Impact of the extension of Alexandria Coastal road on the transformation of material of the near shore marine environment

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The extension of Alexandria Coastal road

- **Alexandria city was established on the narrow coastal road between Maryut and Mediterranean Sea in 332 before B.C., with waterfront of 42 km from Abu Quir in the East to Agamy in the west.**
- **In 1934, the Corniche Road was established as well as the Sea wall for protection on Abu Sir Ridge elevation.**

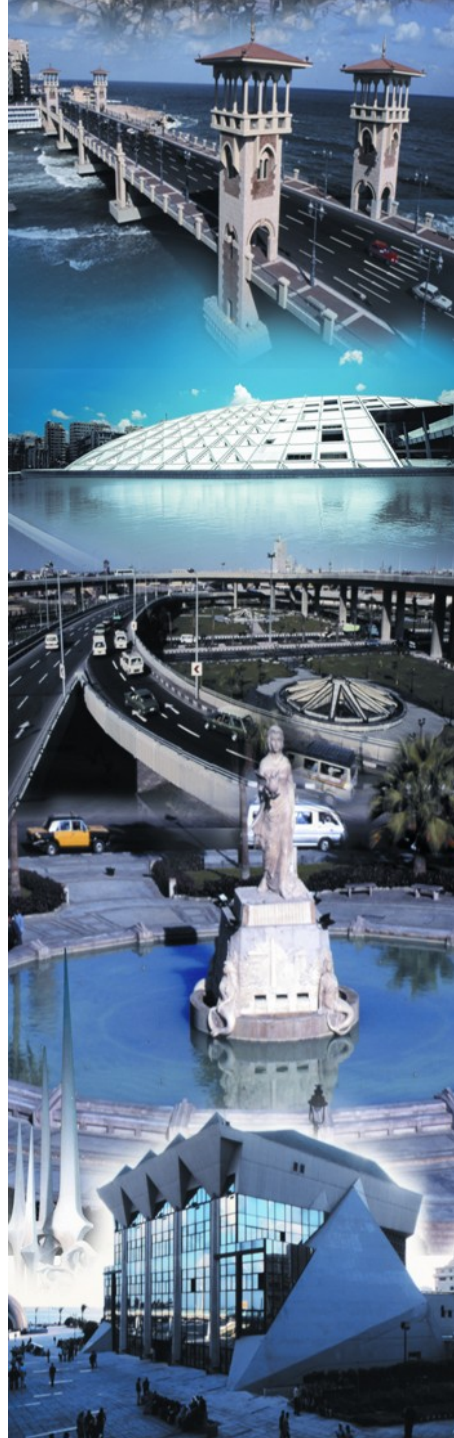
- **During the last fifty years, Alexandria beaches was covered with sands for a distance of 50 to 100 meter wide. The shoreline of Alexandria beaches exhibits typical features of a youthful shoreline (Shukri V Philip, 1955).**

The extension of Alexandria Coastal road

- **During the last decade, several changes took place along the coastal area of Alexandria city.**
- **The widening of the existing coastal road of Alexandria (Alexandria Corniche) , extending about 20 Kms, was done without any Environmental impact assessment studies (EIA) before and after the extension.**
- **This exposed the coastal area of Alexandria to severe negative consequences mainly erosion.**

The extension of Alexandria Coastal road

- **During the period 1998 to 2003 widening extends seaward to about more than 50 meters in some locations.**
- **Bridges are built in some areas.**



Stanley Bridge

The extension of Alexandria Coastal road

Although this project will have an obvious positive effect in solving the traffic flow problem in the city,

its negative impact on deteriorating the neighboring marine environment is highly expected.

What We are thinking to do?

Since no EIA studies were done before or during this project, the main goal of the proposed study is :

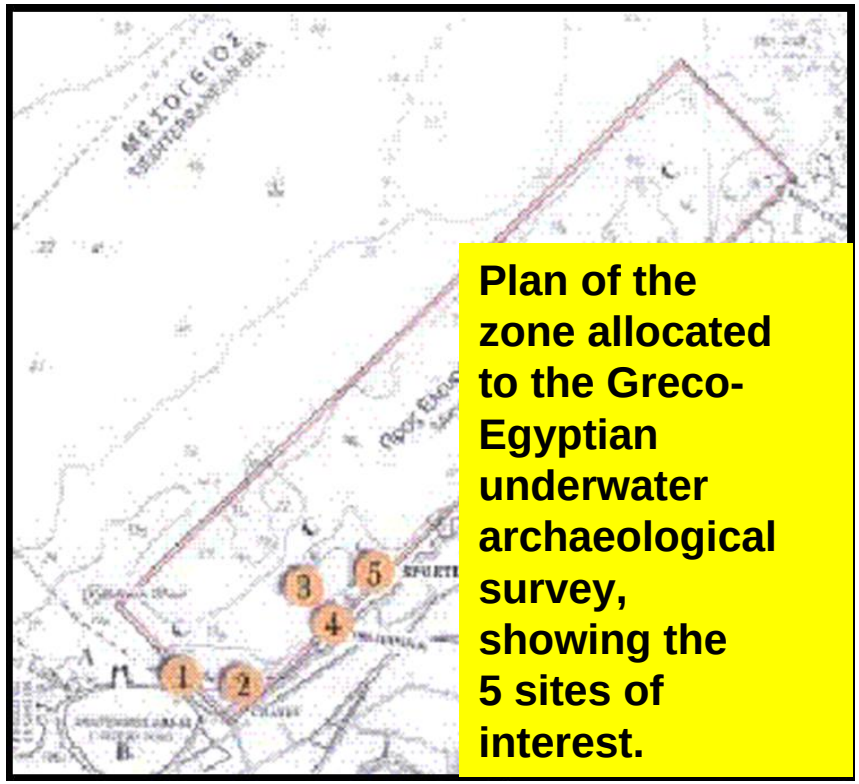
- **To follow up the effect of the coastal road widening on the marine environment .**
- **To issue practical solution to overcome its negative consequences.**

Necessary steps must be taken to study the impact of the coastal road widening on :

- Sediment transport.
- Changes in bottom topography .
- Water productivity .
- The biodiversity of plant and animal populations.

Necessary steps must be taken to study the impact of the coastal road widening on :

- The necessary measures must be taken to protect The submarine archeological sites.
- The distribution and spawning grounds of fishes.



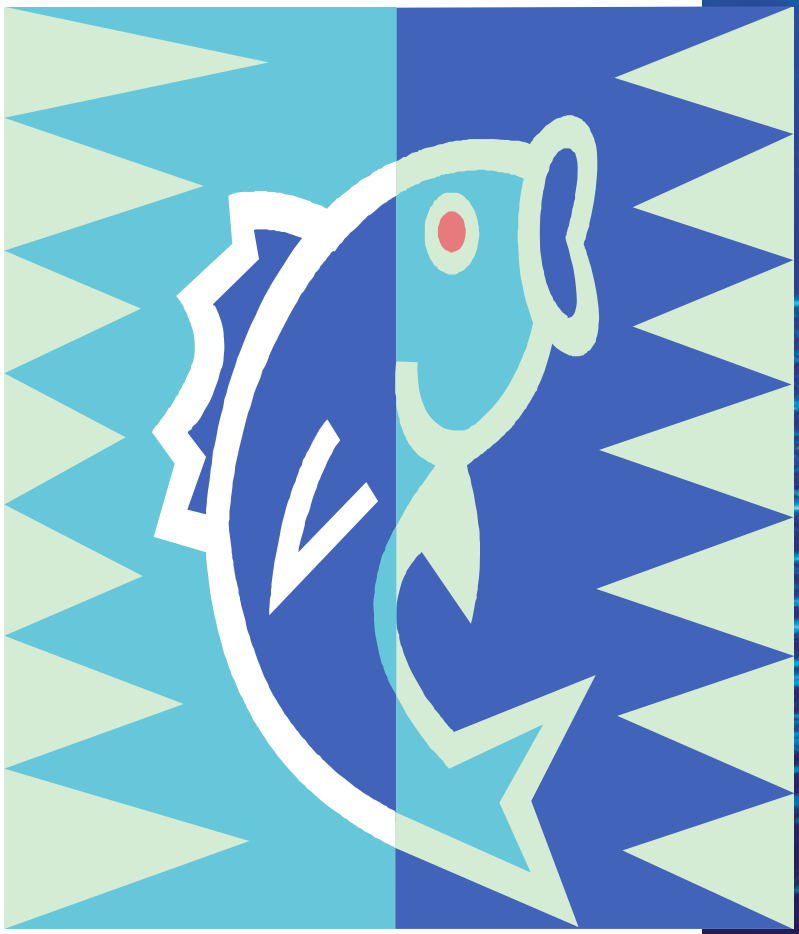
Plan of the zone allocated to the Greco-Egyptian underwater archaeological survey, showing the 5 sites of interest.

New Situation Survey

- The new situation affect considering the coastal area by vanishing most of the wide sand coastal area which was varying between 50 to 100 meter.
- After widening, the sandy coastal area disappeared from most of the beaches leaving them as Beach pocket or embayment.

Corniche road before and after extension

New Situation Survey



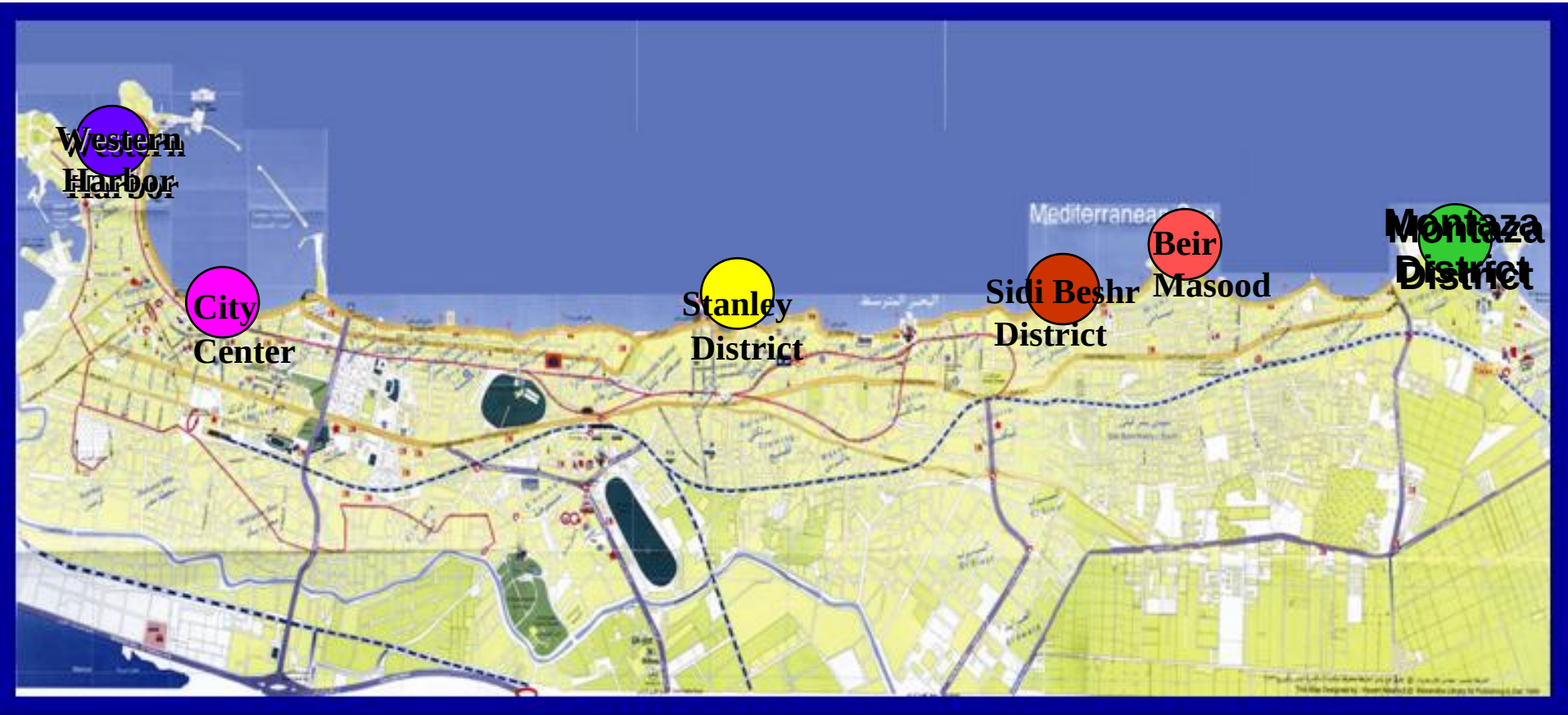
- Disappearing the nearshore habitats such as benthic marco – algal vegetation.
- Studies on submerged aquatic macrophytes reveal that some of the seagrass communities disappeared in the intertidal zone.
- Also, several algal species that were obviously common before implementing the project, now appear to be absent.

New Situation Survey

- The erosion rate varies considerably along the Alexandria coastal area leaving some areas exposed directly to the storm in particular during winter times.
- This occured during the **winter 2003/2004** where some coastal area was submerged in particular at Mandara.

ALEXANDRIA

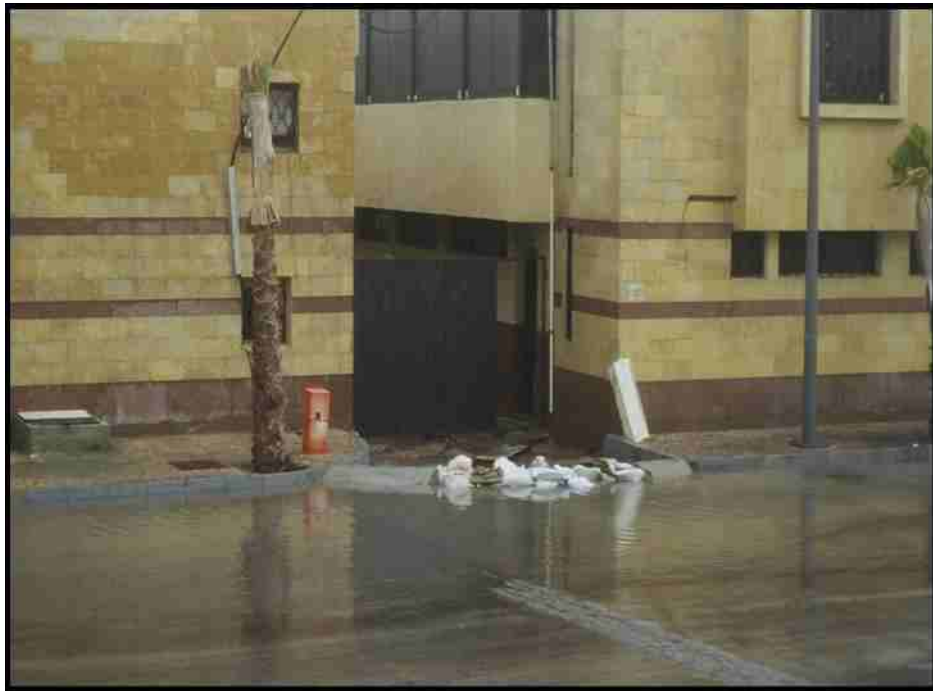
This Fig. shows an example of Alexandria corniche during one of the storm, which indicate the negative consequences all over the area. from El Montaza to Eastern harbour.



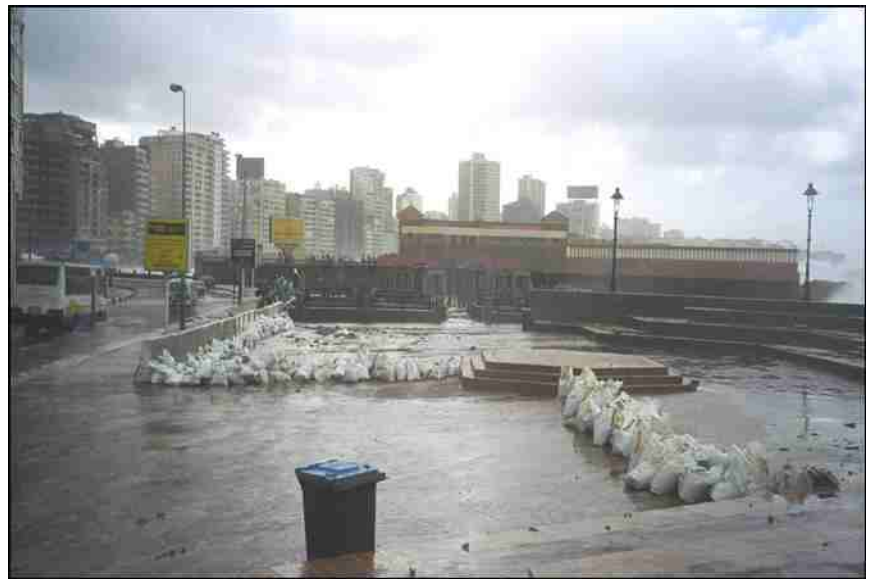
Montaza District

(El Anfoushy District)

El Ramleh area (city center)



Sidi Beshr District



Beir Masood

Before winter 2003-2004

Beir Masood

Beir Masood

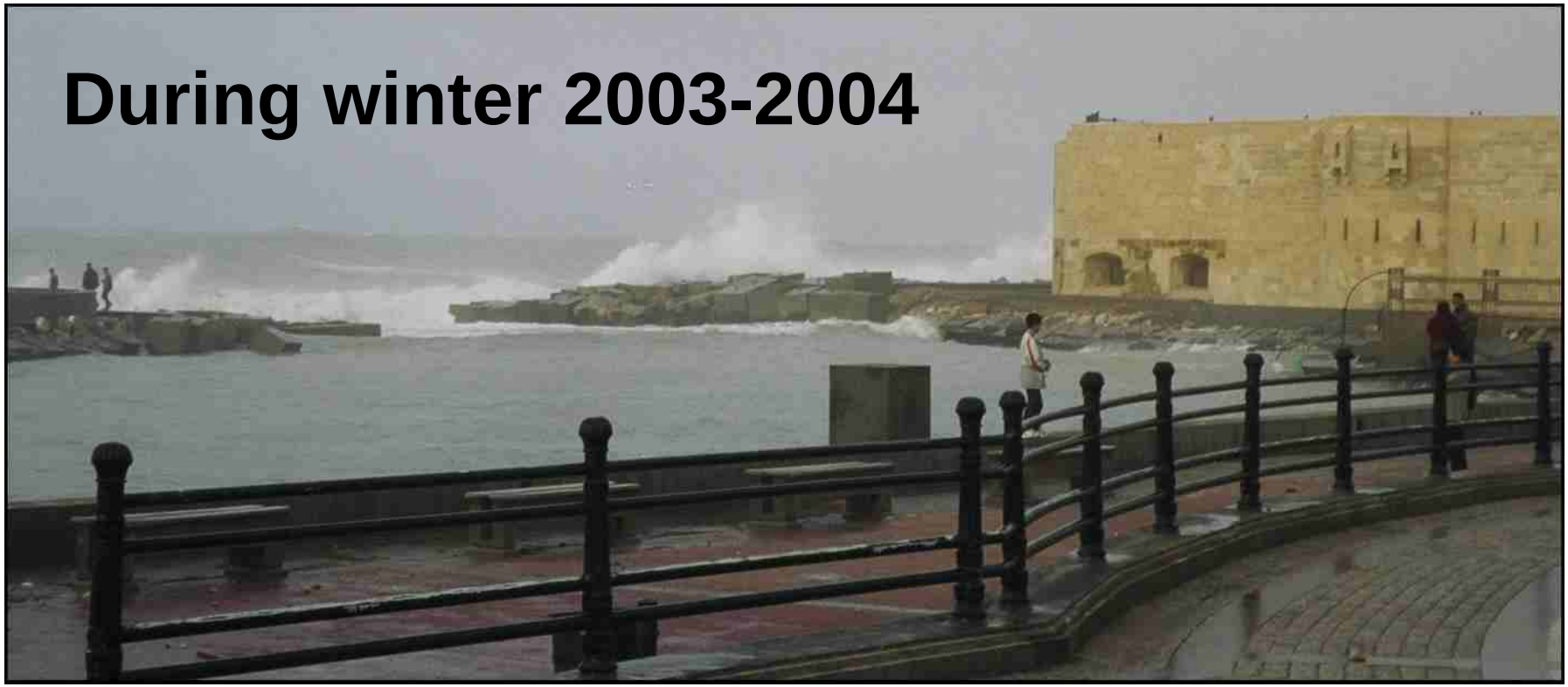
Waves breaking stairs and floor tiles

Damage in many places at the corniche

BEFORE

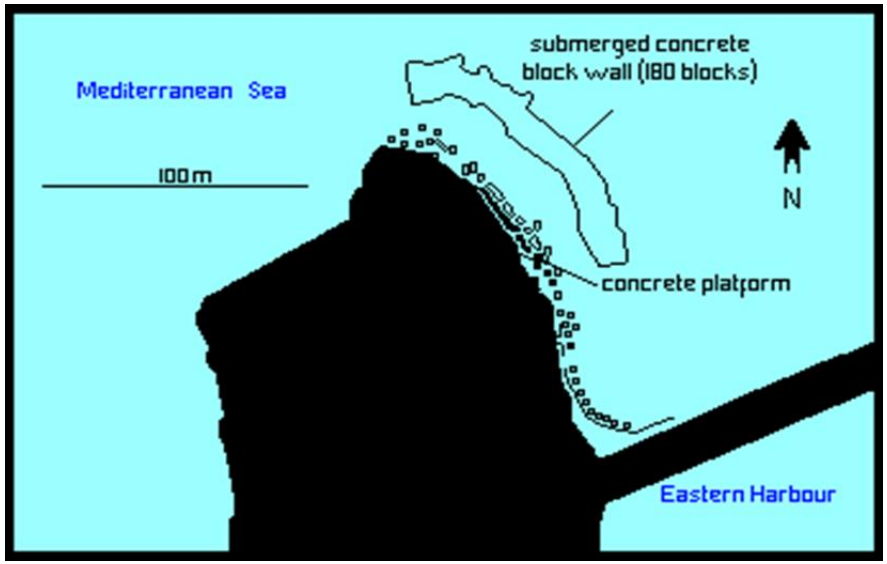
Quaitbay Castle

Quaitbay Castle



Quaitbay Castle

During winter 2003-2004

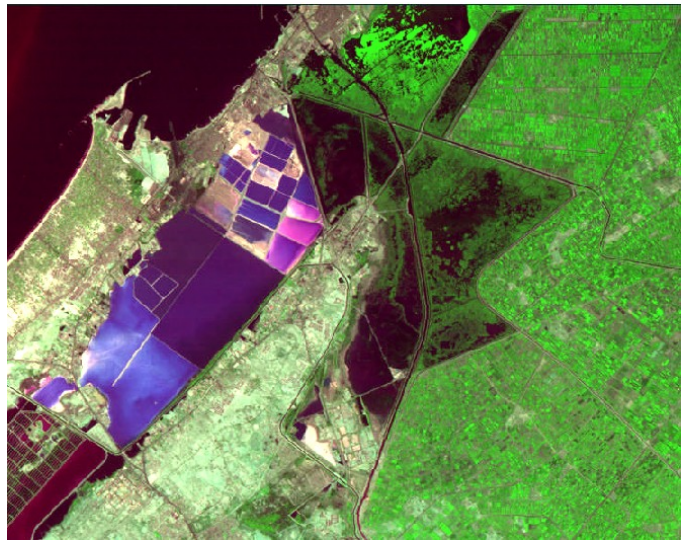


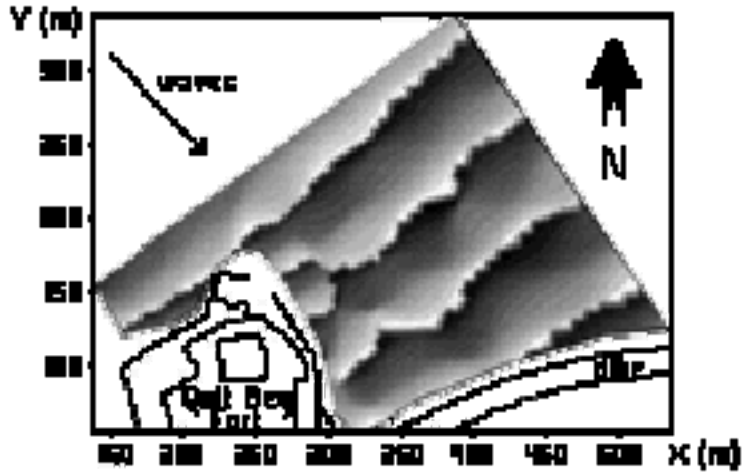
This means that if we are not going to protect this extension, the whole Alexandria coastal area will expose to a serious damage at several localities, This will put Alexandria city in a very critical situation,

Also some of the submarine archeological sites exiting in the neighborhood area of the Eastern harbor will be destroyed.

Necessary measures for protection of the coastal area from Beach erosion:

1. New topographic chart for Alexandria coastal area must be constructed to identify the new bottom topography of that area.
2. Study the impact of coastal road widening on certain parameters such as current, waves distribution and environmental conditions and also determining the erosion, accretion along Alexandria coastaline area.





Some Suggested Solutions

Various options exits to reduce the erosion hazard to public and private buildings and infrastructures.

Some Suggested Solutions

- **It is recommended to use artificial reefs as wave breaker to reduce coastal erosion especially in areas suffering from erosion along Alexandria coastline. In fact, multipurpose artificial reefs are a beneficial solution for coastal protection which mimic nature's most common way of protecting exposed shoreline (Black, 2004).**
- **Various options can be used to reduce erosion hazards to public and private buildings and infrastructures.**

Some Suggested Solutions

These options include (committee on coastal erosion zone management, 1990):

- **Hard structural approaches (e.g. seawalls, groins, offshore, breakwaters, etc.)**
- **Building and land use restriction (e.g. setback requirements)**
- **Relocation of existing structures from eroding shore.**
- **Soft structural (e.g. beach nourishment)) are environmentally sound approaches in recreation areas.**

RECCOMMENDATIONS

- **At Alexandria, from the previous studies on the coastal erosion in particular before and after widening Alexandria Corniche, it is recommended that certain studies must be done before taking any step for protection .**
- **This include:**

1. **hydrographic survey from coast line to a depth 30 meters.**
2. **Also to make ground survey from coast line to Corniche wall defining the wideness of the sand beach as well as ridges, beach pockets or embayment and revetments.**

RECCOMMENDATIONS

The preliminary investigations indicate the soft protective works (Beach nourishment), is most suitable way for protection in Alexandria coastal area.

Beach nourishment

Methods for Erosion Reduction

Beach nourishment

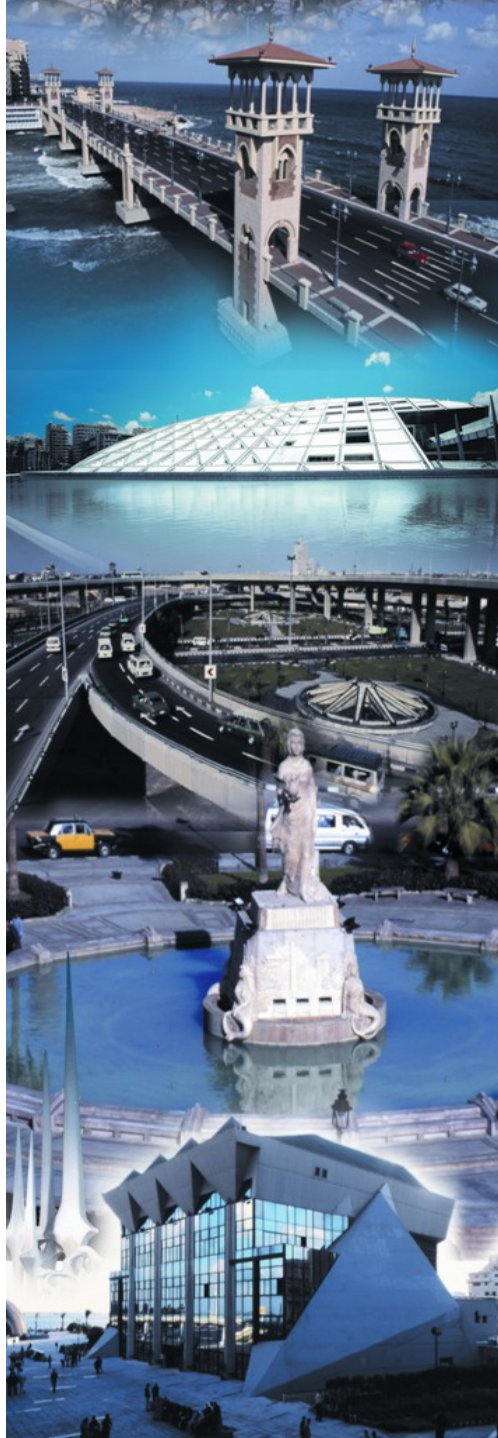
- **In Alexandria coastal area, the most proper methods for erosion reduction is the beach nourishment, which involves excavation from one site and placing in another site large quantities of sand on an existing but retreating beach to advance the shoreline seaward (Bird, 1996).**
- **Sources of sand for beach- fill are often scarce.**

There are two appropriate sources of supply for beach nourishment.

(a) the open ocean or broad – estuaries bays beyond a depth of 40 feet or

(b) area around inlets or – other places of accretion, where the supply is constantly replenished by natural force (Clark, 1996).

Protect Alexandria



- *Time-table for completing the project*
- *Funding*
- *Research objectives, methodology and techniques*
- *Qualifications, responsibility and experience*
- *Preliminary investigation*
- *Documentation*
- *Material conservation*
- *Site management and maintenance*
- *Health and safety*
- *Report preparation*
- *Curation*
- *Dissemination including public participation*
- *International co-operation*

PROJECT DESIGN

Thanks for your attention

BIBLIOTECA

ALEXANDRINA