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ALTERNATIVE USE OF ROUNDABOUT AS STORM WATER DETENTION POND

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Abstract – This study explores the concept of utilising roundabout as a component of the urban stormwater system. The research team has developed a drainage model to incorporate a roundabout as dry detention pond. In addition, the model is used to determine the effectiveness of such design by applying the concept virtually on a real-world roundabout at the southeast of UniGarden, a housing estate situated about 17 km from Kuching City of Sarawak. Computer representations of the existing drainage system and roundabout dry detention pond are built using the USEPA SWMM software. The modelling effort shows that the open space provided by a large roundabout is capable of achieving the maximum attenuation of storm flows and is able to hold 100% of runoff from 100-year storm. As empty spaces are increasingly hard to come by in urban areas; therefore, using an open space in a roundabout for dry detention pond is a good example of an innovative drainage system.

Keywords: Dry detention pond, flood infrastructure, runoff, SW

1.0 INTRODUCTION

Roundabout is a form of road intersection with a round island in the middle; it allows traffic to move in a circular and continuous flow [1]. Kuching city is famous for its large-sized and large number of roundabouts. As depicted in Figure 1, there are nine roundabouts in such a small part of Kuching. The River Kuap marks the administrative boundary between Kuching and Samarahan Divisions.

For aesthetic purposes, the middle portion of roundabout islands is usually decorated with hard and/or soft landscapes [2]. The landscape elements are deemed, among others, to represent local heritage or identity [3], promote visual effect [4], and enhance urban ecological connectivity [5]. In this paper, the concept of utilising roundabout as a component of the urban stormwater system is explored. The roundabout chosen is located at the southeast of UniGarden, and at km-17 of the Kuching-Samarahan Expressway.