

Evaluation of Urban Road Networks Accessibility in Umuahia Urban Using GIS Techniques

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Key words: Geoinformation/GI; Spatial planning; Urban renewal; Impedance Road Network, GIS and Sustainability

SUMMARY

This research is aimed at the evaluating Road Network Accessibility in Umuahia Urban using Geographic Information System techniques. The study was carried out by assessing the weight impedances on the routes and the connectivity levels within the urban area using the digital road map in the created database. The objectives include the presentation of digital road map, hence, the database, assessment of the route characteristics, spatial arrangement of the town in question, impedances of the roads used as a measure of the connectivity and accessibility status. Lastly, the buffer analysis was applied to check winding, clustered areas in Umuahia urban. The datasets used include the base map of Umuahia obtained from the State Department of Lands and Survey, Umuahia, population data from National Population Commission (NPC), transportation data on auto crash from Federal Road Safety Commission (FRSC), traffic congestion and impedances data from field work. Quickbird satellite imagery of Umuahia Urban with 0.5 meters spatial resolution acquired from Geo Eye Imagery Collection System Inc, U.S.A. acquired in 2011 was used in the image analysis to generate spatial data. Data processing involved scanning, georeferencing, digitising, etc. Data analysis involved layers and database creation, connectivity and road density index, link impedances that indicate area with low, moderate and high efficiency route and proximity analysis that indicates areas with difficulty in accessibility due to poor planning of the infrastructure. The results obtained include digital road map and database (attribute table) which revealed the present condition of roads in Umuahia Urban city. Thus, the connectivity status and the impedances surface also showed the routes connectivity level and efficiency, the buffer analysis indicates the structures (legal or illegal) on the roads. However, connectivity Index, impedances surface and buffer analysis was used to measure accessibility level of Umuahia Urban. From the analysis, the use of geodatabase, digital road map for the evaluation of road transportation and infrastructure planning was recommended. This will eventually help in improving the socio-economic life of the people and improve the living standards and good governance which is

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apt with the World Bank's vision or post 2015 agenda on sustainable urban transport and socio-economic development globally.

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