

## GIS-BASE BUILDING SITE SUITABILITY ANALYSIS OF PART OF UNDEVELOPED AREA IN GIDAN KWANO CAMPUS, FUT MINNA

**Abdullahi A. KUTA<sup>1</sup>, Yusuf D. OPALUWA<sup>1,2</sup>, Nanpon ZITTA<sup>1</sup>, Endurance OJATAH<sup>1</sup>, Ejovorie M. UGOLO<sup>1</sup>**

<sup>1</sup> Department of Surveying & Geoinformatics, Federal University of Technology, PMB 65, Minna, Niger State, Nigeria

<sup>2</sup> Geomatics Innovative Research Group (GnG), Faculty of Geoinformation & Real Estate, Universiti Teknologi Malaysia.

\*Corresponding author email: [type\\_email\\_here@replace\\_text.com](mailto:replace_email_here@replace_text.com)

**ABSTRACT.** This research adopt a Geographical Information System (GIS) sieve mapping approach to select suitable sites for siting buildings in part of undeveloped area of Federal University of Technology, Gidan-Kwano campus, Minna, Niger State. This is to minimize cost of construction usually associated with some environmental factors using spatial analyst tool of ArcGis 10.1.to overlay map layers of constraint to produce a visual representation of the suitable areas for siting buildings. The constraints considered include slope of the surface area, areas not inside or close to stream and swamp. The criterial are slope not above 25% and sites area above 2000Sq.m. XYZ data was obtained from ground survey using the Hi-Target V30 GNSS receiver to produce the topographic map of the area. The final result showed that only four (4) site are suitable for siting building covering an area of 20.54Ha (37.14% of the total area) out of the total size of 55.30Ha. The final map showed that the northern part of the study area is most suitable for siting building.

**Keywords.** Suitability site Analysis, Sieve Mapping, GIS, Map Overlay

### 1.0 INTRODUCTION

Land suitability analysis is the determination of the fitness of a given expanse of land for a defined use (Hopkins, 1977; Steiner, 1983) as cited by [1]. Site suitability assessment is the suitability of particular kinds of land use based on socio-economic and natural attributes [2] which needs a scientific approach to avoid blunders in decision making, guide

development and investment for sustainable use of land [3].

Site selection is the choice of a site with respect to a relative given criteria or requirements. [4] stated that workers safety during construction is widely accepted, but the selection of safe sites for a building is generally not done by contractors. The basic principle of GIS suitability analysis is that each aspect of the landscape has key characteristics that are to some degree either suitable or unsuitable for the activities being planned [5]. This study is aimed at selecting suitable site for siting buildings in part of the undeveloped areas of Federal University of Technology, Minna (Gidan Kwano Campus) using GIS sieve mapping/overlay techniques which will help in minimizing cost of building projects associated with unsuitable sites.

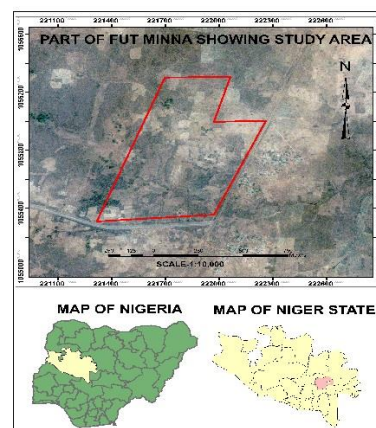


Figure 1. Part of FUT Minna showing study area in Red in relation to Map of Niger State showing Minna and map of Nigeria showing Niger State

**RESULTS AND DISCUSSION**

Figure 2a is the map of the suitable site for siting buildings generated from overlay operation while figure 2b are the suitable sites having areas above 0.2Ha.

Table 1. Sizes and numbers of suitable site

Total Area	Area of Suitable Sites		Area of suitable Sites >0.2.		No of Suitable Sites	
	Ha	%	Ha	%	Total	>0.2Ha.
55.30	23.19	41.9	20.54	37.14	181	4

From figure 2a, there are suitable site for siting building in every part of the study area with the north eastern part of the study area has a larger size suitable site for siting buildings while the central part of the study area has more scattered number of suitable sites. Also, the south western part of the study area has the second largest size. Also, the location of suitable sites above 2000 Sqm. (0.2Ha.) are found in the north and the southern part of the study area with each part having two (sites) making it a total of four (4) sites (Figure 2b) out of the total number of 181 sites suitable for siting building Table 1. The northern part of the study area has the largest size of suitable site which is bigger in size than the remaining three (3) sites Fig 2b.

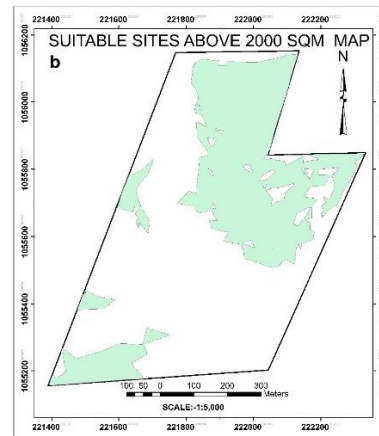
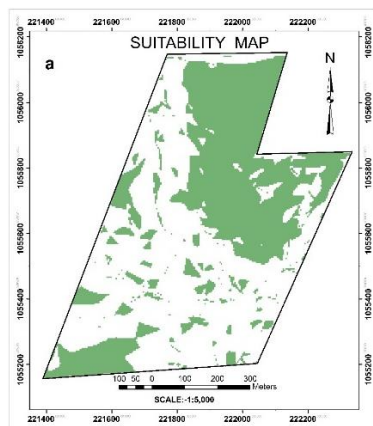


Figure 2. Suitability sites for siting buildings (a), suitable sites above 2000 Sqm (b).

Table 1 shows that only 20.54Ha. (37.14%) of the total land is suitable for siting building according to the size of land above 2000Sq. This shows that the larger portion of land didn't meet the requirement as such not suitable for siting buildings according to the giving criteria and constrains.

**CONCLUSION**

GIS has proven to be one of the best tools for decision making in general planning of land and site selection for optimum used. The suitability of land for siting building depend on many factors; the purpose, financial capacity of the owner, personal preference etc. GIS base site suitability analysis could be carried out before the acquisition of land to meet the requirement of the prospective land buyer.

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