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FLOOD RISK ASSESSMENT FOR SEGAMAT TOWN SUSTAINABILITY USING REMOTE SENSING AND GIS APPROACH

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AUTHOR'S DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Post Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

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ABSTRACT

Flood is a natural disaster that frequently occurred all over the world. It has greatly affected the people who lives near to the flood prone area. One of the factors that contribute to flood events was land use changes which were affected by the natural and human activities. The aim of this study was to assess the flood risk and sustainability of Segamat Town in Johor using Remote Sensing (RS) and Geographic Information System (GIS). Land use change detection was done using two different satellite images for 1990 and 2012. These satellite images were classified into 7 classes which include water bodies, vegetation, settlement area, open area, cemetery, road network and railway road. Vegetation and settlement area were recorded as having the most changes in these 22 years. The area for vegetation was decreased. However, there was increasing of the area for settlement area which showed that development occurred in Segamat Town for the past 22 years. Annual daily rainfalls comparison for Segamat Town between 2006 to 2011 showed that between December until March, rainfall distribution for Segamat Town were much higher compared to other months. Flood hazard map was produce using Analytical Hierarchy Process (AHP). Several criteria such as elevation, rainfall distribution, slope, land use, drainage density and road density were the factors used for the AHP. Flood risk map was developed using weightage overlay analysis in ArcGIS 10. GIS environment and Hydraulic Modeling software, HEC RAS were combined in order to perform flood modeling simulation. Digital Elevation Model (DEM), river cross section, water level and discharge data for Segamat River and Muar River were used to develop the water level simulation for different return periods and its inundation maps. The major findings of the study from both RS/GIS and GIS/Hydraulic Modelling approach indicated that citizen that lives near the river channel and downstream part of Segamat River and Muar River have higher possibility to be affected by flood. Results indicated that 20.226 km^2 of 188.631km^2 of the study area were identify located within the very high risk area to be flooded. Sg. Segamat, Buloh Kasap and Pagoh sub-districts of Segamat were revealed as having the most area to be at very high risk being flooded which is about 11.324km^2, 2.419km^2 and 3.322km^2. This study emphasizes one of the alternatives to presence flood risk assessments respectively that can help the authorities to devise strategies in dealing with flooding. It can also be used to generate awareness to the society of the possibility for their homes to be flooded in order to take extra precaution steps for their safety.

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