ISIS FAST Case Study

Rapid assessment of pluvial flood risk: Fingal-East Meath region, Ireland

The Fingal and East Meath (FEM) region in Ireland have suffered significant flooding over the last 12 years, resulting in considerable flood damage. In order to develop integrated and pro-active flood risk management meeting the requirements of the EU Floods Directive, a Flood Risk Assessment and Management Study (FRAMS) was undertaken for the FEM region. The study focussed on urban areas known to have experienced flooding in the past and areas subject to significant development pressure both now and in the future.

ISIS FAST has been used as part of FEM FRAMS to provide a rapid assessment of potential locations where pluvial flooding may occur.

Use of ISIS FAST to simulate pluvial flooding involves the following three stages:

Stage 1 involves automated pre-processing of digital terrain data to identify topographic depressions where water may pond and the flood pathways which connect them. Elevation-storage relationships are calculated for the depressions.

Stage 2 involves the rainfall being applied and routed between depressions, taking account of the elevation-storage relationships, the higher ground surrounding depressions and the flood water already within adjacent depressions.

Stage 3 involves post-processing of results to generate flood depths by subtracting ground levels from calculated water levels.

For the Fingal-East Meath study, a 2m grid of LiDAR terrain data was used, both to generate the elevation-storage relationships and for post-processing; thus producing a pluvial flood depth dataset on a 2m grid. A single representative extreme rainfall depth of 50mm was applied to the study area. The model set-up and simulation was very quick to undertake (taking about one day).

The model results were mapped at a scale of 1:50,000 with pluvial flood depths shown colour-coded to enable easy identification of shallow and deeper flooding.

These maps were then used as part of a consultation workshop with Fingal County Council, Meath County Council and the Office of Public Works. The maps were compared with a database of historic flooding and with the local knowledge of the workshop attendees.

The workshop provided valuable feedback confirming that the pluvial flood maps were, in general, representative of expectations and knowledge of the area whilst also identifying additional areas of potential pluvial flood risk.

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