

WATER SENSITIVE URBAN DESIGN (WSUD)

INTRODUCTION

Water sensitive urban design (WSUD) integrates planning and design of the urban water cycle, water supply, waste water, stormwater and groundwater management, urban design and environmental protection.

WSUD is a best practice approach to urban stormwater management. It provides for:

- The sustainable management and improvement of water quality entering waterways from urban regions.
- Opportunities for stormwater and greywater harvesting and re-use.
- Innovative reductions in potable water demand.

STATUTORY REQUIREMENTS

Currently, most states and territories have varying legal requirement to adopt WSUD. The federal government promotes the adoption of WSUD through the 2004 National Water Initiative (NWI) agreement. As part of the NWI, *Evaluating options for water sensitive urban design – A national guide* was released in 2009. It provides a comprehensive list of reference documents and websites for each state and territory. Many local authorities encourage WSUD and water cycle management through their development control plans or stormwater policies.

WSUD OBJECTIVES

WSUD aims to closely match or improve on the water cycle existing prior to development.

Design objectives can include the following:

Water quality	<ul style="list-style-type: none"> - Achieving pollutant concentration targets. - Pollutant load reduction. - Acute impact management. - Visual amenity maintenance.
Amenity	<ul style="list-style-type: none"> - Sensitive area protection. - Natural drainage systems preservation. - Integration of the built environments within the landscape.
Water quantity	<ul style="list-style-type: none"> - Maintenance of original peak flows, duration, frequency and volume.
Water supply	<ul style="list-style-type: none"> - Demand reduction. - Potable water substitution and recycling.
Function	<ul style="list-style-type: none"> - Design for maintenance. - Service integration (e.g. stormwater harvesting). - Multiple uses. - Adequate water life cycle.

WSUD APPLICATIONS

WSUD techniques can be implemented in new or existing streets and roadways, standard residential/commercial blocks or whole subdivisions. There is no limit to the size of the site, provided there is appropriate planning, feasibility and design to achieve an optimal result. WSUD is an innovative design process. The devices and applications may include the following:

- Source controls: Site design, road design, industry operations, maintenance practices.
- Water conservation: Water saving fixtures, waterless urinals, irrigation and garden watering, greywater re-use, blackwater re-use.
- Stormwater re-use: Rainwater tanks, irrigation and garden watering, aquifer recharge.
- Flow redirection: Pipes, drains and channels, outlets and spreaders.
- Flow reduction: Rooftop controls, stormwater re-use, on-site detention tanks, detention basins, infiltration systems, porous pavement, landscaping.
- Water quality treatment: Wetlands and wetponds, bio-retention systems, sand/inorganic filtration, raingardens, litter control, hydrocarbon separators, gross pollutant traps, swales, buffer strips.
- Construction sites: Site management, surface stabilisation, erosion and sedimentation control, flow management, water quality treatment, regulation and education.

AUS-SPEC PROVISIONS

The AUS-SPEC design and construction worksections include WSUD principles in line with the NWI agreement. Use relevant AUS-SPEC worksections to integrate WSUD into the built environment to achieve the WSUD objectives. Some opportunities for WSUD applications using AUS-SPEC include detention of stormwater, capture and re-use of stormwater, use of vegetation for filtering, water-efficient landscaping, localised water harvesting and localised wastewater treatment systems.

WSUD BENEFITS

Introducing WSUD in the landscape influences microclimates and reduces urban heat island effect. Vegetated treatment systems provide green infrastructure and add recreational value to the communities. Road upgrades or new roads with WSUD features reduce stormwater loading and reduce the rehabilitation and maintenance of waterways.

Examples of WSUD techniques



Grassed swales



Bio-retention systems



Sand filters



Constructed wetlands

Relevant reference documents

Evaluating options for water sensitive urban design: A national guide (2009)

Relevant websites

www.sydneywater.com.au
www.hccrems.com.au

Relevant workgroup

00 PLANNING AND DESIGN

Relevant worksections

0254 Irrigation
 0257 Landscape – road reserve and street trees
 0281 Bushfire perimeter tracks (Construction)
 1102 Control of erosion and sedimentation (Construction)
 1111 Clearing and grubbing
 1112 Earthworks (Road reserve)
 1121 Open drains
 1122 Kerbs and channels (gutters)
 1171 Subsurface drainage
 1172 Subsoil and formation drains
 1173 Pavement drains
 1174 Drainage blankets
 1351 Stormwater drainage (Construction)