Geophysical Research Abstracts,
Vol. 10, EGU2008-A-08289, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-08289
EGU General Assembly 2008


# Green roofs efficiency scenarios in preventing localised flooding in a Mediterranean urban catchment

**A. Palla**, L.G. Lanza and P. La Barbera

Dept. of Construction, Environmental and Territorial Engineering, University of Genova, Italy

(anna.palla@dicat.unige.it / Fax +39-010-3532481 / Phone +39-010-3532301)

Traditional storm water management practices mainly rely on conveyance to route storm water runoff from urban impervious surfaces into the nearby natural water bodies. Dedicated facilities are designed to reduce storm water runoff pollution and/or mitigate the effects of the increased runoff peaks and volumes.

More recent concepts in urban storm water management, such as better site planning techniques, hydrological restoration and Low-Impact Development (LID) technologies – including green roofs, focus on the use of both planning techniques and micro-scale integrated landscape-based practices to prevent or reduce the impact of storm water runoff at the very point where these impacts would be initially generated (the source control option).

In urbanized areas, undeveloped land is scarce and storm water management must be retrofitted into the built environment. In this sense green roofs provide a way for roofs to be used beneficially rather than contributing to storm water problems. The proportion of impermeable ground in existing developments is increasing and urban flooding due to drainage system failures is expected to happen more often because of the increase in the amount of rainwater running off the surface into drains and sewers.

The urban catchment of Colle Ometti, in the town of Genoa, Italy, where a monitoring storm water runoff campaign was carried on for both quantity and quality, was selected as a test site for the hydrologic modelling of rooftops greening scenarios. This 5.5 ha watershed was urbanised in the eighties with about 500 residential apartments built on

a previously undeveloped hill slope.

Although no green roof installations are now present in the area, this study investigates the potential hydrologic benefits of three hypothetical rooftops greening scenarios (conversion of 10%, 20%, 100% impervious to green roofs) at the catchment scale.

Precipitation scenarios were developed based on eighteen years of high resolution (one minute) rain gauge data recorded in Genoa (1990-2007). The study focuses on urban floodings due to drainage systems inefficiencies following rainfall events with return period $T \geq 10$ years.

The modelling of green roof performances was undertaken using methods already employed in the literature (such as the SCS-CN method) and the EPA SWMM, and the obtained results are here compared and discussed. Land uses were classified as roofs, flat roofs, roads and parking lots, green areas and farmlands.

Results demonstrated that widespread green roof implementation can significantly reduce peak runoff rates and the event runoff volumes. Moreover, the water balance shows the relative importance of green roofs for disposing of storm water through evaporation. The reduction of peak runoff is able to lower the risk of localised flooding in the urban area and – in case of combined sewer systems – to reduce the number of CSOs (with beneficial effects on the environment) while water retention lightens the overall load on WWTP.

The strategy also suggests that land-use planning policy will seek where possible to reduce the risk of flooding and both the location and design of new developments – for example with most buildings being designed with green roofs - can have a large impact on this goal in urban areas.