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**TECHNICAL REVIEW OF CULVERT DESIGN**  
**AT OVERSEAS AND IN MALAYSIA**

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## ABSTRACT

This report reviews some existing culvert design methods such as :

- a) the conventional method (Standard Design Method) based on an analytical approach and the use of design charts; and
- b) the design method of 'minimum energy' culverts, sometimes referred to as 'constant energy' culverts.

Before these methods of design are considered , hydrological design of culvert are firstly discussed so that the waterways are designed to carry the discharge. Then followed by the discussion on hydraulic design of culverts with some design examples.

## CHAPTER 1

### 1.0 INTRODUCTION

#### 1.1 General Remarks

Highway drainage structures have been found to constitute about one fourth of highway construction costs. Hence it is worth while paying much attention to them since proper design and construction of these structures could save much money. Highways cross many natural drainage channels and the water carried by these channels must be conveyed across the right of way without obstructing the flow in the channel upstream of the road and causing damage to property outside of the right of way. Notable of these structures and one of the most frequently used is the CULVERT. A culvert is defined as an artificial water passage under road, a railroad or canal. It applies not only to a drainage opening beneath an embankment as used in highway and railway work, but to any short, closed conduit.

Although a bridge performs the same function, except that its surface forms part of the carriageway whereas the top of a culvert is always beneath the carriageway.

Also, a culvert may be designed to flow full, especially minimum energy culverts as discussed later, whereas