

THESIS

**FLOOD MAPPING OF NOWSHERA URBAN CATCHMENT  
EMPLOYING FREQUENCY ANALYSIS OF 2010 FLOOD**



BY

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## ABSTRACT

The study was conducted along 60 km reach of Kabul River from Amankot to Khairabad. Bed elevation at upstream cross section was 297 m and at downstream cross section was 279 m, resulting elevation difference of 18 m between these two cross sections. Kabul River has steep slope in u/s and then slightly flatter towards confluence point with Indus River. The average river bed slope was 0.0003 m/m. Average width of river in u/s section was 577 m and in d/s section was 198 m. Average depth of river in the reach was 5 m. Pir Sabak, Akora, Mohib banda, Pastun Garhi etc are densely populated areas on the banks of Kabul River.

In the present study, frequency analysis was done by using flood frequency analysis softwares i.e. Design Flood for Windows (DFW) and HEC-SSP for the peak flow discharge data of 50 years from 1960 to 2010. Results of frequency analysis showed the recurrence intervals of upto 500 years by using the Log-Pearson Type iii distribution. Results of frequency analysis showed that the flood of 2010 has return period of about 300 years by using DFW and HEC-SSP softwares for the peak flow discharge data.

The discharge and channel cross section data were obtained from respective offices. Pre-processing of data was performed in ArcGIS software for extraction of geometry of the river. Cross sections were extracted from SRTM DEM by ArcGIS software. DEM cross sections were verified with surveyed cross sections at few points and it was found that DEM cross sections or geometry need no adjustment. HEC-RAS computer model was used to determine the water surface profiles under various flood conditions. HEC-RAS water surface levels were compared with actual water levels for determining the flooding hazards.

Post-processing of HEC-RAS results were performed in ArcGIS in order to determine the flood inundation extent of different return periods. Area which would be inundated by 500, 200, 100 and 50 years return period floods are 17434, 15761, 14568 and 13336 hectares respectively.