Determination of Safe Development Platform for Flood Control Using Sensitivity and Risk Based Assessment

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An appropriate safe development platform level is a pre-requisite for protecting a development site from nuisance floods during major storm events. This is of critical importance especially for development sites which are located in vicinity of major canals, streams or regional ponds; i.e. the major drainage system. Safe development platform level refers to the minimum platform level set for major infrastructures within a development site; e.g. main entrance of buildings, major roads and expressway; as well as underground facilities such as MRT and car parks. Flood risk is generally not acceptable to these infrastructure attributed mainly to substantial financial loss associated with its operation breakdown in addition to physical damage by the floods.

An approach commonly adopted to set the safe development platform level is by adding a freeboard to flood level for a storm event up to 50 year or 100 year return period. Unfortunately, flood level (either historical or simulated) may not always be available for private developers; in particularly in developing countries in the South East Asia (SEA). Although hydrologic/hydraulic modelling has been commonly used as a tool for elucidating maximum flood level; the model's capabilities in providing representative flood levels depend substantially on availability and reliability of data/information used for model setup, model calibration and verification. Various technical and non-technical reasons could lead to noticeable uncertainty in data/information used as inputs to the model. This further implies that additional risk inherits in safe platform level derived from modelled flood level. Under this circumstance, it appears that modelling exercise should be coupled with sensitivity analysis to identify potential key factors that have significant effects on the flood level of the development site as well as to quantitatively access their impacts. Further sensitivity analysis, by the combination of those significant factors, could provide a range of flood level representing the best and worst case scenarios. This approach aims to enhance robustness of the proposed safe development platform level in dealing with uncertainties in the input data/information. Risk assessment subsequently identifies and evaluates impact of any future activities (beyond control of the client); which can potentially increase flood level higher than the predicted worst case scenario. Recommendations are then made to the client so that necessary pre-cautions/actions can be taken by the client to mitigate such risk through collaboration with relevant local agencies/authorities.