

Application of geophysical technique in investigation of groundwater quality at Melaka Tengah, Malacca

ABSTRACT

A study on 2D geo-electrical resistivity imaging at Melaka Tengah, Malacca was conducted to determine the potential groundwater zone. This investigation is needed to identify the quality of the groundwater, since the site is located in the coastal areas where groundwater influence tends to diminish due to intrusion of seawater. Two resistivity lines were proposed with length of 400m each by using Terrameter SAS 4000 and ES1064. Geo-electrical of electrical resistivity and induced polarization method with the Wenner-Schlumberger configuration were carried out. The Res2Dinv software would then render the 2D resistivity image through inversion method which provided detailed information of both the laterally and vertically geological structures based on their part. The electrical resistivity measured the resistance of the subsurface to the flow of electric current in units of ohmmeters and value of chargeability during the transient decay of the applied voltage in ms for induced polarization. Well data provided was very useful in direct determination of subsurface soil lithology. The result obtained showed an 84.7-meter subsurface depth for both areas which then reflected that the subsurface consisted of two different layers namely overburden (laterite, clay, and/or peat soil) with ranged 1 ohm.m – 10 ohm.m and 50 ohm.m – 500 ohm.m for schist formation. However, this area was considered to be brackish water area because of the low chargeability value of 0ms – 1ms especially in top soil layer and 5ms – 20ms for schist formation. Thus, this area was deemed not suitable for groundwater exploration due to the intrusion of salt water.

Keyword: Groundwater zone; Malacca; 2D geo-electrical resistivity

