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Site characterisation using electrical resistivity methods: a case study of Iba Nursery/Primary School, Ojo, South-West Nigeria

A S Ogungbe and C O Ogabi Lagos State University, Nigeria

Two-dimensional (2D) resistivity imaging and vertical electrical sounding (VES) were integrated to map the subsurface Iithology within Iba Nursery/Primary School, Ojo, Southwest, Nigeria, with a view to ascertaining the thickness and stratigraphy of the beds and their implications on engineering structures. Ten vertical electrical soundings, covering the entire area were conducted using Schlumberger configuration. Three 2D horizontal profiling (Wenner array) was used to qualitatively interpret the geo information of the lithological nature of each geo electric layer within the study area. The VES data were processed and inverted using master curves and computer software called WinResist, while the 2D inversion was done using Diprowin. Four to five subsurface layers comprising of topsoil, clayey sand, sandy clay, sand and clay were delineated. Qualitative interpretation of VES data revealed five QHA, one QH, one KQH, one KHK, one KHA and one HA curves. The study also showed that the second and third layers are composed of sandy clay and sand considered to be good prospect for foundation of small to medium engineering structures with thickness value ranging between 2.4 m-19.8 m and resistivity value from 152.9\Omegam - 466.2\Omegam. This lithological sequence in which the near surface sand deposits are underlaid by sand partially saturated with water, gives a sense of stability to the overlaying sandy clay layer. Thus, the application of 2D resistivity imaging and VES has revealed both the lateral and vertical variations in depth to competent sand layers within the study area, hence providing a useful guide for the site engineers in designing appropriate foundation structures.

ogungbea@yahoo.co.uk