

# Optimum Geoid Determination for Enugu Lifestyle and Golf City Estate, Nigeria

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## SUMMARY

The awakening in the mind set of West Africans for sustainable Estate development has gained momentum in recent times; this is evident in the resolutions made by Private Estates West African LTD to offer south eastern Nigeria with affordable and exquisite housing. The Enugu Lifestyle & Golf City Estate is arguably one of the most beautifully planned cities in Nigeria. It is set on 1,097 hectares in the Awkunanaw Hills; the city delivers a lifestyle of luxury and serenity. From the inception, the estates horizontal coordinate systems were well defined, but the vertical coordinates system has suffered some major setbacks because of the difficulties in the realization of the surfaces, so it caused some impediments in the engineering projects in the city. Geodesy is the study of the shape and size of the earth and its gravity field which is concerns primarily with positioning. The definitions of positions are made on geodetic surfaces using coordinates of a conventional coordinate system. In Geodetic and Engineering activities, The Geoid has strong correlation with the direction of water flow; Orthometric heights are predominantly used because it has a humanly intuitive meaning. This Project aims at the Determination of a best fitting Geoid for Enugu Lifestyle & Golf City. The Geometric method (GPS/Levelling) was used because of its advantages over other methods for the determination of the geodetic surfaces. The Geometric method was applied in the study area in order to determine a high precision and high resolution local Geoid for the estate. This project covers the approximate area of 1,097 hectares. Fifty (50) first order control points were monumented and observed to derive all the required parameters for accurate Geoid determination at a density of about one control point per 500m. At each benchmark, both the Orthometric and ellipsoidal heights were determined and rigorously adjusted. Imperatively, all participants in the Estate project shall benefit from the Local Geoid Determination.