

Case Study of Stormwater Control by Permeable Road in Commercial Centre under Equatorial Climate

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ABSTRACT

This paper describes the investigation into stormwater control measures of a 3,425 m² commercial centre of 61% of which were tarred surfaces and targeting these surfaces, areas from 10 to 34% of which were permeable roads of various coverage areas of permeable roads of various surface areas were modelled using Storm Water Management Model version 5.0. Testing the permeable roads for very-short duration storms ranging from 5 to 15 minutes, it was found that the catchment area contributing water for detention purposes played a major role in stormwater control. Other than that, the orifice outlet attached to the storage facility was major factor in determining the flow.

Keywords: Drainage, hydrograph, urban runoff, post-development, pre-development, sustainable development.

1. INTRODUCTION

Located in the equatorial region, Sarawak receives 3,000 mm of rainfall annually. Urban stormwater drainage system over the region is separated into two distinct systems, namely the major drainage system which is designed to 50- or 100-year Average Recurrent Interval (ARI), and minor drainage system which is designed to 10-year ARI design storms [1], [2]. This paper reports the stormwater control over a commercial centre surrounded by parking spaces and roads which is classified as a minor drainage system (Figure 1).

According to a local study [3] conducted from December 2019 to February 2020 in conjunction with the Northeast Monsoon, it was reported that 90% of the recorded rainfall

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