

DESIGN OF A LEVEE AS A FLOOD CONTROL STRUCTURE

Prepared by: Jocelin Wijaya

ABSTRACT

Flood is the result of runoff from rainfall and or melting of snow in quantities too great to be confined in the low—water channels of streams (Linsley, 2002). Flood can be caused by many reasons such as heavy rainfall, melting of snow or extremely high discharge that exceeds the capacity of the river. Flood can cause a great damage to human being especially in term of crops and property and sometimes life. Therefore people always try to minimize the damage caused by flood that is called flood damage mitigation.

Flood disaster that occurred at the end of 2006 at Johor Bahru had brought huge negative impact, damage and loss to humanity. Therefore this project is to design the cross sectional area of levee required for the particular area (station no. 1737541) in Sungai Johor, Rantau Panjang, Johor Bahru. The maximum discharge for assigned return period has been determined by flood frequency analysis. For frequency analysis, Gumbel distribution and Log Pearson Type III distribution are used in this study. From the designed discharge and the rating curve, the height of 4m is obtained for the area under study. The top width is assumed as 3m as recommended by U.S Army Corps of Engineers. Slope stability analysis is done to ensure the slope is safe for these three conditions: end of construction, sudden drawdown and steady state seepage. The method used is Bishop's simplified method of slices. Both computer and manual analysis are done for three conditions for slope stability analysis.

For the maximum discharge of 676m³ /s obtained from the frequency analysis by Gumbel distribution, height of levee required would be 4m above the river bank. After several trials for different slopes by STABL program, slope of 1 horizontal (H):2 vertical (V) is chosen for the slope of the levee because it is safe and results in lesser value of soil required to construct the levee in the studies area.