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# Geophysical Investigation for Engineering Site Characterizations of Wachamo University, North-east of Hosanna, Southern Ethiopia

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Geophysical investigation was conducted to characterize the building foundation conditions of Wachemo University, Southern Ethiopia. Electrical Resistivity Tomography (ERT) and magnetic methods were employed to assess the suitability of the foundation condition. Both ERT and magnetic data were collected in three parallel and one perpendicular profiles. The ERT results revealed that the thicknesses of overburden, depth of bedrock, moisture content and geologically weak zones of the proposed building site. Further, the stacked apparent resistivity pseudo-section map presented the depth-wise electrical variation at the proposed building site. The magnetic anomaly map exhibits high contrast that shows high magnetic variation of the subsurface. The high magnetic anomaly responses are the result of fresh igneous rocks whereas low magnetic anomaly responses result from weak zones and a high degree of weathering in rocks. The correlation of the magnetic anomaly plot and the inverse model resistivity section has enabled identification of geological weak zones. The geophysical investigations revealed potentially hazardous sub-surface conditions which may have an adverse effect on the proposed buildings. The survey provides continuous subsurface information and locates geological structures where geotechnical tests such as pit tests and boreholes would probably miss the information. Therefore, it is strongly recommended that the building foundation sites should be selected away from these geologically active zones.

*References*

[1] Anderson N (2006). Selection of Appropriate Geophysical Techniques: A Generalized Protocol Based on Engineering Objectives and Site Characteristics: *Proc., Highway Geophysics-NDE Conference*, 29–47
[2] Dahlin T (1996) 2-D Resistivity Surveying for Environmental and Engineering Applications: *First Break* **14 (**7), 275-283
[3] Dobrin M (1976) Introduction to Geophysical Prospecting: McGraw-Hill Book Company, New York, 630-632.
[4] Griffiths D and R Barker (1993) Two-dimensional Resistivity Imaging and Modeling in areas of complex geology: *Journal of Applied Geophysics***29**, 211-226
[5] Loke M. H and Barker R.D (1996) Practical Techniques for 3D Resistivity Surveys and Data Inversion: *Geophysical Prospecting*, **44**, 499-523.