

Executive Summary

Yuen Long Bypass Floodway (YLBF) was built in the 2000's as part of the basin management plan to prevent flooding in the Yuen Long – Kam Tin drainage sub-catchment. YLBF serves as a diversion channel of the Yuen Long Main Channel (YLMC) and conveys flows from the Sham Chung Channel (SCC) and the San Hui Channel (SHC). YLBF has been designed to divert approximately 15% (i.e. $38\text{m}^3/\text{s}$) of the YLMC flow which conveys a total combined flow of $278\text{m}^3/\text{s}$ to downstream under a 200-year return period design condition.

In this study, field data was conducted from flow survey for the analysis of the hydraulic performance of YLBF and the comparison of the computed result of hydraulic modelling. Two flow surveys had been conducted, which covered the monitoring period from Apr 2010 to September 2010 and Apr 2012 to October 2012 for recording the depth, velocity, and flow of the discharges at YLBF. Flow measurements were then compared and analyzed for flow balance at each junction. Moreover, hydraulic analysis was conducted to review drainage performance of YLBF at two critical junctions during several significant rainstorms events in 2010 and 2012. The efficiency of hydraulic performance of YLBF during different rainstorm events was evaluated comprehensively. Lastly, computed results from the computational hydraulic modelling were reviewed for comparison with the field data.

The flow data conveyed in 2010 and 2012 was thoroughly reviewed in this study. The flow recorded at downstream of the YLBF-YLMC junction was plotted against the flow recorded at upstream to analyze its hydraulic performance. In 2010, the flow survey indicated that about 83.77% of YLMC flow was being conveyed to downstream and about 16.23% of flow was conveyed to YLBF. In 2012, the flow survey indicated that about 73.79% of YLMC flow was being conveyed to downstream and about 26.21% of flow was conveyed to YLBF.

In some rainstorm events, the flow ratio as recorded on site was close to the design criteria (15% of flow to YLBF and 85% of flow remain at YLMC). Under a low flow condition, the design criteria of 15% or even a higher percentage of flow diversion was achieved.

Since neither medium nor large flow was recorded during the survey period, it is immature to conclude if the hydraulic performance of YLBF could generally achieve the design criteria. To study the hydraulic performance at different flow rate, a longer period of flow record is considered quintessential for a comprehensive analysis. It is recommended that that long term flow monitoring could be taken place in future for analyzing the hydraulic performance of YLBF under other suitable R&D project.