Water Sensitive Urban Design (WSUD)

For large scale developments
or small scale/one off projects.

Development of this brochure was a joint initiative between Melbourne Water and Knox City Council.

Melbourne Water

What is Water Sensitive Urban Design?

Urban planners and engineers are looking for ways to make better use of water in our expanding cities. As Australia's rainfall and runoff are among the world's most variable, it makes water management very challenging.

A best practice approach to urban stormwater management is rapidly evolving – water sensitive urban design (WSUD) that provides for the sustainable management and improvement of water quality entering Melbourne's waterways from urban regions; opportunities for stormwater and greywater harvesting and reuse; and innovative reductions in potable water demand. Through collaborative efforts between councils, developers and other relevant regulatory authorities, WSUD is being incorporated into urban developments and road designs across Victoria.

WSUD contributes to urban sustainability and provides the conditions for attractive, human-scale living environments through integration of urban planning and design with the management, protection and conservation of the whole water cycle.

Key Principles of WSUD

Consistent with the *Urban Stormwater: Best Practice Environmental Management Guidelines (CSIRO 1999)*, the key principles of WSUD from a stormwater management and planning perspective are:

- Protect natural systems – protect and enhance natural water systems (creeks, rivers, wetlands) within urban developments
- Protect water quality – improve the quality of water draining from urban developments into creeks, rivers and bay environments
- Integrate stormwater treatment into the landscape – use stormwater treatment systems in the landscape by incorporating multiple uses that will provide multiple benefits, such as water quality treatment, wildlife habitat, public open space, recreational and visual amenity for the community
- Reduce runoff and peak flows – reduce peak flows from urban development by on site temporary storage measures (with potential for reuse) and minimise impervious areas
- Add value while minimising development costs – minimise the drainage infrastructure cost of development
- Reduce potable water demand – use stormwater as a resource through capture and reuse for non-potable purposes (e.g. toilet flushing, garden irrigation, laundry).

Why implement WSUD?

WSUD provides a range of measures to help address the environmental degradation that flows from traditional practices of stormwater management. WSUD is about designing our urban environments to more closely match the original water cycle that exists, prior to development. It is about:

- Trying to more closely match the pre-development stormwater runoff regime – both quantity and quality
- Optimising the use of rainwater that falls on our urban areas
- Reducing the amount of water we transport between catchments, both in water supply import and wastewater export.

WSUD Applications

WSUD applications can provide water based or natural vegetated features that add community value, while performing a treatment function through filtering of stormwater runoff. These applications include (not limited to):

- Grassed or landscaped swales
- Infiltration trenches and bio retention systems
- Wetlands*
- Rainwater tanks – stormwater harvesting & reuse
- Greywater harvesting & reuse
- Rain gardens, rooftop greening, urban forests
- Porous pavements

* Refer to *Constructed Wetland Systems Design Guidelines for Developers* (Melbourne Water, 2002)

Where can WSUD techniques be implemented?

WSUD applications can be sized up or down to suit the individual site, from a standard house block through to a whole subdivision. Appropriate planning and design will ensure successful outcomes. The range of applications available may be applied in the following areas:

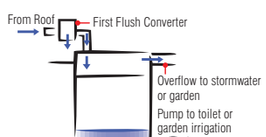
- New road/streets in large or small development areas
- Existing streets and roadways
- Where drainage systems or pavements are to be substantially upgraded
- Where roadways are duplicated
- On publicly owned land
- In new residential development – detached housing, medium density or integrated housing
- In existing residential developments – redevelopment and infill areas
- Commercial or industrial properties/estates
- Carparks/driveways/access routes – public or private property

Planning & Feasibility

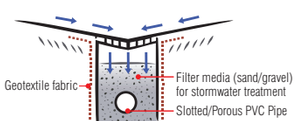
WSUD concepts and technologies, if planned and implemented correctly, offers an opportunity for elements of the water cycle and the development to compliment each other. In order to achieve the best possible results of implementation, the pre-planning and design phase must:

- Identify the land use capabilities of the development site (feasibility stage – existing conditions or limitations)
- Consider the intended design and function of the proposed development
- Identify the likely impacts of the development on the existing environment (immediate, surrounding or downstream areas)
- Match these factors with the most appropriate WSUD applications, designed to achieve a balance between development and environment; so as to ensure integration, sustainability and sound management of the water cycle.

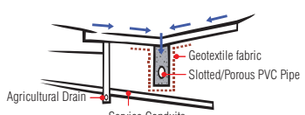
1 Rainwater Storage Tank



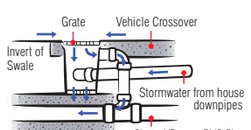
2 Grass Swale/ Bioretention Trench



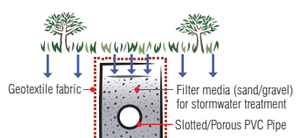
3 Swale Vehicle Crossing



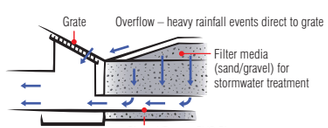
4 Driveway Pit & House Connection



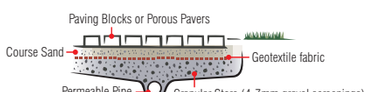
5 Vegetated Swale/ Bioretention Trench



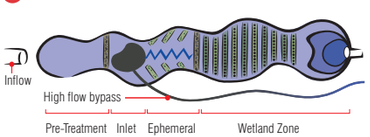
6 End of Swale/Bioretention Trench



7 Porous Pavement



8 Treatment Pond/Wetland*



Acknowledgements

Melbourne Water is responsible for managing regional scale drainage and waterways in greater Melbourne. We aim to improve the quality and environmental health of these waterways as a key part of our objective to sustainably manage Melbourne's water resources and the environment. For more information on WSUD, visit www.wsud.melbournewater.com.au or call 131722.

Knox City Council, in association with MDG Landscape Architects and KLM Development Consultants, have developed WSUD Implementation Guidelines for the municipality. For a copy of the Guidelines, call Council on 9298 8000.

Winner: Savewater Awards 2002

Category: Water Sensitive Urban Design Project