

VERTICAL ELECTRICAL RESISTIVITY SOUNDING FOR GROUNDWATER IN BISHINI AREA OF KADUNA STATE

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ABSTRACT

Groundwater occurrence in Bishini area of Kaduna state was investigated using Electrical resistivity method for the purpose of sitting viable borehole. A total of twenty-seven (27) vertical electrical soundings (VES) using Schlumberger electrode array were acquired with a maximum electrode separation of $AB/2=150$ m, using the ABEM Terrameter SAS 300C.

Interpreted sounding curves revealed predominant of Three to five electro-stratigraphic units were delineated in the study area, namely: the topsoil (indurated laterite), lateritic clay, weathered basement rock, fractured basement rock and fresh basement. The weathered and / fractured basement rocks constitute the aquiferous zones with the weathered layer aquifer (63%) predominant while the weathered/fractured (unconfined) aquifer (7.4%) was least represented. The first two layers have variable resistivity of between 76 and 22938 Ω -m. Weathered basement with average resistivity and thickness values of 211.52 Ω -m and 16.4m respectively was encountered in all the sounding locations with exception of VES 23 and VES 26. Weathered/fractured basement was encountered in six locations with resistivity and depth to the top of fracture basement ranging from 77 - 977 Ω -m and 5 -14m respectively. The weathered layer (5 – 37m overburden thickness) and weathered/fractured basement (20 – 62m overburden thickness) found within basement depressions constitutes the main aquiferous units. The geo-electric sections in the N-S, NW- SE and NE-SW directions revealed VES 9, VES13, VES 19 and VES 21 as sounding locations that could be drilled. VES 21 that was fractured with resistivity of 977 Ω -m and overburden thickness of 62m was considered most suitable for borehole drilling provided there is no drop in volume of water as drilling progresses.

KEYWORDS: Vertical Electrical Sounding, Sounding Curves, Electro-Stratigraphic Units, Basement Depressions, Aquiferous Units