World Academy of Science, Engineering and Technology
International Journal of Humanities and Social Sciences
Vol:9, No:11, 2015

# Estimation of Aquifer Parameters Using Vertical Electrical Sounding in Ochudo City, Abakaliki Urban Nigeria

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**Abstract :** Knowledge of hydraulic conductivity and transmissivity is essential for the determination of natural water flow through an aquifer. These parameters are commonly estimated from the analysis of electrical conductivity, soil properties and fluid flow data. In order to achieve a faster and cost effective analysis of aquifer parameters in Ochudo City in Abakaliki, this study relied on non-invasive geophysical methods. As part of this approach, Vertical Electrical Sounding (VES) was conducted at 20 sites in the study area for the identification of the vertical variation in subsurface lithology and for the characterization of the groundwater system. The area variously consists of between five to seven geoelectric layers of different thicknesses. Depth to aquifer ranges from 9.94 m-134.0 m while the thickness of the identified aquifer varies between 8.43 m and 44.31 m. Based on the electrical conductivity values of water samples collected from two boreholes and two hand-dug wells within the study area, the hydraulic conductivity was determined to range from 0.10 to 0.433 m/day. The estimated thickness of the aquifer and calculated hydraulic conductivity were used to derive the aquifer transmissivity. The results indicate that this parameter ranges from 1.58-7.56 m²/day with a formation factor of between 0.31-3.6.

**Keywords :** Asu river group, transmissivity, hydraulic conductivity, abakaliki, vertical electrical sounding (VES)
**Conference Title :** ICHHS 2015 : International Conference on Humanity, History and Society
**Conference Location :** Cape Town, South Africa
**Conference Dates :** November 05-06, 2015