CHAPTER 1

INTRODUCTION

1.1 RESEARCH BACKGROUND

Malaysia has seen many changes in term of rapid urbanization. This development has accelerated effect on the river catchment areas will cause massive increase in the surface runoff and resulting in higher sediment transport. Sediment transport will be defined as the solid particles such as soil and rock that has been displaced passing each cross section for a specified period of time. Sediment transport is serious dangerous lead to damage the hydraulic structures along the river. When this phenomenon happens, it will not only affect river morphology but also decrease the channel capacity to convey the flood water to downstream and cause instability in the river channel.

Sediment in transport affects the quality of water and its suitability for human consumption or use in various enterprises. Sediment deposited in stream channels reduced the flood-carrying capacity, resulting in more frequent overflow and greater floodwater damage to adjacent properties. The deposition of sediment in irrigation and drainage canals, in navigation channels and floodways in reservoirs and harbors, on streets and highways and in building not only creates a nuisances but also inflicts a high public cost in maintenance removal or in reduced services (Bennett, 1939; Brune, 1958).

The phenomena of sediment transport occurred in rapid development in urban area. The emerging of urban area creates more impervious area. In addition, the amount of impermeable areas will increase for many purpose of landuse (Husan, 1991). The
shifting from forest and open space areas to the commercial and industrial area caused substantial changes to the local ecosystem.

Sungai Tui is located in the state of Pahang where huge amount of rainfall during monsoon season subjected to sediment transport process. The river responses by increased or decreased sediment carrying capacity, changing in channel cross section, erosion and deposition along the channel, which impact on bank stability over a period of time. Monitoring and computing the sediment transport is necessary. The research is to model sediment transport around bridge at Sungai Tui by using 1D quasi unsteady flow HEC RAS. Modelling of sediment transport stimulate the sediment pattern around the bridge by using HEC RAS.

1.2 PROBLEM STATEMENT

Movement of sediment in suspension from upstream to downstream may cause several problems. The sediment transport as bed load rolling or sliding along the bed depends on the particle, size, shape, and specific gravity respect to velocity and turbulence. Cobbles move with high velocity and turbulence while silt particles move in low-gradient, low-velocity channels as muddy stream. Muddy stream increase the turbidity leads to decreases the growth of microscopic organisms that feed the fish. The study indicated people concern to fish in muddy stream because the effect of suspended sediment on the size, population and species of fish in a stream (Ellis, 1936). Huge amount sediment transport in river leads to stream morphology of the channel. The flood carrying capacity of the river channel is reduced by high level of sedimentation. This result in greater flood occurs.

1.3 OBJECTIVE OF RESEARCH

The main objective of this research can be outlined as follow:

i. to analysis the pattern of discharge (Rainfall Runoff Relationship).
ii. to stimulate and analysis the pattern of sediment transport around bridge at Sungai Tui, Pahang
1.4 SCOPE OF RESEARCH

The scope of study includes simulating the river using HEC RAS software using gathered data from local authorities. This study involved in the catchment area of Sungai Tui. In this study, a river network was established using the Google satellite images data and the analysis were carried out using river modelling and simulation. The river simulation was carried after all the data were inserted and the networks were created. The river flow from upstream to downstream was marked in the model.

1.5 EXPECTED OUTCOME

This research paper produces a pattern of sediment transport at Sungai Tui, Kuala Lipis, Pahang. Erosion and deposition can be evaluated form the analysis by using HEC RAS for one year, three years, five years and ten years. Sedimentation problem can be solved by increasing cross section of the river. Thus it decreases the flow rate of the river. Apart from that, defense structures such as reservoir, leeves, or weirs can be built to reduce the sediment transport to the downstream.

1.6 SIGNIFICANCE OF THE PROPOSED STUDY

River modelling is the best option to study the behaviors of and what are the influenced factors. By creating the river model based on the actual data and GIS image, the true phenomenon of what is really happened can be understood. The limitation of human activities along the river area could be established after a river simulating was conducted and the hazard risk map was produced. Through this study, the effect of massive water flow around the bridge to the sediment transport occurrences and behaviors could be determined. Thus, for the future, the appropriate early solution could be implemented for massive discharge.

This study is also expected to be able to help the responsible agencies and authorities to river and river basin management to apply more efficient approach for the purpose of analyzing and producing the best design practice in overcoming the sedimentation problems.