RETRIEVE THE WATERFRONT ALEXANDRIA:

Strategies & Guidelines Framework Towards a Democratic Corniche

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Master's Thesis - December 2014
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ABSTRACT

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The thesis is entitled to address the risk of declining livability of the city of Alexandria, Egypt. Hence, the waterfront will be introduced as a fundamental way out to rescue the declining livability of the city in a whole, as a prime asset of public property to be retrieved.

The thesis is concerned that, the city of Alexandria was never provided a strategic plan with a clear vision for the entire waterfront as a democratic place, a place for all Alexandrians, a potential to boost the livability of the city and its inhabitants.

The project is entrusted to develop a set of guidelines and strategies in attempt to establish a comprehensive framework to guide the future development of the waterfront of Alexandria and occurrence of a paradigm shift willing to oppose the current adopted policies and draw the attention to alternative solutions aspiring to retrieve the waterfront to the public interest.

This to be approached by investigating multiple issues at their different scales and typologies in order to classify the parameters given by the city and resolve them into 3 major bands that define the project metrics, as follows; The Waterfront, The Road, and The City.

Through the performed analysis and the variable issues raised by considering different aspects for investigating the city, the waterfront was elaborated and interpreted into 4 major patterns that on one hand contribute to the unity of the waterfront, while on the other hand, each pattern revealed certain concerns related to its very own setting. Hence, the patterns will be conducted on 2 different scales.

RECUPERO DEL WATERFRONT DI ALESSANDRIA:
Stretegie & Linee guida per un Corniche Democratico

La tesi affronta il tema del rischio di declino della vivibilità della città di Alessandria d'Egitto. il lungomare sarà introdotto come mezzo fondamentale per salvare la vivibilità della città, un bene primario di proprietà pubblica da recuperare.

La tesi affronta in modo critico l'attuale situazione di Alessandria che non ha mai avuto un piano strategico con una chiara visione dell'intero lungomare che invece potrebbe offrire un potenziale strumento per arricchire la vivibilità della città .

Il progetto è intenzionato a sviluppare una serie di linee guida e strategie nel tentativo di stabilirne un quadro globale al fine di orientare lo sviluppo futuro del lungomare di Alessandria, organizzando un modello in grado di opporsi alle politiche adottate fin ad ora ed attirare l'attenzione su soluzioni alternative con l'intento di recuperare il lungomare per l'interesse pubblico.

È stata fatta un' analisi sistematica della città a diverse scale e tipologie allo scopo di sintetizzarli in tre linee guida principali che definiscono i parametri del progetto come segue; Il Lungomare, La Strada e La Citta.

Analizzando le diverse variabili e considerando differenti aspetti della città, il lungomare è stato elaborato ed interpretato in quattro principali modelli che da un lato vogliono contribuire all'unità del lungomare, mentre dall'altra parte, ogni modello ha rivelato alcune preoccupazioni legate alla sua impostazione. Di conseguenza i modelli sono stati elaborati su due scale diverse.

1.1. General Introduction to Thesis Work:

Urban Waterfronts are proposed as one of the most fruitful facets of creative cities. Dense and hybrid places where resources, opportunities, aspirations and ambitions of cities become vision, new relationships and projects.

The thesis is entitled to address the risk of declining livability of the city of Alexandria, Egypt. Once stood as grandiose frontage of the Mediterranean, nowadays the city's waterfront encounters the risk of losing its essence as a place for public enjoyment. Moreover, the waterfront will be introduced as a fundamental way out to rescue the declining livability of the city in a whole, a prime asset of public property to be retrieved.

The thesis is concerned that, the city of Alexandria was never provided a strategic plan with a clear vision for the entire waterfront as a democratic place, a place for all Alexandrians, a potential to boost the livability of the city and its inhabitants. In addition, most of the implemented projects and the future transformation projects proposed by the municipality were observed to be not identifying any clear public identity to the waterfront and the pedestrian accessibility to the waterfront as a great portion of public space was never conceived.

The project is entrusted to develop a set of guidelines and strategies in attempt to establish a comprehensive framework to guide the future development of the waterfront of Alexandria and occurrence of a paradigm shift willing to oppose the current adopted policies and draw the attention to alternative solutions aspiring to retrieve the waterfront to the public interest. Nevertheless, it can be further elaborated into a group of key projects capable to better promote the resources and opportunities of the waterfront.

This to be approached by investigating multiple issues at their different scales and typologies in order to classify the parameters given by the city and resolve them into 3 major bands that define the project metrics, as follows;

-The Waterfront: as a target to exploit, rejuvenate and enrich.
-The Road: not only as the problem, but at the same time a potential to perform as a better waterfront connector.
-The City: on one hand, as the global conductor to the entire image of the project, while on the other hand, as the fine mesh that carries all the inherited qualities and potentialities.

Through the performed analysis and the variable issues raised by considering different aspects for investigating the city, the waterfront was elaborated and interpreted into 4 major patterns that on one hand contribute to the unity of the waterfront, while on the other hand, each pattern revealed certain concerns related to its very own setting. Hence, the patterns will be conducted on 2 different scales.

1.2. Context & Historic Overview

Alexandria is located north-west of the Nile delta and stretches along a narrow land strip between the Mediterranean Sea and Lake Mareotis, site of the city's fresh water.
Ancient Alexandria was founded in 331 BC by Alexander the Great who appointed Dinocrates as director of the surveying and urban-planning work for the city of Alexandria (on the Mediterranean coast of Egypt), which was laid out on a "Hippodamus" grid plan that was influential in Hellenistic city planning. He was aided by Cleomenes of Naucratis and by Crates of Olynthus, an esteemed hydraulic engineer who built the waterworks for the city and the sewer system demanded by the low-lying site. The city incorporated the best in Hellenic planning and architecture. Within a century of its founding, its splendours rivaled anything known in the ancient world. In these early years Alexandria was known best for being the city to which the body of Alexander the Great was returned by Ptolemy. Ptolemy was one of Alexander's generals and it was into his hands that the city was passed.

Alexandria had been the cultural and intellectual capital of the Hellenistic world, a world not of nations but universal and cosmopolitan, the common possession of all mankind [1], a mixture of Greek, Egyptian and Jewish populace. The Greek though still had control and were responsible for the construction of the Pharos, the Lighthouse of Alexandria, which was one of the Seven Wonders of the Ancient World.

Greek influence slowly declined as the might of Rome increased. As Alexandria was captured by Julius Caesar in 47BC following an internal dispute between Cleopatra VII and her brother Ptolemy XIII. Although the city was once again briefly given back to the Greeks, the city finally became a Roman city in 30BC when it was taken by Octavian, also known as Augustus.

The city became not only, an important center of the Hellenistic civilization, but also remained the capital of Hellenistic and Roman & Byzantine Egypt for almost 1000 years. It experienced uninterrupted growth and prosperity, flourished and grew rich and productive and became, in Strabo's words, 'the greatest emporium in the inhabited world' (El-Abbadi, 2000). Within decades of its foundation, it had become the major commercial center of the ancient Mediterranean. [2]

However, it was with the founding of Alexandria in 331 BC that the site steps into the full light of history. A causeway known as the Heptastadion, was constructed to link the mainland to the island of Pharos, thus creating two remarkable harbors: Portus Magnus to the east and Eunostus to the west. Within the innermost corner of the Eastern Harbour, close to the Heptastadion, a structure known as the Kibotos was built, and functioned as a lock connecting the sea with Lake Mariout to the south. The lake was in turn connected to the River Nile by canals, thus providing a link for maritime shipping to the inland waterways of Egypt and greatly increasing the possibilities for transport and commerce. [Ibid]

"On entering the great port, the island and lighthouse of Pharos lie to the right while on the left are seen a cluster of rocks and Cape Lochias, on whose summit a palace stands. As the ship approaches the shore, the palaces behind Cape Lochias astonish one because of the number of dwellings they contain, the variety of constructions, and the extent of their gardens …" was a picturesque description of the Eastern Harbor by Strabo, a geographer of the first century BC. (Strabo, The Geography, Vol XVII). [Ibid]

The Roman City (30 BC - AD 641)

In Strabo's time, (latter half of 1st century BC) the principal buildings were as follows, enumerated as they were to be seen from a ship entering the Great Harbour:

The Royal Palaces, filling the northeast angle of the town and occupying the promontory of Lochias, which shut in the Great Harbour on the east. Lochias has almost entirely disappeared into the sea, together with the palaces, the "Private Port" and the island of Antirrhodus.

The Great Theater, used by Caesar as a fortress, where he stood a siege from the city mob after the battle of Pharsalus

The Poseideion, or Temple of the Sea God, close to the Theatre known as "The Timonium" built by Mark Antony;

The Emporium (Exchange), the great trading market;

The Navalia (Docks), lying west of the Timonium, along the sea-front as far as the mole;

Behind the Emporium rose the Great Caesareum, by which stood the two great obelisks, each later known as "Cleopatra's Needle," This temple became, in time, the Patriarchal Church of Alexandria;

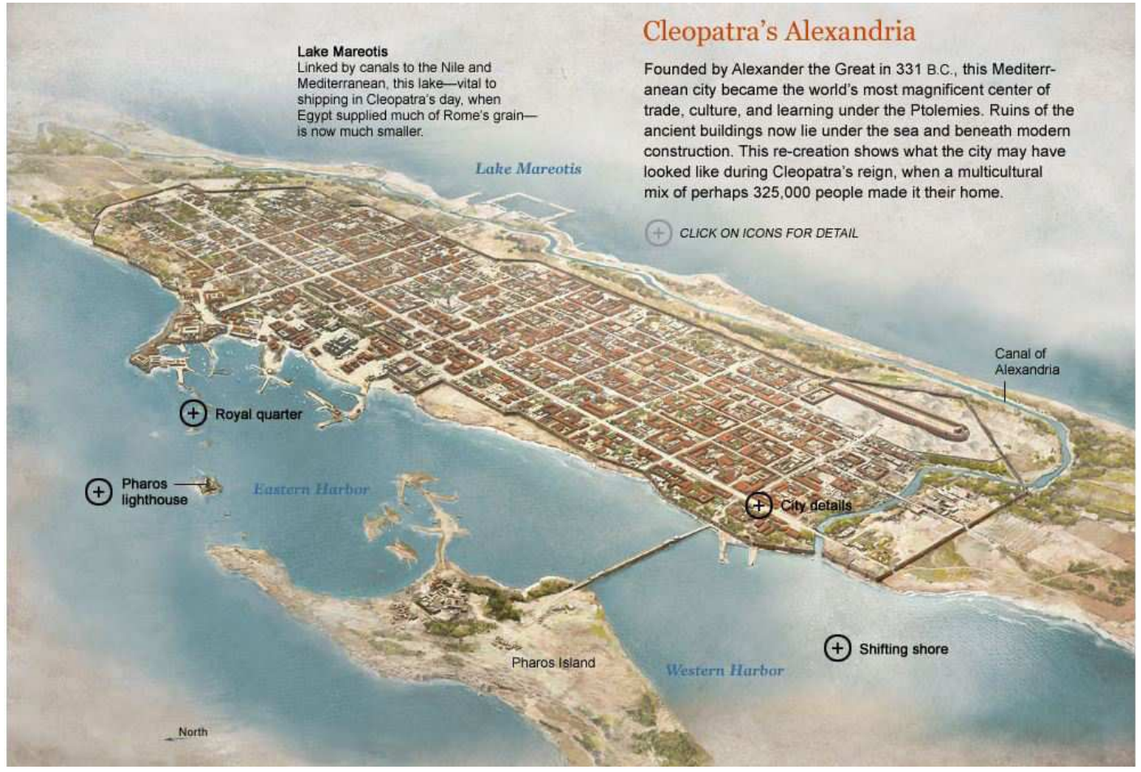
The Gymnasium and the Palaestra are both located inland, in the eastern half of the town; they have never been rediscovered;

The Temple of Saturn; site unknown.

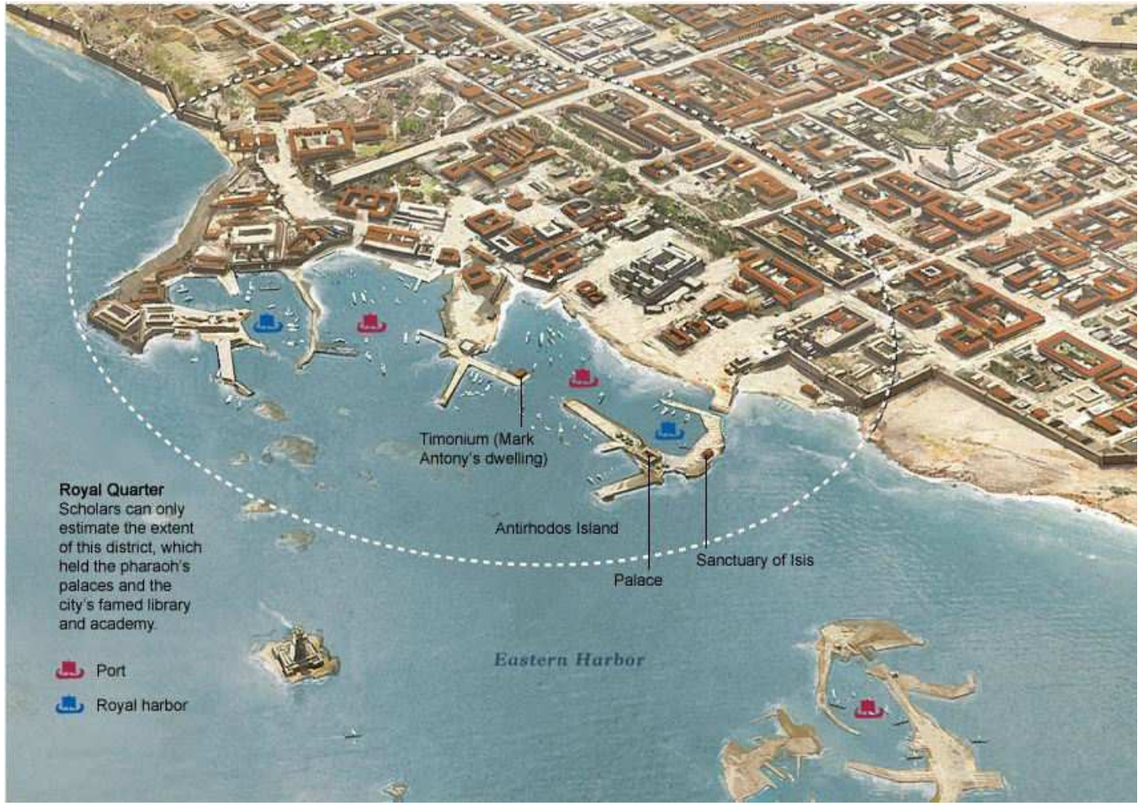
The Mausoleum of Alexander (Soma) and the Ptolemies in one ring-fence, near the point of intersection of the two main streets of the city;

The Museum or Mouseion with its Library and theatre in the same region; site unknown.

The Serapeum, the most famous of all Alexandrian temples. Strabo tells us that this stood in the west of the city; and recent discoveries go far to place it near “Pompey’s Pillar” which, however, was an independent monument erected to commemorate Diocletian’s siege of the city.



Reconstructed model depicting ancient Alexandria (Courtesy of National Geographic)



Blow up view depicting the configuration of the Royal Harbor of Ancient Alexandria (Courtesy of National Geographic)

Decline:
Under the influence of Rome Alexandria continued to flourish as a trading center, but the metropolitan nature of the city was causing problems with war breaking out between the different races. The importance of Alexandria though was on the decline, following the collapse of the Roman Empire, Alexandria came under the control of the Persians, the Byzantium Empire and finally the Arabs, who's hands it remained in from 641 A.D. This though saw the end of Alexandria as the capital of Egypt. Nature was also playing a role in the decline of the city as first a Tsunami hit in 365 A.D.

Both historical records and archaeological evidence of collapse have shown that the city was devastated both onshore and offshore by an earthquake in the mid- to late-eighth century A.D., and by one or two earlier earthquakes sometime during the period 200 to 600 A.D.

In more modern times, or at least the last two hundred years, Alexandria has continued to play an important role in the history of Egypt and Africa. The Battle of Alexandria in 1801 saw the British start to overturn the French dominance, under Napoleon. Napoleon had sent his troops into the city back in 1798 and it was one of the bases from which he sent his scholars out to learn all about the history of Egypt.

Following the expulsion of the French, Alexandria came under the control of the Ottoman Empire, who began to rebuild the city and make use of its strategic coastal position. This position though also made it vulnerable to attack, and the British once again attacked the city by sea in 1882.

Renaissance:
Alexandria was re-founded in the 1820s by Muhammad Ali, an ambitious and westernizing ottoman adventurer from Kavala in northern Greece who made himself master of Egypt in 1805. Almost all traces of the once splendid ancient city had vanished. A city of five thousand people marked the site. Muhammad Ali brought the city back to life by digging Mahmoudiya canal, making Alexandria the seaport of the Nile. The canal stimulated the potential of the Nile valley and the Delta. He developed and enlarged the Western Harbor which had been closed to Christian shipping, and opened it up for trade, where he built dockyards and a fleet. On the headland of Ras el Tin, the closest point to Europe Muhammad Ali built a palace and nurtured his ambition to make Egypt prosperous and strong. [Ibid]

Today Alexandria is the second largest city within Egypt, second only to Cairo. The position on the coast sees it play a major role in Egypt's sea trade, with the vast majority of imports and exports for the country being transported through the modern day port. It is more than just an industrial city though and every year hundreds of thousands of tourists make the city their temporary home as they take advantage of the Mediterranean coastline.

1) "Vintage Alexandria: Photographs of the City, 1860-1960" / by Michael Haag.
2) "Towards integrated management of Alexandria's coastal heritage"

Ras el–Tin Palace, built by Muhammad Ali in 1847

Montaza Palace, built in 1892 by Khedive Abbas II, the last Muhammad Ali Dynasty ruler.

1.3. History of Cartography in Alexandria.

Beyond The Myth:
In search of traces of old cartography for the city of Alexandria, a remarkable book was found to be a comprehensive collection of Alexandria's most important cartographic maps by Luisa Ferro and Cristina Pallini. A Politecnico di Milano professor Luisa Ferro had further contributions to the city of Alexandria, a research study to "The astronomical orientation of the urban plan of Alexandria", in which she derived a conclusion that Alexandria was deliberately orientated towards the rising sun on the day of birth of Alexander and the rising of the king's star Regulus.

Alessandria d'Egitto OLTRE IL MITO: architettura archeologia trasformazioni urbane, a cura di Luisa Ferro e Cristina Pallini.

Ps: The maps reviewed were seen as a fundamental approach to understand the natural setting of the coast of Alexandria and the different changes in the shoreline through times.

In spite of the fact that the Mediterranean Sea was infested with pirate ships -Christian and Islamic - and that the plague of piracy continued until the end of the l 9th century, there is a gradual increase in the number of Christian travellers calling at Alexandria on board European vessels. From the middle of the 14th century, the visits of these travellers are documented by their travel diaries, which provide valuable information on the trade and the movement in the ports. [3]

Most of these travellers were pilgrims, merchants, diplomats and scientists, and have left valuable observations as well as a number of maps, plans and illustrations of Alexandria and its ports. Prior to the view of Alexandria that is depicted in the Codex Urbinate made for Ugo Comminelli in 1472 [4], all the earlier representations were schematic and do not provide reliable information on the appearance of the town and of its ports. So the plan of Comminelli is, as far as we know, the very first panoramic depiction we have of the town and its ports. It should however be stressed that all the early plans, although extremely useful for the understanding of the medieval topography of the town, were often much influenced by the artist's imagination. It was also customary to copy previous plans and maps, with additions.

3) "Underwater Archeology and coastal management: Focus on Alexandria". UNESCO Publishing.
4) Codice Urbinate 277, Biblioteca Vaticana, cf Gaston Jondet, Atlas Historique de la Ville et des Ports d'Alexandrie, pl. I. Societe Sultanieh de Geographie d' Egypte, Cairo (1921).
5) "Alessandria d'Egitto OLTRE IL MITO: architettura archeologia trasformazioni urbane"/ a cura di Luisa Ferro e Cristina Pallini.

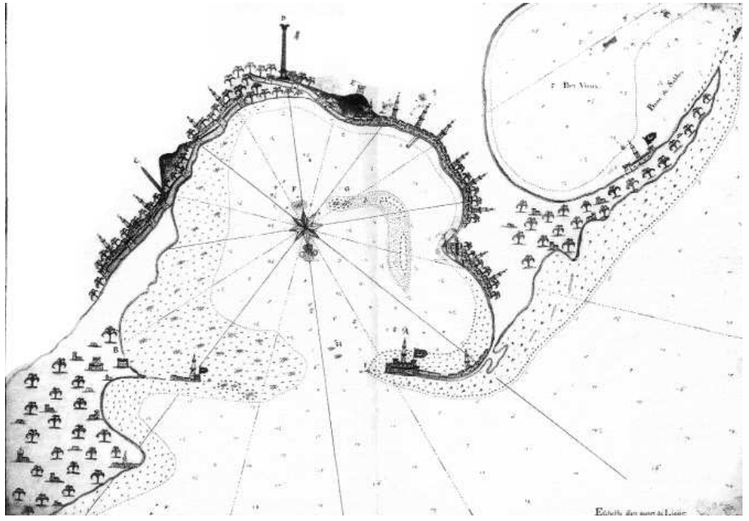
[1470 - 1480] By; Jacopo d'Angelo, Ugo Comminelli, Pietro del Massaio, Francesco Roselli. Archives of the Bibliotheque Nationale de France.

At the beginning of 16th century, an early perspective views were developed by Foresti De Bergamo (1508-1524), Pierre Belon du Maus (1547), and Johannes Helffrich (1566). Later on, a transition from mere views to first topographic maps was realized in the “Portolani Nautical Charts” where precise drafting of coastline and landmarks on the coast were located. Followed by Kitab – I Bahriye (1521-1526) a book of navigation by the Turkish admiral and cartographer Piri Re’is. In 1699, Christian Melchien identified several landmarks of the city (Lighthouse, Pompey pillar, Cleopatra’s needle, numerous minarets, and Garde d’Alexandrie, a tower on the western hill). [5]

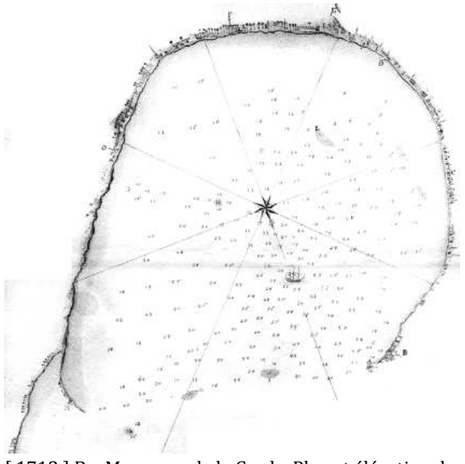
The early topographic maps of the city show the separation between the ancient city and the new one, when the inhabitants went from inside the old wall and settled on the peninsula between the two ports.

[1575] By; Braun and Hogenberg, Civitates Orbis Terrarum II 56.

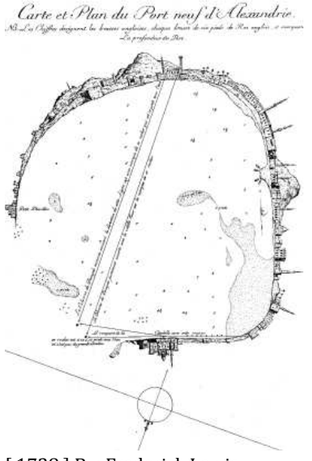
[1685] By; Etienne Gravier d’ortieres.



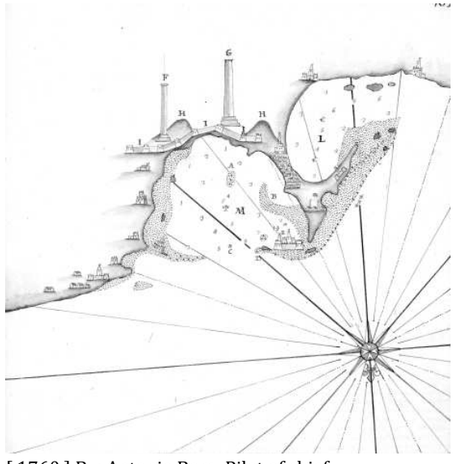
[1699] By; Christian Melchien, Plan du port d’Alexandrie.



[1713] By; Marquese de la Garde, Plan et élévation de la rade d’Alexandrie.



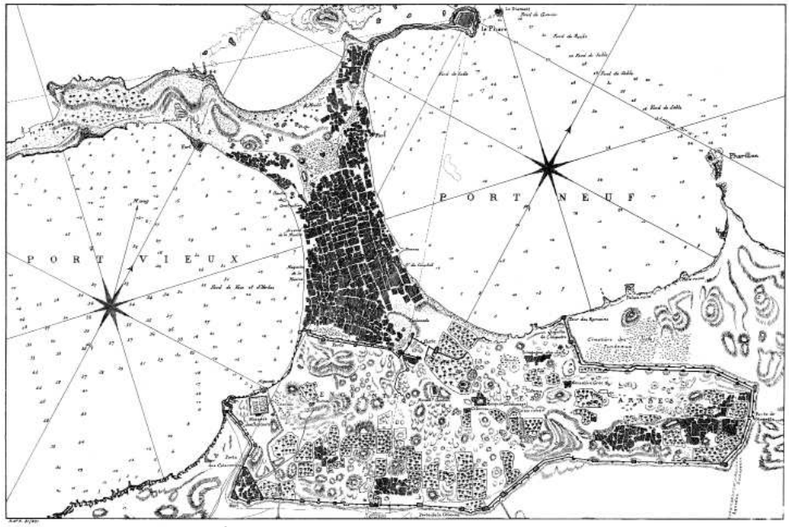
[1738] By; Frederick Lewis Norden, Carte et plan du port neuf



[1760] By; Antonio Borg, Pilot of chief galley of the Order of Malta.

In 1798, the French fleet carried not only 2000 guns but also 167 scholars known as civil scientists. This was when Napoleon decided to map Alexandria and write the history of Julius Caesar in (la Description de ,l'Égypte).

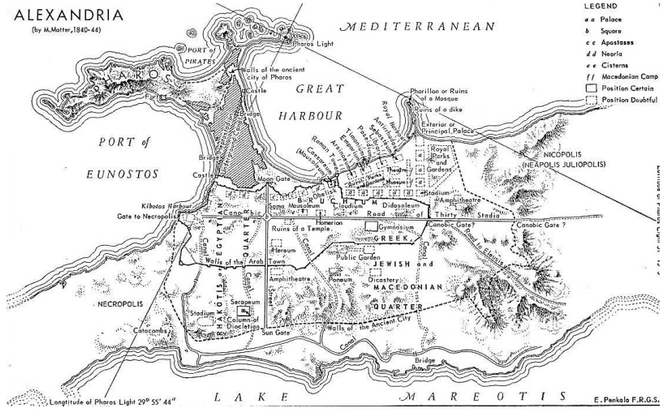
[1798] la Description de ,l'Égypte
By; Gratien Le Père, Carte générale des côtes, rades, ports, ville et environs d'Alexandrie.



1798] la Description de ,l'Égypte
By; Ingénieurs de l'armée d'Orient, Plan général des deux ports de la ville moderne et de la ville des Arabes.

The topographic maps of the 19th century, fairly corresponding to reign of Mohamed Ali (1805-1849) a significant evolution can be observed through the several transformations implemented, as follows;
- Creation of Mahmoudiya Canal and urbanization to the south of the ismuths.
- Demolition of the north-western section of the defensive walls.
- Emergence of European quarter (Place des Consuls).
- Development of Ras el Tin area around the palace.
- Emergence of warehouses and commercial depots around the area of Mina el Basal.

[1855] By; Charles Müller, Plan d'Alexandrie comprenant toutes ses fortifications, rues et édifices principaux.

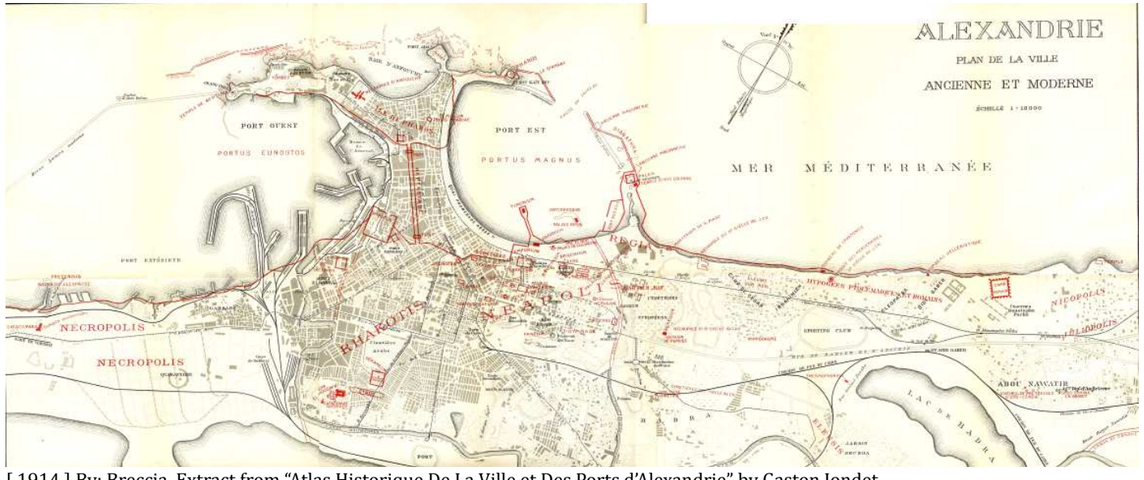


[1840] By; M. Matter.

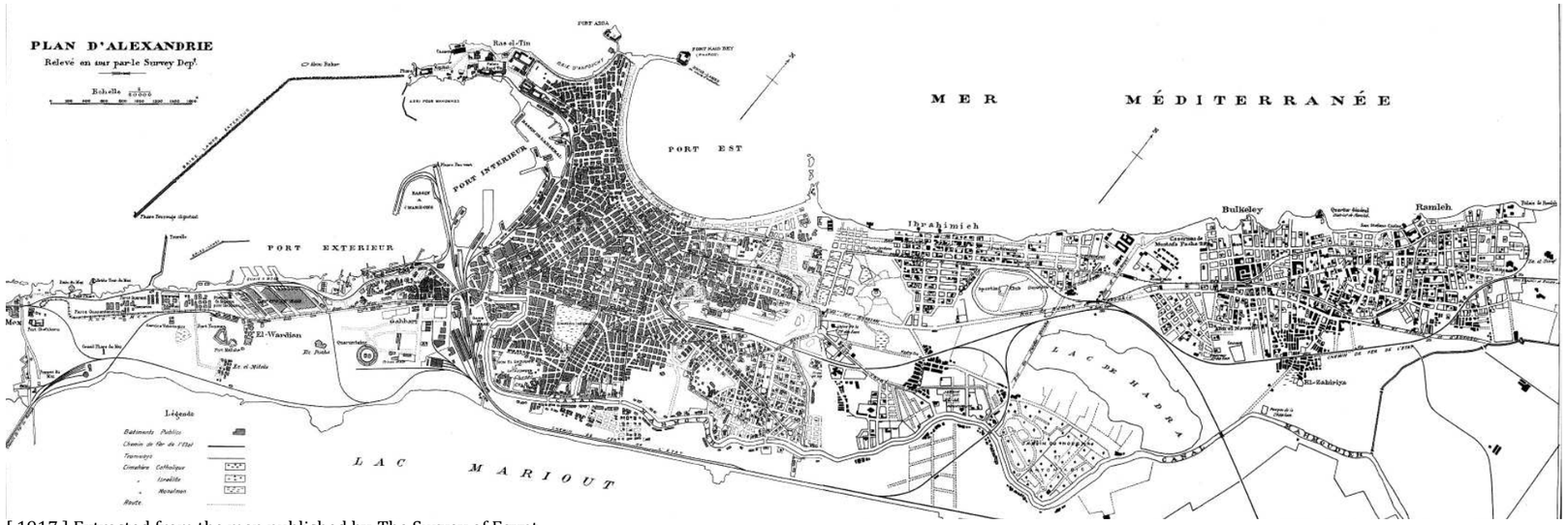
In 1865, Mahmoud el Falaki, an astronomer who was appointed to make the necessary excavations to free the ruins from a thick layer of earth. El Falaki drew up a very precise and detailed key map for the city.

[1866] By; Mahmoud Bey El-Falaki, Carte de l'antique Alexandrie et de ses faubourgs. Extract from "Atlas Historique De La Ville et Des Ports d'Alexandrie" by Gaston Jondet.

1914, a map by Breccia depicting the ancient and modern cities by superimposition of both maps showing the evolution of the shoreline.



[1914] By; Breccia. Extract from "Atlas Historique De La Ville et Des Ports d'Alexandrie" by Gaston Jondet.



[1917] Extracted from the map published by, The Survey of Egypt.

Until this map, representations were mostly limited to that urban boundary before the city expanded towards East as shown in the next map of 1958.

[1958] By; US Army.

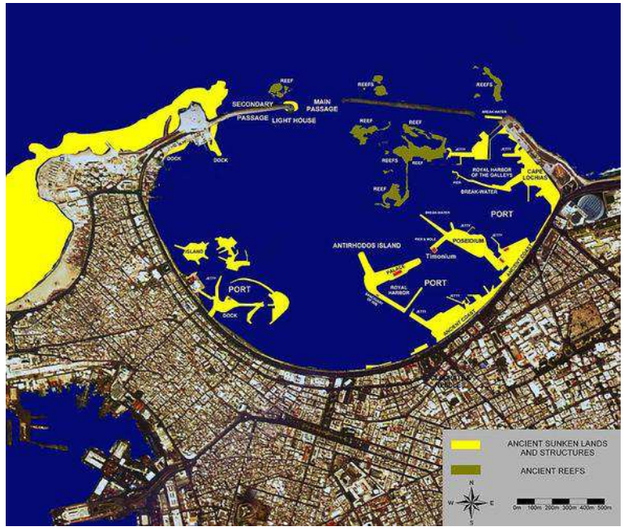
Map is compiled from: Al-Iskandariyyah Tourist Map 1992. Shows the urbanization of the eastern portion of the city.

Map is compiled from: Google satellite imagery 2013. Shows the urban sprawl on the agricultural land towards South.

1.4. Discoveries of Coastal Heritage:

For centuries, ancient writers had praised the Egyptian cities of Canopus and Heracleion as visions of splendor. Such descriptions had long sparked the interest of historians and archaeologists in the modern world, but the cities themselves were nowhere to be found. Finally, in 1992, researchers from the Institut Européen d'Archéologie Sous Marine—European Institute of Underwater Archaeology (IEASM)—set out to search the Alexandrian waters. Literary texts, ancient inscriptions, papyrological documentation, and archaeological information provided by Egypt's Supreme Council of Antiquities (SCA) all indicated great promise in this region. Still, scientists had only a faint idea of the monuments and artifacts hidden in these shallow waters. Their discoveries now reveal that Canopus and Heracleion formed a rich network with nearby Alexandria, a network that allowed the entire region to flourish. Today the sunken cities contain only remnants of this network, but artifact by artifact, excavations have brought us a few steps closer in the never ending search for Cleopatra VII, the last Ptolemaic queen of Egypt.

The site of Alexandria and its coastal environs appear to have possessed some significance even before Alexander the Great founded the city. Greek literary tradition dating back to Homer recognizes the island of Pharos as a landing stage for international navigation, and there is some evidence of Pharonic port facilities to the northwest of the island. Rhakotis, on the mainland, was one of several hamlets that guarded the Egyptian coastline from possible sea-borne incursions during the Pharonic period. Its eventful history has left Alexandria with a variety of archaeological remains, many of which are now submerged (Morcos, 1985). [2]



The eastern port of Alexandria as it looked during the Ptolemaic and Roman periods. The today's sunken lands and structures are marked in yellow. (Courtesy of Franck Goddio/Hilti Foundation)

Here the team retrieves the statue of the god Hapi. ©Franck Goddio.

A bronze statuette of a Pharoah of the 26th dynasty. ©Franck Goddio.

More and more statues are brought to surface, still in excellent condition. ©Franck Goddio.

2. FOCUS OF THE THESIS WORK

2.1. Application to Case Study of the Waterfront of Alexandria.

A) Introduction

The liquid city is not only a port area, but an accumulation of productive, relational, cultural, leisure and housing functions. It's not enclosed and protected area, but an osmotic interface and a permeable perimeter, sometimes rigid, but as much often spongy [6]. Such a notion was left to abandonment and neglect while dealing with the city's waterfront, especially in the last decades when the livability of the seaside declined and the quality of the waterfront as an accessible open space was drastically minimized.

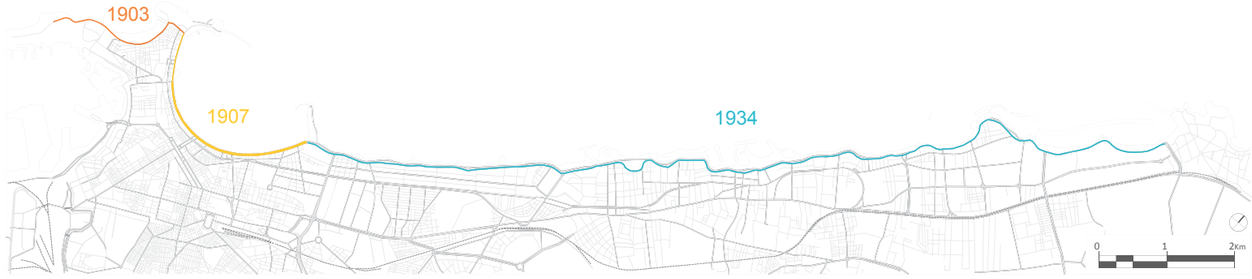
Before construction of the Corniche

B) Historic Overview to the construction of the Waterfront of Alexandria and its First Corniche:

The attention to the rehabilitation of the city waterfront was witnessed in 1903, when work was started to construct the Corniche from Ras el-Tin to Anfoushy, later in 1907 work began on the docks along the eastern harbor by Almagia' Company, that was already thought in 1870 by Pietro Avoscani [7], an Italian Egyptian architect who was born 1816 in Livorno, he emigrated to Alexandria in 1837, where he died on 1 March 1891, was the first creator of the great promenade of Alexandria. Italian emigration to Egypt included a sizeable number of architects, engineers, and builders: pioneers who set to work for Mohamed Ali; political exiles who had been involved in the Risorgimento risings; emigrants seeking their fortune in and after the "golden days of the Khedives"; and up and-coming professionals. Their influence began to make itself felt with the reconstruction of Alexandria (1819–1848), reaching a peak at the start of the twentieth century and lasting until the Nasserite period.[8]

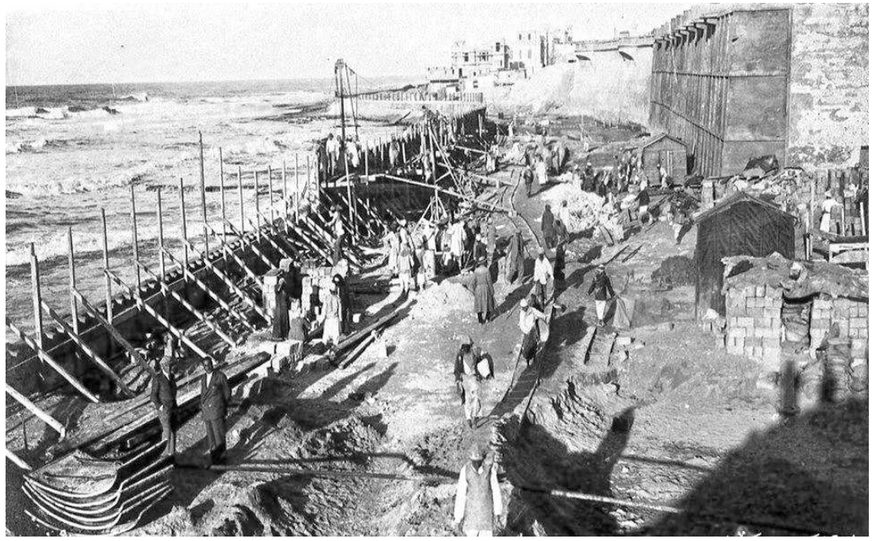
In 1921, with the evolution of Alexandria during the first half of the 20th century, a comprehensive master plan was developed by the chief architect of the municipality of Alexandria back then "McLean". The plan included several aspiring and necessary projects that can accommodate the increases in the city's population at the time, among those mega-projects was the idea to establish the Corniche of Alexandria.

In 1930, The prime minister of Egypt, Ismail Sedky pacha accepted the proposal of the Italian engineer Dentamaro to construct a new road along the entire coast of Alexandria. By 1934 Dantemaro finished constructions, the Corniche was inaugurated, and the city was given its first seawall.



Map 1: Phases of construction of the first Corniche

6) "La Città sostenibile del Mediterraneo: conoscere il passato e il presente per costruire il future" / Giovanni Spalla.
7) "Aspetti della marginalità urbana nei paesi in via di sviluppo: il caso di Alessandria d'Egitto" / Dato, Giuseppe, 2003, ISBN 88-87669-42-2, p. 62.
8) "Italian Architects and Modern Egypt" / Pallini, Cristina, MIT. P.6 retrieved 2013-05-15.



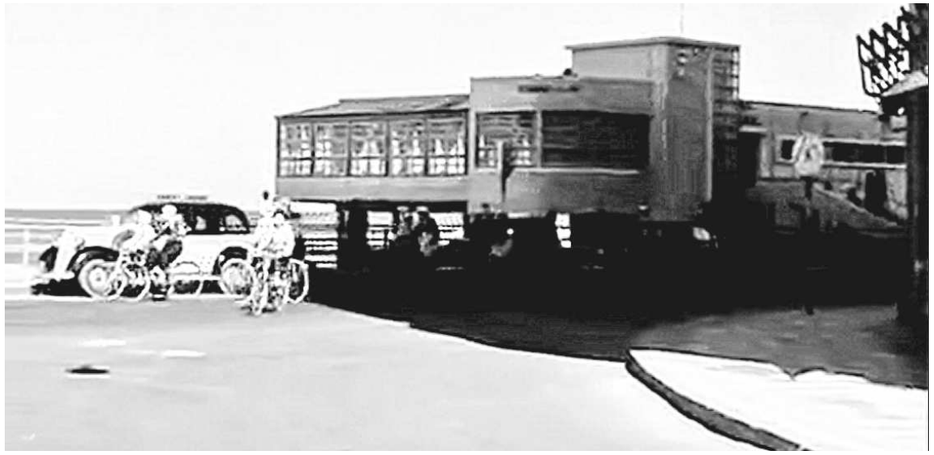
Construction of the Corniche & seawall by Dantemaro 1930s.

Aerial photo of the Eastern Harbor after the construction of the Corniche road.

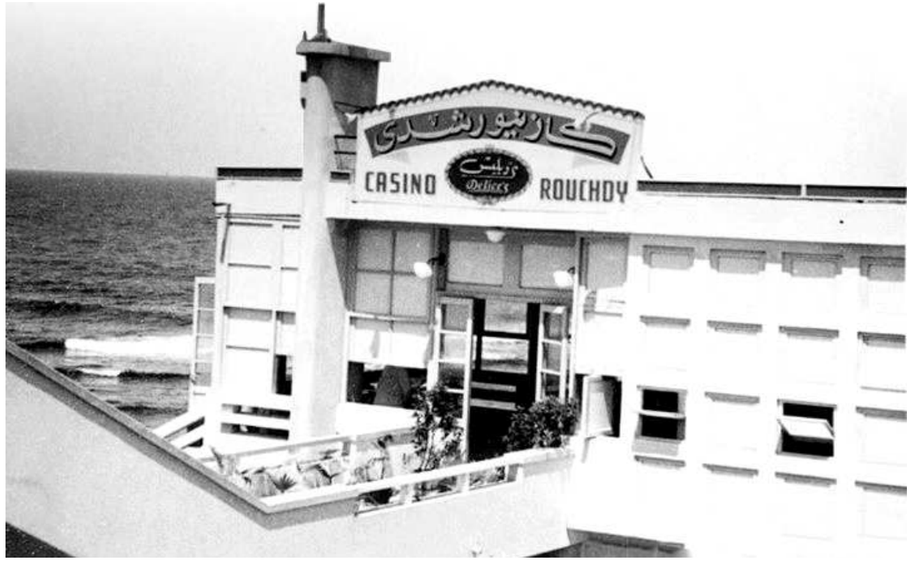
Natural cove of Sporting area, entirely landfilled for the sake of the new road

Cabins of Sidi Beshr beach circa 1960, demolished to broaden the road in the 1990s.

Casino Shatby, now rebuilt on different setting.



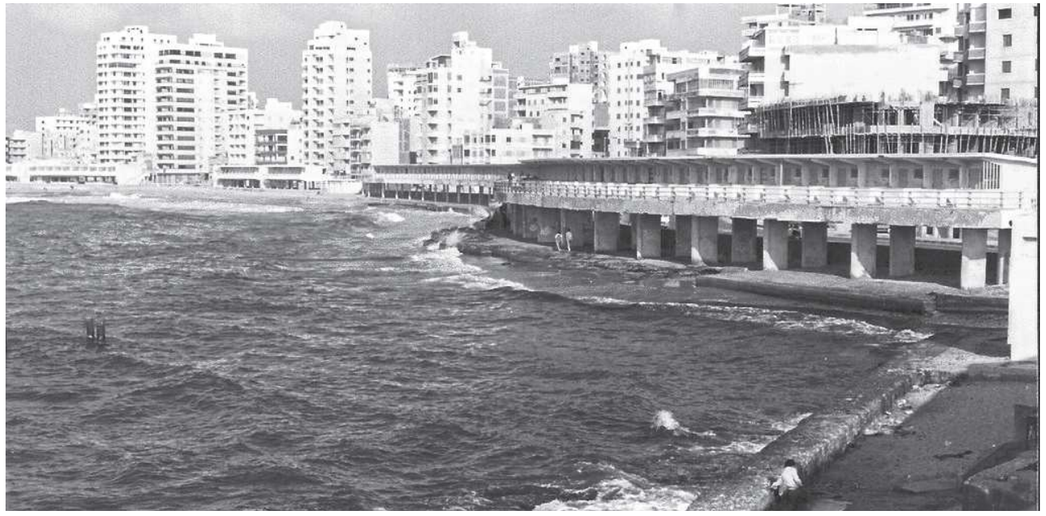
Casino Sporting, now demolished and the natural cove was entirely landfilled.



Casino Rouchdy, now demolished and replaced by the private gated waterfront.

Casino Saraya, now deteriorated and marginalized after construction of Stanley bridge.

Stanley bay and beach cabins, now obscured by the bridge constructed across the bay.



Cabins strip was demolished in favor of the new road.

C) Corniche Road Extension Project:

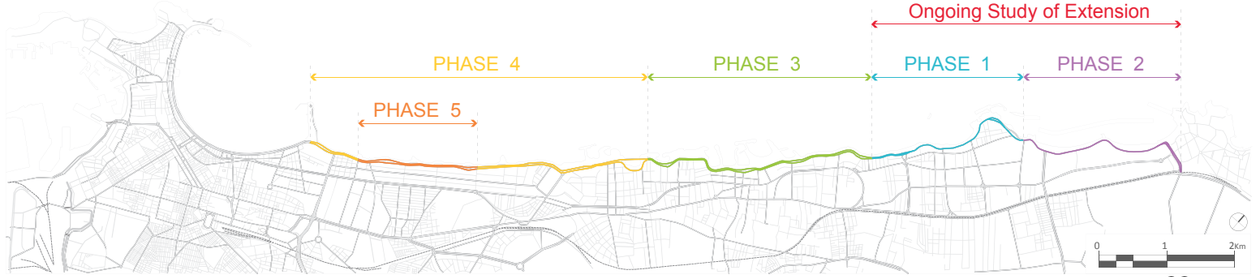
"Widening roads to relieve congestion is like loosening your belt to relieve obesity" Walter Kulash, Orlando traffic engineer.

In 1998, the extension project was launched and engineer Ossama El Mor, was appointed as a Project manager for the corniche extensions. The constructions took place on 5 phases as follows;

Phase 1:
From: Mahrousa Hotel , To: Khaled Ibn Elwaleed Street (about 2.6km)
Started: 1.3.1998 Ended: 30.6.1998
Method of extension:
To broaden the road by about 7-9 meters, without reduction of beaches depth. Apparently, the width added to the road was cut at the expense of the beach cabins strip. The demolition of the cabins has changed the character of the beaches along this section.

Phase 2:
From: Khaled Ibn Elwaleed Street To: Montaza park
Started:1.10.1998 Ended: 30.6.1999
Method of extension:
Followed the same notion of extension as in phase 1

Phase 3 From: Mahrousa To: Stanley bridge Ended: June 2000
Phase 4 From: Stanley bridge To: Sporting +Shatby to Silsila Ended: June 2001
Phase 5 From: Sporting To: Shatby Ended:2002
Method of extension:
Unlike Phase 1&2, this section was to be broadened at the expense of the sea itself, where a significant landfill took place directly into the sea, for the sake of the new 45m wide road (5 lanes/each direction) and the new private waterfront.



Map 2: Phases of extension of the Corniche

Notably, the seabed in this part is composed of natural rocks known as “Coastal Ridge” - upon which the seawall was constructed in 1934 - that required defense along the shoreline to protect the road from the natural rocks being carried and thrown by the sea currents and tides, says Dr. Alfy Fanoos, the former manager of the “Institute of shores protection” in Alexandria. Thus, the need to construct a cordon of concrete blocks “Accropode” to protect the new landfill rubble was inevitable. Such a massive intervention had strong impact on the image of the waterfront that made it aesthetically displeasing.

Ongoing Study of Extension:
Nevertheless, another extension phase is currently proposed by the municipality of Alexandria, perhaps the extension project will be based on the same concepts followed in the previous practice by giving the road 5 lanes on each direction instead of its current 3 lanes.

D) Today’s Condition:

“CAN ANYONE TELL ME: how does one get the idea of separating a city from the sea with a highway? When those in power decided to place the highway along the Corniche they did not ask us. Instead they destroyed the beaches, they destroyed the old cabins. To build a highway is to encourage cars to go faster not caring about the people who wish to go to the sea.” Says Salah Hareedy, Associate Professor, Department of Architecture, Alexandria University.

Extensive landfill of privatized waterfront.

Casino Shatby and the evident change in its setting seized by the new road.

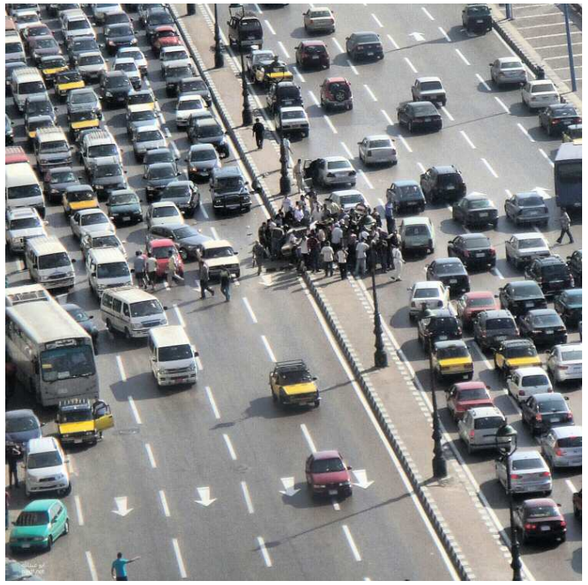
Nowadays, the road have strong negative impact on the livability and tranquility of the waterfront

Accidents

Diverse scenarios of accidents are taking place at different parts of the road, as the new road profile induce drivers to speed up leading to deadly accidents in most cases.

39.5% violate the speed limit on the Alexandrian Corniche Road. The top violators are buses, 2nd private
vehicles, 3rd taxis, 4th microbuses and 5th large and small trucks.

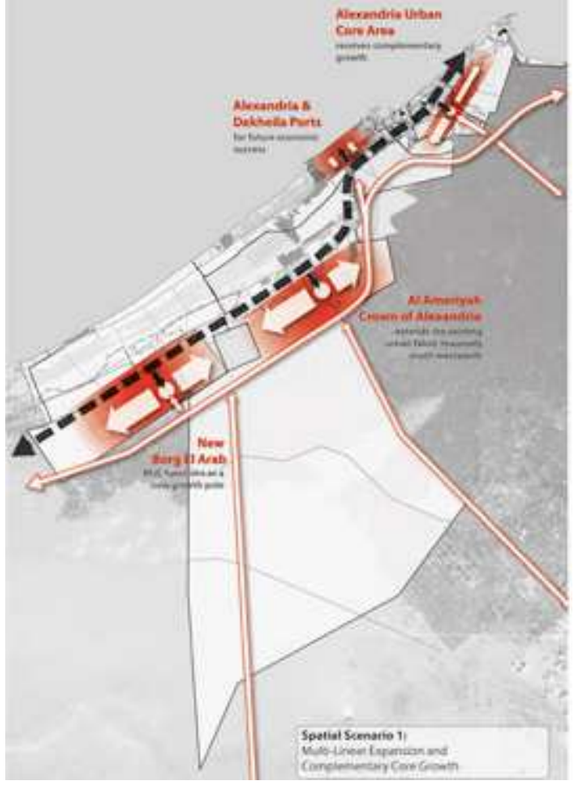
Source: Johns Hopkins University, World Health Organization (WHO), Ministry of Interior, CAPMAS , 2011



2.2. Future Transformation Projects & Visions by the Municipality of Alexandria

A) STRATEGIC MASTER PLAN FOR THE URBAN DEVELOPMENT 2032 | Alexandria, Egypt.
MHUUD - Ministry of Housing, Utilities & Urban Development, Egypt.
General Organization for Physical Planning (GOPP).
Organizational Unit for Development Assistance (OUDA).
AS&P – Albert Speer & Partner GmbH – Architekten, planer – Frankfurt.

The project is expected to develop a Strategic Urban Plan (SUP) for Alexandria City to provide the road map that will guide development of Urban Management Strategy and Guidelines to ensure a sustainable long-term city development till year 2032, reflecting the Governorate's vision and goals.
Two alternative general spatial schemes for the development of Alexandria have been elaborated. Each scheme forms a distinct spatial development path to achieve the city vision for Alexandria 2032 and both plans realize the main objectives and strategic goals of sustainable urban growth.

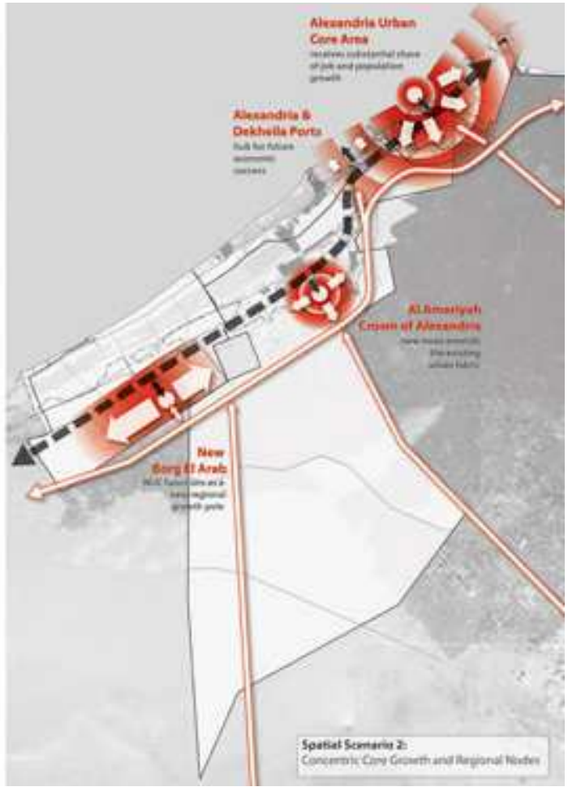


Spatial Scenario (1) for development of Alexandria 2032. Courtesy of As&p.

The first scenario builds upon Alexandria's heritage as a linear city and proposes a main settlement axis running in an east-west direction bridging the gap between Alexandria and new Borg El Arab.

The second scenario envisages an onion skin-like growth of the existing core settlement body with complementary regional centers in the west. A particular strength of this proposal lies in its direct response to developer and consumer preferences in the Alexandria real estate market.

In the upcoming second phase, the strongest features from both scenarios will be combined in one coherent strategic land-use map for Alexandria. Moreover this phase includes concept plans for pioneering projects; Medical City and Olympic City.

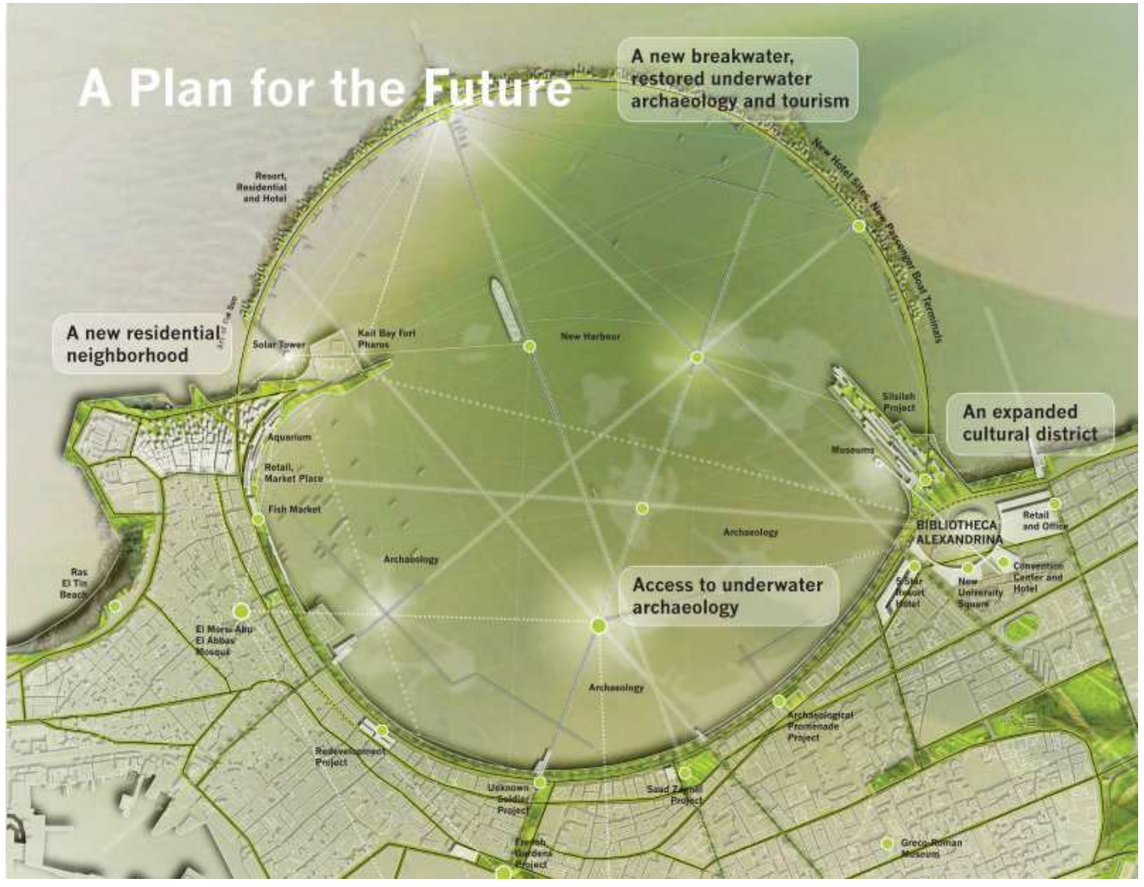


Spatial Scenario (2) for development of Alexandria 2032. Courtesy of As&p.

B) A Framework Plan for the Historic Eastern Harbor of Alexandria City.
International Competition, Winner: Skidmore Owings & Merrill llp.

The Master Plan aims to regenerate the Eastern Harbor of Alexandria and to help re-establish the city's position as one of the leading cultural centers in the world. The design strives to fulfill the following;
- Re-energize the waterfront environment.
- Improve transport and pedestrian accessibility
- Enhance civic destinations.
- Tourism will be strengthened by the integration of existing historic sites and the creation of investment opportunities.

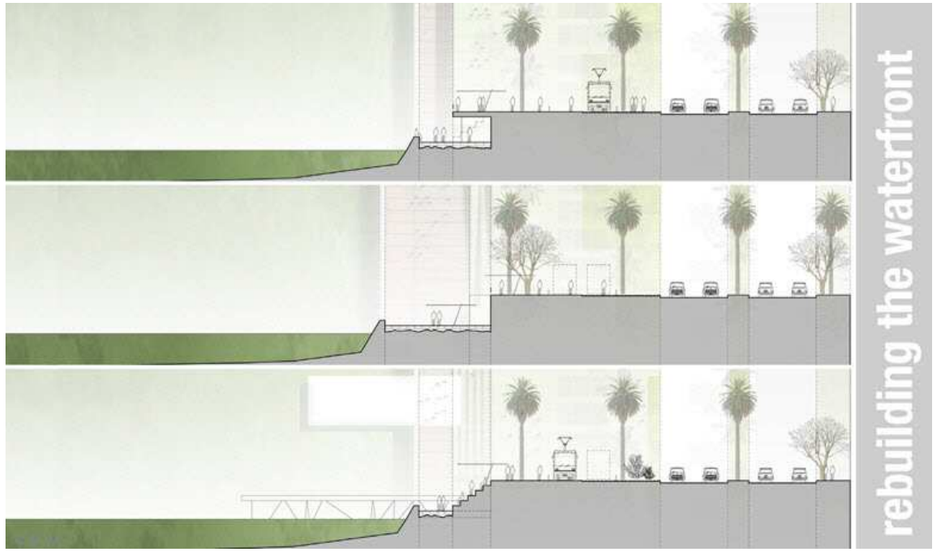
Aerial overview of the future vision for the Eastern Harbor showing the added breakwater to perfectly enclose the harbor as a ring of destinations. Cortesy of SOM.



General Master plan showing the key projects of transformation and the constellation of linked destinations. Courtesy of SOM.

New residential neighborhood and Solar tower next to the Qait Bey Fort.

A blow up view showing the re-configuration of the road and the expanded waterfront with new piers for water transit.



Cross sections showing the variable profiles of the expanded waterfront, new Corniche light rail and new piers of water

Photo edit depicting the image of the new waterfront.

C) COMPREHENSIVE STUDY OF GENERAL TRANSPORT PLAN | Alexandria, Egypt.
Alexandria Governate
Ministry of Transport
Faculty of Engineering; Dr. Amr Youssef El Sherif.

The rapid urban growth of the metropolitan area of Alexandria demands a continuous development and expansion projects in the transport system to commensurate with the excessive increase in the population and the development of socio-economic state. This urbanization and expansions in the commercial and industrial activities lead to an increased need to travel between the different parts of the city. While the existing modes of collective transport is not capable to mobilize this excessive growth of passengers, moreover, the deterioration of its physical condition and performance didn't meet the needs of mobility within the city, that consequently increased the private car ownership and prevalence of informal transport modes (Microbus) causing traffic congestions & bottlenecks in most of the roads. Eventually, that caused a significant difficulty of moving east-west. Thus, this study aims to set a comprehensive plan for the development of the mass transit system and goods freight in the governorate of Alexandria (Suburban Train – Light Rail - City Tram - Buses).

Plan of Redevelopment of mass transit. To exploit the existing infrastructure of Rails and Trams to be transformed into an integrated system of surface and isolated corridors of fast mobility. Courtesy of Dr. Amr el Sherif.

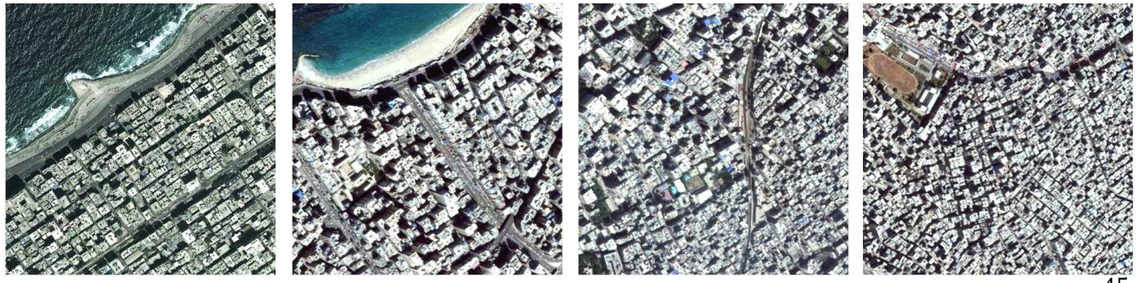
Plan of Requalifying the road network into 4 ring roads East-West direction, and 16 main transects North-West direction. Courtesy of Dr. Amr el Sherif.

2.3. Why the Waterfront?

"WE DO NOT HAVE ENOUGH land for public use. This is a major obstacle for development here in Egypt. Public land is often owned by different organizations, like the Ministry of Agriculture, the Railway Authority, or the Ministry of Antiquities. Again and again we have a situation with the three fighting together. How can we develop the land when the ownership is not settled?" says, Hebattallah Abouelfadl, Associate Professor, Department of Architecture, Alexandria University.

How to compensate such a significant lack of public space?
Roughly, in the last two decades, the city was subjected to profound transformation by the restless constructions profiting out of more or less every single unbuilt patch of land, that can be easily observed in today's map of Alexandria, one can't really perceive a clear network of public spaces.
Despite the fact that the decision makers should have hand in stopping such practices and intervene to rescue & reconstruct the deteriorated network of public spaces across the city, the thesis is entitled to suggest the waterfront as a fundamental way out to rescue the livability of the city, a prime asset of public property to be retrieved.

Nevertheless, most of the transformation projects "previously reviewed" and the extensions along the waterfront "to be reviewed later" were observed to be not identifying any clear public identity to the waterfront, moreover, the pedestrian accessibility to the waterfront as a great portion of public space was never considered. The projects were either "Tourism-oriented" as the case of the visionary plan for the eastern harbor by SOM, or "Car-oriented" as for the extension project of the Corniche road, or "Private-oriented" as for the pumped investments in the gated waterfront mostly dominated by private clubs, however, those clubs are property of different Academic Syndicates, which means that they carry the potential of creating a new academic hub on the waterfront, only if the government is willing to adopt public biased policies.
As for Niklas Svensson, Strategist at Stockholm City Planning Office says; "The planners here in Alexandria are also discussing how to attract tourists. In my opinion this is the wrong way to start. If you get satisfied and happy citizens, the rest will come. It is not the tourists that will solve the situation. The planners and politicians should forget about tourists for now and try to get the people of Alexandria satisfied. If people are proud of their city Alexandria is going to be a very good tourist city I am sure."



Different samples of Alexandria's map to demonstrate the high urban density and lack of open spaces.

2.4. Objectives and Mission

Apparently, the city was never provided a strategic plan with a clear vision for the entire waterfront as a democratic place, a public property for all Alexandrians, a potential to boost the livability of the city and its inhabitants rather than glorifying the automobile volumes.
Based on the above information and the derived conclusions from the performed analysis “to be reviewed later”, the thesis is entitled to achieve the following targets;
- Address the raised issues threatening the livability of public realm on the waterfront.
- The thesis approaches the topic by attempting to investigate and know how to liberate the waterfront from the obstacles of achieving such a goal.
- Provide a consolidated framework for the entire waterfront that can integrate with the positivities observed in the projects proposed by the city, especially to the transformation proposal of the historic eastern harbor by SOM.
- This framework to be set on the basis of multi-criteria investigation and selective analysis according to the different problems and needs across the waterfront.
- Attempting to provide an omnipotent road map to guide the future development of the waterfront.
- Occurrence of a paradigm shift willing to oppose the current adopted policies and draw the attention to alternative solutions aspiring to retrieve the waterfront to the public interest.
- This to be achieved by establishing a set of guidelines and strategies concerning the different patterns of the city and to carefully respond to the diverse identities and patches of activities along the waterfront.
- This set of guidelines is entitled to act as a base that can be further developed into a series of transformation projects capable to promote a new mode of public investment.

2.5. Structure and Methodology of Investigation

In the light of proceeding with the method of “selective analysis” by investigating multiple issues at their different scales and typologies, it was important to classify the parameters givens by the city and resolve them into 3 major bands that define the project metrics:

- The waterfront; as a target to exploit, rejuvenate and enrich its activities through clear definition and emphasis on its public identity and ownership.
- The Road; not only as the problem, but at the same time a potential to perform as a better waterfront connector capable to mobilize the inhabitants across the city at its full span.
- The City; on one hand, as the system, the global conductor to the entire image of the project, while on the other hand, as the fine mesh that carries all the inherited potentialities needed to reflect and influence the mutual relations between the inhabitants & the sea.

Ps: In the following research, the city will not be studied as a separate point on its own, rather it will be simultaneously analyzed with both cases of Waterfront and Road, a process of cross investigation back and forth between (Waterfront and Road) as targets, and the (City) as a mediator for the selected investigation.

3. RESEARCH AND ANALYSIS

3.1. The Corniche Road:

After reviewing the phases of extension of the great Corniche road, and how it was broadened at different concepts according to the setting of each phase, and the wrong assessment of the extension project that was envisioned to relieve traffic congestion in the city, while in fact, it increased the traffic volumes across the road acting as the biggest promoter for automobile ownership. Apparently, the road has higher capacity to accommodate cars than its potency to mobilize inhabitants.

A) Street Network Analysis

Starting with applying the conventional analysis of Street Hierarchy trying to resolve the existing infrastructure according to its physical conditions and profiles, made it possible to read the important nodes and connections mainly classified into, primary roads, secondary roads, arterial roads, and local connectors. Simultaneously, it was important to investigate the Corniche road according to the entire system of street network to better understand its influence and capacity of mobility within the city that will help to assess and evolve the proposed solutions.

- Applied Tools (City Engine)
Space syntax methodology and axial maps “Multiple centrality assessment”

Introduction and limits of “Analyze Graph Tool”

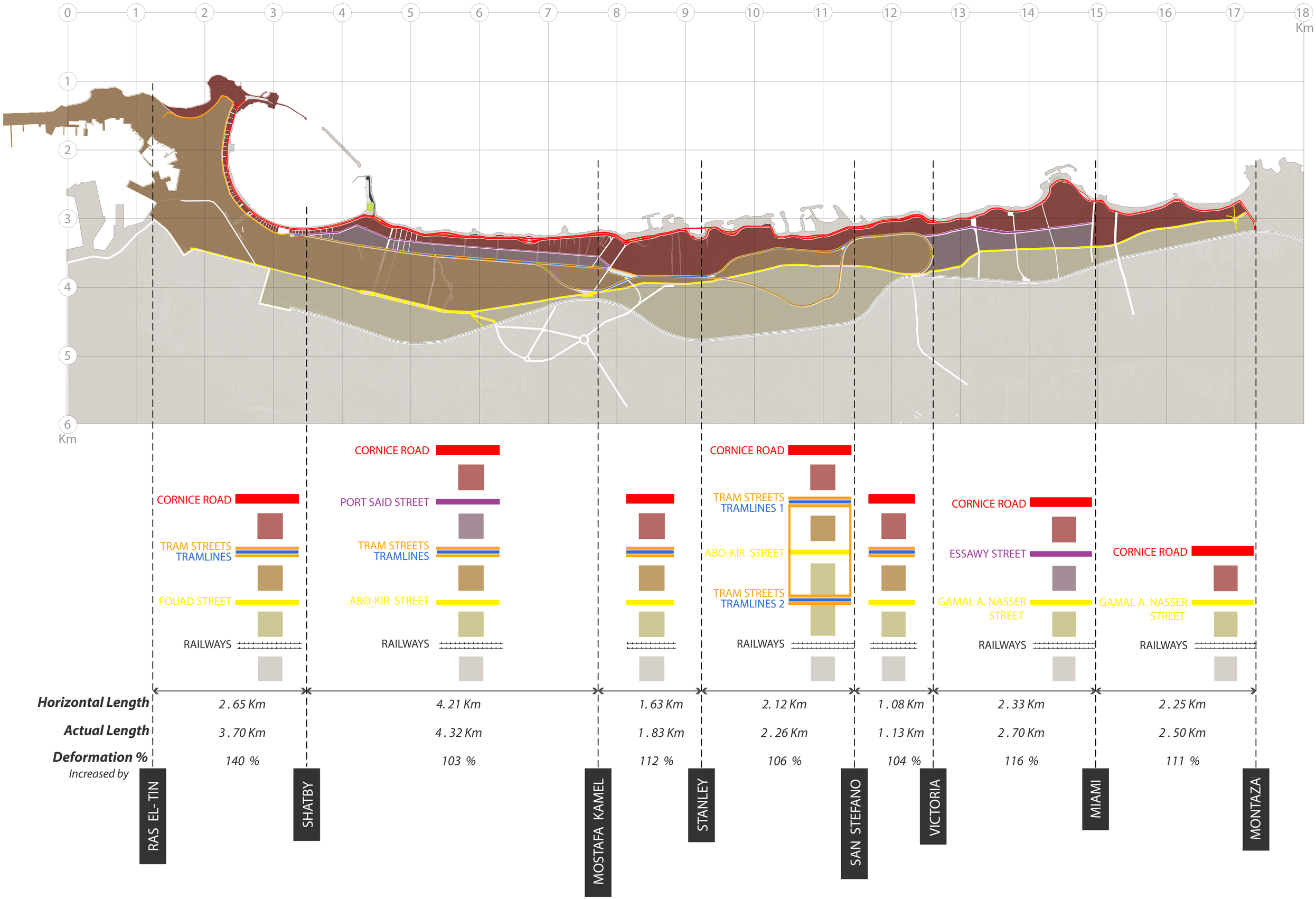
Graph networks can be analyzed by computing global integration, local integration and in-between centrality. For each street these three values are computed and stored as object attribute “Integration Global”, “Integration Local”
and “In-between Centrality”. The values can be visualized or used also to approximate street widths.

Visualize analysis (assign rule):
Computes the three analysis values and assigns a visualization rule file to the street shapes. The model generation is automatically triggered and represented in a range of colors where the “Red” is the most central streets, while “Cyan” represents the least central ones, according to the global value given to every single street within the entire network.

- Global integration
For each street segment, the shortest paths to all other segments are summed up. Each sum is then divided by the square of the number of segments. Next, each value is inverted. Finally, the values are normalized so that each value is in the range zero to one.

- Local integration
For each street segment, the shortest paths to all other segments which are closer than (Depth of local integration) 90 degree turns are summed up. Each sum is then divided by the square of the number of visited segments. Next, each value is inverted. Finally, the values are normalized so that each value is in the range zero to one.

- In-between centrality
For each street segment, the number of shortest paths which pass this segment is computed. Then, the values are normalized so that each value is in the range zero to one.



STREET NETWORK ANALYSIS

Analyze Graph Tool

Graph networks can be analyzed by computing global integration, local integration and inbetween centrality.
For each street these three values are computed and stored as object attribute "integrationGlobal", "integrationLocal" and "inbetweenCentrality". The values can be visualized or used also to approximate street widths.

Highest Centrality Value — Lowest Centrality Value

Visualize analysis (assign rule):
Computes the three analysis values and assigns a visualization rule file to the street shapes. Model generation is automatically triggered.

- Global integration

For each street segment, the shortest paths to all other segments are summed up. Each sum is then divided by the square of the number of segments. Next, each value is inverted. Finally, the values are normalized so that each value is in the range zero to one.

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For each street segment, the shortest paths to all other segments which are closer than (Depth of local integration) 90 degree turns are summed up. Each sum is then divided by the square of the number of visited segments. Next, each value is inverted. Finally, the values are normalized so that each value is in the range zero to one.

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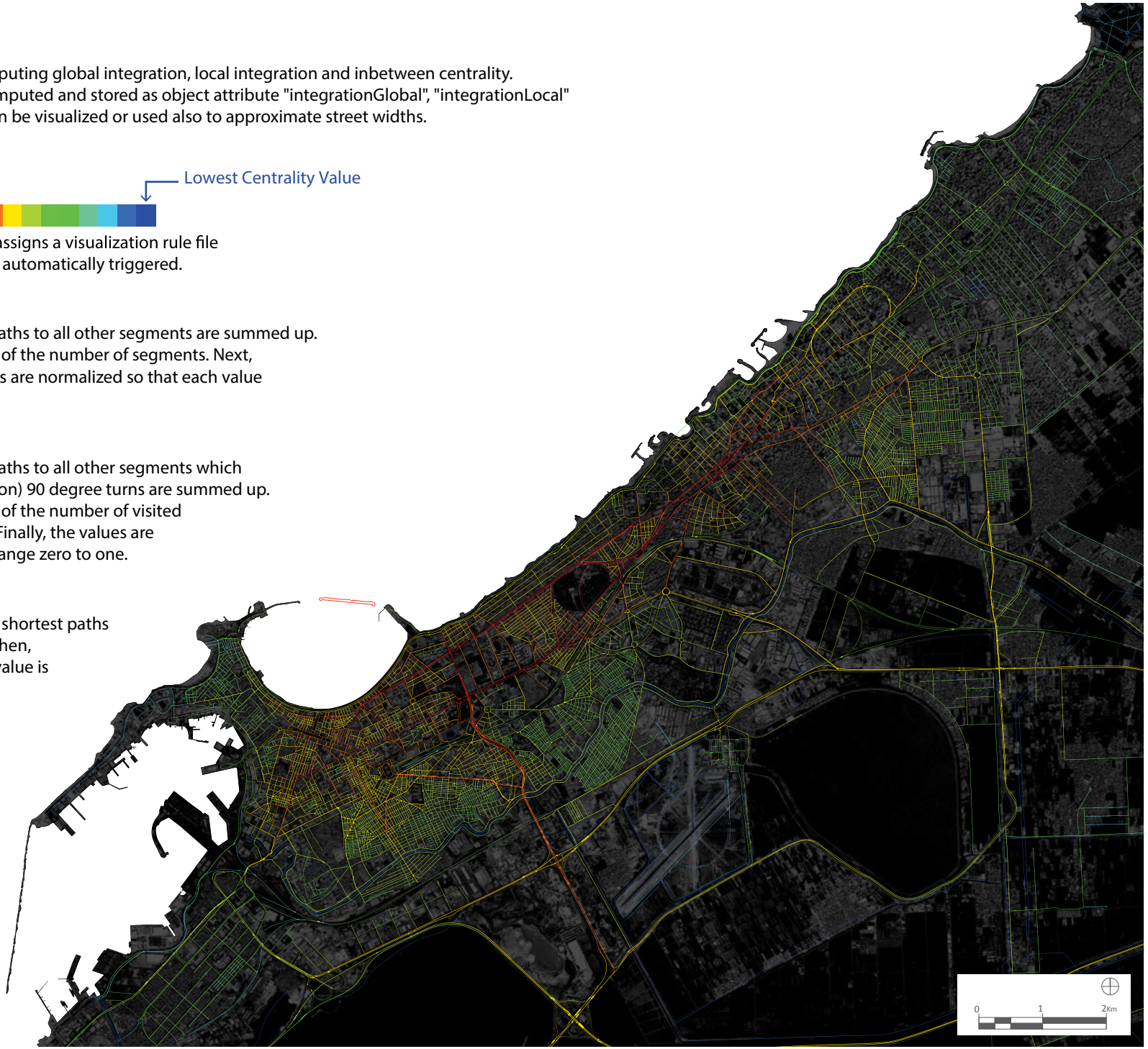


STREET NETWORK ANALYSIS:
Outcomes of application of automated tool (City Engine)

- Outcomes and Assumptions

According to the outcomes of the initial attempt to use the automated tool for analyzing the streets centralities and integrity of the network, it was noticed the following;
The area of the city center that roughly corresponds to the eastern harbor was given values that were mostly presented in (Orange & Yellow). According to the visualization rule file used by the tool, the (Orange & Yellow) layers represent the streets given the 2nd & 3rd most centric values, while the 1st most central layer "presented in Red" was given to the transversal arteries of "Tramlines & Abo Kir Street" spanning from El-Raml Station till Gleem Station. That is to say, as the city was destined to evolve and grow towards the East, consequently the outcomes of the automated tool has reflected the morphological condition of the street network, as the centrality of the network tend to polarize and shift towards the east than its origins around the Eastern harbor. Thus, it was important to resolve the complexity of the network by splitting the ranging layers to observe every single color/value on its own, that helped to evaluate the performance of single parts and their contribution to the entire network, as follows;

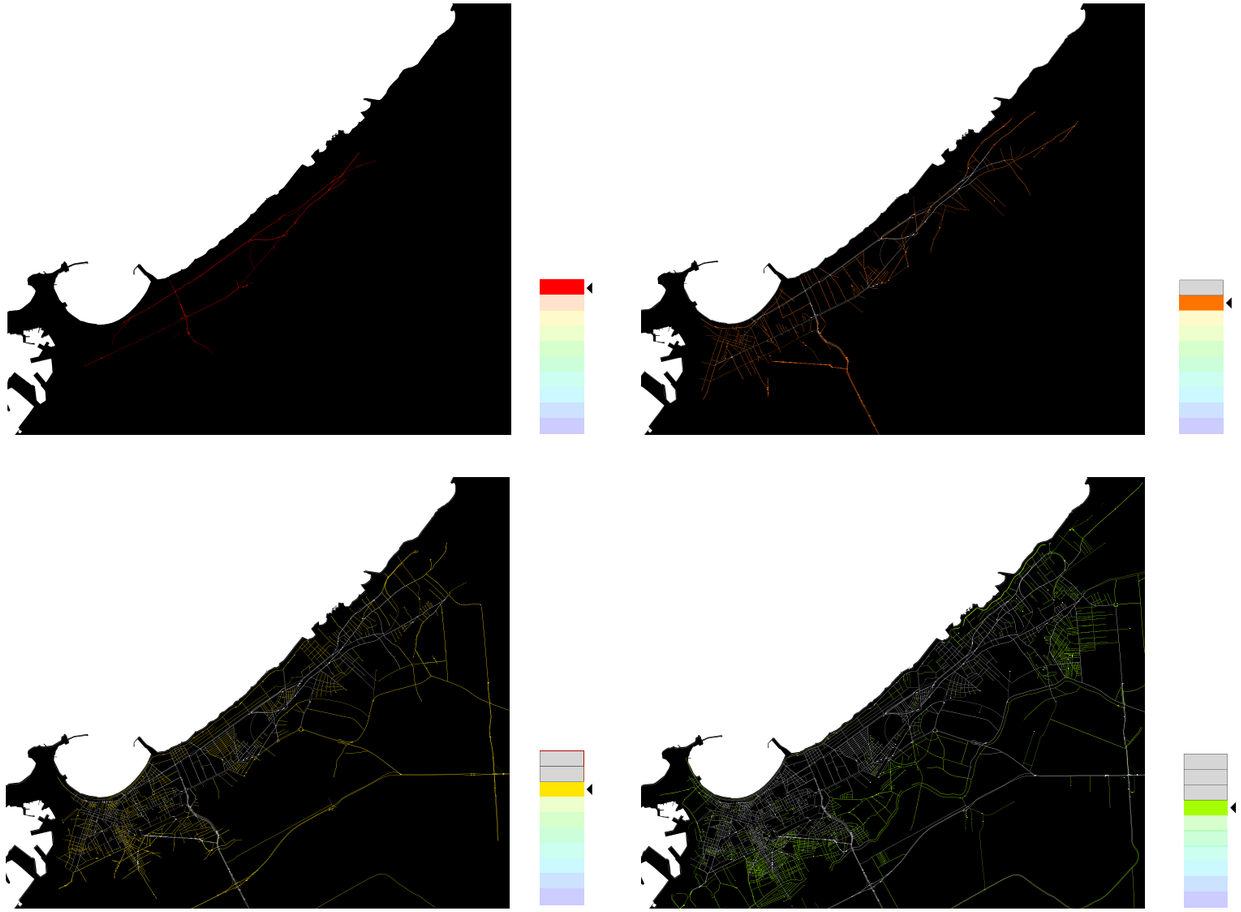
The Corniche Road
The road was never presented in the first 2 most central layers (Red & Orange) at any of its segments, in fact, its first existence was in the 3rd layer (Yellow) where it spans from Mansheya Square to Stanley bridge, by moving more East it gradually fades to less-centric layer (Green).

The Tramways
On the contrary, the tramways scored higher centrality and integration values represented in (Red & Orange), these qualities were acquired by its geometrical setting & localization within the street network as a whole. Surprisingly, the least value scored along the tramways was presented in (Yellow) that was the maximum value of centrality given to the Corniche road.

Fouad - Abo Kir Street
The street scored highest 2 values represented in (Red & Orange) starting from its very beginning on the West spanning until San Stefano area, by moving more East it gradually fades to less-centric layers of (Yellow & Green). Undoubtedly the top values of centrality and integrity scored at the western part were given by virtue of its inherited importance as the prime backbone where the city had its early genesis.

Conclusion of Final Considerations:
The Tramways given the greatest values of centrality can be considered in the thesis work as an indicator for the potential of this infrastructure – also based on the physical condition of the street canyon and its considerable width – to be exploited as a new mobility attractor capable to relieve congestion and discharge the Corniche road from its daily burdens of heavy traffic volumes.

"Multiple Centrality Assessment" Resolving the outcomes into the first 4 layers according to their different centrality values. Red is the most centric streets, while Green is less centric.



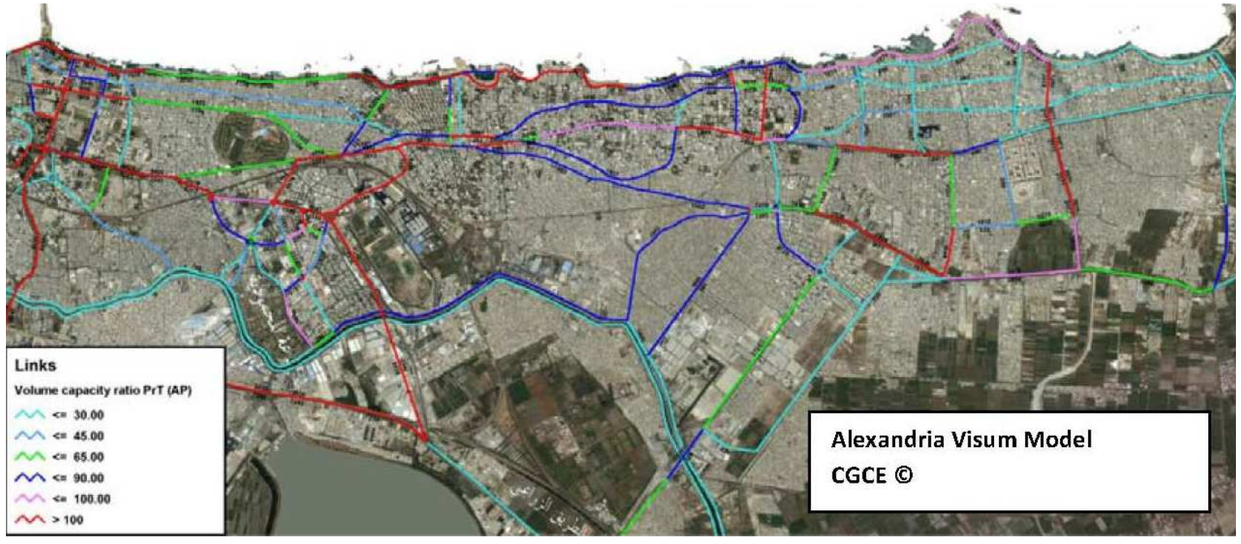
B) Congestion & Traffic Crisis in Alexandria

In 2011, fairly corresponding to the Egyptian revolution the traffic crisis started to inflate leaving the city inoperative and the daily life of Alexandrians turned to be disabled. Before, the traffic jam was activated only in summer due to the flows of domestic tourism from other provinces heading to the city, while nowadays congestion takes place on daily basis.

Social Response:
As the severity of congestion continued to grow while the city is not supporting any policies to discourage automobile – on the contrary they build bigger roads and broaden the congested ones -, the inhabitants were left with no other choices but to confront the situation themselves and find alternative solution. Such necessity led to the emergence of "scooter" trend, where the idea was initiated by (Alexandria "Scooter" Riders Club) that met the interest of many people and the club started to grow. Notably, the majority of the scooter riders turned out to be "Ex-car riders", as more and more people started to abandon their cars and use scooters as their sole salvation to escape from congestion. That's to say, whilst the city was broadening the Corniche road in favor of cars, the road turned to be repulsive and unpleasant for the car riders themselves.

A new rising group of "Alex scooters" showing an alternative trend of mobility across the corniche

A traffic engineering study was conducted by Dr. Mohamed Shahin "consultant group for civil engineering" seeks to establish an overall and integrated strategy for the development of Alexandria Transportation Master Plan. This has been done through collecting data for the existing transportation condition as well as other trades in Alexandria City. One of the core tasks was the development of a VISUM transport model as a tool to assess current conditions. Hence, a traffic survey was conducted to provide the data basis for model development and calibration against empirical data.
The visualization of the outcomes of VISUM model is represented in a range of colors where the "Red" is the severely congested streets, while "Cyan" represents the non-congested ones. That to be interpreted as follows;



Visum model: a tool to calculate traffic volume/capacity ratio to identify congestion. Courtesy of Dr. Mohamed Shahin "Consultant Group of Civil Engineering"

The Corniche Road

The highlighted parts represent the most problematic parts where congestion takes place at different segments of the road. The reasons for congestion might vary by considering different criteria, for instance in part (1), where the Corniche road is approaching the eastern harbor and the city center, the congestion is caused by the heavy traffic flows from and to Suez Canal Street, this artery is the primary gate connecting the city to the new downtown located at south and the desert road to Cairo. While in part (2), perhaps the road is congested due to its serpentine profile where cars are deviating with the curves, at the same time interrupted by the rapid and informal stopping of "Microbuses" on both sides of the road forcing the automobile drivers to drift between lanes which induces more congestion along that part, that brings the risk of forming a median bottleneck that impedes the East-West flows. However in part (3) where the width of the road decreases and its physical conditions changes as it passes by the most populated part of the city, also where the majority of beach facilities are located that require frequent pedestrian crossing, while the pedestrian tunnels are insufficient along that part.

The Tramways

The highlighted part was mostly indicated by moderate congestion levels, that's because the tramways are not really accommodating big traffic volumes that can cause congestion like in the case of the Corniche road, on the contrary, less car riders are willing to use the single lane sideways of the tram. The isolated profile of the tramlines with its protruded rails is restraining any other means of transport to stream along the same path but the trams, leaving this corridor underused.

Abo Kir Street

The highlighted part was mostly indicated by severe and high congestion, despite its relative vicinity to the previously highlighted part of the tramways that was moderately congested.

Conclusion of Final Considerations:

In light of the previous conclusions derived from the outcomes of City Engine analytical tool, and the analyzed situation of congestion in both (The Cornice & Abo Kir street) located to the (North & South) of the underused tramways, is another incentive that urges the transformation of the tramways along this particular segment as an opportunity to ease the East-West flows.

Map 3: Highlights of the parts referred to in the text

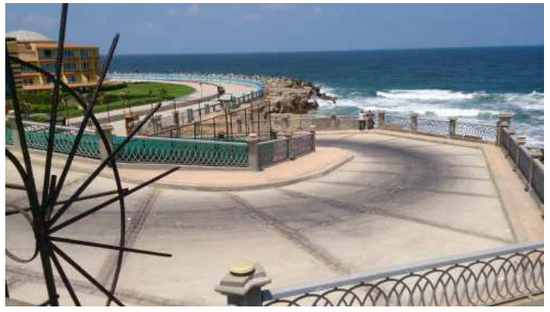
Congestion in Glym area (Part 2)

Underused infrastructure of tramways due to its protruded rails and isolated profile. Represented in map 3 mostly in Blue for moderate congestion of the side ways.

3.2. The Waterfront:

A) Evolution of the Waterfront and Landfill

Extensive Landfill



Gated waterfront

Dominance of the road

Referring to the extension project of the Corniche Road carried out on 5 phases as previously reviewed, it was crucial for the thesis work to develop a study for the evolution of the waterfront through time. The study is looking forward to reconstruct the old image and identity of the waterfront that was erased in favor of the new road. The study to be carried out simultaneously on 2 main points of interest as follows;

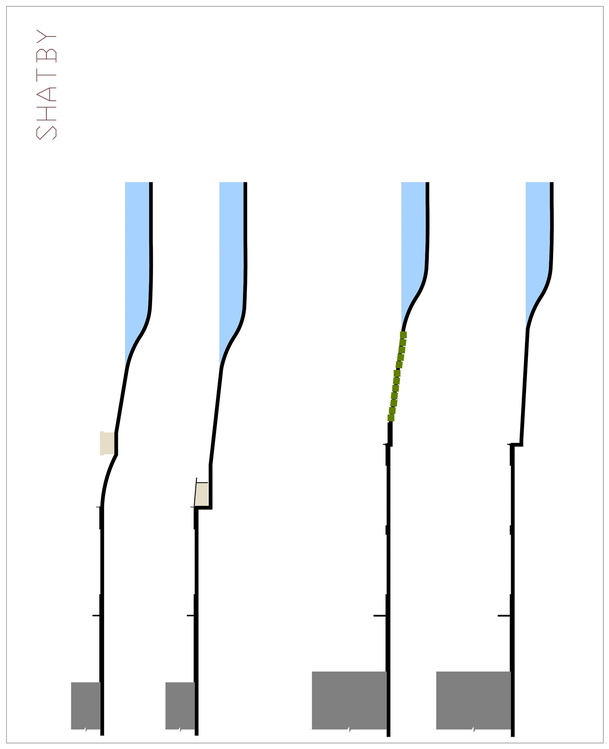
- By tracing through timeline the sequential landfill and the change in the physical conditions of the shoreline profile.
- Image board as a panorama on the typology of activities, functions and structures that once stood on the waterfront.

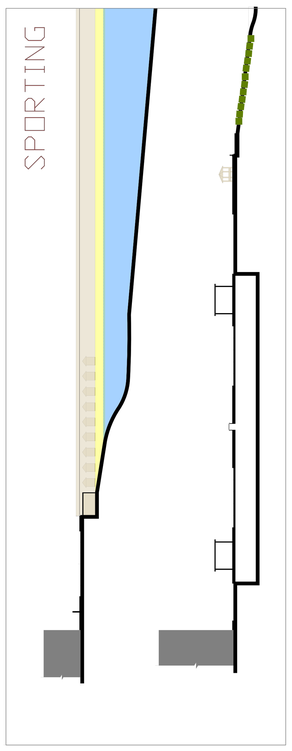
Both together will help to highlight the pros and cons of the previous transformations to better evaluate the impact of the practices that has been carried out, and how far they affected the character of the waterfront compared to today's condition.

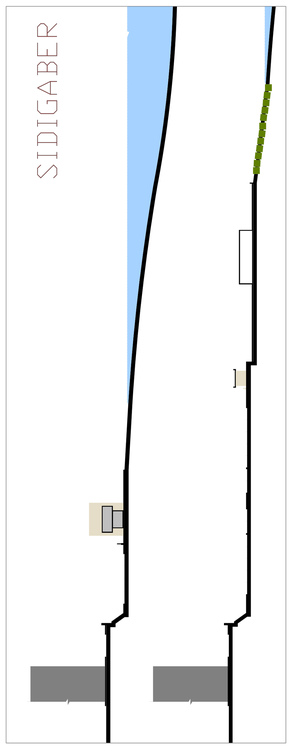
Ps: The maps produced were constructed by tracing the satellite historical imagery of Google.

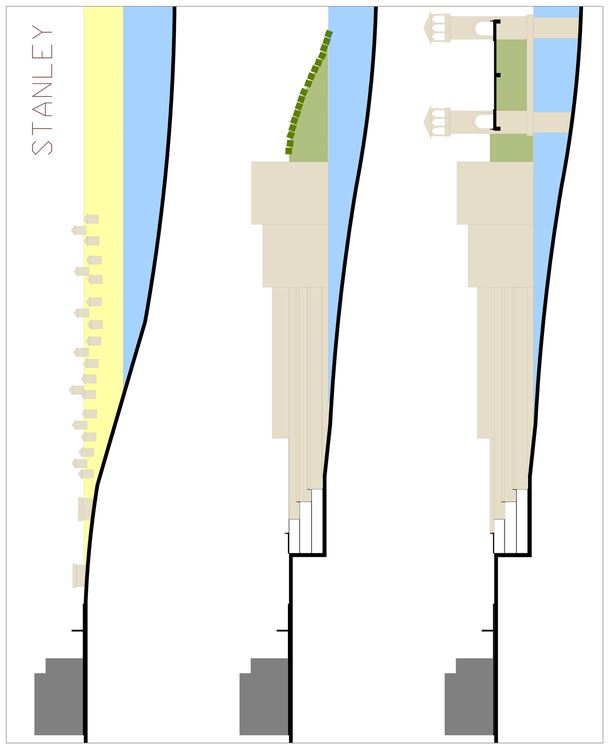
By following the traces of the old condition of the waterfront compared to today's condition, aiming to grasp any practices that were carried out in favor of livability of the waterfront and the public realm, the "Promenade" was found to be the sole virtue provided to the city's waterfront. Despite the fact that, the promenade is a mere path, not having identified program or any considerable attraction areas, however, from a social perspective, today the promenade represents the essence of the waterfront, the reservoir of activities, the social asset that shall be reinforced.

In October 2011, the Swedish Institute of Alexandria together with Alexandria University conducted extensive programs on urban topics in the city of Alexandria. Cecilia Lindahl, a Regional Planner of Stockholm County Council, talking about how to better exploit the Promenade, says "Because of the heavy traffic it almost feels impossible to reach the sea in many parts of the city. To make it easier for people to cross the street one could, for instance, install traffic lights or build bridges. When you compare the Corniche to other cities around the Mediterranean Sea, where everyone uses the walking lane for evening strolls—the "Passigata"—and its many restaurants and stores, it looks like there are many possibilities to explore in Alexandria. Besides making more use of the Corniche, one could also take advantage of the water. For instance, Water Taxis could transport inhabitants and tourists to important places along the coastline."







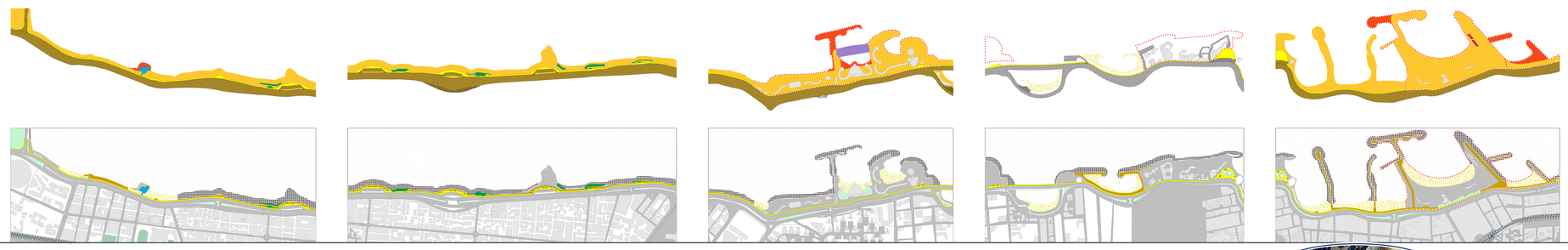


Public Green
Sport Areas
Beach Casino
Beach Cabins
Sidewalk
Beaches
Beach Path
Natural Rocks
Acropode

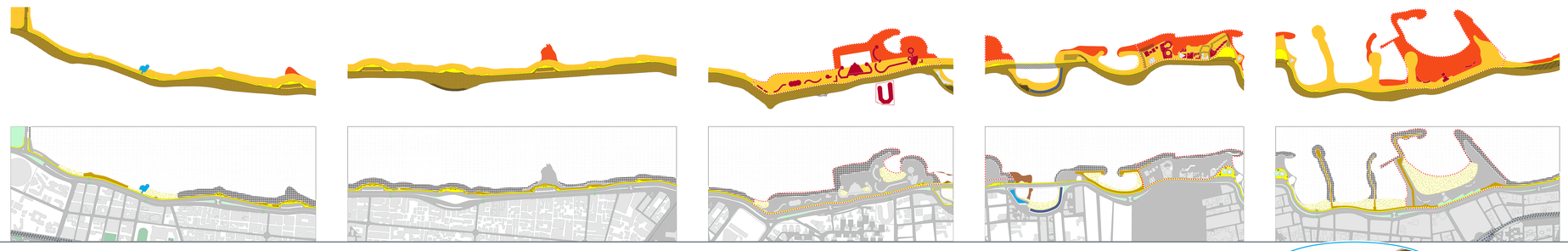
Existing Waterfront
Existing Asphalt
Existing Buildings
Demolition
Added Landfill
Added Asphalt
Added Buildings
Informal Profiteers

0 1 2Km

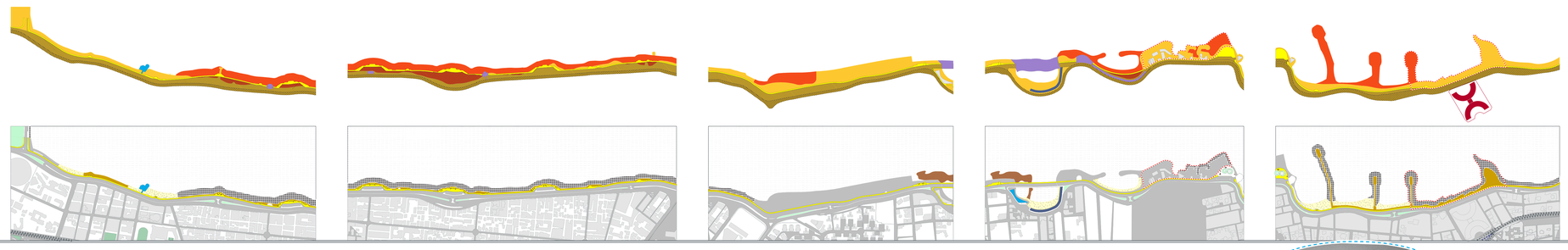
2010 - Present



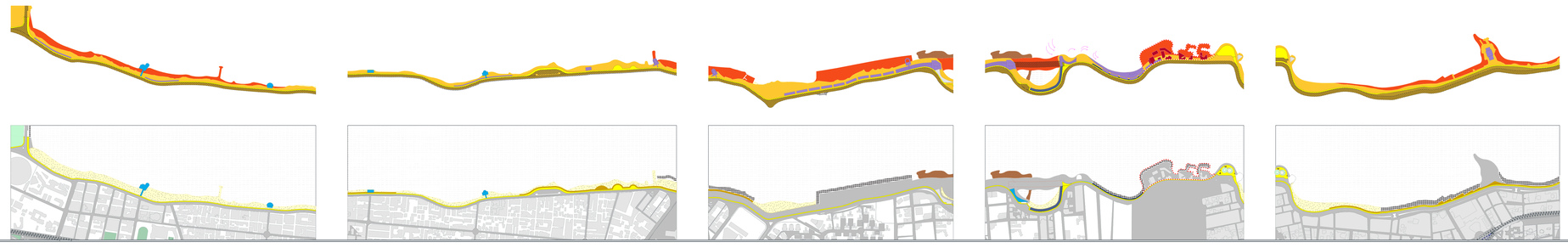
2007- 2010



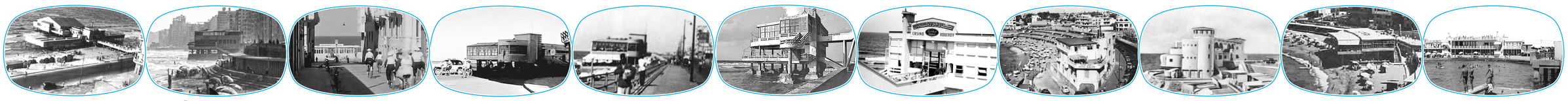
2003-2007

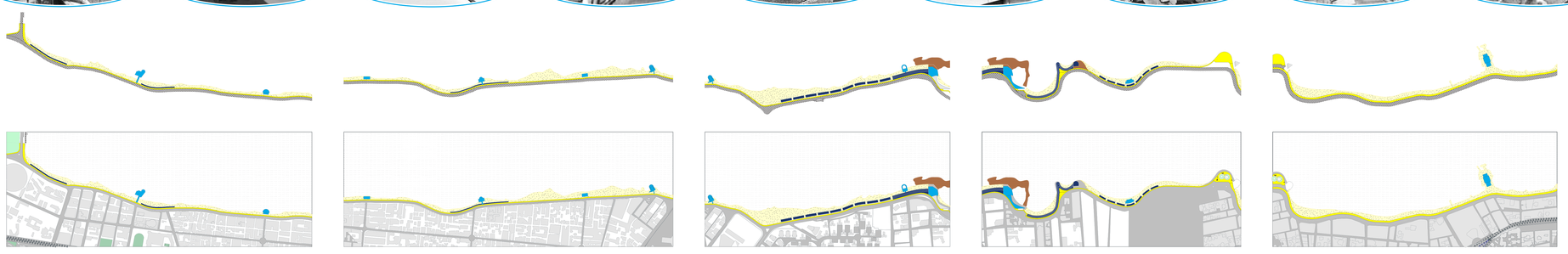


2000-2003



BEFORE 2000

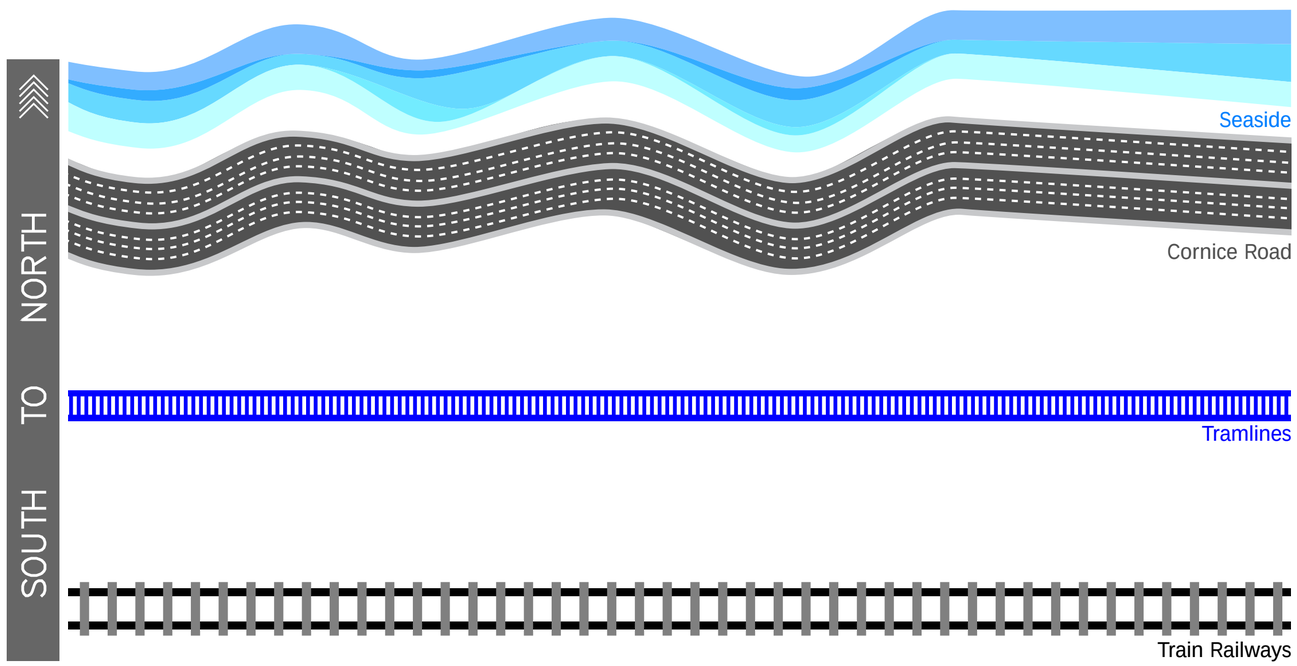




Evolution of Waterfront & Landfill

VISUAL COMMUNICATION FOR THE SONIC MAP OF *"Alexandria Streets Project"*

is an artistic radio and audio project by Berit Schuck and Julia Tieke developed between September and December 2012.
It comprises a sonic map of Alexandria published on air and on the internet, a programme with hands-on workshops and public listening events.



" Before the project of broadening the Cornice road, we could hear and feel the sea with no need to cross the road , actually you start to experience it even before, when you are by the tramlines,..."

" Nowadays, in order to enjoy the seaside, you have to be just 10 meters off the shore, in fact, you have to be literally inside the sea to get detached from this chaotic environment."

" Once you get there, you start to enter this aura of hustle and bustle, ..."

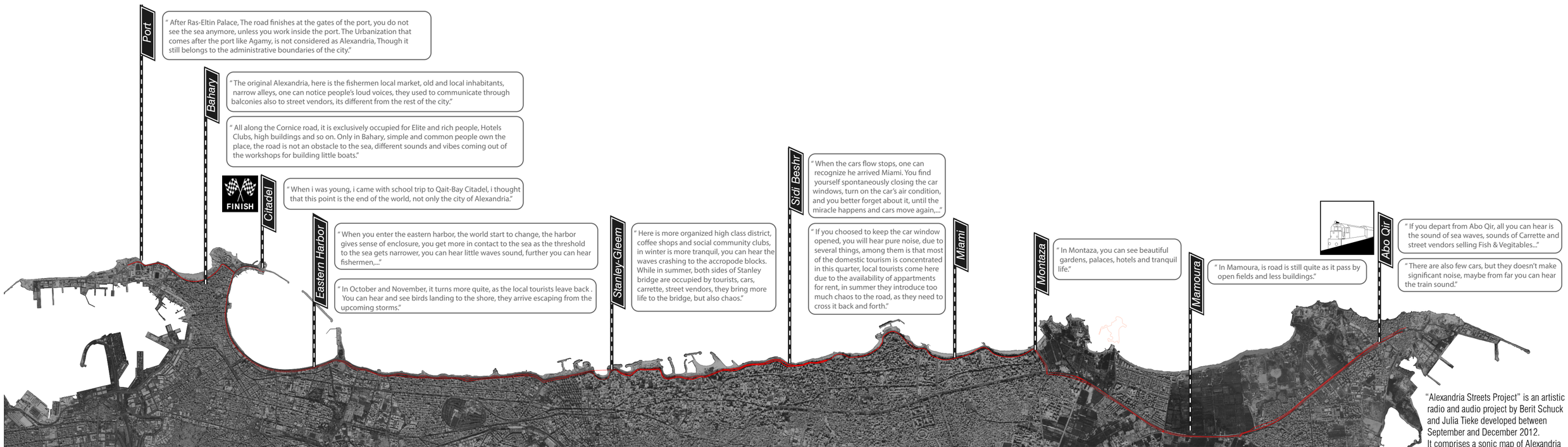
" A dramatically cutting edge is obstructing you from the sea, in all physical, visual, and sensual means."

" After all, You find yourself wondering how to cross this super broad & busy highway. People are asking for more pedestrian tunnels, as if tunnels are the only possible solution to cross this deadly road!!"

" After crossing the tramlines, you enter the relatively quite zone, not that quite, but at least the vehicular attitude is still controlled, until you approach the cornice road, ..."

" By crossing further towards the north, you will meet the tramlines, it has a different mode of noise and crowdedness, maybe less."

" When you cross the Railroad, one can notice how terrifying this train is, it's even different from the reigonal train, it's different in character, sound, passengers and rails. people living next to railroads - for instance in "Sidi Gaber" - can recognize from the sound whether it's "Abo-Qir" train is passing or the regional ones."



INTERVIEWS WITH INHABITANTS : Interpretation for [Alexandria street project]

EAST TO WEST
Text extracted from sonic map of (Alexandria-Streets-Project)

"Alexandria Streets Project" is an artistic radio and audio project by Berit Schuck and Julia Tieke developed between September and December 2012.
It comprises a sonic map of Alexandria published on air and on the internet, a programme with hands-on workshops and public listening events.

Social Response:

Despite the fact that, the promenade is an attractor for “individual” patterns of sportive activities, the only considerable “collective” sport activity was initiated by (Alex Runners), a group of athletes started to organize a marathon along the promenade every Friday morning. The marathon induced not only a good vibe of sport, but also a new social vibe that brought the people together to demonstrate their rights to reclaim the waterfront. While investigating the origins of the initiative and how it started, worth mentioning that among the founder athletes there were some members of the private (Alexandria Sporting Club). That is to say, an important leap of social awareness has been made from inside out, when those athletes decided to leave their private running tracks and enjoy the publicity of the waterfront.

The promenade mostly used for Sport, jogging and strolling.

Group of “Alex Runners” on the sidewalk of the corniche road as the promenade is interrupted by the private waterfront.

Group of Athletes exercising on the promenade.

Conclusion of Final Considerations:
The typical demolition of the casinos on the waterfront is seen as a devastating loss for the city. These structures were not only acting as “social cells” representing the different neighborhoods on their local scale, but also a potential seed from which the entire system of waterfront could have initiate its growth, as they were given emphasis by alignment and coordination within the corresponding city grid. Such a configuration made a sort of order, unity and integrity between the city and its frontage. Thus, the system of “social cells” to be recalled as a foundation for the thesis guidelines and proposals that is foreseen to redefine and reflect the local identity of the neighborhoods on the waterfront once again, as a catalyst to activate and promote for the re-establishment of the new waterfront.

B) Shore Protection Project:

Due to the global change in climate, beach erosions became a common risk for most of coastal cities, where the erosions percentages were significantly increased above the standard rates. However, Alexandria was subjected to this phenomenon for more other reasons than the global climate change.

The extension process of Alexandria’s Corniche was carried out without a complete awareness of all the technical consequences of the intervention, says engineer Ossama El Mor, the Project manager for the corniche extensions. Moreover, there was no clear assessment of the impact of such a process, or any precautions of crisis management taken by the decision makers in case of striking storms. According to Dr. Mohamed El Raie, head of “Association of Climate Changes”, Alexandria University, by not taking the environmental criteria in consideration within the process of landfill and throwing colossal amounts of rubble in the seabed, we risk the environmental response of such transgression. These issues were soon to be all aroused and revealed with the first storm to hit the city since the completion of the project.

First shore protection project: Montaza – Miami

In 2003 a striking storm hit the shores of Alexandria, as the sea level rose causing a damage mostly at Mandara area of some 300m causing ground subsidence to the newly constructed road that lead to beach erosions.
An urgent study had to be prepared for Shore Protection at the affected parts that was then approved by the cabinet of ministers in July 2004. A technical and financial report was prepared for the 3 phases of the project and work was started in May 2005.

There are many factors contributed to that severe coastal erosion, including:
- Incident waves, storm events, and the phenomena of Sea Level Rise (SLR).
- Elimination of sources of organic sediments as a result of water pollution.
- Instability of northern delta cost due to the lack of Nile river sedimentation.
- Loss of a considerable part of the sand beach due to the enlargement of the Cornish road toward the sea.

Source: 26th International Conference for Seaports & Maritime Transport “Integration For a Better Future”.

Damage at Mandara beach during the storm in 2003. The sand beach was vanished with wave scouring underneath the road seawall.

The study was conducted on the basis of investigating the reason of the ground subsidence that happened, in which the conclusion was found to be that, during the storm, the waves are directly striking to the seawall, then the tide pulls back the sands below the seawall into the sea, that strips the wall at its bottom, causing the ground subsidence. Based on this conclusion, the solution was to protect the gap between the shoreline and the seawall by concealing the seawall by a cordon of concrete blocks to mitigate the impact of the striking waves. This solution was observed to be insufficient when the same problem of pulled out sands after the tidal waves happened to the concrete blocks itself, causing another ground subsidence below the blocks.

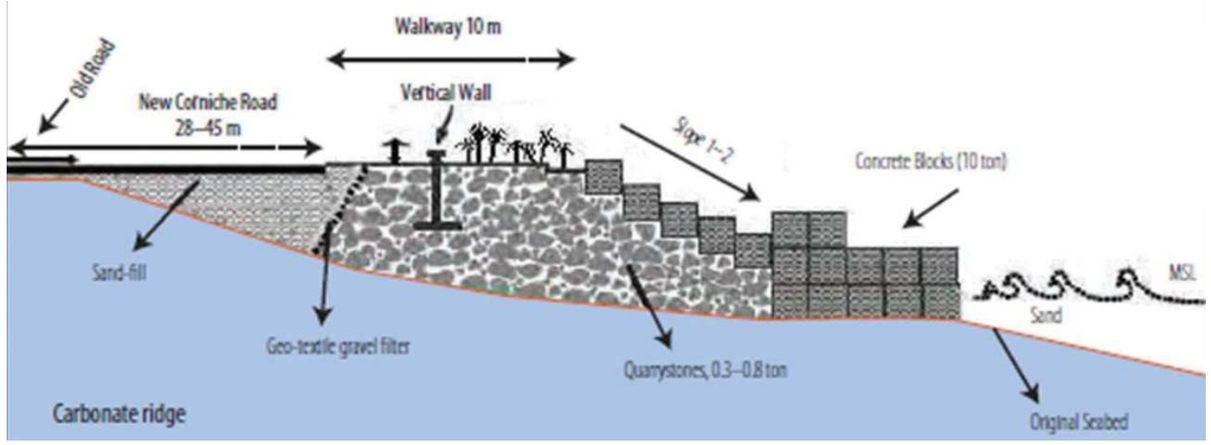
Concealing the waterfront with the cordon of concrete blocks induces the rise of wave altitudes to hit the concrete blockage on the waterfront.

The cordon of concrete blocks had strong impact on the image of the waterfront that made it aesthetically displeasing.

The concrete boundary is limiting the experience of the users and their accessibility to the sea.

Dr. Sayed Sharaf El Din, Oceanography professor, faculty of science, Alexandria University, addressed the risks of both projects previously reviewed (the Corniche road extensions and the landfill), the risks were listed as follows;

- Concealing the waterfront with the cordon of concrete blocks induces the rise of wave altitudes to hit the concrete blockage on the waterfront.
- The rubble landfill that was then covered with sand in phase (1) was eroded during seasons of high tide and storms, that lead to exposure of the rubble stone that directly affected the quality of beaches and induced the water currents causing raise in numbers of drowning swimmers.
- Total change of sand shifts in the seabed due to the new currents generated by the landfill.
- Beach erosions that can extend to the seawall and the bottom of the road.
- The drastic change in the shoreline by cut out and landfill causes an environmental transgression to the seabed, and a potential deterioration in the water quality, thus, in the natural habitat and fisheries.



The Corniche road, recently built on reclaimed sea-shore, has aggravated storm surges by altering the sea-bed slope.
Source: "Adaptation and Resilience Action Plans for Alexandria, June 2011"

In December 2010, the city was hit by immersive storm of 76 km/h wind speed for 2 days, when the waves rose for unprecedented levels that left traces of Breakage in different parts of the city.

The tidal waves carried the rubble from the seabed out across the promenade at Sidi Beshr area. Refer to Map 4: Part 5.

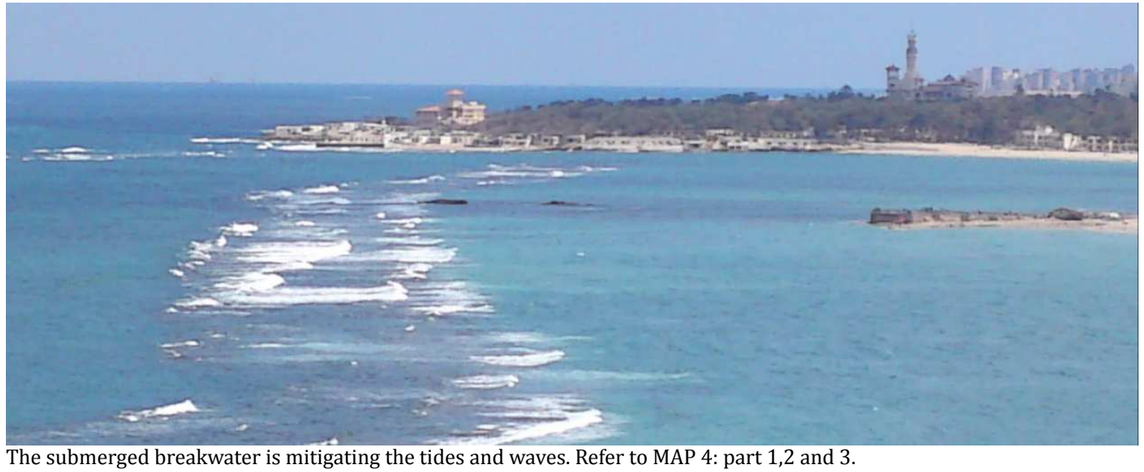
High waves crossed the Corniche street at Sidi Beshr area. Refer to Map 4: Part 5.

Because of the low level of the road, it was immersed by the sea during the storm, but with no damage due to the submerged breakwater. Refer to Map 4: Part 2.

Severe damage in some parts of coastal structures.

Dr. Bahaa El Sharnouby, Head of “Department of port engineering and offshore installations”, Faculty of Engineering, Alexandria University, and the designer of the submerged breakwater protection project says, This time, the presence of submerged breakwater in the area between Montaza Park and Miami played an important role to reduce the destructive power of tidal waves. By comparing the damage that happened in the same area in 2003 & 2006 – before the construction of the submerged breakwater – to 2010, a significant shrinkage in the impact of waves is observed despite the unprecedented wind speed and continual tides for 2 days on the shores of Alexandria. Moreover the damage was confined only to the parts where the level of the street is almost coinciding with the sea level, and the parts where the beaches width is narrow as the shoreline is relatively close to the seawall.

Before and after the installation of submerged breakwaters. Refer to MAP 4: part 2.



The submerged breakwater is mitigating the tides and waves. Refer to MAP 4: part 1,2 and 3.

Impact of the storm:

Part 1: Montaza (&+) Asafra
Due to the depression of street level in that area, and the high magnitude of the tidal waves exceeded above the street level, that made the water come across the street in most parts, but without any remarkable damage, Thanks for the the presence of submerged breakwater that mitigated the destructive power of the tidal waves and decreased its momentum when reached the seawall.

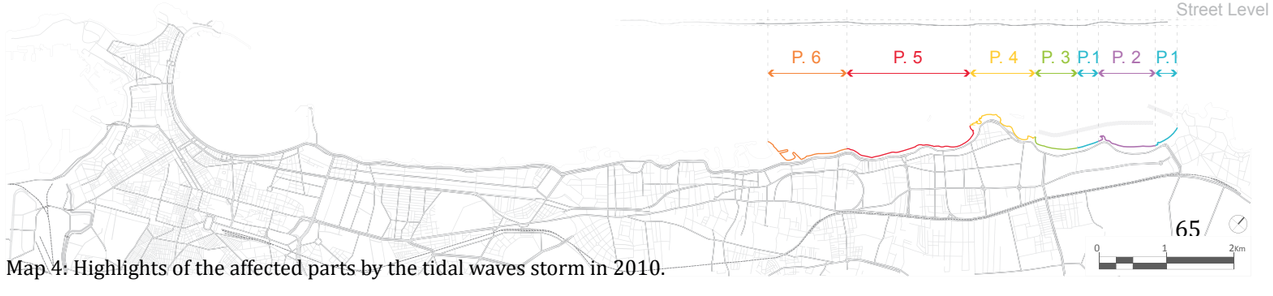
Part 2: Montaza to Mandara
No damage occurred in that area, due to the presence of submerged breakwater, unlike in 2003, when the majority of damage was reported in that area.

Part 3: Miami”BEAURIVAGE”
No damage occurred in that area, due to the wide beach that helped to lessen the momentum of waves.

Part 4: sidi beshr ”bir masoud”
As the Shore Protection Project was halted before covering this area, it was observed more vulnerability of tidal waves than the protected parts (1, 2 and 3).

Part 5: bir masoud to Mahrousa
Was strongly attacked by the tidal waves that caused a series of wrecks along the coast and went further in some parts, when enormous amounts of sand was carried by the waves across the road, and the waves were directly striking the retaining wall of the Corniche road. Not to mention, it was all due to the total absence of any shore protection or breakwater.

Part 6: Mahrousa to S.stefano
This area had the worst quota of damage, as the damage went profound exposing the foundation layers and the retaining wall of the road, in addition, the parapet and the floor tiles of the sidewalk were displaced. The main causatives of such a significant attitude for the currents, is due to the presence of protruded dikes spanning inside the sea, placed orthogonally to the shoreline, that was an important catalyst that induced the rage of currents, concentrated and focused its power across the shores, which showed the severity of rescuing such a situation.



Map 4: Highlights of the affected parts by the tidal waves storm in 2010.

Second shore protection project:
Dr. Bahaa El Sharnouby recommended the following;
- An advanced shore protection works should be urgently carried out at the areas of Mahrousa & Louran.
- Connect the submerged breakwater to reach the corresponding protruded dikes at Bir Masoud.
- Start a comprehensive shore protection program for the entire area of Sidi Beshr.
-Broaden the beaches in Miami and Montaza.

In light of the aroused issues and the defects that emerged year after year, a study of coastal protection had been prepared by the municipality to be carried out on 3 phases as follows;
Phase 1: Mahrousa – Bir masoud, shore protection (Submerged water embankments) 36 months.
Phase 2: Mahrousa – San Stefano, shore protection (Submerged water embankments) 24 months.
Phase 3: Sidi Gaber – Silsila, reclaiming beaches (Submerged water embankments) 48 months.

Added extension of submerged breakwater. Refer to MAP 4: part 4.

Conclusion of Final Considerations:
The parts (4 & 5) were commonly reported for several issues through the different analysis as they showed certain vulnerability risks that was not only, environmentally vulnerable, but also the conflict of (traffic congestion Vs Pedestrian flows) made it the most problematic. Hence both approaches are entrusted to guide the thesis in finding an integral setting capable to perform on both levels of environmental resilience and pedestrian accessibility.

3.3. Summary of Raised Issues and Final Considerations:

Through the performed analysis and the variable issues raised by considering different aspects for investigating the city, the waterfront was elaborated, interpreted and classified into 4 major patterns that on one hand shaped the unity of the waterfront, while on the other hand, each pattern revealed certain concerns related to its very own setting. That is to say, while the waterfront was treated on the global vision of the city, it was also more convenient to be treated on the local scale of its different parts. In addition, they were also given names to better demonstrate and clarify their current condition versus the proposed future vision, as follows;

1) The Legacy:
Strictly corresponding to the Eastern Harbor, a part where its inherited setting is the most acknowledged to fulfill the aspirations of the city to develop and promote itself for global tourism, especially after the discoveries of submerged coastal heritage. The fact that the harbor is a particular portion to be carefully studied and that most of the proposals are streaming towards new visions for that specific arc while the majority of the waterfront was left without any vision, the thesis work is entitled to integrate with the winning proposal of "Eastern Harbor Framework plan" by SOM, and to draw more attention towards the stretch from Silsila to Montaza Park.

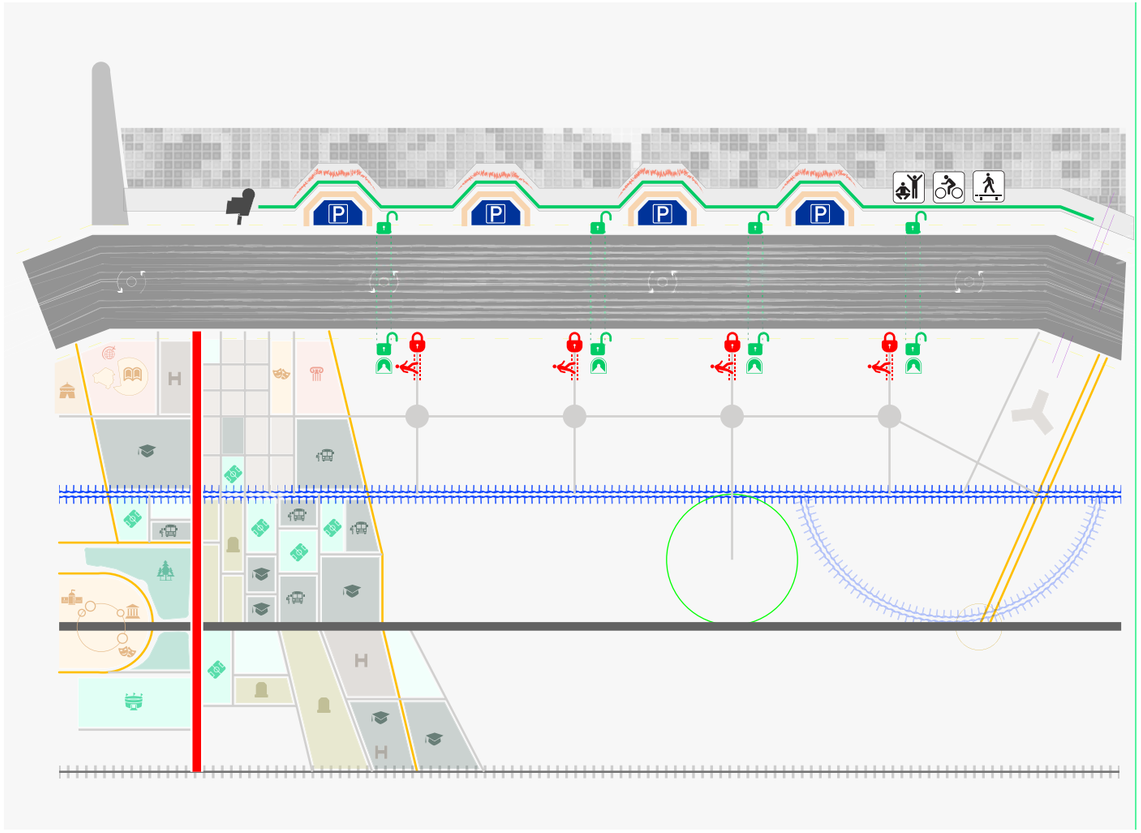
2) The Featurelss:
Due to the typical demolition for the casinos substituted by a tremendous stretch of concrete blocks that part encounters the risk of erased identity that leaves the waterfront without clear structure or any attractions what so ever. Thus, to restructure the old alignment with the existing system of neighborhoods counting on the opportunity to start its activation program firstly, on the local scale of every neighborhood as a Cell capable to promote the entire segment as a unity with the rest of the waterfront.

3) The Exclusive:
Mostly dominated by the private Clubs of Academic Syndicates offering the city a portion of gated waterfront with less public accessibility, however that part is encountering a bigger risk of a median bottleneck that impedes the flows from east to west. Nevertheless, a potential solution was found to be relatively close to assist in relieving the congestion as a prime issue to be solved, the solution was found to be in the corresponding portion of tramways. Hence, the project seeks to embed the intervention inside the city this time by reconfiguring the infrastructure of the tramways, as a first approach to liberate the waterfront from the hustle of congestion.

4) The Vulnerable:
Unlike the other parts where the road represents a border between the city and the water, that part was subjected to conflicts that shape its vulnerability. On one hand it was reported for its fragility in response to environmental threats of tidal waves, and on the other hand the conflict is formed by strong need of pedestrian permeability where the majority of the beaches are located. Subsequently, an integrated solution is entitled to respond for both issues simultaneously. Since the road level tends to approach the sea level, a sustainable solution for environmental resilience requires to construct a new seawall higher than the road level in order to contain the water streaming towards the city in stormy seasons, the seawall to be treated as the threshold where a new pedestrianized surface to be placed upon it, that will suppress the cars below and brings a continuous stretch of open space connecting the city to the beaches in a non-interrupted mode.

3.4. Concept diagrams:

A set of conceptual diagrams developed according to the conditions, raised issues and the different needs of every pattern depicting the current situation Versus the proposed scenario. The diagrams represent the first approach to identify the required strategies and guidelines to be adopted in the final project.



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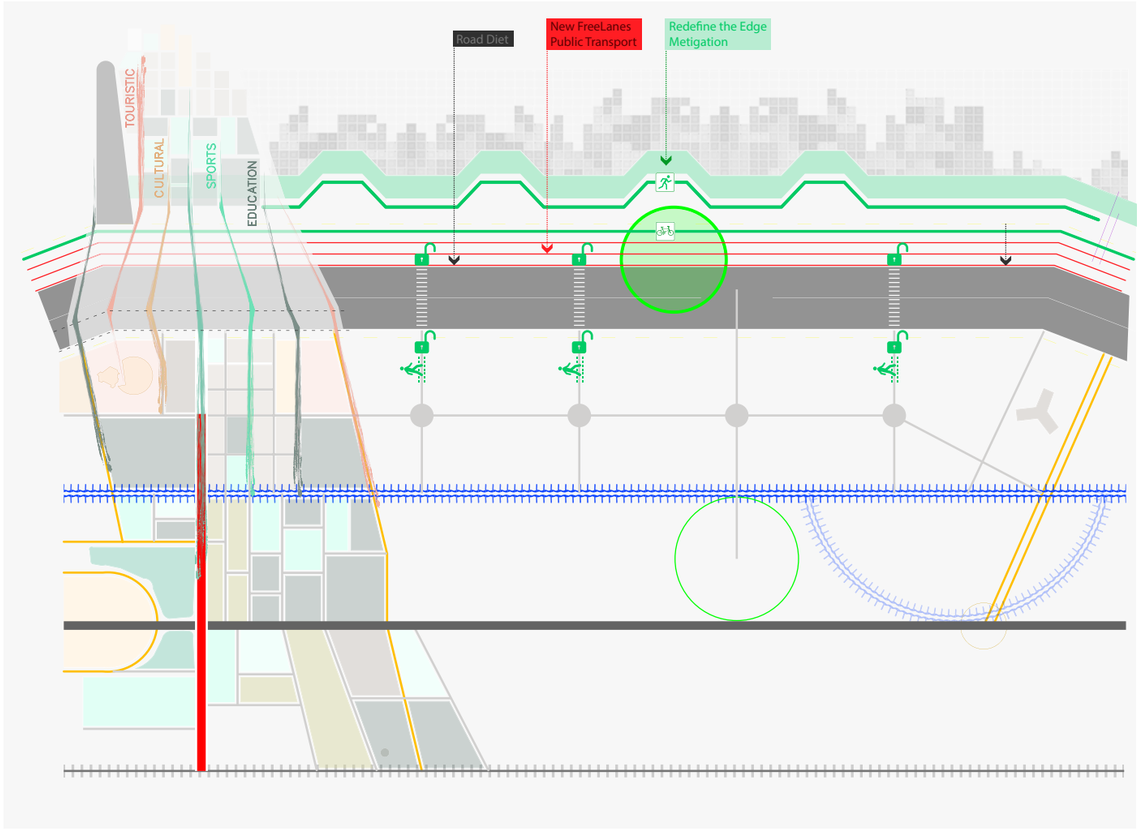
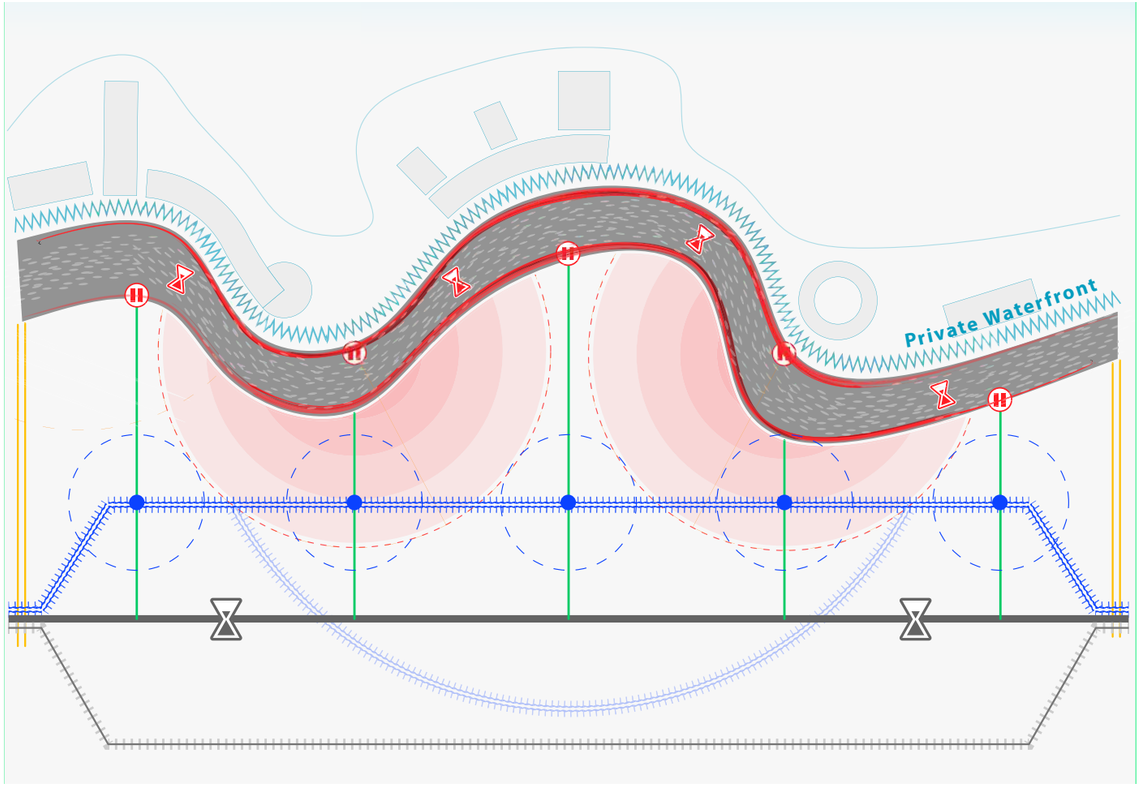


Tomorrow



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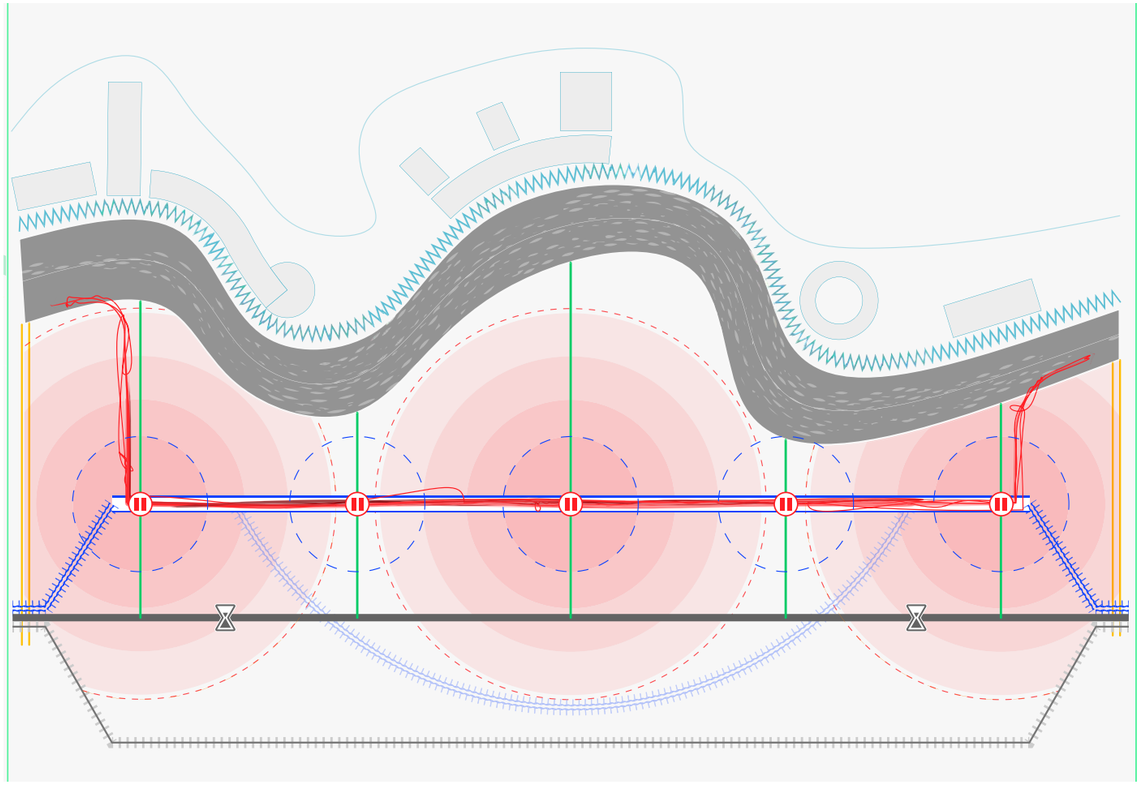

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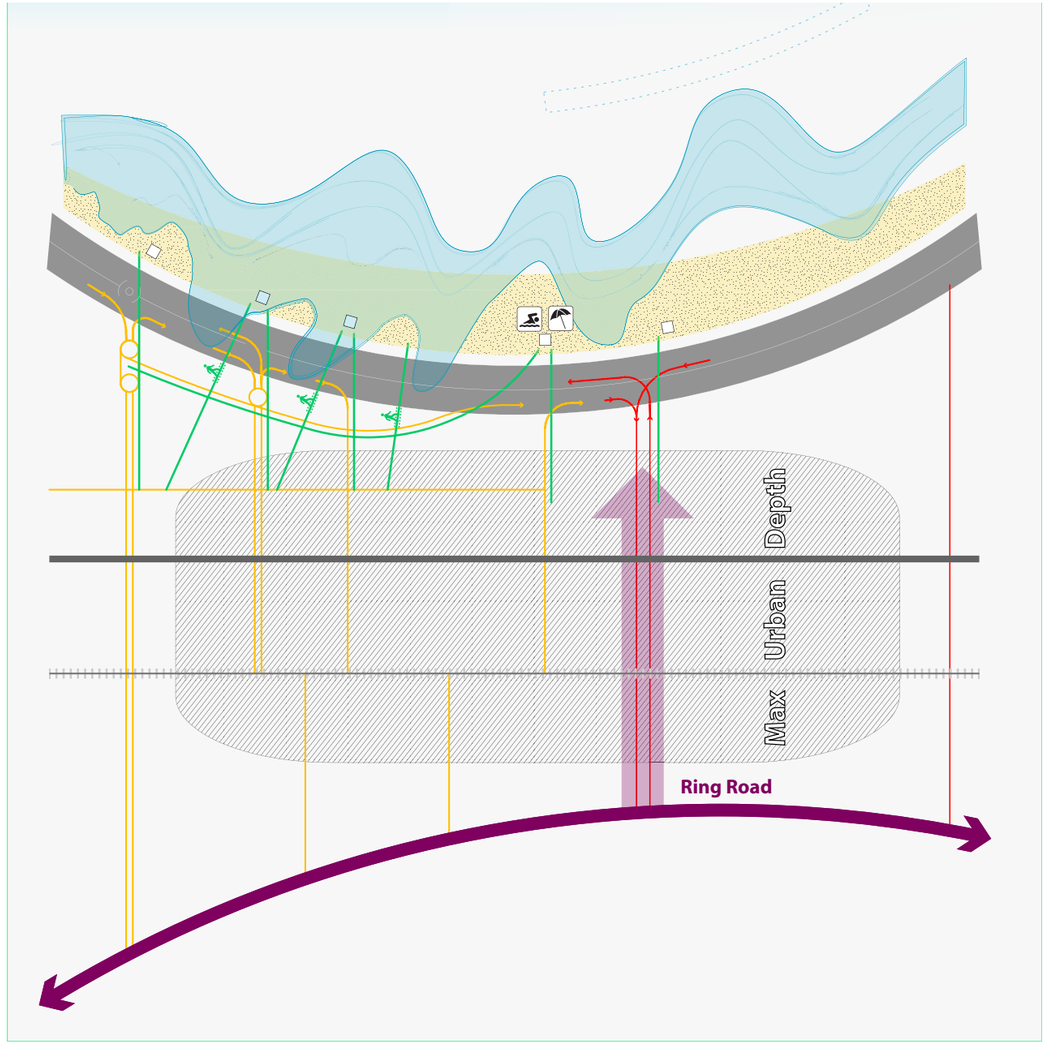

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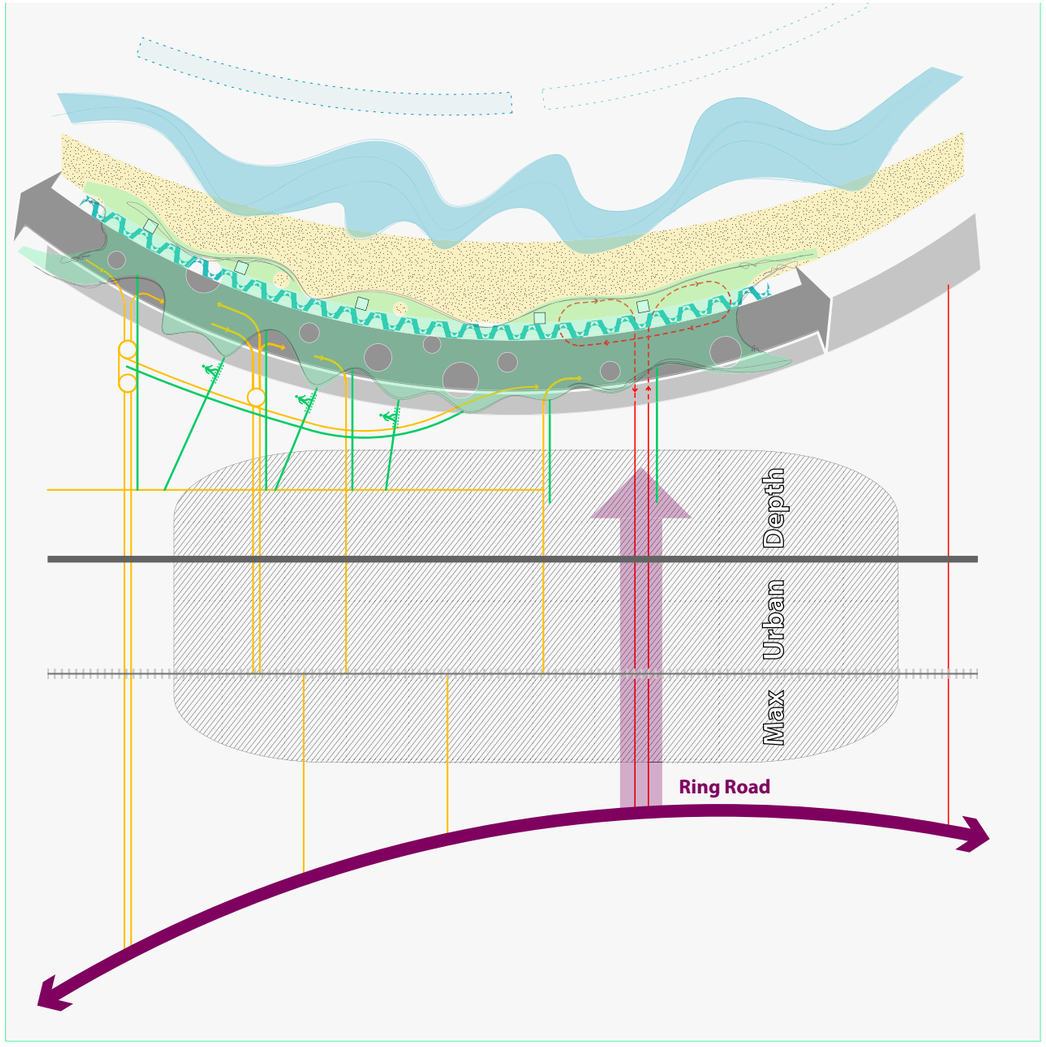


Tomorrow

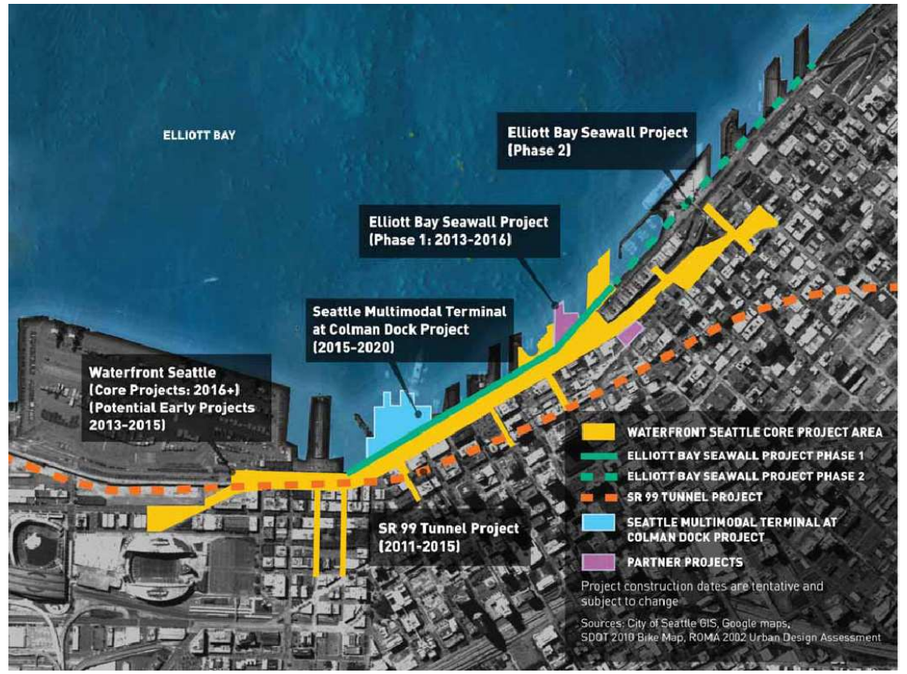
4. RELEVANT PROJECTS:

4.1. Elliot bay, Seattle, Washington “Alaskan viaduct replacement project”.

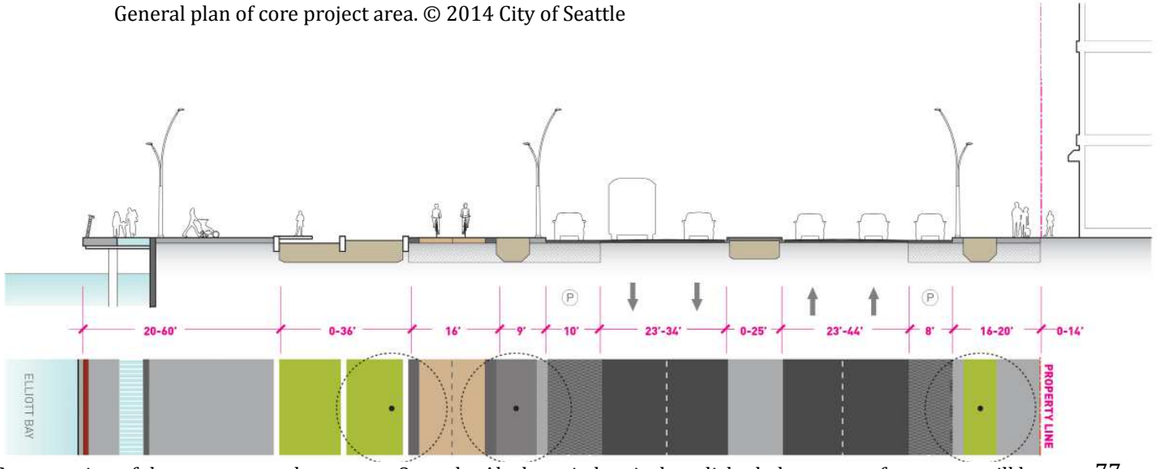
The project was based on the following notions;
- To create a waterfront for all, waterfronts should always represent a democratic space.
- Bring down the road to human scale, unlike the Alaskan way that turning to large thoroughfare separating the city from its frontage.
- Bring people down to the water, to have chance to be directly by the shoreline and experience the natural setting of the place.
- Create a great urban street for all users including (pedestrians, cyclists, transit, freight, cars and parking).
- Integrate the street into overall design of the waterfront where the local waterfront transit will share the street with traffic.

Aerial photo showing the Alaskan way as a strong barrier on the waterfront Seattle.

Photo edit depicting the replacement of Alaskan way by the new waterfront urban street.



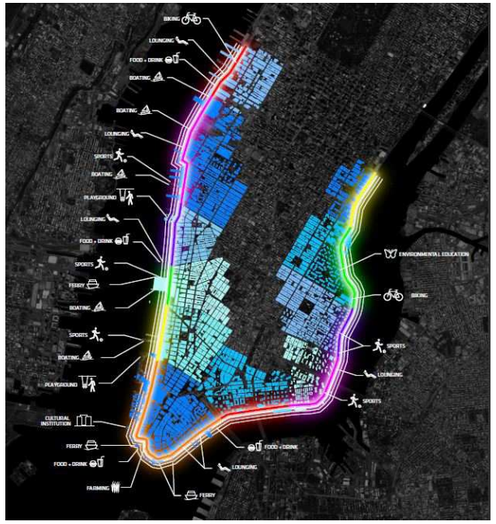
General plan of core project area. © 2014 City of Seattle



Cross section of the new great urban street. Once the Alaskan viaduct is demolished, the new surface street will be built in its footprint to accommodate different users rather than being dominated by cars only. © 2014 City of Seattle

4.2. The Big-U, Manhattan, New York:

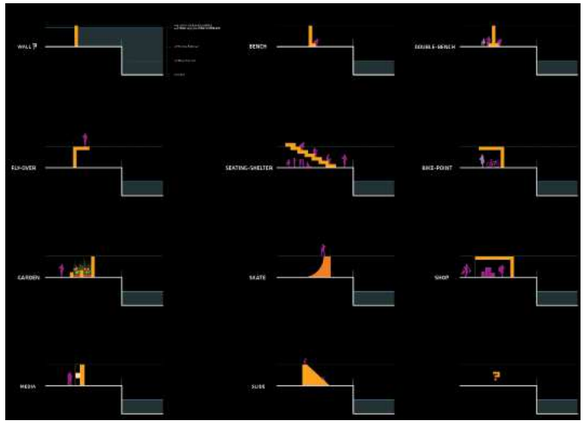
In competition which tasks teams with improving the resiliency of Manhattan waterfront communities through locally-responsive, innovative design. Each proposal was required to be “flexible, easily phased, and able to integrate with existing projects in progress. Bjarke Ingels proposed The Big U as a protective system around Manhattan, driven by the needs and concerns of its communities. The Big U protects 10 continuous miles of low-lying geography that comprise an incredibly dense, vibrant, and vulnerable urban area. The proposed system not only shields the city against floods and stormwater; it provides social and environmental benefits to the community, and an improved public realm.



The Big U as a protective system around Manhattan programmed by a series of public activities.

Envision the resilience infrastructure as a Social infrastructure:

The BIG Team proposes to rethink infrastructure as an amenity, the team calls it social infrastructure. The Big U’s flood-protection will not look like a wall, and it will not separate the community from the waterfront. Rather, the very structures that protect us from the elements will become attractive centers of social and recreational activity.

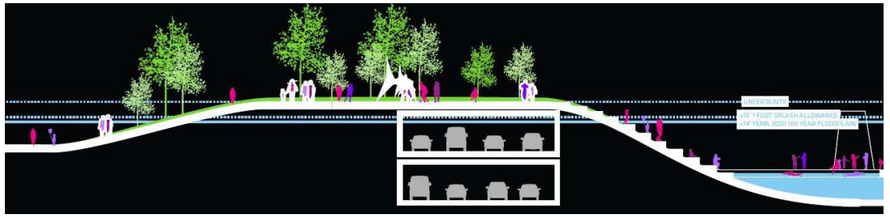


How can a Wall be more than a Wall.

Three Customized Compartments:

The resulting Phase 3 proposal is for three compartments that, while linked together, function independently in terms of flood protection. Each is a particular solution to the problems posed by a particular portion of the city, and each responds to the needs and wishes of the particular communities concerned.
Ps: Only compartment 1 and 2 were seen relevant to refer.

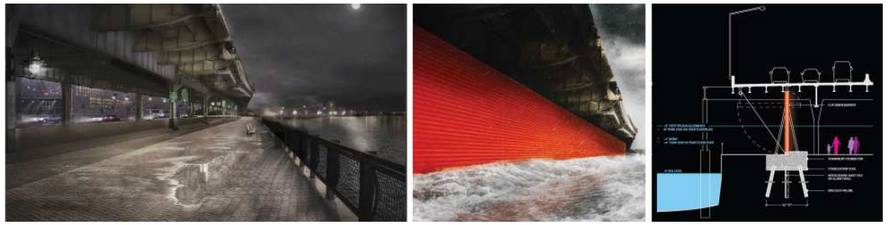
Compartment 1:
Protects a deep floodplain next to the FDR Drive which separates it from East River Park. The park, now poorly connected to the community, has room for a protective berm.



Integrating a buried FDR into a berm and increasing waterfront parkspace

Image depicting the acquired open space by suppressing the FDR below the new park surface

Compartment 2:
At Two Bridges, the relative lack of space between the residential areas and the waterfront favors a mixed-flood-protection strategy. Limited-height flood protection shields the area against most recurrent floods while allowing for views to the waterfront.



Exploiting the existing infrastructure to integrate resilience solutions

5. STRATEGY AND GUIDELINES

THE FEATURELESS:

Today Condition (Problems and needs)
Waterfront Identity : Erased
1- No clear public functions identified by the municipality, which induced a group of informal profiteers to colonize the waterfront.
2- Massive edge of accropode concrete blocks forming a heavy barrier from the sea.

The Road : Dominating the Scene
1- Extensive stretch of asphalt, (35 ~ 70m) wide, (5 lanes/each direction).
2- Excite cars to approach Maximum speed, desperately controlled by speed radars.
3- Impossible surface crossing by pedestrians, most reported for death accidents.

The City : Consistent structure
1- Repetitive system of aligned “Nodes” is the genesis Cells of the urban built structre, these nodes are represented in (Tram stops + Roundabouts + Ex-casinos).
2- “Individuality” of local neighborhoods was reflected vertically across the waterfront, While “Unity” of the system of nodes was connected horizontally along the city.

Strategy (Goals and Targets)
Waterfront Identity : Regenerate
1- New destinations to be promoted for relevant public functions.
2- Mitigate the edge formed by the cordon of concrete blocks to bring people into new experiences at the water level.

The Road : Control
1- As an urban road, rather than a highway.
2- Adopt strategies of traffic control.
3- Emphasize pedestrian permeability across the road.

The City : Extrude
1- By stretching the aligned system of nodes towards the waterfront.

Solution (Actions and Guidelines)
Waterfront Identity : Define
1- Emphasize the existing sport activities along this part of the waterfront by generating new sport node as a seed to promote the sportive identity.
2- New boardwalk to be constructed on the lower level of the existing accropode blocks to ease the accessibility of people to water.

The Road : Reconfigure
1- Road diet, to reduce the inflated profile of asphalt road.
2- Exploit the acquired width for new BRT lanes.
3- Allow pedestrian crossing aligned to the main streets.

The City : Reflect
1- to offer portions of the waterfront that represents the needs of the city. As on the western part of this section is located the biggest academic cluster in the city without any representation of relevant functions on the waterfront.

THE EXCLUSIVE:

Today Condition (Problems and needs)
Waterfront Identity : Privatized
1- Majority of this section is dedicated to private social clubs for recreation.
2- No real presence of public activities - No public accessibility to the waterfront.

The Road : Most Congested
1- As a median connector between the east and west of the city, the congestion in this part of the road is leading to inefficient mobility across the city.
2- Continual informal stopping of Microbuses to (pick-up & drop-off) passengers is definitely increasing the congestion, in addition to road serpentinity which is not really contributing to define clear paths for public mobility.
3- Microbuses enter the city towards south where are located intercharge stops.

The City : Opportunity
1- Underused infrastructure of tramlines with isolated profile of rails not letting any other transport modes to run along this important artery across the city.
2- Congestion of Abo-Kir road along this section of the city.
3- Rich network of North/South connectors.
4- Strong presence of hospitals, whilst the single-lane streets leaves the ambulance cars stuck.

Strategy (Goals and Targets)
Waterfront Identity : Rescue
1- To grasp the potential of the unprivatized parts of the waterfront.

The Road : Relief
1- Reduce traffic volumes by freeing the road from the congestion loads caused by microbuses is a prospective to better connect the city and reduce travelling hours.

The City : Embed
1- Exploit the wide canyon of the tramway artery.
2- Reinforce capacity & frequency of public mobility along the tramway can give more room to absorb the traffic volumes causing congestion in both the Cornice and Abo-Kir roads.
3- Switch the flows of microbuses from the waterfront to the tramway.

THE VULNERABLE:

Today Condition (Problems and needs)
Waterfront Identity : Vulnerable
1- Most subjected to damage caused by storms.
2- Low street level almost equal to sea level at some parts.

The Road : Chaotic
1- The presence of most of the city beaches in that part gurantee strong pedestrian flows back and forth to cross the road.
2- Few pedestrian tunnels leaves the inhabitants to interrupt the road that causes congestion.

The City : Dense
1- The most populated part that induce great pedestrian flows.

Strategy (Goals and Targets)
Waterfront Identity : Resilience
1- Defend the littoral by New Sea wall

The Road : Supress
1- Separate the road from the non-interrupted pedestrian flows.

The City : Liberate
1- Giving the inhabitants the emphasis to pedestrian accessibility.

Solution (Actions and Guidelines)
Waterfront Identity : Stretch
1- By constructing a new seawall higher than the road level, a new entirely pedestrian surface to be extended from the city side to the beach side, to be founded on top of the new wall.

The Road : Reconfigure
1- The road level to be supressed below the new pedestrian carpet.

The City : Reflect
1- The new pedestrian elevated surface is foreseen to liberate the flows from and to the city.

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THE FEATURELESS

Today Condition
[Problems & Needs]

Corniche Identity
Erased:
1- No clear public functions identified by the municipality, which induced a group of informal prefitters to colonize the waterfront.
2- Massive edge of accropode concrete blocks forming a heavy barrier from the sea.

The Road
Dominating the scene:
1- Extensive stretch of asphalt, (35 - 70m) wide, (5 lanes/each direction).
2- Excite cars to approach Maximum speed, desperately controlled by speed radars.
3- Impossible surface crossing by pedestrians, most reported for death accidents.

The City
Consistent structure:
1- Repetitive system of aligned "Nodes" is the genesis Cells of the urban built structre, these nodes are represented in (Tram stops + Roundabouts + Ex-casinos).
2- "Individuality" of local neighborhoods was reflected vertically across the waterfront, while "Unity" of the system of nodes was connected horizontally along the city.

Strategy
[Goals & Targets]

Corniche Identity
Regenerate:
1- New destinations to be promoted for relevant public functions.
2- Mitigate the edge formed by the cordon of concrete blocks to bring people into new experiences at the water level.

The Road
Control:
1- As an urban road, rather than a highway.
2- Adopt strategies of traffic control.
3- Emphasize pedestrian permeability across the road.

The City
Extrude:
1- By stretching the aligned system of nodes towards the waterfront.

Solution
[Actions & Guidelines]

Corniche Identity
Define:
1- Emphasize the existing sport activities along this part of the waterfront by generating new sport node as a seed to promote the sportive identity.
2- New boardwalk to be constructed on the lower level of the existing accropode blocks to ease the accessibility of people to water.
3- New destinations to be aligned with the city grid.
4- Possible future extension of public piers for water transit.

The Road
Reconfigure:
1- Road diet, to reduce the inflated profile of asphalt road.
2- Exploit the acquired width for new BRT lanes.
3- Allow pedestrian crossing aligned to the main streets.

The City
Reflect:
1- To offer portions of the waterfront that represents the needs of the city, as on the western part of this section is located the biggest academic cluster in the city without any representation of relevant functions on the waterfront.
2- Exploit the rapid fluxes of athletes from and to Alexandria sporting club as a potential to create new public sports arena entitled to promote and enrich the sportive identity across that part of the corniche.

THE EXCLUSIVE

Today Condition
[Problems & Needs]

Corniche Identity
Privatized:
1- Majority of this section is dedicated to private social clubs for recreation.
2- No real presence of public activities - No public accessibility to the waterfront.

The Road
Most Congested:
1- As a median connector between the east and west of the city, the congestion in this part of the road is leading to inefficient mobility across the city.
2- Continual informal stopping of Microbuses to (pick-up & drop-off) passengers is definitely increasing the congestion, in addition to road serpentinity which is not really contributing to define clear paths for public mobility.
3- Microbuses enter the city towards south where are located intercharge stops.

The City
Opportunity:
1- Underused infrastructure of tramlines with isolated profile of rails not letting any other transport modes to run along this important artery across the city.
2- Congestion of Abo-Kir road along this section of the city.
3- Rich network of North/South connectors.
4- Strong presence of hospitals, whilst the single-lane streets leaves the ambulance cars stuck.

Strategy
[Goals & Targets]

Corniche Identity
Rescue:
1- To grasp the potential of the unprivatized parts of the waterfront to create new public attraction.

The Road
Relief:
1- Reduce traffic volumes by freeing the road from the congestion loads caused by microbuses is a prospective to better connect the city and reduce travelling hours.

The City
Embed:
1- Exploit the wide canyon of the tramway artery.
2- Reinforce capacity & frequency of public mobility along the tramway can give more room to absorb the traffic volumes causing congestion in both the Cornice and Abo-Kir roads.
3- Switch the flows of microbuses from the waterfront to the tramway.

Solution
[Actions & Guidelines]

Corniche Identity
Rescue:
1- The highlighted part is still left unprivatized and is strongly connected to the cluster of schools of fine arts, is an opportunity to be transformed into "Waterfront Art Center" offering the city a new sculpture park, in addition to studios, ateliers and art galleries where the young artists can interact with the public apart from the academic arts cluster.

The Road
Switch:
1- Reduce traffic volumes across the corniche road by switching the routes of transport vehicles "Microbuses" inside the city at a walkable distance to the waterfront.

The City
Integrate:
1- Transform the tramways from isolated rails to surface rails as a new integrated mobility corridor allowing buses & microbuses to run in line with the trams, foreseen to multiply the capacity of public transport along that route.
2- Integrating new stops of Microbuses with the existing tram stops.
3- Add new stops for Microbuses.
4- The high presence of schools of fine arts and palaces, and the relative tranquility of that area is an opportunity to emphasize and thrive the proposed "Waterfront Art Center"

THE VULNERABLE

Today Condition
[Problems & Needs]

Corniche Identity
Vulnerable:
1- Most subjected to damage caused by storms.
2- Low street level almost equal to sea level at some parts.

The Road
Chaotic:
1- The presence of most of the city beaches in that part gurantee strong pedestrian flows back and forth to cross the road.
2- Few pedestrian tunnels leaves the inhabitants to interrupt the road that causes congestion.

The City
Dense:
1- The most populated part that induce great pedestrian flows.

Strategy
[Goals & Targets]

Corniche Identity
Resilience:
1- Defend the littoral by New Sea wall.

The Road
Supress:
Separate the road from the non interrupted pedestrian flows.

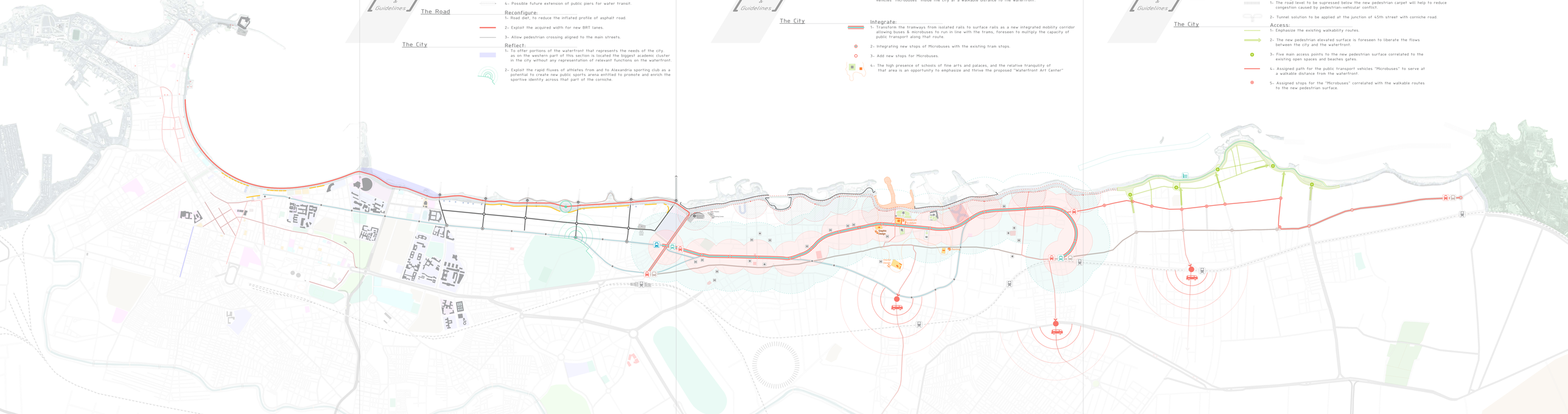
The City
Liberate:
1- Giving the inhabitants the emphasis to pedestrian accessibility.

Solution
[Actions & Guidelines]

Corniche Identity
Stretch:
1- New submerged breakwater to mitigate the destructive power of tidal waves.
2- Construct a new seawall higher than the road level to protect the vulnerable shoreline.
3- A new entirely pedestrian elevated surface to be extended from the city side to the beach side founded on top of the new wall.

The Road
Reconfigure:
1- The road level to be supressed below the new pedestrian carpet will help to reduce congestion caused by pedestrian-vehicular conflict.
2- Tunnel solution to be applied at the junction of 45th street with cornice road.

The City
Access:
1- Emphasize the existing walkability routes.
2- The new pedestrian elevated surface is foreseen to liberate the flows between the city and the waterfront.
3- Five main access points to the new pedestrian surface correlated to the existing open spaces and beaches gates.
4- Assigned path for the public transport vehicles "Microbuses" to serve at a walkable distance from the waterfront.
5- Assigned stops for the "Microbuses" correlated with the walkable routes to the new pedestrian surface.



RETRIEVE THE WATERFRONT ALEXANDRIA:

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Master's Thesis - December 2014
POLITECNICO DI MILANO - School of Architecture and Society
Prof. Barbara Piga & Eugenio Morello

FINAL PROJECT BOARD:
Strategies & Guidelines Framework Towards a Democratic Corniche