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# GIS MODEL FOR SAFE RESIDENTIAL LOCATION CASE STUDY OF RATNAPURA MUNICIPAL COUNCIL

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Universith of Moratuwa
96405

**DEPARTMENT OF TOWN & COUNTRY PLANNING**
**UNIVERSITY OF MORATUWA**
**NOVEMBER 2009**

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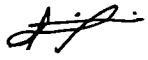
## DECLARATION

I declare that this Dissertation represent my own work, except where due acknowledgement is made, and that is has not been previously included in a thesis , dissertation or report, submitted to the University of Moratuwa or to any other institution for a degree, diploma or other qualification. I wish to also declare that the total number of words in the body of this dissertation (excluding the Tables, References & Appendices), is nine thousand and nine hundred & sixty two.

Signature : 

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## CERTIFICATION

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# ABSTRACT

Urbanization is a continuous process and it is important to identify suitable safe residential areas for future developments. Selecting the location for residential sites is a complex process involving not only technical expertise, but also social, physical, economical and environmental issues that may result in conflicting factors. The said complexities necessitate the use of some advance decision support tools as Geographical Information System (GIS) combining with the use of Analytical Hierarchy Process (AHP) as a weighting technique.

The purpose of this study is to develop an approach of GIS based suitability analysis to identify appropriate sites for residential developments. This research utilize five major steps for suitability analysis, which include the selection, scorings, weighting criteria using AHP, creation of a suitability map and GIS based model. This map is representing the selected area and the model is applicable for any area. Further the research has extended to evaluate the accuracy of the outcome.

For the suitability analysis criteria selection is very important. Based on the available literature existing data several criteria have identified. Out of which five criteria were selected as highly relevant for the study area. For example land slide and flooding which are only relevant for this special study area. The selected five criteria are the characteristic of the land, social infrastructure facilities, physical infrastructure facilities and economic and environmental activities. These five major criteria are again subdivided as sub criteria. Combining the expert opinions conducted by questionnaire survey with AHP weighting method the weight of major and sub criteria have identified. GIS based spatial analysis is then performed base an above criteria and weight selection to accomplish objective of the study. Further the result is then evaluated by a compiling the existing field reality and the Urban Development Authority zoning map for Rathnapura Municipality.

The integration of the said tools (GIS and AHP) has been found to be effective in selecting the residential sites within the Rathnapura Municipal council. Moreover the proposed method has highly possibility for the adoption in other areas as well. This methodology could benefit urban planners, architects and decision makers for future planning. Finally this paper highlights the benefit of utilizing advance decision supportive tools in city planning in proper systematic way.

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# List of Abbreviations

AHP – Analytical Hierarchy Process

CBD - Central Business District

DDA - Dianchi Drainage Area

FAR - Floor to Area Ratio

GIS – Geographic Information System

MOU - Memoranda of Understanding

MC - Municipal Council

NGO – Non Governmental Organization

NBRO - National Building Research Organization

THRU - Tsunami Housing Reconstruction Unit

TOD - Transit Oriented Development

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