

SUSTAINABLE URBAN LANDSCAPE

A Discussion Drawn from 3 Examples of New Development Projects in the Middle East

HÅLLBART STADSLANDSKAP

En diskussion utifrån tre exempel på nya stadsbyggnadsprojekt i Mellanöstern

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Sveriges lantbruksuniversitet
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Faculty of Landscape Architecture, Horticulture
and Crop Production Science

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Abstract

Urban Landscape & Sustainability

Sustainable urban landscape is the intergal subjects in this thesis and public realm as a sub category of urban landscape has been main focus of this study.

The thesis will introduce public realm design process of three urban development projects which are in the same regional context. Each case study has a different theme being: 1. Zero carbon city, 2. Waterfront redevelopment and 3. Forest city in arid zone. Case study (a) has a pre design sustainability guideline and case study (b) has been progressed with attention to sustainability during the design process as a requirement from the developer. A lush forest theme has been priorotised to sustainability in design of case study (c).

The study continues to analyze the three case studies, and a relative comparison of those three in terms of sustainability of their designed public realm. The study further progresses to include a discussion about the pillars of sustainability, the triangle of environmental, social and economic factors, and if the concept of sustainability is achievable being in the centre of the triangle.

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01#

INTRODUCTION

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Background

Summary

OVERVIEW

“The rapid and worldwide urbanization of the human population raises concerns about the sustainability of cities.” (Andersson, 2006) Urban open and green spaces have become crucial elements of urban form. As the Brundtland report states, sustainable development “...seeks to meet the needs and aspirations of the present without compromising the ability to meet those of the future” (United Nations World Commission on Environment and Development 1987)

Urban landscapes are much more than “empty spaces”; besides they provide many benefits for the society. To summarize; urban landscape design supports not only ecological systems in urban environments but also provide the community with places to enjoy within the dense built environment. It also contributes to the identity of an urban area by creating visually legible and high quality places. Moreover, well designed urban open and green spaces might improve social cohesion and support sense of community. (Memlük, 2012, p.294)

In this thesis, the concept of designing public realm as a sub category of sustainable urban landscape will be analysed. The study will highlight comparison between 3 development projects and their sustainable design approach.

WHAT IS URBAN LANDSCAPE & WHY DOES IT MATTER ?

Urban growth has profoundly transformed the landscapes in recent decades and led to the creation of a special landscape type.

Urban landscape is basically formed of open and green spaces within an urban environment. However, it is not totally independent from the surrounding buildings and structures. Altogether, they form the character and identity of a city, and sense of place. It contributes to the cityscape by means of aesthetics and function. It also supports urban ecology. It is dynamic and constantly evolving. (Memlük, 2012, p.282)

Urban landscape is considered crucial to creating sustainable urban environments. Urban landscape holds natural and cultural values and can be designed to reflect a communities heritage and history and influence the community lifestyle and sense of attachment to the place. Therefore an urban landscape is not only about greenery of an urban setting. It is inclusive of many urban sub categories such as streets and public squares, children playgrounds, cycle and pedestrian pathways, waterfronts and city parks.

Von Borcke (2003) points out that “landscape plays a profound role in development process. it is not an add-on but

rather forms the basis for creating places. Landscape is not only trees, shrubs, load added for their aesthetic value, rather landscape combines landform, ecosystem and open space networks that forms the natural environment and sustain planting.”(Van Borcke, 2003, p.33)

Urban landscape is where people can have an opportunity to spend their leisure time, to see and to be seen, and to interact and be involved with a community.

“When talking about landscape in the city, one should not forget the primary role of urban areas- they provide the main locations for human habitation and interaction” (Van Brocke, 2003, p.34)

In an urban environment, although landscape design might be considered for a range of purposes, urban landscapes are basically designed to make outdoor space for people.

What makes cities interesting is that they are dominated by humans among other species and social and cultural variables are strongly involved in the shaping of identity and value system. Place making is an important value that public realm design can provide. Urban public space is a necessity and not an amenity in designing and planning communities.

Open and green spaces are not added values to an urban environment but necessities for urban life. Urban design without programming the public realm would effect people’s health and well being mentally and physically.

SUSTAINABLE PUBLIC REALM DESIGN APPROACH

“History’s greatest cities have unique physical patterns that are defined by the relationships between buildings, streets, open spaces and landforms. These relationships form the public realm system and create destinations.” (Abu Dhabi Public Realm Design, 2013 , p 3) “Public realm includes all exterior places, linkages and built form elements that are physically and/or visually accessible regardless of ownership. These elements can include, but are not limited to, streets, pedestrian ways, bikeways, bridges, plazas, nodes, squares, transportation hubs, gateways, parks, waterfronts, natural features, view corridors, landmarks and building interfaces.” (Abu Dhabi Public Realm Design, 2013 , p 3)

Sustainable public realm design is inclusive of natural, social, economic and cultural dynamics. There are key principles to design a sustainable public realm which are livability, identity, access, connectivity, place making, activation, diversity of programs.

“The key to design a successful public realm is understanding how the community views the public realm” (Abu Dhabi Public Realm Design, 2013 , p 3), what are the requirements of that community and to provide them with the right facilities.

Objectives

Research Method

AIM & OBJECTIVES

The overall objective of this thesis is to have a theoretical and practical analysis between urban landscapes designed in regards with their measures of sustainability. The analysis will be conducted by comparison of 3 newly designed development projects.

This thesis covers the following discussions:

- What is sustainable landscape and how does it matter in public realm design?
- How sustainable design will be applied and assessed in public realm of different project types?
- How possible is achieving to public realm sustainability as a central point in sustainability triangle?

RESEARCH METHOD

Computer based study is basically the research method of this thesis and Google search engine has been primarily used in order to access related literature and references.

Guidelines provided from Abu Dhabi Urban Planning Council, such as ESTIDAMA (second edition), Public realm Design Manual, Waterfront developments Design Manual, Street Design Manual have been referred to widely.

This thesis is mainly focused on urban landscape and public realm design with high measures of sustainability (environmental, social and economical) and current modes of assessment. However, the study is based on assessing added values and the quality of designed place, therefore detailed study of mentioned factors is not a scope of this thesis.

SELECTION OF DEVELOPMENT PROJECTS

Three development projects have been selected as case studies to be compared in terms of their outdoor space in order to define sustainability of their urban landscape design. The projects have been designed in two international design firms. In selection of these case studies the following factors have been mainly concerned allowing a comparative analysis:

- All 3 developments are newly designed.
- All are in the same region, United Arab Emirates; two in the capital city, Abu Dhabi, and the 3rd project in Dubai.
- I have been involved with all 3 case studies. My role in case study (a) was a design team member, landscape architect and urban designer in a team of architects and designers. In both case studies (b) and (c) I lead creating the design package and designed the urban landscape and public realm.

Three case studies are listed as below:

- Masdar zero carbon city
- Al Bateen waterfront revitalization
- Sobha city development

Following is an overview about Dubai and Abu Dhabi where the developments are happening, Regional Urban Planning Council Guidelines on public realm, and a brief introduction on each case study.

Development designs will be included in 2nd chapter. 3rd chapter will conclude a comparison of case studies in terms sustainability of their public realm design.

In the 4th chapter the issues raised by the comparison will be highlighted and discussed.

5th chapter will be conclusion chapter, followed by list of literature and references as the final chapter.

Regional Context

Abu Dhabi : location of case studies (a) & (b)



Figure 1 – Abu Dhabi Map (Google maps, 2013)



Figure 2 – Abu Dhabi Ariel View (Abu Dhabi Guide, 2013)

Abu Dhabi ; Location of Masdar & Al Bateen

Abu Dhabi is the federal capital of the United Arab Emirates and the largest of the seven emirates. The Emirate lies on the borders with the Kingdom of Saudi Arabia, the Sultanate of Oman and the Persian Gulf. The emirate comprises 200 islands and has 700 kilometres coastline. (Abu Dhabi Emirate: Facts and Figures, 2013) Abu Dhabi is divided for administrative purposes into three major regions. The first region encompasses the city of Abu Dhabi which is both the capital of the emirate and the federal capital. (Abu Dhabi Chamber, 2013)

“Abu Dhabi lies on a T-shaped island jutting into the Persian Gulf from the central western coast. The city proper had a population of 921,000 in 2013. Abu Dhabi has grown to be a cosmopolitan metropolis. Its rapid development and urbanisation, coupled with the relatively high average income of its population, has transformed Abu Dhabi to a larger and advanced metropolis.” (Abu Dhabi wikipedia, 2013)

Abu Dhabi City Planning

“The city was planned in the 1970s for an estimated maximum population of 600,000. In accordance with what was considered to be ideal urban planning at the time, the city has wide grid-pattern roads, and high-density tower blocks.” (Abu Dhabi wikipedia, 2013)

“In 2007 the Abu Dhabi Urban Planning Council (UPC) was established, which is the agency responsible for the future of Abu Dhabi’s urban environments and the expert authority behind the visionary Plan Abu Dhabi 2030 Urban Structure Framework Plan that was published in September 2007.” (Abu Dhabi Urban Planning Council, 2013)

Dubai: location of case study (c)



Dubai ; Location of Sobha

“Dubai is the most populous city and emirate in the United Arab Emirates (UAE), and the second largest emirate by territorial size after the capital, Abu Dhabi. Dubai is located on the southeast coast of the Persian Gulf and is one of the seven emirates that make up the country.” (Dubai wikipedia, 2013)

“Today, Dubai has emerged as a cosmopolitan metropolis that has grown steadily to become a global city and a business and cultural hub of the Middle East and the Persian Gulf region.” (Dubai wikipedia, 2013)

“Dubai has recently attracted world attention through many innovative large construction projects and sports events. The city has become symbolic for its skyscrapers and high-rise buildings, in particular the world's tallest building, the Burj Khalifa. In addition, Dubai is home to other ambitious development projects including man-made islands, hotels, and some of the largest shopping malls in the region and the world.” (Dubai wikipedia, 2013)

Dubai City Planning

“Dubai Municipality (DM) was established in 1954 for purposes of city planning, citizen services and upkeep of local facilities. DM... comprises several departments such as the Roads Department, Planning and Survey Department, Environment and Public Health Department and Financial Affairs Department.” (Dubai wikipedia, 2013)

“The Municipality has the vision of creating an excellent city that provides the essence of success and comfort of living. Dubai Municipality is also instrumental in maintaining the architectural heritage of the emirate through many projects that aimed at reviving and maintaining cultural landmarks of Dubai.” **(Dubai Municipality, 2013)**



Figure 3 – Dubai City View (Sobha City Brochure, 2013)

01# 05

Case Studies

Masdar City



Figure 5 – Masdar City Map (Google maps, 2013)



Figure 6 – View from Masdar city (Masdar, 2013)

LOCATION

Masdar City, Abu Dhabi, UAE

ZERO CARBON CITY

“A zero-carbon city runs entirely on renewable energy; it has no carbon footprint and will not hurt the planet.” (zero-carbon city wikipedia, 2013) “There are two places that are prototyped to become zero-carbon cities: Masdar City, United Arab Emirates and Dongtan, China. Once created these cities will become living examples of sustainable development, which demonstrate optimal resource utilization.” (zero-carbon city wikipedia, 2013)

PROJECT DESCRIPTION

Masdar City is recognised around the world as a exemplar of sustainable cities of the future. It has to re-imagine the city as a desirable place to live with an attractive Real Estate offering.

The goal behind this project is take the initial Masdar City Masterplan, existing buildings and proposed buildings and develop it to create a lifestyle vision and urban design proposal that can be used to attract people and speed the approval of further development at Masdar City.

“Masdar City is a modern Arabian city that, like its forerunners, is in tune with its surroundings.” (Masdar City, 2011) A high density, pedestrian-friendly, sustainable development, “Masdar City not only embodies Abu Dhabi’s commitment to a sustainable future but is also pioneering best practices in sustainable urban planning, design and development.” (Brochure Masdar City, 2011)

“Masdar City Facts:

Total Site Area: 700 hectares 3.7 million sqm GFA

Residential: 52%

Commercial: 38%

Retail: 2%

Community: 8%

Projected resident population: 40,000

Projected commuters: 50,000

Residential density: 140 people/hectare” (About Masdar City, 2013)



Figure 7 – Masdar logo (Masdar, 2013)

Al Bateen Wharf



Figure 8 – Al Bateen Map (Google maps, 2013)



Figure 9 – Al Bateen Wharf ariel view (Gulf news, 2010)

LOCATION

Al Bateen, Abu Dhabi, UAE

WATERFRONT DEVELOPMENT

Waterfront development refers to an urban development in the edge of water which may be a river, canal, lake, sea, bay or creek.

PROJECT DESCRIPTION

“The Al Bateen Wharf’s Fishermen Marina situated in Abu Dhabi’s oldest occupied area which is being renovated in phases.” (Gulf news, 2010) “The Al Bateen district of Abu Dhabi, the oldest occupied area of the UAE capital city, is to be redeveloped at a cost of AED 1.6 billion (US \$435 million) to include a signature waterfront destination with a luxury five-star hotel complex. The 54,000 square metre site will be known as the Al Bateen Wharf and will include a Fishermen’s Marina and the Al Bateen Wharf Hotel.” (TDIC to redevelop Al Bateen, 2007)

“Renowned for its holistic approach to urbanscapes, the Fishermen’s Marina will include berths for 285 fishing boats and 38 racing dhows and will retain the Bateen shipyard which has remained unchanged for years and showcases the ancient skills of Arabian dhow building. The dry-stack facility will have a maximum capacity for 200 boats. Hydraulic lifts are provided for each of the racing dhow berths in order to lift the boats out of the water after each race.” (TDIC to redevelop Al Bateen, 2007)

“The marina will have a maintenance shed, which will incorporate modern facilities for use by the existing fishermen, and there will be a community centre with its own Majlis and retail outlets for fishing equipment. In addition, water and electricity connections will be provided to ensure high standards of service. Convenient fuelling facilities are also being made available for all the boats in the marina. There will also be an active public boardwalk complete with a range of waterfront shopping, restaurants and cafés. The boardwalk will be dotted with environmentally-sensitive lighting.” (TDIC to redevelop Al Bateen, 2007)

“The Al Bateen Wharf Hotel will incorporate the latest in sustainable design features with energy-efficient solar screening, eco-friendly landscaping, passive cooling through shading and airflow, fritted glass with integrated solar cells and a transparent ‘sail like’ veil which will transform the shape of the building at night.” (TDIC to redevelop Al Bateen, 2007)



Figure 10 – Al Bateen logo (TDIC, 2013)

Sobha City



Figure 11 –Sobha city Map (Google maps, 2013)

LOCATION

Meydan, Dubai, UAE

MIXED USE DEVELOPMENT

Mixed-use development is — in a broad sense — any urban, suburban or village development, that blends a combination of residential, commercial, cultural, institutional, or industrial uses, where those functions are physically and functionally integrated, and that provides pedestrian connections. (Mixed use development wikipedia, 2013)

PROJECT DESCRIPTION

Sobha City, the 743,224m² mixed use development in Meydan City, signals the return of mega-projects to Dubai after recent recession. Located at the greater downtown area of Dubai and in the shadow of the world's tallest building - The Burj Khalifa. Close to the airport, golf courses, tennis and riding academies. The project consists of 280 villas, 13 high rises, garden apartments, a shopping mall, hotels, a retail complex and international schools. Self-contained communities add a special dimension to its social life and its public realm. (Introducing Sobha City, 2013) As a requirement from the project developer, this exotic setting is designed with lush urban landscapes, themed similar to an urban forest, which apart from being branded for its uniquely designed urban landscape, would promote health benefits and help recharge mind and body with an array of public realm facilities involving recreation, sports, fitness centers, cafes and restaurants. The project aims to be completed in a phased manner over the next 10 years. (Introducing Sobha City, 2013)



Figure 12 –Sobha city Vision (Couturie city park, 2013)



Figure13 – Sobha City logo (Sobha Dubai, 2013)

Sobha city road network forms part of the fabric that creates the forest in Sobha City. Street tree planting has been prioritised to ensure both sides of the road have a continual canopy broken only by vehicle access to plots. The main roads also include a planted central median which allow for three or four rows of trees across the street section. Shrubs and ground covers will be planted under trees to segregate pedestrian footpaths and the road area. Road reserves will be used for small pocket parks and roundabouts will also be landscaped to showcase Sobha's vision of a forest and identify the different districts. Pedestrian crossings will be included at key nodal points with traffic calming measures implemented to allow for safe accessible movement through Sobha City public realm. Crossings will predominately be on signalised junctions or on raised tables throughout the main roads, secondary roads will have level crossings but be clearly identified and lit. Connections to the schools, mall, parks from the residential areas through an intricate network used for recreation, walking and cycling will set Sobha City's urban landscape aside from other developments in Dubai. Road lighting will be from light poles located along the side of the roads which will either spill light onto the pedestrian areas or a lower luminaire will be added to the column ensuring both the street and pedestrian paths are lit for safety and night use.



Figure 15 - The four pillars of Estidama (Pearl Community Rating System manual, 2010)

Similar to LEED and BREEM, ESTIDAMA is the regional system to assess sustainability of a development based on credit points and in design, construction and maintenance phases.

UPC Estidama organization defines the aims and objectives of the system as below: (Pearl Community Rating System, 2010)

“Abu Dhabi’s Plan 2030 establishes a clear vision for sustainability as the foundation of any new development occurring in the Emirate and capital city of Abu Dhabi. This commitment is a reflection of the values and ideals of our nation. The tenets of sustainable living in the Middle East is the guiding force behind Estidama. More than just a sustainability program, Estidama is the symbol of an inspired vision for governance and community development.” (Planning for the next generation, 2010)

“It promotes a new mindset for building a forward thinking global capital. To establish a distinctive overarching framework for measuring sustainability performance beyond the usual planning and construction phases, UPC has worked with the team guiding Estidama to assure that sustainability is continually addressed through four pre-defined angles: environmental, economic, social and cultural.” (Planning for the next generation, 2010)

Estidama, which means ‘sustainability’ in Arabic, is the initiative which will transform Abu Dhabi into a model of sustainable urbanization. Its aim is to create more sustainable communities, cities and global enterprises and to balance through four pre-defined angles: environmental, economic, social and cultural.

The purpose of Estidama is to create a new sustainability framework that will direct our current course while allowing adaptation as new understanding evolves.

Al Bateen project is designed along with Estidama guidelines as a requirement. During the design of Masdae high level of attention has been paid to Estidama guidelines. Sobha has been designed with lower level of attention to Estidama.

DEFINING KEY PRINCIPLES

Abu Dhabi Urban Planning Council, defines the key principals of designing public realm for the region as below:
(Abu Dhabi Public Realm Design, 2013 , p 9-12)

- **Liveability** - It is very important to provide the public realm with facilities and programs that make it practically usable e.g. shade structures for pedestrian pathways are essential in the region to serve walkability purposes. Public realm is a safe and comfortable space, where diverse activities can be experienced by all, contributing to people's physical and mental wellness, and providing a highquality of life.
- **Identity & Branding** - Public realm will reflect a communities cultural, traditional and heritage values.
- **Access** - The public realm ensures full access to Parks, Streetscapes, Waterfronts and Public Places.
- **Connectivity** - The public realm is interconnected and enhances the mobility of people by providing continuous land and water access for pedestrians, cyclists and other modes of transport.
- **Place making & Design Excellence** - Public realm is made up of high-quality, human-scaled and visually interesting places. The public realm includes multi-functional, flexible and climate responsive design solutions using highquality, sustainably sourced materials.
- **Environmental Stewardship** - The public realm is responsibly designed to achieve water and energy efficiency, and will respect important natural assets and native flora and fauna.
- **Inclusivity** - Public realm will provide a safe and comfortable array of diverse places and activities for all people to enjoy.
- **Activation** - Public realm will immediately be improved by ensuring activities and functions are appropriately integrated and programmed while also defining a clear operations and maintenance programme that ensures continued contribution to the identity of the place.
- **Shared Ownership & Implementation** - Public realm will be developed through a cooperative effort of government and/or private entities to ensure a high-quality resource that all stakeholders will contribute to and enjoy.

PUBLIC REALM HIERARCHY

The Public Realm Hierarchy forms the basis for identifying Level of Service. The hierarchy consists of five classifications: Emirate, Municipality, City, District and Neighbourhood and is defined as below: (Abu Dhabi Public Realm Design, 2013 , p15)

- **Emirate** - The highest level of the hierarchy is the Emirate level which includes public realm elements that serve the entire Emirate of Abu Dhabi. The Emirate level public realm elements include the most important parks, civic spaces and natural landscapes in the Emirate.
- **Municipality** - The Municipality level features public realm elements that serve an entire Municipality (Abu Dhabi, Al Ain and Al Gharbia) within the Emirate and includes significant attractions for a variety of users. The Municipality level public realm elements form the central building blocks of each region's public realm system.
- **City** - The City level includes public realm elements that serve all residents of a City or community. This would include all of the mainland cities. The City level public realm elements are often defined through master plans. These elements should be developed within the context of the Municipality-wide system.
- **District** - The District level parks serve sectors within a City or small settlements. The District level public realm elements serve multiple Neighbourhoods and are often the place where local events and festivals would occur.
- **Neighbourhood** - The Neighbourhood level of the hierarchy encompasses the smallest planning area and can include subdivisions, blocks or high-rise residential developments. Public realm elements at the Neighbourhood level are highly integrated into the daily lives of local residents and are where the most publicly prominent activities of daily life occur.

UNIVERSAL LEVEL OF SERVICE

The Level of Service standards regulate the amount and location of public realm elements. Three universal standards are established for the Emirate. They include:

- A universal Level of Service for parks;
 - A universal standard for open space;
 - A universal standard for the maximum distance to a park.
- (Abu Dhabi Public Realm Design, 2013 , p 16)

Criteria	Universal Standard
Park Level of Service	1.3 ha/1,000 population
Open Space	20% of Total Land Area
Maximum Distance to Nearest Park	350 m or 10 minute walk

Figure 14 - Public Realm Universal Standards (Abu Dhabi Public Realm Design manual, 2013)

02#

DESIGN : Case Study 'A'

Masdar Zero Carbon City

- 02#⁰¹ Project Summary
- 02#⁰² Client's Brief
- 02#⁰³ Context
- 02#⁰⁴ Vision
- 02#⁰⁵ Design Research & Strategy
- 02#⁰⁶ Masterplan Framework
- 02#⁰⁷ Development Toolbox
- 02#⁰⁸ Development Phasing
- 02#⁰⁹ Masterplan Components



Project Summary

Design Project Background

Masdar City is recognised around the world as an exemplar of sustainable cities of the future, but now it has to be re-imagined as a desirable place to live.

A number of real questions emphasise the difficulty of positioning Masdar as a lifestyle destination. We can all presume that Masdar is a benchmark of sustainable living but how do we get people to want to actually live there? How do we get people to lease property here considering all the other lifestyle products on the market in Abu Dhabi?

Currently most people living here are students or faculty members so should Masdar City become a Creative University City like Bologna or Oxford? Is proximity to the Airport something that is a competitive advantage? How do we create lifestyle that one can market against other Abu Dhabi developments?

BUILDING ON THE BEST TRADITIONS OF REGIONAL URBAN DESIGN PRINCIPLES

The concept of Masdar City is based on the model of many of the traditional cities of the region. Cities like Damascus, Aleppo, Fez, Marrakech, Muscat, Amman, and Shibham provide real-world examples of highly liveable and sustainable city models. Those cities have typical characteristics like:

- Intimate deeply shaded streets
- Communal squares (Barahas)
- Street retailing and cafe's
- Bazar (Souq) as a heart of daily life
- Lively and active public realm
- High Density with a compact public realm
- Modest presence of water and vegetation
- Small unexpected corners of space where chances of meetings can occur
- Neighbourhoods anchored by Town Squares often with Mosques
- Low rise buildings

Many of these essential components are already well suited to the Masdar Masterplan. In contrast most other contemporary developments concentrate on large wide-open spaces and grandiose civic space. This is clearly a key, unique strength for Masdar.

MASDAR AS A CREATIVE CITY / UNIVERSITY TOWN

Universities and University Towns have served as magnets for talented, creative people and young energetic urban populations because of their vibrancy. Their bohemian appeal extends well beyond just students and faculty and is appealing to young upwardly mobile populations. In addition they become well known as crucibles of creativity with students, faculty and researchers at the backbone. That backbone becomes embellished by the creative industries that thrive in such environments. Cities like Silicone Valley in the USA, Bologna in Italy and Oxford in the UK are beacons for people seeking a youthful and vibrant lifestyles.

Masdar has one of the worlds finest tertiary education institutions in Masdar Institute. It is also host to the substantial future campus of Khalifa University. The imminent presence of a large International School also adds to this youthful vibrancy. Once again, Masdar has these essential ingredients already in place and are strengths which no other location in Abu Dhabi can claim to have.

MASDAR CITY AS AEROTROPOLIS

The concept of an Aerotropolis has evolved over the last twenty years in response to the exploding popularity of air travel. An Aerotropolis usually evolves around a major Airport and develops around key industry clusters like trade, logistics, manufacturing and R & D.

New 'eco-cities' like Masdar and Songdo City in South Korea align with the potential for creating an Aerotropolis grounded in sustainable living. While the Aerotropolis seems to be antithetic to the idea of a sustainable metropolis, recent research has shown that global trade can substantially reduce CO2 when the totality of the production chain is taken into account.

A series of studies conducted by Lincoln University in New Zealand in 2007 & 2008 demonstrated convincingly that global trade can result in substantial reductions in CO2 emissions for agricultural products. Because of its undeniably close connection to the Abu Dhabi Airport and future Midfield Terminal Complex, the strong Research and Development base and the Clean Industry cluster already in place Masdar City is a perfect model for the 'sustainable Aerotropolis'.

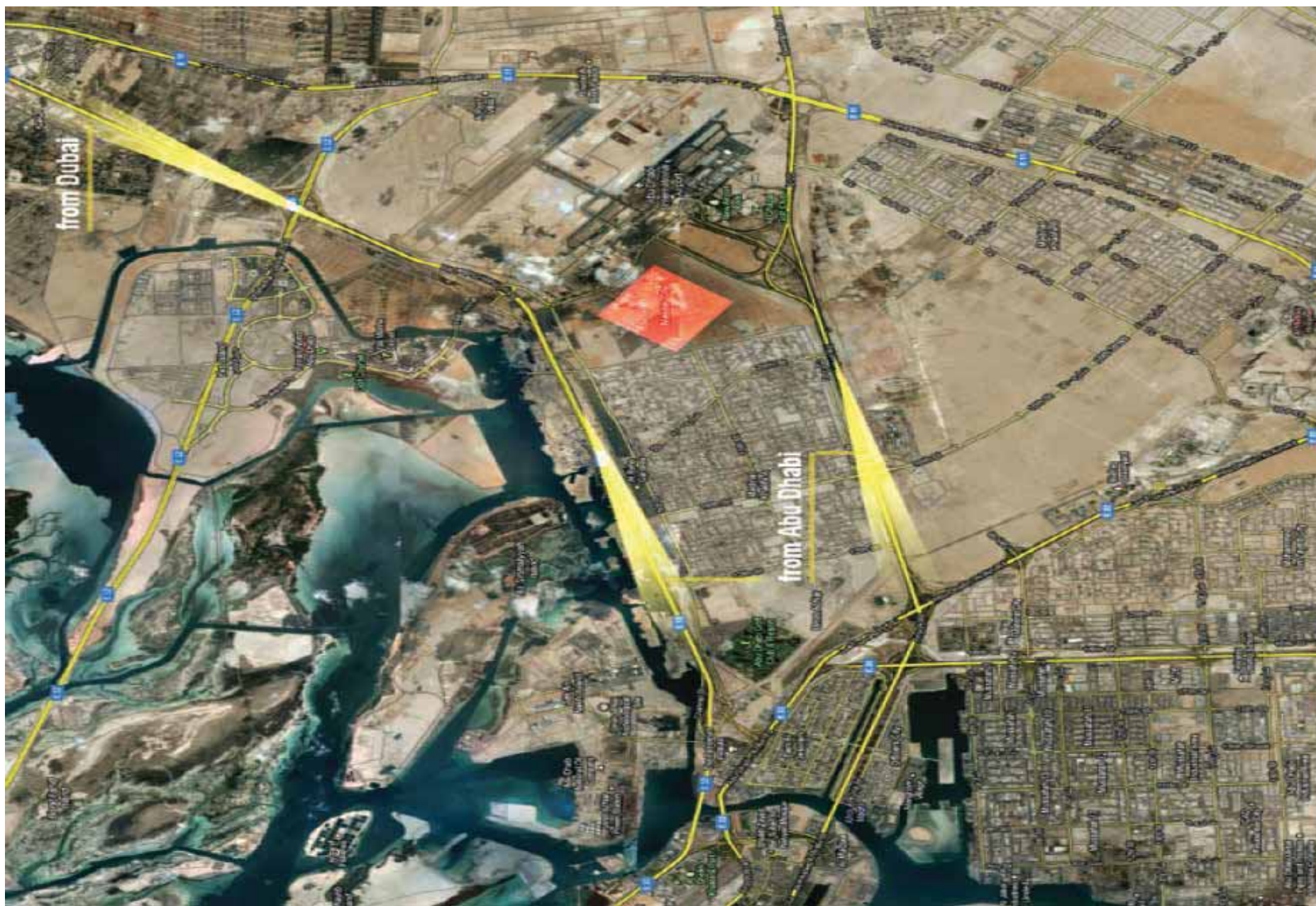
Client's Brief

A Study to be Built on the Masterplan

The Masdar City team has briefed to the design team to provide a design study that investigates the core value proposition and substantiates the further development of Masdar City Phase 1 public realm.

The brief included the following:

- Take into account Masdar Institute and its current expansion
- Consider the on-going development of Siemens and how it can be incorporated into the wider development
- Study how the Masdar HQ building can be integrated with the existing and committed developments
- Study how the HQ can be connected to MI
- Integrate with developments at plot I 14 (Hotel), G08 (Medical & Retail Centre) & F 16 (School)
- Study how a compact built form can incorporate an enticing outdoor souk environment incorporating lively street retailing and cafe's
- Create a souk environment that can connect the Institute to the International School on F16
- Create neighbourhoods anchored by Town, Squares often with Mosques
- Manage the level changes between the podium level and grade levels



Context

A Unique Context - Masdar Phase 1

The Context of Masdar City is both its biophysical setting and the existing development of the Masdar Institute. The following elements are key to the context of Masdar City:

- Coastal Environment with Hypersaline Hydrogeology
- Proximate to existing Abu Dhabi Airport Terminals
- Proximate to the upcoming Midfield Terminal Complex
- Close to future Airport Free Zone
- Close to the Al Raha Beach Lifestyle Hub
- Close to the low-density Khalifa City Development
- In-principle suited to uses such as souks and outdoor pedestrian malls
- Accessible by numerous significant roadways
- Extremely well served by future public transport
- Largely self-sufficient in energy
- Significant and growing student and faculty population as potential market for housing
- Significant and growing Airport-related population as potential market for housing
- Significant potential for attracting day visitors from Abu Dhabi Airport

Masdar City has substantial competitive advantage and stands to benefit from the on-going development of Masdar Institute and surrounding developments such as Abu Dhabi Airport, Al Raha Beach and Khalifa City. While Masdar has advantages it also suffers from difficulties associated with financial constraints of being largely self-sufficient in terms of bulk infrastructure.

Opportunities

Masdar aims to Create an environmentally, socially and economically sustainable contemporary lifestyle that incorporates the very best of Traditional Arabic Cities to appeal to the diverse expat population of Abu Dhabi.

To capitalise the development, Masdar Phase 1 developments should also incorporate:

- Extensive street retailing and cafe's
- A Lively Souk as a heart of daily life
- Lively and active public realm
- Density of occupation from having a compact public realm
- Modest presence of water and vegetation
- Small unexpected corners of space where occasional meetings can occur
- Neighbourhoods anchored by Town Squares often with Mosques

Stimulate a vibrant, comfortable campus atmosphere with a unique 'creative city' character that is very attractive as a living environment. To capitalise the Masdar Phase 1 developments should also incorporate:

- Thermally responsive outdoor spaces where students and researchers can comfortably live, work and play
- Extensive street retailing and cafe's
- A Lively Souk as a heart of daily life
- Dense city living environments above and around the Souq and cafe's
- Entertainment facilities suited to a free zone location
- Open space and facilities suited to a young and active population
- Access to vibrant living environments to encourage Research & Development enterprises to locate there
- Spaces that promote a relaxed set of social expectations required for creative environments

Create a convenient, connected, always awake global trade hub that is a living laboratory of how to facilitate sustainable global trade. Therefore, Masdar Phase 1 A developments should also incorporate:

- Apartments designed to appeal to people working at Abu Dhabi Airport
- Focus and enhance the study at Masdar
- Institute of how global trade can be optimised to reduce carbon emissions
- Create 24 hour a day facilities that can cater to a constantly active Airport population
- Attract day visitors from Abu Dhabi Airport to see a sustainable living environment
- Provide additional hotel accommodation and conference facilities within Masdar City
- Promote the establishment of a Green Logistics Hub and Green Data Centre at Masdar City
- Provide free Masdar City low-carbon transport from the Airport Terminals to the Masdar City Souk

Vision

Objectives & Strategies

OBJECTIVES

Based on the initial context study, Masdar public realm design has been predefined with the following objectives:

- 1 - A sustainable development
- 2 - Flexibility and adaptability
- 3 - Successful implementation
- 4 - Competitive development

STRATEGIES

How do we ensure a SUSTAINABLE DEVELOPMENT?
ESTABLISH A DEVELOPMENT FRAMEWORK

In order to create a sustainable development framework we aim to establish the following:

- Strong mixed use neighbourhood centres
- Distinct neighbourhoods with a strong identity
- Active retail links along main access streets
- Active retail/mixed use link between the main anchors
- Walk-able access to public transport routes
- Walk-able access to public spaces
- Feasible development phasing strategy

How do we allow for FLEXIBILITY AND ADAPTABILITY?
ESTABLISH A DEVELOPMENT TOOLBOX

At the same time the development needs to allow for flexibility and adaptability in its implementation over time. Therefore we will aim to create the following 'Toolboxes' to allow for a variety of applications :

- Architectural Design Toolbox which secures a variety of sustainable design strategies and materials
- Landscape Design Toolbox which secures a variety of sustainable design strategies and materials

- Block development which allows flexibility in its final use
- Phasing strategy that established a strong first phase development providing a starting point for all different districts and uses

How do we ensure a SUCCESSFUL IMPLEMENTATION? CREATE A REALISTIC AND FLEXIBLE PHASING STRATEGY

The development needs to be developed in phases that will ensure a feasible implementation strategy:

- Phases need to ensure a proper mix of uses is offered in the early stages
- The Anchors will establish strong sense of neighbourhood identity
- There needs to be a activated link between the Anchors at an early stage
- The phasing Framework needs to allow for sufficient flexibility in its implementation for future changes in the market

How do we create a COMPETITIVE DEVELOPMENT? CREATE A PRIME LIFESTYLE PRODUCT

Based on the current model of Masdar accommodation we need to consider a more Lifestyle-focussed offering to create something that is undeniably attractive:

- Offer prime public realm access to a lifestyle destination such as a vibrant souq
- Provide low rise apartments that offer, views, maximum daylight, sense of privacy
- Provide an architecture that is open and allows daylight to penetrate which is very important to the feeling of well being
- Create apartments that offer a sense of privacy while at the same time giving you a feeling liberation due to its open views
- Provide elements like a souq hub and walkable lifestyle street as attractors
- Appeal to peoples desire to live a sustainable lifestyle and market apartments as a sustainable choice for the informed

The concept is driven by a wholistic proposition to add value to the place through allocating public centres, distributing densities, making public transport easily accessible, while simultaneously enhancing views and creating distinguished districts.

Add value by defining distinct identity

Delineating Neighbourhoods

Distinguishing each area to have a single focal point, which allows for efficient division of densities.

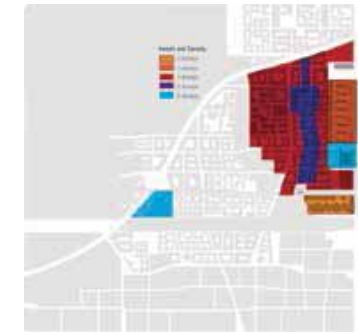


Land Use

Each area has distinct character, program, and identity that differentiates from the rest of the site.



Add value by focussing density



Add value by enhancing views

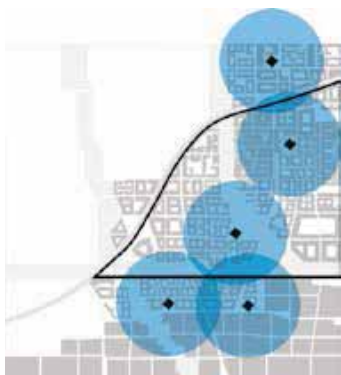
Views to communal focal points

Views to Public spaces

Views to/from community facilities



Add value by allocating community centres



Central Location

Creating apparent and easily accessible focal points. Each focal point is assigned a clear function.



Add value by proximity to public transport + gateway definition



Mobility/ Connectivity

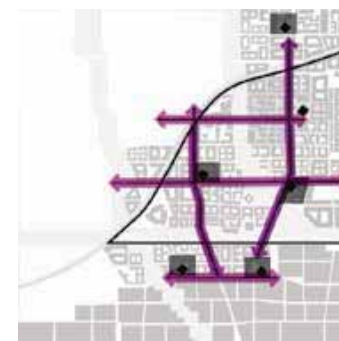
Public Transport

An orthogonal grid intersects the LRT stations, and simultaneously leads to the clearly defined gateways. Entrances to the site now relate to distinct areas, and communal focal points.



Pedestrian Movement

The gateways connect with bicycle parking, where vehicular movement easily transforms into a pedestrian one. Narrow streets are combined with the cyclist network.



Masterplan Framework

Design Principles



The Walk (blue) and the Heart (orange)

Masdar City's Masterplan helps to make Environmentally Sustainable Design a standard. Its compact city form, open space structure and response to climate effectively ensure the best possible starting point for the development.

Given the change in economic realities, the viability of a development based solely on ESD is called into question. The time has come to consider Masdar City more holistically. To envision it as a place so attractive that it represents the most logical lifestyle choice for Abu Dhabi Residents.

A place where cafe's and entertainment venues constantly buzz with the Bohemian energy of Masdar Institute and the future Khalifa University Campuses. A place where ideas change the world.

AL MAMSHA - THE WALK

Al Mamsha serves two vital functions. The first is to act as the transition between the elevated Podium Level that supports the Existing Masdar Institute and Northern Car Park and the existing grade level which will be the floor level for future developments at Masdar. It also links the academic campus of the Masdar Institute with the academic campus of the Bloom Properties development.

The second role for Al Mamsha is to act as the lifestyle spine that distinguishes Masdar City as an informed lifestyle choice. It is lined with a series of shops, cafe's, restaurants and service facilities at the ground floor. Located above the enlivened active facades at the ground floor are a mix of market grade apartments, SOHO's (small office / home office), cleantech startup incubator offices and high-grade student accommodation.

One of Masdar's key strengths lies in the fact that the streets are compact and deeply shaded making the Walk a desirable lifestyle location for those seeking the bohemian, cafe-culture lifestyle of University Cities.

AL QALB - THE HEART

As the name suggests it lies at the heart of our proposals for the Phase 1 development. It is the place where Al Mamsha intersects with the primary entrance from the lifestyle street between the Northern Car Park and the Hotel to the south.



MHQ Link

As a key intersection between Al Mamsha and the primary entry point, Al Qalb is typified by Cafe's, Restaurants & Entertainment facilities. Anchored at both ends by Town Squares containing community mosques, neighbourhood shopping and coffee shops these anchors serve the residents of the Al Mamsha neighbourhood & provide a constant stream of pedestrian traffic.

Al Qalb is intentionally separated from the Masdar Institute providing the location for people to 'get away', and find a quiet place work in a cafe setting. At night Al Qalb comes alive with street retailing and performance art. Within the street environment a free & accessible wireless internet mesh network provides superfast internet connectivity in all public areas.

THE MHQ LINK

The Masdar and HQ development will serve an important catalysing function and will act as a watershed for Madar City. It will add a vital commercial and institutional presence to enliven the daytime environment of Masdar City. Complimented by a future Conference Venue it will serve as the commercial and institutional heart of Masdar. With its unparalleled proximity to Abu Dhabi International Airport, HQ and the Conference Center will quickly become the Sustainable Technology and Cleantech Conference hub of the World - a knowledge centre positioned perfectly between the eastern and western hemispheres.

However the HQ and Conference hub is remote from the existing development and a carefully considered link is required. It will function as connective tissue, a "Lifestyle Incubator" and a "Learning Lab" incorporating a series of outdoor interpretive displays telling the Masdar Story.

For the early phases of Masdar the Link will serve as vital piece of Green Infrastructure with Reed Beds as visible 'right sized' water treatment system. In the long term buildings will fill in elements of the link ensuring a continuity of form over time.

Fareej Design Principles

Strengthening Masdar's links to the past, present and future, the use of Fareej design principles will reinforce Abu Dhabi customs and heritage and inspire Emiratis to engage with and live in Masdar City.

Those principles of Islamic urbanism and timeless aspects of traditional architecture, will base the translation of life-style desire into modern architecture design and technology.



- Organic growth patterns
- Softened geometry of city fabric



- Strongly directional Primary Network
- More organic Secondary Network -
- Lanes and passageways
- Connecting housing clusters



- Interconnecting community nodes
- Sequence of public squares and buildings
- Neighbourhood gateways



- Reinforce Masjid and Sahan, the retail corridor from the heart
- Masjid as Landmark element provides frontage to Sahan
- Formal geometry of foreground buildings



- Souk aligns with key routes and shops front the central square



- Buildings groups affirm character of the street, square, lane or courtyard
- Introspective courtyard spaces
- Layered thresholds





Development Toolbox

Built Form

SUSTAINABLE PLANNED FORM

Built Form Strategies are driven by the original Foster & Partners Masterplan. The primary blocks are derived from a close knit urban form. However there has arisen a series of challenges that confront the livability and desirability of Masdar today.

In order to address these challenges we need to look at existing low rise high density areas and see why they are not successful in attracting a high end residential market segment. These are primarily related to the following factors:

- They offer dark living spaces that even during daytime need artificial lighting.
- They create a sense of enclosure whereas spaciousness is valued for livability.
- They have a lack of privacy, which in an Arabic culture is difficult when you are looking directly into a neighbours home.

IMPROVING LIVABILITY

We can all presume that Masdar is a benchmark of sustainable living but how do we get people to want to actu-



ally live here? How can we improve the low-rise high-density LIFESTYLE outcome? The following strategies summarise our approach:

- Maintain a streetscape that is protected from direct sunlight and creates a souk like character
- Provide living areas with sufficient sunlight
- Establish living areas that provide privacy
- Provide living areas that don't feel enclosed
- Establish living areas with more open views
- Establish a vibrant street life by introducing active land uses
- Introduce strong anchors to create flow and activity (access urban street life is a main point)
- Create interesting green roof environments that that enriches the living context and provides pleasant views

These require a re-evaluation of the typical blocks, their dimensions to create a degree of openness which is mitigated with passive design features.

SUSTAINABILITY TOOLBOX

This revision to the block arrangements and dimensions to provide brighter, more open apartments must be validated with a toolbox of sustainable design elements which can be used to improve livability AND energy efficiency. These might include:

- Use efficient glazing combined with horizontal shade elements to provide passive solar control while allowing daylight in
- Provide Roof Parasols that shade primary roof forms and may include provision of Solar PV panels and Solar Thermal Systems
- Provide Communal open spaces on building roofs in the zones shaded by Parasols
- Provide modest roof greenery in those areas to enhance the physical environment
- Use new highly water efficient irrigation systems such as the EPIC chamber system as they reduce water consumption by 80%
- Incorporate Living Machines or Reed Bed systems into developments to treat wastewater on-site both effectively and cost efficiently (in doing so reducing infrastructure capital cost)
- Provide generous public spaces shaded deeply by shade structures and taller built form on Southern sides of streets

Public realm

Masdar already has a very well defined public realm strategy. This information relates primarily to the revisions contained in this study and are intended to complement the existing strategies.

TYPOLOGIES

Six distinct typologies make up the public realm, each with its own character. They are:

- Al Mamsha - the walk - landscape
- The Masdar HQ Link
- Al Qalb - the heart - Square
- Green Finger
- Squares and Courtyards - Al Qalb Square
- Promenades
- Streets and Lanes
- The Sabkha

The intent is to create a vibrant, friendly, environmentally responsive and identifiable public realm, that highlights the natural Landscape character surrounding the site.

OPEN SPACE HIERARCHY

Open space has been organized into three types, each of which will hold their own location, character and program:

PRIMARY OPEN SPACES

These spaces would typically include more active amenity programs. They will act as the central recreational parks and benefit from the immediate community sector. They consist of:

- Al Mamsha - the walk - Landscape
- The Masdar HQ Link
- Al Qalb Square



- The Green Finger
- The Peripheral Landscape
- The Sabkha

SECONDARY OPEN SPACES

Secondary spaces are those that support the primary open spaces by housing more passive recreational activity. Spaces such as the Squares and Courtyards are accessible to residents of different community sectors and therefore support a number of community focussed uses.

These include:

- Squares & Plazas
- Courtyards
- Promenades
- Streets and Laneways



TERTIARY OPEN SPACES

Although some of these open spaces lie beyond the current Phase 1 site boundary, they have been considered as informal recreational resources. Public Realm elements such as the Link and road accesses have been aligned to create links to those areas.

Likewise the Green Finger has alignments that link the edge of the Sabkha to encourage informal use of the sabkha environment, particularly during winter when biodiversity tends to be stimulated with seasonal rains. Tertiary open spaces include:

- Temporary landscapes such as the slab of the original Masdar HQ
- The sabkha beyond the existing development
- Remnant Vegetation from previous Plantations
- Pedestrian Circulation

Development Phasing

Implementation Strategy

“On completion, in 2012, the Masdar Institute and the surrounding buildings will represent approximately 30% of the almost one million square meters of commercial, residential, retail and educational space to be constructed in Phase one.

Having completed our recent Masterplan review, we are continuing, at pace, to deliver the first phase by 2015. This will be a living Masdar community, with retail and community facilities, to service the City’s estimated 8,000 residents and up to 10,000 workers in the first phase.”

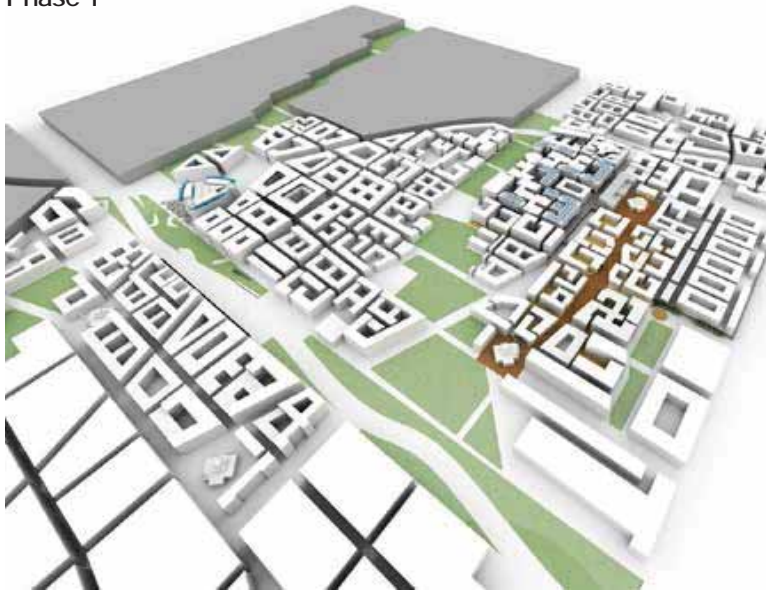
-Alan Frost, Director, Masdar City

A key objective is to assess the potential progress towards the goal of realising a substantial completion of Phase 1 of Masdar within the coming years.

At present, and subject to the testing against market demand, the phasing diagram suggests the potential future of the development.



Phase 1



Existing



2013



2014



2015



2016



2017



02# 9

Masterplan Components

Lifestyle Strategy

The concept masterplan for Masdar City Phase 1 is an answer to major concerns raised at a brief stage regarding the character and technicality of the execution, where studies and strategies were developed for each of those masterplan components. The most important areas detailed on this exercise included street life, podium transition structure with car park, souk character retail street, green finger and podium edge, and a temporary landscape link to MHQ.



CS'A' : Masdar Zero Carbon City

MHQ LINK

The HQ Link will serve the following vital roles:

1. Educational: telling the Masdar Story to visitors and providing a communication channel to tell share ongoing transformation and message of Masdar City
2. Lifestyle; providing Masdar City residents, employees and visitors with a range of lifestyle opportunities including sporting facilities, clubhouses, gardens and future courtyard vegetation to link the HQ and MI sites.

The educational function of the link will have a number of aspects. Firstly a series of interpretive design elements will engage particularly young visitors and families. They examples shown on the following pages show how the exhibits will engage visitors on an interpretive journey that educates the users on the Masdar Story.

In addition the link will function as a living laboratory based in the exploration of extremely low irrigation environments. Primary amongst those will be the areas immediately adjacent to the link which will comprise of stimulating the germination and growth of native seed currently dormant in the site sands through the use of 'rain guns'



MHQ LINK - The connection between the existing institute and the future Masdar Headquarters was a requirement. It related not only to the physical link between those developments in the early stages of Masdar, but also to the quality of life for residents and workers.

The Project Team has explored alternatives for a temporary landscaped link through which users will access sports and leisure facilities, in order to make the journey as pleasant as possible, and to support other developments in the area.

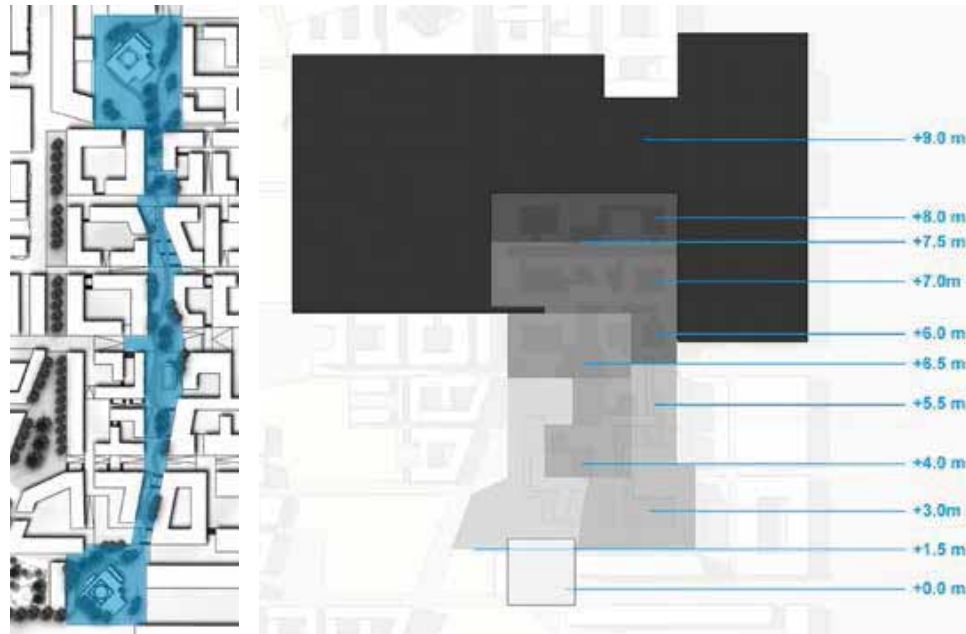
3-4 times a year in the cooler months. This will have the effect of stimulating a relatively dense cover of natural dune vegetation which will not require any other irrigation. In terms of the lifestyle benefits, sports courts and the clubhouse will provide recreational facilities which do not currently exist, and which can help to transform the lifestyle offering of Masdar City.

Particularly in response to the significant development of the Masdar / IRENA HQ building the link facilities will provide an attractive and important link between areas.

The link is also designed to evolve with Masdar City as it incorporates elements that frame future development sites. This ensures that even when infill sites start to be developed the recreational functions can be maintained.

PODIUM TRANSITION

Among the requirements of the project, one of the major challenges was connecting the top of the existing podium to the natural grade, providing pedestrian and vehicular mobility. The chosen strategy took advantage of that situation by creating gentle slope streets for both cars and pedestrians, and using that transitional structure to give room to car park.



CS'A' : Masdar Zero Carbon City

RETAIL STREET

The creation of an address to the community with a strong character was one of the inspirations for the project. The Al Mamsha retail spine will answer that question by providing an attractive souk, inspired public environment, and will serve as a connector between neighbourhoods within the plan.



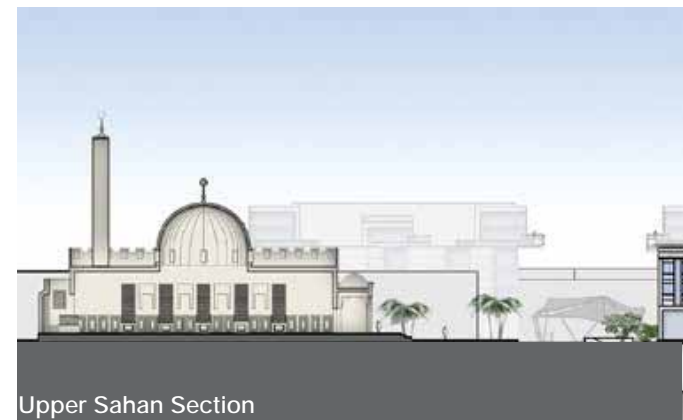
Retail Street Plan



Retail Street Massing Study

OPEN SPACES

The plan for Masdar City has been adapted keeping the main principles of sustainability. While street typologies are detailed by the previous plan, few public spaces required closer studies. Key types of open space, planned or proposed, had their character developed towards the community identity envisaged for the area.



CS'A' : Masdar Zero Carbon City



Residents Access

Masdar residents and their visitors will have comfortable access from the car park to their units through lobbies at car park level.



Visitors Access

Visitors will also have direct access from the car park to major public areas through strategically located vertical links. The intention is to invite visitors independently into the public square.



Shared Streets

Few streets within the project's boundary will need to give room to public transport. Those corridors will include several ways to the podium's top levels through streets and buildings.

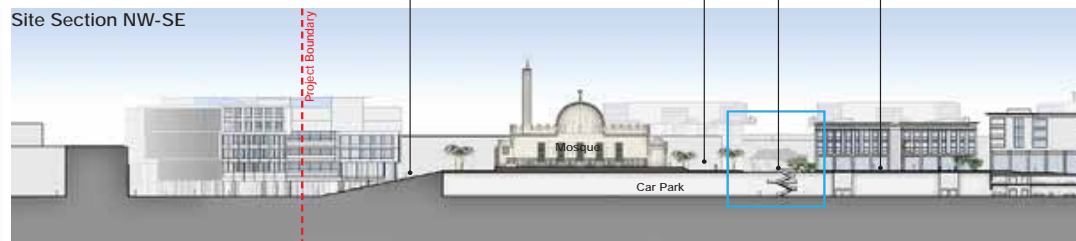


Al Mamsha Retail Street

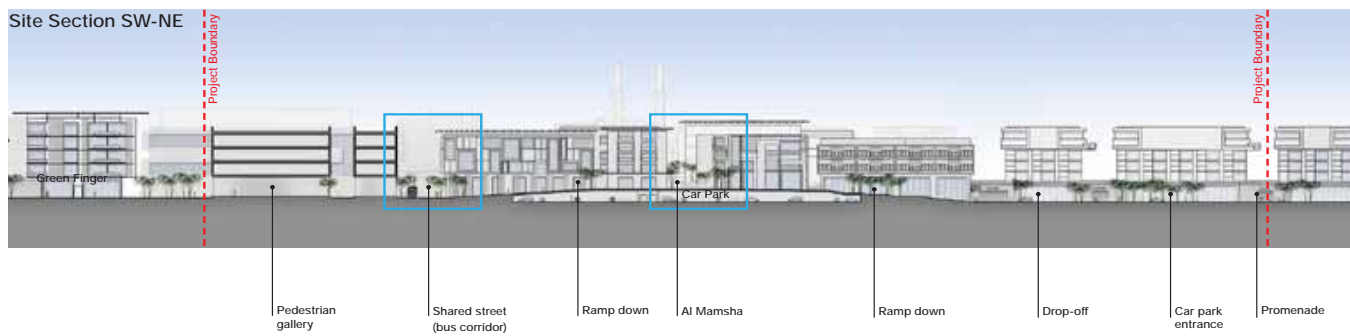
The main street of the project itself was developed as part of the strategy of connecting different levels within the area. The character of that corridor, composed by sequences of ramps and steps, will make that transition an interesting journey.



Site Section NW-SE



Site Section SW-NE



TYPICAL BUILDING BLOCKS

Testing of the capacity of plots and the surrounding streets is primary to confirm the built form. In addition to unit sizes, the building address can be seen only once a typical urban block is understood. A typical residential block was taken for analysis and the output is typical floor plans that respond to the desired building.



Ground Floor Plan



Side Elevation



Typical Floor Plan



Side Elevation



Typical Block



CS'A' : Masdar Zero Carbon City

GREEN FINGERS, GREEN PARK, GREEN LINKS



03#

DESIGN : Case Study 'B'

Al Bateen Waterfront Revitalization

- 03#⁰¹ Project Summary
- 03#⁰² Client's Brief
- 03#⁰³ Context
- 03#⁰⁴ Design Research
- 03#⁰⁵ Masterplan Framework
- 03#⁰⁶ Masterplan Development
- 03#⁰⁷ Masterplan Components

CASE STUDY 'B'



Project Summary

Background

“PLAN ABU DHABI 2030 presents a vision for a thriving and sustainable public realm for all citizens, residents and visitors of Abu Dhabi with particular emphasis on safeguarding natural resources and the cultural heritage of the city. The turquoise waters of the Gulf represent one of the most defining characteristics of Abu Dhabi Island. The experience of the water’s edge on the island is quickly being lost with the rapid pace of development. Because of the significance of the Bateen Waterfront area to the history and development of the city, it is imperative that continuous public access to the water’s edge with supportive community amenities be provided for now and future generations.” (Al Bateen Waterfront Design Guidelines, 2011, p.4)

AL BATEEN WHARF

“Al Bateen is one of the most historic areas of Abu Dhabi and is considered a national asset. It was once a fishing village, separated from the main area of Abu Dhabi by a large sand dune. The fishermen liken the island to a body, calling Al Bateen “the stomach”. An Arabic word for stomach, al batn, is similar.” (Al Bateen: quiet for centuries, busy for decades, 2012)

“Many residents fished for a living. According to fishermen, the waters on the other side of the island are choppy, but Al Bateen’s bay is calm, making it a good place to fish. Some residents lived in barastis - traditional palm frond homes - while others lived in coral stone houses, according to the historian f rauke Heard-Bey.” (Al Bateen: quiet for centuries, busy for decades, 2012)

“Al Bateen’s old dhow yard had been where wooden boats were crafted by hand and dhows were being built in the old ways of construction. The dhow yard closed a few years ago, making way for the marina development. Currently, there is a place for the fishermen to gather and talk daily in a majlis - arabic work for sitting area - nearby, overlooking water.” (Al Bateen: quiet for centuries, busy for decades, 2012)

Client's Brief

Al Bateen Wharf Redelopment

VISIo N

INITIAL VISIo N & PRo JeCT o BJeCTIVeS

Al Bateen Wharf, the longest-settled area of Abu Dhabi Island, is intended to serve the community and pay tribute to generations of fishermen who have worked there. "The Al Bateen precinct is developing into a historic and strategic mixed use development site that has a considerable role to play in the future development of Abu Dhabi as a destination for commerce and tourism. The Al Bateen precinct will showcase a diverse range of architectural design styles and scales," (Al Bateen - Abu Dhabi - UAe , -) ranging from contemporary hotel developments to the traditional style of the existing cultural heritage district on the south-eastern corner of the site. The proposed development will consist of a marina with wet berths, dry stack for boats storage, f & B outlets, and a maritime and boat maintenance facility and a yacht club.

The development will be responsible for the enhancement of Al Bateen as a harbour for local fishermen to berth boats and land their catch. "The proposed Al Bateen Waterfront will utilize the historic strength of the location to create a destination that is attractive to residents and tourists but also enables the fishermen to continue as they have done for generations." (Al Bateen - Abu Dhabi - UAe , -) "The natural beauty of the bay and its location within the urban framework of Abu Dhabi ehances this site as one of the premier marinas in the Middle east which will set a benchmark in terms of standard and approach." (Al Bateen - Abu Dhabi - UAe , -)

Throughout the design process, the underlying objective was to meet the main principles identified in the Abu Dhabi UPC Al Bateen Waterfront Guidelines. "The following are the main principles to be realized in the implementation of the Bateen Waterfront Design Guidelines:

- Preserve public connectivity from the waterfront to the primary public access routes of the city
- Preserve views from public access-ways to the waters edge
- Provide continuous open public access at the waters edge for people of all ages and abilities
- Provide strategic focal points at the waters edge that offer opportunities to celebrate culture, heritage and views."

(Al Bateen Waterfront Design Guidelines,2011, p5)

eAST BAy - MARINA

The east Bay Marina will be an international standard marina for larger yachts between 15 and 50m. The public promenade provides a majlis and dining facility reflecting the prestige and status of the location. It will be the place to be seen, watch people and view some of the most magnificent yachts in the Gulf. The East Bay also includes for a dry stack which will be one of the first such facilities in the Gulf. Abundant surface car parking ensures marina users and visitors to the West Bay f +B outlets will be catered for.

A palm lined shaded walkway connects the two bays with a signalized crossing over Ninth Street. Given the size of the site thermal comfort has be given priority whilst maintaining views to both marinas.

WeST BAy - fISH eRMeN'S MARINA

The West Bay is a working Marina; it is a place of activity and cultural significance, a place where fisherman lay their catch, socialize and reflect on the day's events in much the same manner as generations before. Architecture, design and landscaping will reflect the origins of the port and will utilize the historic strength of the location to create a destination that is attractive to residents whilst being enjoyed by both people working in the area and tourists.

The variety of food and beverage facilities will accommodate a diversity of markets throughout the day, and will be orientated towards family and convenience dining.

Me THo Do Lo Gy

MASTeR PLAN Co NCePT

Designed to create a community environment that serves both the functionality of a marina and the social interaction of residents and visitors. The concept provides a unique promenade walk surrounded by themed restaurants, allowing direct personal connection with the marina environment visually and physically. In preference to zoned areas, this development plan will provide a platform for creating interest in and involvement with a significant heritage activity.

ARCHITeCTURe

Architecturally the buildings are designed to provide a reflection of regional detail presented in a modern interpretation. The forms will blend monolithic rendered walls with glazed screen walls designed to open the restaurant interiors to the marina environment.



03# 03

Context

existing Condition - Site Analysis

PRo JeCT Co NTex T - The SITE

The project site encompasses approximately 60,000 square metres. It is divided into the west and east bay by Ninth Street linking the mainland to the Island via Bainunah Street.

To the east, the bay is scenic and attractive. The Crown Prince has a palace on the northern shore while the Sheikh Sultan bin Zayed Mosque provides a backdrop to the eastern ocean vista. To the west, existing developments include the Six Towers development and the central bank of UAE. Proposed developments along this bay include for contemporary hotel and retail projects. To the south the site is bordered by the Cultural Heritage museum with its rich traditional architecture.

The Al Bateen Wharf serves as a bridge between the highrise offices of downtown Abu Dhabi and the city's hotel district on one side and the stately low-rise residences surrounding the Royal Diwan.



Historical Background - Heritage

As one of the most historic areas of Abu Dhabi, heritage and historical background of Al Bateen must reflect in the design of the waterfront.

- Old tradition of pearl diving and fishing has been main occupation of the residents.
- Fish market would provide fresh fish for the visitors to buy.
- Barasti homes had been typical architecture theme of the area for centuries.
- In the Dhow yard, men used to build traditional boats with special equipments.

Fishing Village & Pearling Tradition



Fishermen's Barasti Homes



Dhow Yard



Local Analysis - existing Buildings

Al Bateen is a prestigious area with a modern theme and new developments being constructed all around the area.

One of the most important developments is the six office towers which will hold a large number of companies and employees.

Hotel in the east neighbourhood is another key development which would play a big role in relation to the waterfront public activation.

Belbadi Development (Northern Plot)



Etihad Towers & Tabreed Chiller Station



Newly Built Building on Southern Plot



Newly Built Building on Southern Plot



6 Office Towers on Northern Plot (Main Target for the F&B Retail)



Tabreed



6 Office Towers



Belbadi Hotel Development (Western Neighbour)



6 Office Towers on the neighbouring Northern Plot Specially Partially Empty



Urban Analysis - Iconic surroundings & Landmarks

Al Bateen is located within a network of landmark places and modern developments such as Abu Dhabi corniche, emirates palace and a number of councils and embassies.

There is a magnificent view to the Sultan Mosque which is further in the east. The client has particularly requested to maintain the view from the marina and the main street.

Ministry of Foreign Affairs



Sultan Mosque



Abu Dhabi Corniche



Etihad Towers



Emirates Palace



Abu Dhabi Executive Council



Marina Sports Club



Womens Association School

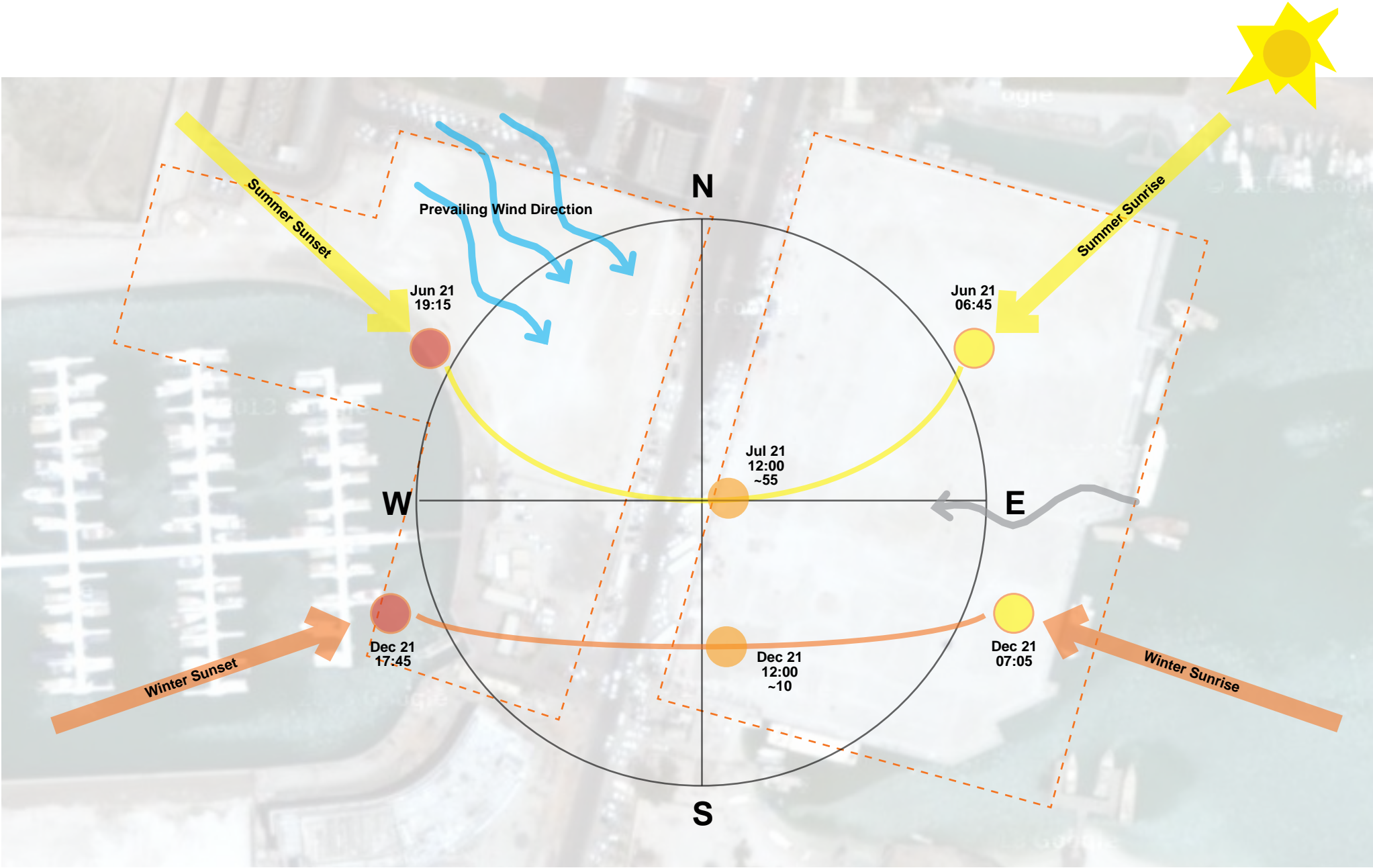
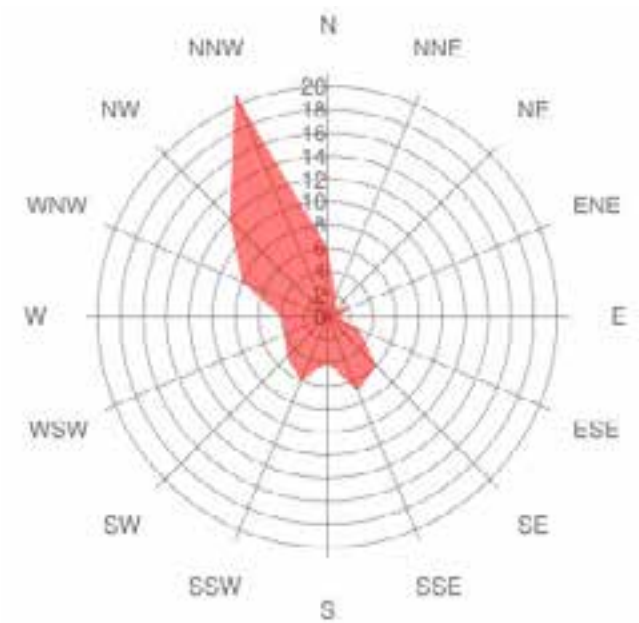


Al Bainunah St.



environmental Analysis - Sunpath & Wind

Wind dir. distribution Abu Dhabi Bateen all year



LEGEND

- Site Boundary
- Summer Sunpath
- Winter Sunpath
- Wind
- Prevailing / Summer Wind
- Winter Wind
- Sunrise
- Sunset



03# 04

Design Research

Design philosophy - Inspirations

Design of Al Bateen waterfront has been inspired by three main factors:

- Heritage : to reflect traditional fishermen village which has been there for centuries.
- History : Arabic theme architecture of the buildings.
- Style : Benchmark study of modern marina developments.

HERITAGE

Traditional Fishermen Village



HISTORY

Arabic Theme



STYLE

Modern Marina Developments



Value Proposition - Maximizing Urban Amenity

ADDING VALUE BY :

In accordance to the design objectives of the waterfront, project context and points of inspirations, the following factors have been considered for the design of the waterfront:

- Accessibility for ALL regardless of their age, gender and level of ability.
- Public realm activated with variety of programs to promote outdoor lifestyle.
- Walking and biking as primary mode of transportation.
- Features that provide possibility for visitors to bond with the place.
- Visual access to water and greenery both for aesthetic pleasure and sense of well-being.
- economic development
- Branding the area as an iconic leisure destination with unique features

Public Accessibility & Safety



Promoting Outdoor Lifestyle



Activating Public Space



Pedestrian & Bike Friendly Community



Cultural & Heritage Features



Place Making



Enhanced Views & Visual Amenity

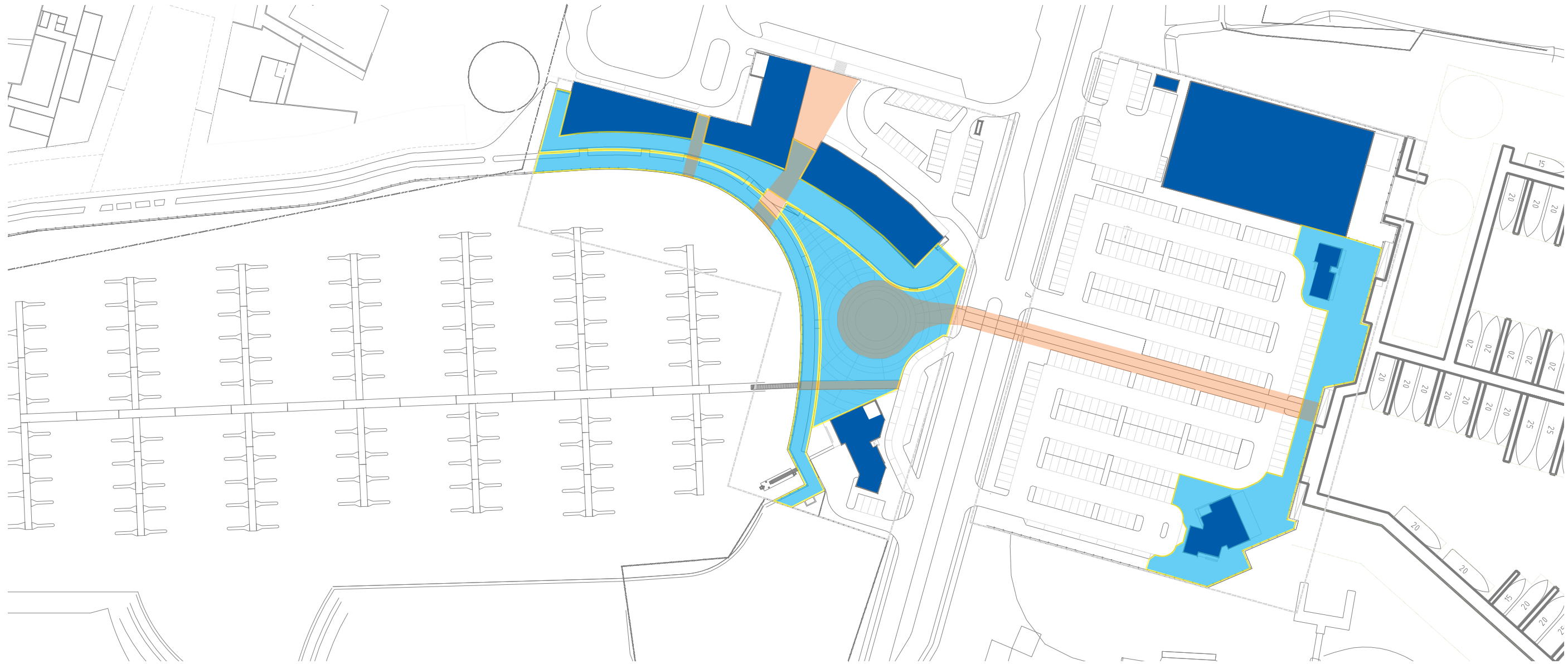


Sence of Well-being



Branding





Key principles to design Al Bateen Waterfront are:

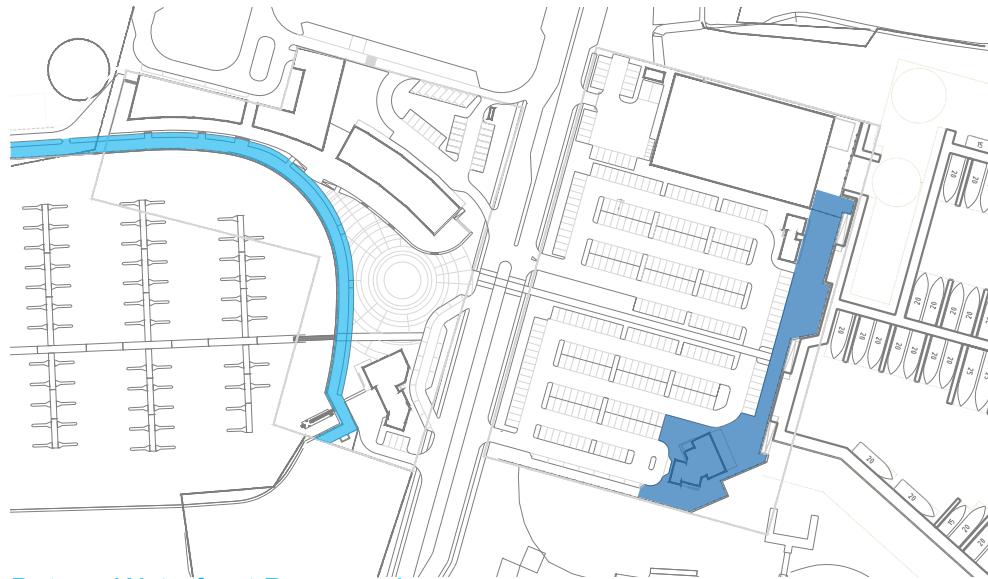
- Vibrant public realm to attract visitors and serve residents with suitable amenities and facilities.
- Walking links to be as comfortable as possible all year round, with shading and cooling elements in Abu Dhabi's summer climate.
- Buildings to reflect traditional arabic theme while designed as a modern marina.

LEGEND

- Buildings
- Public Realm
- Walkable Links

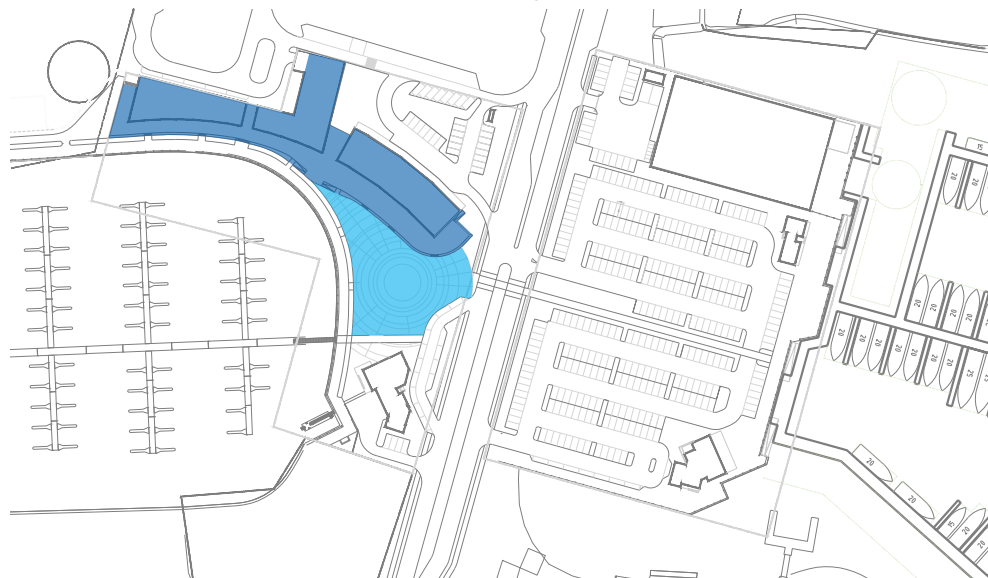
Imagining the Possibilities

OPPORTUNITIES



Bateen Waterfront Promenade

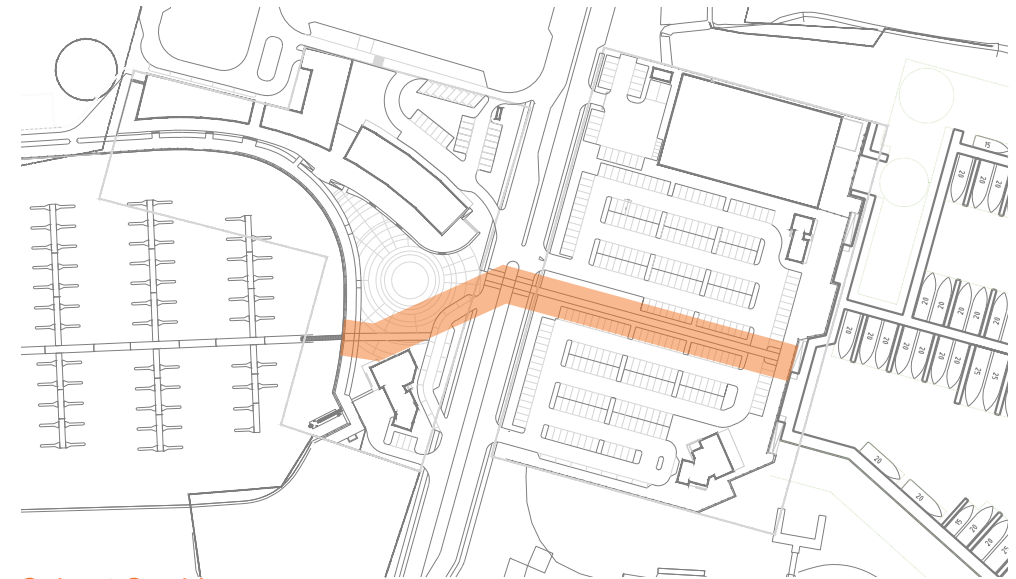
The waterfront pedestrian promenade provides a direct connection with the marina environment rarely found accessible to the public in the Abu Dhabi or the UAE. The marina provides visitors with views of the sea and an active working marina whilst connecting several new residential and mixed used developments in Al Bateen Wharf.



Plaza and F&B Terrace

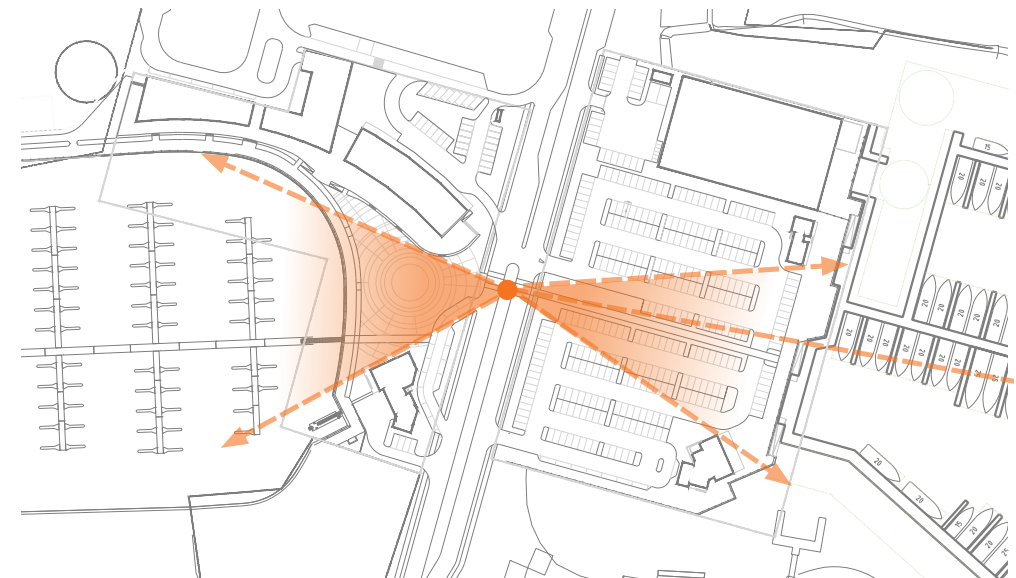
The terrace is raised above the promenade maximising views over the marina whilst dining in a choice of international cuisine. This encourages outdoor dining and activates the public space. The architecture of the terrace has a mixture of culture and heritage with modernism and functionality to bring diversity in facilities, people and business activity.

CONSTRAINTS



Culvert Corridor

The culvert corridor provides an essential environmental sea flow between the East and West Marinas however this creates a separation of functions within the master scheme that constrains the design, limiting locations, restricting utilities and contains space allocation.



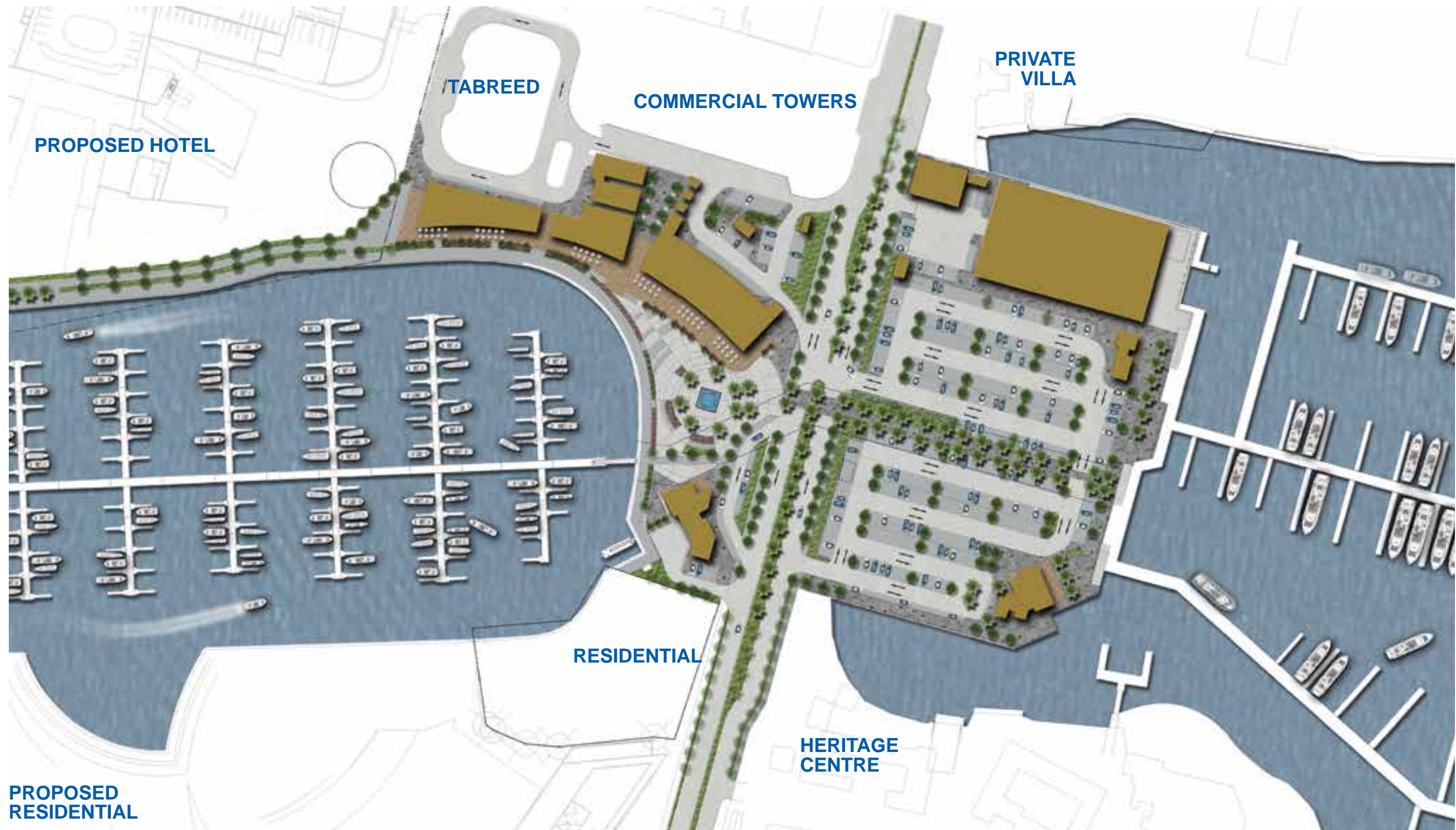
Principle View Points

The UPC guidelines wish to open views to both marina basins from a central location and provide the most attractive view corridors that focus on the marina and its surroundings. The viewing points provide a context on which to build the conceptual design.

03# 06

Masterplan Development

Illustrative Site Plan



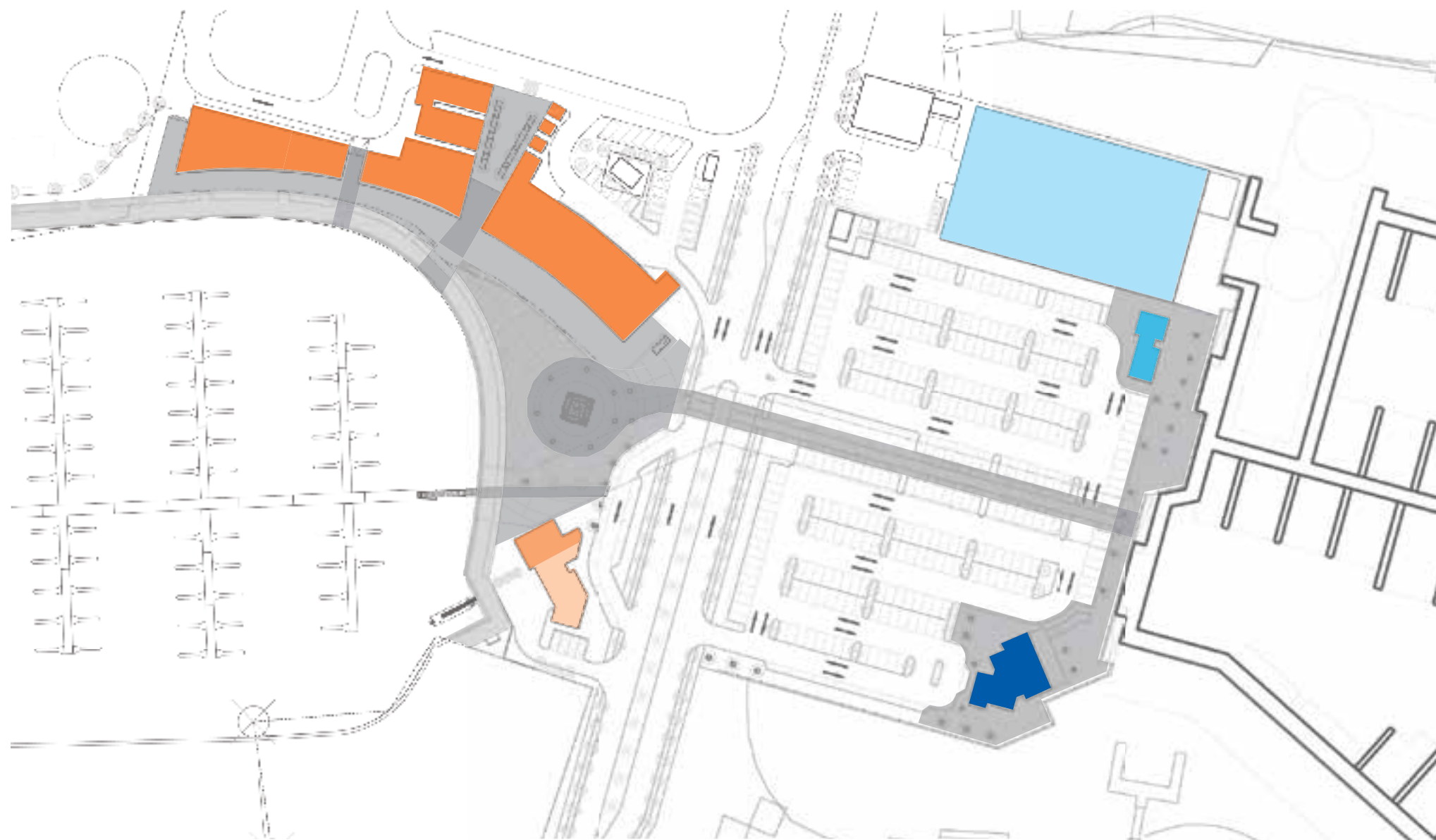
PROPOSED
RESIDENTIAL

CS'B' : Al Bateen Waterfront

Masterplan Key Components

In accordance to the design objectives of the waterfront, project context and points of inspirations, the following key components have been considered for the design of the waterfront:

- f & B - food and beverages - strip with a variety of outlets to serve taste of mixed user groups.
- Fishermen's majlis - sitting area - designed with service facilities and toilets, and outdoor sitting space.
- Maintenance building for the boats.
- Promontory cafe for the visitors who wish to have an opportunity to closer to the water and enjoy the view in a more quiet setting.
- VIP majlis - sitting area - redesigned in almost same location as old times, enhanced by adding service facilities and toilets, as well as outdoor sitting space.
- Dry Stack building with a modern industrial theme with space to hold a certain number of boats and facilities to lift the boats and transfer them to the slipway.
- Two public promenades which would allow people and cyclists to walk and bike along the water.



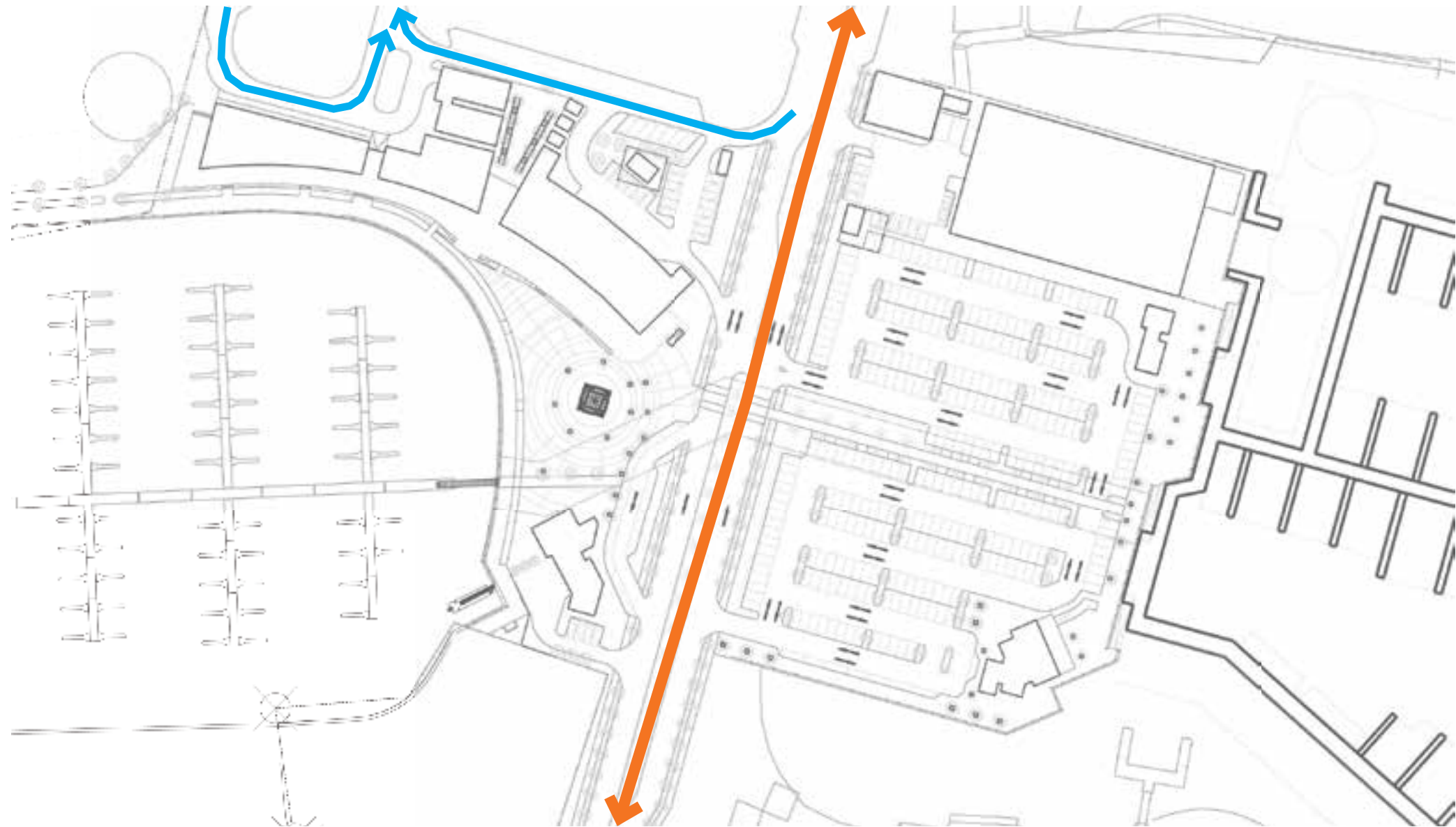
LEGEND

	F & B Strip
	Fishermen Majlis
	Maintenance Bldg
	Promontory Cafe
	VIP Majlis
	Dry Stack Building
	Public Areas

Road Classification - Site Circulation Plan

Considering the road classifications (avenues, streets and access lanes), Al Bateen is accessible by a street - two way, double lane - which is stretched between east and West Bays.

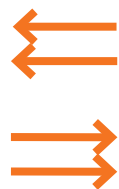
Two access lanes provide links in the back of the house to the taxi drop off and service trucks.



Avenue



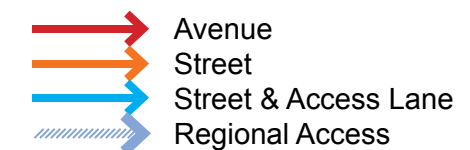
Street



Street & Access Lane



LEGEND



Walkability - Pedestrian & Cyclists Movement

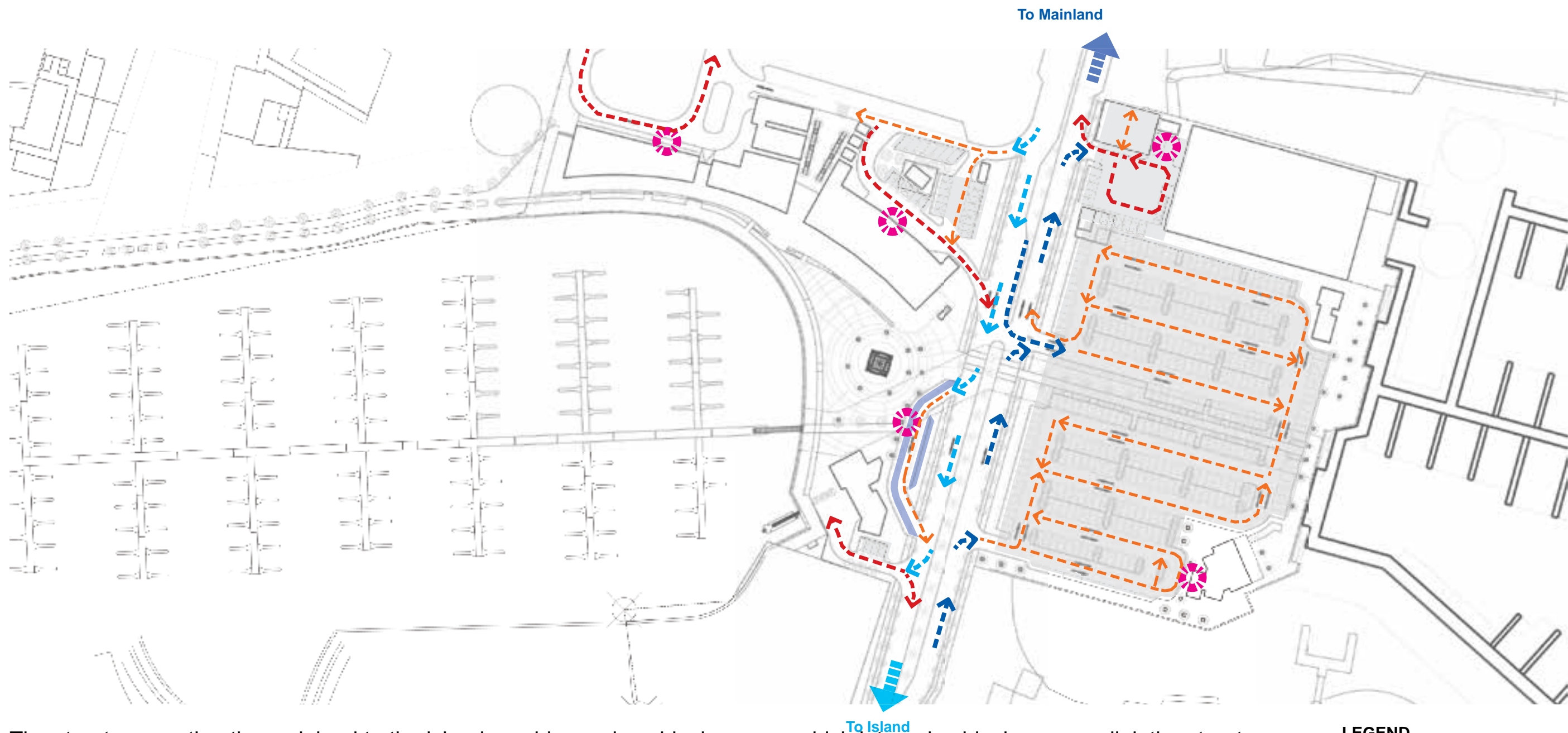


Walkability in all seasons including hot summer months in the area is assured by shaded pathways as the main pedestrian link, connecting the Slipways in the east through the parking to the main street raised cross walk which continues along the f & B deck. Apart from the main link, there is network of primary and secondary pedestrian links to provide walkable access to all the nodes, meeting points, drop offs and car/bike parkings.

LEGEND

- Shaded Pathways
- Pedestrian Movement (I)
- Pedestrian Movement (II)
- Pedestrian & Cyclists
- Pedestrian Access Points
- Cycle Path
- Meeting Points (indoor)
- Meeting Points (outdoor)

Vehicular Movement / Road Network & Access

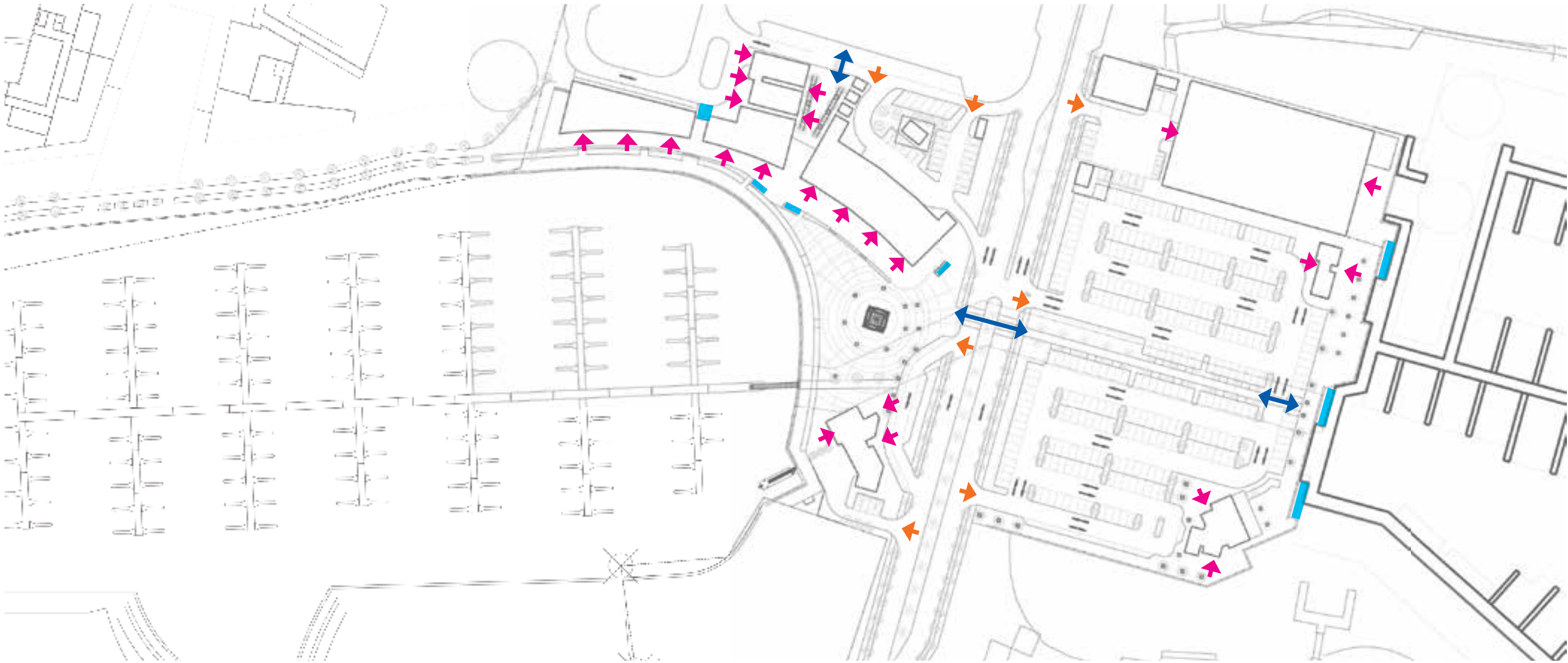


The street connecting the mainland to the island provides main vehicular access which internal vehicular access link the street to the parkings and drop offs. Parkings are located in both bays, however, main parking is considered to be in the east bay due to availability of space to provide sufficient number of car parks and possibility of effective circulation system. There are temporary car parks intended for the drop off area of West bay as well.

LEGEND





- Parking
- Drop off Temporary Car Park
- Main Movement to Island
- ← Main Movement to Mainland
- ✱ Drop off / Service Points
- Truck Access
- Internal Vehicular Movements

Public Accessibility / Disabled Access



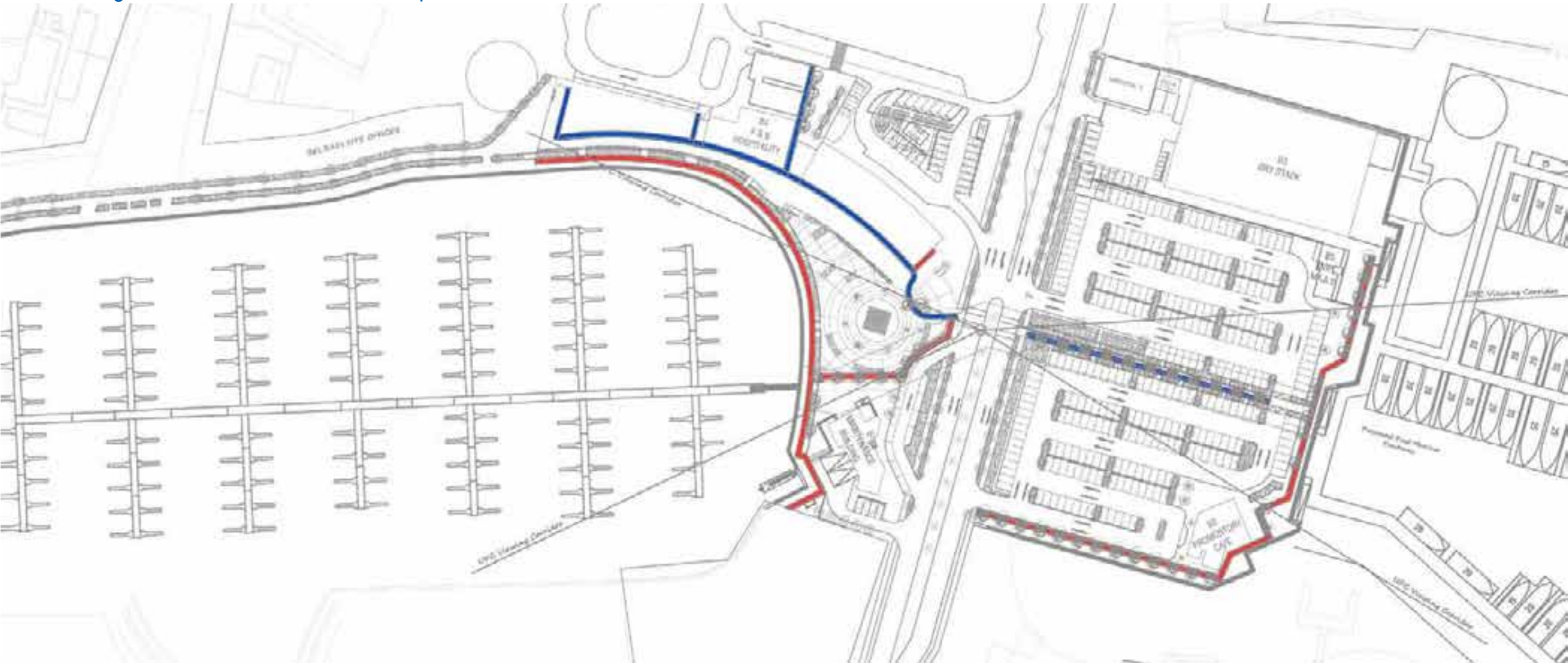
All the access lanes and external/internal entrances are designed to be accessible by all types of pedestrian users inclusive of the disabled. Main street is designed with raised crosswalk and there are flat crosswalks designed in narrower areas which overlap the mail link or have a potential to be used more regularly.

LEGEND

-  Ramps (Disability Features)
-  Public Entrances & Exits
-  Access to Parking (Cars)
-  Pedestrian Crossing

Shading Plan - Summer

Shadow Diagram - 2 Summer Solstice 1:00pm



Shade has been provided by shade trees (in pathways) and canopy (in f &B deck) and in accordance to the provided ammount of shade, a study has been performed for both Summer solstice and Autumnal equinox. According to the study, 80 % of shade for the main link (in blue) with total area of 583 sqm will be achieved in the mid summer noon, and 51% in the autumnal aquinox.

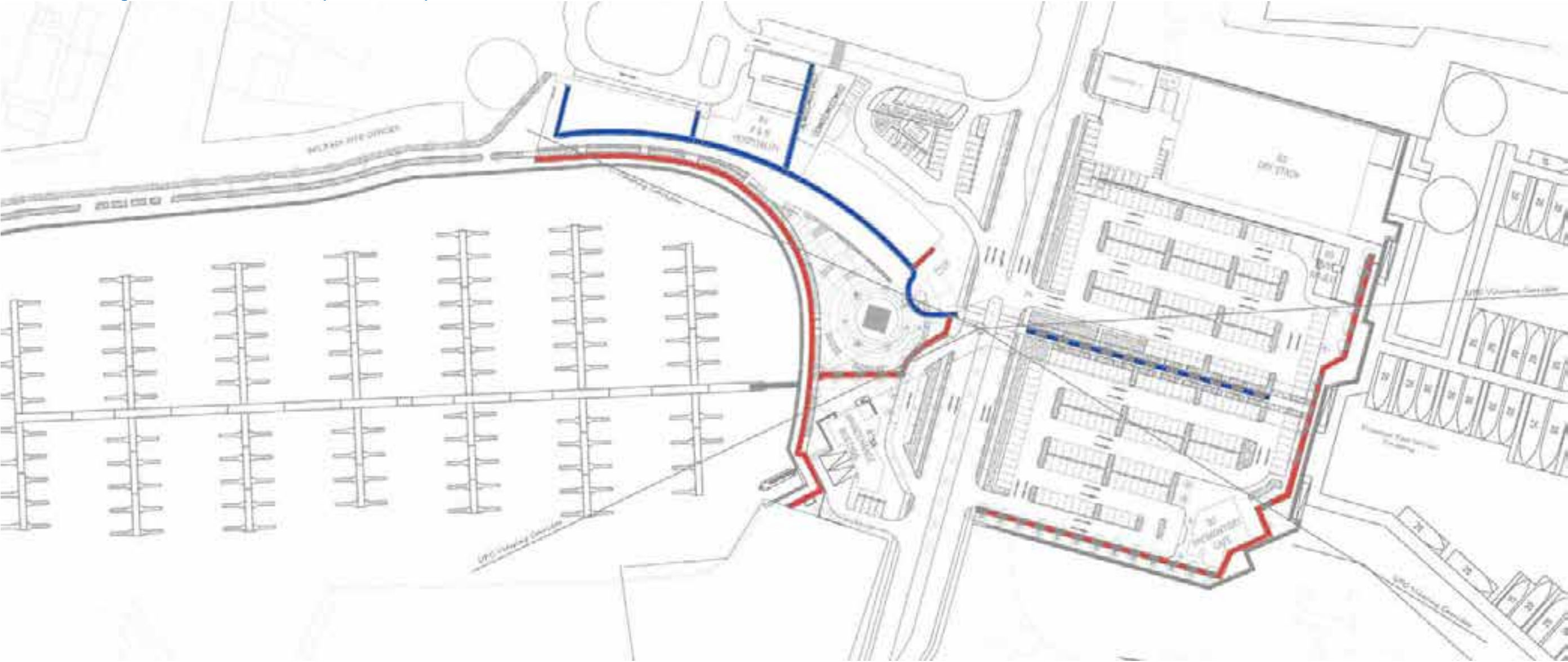
LEGEND

- Primary Shaded Pathway
- Secondary Shaded Pathway

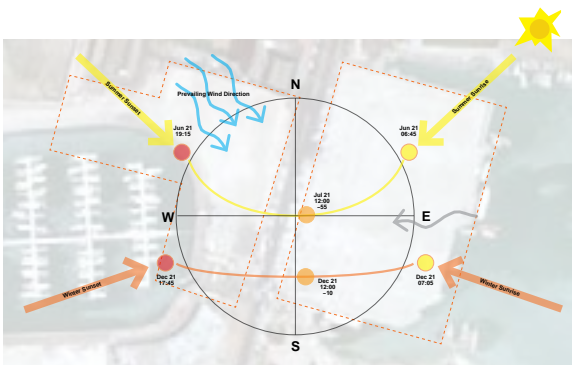
	TOTAL AREA	TOTAL SHADE	%
PRIMARY	583.23	468.71	80
SECONDARY	904.5	346.9	38

Shading Plan - Autumn

Shadow Diagram-1 Autumnal Equinox 1:00pm



	TOTAL AREA	TOTAL SHADE	%
PRIMARY	583.26	300	51
SECONDARY	904.5	318.25	35



LEGEND

- Primary Shaded Pathway
- Secondary Shaded Pathway
- Site Boundary
- Summer Sunpath
- Winter Sunpath
- Wind
- Prevailing / Summer Wind
- Winter Wind
- Sunrise
- Sunset



Public Realm - Key Places & Links

Places & Destinations

The WALK : Yacht Promenade



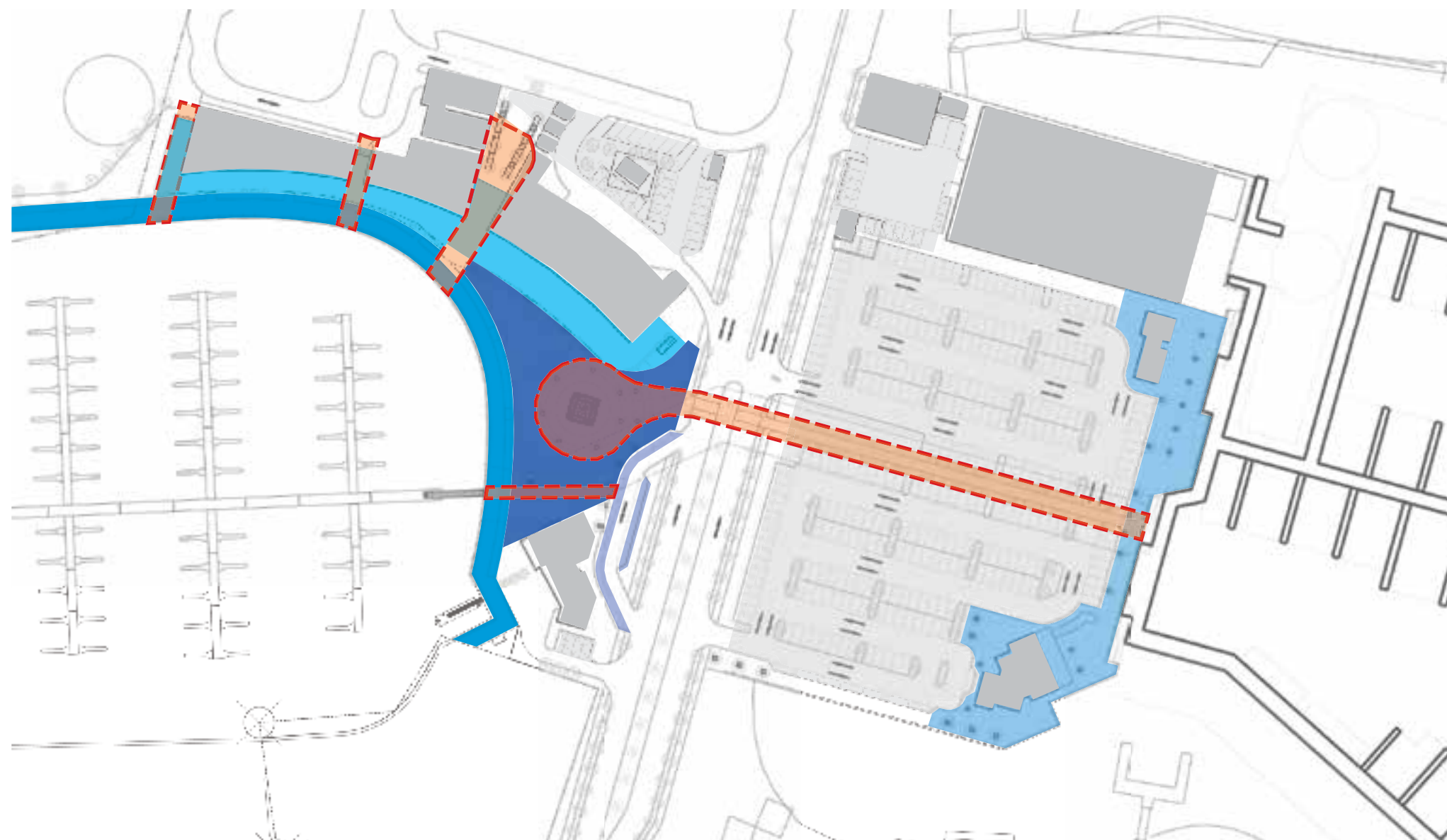
The SPINE : F&B Deck



The HEART : Plaza



The EDGE : Fishermen Promenade



LEGEND

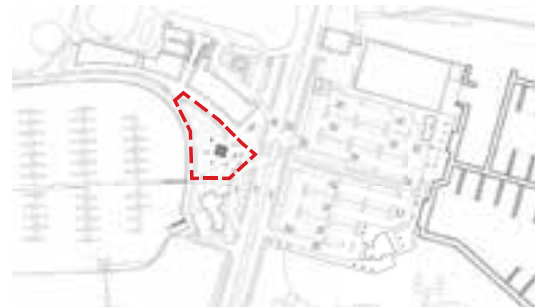
- Marina Plaza
- Fishermen Promenade
- F&B Deck
- Marina Promenade
- Pedestrian Links

Al Bateen public realm is inclusive of the following key places:

- The Heart - Marina Plaza : to serve as a welcoming and open space with heritage palm trees , planters, seats and a water spray feature in the centre.
- The Edge - Fishermen promenade : Shaded pathway next to water to walk, jog and bike
- f &B deck : the food and beverages strip
- Marina Promenade : intended basically to serve the fishermen community

MARINA PLAZA

The public realm design for Al Bateen has been adapted a sequence of public nodes as the anchors and links to connect them as the axis. The Marina Plaza is aimed to provide the visitors with a welcoming space as the walkway from the parking leads to the plaza from one end. Plaza has a circle of heritage date palm trees around it and a water jet feature in the centre. Seats and planters would be added around the plaza. The plaza is a node, connecting the f & B terrace, Marina promenade and parking link.



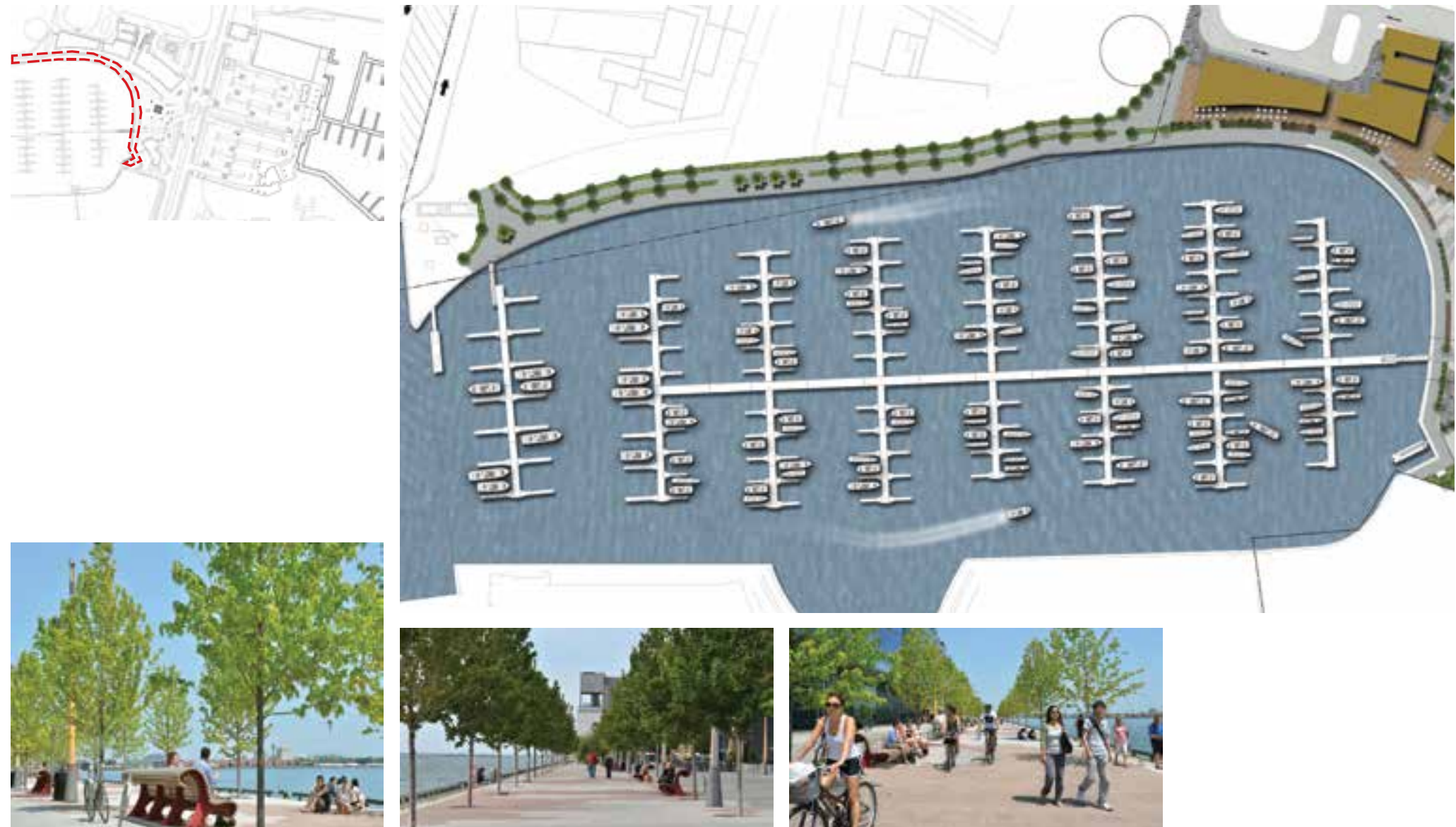
f &B TeRRACe

Food and Beverages Terrace is stretched along the f &B outlets which offer variety of choices to cover different customers taste and preferences. The possibilities range from steak house and ice cream parlors to classic restaurants. The outlets have indoor, outdoor and rooftop seating space to respond to the seasonal requirements.



MARINA PRo MeNADe

The promenade is intended to provide the visitors with opportunities to walk, jog and cycle. The connection extends from the Plaza and f & B terrace to the future development of a 5 star hotel on the west end. o n the side of the f & B terrace, there is a bicycle parking space designed as well.



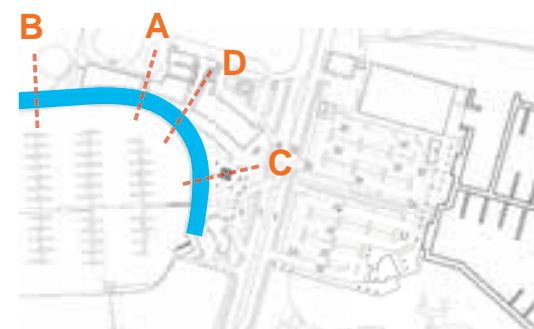
fISH eRMen'S PRo MeNADe

Fishermen's promenade is stretched between the renovated fishermen's club to the promontory cafe.

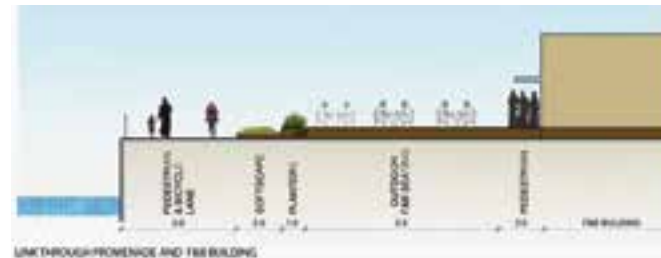


MARINA PRo MeNADe Se CTIo NS

The sections are intended to show the typical width and arrangement of the pathways and seating spaces for the pedestrian and cyclist visitors. Standard measurements and proper shading are considered along the length of promenade.



Section A



Section B



Section C



Section D



TYPICAL BUILDING BLOCKS

The promenade is intended to provide the visitors with opportunities to walk, jog and cycle. The connection extends from the Plaza and f & B terrace to the future development of a 5 star hotel on the west end. On the side of the f & B terrace, there is a bicycle parking space designed as well.



Public Realm - Safety & Security

Public Realm Safety

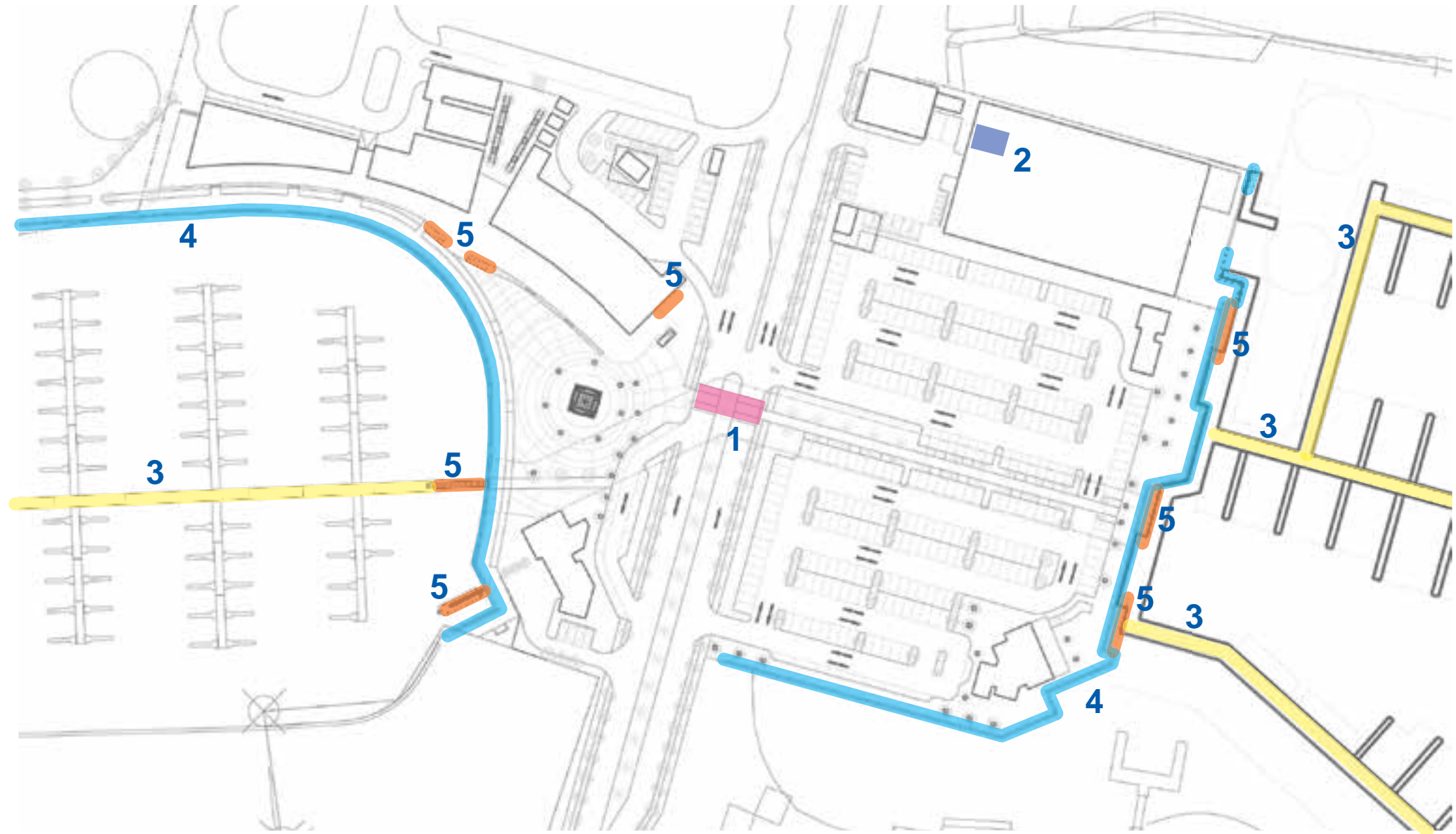
- Pedestrian Link: Signalized Crossing (1)
- Security Office (2)
- Security Pontoon Cameras (3)
- Safety Promenade Balustrade (4)
- Lighting Elements (All Over Site)

Landscape Safety

- Selection of the Plants : (All Over Site)
 - a. Non Poisonous
 - b. No Pointee leaves / thorns

Architectural Safety

- Slope of the Ramps for both pedestrians and the disabled (5)



Special Considerations :

MARINA SAFETY & SECURITY

Forklifts carrying boats always prevents potential hazards. Although not always practical, separation of the public from the dry stack storage operations is preferred for safety and security reasons. Fencing with door and swing gate access should be included as a physical separation barrier. Gangway access to the staging docks should be outside the operations fencing area (note that gangway access on the retrieval docks should be for operations personnel only).

MARINA ACCESS SECURITY & SAFETY

Marinas create a challenge in allowing ease of access to their clients while restricting access to the general public for reasons of safety and security if so desired by the operator. Landside security gates along with restricted access signage should restrict access to all gangway access points within the public domain. Where gangways abut within restricted access areas the need for specific gates can be removed. Where gangways abut within a secure operational areas such as repair facilities, with moving plant and machinery, a low level access gate is recommended.



04#

DESIGN : Case Study 'C'

Sobha City Development

- 04#⁰¹ Project Summary
- 04#⁰² Client's Brief
- 04#⁰³ Context
- 04#⁰⁴ Design Framework
- 04#⁰⁵ Design Strategy
- 04#⁰⁶ Public Realm Components
- 04#⁰⁷ Public Realm Design

CASE STUDY 'C'



Project Summary

Background

So Bha City

Sobha City is a 743,224m² mixed use development in Meydan City, Dubai. The development is less than a 15 minute drive from the airport and is in close proximity to the world's finest racecourse, golf course, and tennis and riding academies.

The development is comprising the following :

- **280 Villas** - Expansive windows, natural wind flow and light are key components of the villas. Careful consideration has gone into bringing nature back into the urban landscape.
- **Garden Apartments** - Each eight storey building is located amidst a forest complete with native plants and birds nestling in the wilderness.
- **13 High Rise Residences** - Located along the waterfront promenade
- **Two Clubhouses** - with an array of facilities involving recreation, sports and other entertainment options
- **Hotel & Spa**
- **Office Buildings**
- **Two premium Schools**
- **A shopping Complex**

Client's Brief

Sobha City Public realm; Streetscape & City Park

CLiEnt' S initia L Bri Ef

Sobha City is to be unique within Dubai's cityscape with public areas reminiscent of a forest;

- Streetscapes are to promote pedestrian and cycle use with connectivity
- Pedestrian areas to be shaded naturally by tree canopies
- roundabouts to be planted and showcase Sobha's vision
- Connections to be made to public transport network
- Medians are to be heavily planted to segregate the traffic
- Lighting is to provide for both vehicle and pedestrian areas
- irrigation to be sourced from the sustainable t SE network

ViSion

initia L ViSion & Pro JECT o BJECTi VES

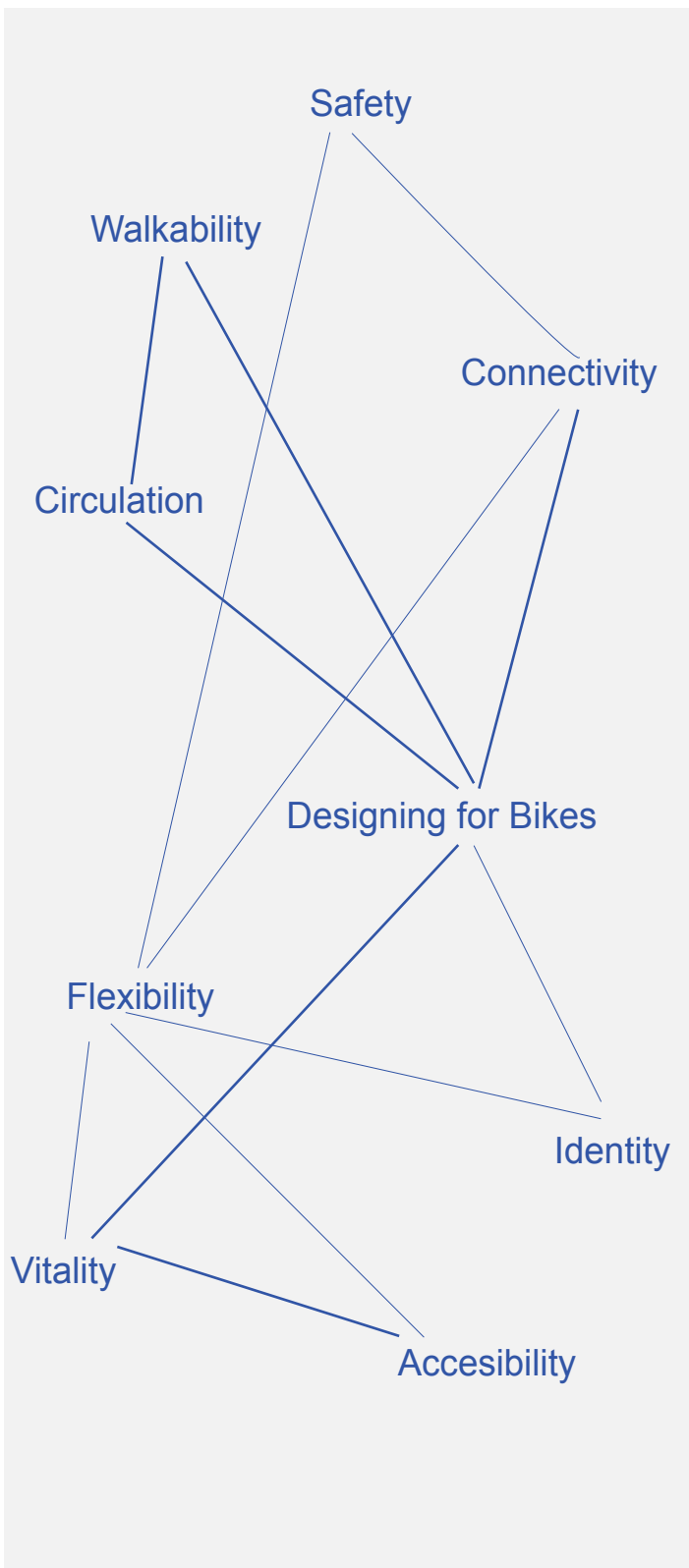
Park S

Entrances at either end will have dense planting to prevent view into the park from the road. informal paths wind through undulating ground offering different track options and access to each buildings. the track would be surrounded by dense ground cover and the canopy of large trees will shade the path.

the design of the park is predominantly aimed at providing passive and active recreation areas for activities like walking, dog walking, family gatherings, toddler play and informal play. hard surfaces and playing courts are limited to small plazas and tennis courts.

Planting will be dense and forest like with varied with heights, textures and colours. Palms will be used sparingly in the park in only one or two feature areas. trees have been selected for their beauty, colour and shade provision. Eatable trees will be included to ensure the ecosystem created attracts a variety of wildlife and allows residents to harvest fruits.

Although a relatively narrow landscape mounding will be used to flow naturally through the parks. Paths, shrubs and lawns will all pass through the gentle height variations.



Park lighting will be indirect light with up lighters on pavilions and feature trees, bollard lights will be added to ensure the primary path and rest areas are lit continuously.

road DS

The road network forms part of the fabric that creates the forest in Sobha City. Street tree planting has been prioritised to ensure both sides of the road have a continual canopy broken only by vehicle access to plots. The main roads also include a planted central median which allow for three or four rows of trees across the street section.

Shrubs and ground covers will be planted under trees to segregate pedestrian footpaths and the road area. Road reserves will be used for small pocket parks and roundabouts will also be landscaped to showcase Sobha's vision of a forest and identify the different districts.

Pedestrian crossings will be included at key nodal points with traffic calming measures implemented to allow for safe accessible movement through Sobha City. Crossings will predominately be on signalised junctions or on raised tables throughout the main roads, secondary roads will have level crossings but be clearly identified and lit. Connections to the schools, mall, parks from the residential areas through an intricate network used for recreation, walking and cycling will set Sobha City aside from other developments in Dubai.

Road lighting will be from light poles located along the side of the roads which will either spill light onto the pedestrian areas or a lower luminaire will be added to the column ensuring both the street and pedestrian paths are lit for safety and night use.

Irrigation Methodology

The design includes for an environmentally sustainable irrigation system that can be seasonally controlled to suit weather conditions and timed so irrigation occurs during off peak hours. Water will be sourced from Dubai Municipalities sewer network with one days storage on site. Soil additives such as Zeoplant will be added to retain water and reduce water demand by up to 50%. Mulch will be applied to planting areas to slow evaporation rates and aid in keeping the soil temperature down during hot summer months.



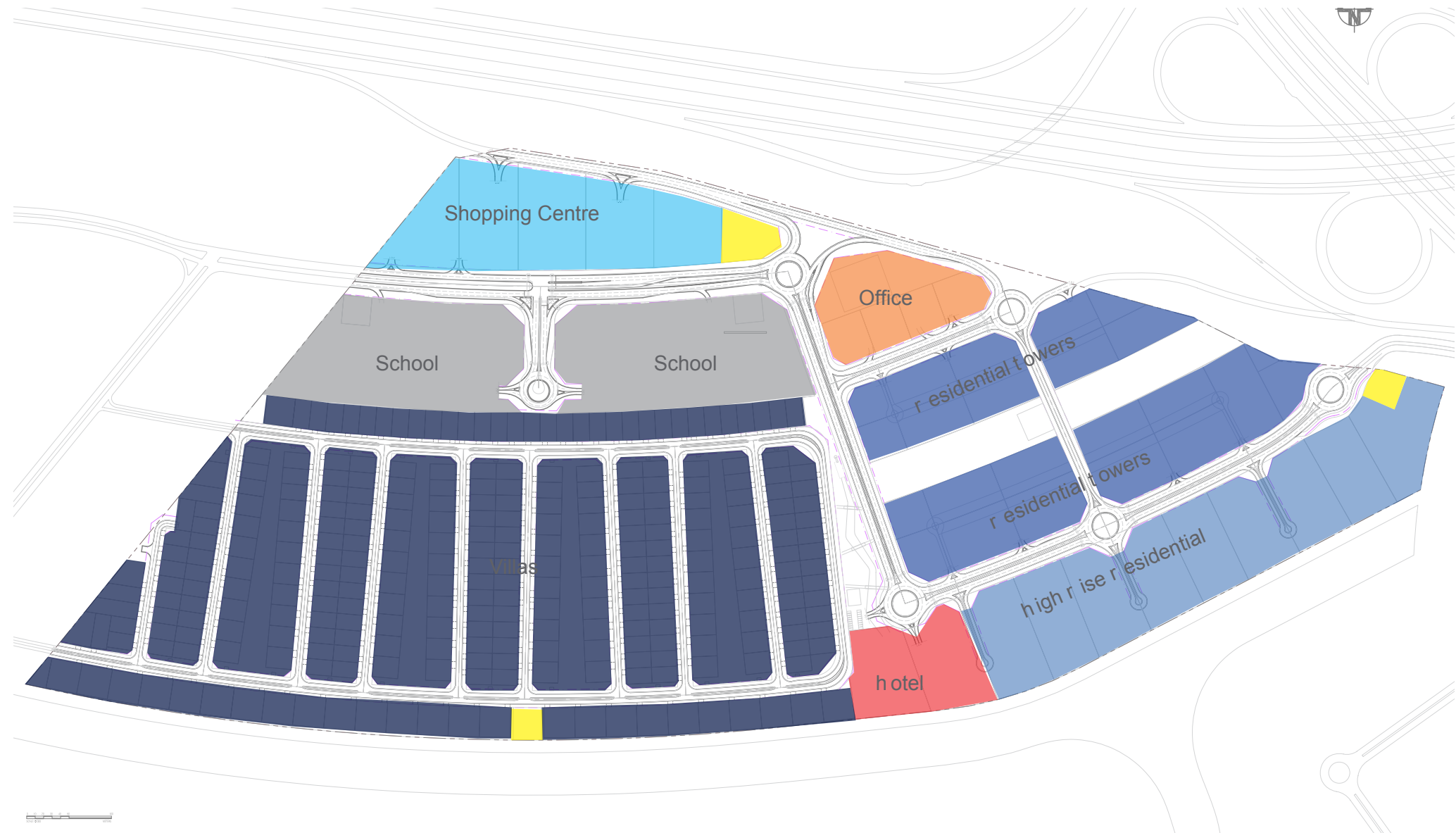
04# 03

Context

Existing Condition - Site analysis

as a mixed use development, Sobha city 's areas are defined based on each area typology e.g. residential, commercial, corporate, educational and leisure as well as low rise or high rise.

t here is a promenade designed next to the water in the south part of the city along the high rise residential towers, hotel, Luxury Villas.



LEGEND

- Villas
- r esidential towers
- high r ise r esidential
- Office Towers
- Mosques
- Shopping Centre
- h otel
- Schools

Urban analysis - iconic surroundings & Landmarks

Sobha City is located 4 kilometres from Burj Khalifa - the tallest tower in global scale - and is 15 minutes drive from Dubai airport.

Other landmark areas in the surroundings of Sobha City are :

- Meydan horse racing track and hotel
- Dubai Mall - largest shopping mall in Dubai
- Sheikh Zayed road, the main highway stretched along Dubai
- Al Khail road and Meydan roads newly constructed highways, adjacent to Sobha City
- Jumeirah Beach road, parallel to Sheikh Zayed road and stretched along the sea

Burj Khalifa



Meydan horse racing track



Dubai Mall



Sheikh Zayed road



Al Khail road



Jumeirah Beach road



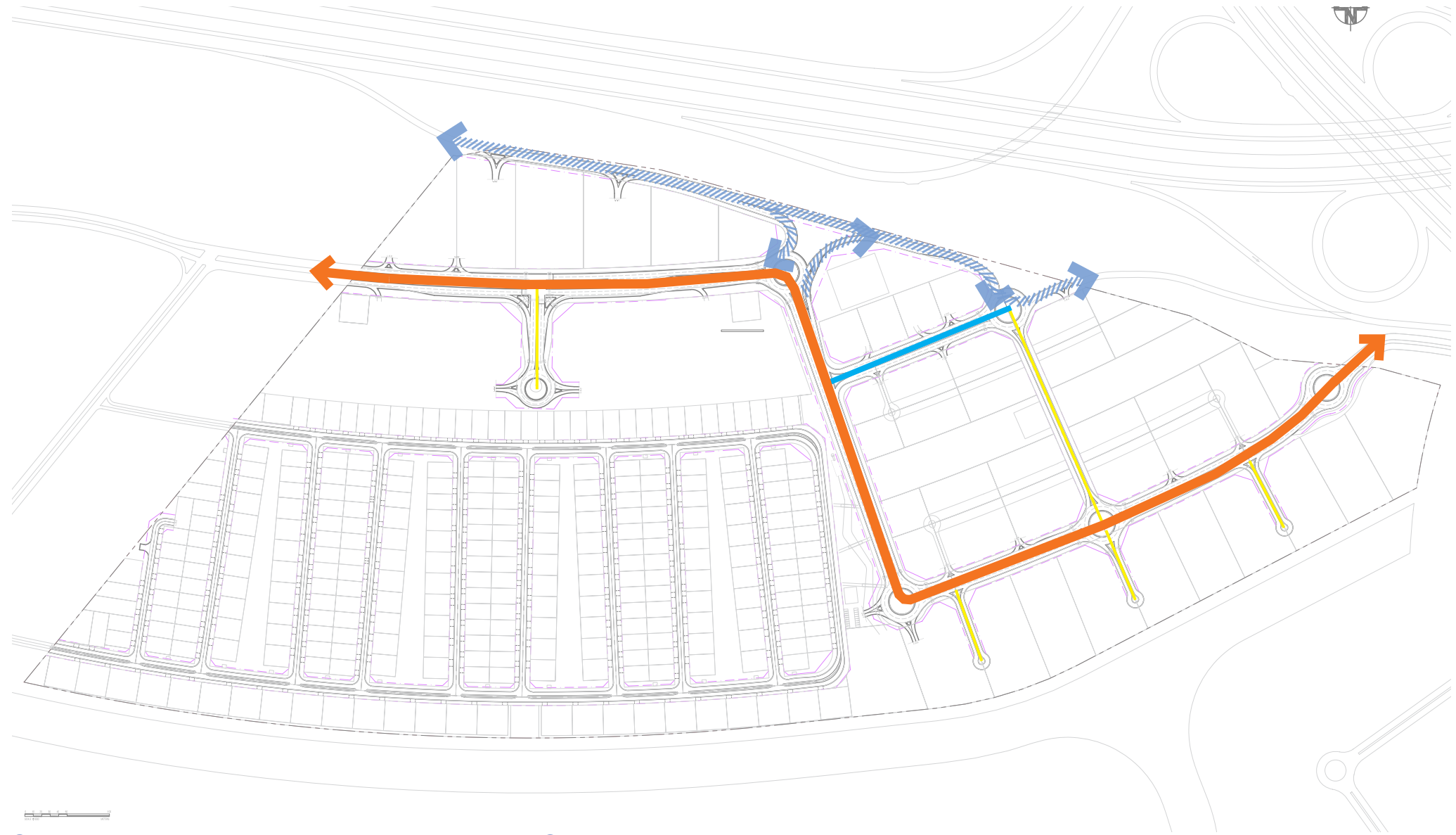
Meydan road



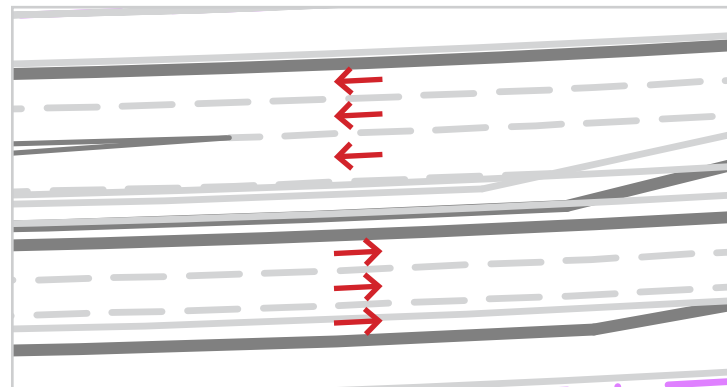
road network & Streets

as a mixed use development, Sobha city 's areas are defined based on each area typology e.g. residential, commercial, corporate, educational and leisure as well as low rise or high rise.

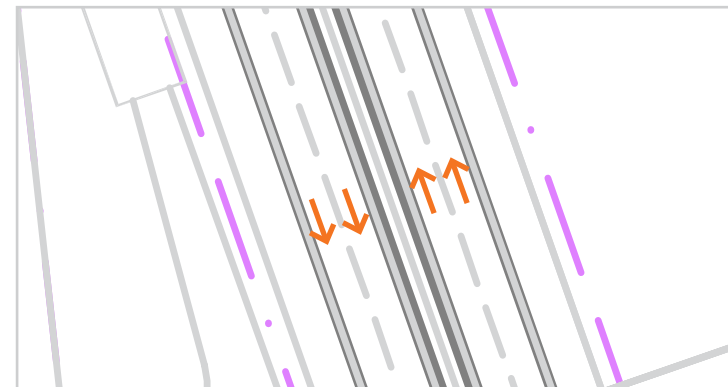
there is a promenade designed next to the water in the south part of the city along the high rise residential towers, hotel, Luxury Villas.



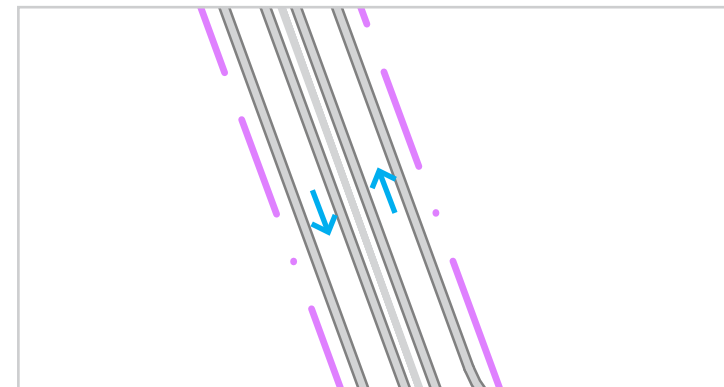
Avenue



Street



Street & Access Lane



LEGEND

- avenue
- Street
- Street & Access Lane
- regional access

Sobha City Development

Public green areas typology & City Park



Green Open Space Hierarchy

District Park



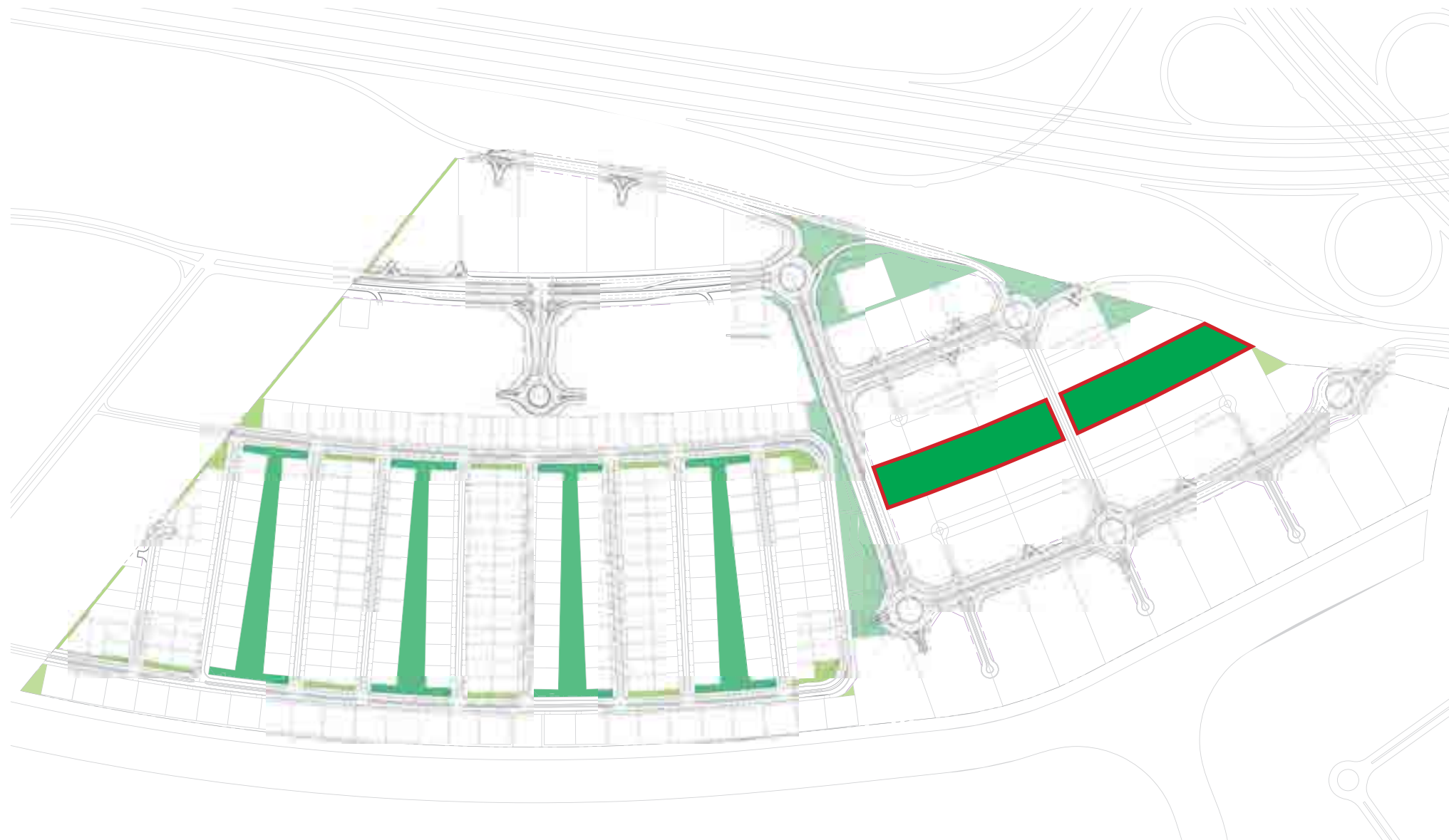
Community Park



Neighborhood Park



Open Spaces



Green space of Sobha city is defined in four types in accordance to their hierarchy within the city. Sobha City park is planned to be designed in a district level with facilities and areas covering the requirement of the whole Sobha city residents and visitors. On the other hand, the four linear parks are Community parks intended for the specific villa residents and their activities and gatherings. Neighbourhood parks would serve visitors as well as office towers employees. Open spaces are planned to be treated with lush vegetation.

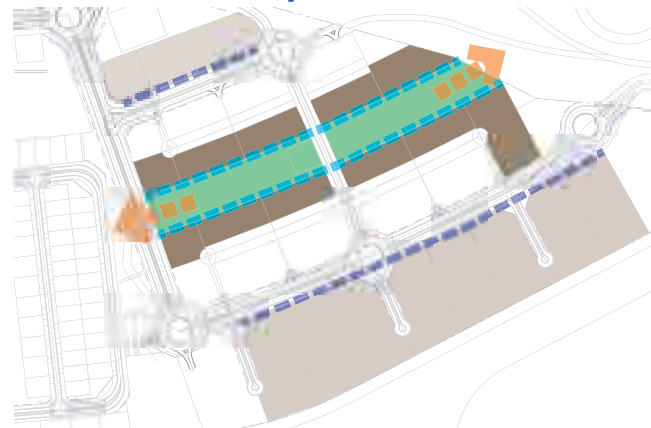
LEGEND

- District Park
- Community Park
- neighborhood Park
- open Spaces
- Site Boundary

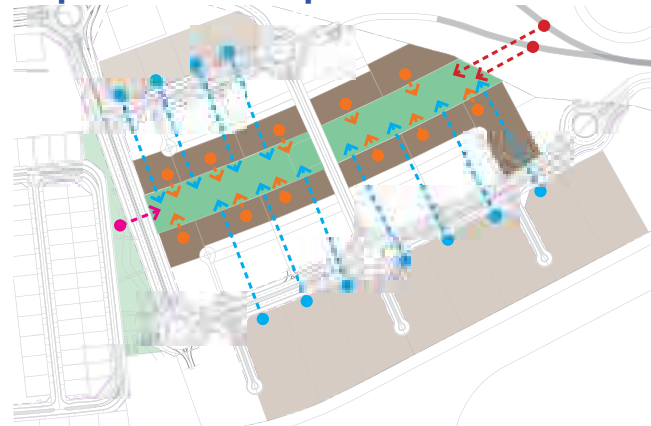
City Park Proximity

Buffer Zones : Walking Distance From Park

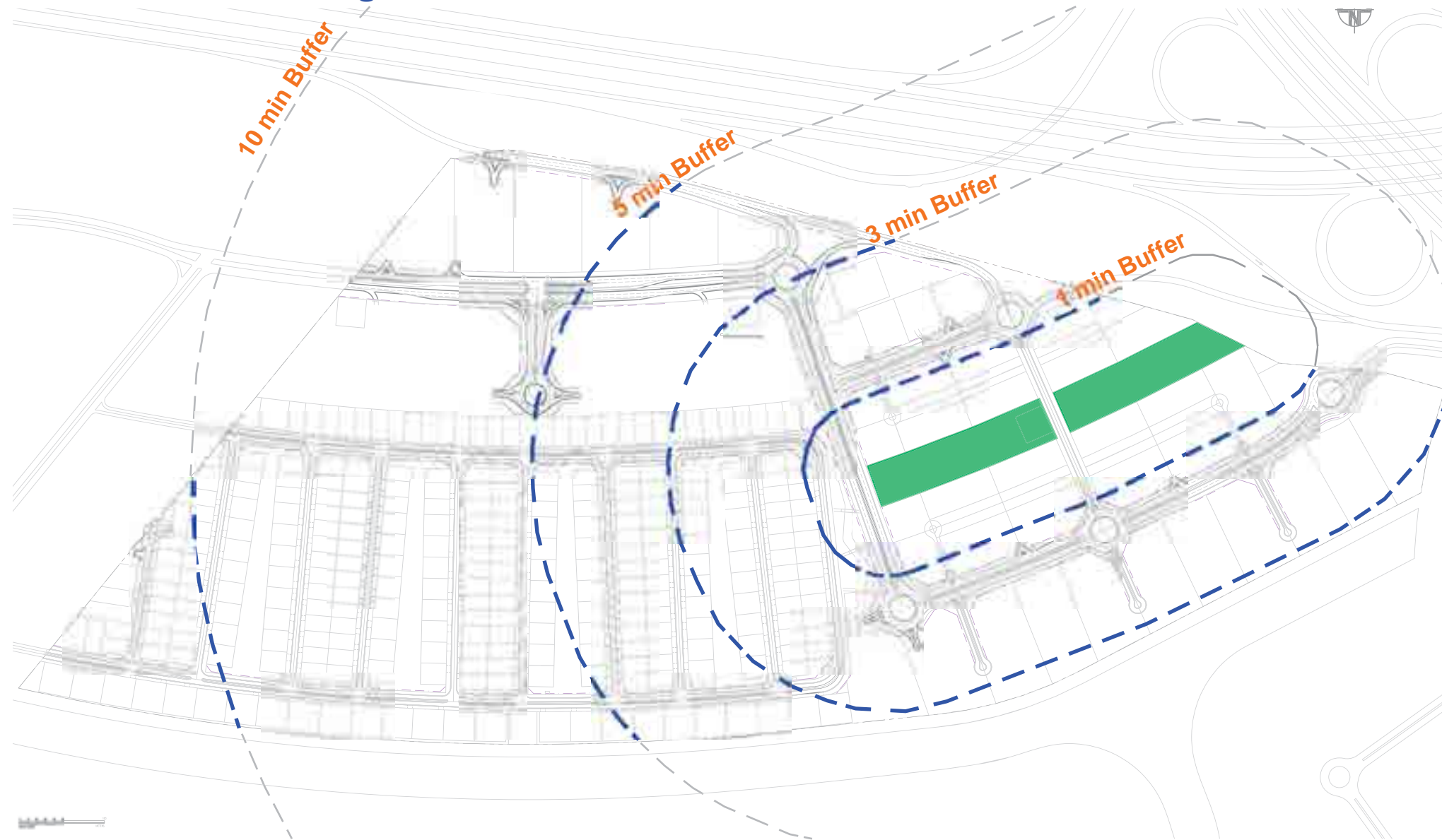
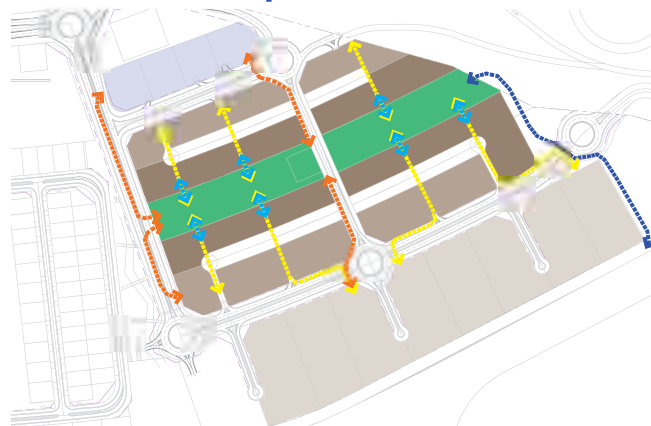
Views from the park



Exposure of the park



Access to the park



The city park is located in 1 minute distance from the residential towers with direct access for the tower residents, 3 minutes walk from the high rise residential buildings and office towers, 5 minutes walk from the schools shopping complex and most villas and approximately 10 minutes walk from the furthest villas.

Diagrams on the left, demonstrate direct pedestrian access and visual connections to and from the park.

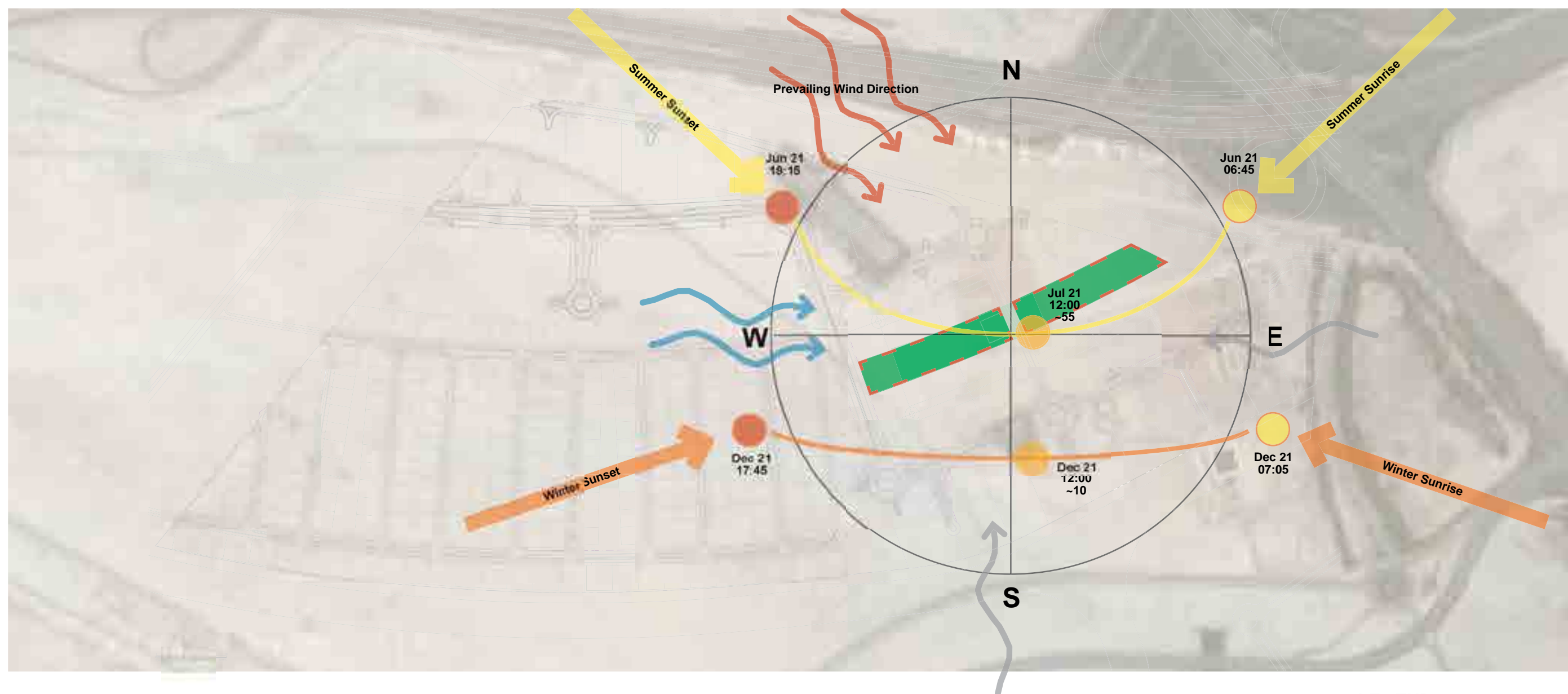
LEGEND

■ District Park
--- Time Buffers

Walkable Distance

80 m :: 1 min
 240 m :: 3 min
 400 m :: 5 min
 800 m :: 10 min

Environmental analysis - Sunpath & Wind



Environmental study of the area has been performed in order to provide Sobha city's public realm with suitable shade elements and walkable corridors protected from the harsh sunlight especially during the hot months of the year. However, wind plays a very small role in designing the public realm elements and corridors as sand storms occur very briefly and only during few days and the effect would be minor.

LEGEND

- Site Boundary
- Summer Sunpath
- Winter Sunpath
- Wind
- Prevailing / Summer Wind
- Winter Wind
- Sunrise
- Sunset

o verall Masterplan



Sobha City Development

Typical Building Blocks

apartments

apartments and villas of Sobha City are designed with a modern minimal style and a balance between modern and natural elements is evident in them.

Lush landscape has made its way into the apartments by the expansive windows allowing a visual connection with the unique nature outdoor and into the villas by the extension of the greenery into the courtyards.



VillaS



Design Framework

analysis Conclusion - City Park

Concept Development of Sobha City can be concluded as opportunities and Constraints to shape a framework to design the Concept for the Public realm.

The framework will guide us towards defining the design objectives. By assigning strategies to each objective we will be able to assign suitable strategies in order to fulfill those objectives.

Opportunities

Health Benefits

the Park will be within walking distance for the residents and employees of Sobha City and can be accessed by bike too.



Exposure

the Park can be viewed from all residential buildings and office towers facing it.



Constraints

Vehicular Access

the Park will not be accessible by car, however, in order to maximise public green space, no public parking space will be proposed in the design.



Comfort

the park will be protected from Dubai prevailing Wind by a shield of buildings. the wind direction and sun path study informs the orientation of the Park Elements to enhance the Environmentally Sustainable Design of the project. the site is relatively flat but opportunities exist to model the site as desired.



Access and Connections

the Park will be next to Sobha City Spine which forms a part of the wider pedestrian network of the development.



View

the view from the park is limited by buildings on both long edges.



imagining the Possibilities

features : a landscape balanced of Nature + Culture

Sobha City's public realm is planned to be a vibrant and lively place where the residents and visitors feel bonded and connected with the place and enjoy spending time in the outdoors.

In order to achieve a right level of amenities, a set of features and activities are proposed to fulfill the requirements of enjoyable parks and streets which are basic components of the city's public realm.

The proposed features are planned to shape a landscape balanced of natural and Cultural elements to provide right space not only for certain groups but for everyone.

The activities are intended to promote physical and mental health for the residents and visitors.



Lush green with lots of trees & greenery



Shaded areas



grassed picnic areas



Distinctive lighting elements



Space Maze



a little forest



Central piazza

activities : a leisure space for Sport + recreation



Children games



outdoor gym



Jogging track



Sport facilities for basketball, tennis & skating



Coffee kiosk



Play areas



BBQ areas



Events and parties place

Value Proposition

Sobha City Public realm is intended to be a rich Cultural and natural space and therefore, certain concepts have been thought throughly to add to the valuse of the public space.

Way finding and flow through the space is proposed not only by a signage system but also by anchor and focal points. Every element designed in the public realm must add to the identity of the city and promote it as a whole.

t he public realm would be a space for all regardless of their level of ability and cyclists with seperate pathways will flow thorough the city. t hese valuse in combination of sustainability considered for all the stages of design and construction would give a Unique image to Sobha City.

anchors & focal Points



Identity



Place Making



Connectivity & flow



Unique image



Sustainability



Design for Special needs



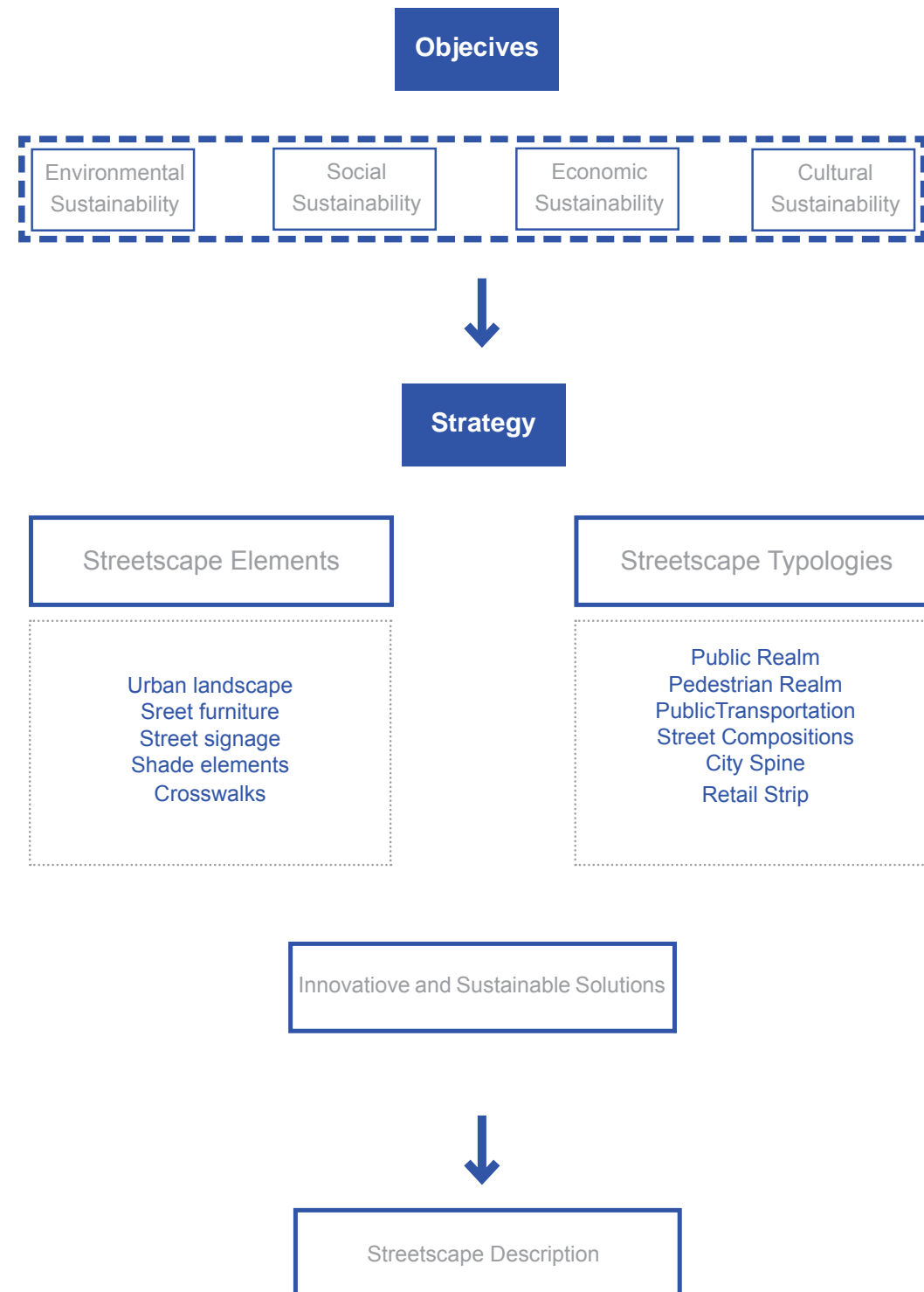
Public Space



access

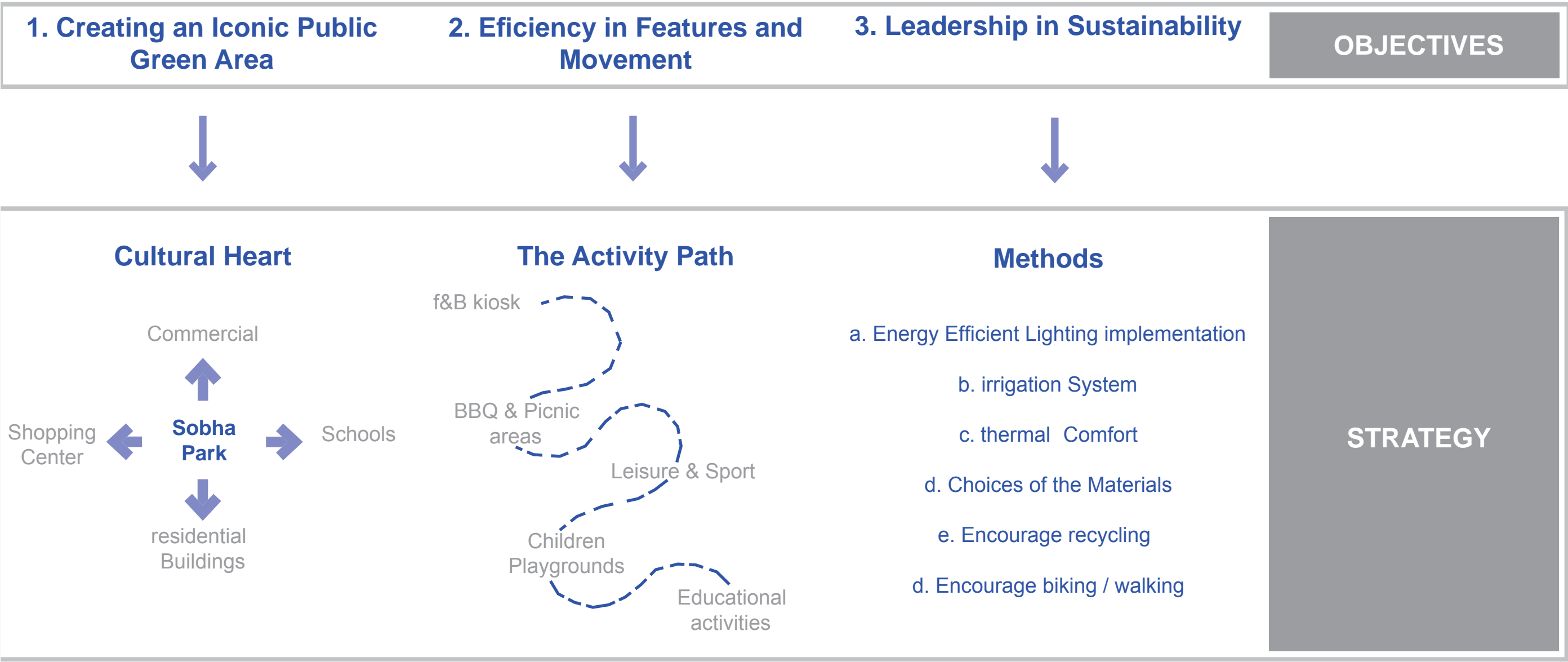






Objectives	Strategies
Environmental Shading Cooling Water management and conservation Energy Conservation	Shade trees, green canopies Shade elements and structures Intelligent plant selection Water sensitive design Modular concrete pavements Selection of the materials
Social Place making Streetscape facilities Streetscape activities	Activating the City Spine & Retail Strip Meeting points Walkable streetscape Safety considerations
Economic Water sensitive design Energy Conservation	Activating the City Spine & Retail Strip Water sensitive design Selection of local materials and plants
Cultural Sobha City branding & Identity promotion Outdoor cultural activity and vitality Promotion of cultural diversity	Signage designs Link between attractions Provide space for cultural activities Selection of heritage plants

City park



this Path is there to connect, engage and activate the users and inhabitants of the SftP . it folds itself through the green path allowing for a journey through the site.

Sobha City Public realm is shaped of two components:

- the Streetscape
- the City Park

City Spine

In order to activate the streetscape, we may start by defining the primary axis of the city by locating the anchor points. In accordance to the area analysis diagram we can define three major anchor points:

- Shopping centre
- City Park
- hotel

The axis can be obviously shaped by connecting the three major anchor points. The defined Spine can be treated as a shaded corridor and be activated with Meeting points e.g. street cafes, a retail strip.



Shaded Corridor



Retail Strip



Meeting Points e.g. Street Cafes



LEGEND

- Main City Spine
- Meeting Points
- Public Green
- Commercial and Entertainment
- Leisure
- Mosques
- Shaded Corridor

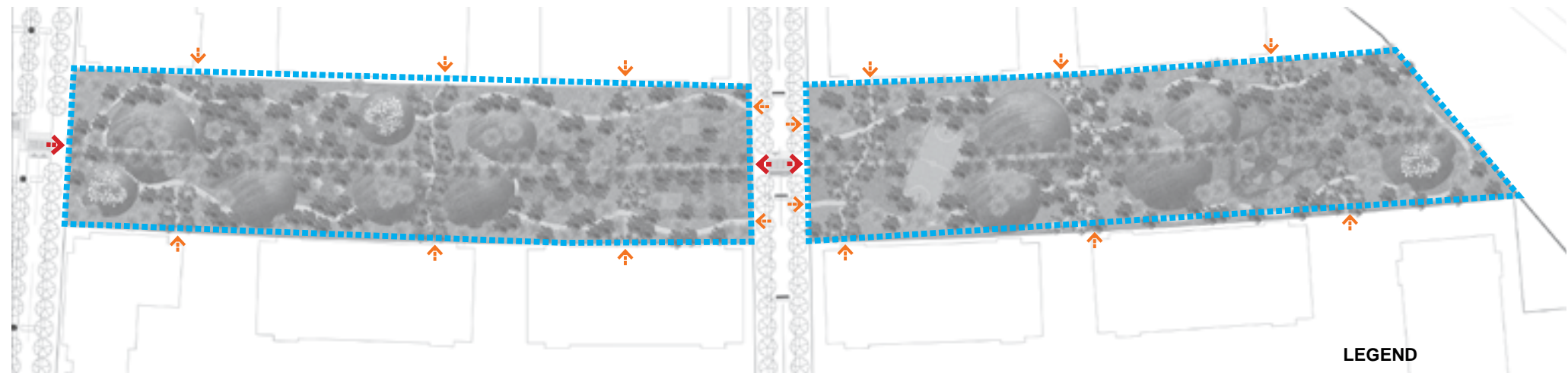
City Park

Sobha City Park will be designed as a secure area with a full perimeter fence which will be accessible by primary gates from the street and secondary gates from the surrounding apartment buildings.

The park will have a natural theme with lush landscape similar to an urban forest which will be reflected in design of the elements and facilities as well.

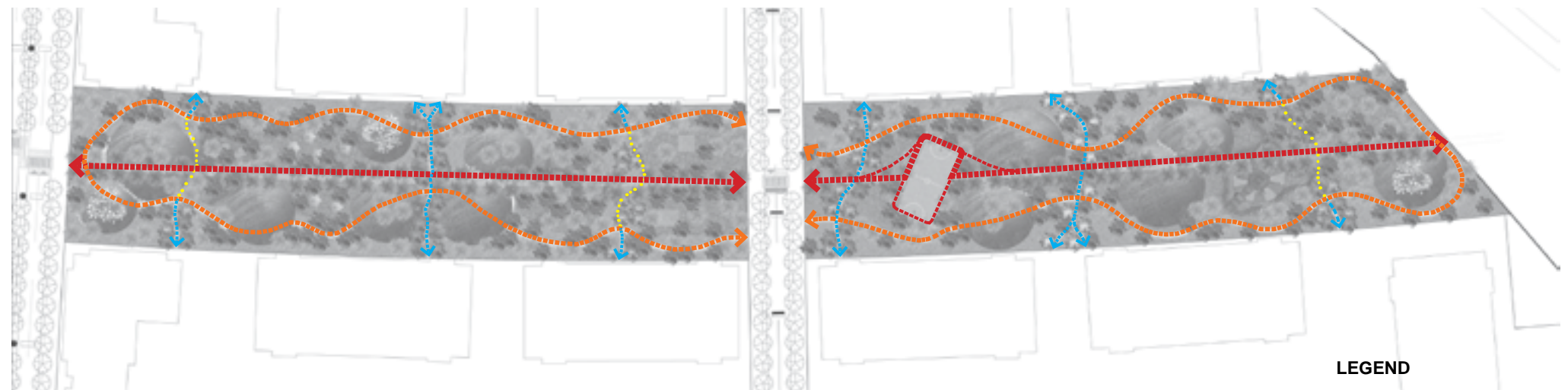
There will be a primary pathway connecting main gateways as well as different areas of the park e.g. BBQ area, playgrounds, MUga ,... with straight quick access through the park. The secondary pathway will have a more organic shape going up and down on mounds intended for a pleasant jogging/walking experience. Tertiary pathways will be intended to link the secondary gateways to the secondary pathways.

The hardscape will be clay pavers to serve for both natural theme and sustainability.



LEGEND

- Perimeter Fence
- Main Entrance
- Secondary Entrance



LEGEND

- Primary Walkway
- Secondary Walkway
- Tertiary Walkway
- Informal Walkway

Identifying the Pedestrian Network



LEGEND

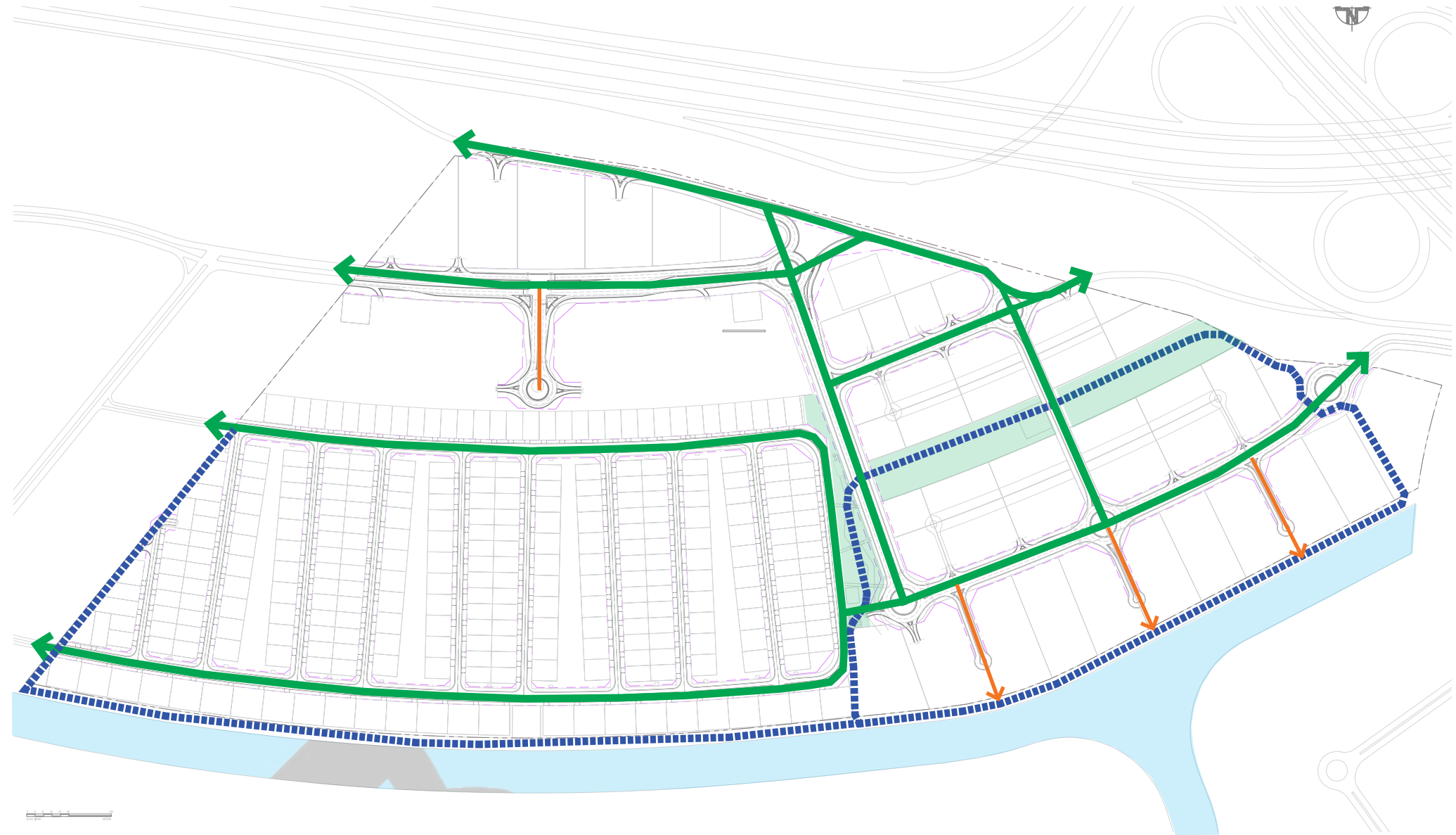
- Primary Network
- Secondary Network
- Mosque

Sobha City is designed to be walkable by a network of shaded pedestrian pathways. There is an exercise track along the promenade which continues through the city park. Bicycle network is designed along the whole primary pedestrian network.

Pedestrian Lane



PEDESTRIAN REALM - NETWORK & CIRCULATION



Bicycle Lane



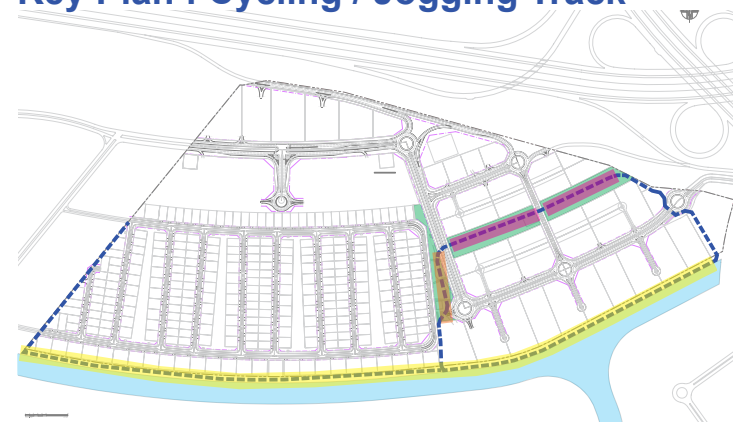
Exercise Track



LEGEND

- Regional Ped/Bike Links
- District Exercise Track
- Neighborhood Ped Links

Key Plan : Cycling / Jogging Track



LEGEND

- Seperate Track through the Park
- Seperate Track through the Green Area
- Track combined in pedestrian way

Ex Er CiSE t ra Ck - Bi Cy CLE St an DS



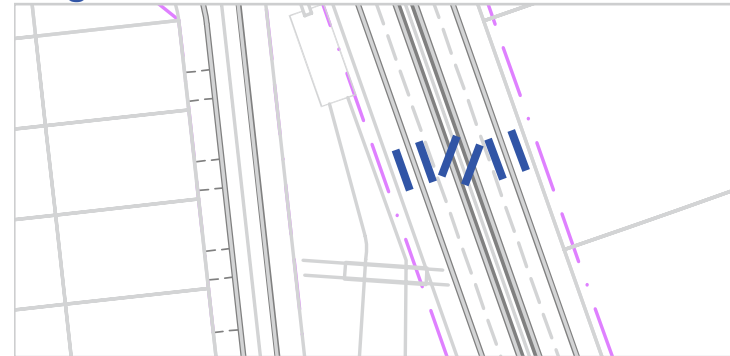
t he exercise track is paved by rubberized material. t here are bicycle stands throughout the track and in the nodes. Another bicycle stand is defined next to the shopping mall with options of parking or renting bikes.



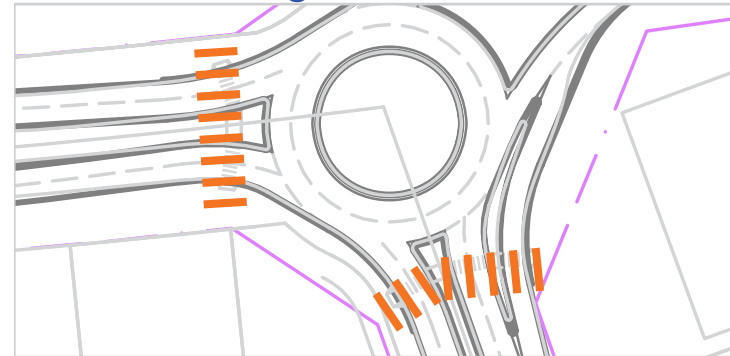
LEGEND

- Bicycle Stands
- District Exercise Track
- Public Park
- Water Canal

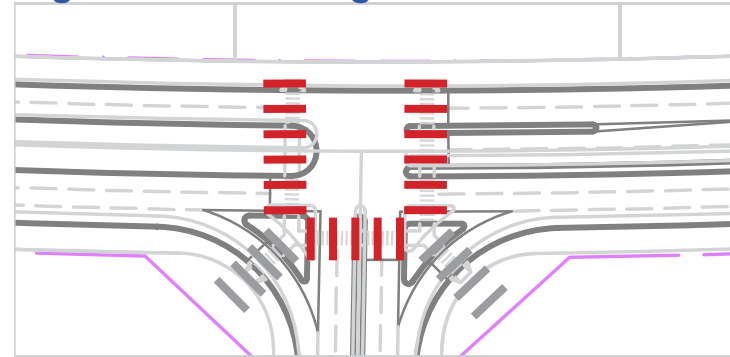
Angled Cross Walk



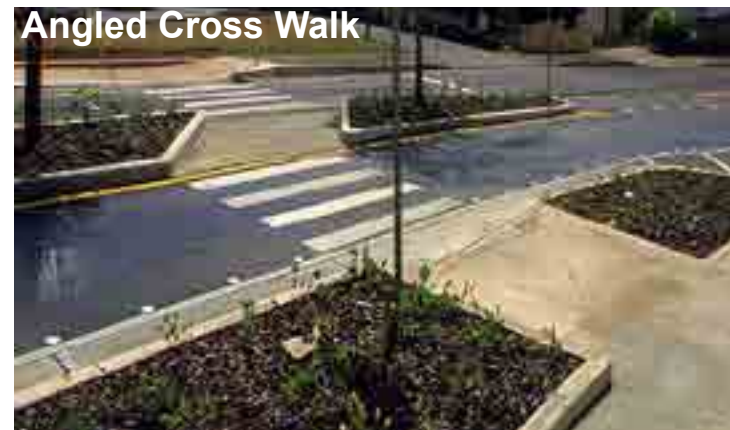
Raised Crossing



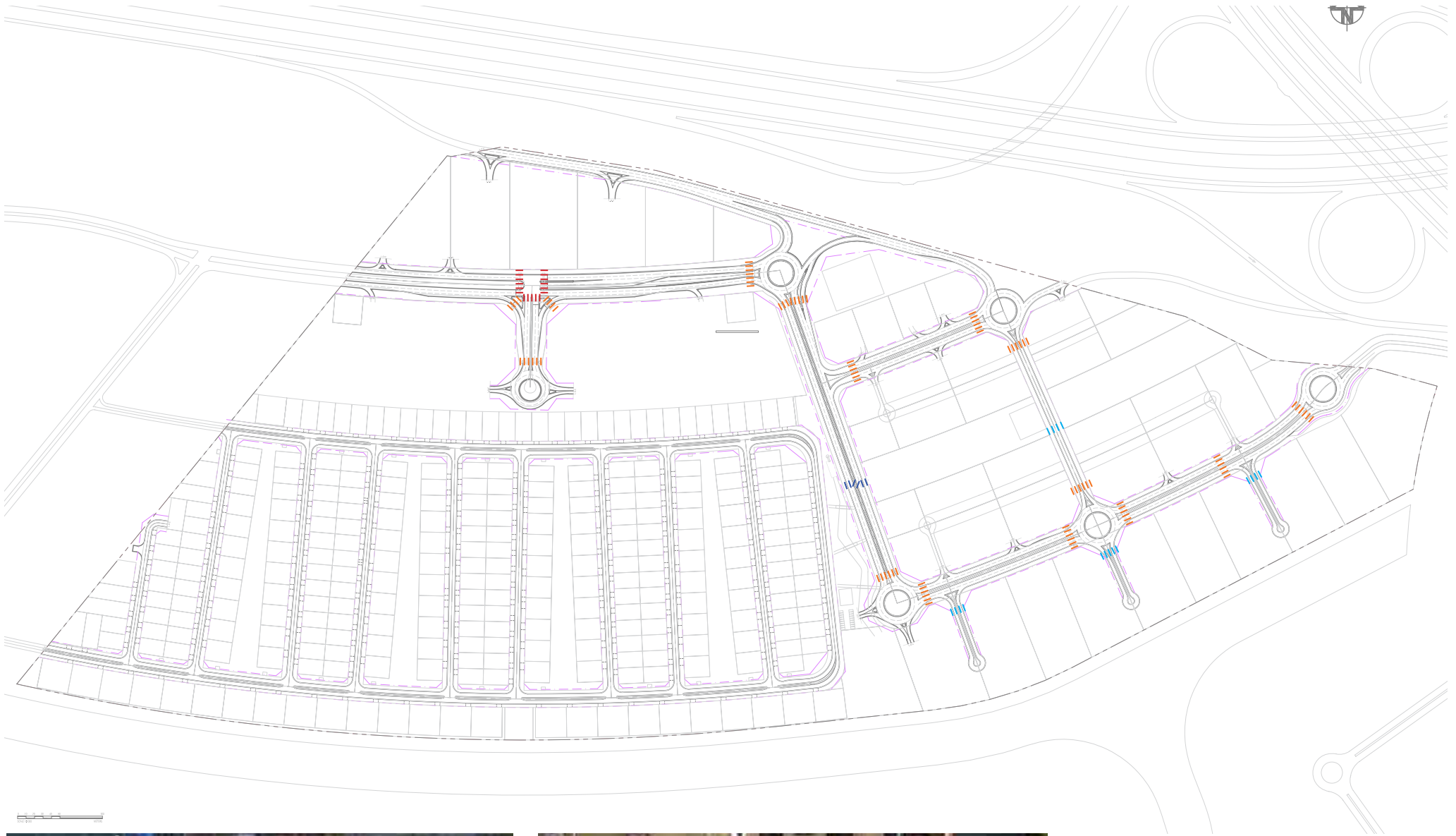
Signalized Crossing



Angled Cross Walk



PEDEStrian rE aLM - Cro SS WaLk S



Raised Crossing



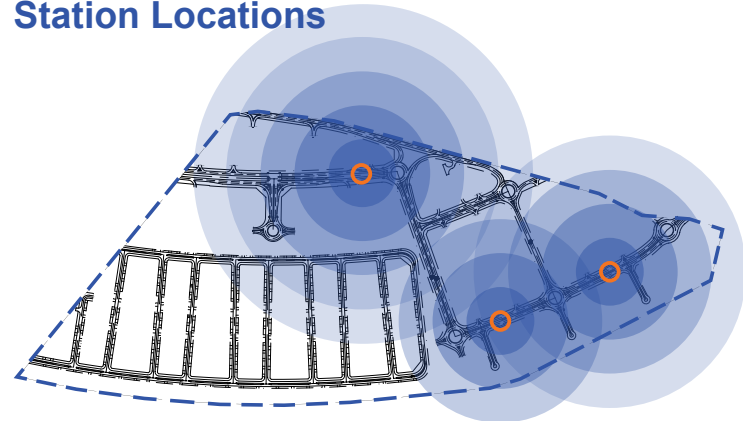
Signalized Crossing



LEGEND

- Crosswalk
- Angled Crosswalk
- Raised Crossing
- Signalized Crossing

Station Locations



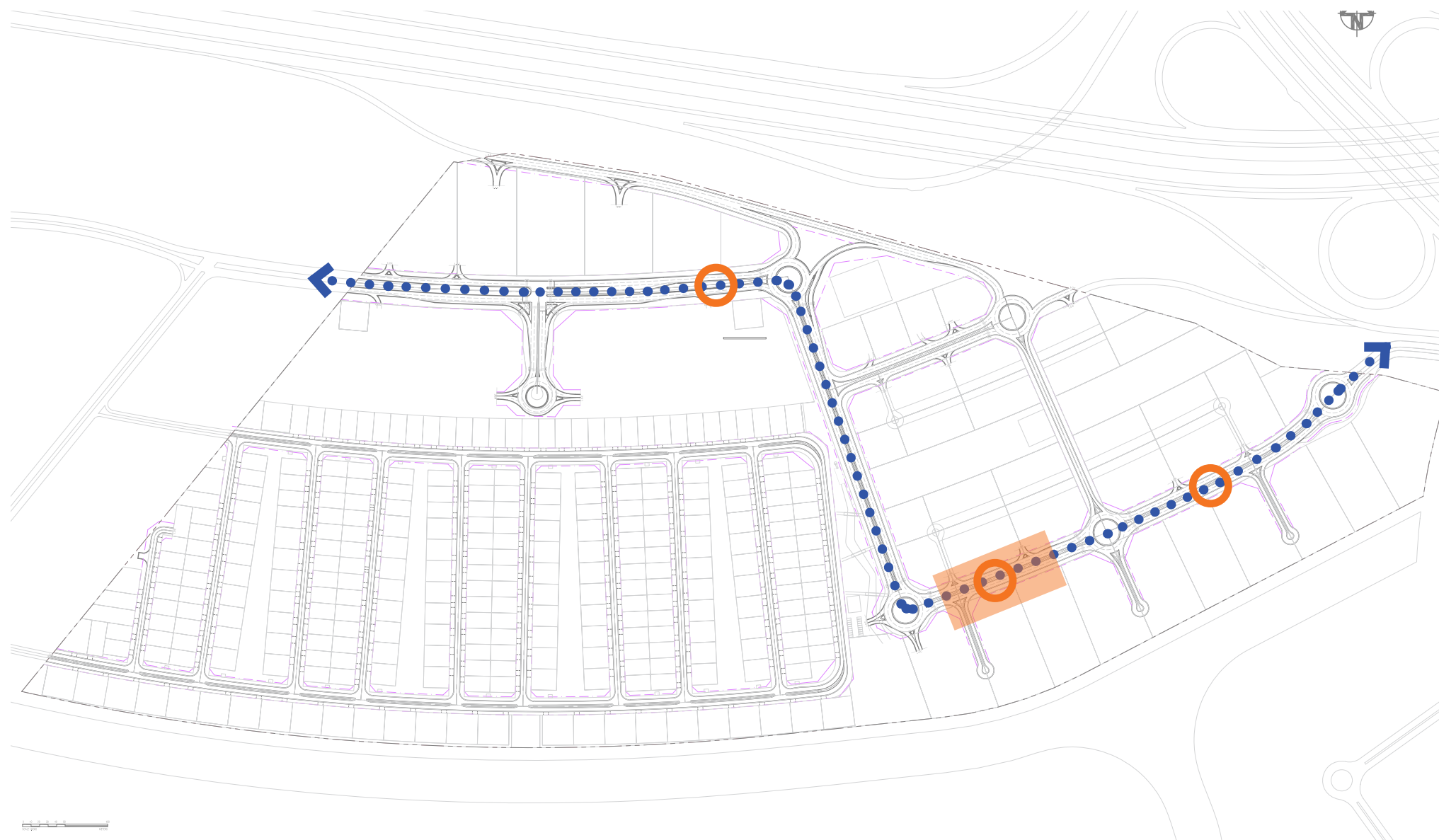
Walkable Distance

80 m :: 1 min	—
160 m :: 2 min	—
240 m :: 3 min	—
320 m :: 4 min	—
400 m :: 5 min	—

Public transport route is stretched along the City Spine - to connect the primary nodes; shopping complex, park and hotel - and is extended towards the Sobha city's entrance/exit gates from both ends.



PUBLIC t ran SPor t - BUS Station S



Scale bar

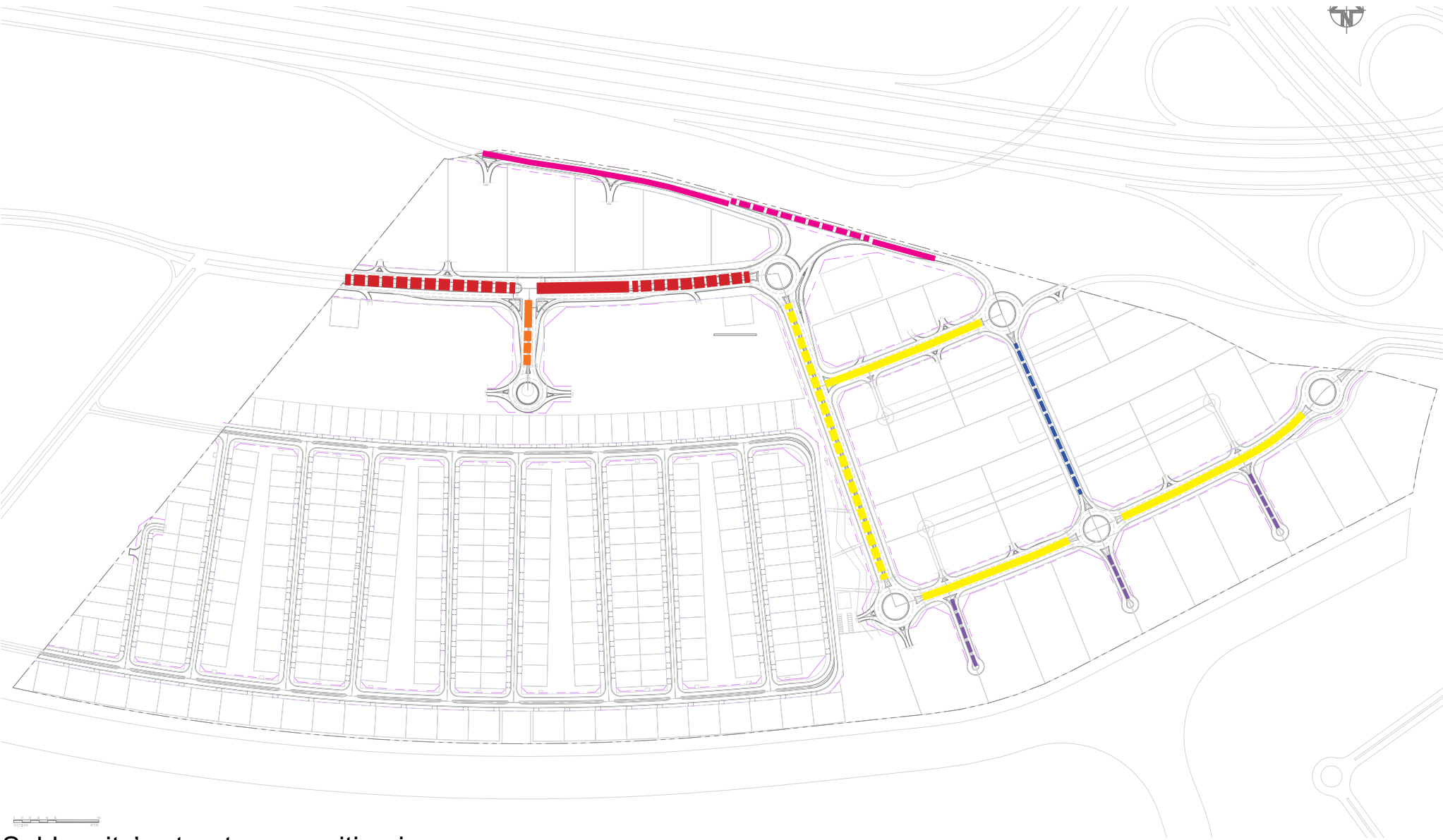
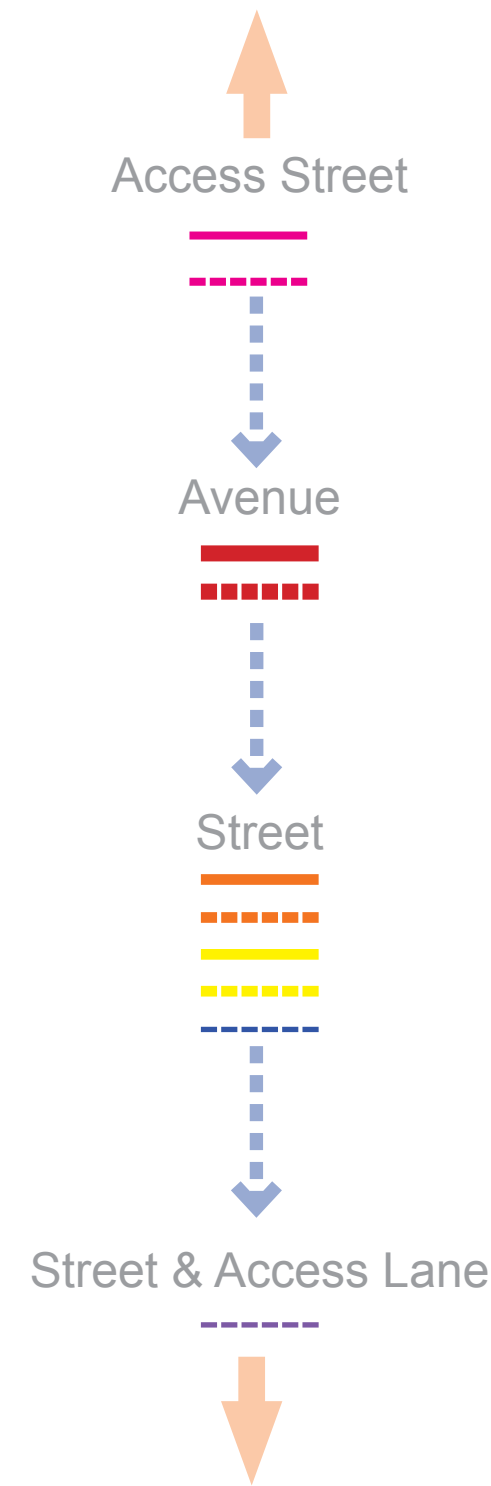


LEGEND

- ● ● ● Bus Route
- Bus Stops - Option 1

Streets Composition

Higher Vehicular Density



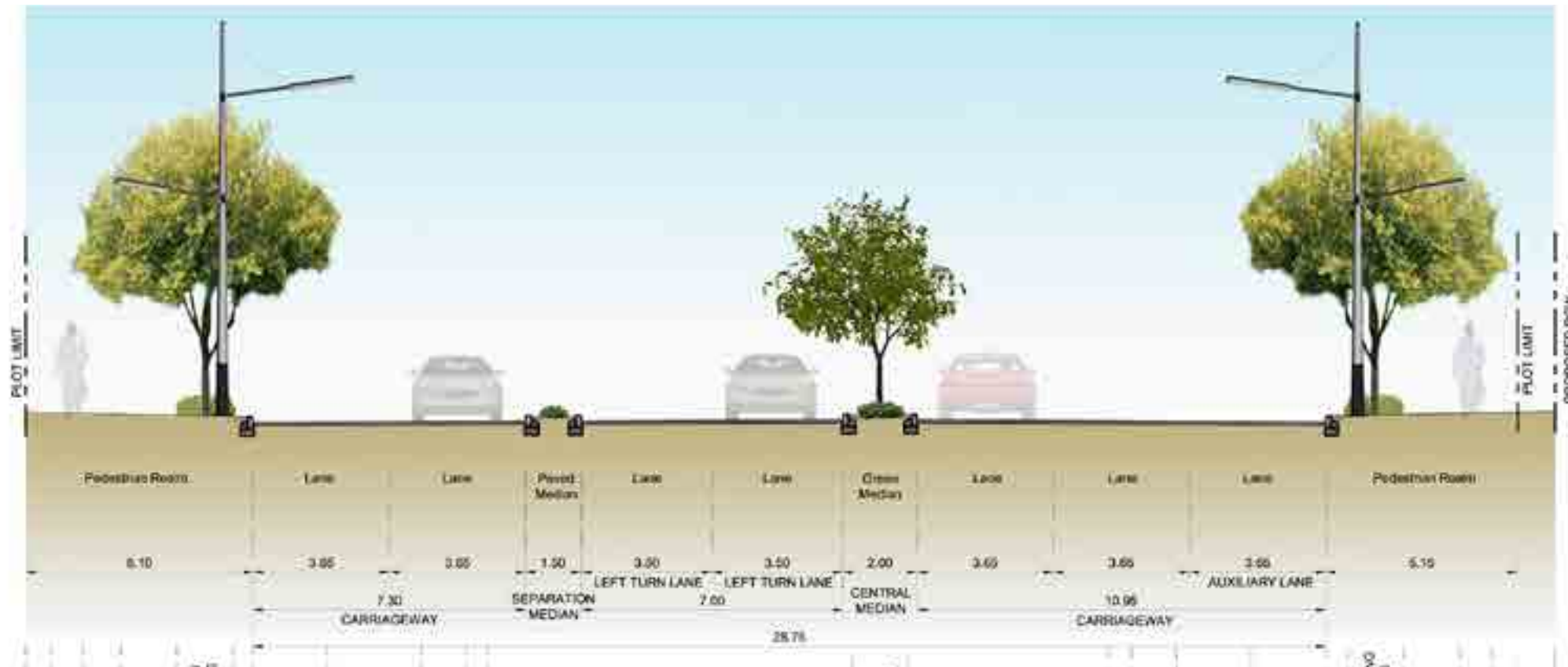
Sobha city’s street composition is desined based on traffic prediction and capacity required for each road specially in rush hours.

The hierarchy has been defined on the left and street types by colors. Each col-or would communicate with its relavent street section.

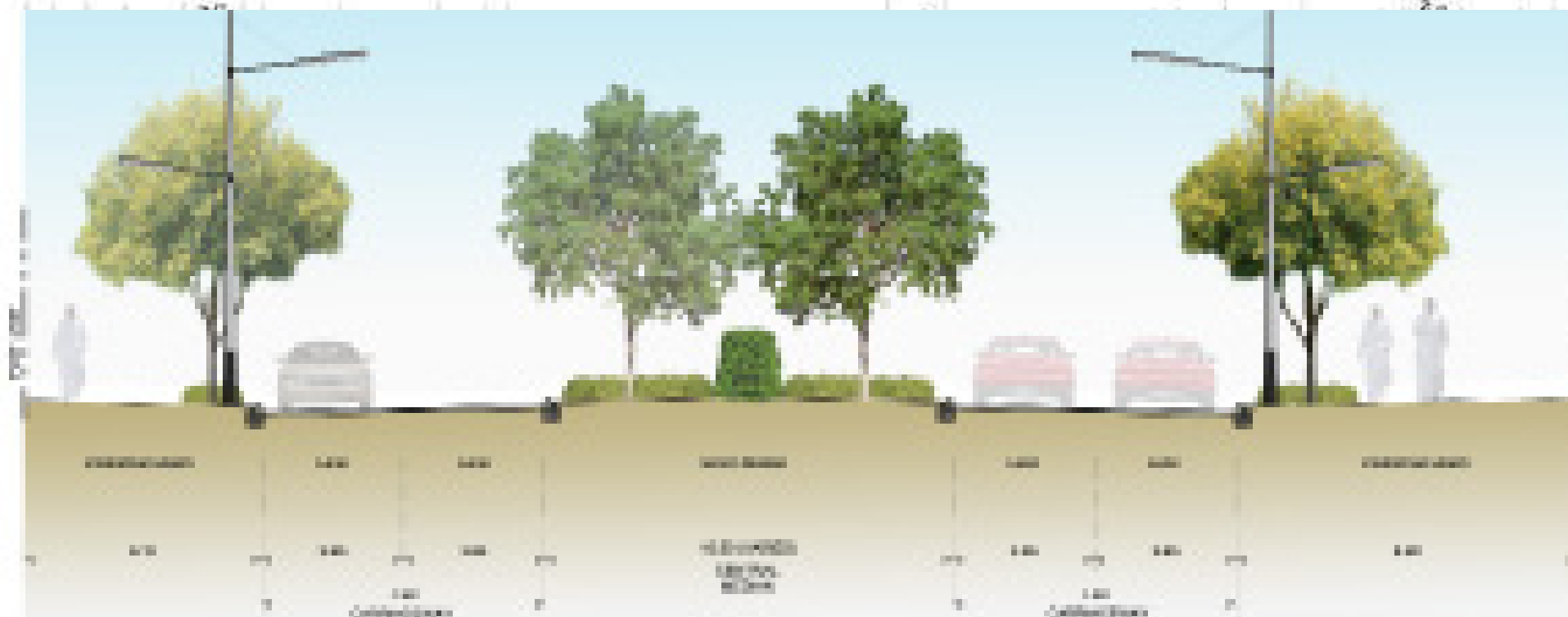
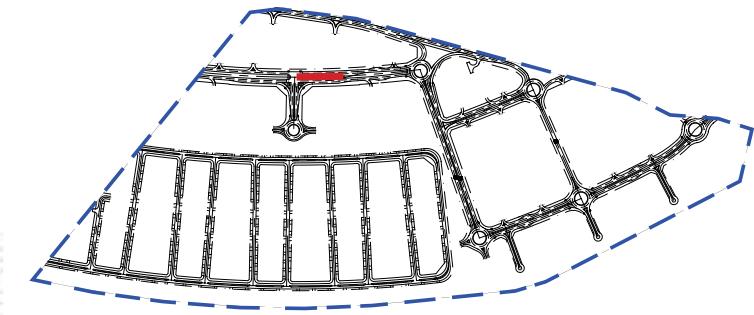
LEGEND

- | | |
|---|--|
| —— Type A | - - - - Type C1 |
| - - - - Type A1 | - - - - Type E1 |
| —— Type B | - - - - Type F |
| - - - - Type B1 | —— Type H |
| —— Type C | - - - - Type H1 |

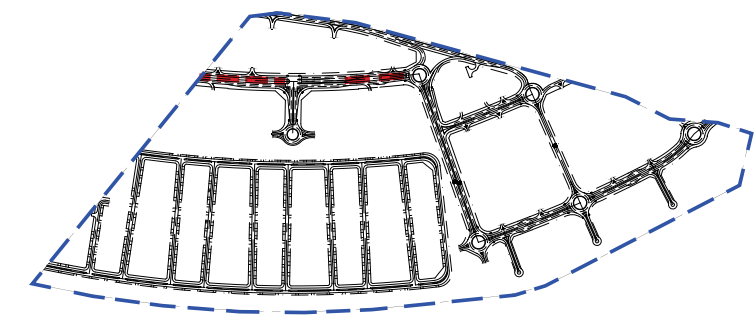
Typical Street Sections



Key Plan - Type A



Key Plan - Type A1



Examples of street sections are added here. These sections communicate with colors - type a with red and type a 1 with orange - on the key plan.

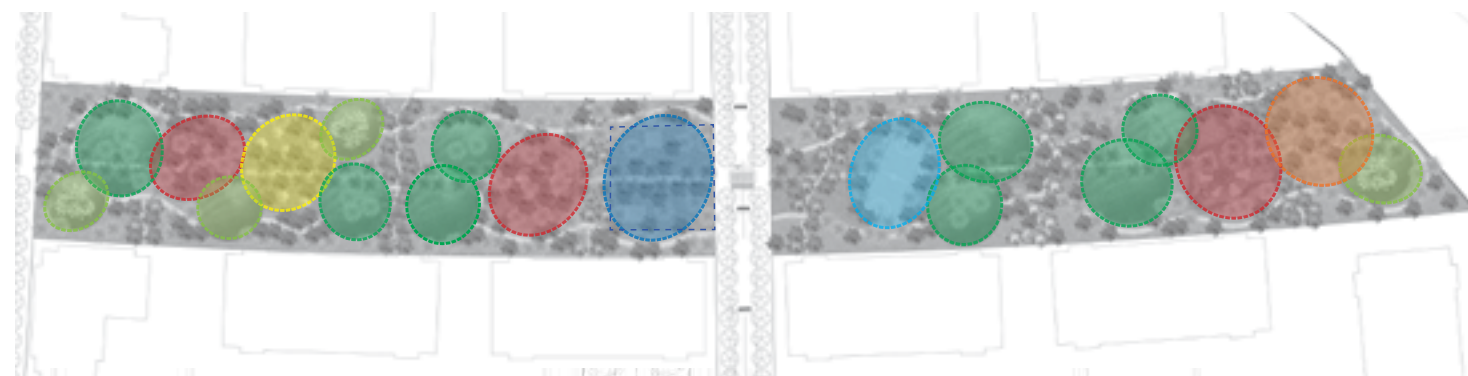
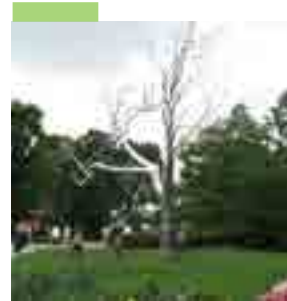
City park Design

Sobha City Park is designed with passive and active areas.

The base theme of designing the park is mounded lawn which is spread all over the park. In some areas the jogging track moves over the mounds to make the experience more natural and pleasant.

Active areas are consistent of a variety of activities such as playgrounds, BBQ areas, Community gathering areas, MUga (multi use game area).

Passive areas are mainly grassed lawns where visitors can have picnics or kick a ball.



LEGEND

- Mounded Lawn
- Feature Element
- Playground
- Sheltered BBQ Area
- Coffee Kiosks / Community Gathering
- MUga
- Grassed Picnic Area
- Temporary Landscape





05#

ANALYSIS

05#⁰¹ Sustainability Analysis

05#⁰² Sustainability Comparison

ANALYSIS

Sustainability Analysis

Case studies 'A', 'B' & 'C'

SUSTAINABILITY IN MASDAR CITY

Masdar City is an emerging magnet for talent, financial capital and entrepreneurship in the renewable energy and technology field. “The ground-up approach that Masdar City has taken to ensure a sustainable and enjoyable way of life for residents demonstrates that environmental responsibility need not be a hardship.” (Sustainability in Masdar, 2013) During the design process, the plan for Masdar City has been adapted keeping the main principles of sustainability, and closer studies on its public spaces required.

ENVIRONMENTAL SUSTAINABILITY

ENERGY CONSERVATION - “The city is designed to maximize convenience and reduce environmental impacts. Nearly all of the electricity in Phase 1 is offset from a 10MW solar photovoltaic plant and an array of building-mounted solar panels, reducing the need for power produced by fossil fuels.” (Sustainability in Masdar, 2013)

WATER MANAGEMENT AND CONSERVATION - Fundamental to the role of Masdar City is, of course, the notion of living sustainably. To this extent we also embraced sustainable design measures in all aspects of the landscape design. This takes the form of innovative water conservation and irrigation systems, reed bed wastewater treatment systems and careful selection of low water consumption plant materials for arid zones. Taking into account further principles of sustainability in the region, public realm of masdar city has been designed demonstrating low amount of greenery and water features. Treated waste-water that is recycled for plant irrigation ensure water conservation. (Sustainability in Masdar, 2013)

SHADING AND COOLING - Although the region offers a moderate weather for about 7 months of the year, however, shining Sun throughout the year make it a main objective to design a walkable public realm. The objective has been taken into consideration by providing shaded pathways, by shade trees or shade structures, along all primary pedestrian pathways and main city spine, in an aim to encourage the residents to walk instead of using private motor vehicles which is the primary method of movement in the region. Apart from the environmental benefits, this would also promote health benefits.

LOW CARBON MATERIALS - clever use of higher performance low-carbon hard landscape materials such as e-concrete pavers and biobrick retaining walls.

SOCIAL SUSTAINABILITY

Social sustainability in terms of offering a holistic living environment has been a fundamental component in design-

ing masdar public realm and urban landscape. “A mix of educational and recreational spaces, along with housing, retail, manufacturing and office spaces allow commuters and residents to find everything they need close at hand, reducing transport needs.” (Sustainability in Masdar, 2013)

IDENTITY - Each area of designed public realm has distinct character, program, and identity that differentiates from the rest of the site. The zones for land use are divided into four categories of Corporate housing, Academic (MIT), Business (Commercial activity) and Residential. Distinguishing each area to have a single focal point, allows for efficient division of densities. Cultural aspects are of high importance in designing masdar city and to promote Emirati landscape, selection and arrangement of soft and hard elements have been considered during the design process to reflect culture and heritage of the region.

PLACE MAKING - To ensure a viable and vibrant public realm experience, range of activities and facilities has been assigned to add values to the outdoor open space by public space programming such as gathering places and meeting points, outdoor public cinemas, public art locations, food and beverage outlets, retail strip, playgrounds. Activities in the open space affects mental and physical health as well as helping to enhance local community making and sense of belonging to the area.

ACCESS - Without way finding strategy, public realm may become confusing for visitors or even the community residents which will reduce motivation to use the outdoor space. Allocating public centers, city spine and green fingers play major role in way finding strategy of the city. Way finders are distributed in various manners along a path that will always lead you back to a focal point – In this case, the MIT and the MHQ. Each proposed pedestrian pathway can have an element that acts as a guide/way-finder along that connecting path. The elements are suggested to be types of vegetations, selection of hardscape or urban elements.

ECONOMIC SUSTAINABILITY

Designing the low-carbon development has played an integral role in transforming Abu Dhabi's economy from oil to a knowledge an innovation.

MATERIALS SELECTION - During the design process we have been strongly encouraged by masdar to specifying recycled products and regionally available products.

LOWER AIR CONDITIONING EXPENCES - The region demands high usage of air conditioning as a result of its climate and high temperature in warmer seasons of the year.

Buildings are designed to be densely populated, allowing for living and working in the same location. This will ef-

fect the public realm as reduces heating, cooling and internal transportation needs. “Streets maximize shade all day long, capturing cooling breezes, and reducing the need for air conditioning.”(Sustainability in Masdar, 2013)

LOWER WATER CONSUMPTION EXPENCES - Although adding to the project estimated budget in initial phases, however, water management strategies, in terms of water recycle/reuse and irrigation methods, suggested for masdar city and solar panels ensure economic sustainability in the long term.

SUSTAINABILITY IN AL BATEEN WATERFRONT

Al Bateen Wharf, the development at the longest-settled area of Abu Dhabi Island, is intended to serve the community and pay tribute to generations of fishermen who have worked there. In recognition of its importance to Abu Dhabi heritage, Al Bateen Wharf was expecting a design taking account high measures of sustainability.

The design was prepared in line with the sustainability regional guidelines fulfilling the credit requirements, then provide supporting information to demonstrate that the requirements have been met. This was prepared in conjunction with the preferred contractor to ensure sustainability goals are achieved and budget aspirations are met.

A multidisciplinary professional team has been appointed to ensure the design process attains a greater synergy between project systems, resulting in high performance community. The buildings are predominantly designed as shell and core structures, with final fit out to be the care of each individual tenant. A comprehensive tenant fit out manual will be developed to ensure the vision of sustainability is maintained through construction, commissioning and during operations & maintenance.

Follwoing describes in brief the project’s strategies to address the key credits of public realm sustainability.

ENVIRONMENTAL SUSTAINABILITY

NATURAL SYSTEMS - The site is located on the coastline on reclaimed land. During the Marina excavation, a flushing culvert was installed to connect the East and West Bays which improved water circulation and quality. The quay walls create marine habitat la sessile organisms which in turn attract fish and other marine life.

PRECIOUS WATER - Irrigation water has been reduced to under 2L/m²/day through the use of an efficient irriga-

tion system and selection of appropriate low water demand species grouped in similar usage to ensure maintenance is efficient.

RESOURCEFUL ENERGY - The principle objective is to define equipment performance and provide passive solutions for limitation of heat gain.

SOCIAL SUSTAINABILITY

LIVABLE OUTDOORS - The marina promenade is promoted as a pedestrian and cycle friendly environment with views over the marina and shaded walkways connecting to the restaurants. The central plaza will provide the community with a gathering space and is activated with play, encouraged with an interactive water feature. Bicycle parking and associated shower facilities will encourage staff and marina users to alternative transport along with nearby bus routes and electric car charging points.

LIVABLE OUTDOOR - Considering heat reduction requirements of the region, light colored materials which reflect the heat in a higher rate have been suggested for the selection of the hardscape. Primary pathway have been connected with shade trees to ease access for pedestrians and cyclists. Detailed shade study have been conducted to ensure walkability and cycling possibility of the shaded pathways all your round.

IDENTITY - As longest settled area of the city of Abu Dhabi, design of public realm of Al Bateen has been inspired by its heritage of dhow building tradition, fishermen and pearl fishing. During the design process, there has been special attention paid to the identity aspects and would revitalize this place keeping its old identity.

PLACE MAKING - The marina has been designed with facilities and amenities for different groups of people. Typology of F&B outlets has been selected carefully to satisfy a full range of visitors. The redevelopment process will be in consideration of providing better facilities for the fishermen who are the primary users of the marina.

ACCESS - All Outdoor Areas are connected with a network of shaded pathway.

UNIVERSAL ACCESS - in design of Al Bateen people with all levels of ability have been taken into account. All entrances and exits to or from the buildings or to the public realm as well as all pathways, connections and ramps are accessible for everyone regardless of their level of physical ability.

ECONOMIC SUSTAINABILITY

MATERIAL SELECTION - Our focus in 'Stewarding Materials' is to improve waste management both in construction and future site operation. In support of this primary focus, the design of material elements will endeavour to utilise regional and or recycled materials where possible.

Hardscape materials have been selected by paying attention to their sustainable quality in terms of cost, function and durability. For instance, in selection of material for the timber deck proposed along the F&B strip, concrete timber has been suggested. Although might not be as pleasing aesthetically, however, would be more feasible in cost and durability.

SUSTAINABILITY IN SOBHA CITY

Sobha City is to be unique within Dubai's cityscape with public areas reminiscent of a forest. Streetscapes are to promote pedestrian and cycle use with connectivity, Pedestrian areas to be shaded naturally by tree canopies, Roundabouts to be planted and showcase Sobha's vision, Connections to be made to public transport network, Medians are to be heavily planted to segregate the traffic, Lighting is to provide for both vehicle and pedestrian areas and Irrigation to be sourced from the sustainable TSE network.

While designing urban landscape and public realm of Sobha city, a unique identity and branding of the city has been the main concern.

ENVIRONMENTAL SUSTAINABILITY

IRRIGATION METHODOLOGY - The design includes for an environmentally sustainable irrigation system that can be seasonally controlled to suit weather conditions and timed so irrigation occurs during off peak hours. Water will be sourced from Dubai Municipalities TSE network with one days storage on site. Soil additives such as Zeoplant will be added to retain water and reduce water demand by up to 50%. Mulch will be applied to planting areas to slow evaporation rates and aid in keeping the soil temperature down during hot summer months.

Plants are grouped in similar water use categories to allow for the creation of different irrigation zones and avoid overwatering. The main system will be a drip line irrigating palms, trees, shrub and groundcovers, sprinklers will be used to irrigate the lawn areas.

SHADING AND COOLING - Street tree planting has been prioritised to ensure both sides of the road have a continual canopy which will provide the streets with shade both pedestrians and vehicles. As the design aims for a natural theme, use of shade structures have been minimised and replaced by densely arranged shade trees.

LOW CARBON MATERIALS - clever use of higher performance low-carbon hard landscape materials such as modular concrete pavers. For more lush landscapes such as urban forest themed parks and recreation areas clay pavers have been suggested to give the landscape a more natural theme.

SOCIAL SUSTAINABILITY

Sobha city has been designed with prioritised care to its social space and public realm. The main objective has been creating a uniquely green urban landscape which offers urban recreation and outdoor facilities.

PLACE MAKING - The health aspect promoted by the dense green urban landscape would not be only beneficial for the residents but would also attract visitors to the area to spend their leisure time within the pleasant space that Sobha city would offer.

IDENTITY - The lush urban landscape of sobha city will define the area as a unique place in comparison with other developments in the area. The city would be branded by its quality of green space and refreshing environment in comparison to the fast paced luxurious lifestyle of the city of Dubai.

ACCESS - Apart from the urban signage system, natural way finding strategy has been proposed for Sobha city. Each public area and street will be distinguished by different species and tree arrangements. Roundabouts will also be treated with different themes for wayfinding purposes.

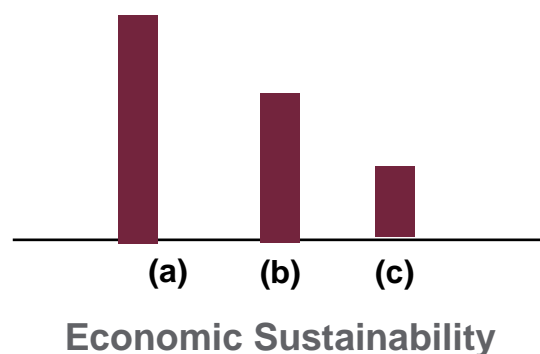
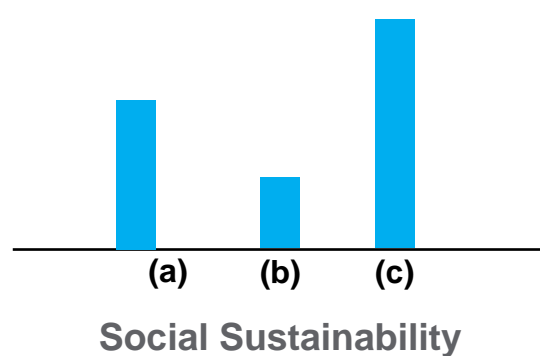
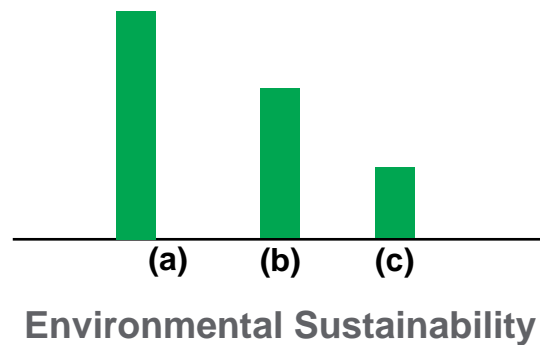
ECONOMIC SUSTAINABILITY

LOWER WATER CONSUMPTION EXPENCES - The special attention to provide Sobha city with water resourced from TSE network has reduced the water demand and cost to 50%.

Sustainability Comparison

Case studies 'A', 'B' & 'C'

Relative Comparison



OVERVIEW

Guidelines

During the design process of Masdar City, the design team was referring to certain guidelines from Masdar developer and was obligated design in accordance to those guidelines. Al Bateen was designed and analyzed (in terms of sustainability) by the design team as a project requirement. The guidelines for the analysis of Al Bateen has been Estidama, which is a credit base system similar to LEED and BREEM, however, designed for the region by UPC. Sobha City has been designed with less emphasize on all aspects of sustainability from the developer as prioritised requirement.

Assessment

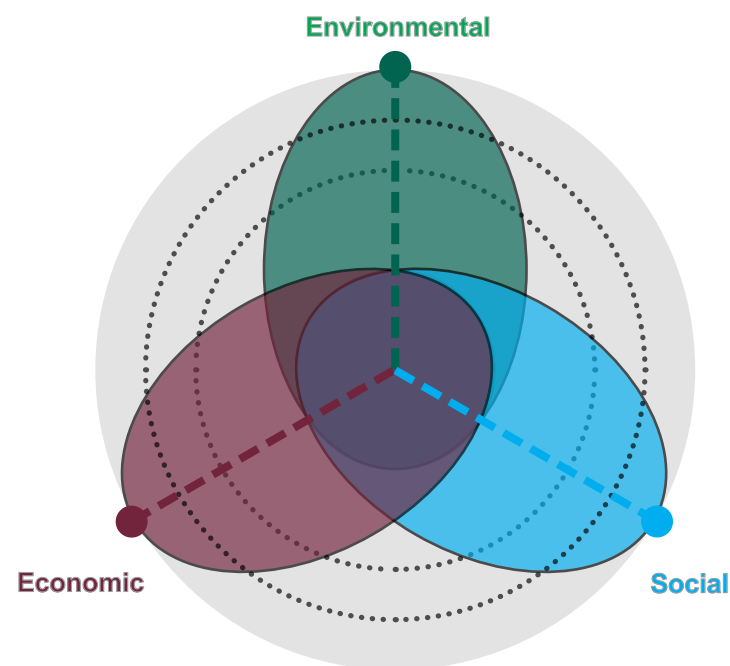
Sustainability assessment based on credit points, numbers and figures would be a very complicated process and not in the scope of this thesis. Moreover, during the design process, sustainability analysis with similar credit basis has not been applied to all three cases, therefore, in this thesis, relative comparison of the three case studies would be applied. In other words, case studies would be compared based on Environmental, Social and Economic qualities, relative to each other.

COMPARISON

Masdar has paid special attention to environmental sustainability as it has an aim to be prototype of a zero carbon city. As mentioned earlier, guidelines to achieve a zero carbon city has been provided by Masdar prior to the beginning of design process which the design team was obligated to put them into detailed consideration and apply them in every stage of design. During the design process of Al Bateen similar considerations have been applied, however, in terms of resourcing energy, Masdar has taken further steps by application of elements such as solar panels.

Although Al Bateen Marina, would be an attractive public realm for its programmed space and being a waterfront development, however, Masdar city's public realm design has provided the city with a set of highly interesting and more diverse programmed outdoor places and way finding elements. The city spine and MHQ connections has connected meeting points through retail strips and shaded pathways.

The dry landscape designed for a zero carbon Masdar city which serves environmental purposes would not be as appealing as Sobha city public realm for its uniquely designed lush green urban landscape. Sobha City's lush forest theme has provided the city with a pleasant and appealing outdoor environment and public realm to escape from fast



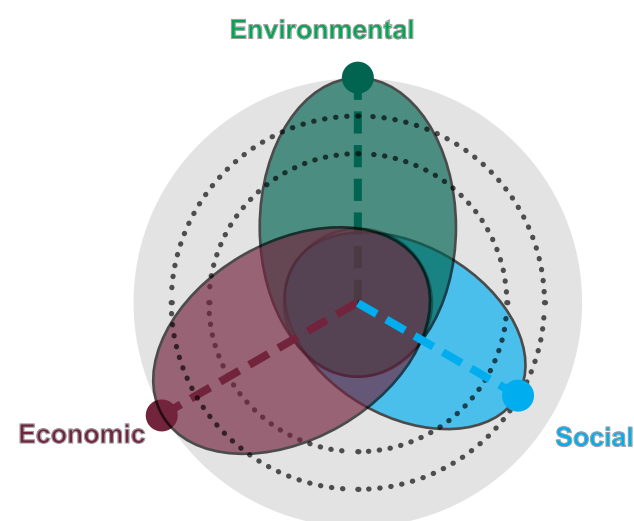
Pillars of Sustainability

passed life style of the region, however, although successful in terms of social sustainability, the cost of maintenance of such landscape in the arid zone of the Emirates would be considerably high.

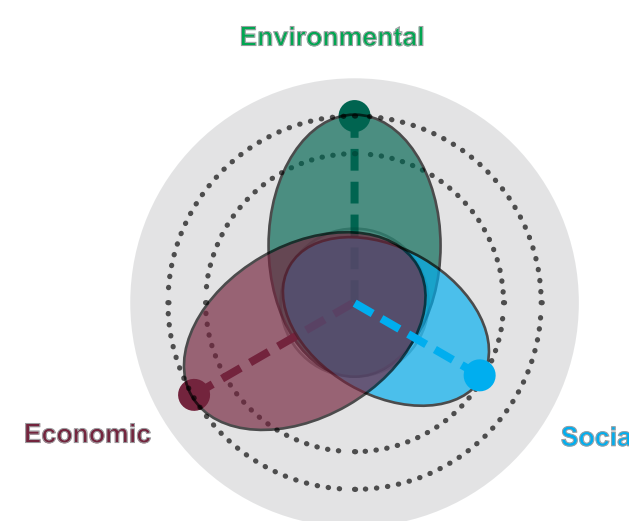
From an environmental point of view, treatment and maintenance of such landscape may produce a high level of carbon which may become higher than the environmental benefit gained from its greenery. Prof. Hoffman Brandt in her publication CITY-SINK argues about having a to adopt to a more environmentally productive framework for urban landscape. According to Hoffman Brandt, the average life of a street tree is between 2 and 10 years, which is a direct result of planting practices that treat trees as artifacts—isolating them from sustaining vegetative plant associations and constraining soil and hydrologic processes. Urban street trees are more like totemic objects than eco-system constituents. Without comprehensive planning and management, she argues, Million Trees has the potential to release more carbon through installation/ management energy inputs and dead wood decomposition than it sequesters. (Hoffman Brandt, 2009)

Masdar City has been designed with guidelines to ensure that financial goals would be met in long term, The design team tried to have a similar approach for Al Bateen however Masdar's predefined strategy and special elements set it in a higher level in terms of economic sustainability.

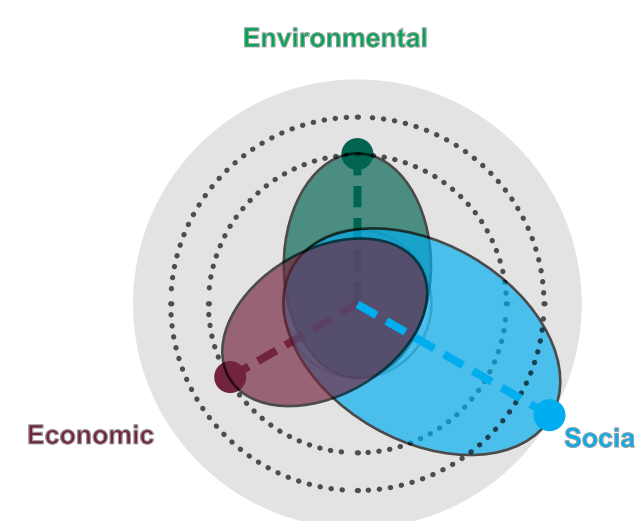
The relatively performed comparison of the 3 case studies have been illustrated in the diagrams below. Accordingly, Masdar zero Carbon city receives more credit points for each pillar of sustainability and may be considered as the most sustainable development, while Sobha city is the least sustainable development although offering a high social sustainability value.



CS(a) MASDAR CITY



CS(b) AL BATEEN WHARF



CS(b) SOBHA CITY

06#

Discussion

06#⁰¹ Achieving Sustainability

06#⁰² Conclusion

DISCUSSION

Achieving Sustainability

Possibility or Oxymoron

OVERVIEW

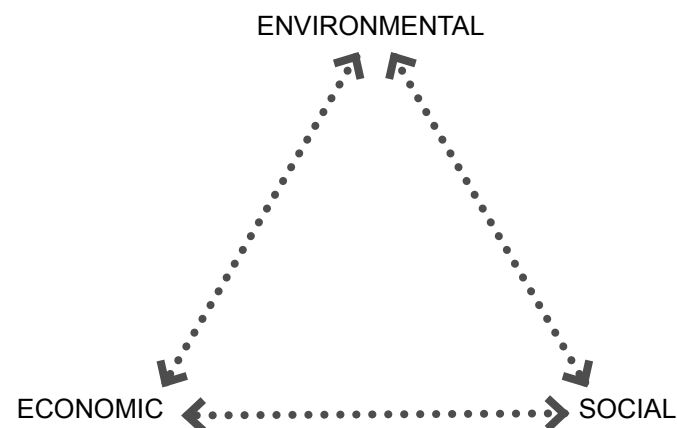
The concept of sustainable development dates back to the early 1970s, and the Club of Rome report “Limits of Growth” was probably the cornerstone piece of literature that got the whole freight train rolling. In 1987, the authors of the United Nations Brundtland report “Our Common Future” (prepared to examine how human activity impacted the world’s natural resources) gave a definition of sustainable development as “meeting the needs of the present generation without compromising the ability of future generation to meet their own needs.” (Dimitrov, V., 2003)

Sustainable development refers to a mode of human development in which resource use aims to meet human needs while ensuring the sustainability of natural systems and the environment, so that these needs can be met not only in the present, but also for generations to come.

The term ‘sustainable development’ was used by the Brundtland Commission, which coined what has become the most often-quoted definition of sustainable development: “development that meets the needs of the present without compromising the ability of future generations to meet their own needs. (Brundtland commission wikipedia, 2013)

sustainability can be a helpful concept in that it posits the long-term planning goal of a social environmental system in balance. It is a unifying concept, enormously appealing to the imagination, that brings together many different environmental concerns under one overarching value. It defines a set of social priorities and articulates how society values the economy, the environment, and equity. In theory, it allows us not only to calculate whether we have attained sustainability, but also to determine how far away we are (actual measurement, though, is another, harder task). Clearly it can be argued that, though initially flawed and vague, the concept can be transformed and refined to be of use to planners. (Campbell 1996)

Contradicting Pillars?



SUSTAINABILITY TRIANGLE

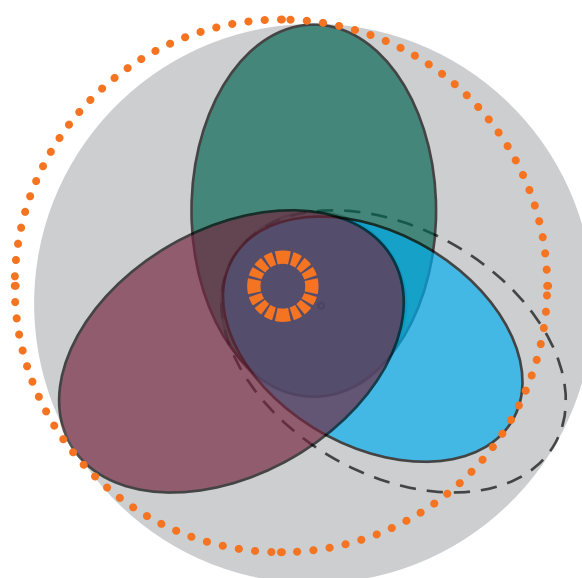
Applying sustainability measures has become necessary in designing developments. However there are arguments which question the possibility of achieving a sustainable result based on sustainability triangle with its pillars of environmental, social and economic in the corners and sustainability in the middle.

Campbell argues that nothing inherent in the discipline steers either toward environmental protection or toward economic development - or toward a third goal of planning: social equity. Instead, planners work within the tension generated among these three fundamental aims called “planner’s triangle” with sustainable development located at

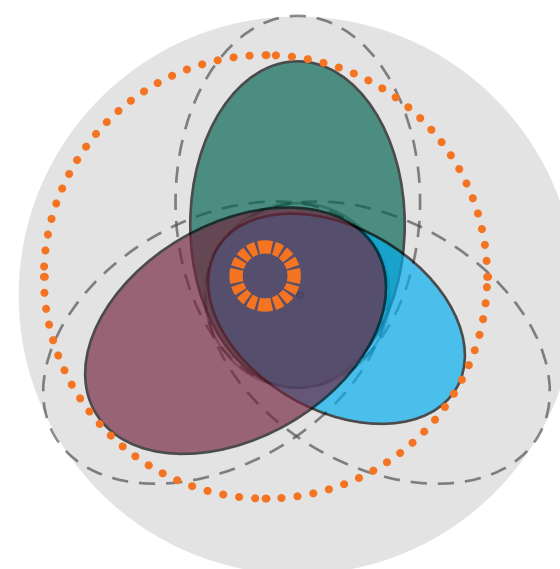
Mode of Assessment

the centre.

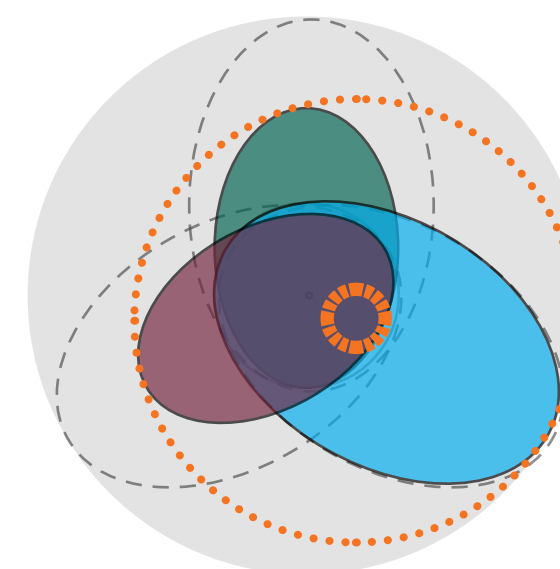
By analyzing the three development case studies we realize that sustainability has not been located in the centre but somewhere close to the centre. Although achieving to high measures of sustainability has been considered highly in Masdar and Al Bateen and in a lower level in Sobha, still non of the three projects have been able to have sustainability in the centre of the triangle. This will raise the argument that are any of these developments sustainable at all?



CS(a) MASDAR CITY



CS(b) AL BATEEN WHARF



CS(b) SOBHA CITY

Figure 17 - Assessment based on Regional Sustainability System ESTIDAMA - A system Equivalent to LEED & BREEM and Sustainability assessed by Summing up Credit Points

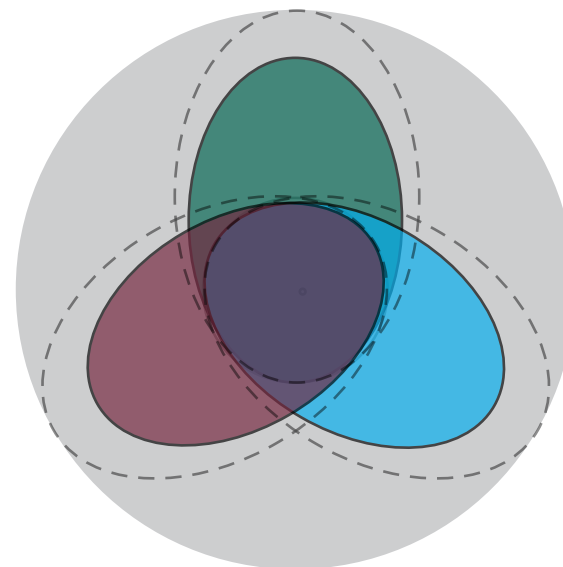
THE BUCKET THEORY

The “bucket theory” says metaphorically that in complex systems, where vital subsets of a system are being considered (such as the vital organs of a body), all are equally important. Therefore, in case we have a level of excellence in one of the pillars (e.g. the economy) if another pillar (social or environmental) is degraded in its level of performance or quality, the outcome must be determined by the “bucket’s lowest plank”. (Développement durable, 2013) If we consider the bucket theory as a basis to determine sustainability of the three case studies, and as illustrated

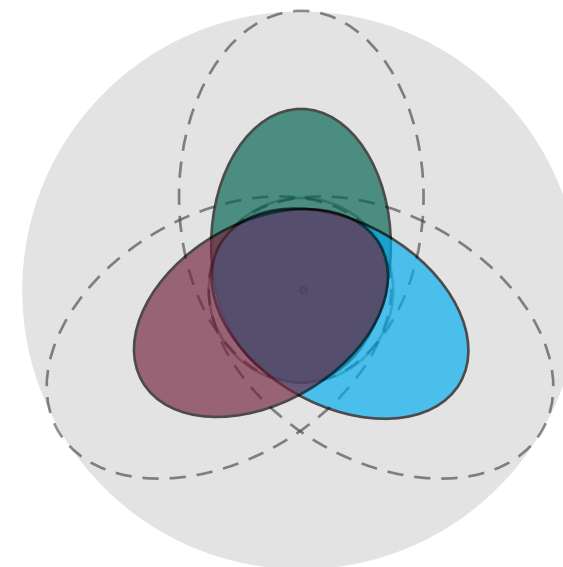
Figure 16 – Theory of Bucket (fr.wikipedia, 2013)



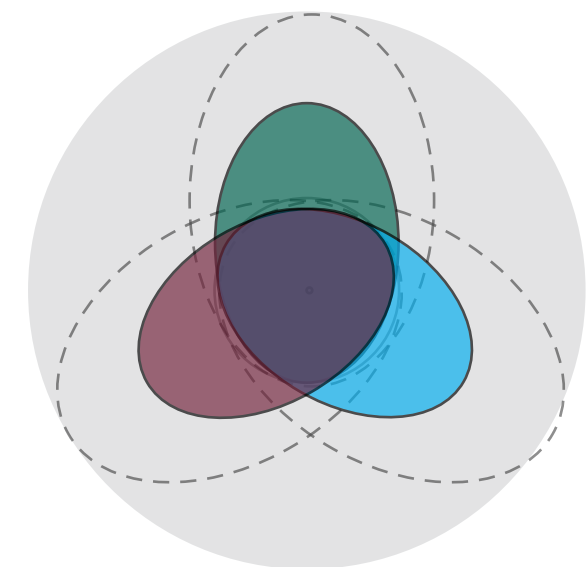
in the diagrams below, Masdar would still be the most sustainable development project, Al Bateen and Sobha will have a similar level of sustainability.



CS(a) MASDAR CITY



CS(b) AL BATEEN WHARF



CS(b) SOBHA CITY

Figure 18 - Assessment based on Principles of Sustainability and Bucket Theory - A system based on sustainability in the centre of the triangle
Sustainability assessed by determining the lowest sustainability Pilar's value

Some environmentalists argue that if sustainable development is necessary, it therefore must be possible. (Campbell 1996)

Designing a sustainable urban landscape realm will result a sustainable public realm which is an inevitable part of designing a sustainable urban development.

Public realms are important assets of an urban fabric. They are designed fundamentally for human and its well being, however, if well designed, they contribute to the city's environmental, social and economic qualities. Factors such as place making, access, identity, community values could be provided by a well designed public realm. Therefore, it is very crucial to be able to assess the level of sustainability of a public realm in a manner that does not seem to contradict with the main principals of sustainability; sustainable development being in the centre of the sustainability trianle, the triangle which is shaped by environmental, social and economic pillars of the same value.

Regional sustainability assessment of ESTIDAMA (similar to LEED and BREEM) is based on summing up of credit points calculated for each pillar, regardless of achieving same level of sustainability for all three of them, however, design based on these criterias still contributes to sustainability factors.

Achieving to sustainability is a more complicated process. Sustainability being in the centre of the triangle made of its three pillars, requires all pillars to be paid attention equivalently and developed in a very same level which practically requires a lot of effort from all stakeholders and starting at an early stage.

Even with the rising acceptance of sustainable development, planners will not always be able, on their own, to represent and balance social, economic and environmental interests simultaneously. (Campbell, 1996) When achieving the same level of value for all pillars is not possible, the lowest pillar might be considered as the basis of assessing sustainability for a project related to it which will consequently place sustainability in the center of its triangle and where it belongs to be.

Sustainability is a complex process which requires global participation. Time is another factor to be considered since fundamental transformation in human lifestyle as well as design and planning methods is essential in order to achieve sustainability.

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07#⁰¹ Figure References

07#⁰² Literature References

07#⁰³ Internet Web Pages

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2. <http://www.abudhabi.ms> (Abu Dhabi ariel view - figure 2)
3. <https://maps.google.com> (Dubai map - figure 3)
4. <http://www.sobha-me.com> (Dubai city view - figure 4)
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6. <http://www.masdar.ae> (View from Masdar city - figure 6)
7. <http://www.masdar.ae> (Masdar logo - figure 7)
8. <https://maps.google.com> (Al Bateen Area map - figure 8)
9. <https://gulfnews.com> (Al Bateen wharf ariel view - figure 9)
10. <http://www.tdic.ae> (Al Bateen logo - figure 10)
11. <https://maps.google.com> (Sobha City map - figure 11)
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