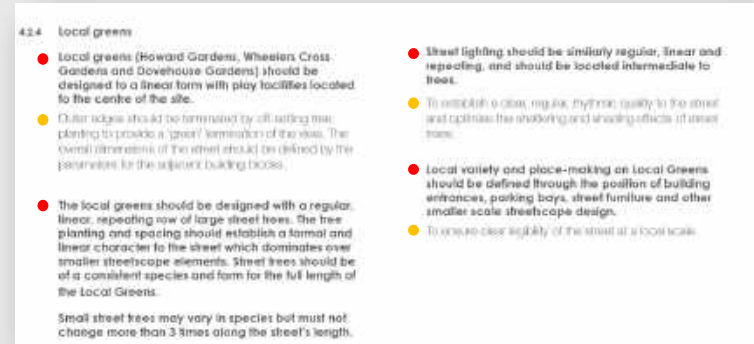


DESIGN CODE PROPOSAL

IRFAN UDC TABLE OF CONTENTS

1. Front Matter
 2. Site-wide Codes
 3. Sector Codes
 - 4. Block Level Codes**
 5. Building Level Codes
 6. Element Level Codes
 7. Key Area Guidance
 8. External References
- Perimeter block assembly**
- Building massing
 - Building density
 - Building Setbacks...
 - Street Wall Controls
 - Townscape Principles
 - Special buildings
 - Special frontages
 - Prominent corners...
 - Village Fabric Principles

Type 3: Tutorial Codes



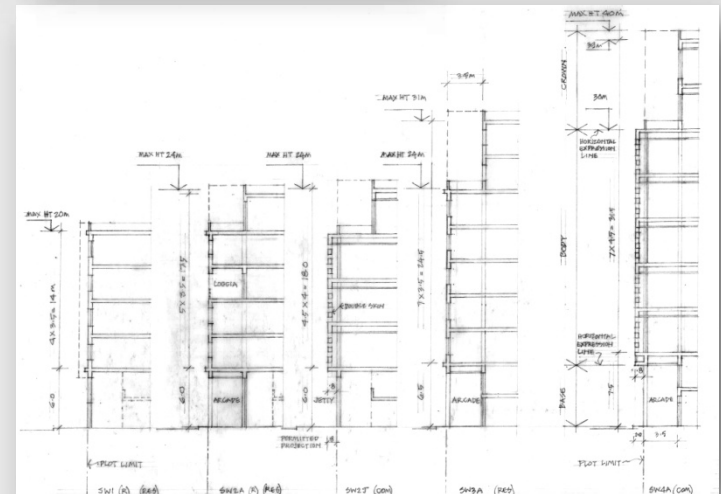
DESIGN CODE PROPOSAL

IRFAN UDC TABLE OF CONTENTS

- | | |
|---|----------------------------------|
| 1. Front Matter | <i>Perimeter block assembly</i> |
| 2. Site-wide Codes | <i>Building massing</i> |
| 3. Sector Codes | <i>Building density</i> |
| | <i>Building Setbacks...</i> |
| 4. Block Level Codes — Street Wall Controls | |
| 5. Building Level Codes | <i>Townscape Principles</i> |
| 6. Element Level Codes | <i>Special buildings</i> |
| 7. Key Area Guidance | <i>Special frontages</i> |
| | <i>Prominent corners...</i> |
| 8. External References | <i>Village Fabric Principles</i> |



Parameter Plan



Type 3: Tutorial Codes

DESIGN CODE PROPOSAL

IRFAN UDC TABLE OF CONTENTS

1. Front Matter
 2. Site-wide Codes
 3. Sector Codes
 4. Block Level Codes
 - 5. Building Level Codes**
 6. Element Level Codes
 7. Key Area Guidance
 8. External References
- Building Types*
- Schools
 - Mosques
 - Health Centres
 - Hotels
 - Theatres
 - Offices
- Residential Types**
- Villas**
 - Town-villas**
 - Town-houses
 - Low-rise Apartments
 - Mid-rise Apartments

Type 3: Tutorial Codes



DESIGN CODE PROPOSAL

IRFAN UDC TABLE OF CONTENTS

1. Front Matter
2. Site-wide Codes
3. Sector Codes
4. Block Level Codes
5. Building Level Codes
- 6. Element Level Codes**
7. Key Area Guidance
8. External References

Building Elements
Colonnades
Entrances
Balconies
Roof Terraces
Wind Turrets
Basement Interfaces

Material Palettes

Stone
Timber
Render
Prohibited Materials
Tree and Planting Palettes



**Type 4: "Kit of Parts"
Codes**

DESIGN CODE PROPOSAL

IRFAN UDC TABLE OF CONTENTS

1. Front Matter
2. Site-wide Codes
3. Sector Codes
4. Block Level Codes
5. Building Level Codes
- 6. Element Level Codes**
7. Key Area Guidance
8. External References

Building Elements
Colonnades
Entrances
Active Frontages
Balconies
Roof Terraces
Basement Interfaces

Material Palettes
Stone
Timber
Render
Prohibited Materials

Tree and Planting Palettes



**Type 4: “Kit of Parts”
Codes**

DESIGN CODE PROPOSAL

IRFAN UDC TABLE OF CONTENTS

1. Front Matter
 2. Site-wide Codes
 3. Sector Codes
 4. Block Level Codes
 5. Building Level Codes
 6. Element Level Codes
 - 7. Key Area Guidance**
 8. External References
- Irfan CBD Square*
Irfan Square
Irfan Theatre Square
Mosque Garden
Irfan Central Souk
Village Square
Gateway Park



Parameter Plan



Type 5: Special Cases

DESIGN CODE PROPOSAL

IRFAN UDC TABLE OF CONTENTS

1. Front Matter
 2. Site-wide Codes
 3. Sector Codes
 4. Block Level Codes
 5. Building Level Codes
 6. Element Level Codes
 - 7. Key Area Guidance**
 8. External References
- Irfan CBD Square*
Irfan Square
Irfan Theatre Square
Mosque Garden
Irfan Central Souk
Village Square
Gateway Park



Parameter Plan



Type 5: Special Cases

DESIGN CODE PROPOSAL

IRFAN UDC TABLE OF CONTENTS

1. Front Matter
2. Site-wide Codes
3. Sector Codes
4. Block Level Codes
5. Building Level Codes
6. Element Level Codes
7. Key Area Guidance
- 8. External References**

***Muscat Municipal
Initiatives***

***Sustainability
Standards***

Technical Standards

MUSCAT MUNICIPAL INITIATIVES

- Cultivating the Seasonal Flowers Program
- Program of Landscape Management for Workers' Rehabilitation of Aforestation and Gardens

SUSTAINABILITY STANDARDS

- Omani Sustainability Standards

TECHNICAL STANDARDS

- Directorate General for Standards and Metrology (Oman)
- SMIIC (Islamic Countries)
- BSI (UK)
- EN (Europe)
- ASTM (USA)

Type 5: Special Cases

Complex and detailed thinking

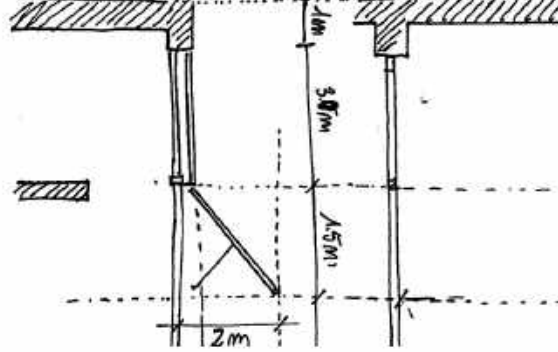
$(F_g \times F_s) \times 100$
 $\times 0.28 \times 0.55 \times 100$
 $\times 154 \times 100$

$0.06 = F_w \times 0.28$
 $= 0.182 F_w$
 $F_w = 0.06 / 0.182$

6% reduction with 500 mm reveal
 for 4 m height shopfront.
 = 24% WWR

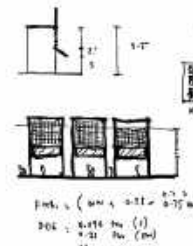
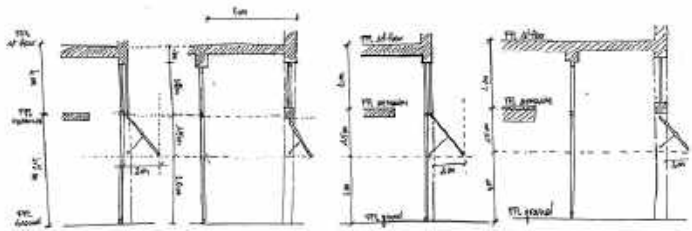
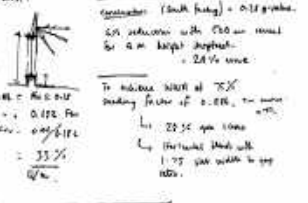
To achieve WWR of 75%
 shading factor of 0.286, 2m overhang
 0.77.
 28% open screen

PFL
 Measure
 4m
 4.5m

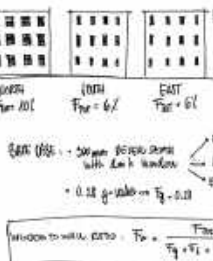


6% reduction with 500 mm reveal
 for 4 m height shopfront.
 = 24% WWR

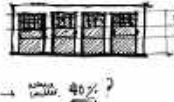
$(F_w \times F_g \times F_s) \times 100$
 $= (0.06 \times 0.28 \times 0.55) \times 100$
 $= 0.91$
 $F_w = 0.06 / 0.182$
 $= 0.33$



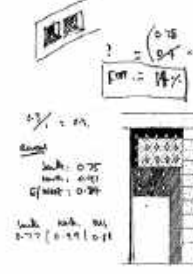
$0.06 = 0.14 F_w = 45\%$
 NORTH $F_w = \frac{10 \times 1}{0.14 \times 0.91 \times 100} = 99\%$
 SOUTH $F_w = \frac{6 \times 1}{0.14 \times 0.15 \times 100} = 28.5\%$
 EAST/WEST $F_w = \frac{6 \times 1}{0.14 \times 0.8 \times 100} = 25.9\%$



$(F_w \times F_g \times F_s) \times 100$
 $= (0.06 \times 0.28 \times 0.55) \times 100$
 $= 0.91$
 $F_w = 0.06 / 0.182$
 $= 0.33$

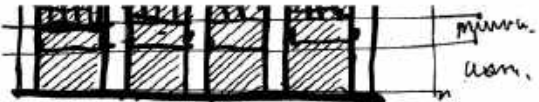


- Avoiding separate elements
 (CONCRETE, ALUMINIUM, GLASS, WOOD)
 - Avoiding base case without aluminium
 (ALUMINIUM, GLASS, WOOD)
 - Avoiding base case without aluminium
 (ALUMINIUM, GLASS, WOOD)



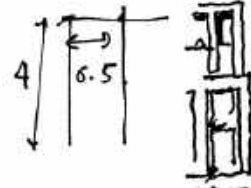
$0.06 = 0.14 F_w = 45\%$
 NORTH $F_w = \frac{10 \times 1}{0.14 \times 0.91 \times 100} = 99\%$
 SOUTH $F_w = \frac{6 \times 1}{0.14 \times 0.15 \times 100} = 28.5\%$
 EAST/WEST $F_w = \frac{6 \times 1}{0.14 \times 0.8 \times 100} = 25.9\%$

$= (F_w \times F_g \times F_s) \times 100$
 $= (0.06 \times 0.28 \times 0.55) \times 100$
 $= 0.91$
 $F_w = 0.06 / 0.182$
 $= 0.33$



achieve WWR target

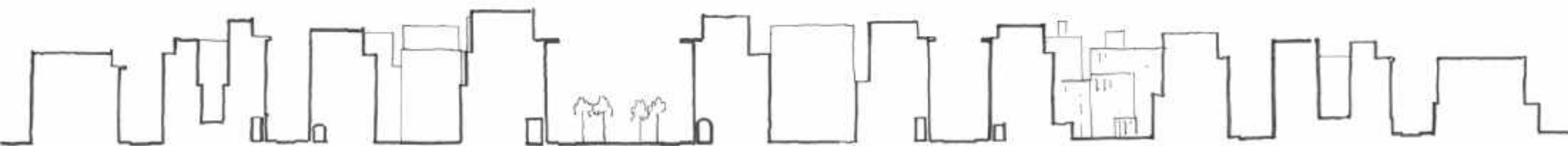
- Achieving base case, % target



NORTH $F_w = 0.98$

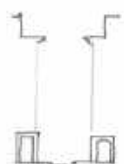
$F_{w,1} = (F_w \times F_g \times F_s) \times 100$

Establish urban design codes that are policy ...



INFORMAL

Height
of door



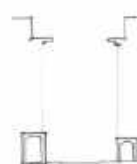
FORMAL

Columns
columns
columns
columns
columns
columns
columns
columns
columns
columns



FORMAL

Columns
columns
columns
columns
columns
columns
columns
columns
columns
columns



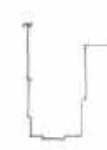
FORMAL

Columns
columns
columns
columns
columns
columns
columns
columns
columns
columns



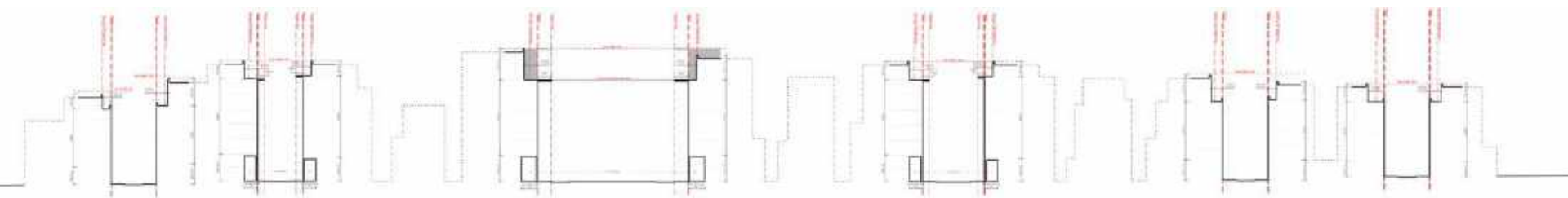
INFORMAL

Height
of door



INFORMAL

Height
of door



TARGET INFRASTRUCTURE CALCULATIONS		
ENERGY	Annual Energy Consumption	4256 MWh/annum
	Renewable Energy Target	852 MWh/annum
POWER	Maximum Demand Electricity Supplied by	3346 MW, PS_IC_3
DISTRICT COOLING	Peak Demand	3542 kW/cond
	Supplied by	DCP_ICE
GAS	Peak Demand	101 m3/hr
POTABLE WATER (Building)	Peak Demand	1.5 l/s
	Daily Demand	48610 litres
POTABLE WATER (Landscape)	Peak Demand	0.1 l/s
	Daily Demand	1518 litres
NON POTABLE WATER (Building)	Peak Demand	0.7 l/s
	Daily Demand	35877 litres
NON POTABLE WATER (Landscape)	Peak Demand	0.1 l/s
	Daily Demand	3477 litres
WASTE WATER	Peak Demand	2.8 l/s
	Daily Flow	8844 litres
	Served by	WWPS_5
TELECOMS	Cable Entry Points	Minimum 2
	Diversity of Connection	Minimum 2
	Ducts per Cable Entry Point	4-way
SOLID WASTE	Dry Mixed Recyclables	285 tonnes/annum
	Organic Waste	256 tonnes/annum
	Residual Waste	128 tonnes/annum
	Hazardous Waste	123 tonnes/annum

ICB-99 1/2

Translate the masterplan's vision into something simple to understand.

MADINAT AL IRFAN

Governance

GOVERNANCE

APPROVALS LANDSCAPE IN MUSCAT

	Environ Permit	Planning Permit	Building Permit	Public Transport	Highways & TIA	Electricity	Water	Drainage	Solid Waste	ICT	Civk Facilities
National Agencies & Ministries											
Ministry of Housing		X									
Ministry of Transport & Communication				X	X						
Ministry of Environment & Climate Affairs	X						X				
Ministry of Commerce & Industry											
Ministry of Civil Defence										X	
Ministry of Religious Affairs											X
Ministry of Education											X
Ministry of Health											X
Ministry of Higher Education											X
Ministry of Culture											
Ministry of Tourism											
Supreme Planning Council		X									
Royal Oman Police					X					X	
Omran											
National Agencies (Utilities & Infrastructure)											
Haya Water							X	X			
Public Authority for Electricity & Water							X				
Muscat Electricity Distribution Company						X					
Oman Electricity Transmission Company						X					
Public Authority for Civil Defence and Ambulance										X	
Public Authority for Civil Aviation										X	
Public Authority for Radio & TV											
Information Technology Authority										X	
Oman Telecommunications Company & Ooredoo										X	
Oman Broadband Company										X	
Be'ah - Oman Environmental Services Holding Co.									X		
Muscat Municipality		X	X	X	X			X			X

GOVERNANCE

KING'S CROSS



- ✓ 27-hectare site
- ✓ Public sector development rights
- ✓ Single master developer
- ✓ Masterplan & Design Codes developed and monitored by master developer
- ✓ Major public investment in the area e.g Kings Cross St. Pancras Station
- ✓ Long-term successful stakeholder consultation and collaboration
- ✓ All approvals and permits by external agencies
- ✓ Private public realm management, adopted streets

GOVERNANCE

MSHEIREB, DOHA



- ✓ 35-hectare site
- ✓ Single land owner and master developer (Msheireb Properties, subsidiary of Qatar Foundation)
- ✓ Masterplan & Design Codes developed and monitored by master developer
- ✓ Developed as a single project (e.g. common site-wide basement)
- ✓ Approvals and permits by external agencies

GOVERNANCE

LUSAIL CITY



- ✓ 3500-hectare site
- ✓ Lusail Real Estate Development Company (LREDC) - Master Developer
- ✓ Subsidiary of Qatari Diar
- ✓ Lusail City Administration Complex (LCAC) - Development Manager
 - ✓ Masterplan & Design Codes
 - ✓ Master development works Design Review
 - ✓ Monitoring and enforcement
- ✓ LREDC issues Temporary Building Permit (to allow enabling works)
- ✓ Final Building Permit by Municipality
- ✓ All services approvals directly through utility companies

GOVERNANCE

SOLIDERE

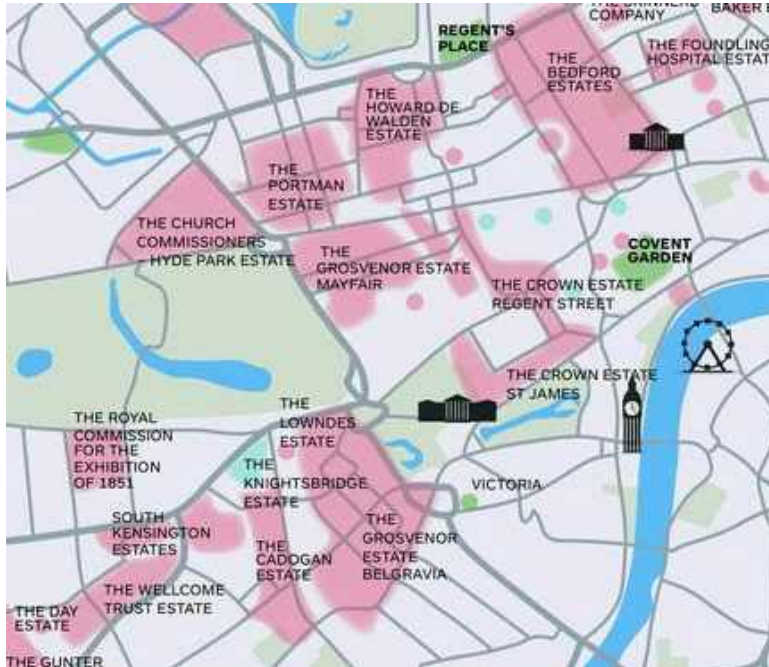


- ✓ 190-hectare site
- ✓ Solidere:
 - ✓ Joint Stock co, formed by Government decree
 - ✓ Landowner, Planning Agency & Master Developer
 - ✓ Finances/constructs all infrastructure, public space
 - ✓ Develops 20%, sells 80%
- ✓ Responsible for Development Control, Quality Control, MP updates & Codes
- ✓ Building Permits issued by Municipality
- ✓ Public authority oversight by CDR*

* Council for Development and Reconstruction

GOVERNANCE

LONDON GREAT ESTATES



- ✓ 'Long term stewardship' of land by private Great Estates
- ✓ Ownership of freehold title; revenue stream through ground rents
- ✓ Property leases have covenants (including 'design codes')
- ✓ Active management of tenants
- ✓ Investment in and management of public realm to enhance quality and land value



GOVERNANCE

OLYMPIC LEGACY



- ✓ 200-hectare site
- ✓ London Legacy Development Corporation (LLDC)
 - ✓ Public land (freehold) owner
 - ✓ Development authority
 - ✓ Planning authority
 - ✓ Manager of public realm
- ✓ Masterplan & Design Codes developed and monitored by LLDC
- ✓ Procurement and development agreements by LLDC
- ✓ Major public investment in infrastructure and land development - built under oversight of LLDC (and predecessor ODA)
- ✓ In the model of the Commission for New Towns

GOVERNANCE

GOVERNANCE MODELS

Scenario 1: **EXISTING STRUCTURE**

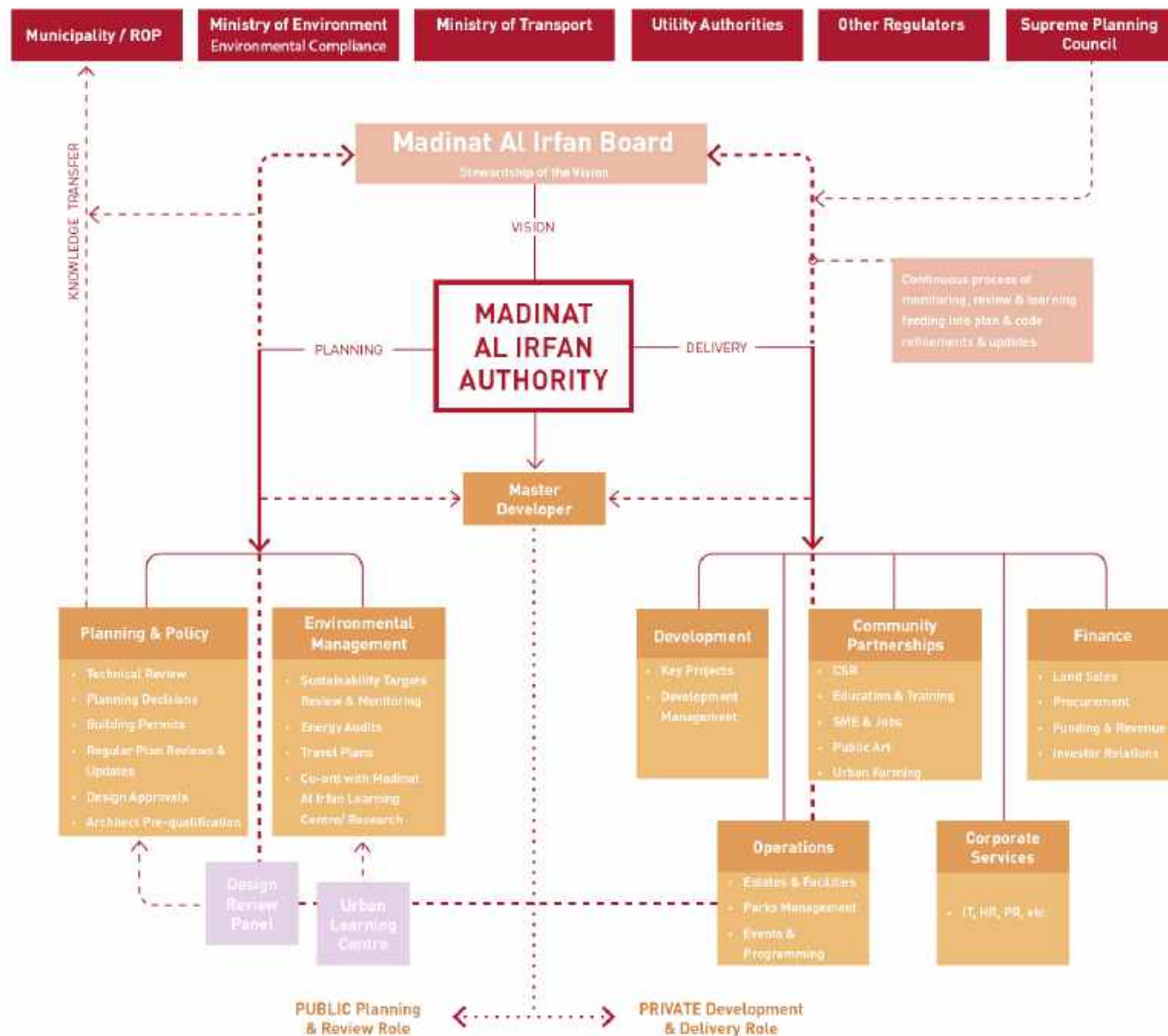
Kings Cross, Msheireb

Scenario 2: **DEVELOPMENT AUTHORITY**

Lusail City

Scenario 3: **PLANNING + DEVELOPMENT AUTHORITY**
option (+ **INFRACO**)

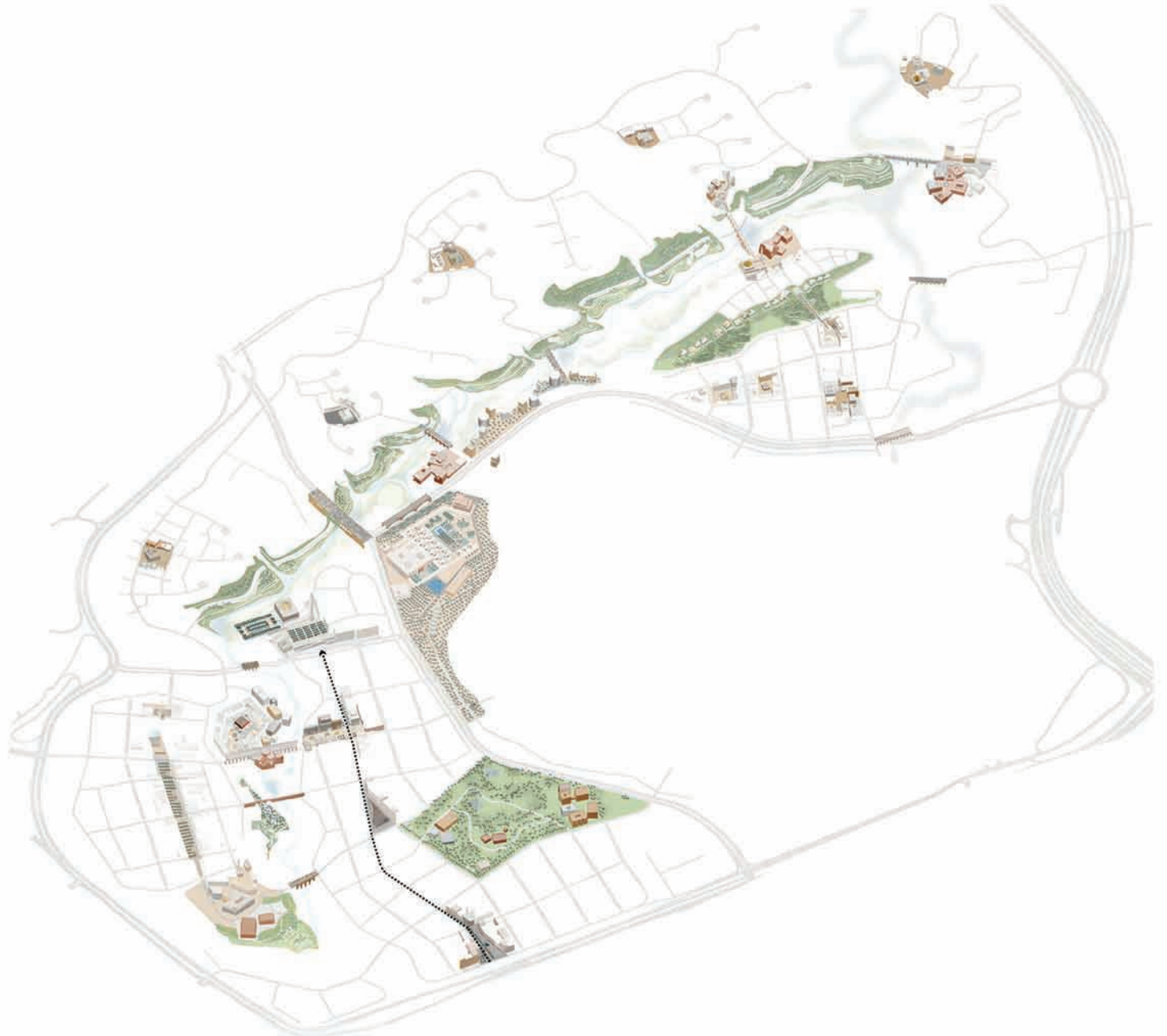
London Olympic Legacy (LLDC)
London Docklands + Canary Wharf
(LDDC)
Solidere



...administered through strong city management and leadership for the long-term.

WHAT MAKES THE CITY?

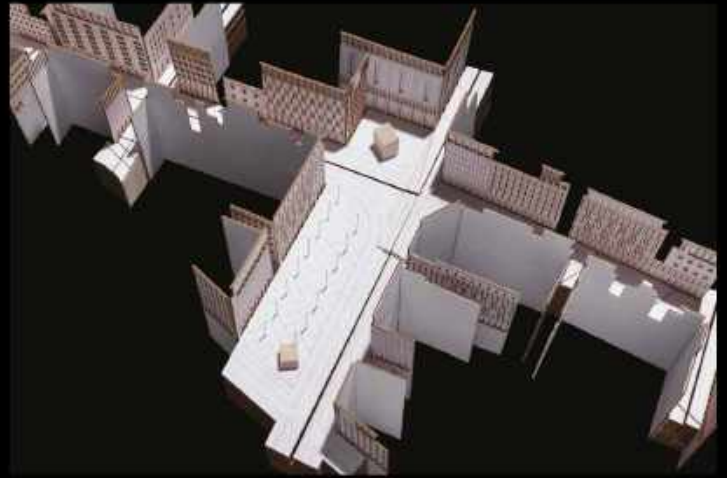
A clear structure of public and civic infrastructure



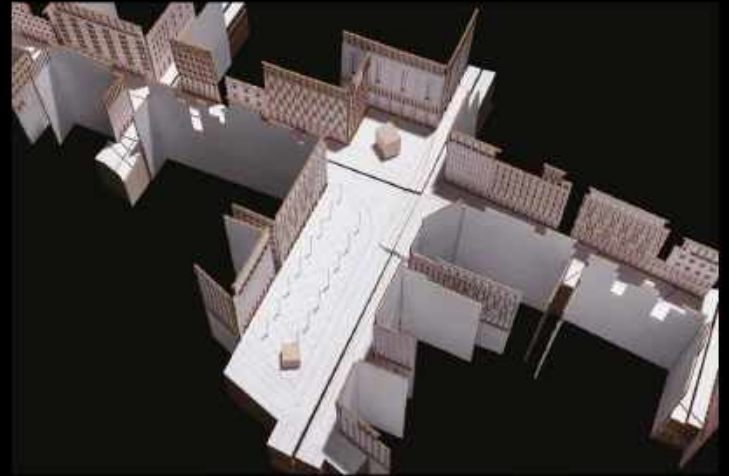
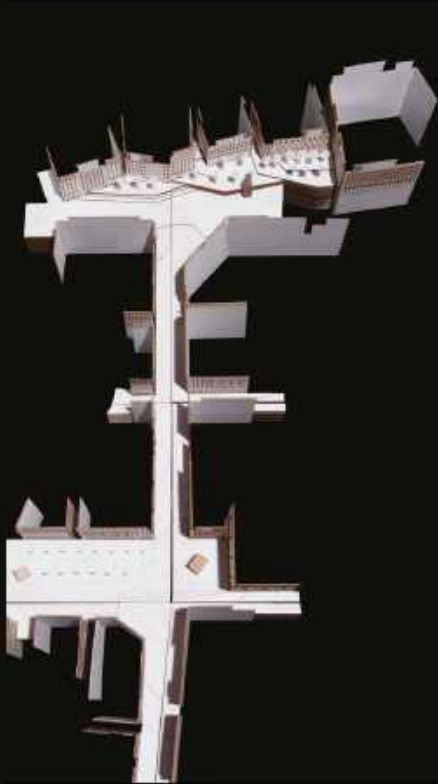
Good streets...



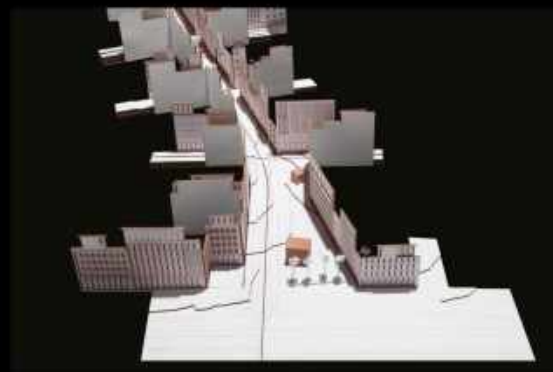
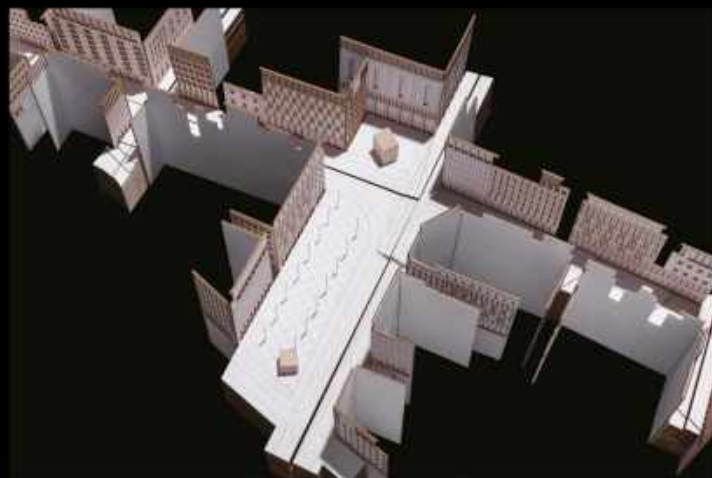
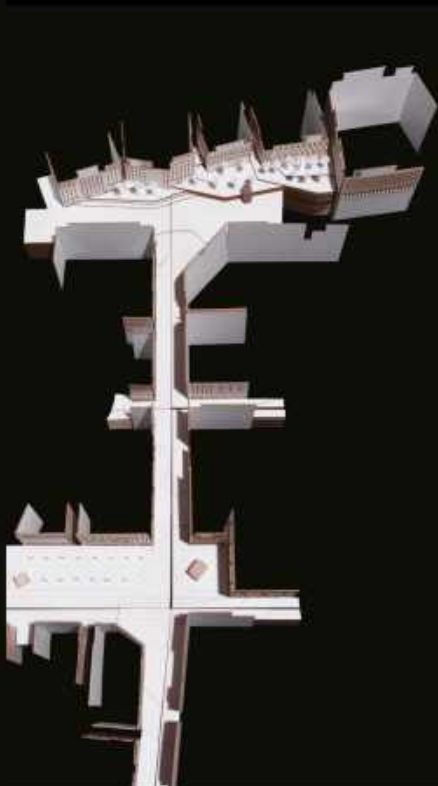
Good streets...



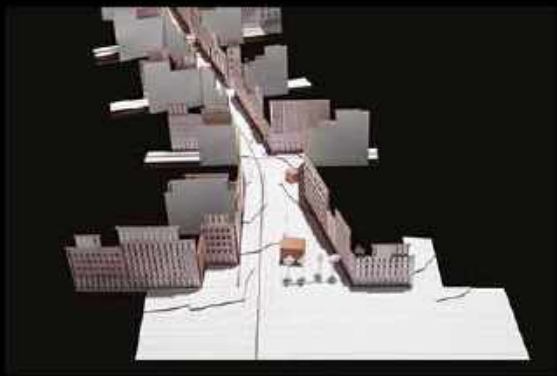
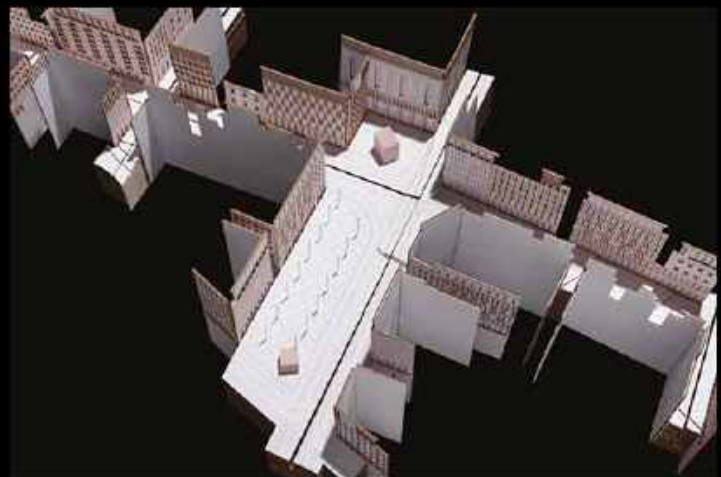
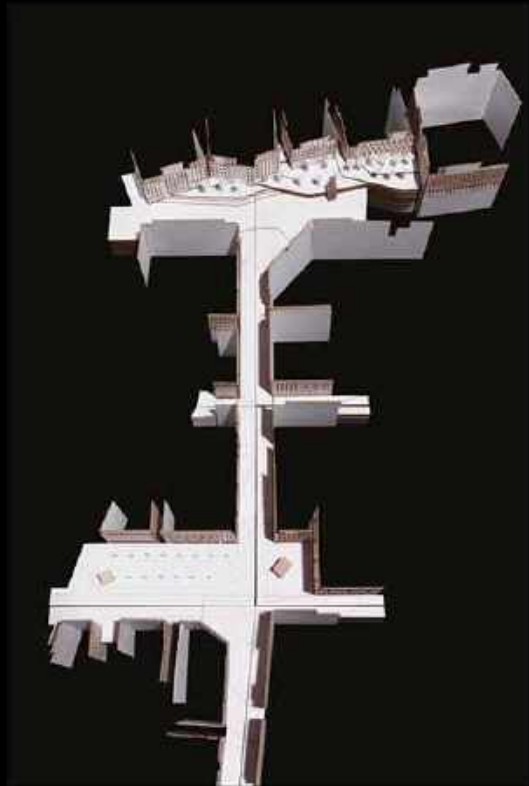
Good streets...



Good streets...



Good streets...



Formal spaces...



and informal ones..



and informal ones..



at one with nature...



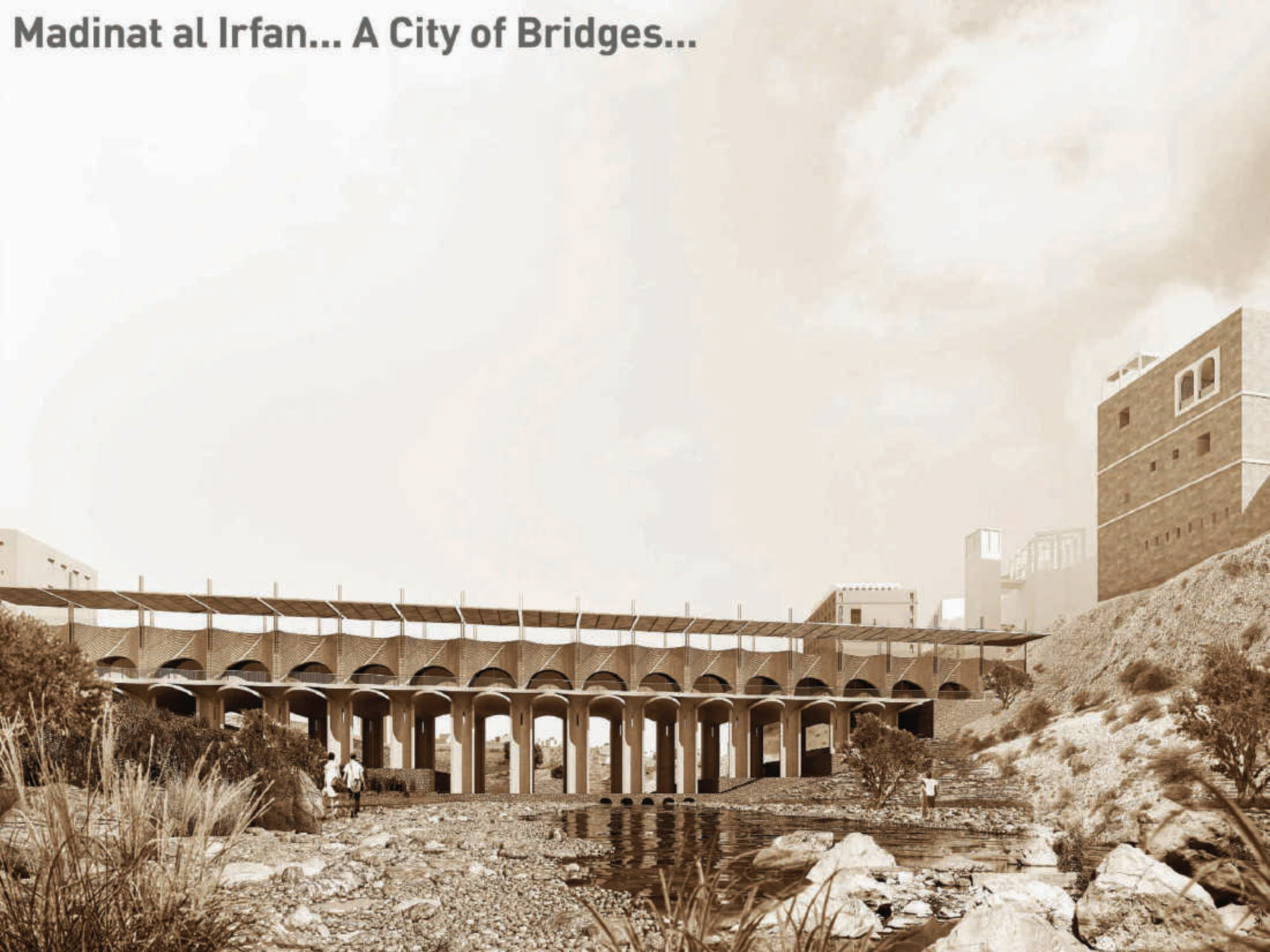
at one with nature...



at one with nature...



Madinat al Irfan... A City of Bridges...



AS IF IT HAS ALWAYS
BEEN THERE



Commonwealth Association of Architects

Engaging with the UN 2030 Sustainable Development Goals

We hope you found this lecture of interest and that you will be interested in the other lectures in this series:

- 1. Introduction to the UN 2030 Sustainable Development Goals**
- 2. Planning for Rapid Urbanisation**
- 3. Planned City Extensions**
- 4. Resilient Infrastructure**
- 5. Climate Responsive Design**
- 6. Heritage-led Regeneration**
- 7. Sustainable Outcomes Guide**

The Commonwealth Association of Architects would like to extend its thanks to all the contributors for their support in the creation of this pilot programme. The CAA welcomes feedback together with suggestions for future topics and would be pleased to hear from subject matter experts from around the Commonwealth who may be interested in contributing future material.

For this or any other issue, please contact: admin@comarchitect.org

Thank you for joining!

@comarchitect

www.comarchitect.org

admin@comarchitect.org

www.commonwealthsustainablecities.org/cpd