

Towards A Sustainable Waterfront Development ”Case Study of Port Said City”

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Abstract: - Waterfront areas are one of the most challenging urban spaces that give a great opportunity for the urban development not only for the waterfront context but also for the whole city. Communities around the water bodies are full of features, which support to adapt the economic and social conditions. Also they become unique places not only for trade, transport, and industry but also as recreational, and entertainment places. Intervention in the existing waterfront is very critical procedures, which needs a sensitive strategy to regenerate the waterfront of a city. Although the international attention to the phenomenon of waterfront development, and also the local attention of developing Alexandria, the North Coast, and Al-Alamen new city, it has not getting the same attention to some other water neglected areas on the Mediterranean. The study selected the case study of Port Said – Egypt. Although, Port Said city is one of the most important Afro-Asian coastal cities, with strategic location, and unique architectural heritage, and particular landscape, and a lot of potentials that qualifies it to be global waterfront, but it has not getting the appropriate attention for real strategic vision for development, only through some individual local attempts, and case by case project carried out by the decision maker far from the planners, the community participation, and public interest as well. So, the study aims to document and evaluate the recent development projects in the promenade waterfront in Port Said city in El Shark district, and set a proposed framework based on comprehensive strategy that can be achieved by guidelines to improve the waterfront development vision and shedding light on some potential spots for future development, that through using different methodologies: descriptive, analytical, inductive, applied, and deductive methodologies.

Key-Words: Port Said, Sustainability, waterfront, evaluation, comprehensive framework, promenades.

1 Introduction

Water is an inspiring natural and renewable resource, which can be used in the aims of agricultural, industrial, energy generation, household, transportation, recreational, and environmental development [1]. Waterfront has an important role in shaping the formation of the settlements and getting their identities [2].

Waterfront identifies the water's edge in cities and towns [3]. So, it can be characterized as a place integrating land with water and having a natural attraction to people [4]. A lot of literatures discuss the waterfronts but it could be defined easily as the urban context that has a strong visual or physical connection to the water [5], even these water bodies could be river, lake, ocean, canal, sea...etc. It's not necessarily for the waterfront to be directly fronting the water but are tied to it visually or linked to it as a part of a larger scheme [6].

Since increasing the environmental awareness and the pressure of urbanization the cities, waterfronts were rediscovered in the city, and the phenomenon of regeneration them emerged. From 1980 urban waterfront regeneration projects has become an effective tool for urban planning and politics. The research depends on this regeneration perspective in analysing the case study, and draws its aims and methodologies.

Aims and Objectives:

- Document and evaluate the recent projects occurring / taking place in Port Said city waterfront.
- Propose a comprehensive approach for waterfront development, which could be achieved through a number of guidelines for waterfront future development in Port Said city.
- Achieve sustainable guidelines for coastal waterfront development projects.

Research Methodology and Structure:

The paper consists of 4 parts:

1. Descriptive Theoretical Background & literature review: waterfront definitions, concepts of waterfront development, and waterfront development principals and standards for design.
2. Inductive & analytical approach: historical background of Port Said city, city resources, economic base, challenges facing the city after ending of the free zone in 2009, and potential for tourism development.
3. Practical & analytical approach: Document and evaluate of the existing urban area of Port Said waterfront, land use, image, accessibility, activities, linkage, and connectivity.
4. Deductive approach: propose guidelines to develop Port Said waterfront.

2 Literature Review: Urban Waterfront Development

In this part the research will present the state of the art of the urban waterfront development.

2.1. Waterfronts and Urban waterfront Definitions

Waterfront means: "*The part of a town or city adjoining a river, lake, harbor, etc.*", that is in The Oxford American Dictionary [7]. **In the urban context, it is described as:**

- Urban area that has integration between land and water [8].
- Any property has strong visual or physical connection to the water [6].
- The conflux area of water and land [9].

Although the vocable of waterfront is clear, it has been met using some different words instead of it such as: city port, harbor-front, riverside, river edge, water edge, and riverfront. Some writers called the Waterfronts as romantic places where used for dreaming and recreation; also waterfront left the feelings of openness that gives the ownership of the place.

2.1.1. Waterfront Development

Because of their unique potential to provide society with diverse opportunities for economic development, public enjoyment, and civic identity, waterfront is one of the country's main national resources. Development of the waterfront is a process that starts because of a community's desire to improve the waterfront, which includes relatively consistent mixed-use development. There are several meanings of waterfront development that vary depending on sites and cities, such as waterfront regeneration, revitalization, rehabilitation, and waterfront redevelopment. [1]

2.1.2. Development Categories of Waterfront [10]

It is important to know and identify in which scale and level we are targeting the waterfront development. To start the process of the waterfront development, it's important to identify first in which scale and level we are planning to proceed. While, the scale and type of the waterfront redevelopment varies from city to city, the basic concept is similar, shown in fig. (1).

1) Waterside development is the local and environmental planning scale, which focus on the interaction between the human and the water and the waterfront remedy to create and enjoyable water environment the research concerns with this level of development in Port Said city, in Egypt.

2) Waterfront development is urban planning scale, which focuses on renewal and development of the urban areas.

3) Coastal development is a national planning scale that concerns with the development strategies and the implementation of planning, and its goal is to prescribe the character of the city and the development scheme.

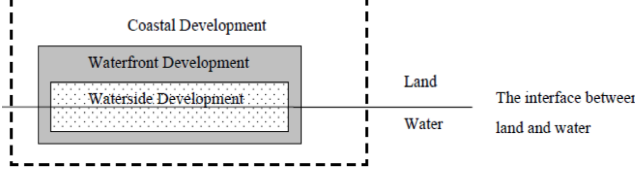


Fig. 1 The three categories of waterfront development [1]
 Source: Riham A. Ragheb , 11, (2017).

2.2. Principals of Sustainable Waterfronts

In the context of the initiatives for the Global Conference on The Urban Future (Urban 21) [11] held in Berlin in July 2000 and in the course of the EXPO 2000 World Exhibition [12], 10 Principles for a Sustainable Development of Urban Waterfront Areas were approved.

- Protect water quality and the climate.
- Waterfront faces are part of the current urban fabric.
- Identification provides identification of historical identification.
- Public access is a prerequisite.
- Public participation is an element of sustainability.
- Public-private project planning speeds the process up.
- Waterfronts are long-term projects.
- Waterfronts profit from international networking.
- Re-vitalization is an on-going process.

2.3. Urban Waterfront Development Standards

This part presents the urban waterfront development standards that had been applied in many waterfront regeneration projects across the world.

Table I: Urban Standards

<i>Land uses</i>	Diverse and mixed uses, that include local business areas like industry, fishing, trade, recreation, transportation, offices and residential areas, integrating with the residential communities “school, playground, park, stores”, or with the leisure areas “recreational facilities, public parks, culture facilities, public spaces, entertainment” Replacing the functions of the waterfront (to tourism and consumption industries beside the socio-economic expand with culture interest) is the generators to redevelopment of the waterfront and to the whole city and region.
<i>Urban Identity</i>	The urban identity is influenced essential by the natural and cultural dimensions. It

is established from the interaction between the human practices towards the city areas including the waterfront areas. The waterfront development is considered as the identity preservation catalyst and important opportunity to represent the distinctive identity of the city.

Socio-Economic Benefits While the waterfront area is considered as an urban advantage, which attracts many investments to the surrounding territory and to the whole city, it becomes an urban structure with significant land value. These new investments must be compatible with the urban uses such as the cultural, tourism, leisure projects. (***Long-term value, Competitive advantage, Business and market places***).

Urban Depth Development It is important to complex an indistinctive relationship between the land and the water whenever the land/water overlap zone is boarder, and the success of the waterfront will increase to contain many activities with huge benefits of its water presence. So, the advantage of the water is not only from the thin line avenue along the water edge. But it can be achieved through thinking of the edge avenue with the perpendiculars of the water edge into the city.

Accessibility Accessibility to the waterfront areas from all the city direction by the network and many facilities such as public transportations, pedestrian and bicycle beside the private vehicles. All of that provide under a movement strategy to avoid any conflicts between all different users.

Place Making Quality Although the pressure of the financial and the commercial development of the waterfronts, it is important to be a living city. It can be achieved by providing mixed uses areas; residential areas with rang of housing types a, facilities and services, recreation and entertainment activities. Also, movement on the water creates a special level of vitality on water, it can achieve by providing costal ferry and terminals.

After the waterfront becomes a globalize phenomenon to improving land development of the city, the image of the city become one national and international level to redevelopment the waterfront.

“Creating ecological protection areas”, and “Sustainable waterfront development in the future” this interest should be for the coast, waterfront lands and the city to face many challenges; global climatic variation, raise of the sea level and wastes of various uses. So the environmental protection can be achieved through selecting suitable economic – social uses and responsible usage of the resources with the assets of all decision makers.

Through these applications:

- Secure the quality of water and environmental conservation of aquarium life;
- Reduce consumption of energy and materials;
- Use green infrastructure, such as trees and shrubbery along green way.
- Use sustainable storm water management;
- Providing pedestrian friendly paths and attractive open spaces with shaded places;
- Providing Sustainable transportation system;
- Providing sustainable buildings;
- Using renewable energy resources;
- Using sustainable wastes collection management

These applications should achieve to reduce energy use, improve air quality, reduce the heat island and help to reduce sound transmission and noise pollution level.

3 Analytical Framework of Port Said Waterfront

It is concluded from the set of principles and standards shown above that it offers general international concepts of sustainability that can be applied on waterfronts, specifically by methods, which respect nature and human needs to make a vital waterfront. But an analysis criterion is needed as an evaluative mechanism to identify the rate of sustainability. The following section will show such attempts, through integrating the urban waterfront development standards with the above waterfront principals, all under the main strategic 4 pillars of sustainability.

Sustainability is one of the most important strategic urban development goals that should be integrated into citywide development planning. Sustainable development is the process that meets present needs with no negative impact on future generation’s ability to meet their needs. Consequently, ensuring sustainability is very important as a strategic goal in

waterfront development programs, to enhance living conditions for residents. In addition, sustainable development strategies seek to improve human welfare and create better places where people can stay, work, and visit and present future residents.

3.1. Analysis Methodology.

Every Waterfront urban development strategy depends on the conditions, opportunities, and problems of each city and its waterfront. The research depends on: mapping analysis, field visit and survey, report information and deskwork.

The methodology used in the study of the applied area is in following steps:

- 1- Historical Background, and studying the urban context of the case study “Port Said city”.
- 2- Analyze the current situation of the selected area to present an evaluation based on the analytical criteria developed through the theoretical part.
- 3- Make the Port Said Waterfront SOWT Analysis based on its theoretical background and information from the visit and survey filed in order to understand the strength, weakness, opportunities and threats to be required in the development of the waterfront.
- 4- Submit development suggestions based on integrated urban waterfront standards in order to achieve strategic objectives.

3.2. Analysis Criteria

A comprehensive analysis criteria was developed depending on the main vision of sustainability. The criteria consist of 4 parts: the socio-economic approach, the urban approach, the environmental approach, and finally the smart approach. As the technology is increasing very fast and spread everywhere in all our life applications, the research sees it’s important to shed the light on the technology approach and some of its application on the scale of urban design.

3.2.1. Socio-Economic Approach

To determine the *type of waterfront* and the existing potentials to draw the future proposed development: commercial, cultural, educational, historical, recreational, or residential. And to identify the *economic base* of the development if it is a long term value, competitive advantage, or business & market place.

3.2.2. Urban Approach

- Land use
- Urban quality
- Connectivity
- Accessibility
- Urban depth development /Urban integration
- Place-making quality (Livability & image)
- Walkability
- Public open space
- Streetscape & amenities

3.2.3. Environmental Quality Approach

- Secure the quality of water
- Consumption of energy & materials
- Green infrastructure
- Sustainable storm & water management
- Shaded places
- Sustainable transportation system
- Providing sustainable buildings
- Renewable energy resources
- Sustainable wastes collection management

3.2.4. Smart Approach

It concerns with the smart applications that could be applied on the waterfront.

4 Port Said Review

Port Said city is located in Suez Canal Region, which consists of 6 cities (Ismailia, Port Said, Suez, El Sharkia, North Sinai, and South Sinai). Port Said was founded between 1859 and 1869 as a part of the project of the Suez Canal. The City is divided into two cities Port Said city and Port Fouad city. Port Said has enriched waterfront, and is surrounded with the Mediterranean Sea from the North, Suez Canal from the East, and El Manzla Lake from the West, and West South. It is located on the Mediterranean Sea with a length of **31 km** on the waterfront of both Port Said and Port Fouad city. The city of Port Said is divided into six districts: El-Sharq District, El-Arab District, El Zohoor District, El- Dawahy District, El- Ganoob District, El-Gharb District. [13]



Fig. 2 Port Said waterfront

Source: Google earth, edited by the researchers

Port Said considers as a ‘Tourist Destination in the Summer time’ on the Mediterranean Sea, including hotels, casinos, and commercial paths presenting local and international products. In 1976 President Sadat announced Port Said as a Duty-Free Zone. Port said undergoing long period of reduction of infrastructure and development funding for the city as well as changes in the national trading and import law, which leading to the end of the Free-Trade Zone of Port Said. The city is generated by the colonial architecture; within the city different architectural styles with Greek, Italian and other European influences can be found. It is based on a rectangular grid street pattern.

4.1. History of Port Said Coastline.

Port Said Mediterranean Sea beach has a waterfront scenic path, with a historic background, which included a unique urban pattern of wooden chalets. After that these wooden chalet was replaced with concrete chalets called El-Mamora in front of the seafront. Later, the beach declined because of natural phenomena and the land in front of these chalets became dry. Finally, a main street called Tarh Elbahr Street, new resorts and promenades beach were created in front of El-Mamora chalets.



Fig. 3 El Noras resort



Fig. 4 Tarh el Bahr Street

Source: taken by the researcher from the field visit



Fig. 5 the wooden chalet 1920



Fig. 6 El Meamora chalet

Source: taken by the researcher from the field visit

4.2. The Study Area.

The study area extends 3.5 km along the Mediterranean coast. Residential and entertainment land use are the most prevalent in the urban area, but distinguishing residential land use from other urban functions is difficult. The area type defines a linear-shape. Because of the Mediterranean Sea's geographical location, the latter appears to have an influential impact as it is related to the enjoyment of the study area's moderate climatic conditions that are suitable for human life throughout the year.



Fig. 7 Port Said waterfront and its urban context

Source: Google earth, edited by the researchers

Table 2: Analytical review for Port Said waterfront

Socio-Economic Approach
 Walkability, swimming and other sport activities are the primary activities on the beach; also give a local identity and character to the study area. Port Said seafront is highly valued by the city. The new projects on Port Said seafront create employment opportunities but at the same time the seafront loses its heritage value and beauty. The new created projects are about small cafes, without any comprehensive development approach.



Fig. 8 waterfront and the soci economic activities
 Source: taken by the researcher from the field visit

Urban Approach
 The waterside has a variety of land uses along its perimeter. There are a lot of consecutive land uses on beach side; such as cafes with sand private beach that serves, which present a bits and pieces blocks on the beach, and a promenade beach serves as walkability path. The waterfront on the other side has mixed land uses with residential area “with ground floor cafes and supermarkets”, touristic resorts, public library, restaurants.

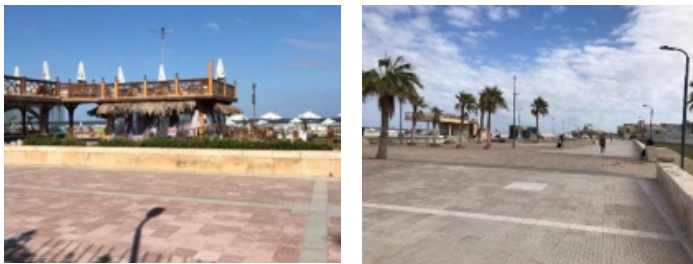


Fig. 9 waterfront land-use
 Source: Google earth, edited by the researchers

Connectivity
 The study area is connected to the city by small street, which connected with Tarh El-Bahr street. The study area is the linear strip of the waterfront with the whole city back yard.

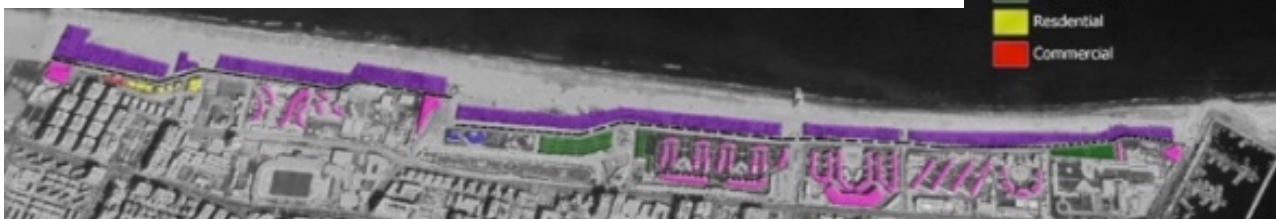


Fig. 10 waterfront land-use Source: Google Earth adapted by the researchers

Urban Quality

The sense of smell and taste is characteristic of the study area and is shaped by the primary activities as the space can be understood through the sense and a mental map can be created. These senses are used to clarify and survive urban space life in order to provide a unique and dynamic place to attract a variety of people; they should also define the experience of people and keep people coming back. By analyzing the characteristics of the study area, the citizens have to pay to enjoy the beach, which means turning the beach from the public open space into private space. The beach's identity was gone and the historical memory was lost. Despite the fact that landscape elements, amenities and furniture such as seats, lighting units and sheds are used to provide comfort, social interaction but not well designed and organized.

Accessibility

The waterfront stretches 3.5 km along the sea and with variable width about 115 m. there are more than 9 T-intersections with small and poor local streets, mostly with dead ends. Also there is service street but it is intermittent street. There is a promenade beach along the waterfront. It was a lined by palm trees to provide shade and there is lighting units along the walkway and a lot of access to the beach and to the service street with little stairs. There are randomly strip cafes along the waterfront that are considered as visual and physical obstruction in front of the waterfront. The waterfront can be accessed by different means of transportation: Taxis, private car, horse cart and bicycles. It esplanade leads to various activities and attractions such as pedestrian path - promenade beach – that achieve walkability.

Urban depth development / urban integration

Vehicles can access the Water front but with limit. Secondary roads linking the seafront to Main road called Tarh Elbahr Street. The main street connected with the city by sub roads, which offers in terms of access to the city center. The side streets are very narrow and in bad condition. The lack of integration between the two sides of the waterfront makes public access uncomfortable and safe.



Fig. 11 waterfront accessibility
 Source: taken by the researcher from the field visit

Urban depth development / urban integration

Vehicles can access the Water front but with limit. Secondary roads linking the seafront to Main road called Tarh Elbahr Street. The main street connected with the city by sub roads, which offers in terms of access to the city center. The secondary streets are very narrow and in a bad condition. Public access is not comfort and safe due to the lack of integration between the two sides of the waterfront.

Place Making (livability & image)

The study area is distinguished mixed uses area; residential areas with rang of housing types, facilities, services, recreation and entertainment spaces, all making it a living city.

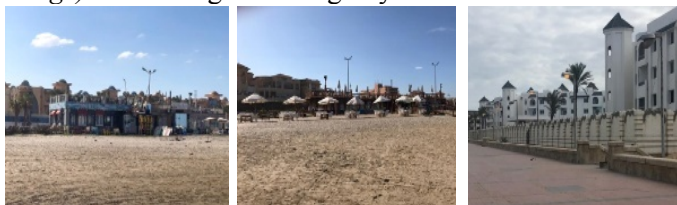


Fig. 12 waterfront land-use
 Source: taken by the researcher from the field visit

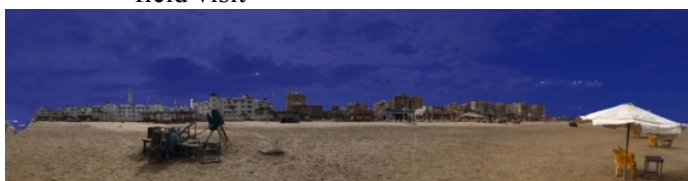


Fig. 13 waterfront land-use



Fig. 14 waterfront

Source: taken by the researcher from the field visit

The city waterfront is very poor and the visual image is very bad because of the new cafés, which were created on the waterside of the city without any vision of the future city image. The promenades beach becomes the main line that dividing the city waterfront from the main city.

Walkability

The area is popular with walkers. Promenade beach contains a number of Cafes and some of landscape elements such as sitting areas, some lighting elements and other facilities. The promenade beach furniture like the shads and seats are not well arranged in the area, and have less quality and there is a very long distance between the promenade beach furniture. The quality of walking path is very poor due to the damage of the furniture and the lack landscape elements quality, which can make the area difficult for pedestrians to navigate.



Fig. 15 waterfront land-use
 Source: taken by the researcher from the field visit

Public Open Spaces

In the past, the beach was designed as a coastal public open space where the citizens could hang out, enjoy, and have fun. The promenade and sands were an obvious attraction. Now the beach becomes a private space because of the subdivision of the beach into private cafes. The identity of the beach was disappeared and the historical memorize was lost. These changes transform the beach from public open space to a private one, and make the citizens must pay to enjoy the fresh air and sea view.

Environmental Quality Approach

The presence of cafes, that are a tourist attraction near the beach, is an issue for concern. Putting them in that place considers a threat because of the Environmental changes as they are vulnerable to drowning at any moment due to the rising sea level and that happened one more time. Dealing with the types of the projects and activities of waterfront should be studied. Occasionally, during Winter storms, the wind destroys the cafes, which build from light wooden structures.

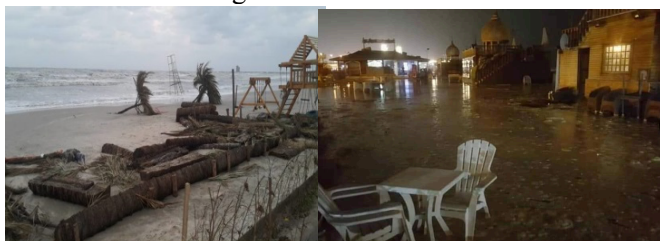


Fig. 16 waterfront land-use

Source: taken by the researcher from the field visit

Smart Approach

Although Port Said governorate announced from 2 years an initiative to transfer Port Said as a Smart Sustainable city, but there are no smart facilities are used in streetscape or in environmental applications.

4.3. SWOT Analysis of Port Said Waterfront.

4.3.1. Strengths:

- The existing of the water as an attractive strong visual determinant, which catalyzes the city's development and provide a recreation spaces.
- The area is an important residential, commercial and entertainment center of Port Said city and has a good derives of uses
- The accessible roads (road way) and connectivity with the city, is a potential for development to support communication between the waterfront and the rest of the city
- The existence of major services, cultural buildings, hotels such as libraries, residential buildings, resorts, important mosques that offer a good opportunity to develop tourism.
 - High percentage of youth under 20 years of age, which represents a large workforce, makes job creation a priority for the economy.

4.3.2. Weakness:

- Buildings on the waterside and the first line of the waterfront are at risk of being drowned by rising of the sea level especially in the Winter.
- Raising sea level is an environmental challenge.

- Lack of adequate efficient services and infrastructure and also utilities and amenities.
- Pollution of the sea water due to evacuate of untreated wastewater and industrial wastes in the sea.
- Weak of environmental awareness of the residence and lack of NGOs contribution in environmental programs.
- Lack of beaches in the area, and lack of adequate water access for the citizens.
- Decision-making centralization, lack of citizen participation and good governance, lack of a comprehensive development plan.
- Lack of quality of the urban design.
- Costly services, and no free public beach areas.

4.3.3. Opportunities:

- The strategic national plan of Egypt 2030, which puts the development in Suez Canal axis, and cities on the top priorities.
- Possibility of making some local events to support the public to engage.
- Possibility of coordinating within the framework of SUP32 between all stakeholders to create a holistic vision for the development of the area.
- The potential to making an urban branding of Port Said city, to market the city and put it on the tourism development plans.
- The potential of being international attractive touristic destination due to strategic unique location.
- Possibility of development the city through various perspectives commercial, industrial, tourism, entertainment, historical, heritage and culture.

4.3.4. Threats:

- Weak state environmental department to deal with environmental treats.
- The need to financial recourse to cover the budget of the development process.
- No comprehensive approach for development in the whole city, just bits and pieces projects and case-by-case actions.
- Lack of safety due to the improper traffic system.
- Lack of free public access to the water.
- NO water integration between the sea and the attaching urban context.
- Weak of citizen awareness of the waterfront development problems and weak of public participation in the development process.

5 An Integrated Development Proposal for Port Said Waterfront

This part concerns with the the proposed approach for development of Port Said waterfront, and divided in two main parts. The first part describes the comprehensive approach for development "Urban, socio-economic, encvironmental, smart" approaches.

Then the second part proposes in urban design scale the intervention zones on the waterfront and the future landuses.

5.1. First Part: Comprehensive Development Approach for Port Said Waterfront.

5.1.1. Socio-Economic Approach

- Major waterfront unique transformation is the waterfront type to meet the needs and aspirations of Port Said city with its strategic location, historical background, and unique architectural pattern. The waterfront is qualified and ready to promote the mixed land uses “housing, shopping, recreation, entertainment”. Establish commercial, cultural, recreational economic-base to start the development plan, with long-term value, competitive advantage, and public interest reflections. Public private partnership is an important key word to push the development proposal from the planning phase to the implementation phase.

- Promote the city with many projects, which gets huge benefits all the year like culture, commercial, and real estate projects as a strategic goal affects the whole city.

5.1.2. Urban Approach

- *Land use: mixed land uses*

- In developing waterfronts, mixed land use is a must. Changing land uses to high profit rate occupancy like recreation, office, and commercial uses helps to make the as an “Open City”, that should achieved with the governmental support and with the public private partnership.

- Designing the waterfront as a central area of the city, “a heart of the city”, with its diversity land uses.

- *Urban quality*

Achieving high urban quality always come from respecting the physical and non-physical heritage of the city, and from the interaction between human and the city. Preserving the architectural pattern of Port Said city is the first step to achieve high urban quality. The issue is not only about the buildings, it's also about the human heritage like “Semsemia Music”, which should be preserved and documented and published between the new generation to keep the identity and personality of the city.

- *Connectivity*

Connecting the linear strip of the waterfront with the whole city back yard.

- *Accessibility*

Although Port Said city has accessible network to the waterfront but it is still not enough to provide accessibility to different users to the waterfront. From the city center to Tarh El-Bahr Street, there are some roads connecting the center with Tarh el-Bahr. From

Tarh el Bahr to the waterfront, there are sub streets connecting them both, and only one service street, which are not enough either qualify to achieve efficient accessibility to Port Said waterfront.

So, Comprehensive transportation and network strategy could be provided by the governorate to avoid any conflicts between the different users. Enrich the network by different means such as public transportation, pedestrian, and cycle enabling beside the private vehicles. This accessible means carry various advantages; economical, environmental; and social.

Promote the accessible axis to the beach with nodes and plazas to achieve hierarchy and sequential spaces.

- *Urban depth development / urban integration*

Redesigning the relation between the thin line between water/land, which is considering an important edge in Port Said city, with the perpendiculars of the water edge into the city. Another scenario is to make development fingers, mixed land use corridors, perpendicular on the water edge to add to the waterfront more value.

- *Place making quality (livability & image):*

Image, comfort, services, amenities, and street scape It's important to make a liveable waterfront. In our case, Port Said city, as a Mediterranean city, is considered a liveable city, but liveable waterfront is different. Liveable waterfront could be achieved in Port Said through mixed land uses “residential areas, services, recreation, culture activities”, and Popular public spaces to attract both citizens and visitors. Adding some activities on the water would send a unique limit of liveability.

- *Walkability: walk-able axis, bike lanes, walk-able city, public health*

First of all Port Said city was established as a walk-able city with new urbanism application, to encourage residents to walk from work to home and from home to the city center at noon. Nowadays because of huge number of car users, the city transferred to be a car-oriented city. The unique arcades in the commercial streets are disappeared, and the side-walks were destroyed to added to the street span in the most of traffic roads in the city

- *Public open space:*

Good design for public spaces, affordable services, and attractive activities.

- *Streetscape & amenities:*

Provide all the landscape and streetscape elements to furnishing the space

5.1.3. Environmental Quality Approach

- Secure the quality of water

Using Drainage system as the infrastructure for drying the land from the excess and unutilized water such as rainwater, waste water and Sea level rise.

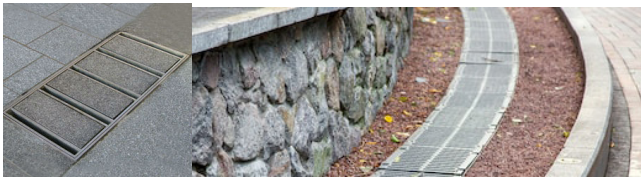


Fig. 17 The proposed Drainage system for new design of waterfront

- Consumption of energy & materials

New surface materials must be durable and in certain locations be able to withstand flooding from the sea. Attention must also be paid to how materials are laid to ensure they don't fail due to heavy use or seawater damage.

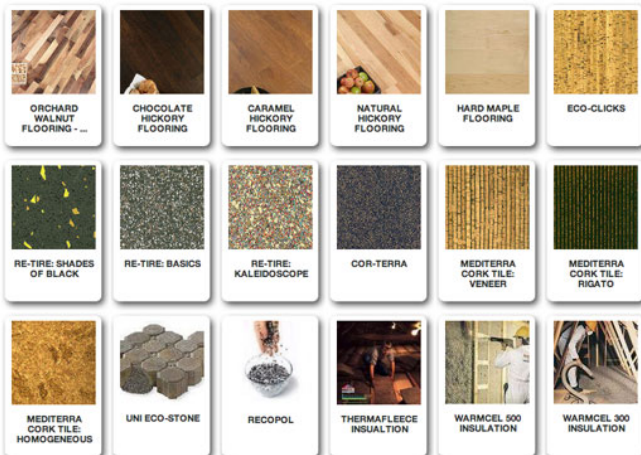


Fig. 18 Some Kinds of Sustainable material That Can be used

- Green infrastructure

Green infrastructure enhances community health and safety, and provides recreation, quality of Life, and other benefits.



Fig. 19 The Of Green paths on the Waterfront

- Shaded places

Sun shading, by using sustainable wood material, is the fundamental way to improve a public space bio-

climatic behavior. Reducing the solar radiation that reaches the people or gets reflected by the ground.

- Sustainable wastes collection management

Waste reduction can be done through recycling old materials like jar, bags and repairing broken items, which helps to achieve zero waste goals.



Fig.20 Towards Zero Waste

- Sustainable transportation system

Limits emissions and waste within the capacity of the planet to absorb them, uses renewable resources or below the rates of renewable substitute development, while minimizing the impact on land use and noise generation.

5.1.4. Smart Approach

Using Smart Photovoltaic lighting system can have an environmental impact in terms of energy consumption



Fig. 21 The Proposed Lighting System for energy consumption

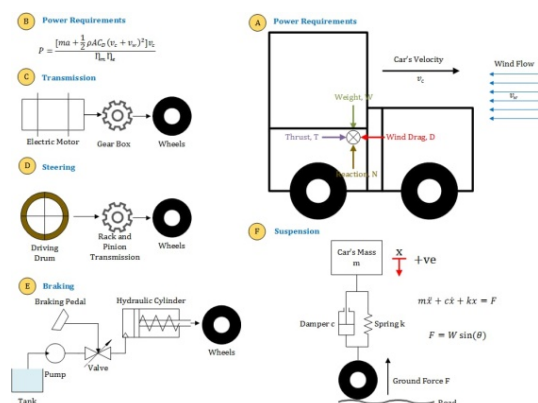


Fig. 22 Proposed clear transportation system to achieve clear and sustainable walkability Path
 Source: Radwan, 2019 [14]

**5.2. Second Part:
 Port Said Waterfront Design Proposal**

The proposal starts with promoting the accessibility to the waterfront by proposing a new street, which is connecting with Tarh El-Bahr Street also with sub streets. Also promoting the waterfront with widening 3 streets to connect the waterfront with the city center of Port Said city. The proposal contains design for new

marina in the water with some social activities, cafes, restaurants and Water Park to support the socio-economic approach from the other side and to attract residents and visitors to visit the waterfront.

The development of the existing cornice is a must with demolish unplanned cafes. Providing some services and attractive open public spaces to attract people to visit the area. Walkability, biking, public interest, and public participation are the key success factors.



Fig. 23 The Drafting Sketches for Port Said Waterfront
 Source: the researcher



Fig. 24 The New Design for Port Said Waterfront, Proposed Land Uses and new accessibility network
 Source: the researcher

CONCLUSION AND RECOMMENDATIONS

The previous study set out the policy context for the regeneration of the Port Said seafont, significant issues faced at the seafont, a vision and regeneration objectives for the seafont and, finally, how this can be delivered. The seafont environment creates drama and interest, giving Port Said City seafont a diverse and unique character. The outcomes of the Study and analysis the port said waterfront can be listed as

creating an attractive environment where both residents, creating a family friendly area which is safe and clean and visitors can relax, providing high quality public amenities, offering high quality and affordable activities and cultural events throughout the year, creating an area which is physically and intellectually accessible and maximizing the impact and improve the economic vibrancy. The following recommendations are set to improve the Waterfront:

- Coastal management's needed to address unplanned urban growth in order to ensure the harmonious development of human activities.
- Creating well-organized street furniture, such as benches, shelters with nice and comfortable material along the waterfront.
- Providing public access to the coastline supported by corridors and establishing convenient connections to the other side of the waterfront and adjacent streets extending from the city's street grid
- Arranging events that are efficient and consistent with the renewed context to ensure diversity in the region economy.
- The water surface and shore should be reserved for use in water and for public access.

The role the seafront has to play in enhancing the city and its image through tourism and culture-led regeneration, which builds on the seafront's heritage, cultural events calendar and attractive environment. A sustainable approach should be taken to providing opportunities for passive and active recreation.

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