

Water Sensitive Urban Design Task Group (WSUD TG)

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Section I - Introduction

Currently, the world's urban population grows at a rate of around 180,000 every day. This means that the world's urban infrastructure and water resources have to absorb the impact generated by the equivalent of double the population of Tokyo (35 million inhabitants) each year, in relation to different geographical and socio-economic contexts. Landscape development associated with still growing pressures affect the water cycle having a particularly forceful impact on urban water systems, such as their integration into the landscape, quality and quantity, and habitat structure. As a consequence, the aesthetic, cultural and recreational quality of landscape can be reduced, as well as the environmental security in cities. One of the major results of the water cycle alteration is increased risks and uncertainties of stormwater management resulting with frequent flooding due to higher land coverage with impermeable areas. Inflexible, traditional engineering stormwater management systems are not meeting the challenges resulting from the increased impact and global climate changes. Accelerated water removal from the city landscape through highly efficient engineering sewerage systems results with lowering the humidity and health of cities inhabitants. Therefore, a fundamental change in approach to landscape planning and stormwater management as well strong perception of the potential rising from their integration is crucial is to address the above issues. For this reason, the "Water Sensitive Urban Design" Task Group (WSUD TG) brings together two WPs: (2.2) Decision Making Process for effective Urban SWM and (5.1) Water Sensitive Urban Design. It's overall aims are:

- to change decision makers' perception of a stormwater as a constraint into stormwater as an economically valuable resource, indispensable in modern town planning, urban design and sustainable decision making process (considering the diversity of stakeholders in the urban management process, and their conflicting interests).
- to develop tools for efficient incorporation of stormwater management and water bodies into the decision making process in IUWM and urban planning, for improvement of urban water systems and quality of life, assuring economics of the management and sustainable solutions under conditions of progressive urbanization and growing cities.
- To link with other TGs for identifying innovations and new technologies developed within the SWITCH research, which can be used to enhance the efficiency of the technologies used in stormwater Best Management Practices (BMPs) and Water Sensitive Urban Design (WSUD), together with their integration and testing in demonstration cities.

These overall goals are being reached based on the particular objectives of WPs 2.2 and 5.1, as stated in the DOW. Their integration should lead to improved urban water systems based on interdisciplinary and holistic management for sustainable cities, including their ecological, economical, social and cultural aspects.

Section II – Innovation In Research Of Task Group

Water Sensitive Urban Design is defined as the interdisciplinary cooperation of water management, urban design and landscape planning which considers all parts of the urban water cycle, combines water management functions and urban design approaches and facilitates synergies between ecological, economic, social and cultural sustainability. It also bridges gaps between various sectors and provides a platform for transdisciplinarity, which is a great challenge for sustainable water resources management in cities. It needs to meet the conflicting demands of various sectors including urban planners, water managers, health, transport, developers and others. In many countries (USA, Northern Europe) the interest in the use of SUDS and BMPs meets increasing interest, although still more consideration has to be given to analyzing their ability to cope with extreme events and changing socioeconomic conditions and to their adaptation to the conditions of Southern European and developing countries (WP 2.1 and 2.3). Using the knowledge generated in these WPs, the

TG will concentrate on the mechanisms of the new approach implementation, which requires optimal strategies under different conditions to meet the conflicting interest of the diversity of stakeholders within the urban environment. There is also a need for a fundamental change of paradigm in urban design practices which, as a rule, needs to identify stormwater not as a challenge but a valuable resource playing a central role in the urban design process and overall sustainability of a city. The TG will evaluate different stormwater management strategies and decision making processes, highlighting existing problems and identifying opportunities (WP 2.2) and strongly incorporate them into the urban planning process (WP 5.1). The tools developed by the TG will demonstrate to the multi-sectoral community of stakeholders how stormwater may become a strong asset and an indispensable element of the holistic city management, contributing to such goals as lowering of the water management costs, cost-efficient maintaining of green areas for recreation, improvement of societal health such as lowering frequencies of asthma, allergies. Considering that limited availability and high price of land in cities makes the maximizing of environmental amenities a real challenge for a society, the TG will also look for links with the work of other WPs and TGs (e.g. WP 5.3) to bring the latest technologies (in Natural Systems) and concepts (e.g. ecohydrology) for optimizing the efficiency of ecological and hydrological processes taking part in water bodies to maximize their cost-efficient operation in water management.

Section III – Research Done To Date

The research on WSUD started with a review of **small-scale planning strategies and solutions of WSUD** in the demonstration city Hamburg and revising the **state of art in WSUD** and documenting **five case studies** on best practice solutions (Report: **Review of planning strategies of 'Water Sensitive Urban Design'**). This was then followed up with the **evaluation of the sustainable components of 'Water Sensitive Urban Design'** for each of the small scale case studies (deliverable 5.1.2 R) which developed indicators of WSUD, defined 'Water Sensitive Urban Design' method and described planning principles of WSUD. An important outcome is elaborating the **1st draft of the design manual on WSUD**. The major demonstration area for these activities is the City of Hamburg, where most of the activities took place, and provided a ground for implementing the practices based on the LA process, including training and dissemination of the developed methodology.

The research related to WP 2.2 started with identifying the **possible secondary uses of stormwater** around the world (Deliverable 2.2.1b) and generation of a report describing **current stormwater management strategies in selected demonstration cities**. The latter was possible based on information collected by integrating efforts with the demonstration cities of Birmingham, Belo Horizonte and Hamburg. A **framework of principles for sustainable stormwater management** in these cities has been developed (Deliverable 2.2.1a). The information contained within this report is also relevant to the work being undertaken in WP 1.1 (Sustainability concepts and indicators) and Theme 6 (Governance and institutional change). One of the crucial steps forward in stormwater research was **development of the Eco.RWB software tool**, to facilitate the calculation of life-cycle costs for different stormwater BMPs (D2.2.2a). The software consist of a tool for the financial computations and has an interface to a BMP-database providing unit costs, life expectancy and operational costs for the BMPs. A report on the software, in addition to stormwater related projects, can also be used for other decision making processes for example in urban water supply and eco-sanitation (Themes 3 and 4). **Training in the use of the tool** (Task 2.2.2b) has taken place in the Emscher region, Belo Horizonte and Hamburg and several other external presentations have taken place.

In July 2008, there was a meeting in Essen in the Emscher region to provide an important step forward towards focusing the joint activities of WP 2.2. with urban planning (5.1), their integration with demonstration cities (Hamburg, Belo Horizonte) and bringing new cities into the process (Lodz). Co-operation with Lodz also strengthens the link to WP 5.3. and ecohydrological innovations developed in this city.

Section IV – Research Currently Underway

Currently, the work on WSUD focuses on the small-scale case studies and their extension through an international programme, and subsequent development of demonstration sites for further elaboration and dissemination of WSUD towards large-scale case studies on city or

regional level. The design manual on WSUD is in the process of being updated. and used in training and dissemination activities. With regard to case studies, urban planning strategies, methods and instruments, which are appropriate to integrate WSUD-solutions, are being evaluated. Emphasis is put on exploring links to other SWITCH cities, and enhancement of those already made in Zaragoza, Lodz, Belo Horizonte, and Birmingham. There is also another project ongoing in the connection with the Hamburg Demonstration City, where SWITCH attends the development of a sustainable stormwater management system in Haulander Weg, although is not directly involved in the financing of implementation of structural measures. Another structural demonstration project of WSUD is also planned in this City, although currently is not directly related to stormwater management. Further links needs to be explored.

The task currently being worked on in WP 2.2 is the identification of stakeholders and their perceptions of, opportunities for, and modes of input into urban planning processes and decision-making procedures, including opportunities for communication with policymakers (Task 2.2.3a). A training needs analysis (TNA) approach to completing this task is under development for circulation to partners. This approach involves 3 key stages: firstly, the identification of organisational needs (e.g. an organisation's legal and policy requirements) secondly, the identification of an individual's needs (for example, what do employees perceive their needs to be in terms of their specific job), and thirdly, an objective analysis role (where the organisational and employee roles are assessed to identify competency requirements). Particular attention will be paid to providing knowledge and skills to support public/community involvement in the decision-making process. This work will require input from WP 6.1 (Governance for integrated water management), and will contribute to the tasks being undertaken in WPs 1.2 (Modeling of urban water systems and decision-making), 1.4 (Strategic approaches in planning, implementation and performance assessment), Theme 5 (Urban water environments and planning) and Theme 6 (Governance and institutional change), and will also involve the development of an institutional map for a specific demonstration city (Task 2.2.3b).

Section V – Future Research

- In December 2008, a joint training for Learning Alliance in Lodz on WSUD, stormwater management and Natural Systems (WP 5.3) will be held. Considering stormwater being the major issue identified by the Lodz LA stakeholders, active LA participation in the SWITCH project as well as intensive development of the City, Lodz provides a good testing and demonstration ground for these joint activities.
- Within months 49-60, the results of the research on WSUD, dissemination and demonstration will be used to develop Best-Planning-Principles, which set-out the key components of water sensitive urban design. They will be included in a WSUD Design Manual (Blue Print / Best-Practice-Guidelines) and include BMP aspects as an integral part of it.
- The TG will participate in the efforts to complete tasks (2.2.5) related to development of best management practice principles for stormwater management with an integrated urban water management approach, with the focus of their integration within the WSUD framework.
- Development of generic Best Management Practice principles will recognize and address the conflict between an integrated approach and engagement with local stakeholders. This task will use information generated within Task 2.2.1, Task 2.2.4 and WPs 1.1-1.3 (Urban water paradigm shift) and 6.1 (Governance for integrated urban water management), and will directly feed into the development of WP1.4 (Strategic planning, implementation and performance assessment).
- The TG deliverables will be part of the Urban Master plan 'Leap across the Elbe', which includes the Elbe river islands and will be the scene of the International Building

Exhibition in Hamburg (IBA 2013). The TG delivers also a IUWM plan for the river island of Wilhelmsburg.

Section VI – Outputs and their potential impacts

Innovation

- Elaboration of joint guidelines for integrating BMPs in stormwater management within the WSUD principles – urban planning and design, for making the best possible benefit for various stakeholders and sectors in a city.
- Involving the Eco.RWB software tool, facilitating the calculation of life-cycle costs for different stormwater BMPs into the urban planning process; (development of a joint WSUD/BMP tool)
- Elaboration of decision-making procedures in WSUD and BMPs in stormwater management, including communication strategies (based on the co-operation with demonstration cities and LAs).

Scientific outputs

- Publication of at least 4 scientific papers on integration of the stormwater issues and approaches in modern urban design and planning, bringing into the picture the new scientific aspects as well as experiences from joint implementations in demonstration projects.
- Presentation of the results at international fora (at least 4 international conferences of high importance);

Demonstration

- Running 4 projects demonstrating application of WSUD principles bringing stormwater BMPs as an integral component of the management strategy, based on best institutional decision making process with the use of the software and guidelines generated within the project.
- Wide dissemination of information among Learning Alliances of other demonstration cities of the project as well as in other identified municipalities

Training

- Preparation of training material integrating WSUD and stormwater management.
- Training for all the SWITCH Demonstration cities Las.