CHAPTER I
INTRODUCTION AND GEOLOGIC SITTING OF HURGHADA AREA

1. Introduction :

Population in Egypt had been conceded many ages ago within the limited band of Nile valley, and they increase rapidly and the places around the Nile valley become narrow so that the construction activities in Egypt at the present time were done to solve the "population explosion". The main sources of water supply in Hurgada area is the conveyed Nile water and the desalinized sea water.The city plan aims to limit urban polarization phenomenon with its associated problems to direct urban expansion toward the desert, to offer new job opportunities in service projects and to form distinguished social and urban environment. Moreover, the progressive development activities (petroleum production, mining & tourism ...etc) greatly stress both finding and searching the new places to build big cities which become needed to copy with the excessive demands and to minimize the environmental constrains.

The main objective target of the study is to get information about the bedrock foundations and to determine the risk zone of the study area by using the geophysical tools.

The most important problem which may affect the stability of the city is attributed to the liquifaction of the sand beds, which are found on the surface and subsurface, in the form of clay and marl intercalation, which may give resistance to the settlement of building above it especially when it become saturated with water.

The main objectives of this study are :

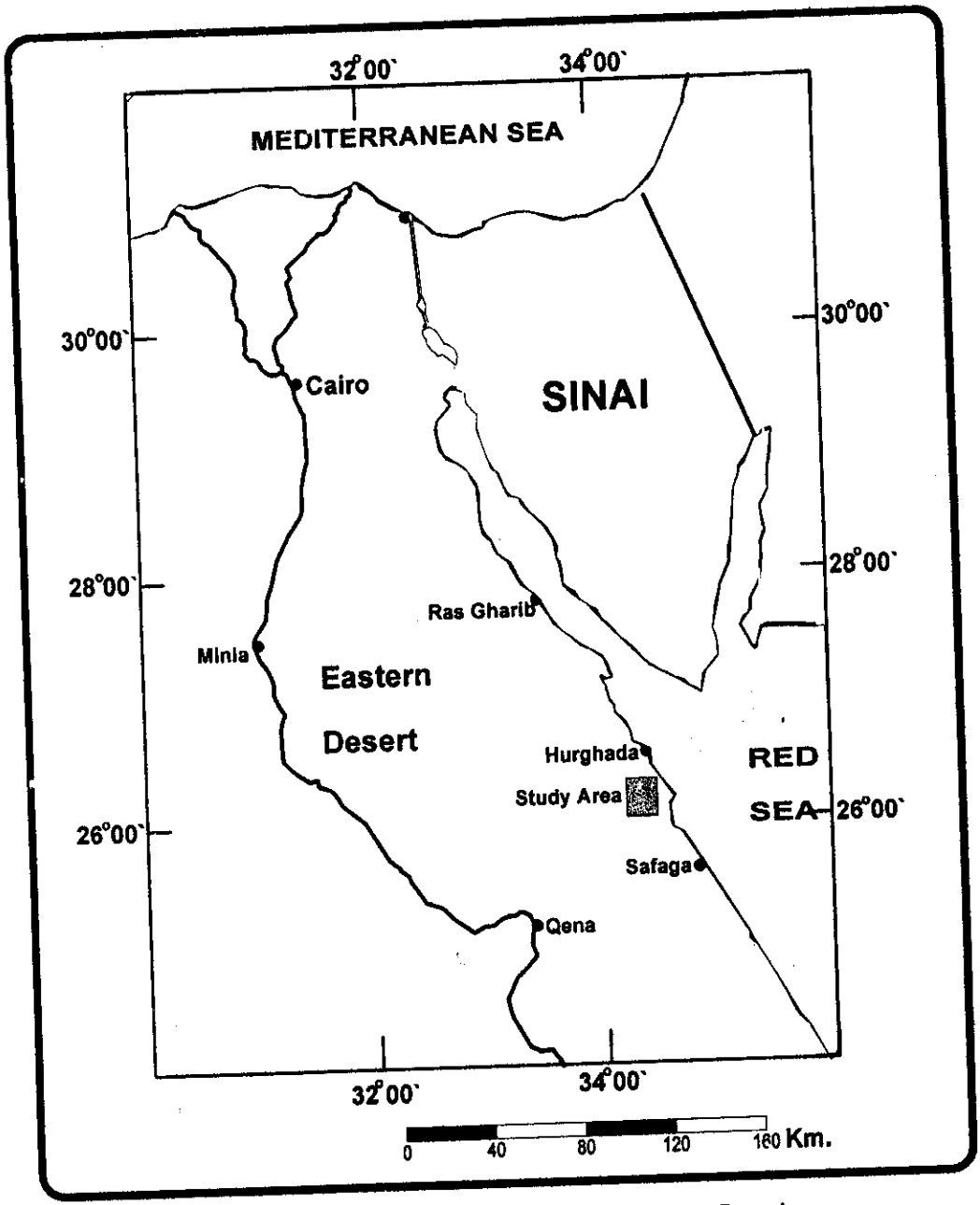
1. Study the surface geology (Lithology and structures).
2. Study the distribution of the subsurface layers by applying both the electric and shallow seismic refraction tools.
3. Evaluate the suitability of the foundation bedrock encountered in the area for different purposes.

Geophysical surveys can be useful in the study of most subsurface geologic problems. In investigating shallow subsurface conditions, the seismic refraction and electric resistivity techniques are of wide range of applications. Usually, the two techniques are used in combination

On the ground , the interpretation of geophysical data generally is ambiguous. The resistivity measurements combined with seismic refraction measurements provide a for more powerful exploration tool than any of them on its own ***Mooney (1980)***. Besides, the surface geologic data are used in the careful geophysical analysis and interpretation. The geologic framework of the study area are therefore described to provide a reasonable view about the lithologic distribution as well as the affecting structures if were finding.

1.1. Location :

The study area (South of El-Hurghada city) is located in the western side of the Rea Sea coastal plain and found beside Hurghada-Qusier road. It lies between Longitudes 33° 49` 45`` and 33° 50` 30`` E and latitude 27° 04` 10`` and 27° 05` 10`` N ; Fig.(1). It occupies an area of about 1 km^2.



Fig(1) : Location Map Of The Study Area

1.2. Previous works :

Previous geologic studies carried out on the study area are very limited. ***El Gezeery et al. (1997)*** analysed the Bouguer gravity anomaly map of Hurghada oil field which reveals that the area is affected mainly by five tectonic trends. They are delineated by five intersecting fault systems, the Suez (N35° – 45°W), the Syrian Arc (N45° – 65°E), the North Africa (N-S), the Mediterranean (E-W) and the Clysmic (N65°W). Structurally, the area composed of a series of NW-SE plunging anticlinal and synclinal folds. Complex numerous minor faults are also present based on the residual maps. These tectonic elements are of Pre-Miocene age and rejuvenated in the Miocene and Pliocene times. The calculated minimum value of the basement depth was found to be 0.6 km. in the northeastern part of the area whereas, the maximum depth about 1.6 km. was reported in the southwestern part.

El-Shayeb et al. (2000) utilized two-dimensional power spectrum technique to determine the depth of the causative magnetic bodies within the basement complex. It was found to be aggregated at two disturbing interfaces having average depths of 0.786 Km. and 2.600 Km. at Esh El Mallaha area. Filtering combined with downward continuation at the two assigned interfaces could simply assist in discriminating between shallow and deep-seated causative bodies.

2. Geomorphology, Stratigraphic and Structure settings:

2.1.Geomorphology :

Hurghada area is characterized by a unique type of landscape that developed on the account of the complicated tectonic history of Red Sea region. Geomorphologically, the study area is distingwished into three units.