

## **Geoelectrical and Hydrogeochemical Assessment of the Groundwater Potentials of Ehandiagu, Enugu State**

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Geoelectrical, hydrogeochemical and hydrogeological investigations were carried out in order to determine the groundwater potentials of the Ehandiagu areas in Enugu state, southeastern Nigeria. The area is underlain mainly by the Nkporo Shale, a low permeability formation. Four vertical electrical sounding (VES) was carried out using the Schlumberger configuration with a maximum electrode separation of 580m. The VES curves were modeled using the Resist software which generated mainly the QH curve type. From our VES interpretation, the area consists of 3-10.1m thick lateritic top soils, 11.9-35.6m thick fractured shales (aquiferous), and compact carbonaceous shales. A depth to water table of 6.2-10.2m was estimated from the surrounding hand-dug wells. A good match was obtained between results of hydraulic characteristics generated from field measurements and values computed using Da-Zarrouk parameters. Estimated values of  $2.62 \times 10^{-3}$ m/day and  $6.65 \times 10^{-2}$ m<sup>2</sup>/day were obtained for the aquifer hydraulic conductivity and transmissivity, respectively. Considering these values, the aquifers were classified as moderately good to poor in quality. Hydrogeochemical analysis of carried out on groundwater samples from twelve (12) hand-dug wells in the area reveal that the water type is mainly Sodium-Potassium-Bicarbonate, and that weathering is the major control on the groundwater. Mn, Fe, Pb, concentrations were generally above acceptable limits for potability, while the SO<sub>4</sub><sup>2-</sup> concentration recorded very low values probably due to sulphate reduction. Based on these ion concentrations, it is implied that the geochemical environment of this study area was generally reducing.