ABSTRACT

The main purpose of this thesis is to study some geophysical details about the bedrock foundation to determine the risk zone in the study area. The aim of Egyptian government is to construct new cities inside the desert_to overcome the population in the old cities. The suggested locations need some studies, like: geological, geoelectrical resistivity, shallow seismic refraction and geotechnical studies. These studies aim to determine the geotechnical properties and their reliability for the best foundation purposes of soil materials. The link between geophysical studies and civil engineering projects depends mainly upon material competence, the thickness of the weathered layer and nature of the bedrock foundations.

The study area is located in the western side of the Red Sea coastal plain; beside the Hurghada — Qusier road in which it lies between longitudes 33° 49' 45" and 33° 50' 30" E and latitudes 27° 04' 10" and 27° 05' 10" N.

Geoelectrical resistivity survey has been carried out using Schlumberger 4 — electrode array. The maximum current electrode half spacing (AB/2) is equal to 300 m.

Twenty nine vertical electrical sounding station (VESes) have been conducted. They were qualitatively and quantitatively interpreted to determine the geoelectric parameters (resistivity and thickness). These parameters were used to construct seven geoelectrical profiles. Geoelectrical succession has been achieved and identified. On the other hand, the geoelectrical parameters: Transverse resistance (T), Transverse

resistivity (p_t), Longitudinal conductance (SL), The average Longitudinal resistivity (p_L) and Anisotropy (X) have been drawn and evaluated .

Shallow seismic refraction survey, employing both P- and 5-waves, has been carried out using ES- 1225 EG & G Geometrics 12 channel seismograph by applying In — offset spread. The study area was surveyed using six seismic refraction profiles which have been acquired with geophone — geophone distance of 10 m. A group of records showing the arrival times of the refracted waves at each geophone were resulted. Three interpretation methods, have been applied to determine the thickness of each layer and its velocity. These methods are the delay time, the intercept time and the ray tracing methods.

Geoseismic cross — section, isopach maps, compressional and shear waves distribution maps for the different layers were constructed. On the other hand, different elastic moduli (Poisson's ratio, kinetic rigidity modulus, Young's modulus, Bulk modulus and Standard Penetration Test) have been calculated from the values of velocities of P- and S- waves. Also, material and soil competence scales and foundation material bearing capacity were evaluated.

Three — layers model was obtained indicating weathered friable sand and gravel layer resting on fine compacted wet sand which overlies reefal limestones.