GENERATION OF 100-YEAR RAIN RETURN SCENARIO FLOOD HAZARD MAPS

Methodology

The flood modelling process is divided into three main steps: data preparation, catchment delineation, and simulation. Data used in the models include topographic and rainfall data. Software limitations as well as time constraints restrict the size of the model areas, so they had to be delineated into smaller catchments based on elevation and flow direction. The flow direction also determined the order in which the catchments had to be simulated.

Rainfall data is gathered from various synoptic stations that are installed all throughout the Philippines. Each station gathers data on the amount of rainfall that falls over time. These values were used by PAGASA to calculate the total accumulated rainfall and the corresponding rainfall intensities were computed for different rain return periods. Values corresponding to the 100-year rain return period is used to generate the maps presented on the website. The accumulated rainfall values were interpolated to obtain a better idea of the range of rainfall values specific to the areas being considered. A weighted analysis of the varying rainfall values falling within the municipality was conducted to generate the 24-hour accumulated rainfall value.

Flooding was simulated using software called Flo-2D GDS Pro, a FEMA-approved flood routing software that simulates the flow of water over complex topography. The software characterizes the entire model as a system of grid elements arranged spatially to represent the project area. Each grid element has its own characteristics, which are represented as numbers in the model. Calculations are done using these numbers to yield the data used to create flood hazard maps.

Flood Hazard Analysis

The 100-year rain return flood hazard maps show low, medium, and high flood hazards represented as yellow, orange, and red respectively. Flood hazards consider take both the height and velocity of the water into consideration and calculates the hazard levels based on the danger they pose to people and structures. Generally, for an average Filipino with a height of 5’ 6”, areas with flood depths from the knee down can be considered to have low hazard levels. Those with flood depths ranging from the knee to neck are considered to have medium hazard levels, and those covered with floods that are higher than the neck have high hazard levels. However, since the flow velocity is also considered, areas that have shallow but fast-flowing flood waters may have a higher hazard level than that denoted by the height of the flood covering it.