Development and application of SUDSLOC in Birmingham

C.Viavattene*, J. Bryan Ellis **

*Flood Hazard Research Centre, **Urban Pollution research Centre
Middlesex University
London, UK

Abstract

The contribution that storm water BMPs (also known as Sustainable Urban Drainage Systems; SUDS) can make to sustainable urban development through their potential to address the needs and concerns of a diverse group of stakeholders, has been widely recognized. These systems include a wide range of structures having different impacts in terms of water quantity and quality, posing different technical constraints and entailing variable costs. However, unfamiliarity with these techniques, and in many cases, the lack of technical knowledge held by stakeholders, could influence the decision-making process when selecting and locating appropriate systems. Urban storm water models are now widely used to assess the impact of control devices on the urban drainage system. Such models provide a good representation of the physical and hydraulic phenomena but, because of their complexity, they are usually non-user friendly. In the context of a typical urban development scenario of multiple stakeholders drawn from a wide variety of backgrounds, there is clear potential for the use of a central data integration and communication GIS tool to act as a precursor to analytical modeling. SUDSLOC has been developed to address this need. SUDSLOC is a Geographic Information Decision Support tool for SUDS implementation at urban scale. The tool is the platform for various information and data systems (e.g. a Multi Criteria Comparator, Pollutant Removal Prediction tool, supporting documentation on SUDS) and provides interactive map functionalities (i.e. identification of potential areas for the location of SUDS at an urban scale; site by site SUDS location approach, creation and export of SUDS layer for the use of storm models). In order to compare and to assess the flood and quality risk before and after the selection of SUDS SUDSLOC has been coupled with two models, a 1D storm water model (STORM[1]) and a 2D GIS Flood model (FLOODAREA[2]). A specific interface has been developed within SUDSLOC to exchange information with the STORM model. The different functionalities of SUDSLOC will be presented as well as an example of its application on a 12 ha plot located within the Eastside redevelopment area of

* *Corresponding Author: c.viavattene@mdx.ac.uk*

[1] http://www.sieker.de/english/

[2] http://www.geomer.de

Birmingham (UK). The impact of a storm event with the characteristics of the 2007 summer flood event was simulated under ‘with SUDS’ and ‘without SUDS’ scenarios. Results indicate that the implementation of porous paving, green roofs and infiltration trenches can reduce flow with the test catchment area by up to 30% and flood depth on some surface water (pluvial) flooding ‘hotspots’ by 20cm. These flooding “hotspots”, associated with extreme storm events, can be identified on a 50 cm raster cell resolution. The use of a dynamic animation of the results generated can also support the preparation of emergency flood planning for extreme events.