

## Potential debris flow study of the Hulu Kelang are

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The susceptibility of debris flow in 62 basins that lay between Taman Tun Razak, Bukit Antarabangsa and Kg. Kemensah in Mukim Hulu Kelang, District of Gombak, Selangor Darul Ehsan, with a total land area of approximately 14 km<sup>2</sup> was investigated. Generally, most basins are within the Class III and IV areas of the construction suitability classification. The basins are characterised by a long stream channel, with some parts being narrow with steep sideslopes. All 62 basins are either partly or minimally disturbed by residential and related infrastructure developments, while the remaining parts are under primary or secondary forest. There are also basins where the developed areas are at both the upper and lower ends of the basin.

The study was carried out in three stages, i.e. data collection and desktop study, field mapping and subsurface investigation (including laboratory tests on soil samples), and data analysing. In the first phase of the study, the topography, geology, landuse and soil maps, aerial photographs, satellite imageries and rainfall data were collected. In the second stage, field data, including characteristics of existing and relict landslides, environmental factors (comprising of geology, physical characteristics of soil, basin morphology, geomorphology, hydrology and land cover) and elements at risk were compiled in the period between October 2009 and February 2010. In the third phase, the data obtained from the second stage were first digitized in the GIS. The results are illustrated on engineering geology maps and detailed cross-sections which provide descriptions through the entire main waterway of each basin based on surface mapping.

Subsequently, information obtained from fieldwork data derived from GIS analysis (i.e. slope, flow direction), rainfall and soil data that are identified as critical contributing factors for the occurrence of debris flow/landslide will be assigned a weighted value that is expected to be proportionate to the relative contribution to the hazard. Specifically, this process will require that each factor be subdivided into a number of relevant classes, before a weighted value is assigned to each class. All factor maps are then converted to the raster structure in a GIS for the following process, which is overlaying of the weighted factor maps to obtain scores of each terrain unit. The obtained scores will then be classified to produce the landslide/debris flow susceptibility or hazard map. A physical vulnerability map will also be produced by identifying the elements at risk and the potential loss of life and economic losses. A landslide/debris flow risk map will be generated as a product of the hazard and vulnerability maps.