

SPRING AWARD Report [YEAR, MONTH OF COMPETITION]

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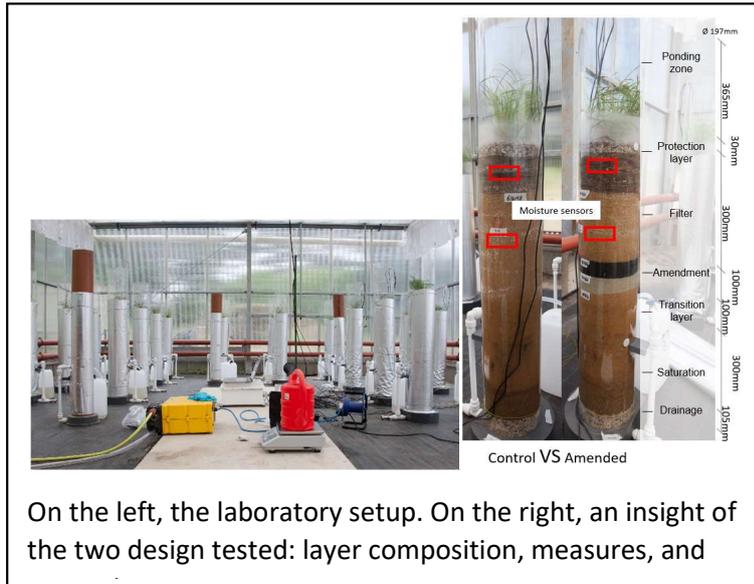
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Thesis Title:

Biofiltration systems for optimized storm water management in urban areas

Supervisor, School and Faculty:

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Due to Climate Change cities around the world are experiencing more severe surface floods. Furthermore, the pollutants transported by storm water runoff from cities is negatively impacting our water bodies.

Sustainable drainage systems (SuDS), and in particular **biofilters**, can be employed to adapt cities to the increasing climate challenges slowing down the flow, treating storm water runoff in-situ, and providing ecosystem services. Recently the UK government has published “A Green Future: Our 25

Year Plan to Improve the Environment”, where a more natural approach is suggested to manage water. Similarly, the implementation of green areas is promoted by Leeds University’s strategy.

However, lack of monitoring, design requirements, and long-term cost/benefits are preventing the use of biofilters. Although this may be true, amended media and accumulator plants could increase the adsorption capacity and extend the lifetime helping the widespread of this technology.

A laboratory has been setup in the greenhouses of Bardon Grange, where 24 mesocosms are being monitored under a constant polluted water regime. Firstly, the hydraulic of these systems is investigated with monthly assessments and thanks to a net of soil moisture. Secondly, water quality is assessed twice a month for nutrients, heavy metals, and solid filtration capacity. Finally, plants growth and pollutants concentration in the media and in the plants will be measured at the end of the experimental period when plants will be harvested. This latter step, financed thanks to the SPRING award, will provide a stratigraphy of the pollutants’ concentration using ICP-AES, and a definitive answer to the amendments contribution on the adsorption process and impact on root architecture, hence, the removal performances.

Preliminary results, so far, show differences in pollutant removal performance between control and amended design, but no answer yet on the impact the amendments have on plants fitness. Having an idea and not having the means to explore it further is frustrating. The SPRING award allowed me to find essential answers to my project, thanks to the possibility of analysis otherwise prohibitively expensive.