

# International Case Studies for Water Sensitive Urban Design (WSUD)

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This project reviews international examples of water sensitive urban design that have been identified and validated by other organisations and/or academics. Using criteria to identify the best cases, these examples are compared to the current situation in the UK. Five countries are analysed: Australia, Brazil, Germany, Sweden and United States.



## Summary of methodology

Each international example of good practice in WSUD was separately analysed through literature review. The best solutions within each WSUD example were identified and compared with other cases to evaluate if the solutions were similar, complementary or contradictory. The solutions were then compared to the UK to determine which of them were transferable to the UK context.

The best solutions identified were:

- strong legislation;
- more decision influence to planners;
- engagement of citizens.

### Strong legislation - Etowah River Basin, Georgia, USA

The Runoff Limits Program aims to diminish the volume of stormwater runoff from impervious surfaces due to the suburbanization in the watershed.

It divided the Etowah Basin into three "Priority Areas" according to the protected fish species, gave each area a proportion of acceptable impervious cover and limited the size and location of the development nodes. Compulsory that developers used WSUD (Water Sensitive Urban Design) tools.

### Strong legislation - Germany

Federal regulations demand the separation of treatment between the runoffs from different catchments. The heavily polluted ones should receive a high-level of SuDS treatment, and clean stormwater runoff should be treated with SuDS at source.

The three most used SuDS techniques to treat runoff from urban areas (except from metal roofs) are permeable pavements, filter channels and filter shaft.

The German state of North Rhine Westphalia made its own system for classifying, and then treating differently the Surface Water Runoff (SWR). The system separates the SWR in three categories according to the number of vehicles passing through the area each day, or the type of roofing materials used on the buildings (Dierkes et. al, 2015, p. 3037).

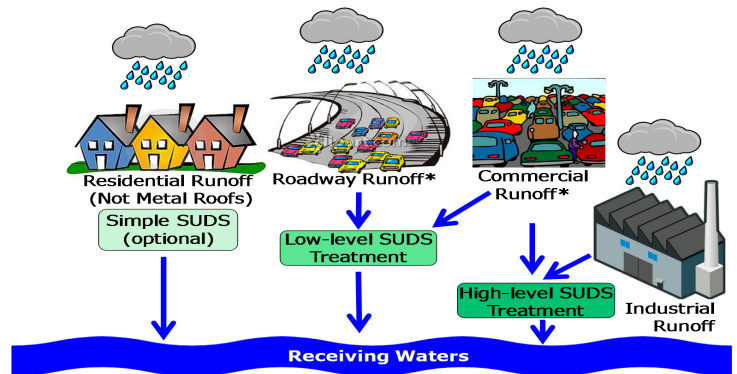
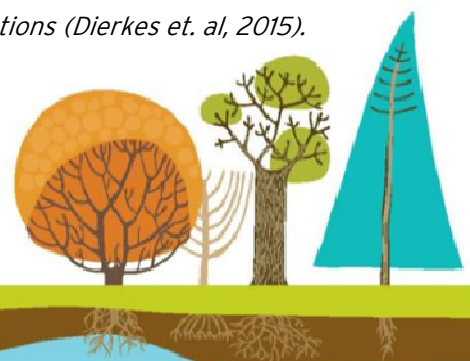


Diagram (above right): Schematic of typical decentralised SuDS water treatment options (Dierkes et. al, 2015).

The research described here is based on a study completed by Nicole Friedrich Neumann for her summer project in Environmental Sciences at the University of Liverpool. Nicole's work was supported by her supervisor Dr Karen Potter and Charlotte Beattie JBA Consulting.

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# International Case Studies for Water Sensitive Urban Design (WSUD) cont.

## Strong legislation - Curitiba, Brazil

Legislation demands that if a citizen wants to cut down a tree, even if it is on his land, they need permission from the Mayor and they will have to replant two trees for every one that is removed.



Photo (above): Aerial view of Barigui's Park in Curitiba.  
Credit: Photo: Michel Willian/SMCS

## Citizen Engagement - Curitiba, Brazil

In Curitiba, urbanists and architects are responsible for large infrastructure projects.

Examples of flood prevention include transformation of small ditches and dams into new lakes, and riverbanks into linear parks in strategic locations. The community received a new open space for leisure, sports and environmental education.

## More decision influence to planners - Sweden

Sweden has been using alternative solutions to piped drainage systems since the 1970s. The influence of water professionals in the final decision on inclusion of WSUDs in a project, was investigated by Cettner et. al (2013). This study interviewed planners from different Swedish municipalities who claimed that the water division should have a legal base for the stormwater management, so the responsibility of choosing piped or sustainable drainage system would belong to this department, not to the engineering.

The solution presented by the interviewees was to give more decision influence to planners, so they can participate in the project planning and the SuDS tools can be put into practice.

## Recommendations for UK based on international case studies of WSUDs

- Better education of water professionals and policy planners increases uptake of WUSDs.
- Analyse the whole cycle of life of the SuDS tools.
- Develop and implement national standards.
- Avoid the use of piped systems and use retrofit SuDS instead.

## Science without Borders

Nicole Friedrich Neumann is a fourth year student of Sanitary and Environmental Engineering at the Federal University of Santa Catarina in Brazil and completed this project at the University of Liverpool through the Science without Borders programme.

Science without Borders is a Brazilian Government scholarship programme which aims to send 101,000 Brazilian students on undergraduate and PhD sandwich courses, and full PhDs to study in science, technology, engineering, mathematics and creative industries at top universities around the world.

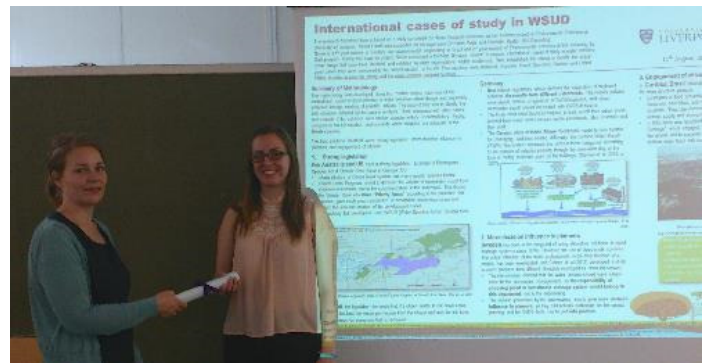


Photo (above): Nicole and Charlotte Beattie (JBA) at the final project presentation.

<http://sciencewithoutborders.international.ac.uk/>