

Water Sensitive Urban Design

Water Sensitive Urban Design (WSUD) is an approach to urban planning and design that integrates the management of the total water cycle into the urban development process. It includes:

- Integrated management of groundwater, surface runoff (including stormwater), drinking water and wastewater to protect water related environmental, recreational and cultural values;
- Storage, treatment and beneficial use of runoff;
- Treatment and reuse of wastewater;
- Using vegetation for treatment purposes, water efficient landscaping and enhancing biodiversity; and
- Utilising water saving measures within and outside domestic, commercial, industrial and institutional premises to minimise requirements for drinking and non-drinking water supplies.

Therefore, WSUD incorporates all water resources, including surface water, groundwater, urban and roof runoff and wastewater.

The Barker Inlet Stormwater Management Plan will consider a water sensitive urban design approach where possible by exploring the possibility to harvest, treat and re-use stormwater while also finding ways to reduce flood risk and improve the quality of water being discharged into the Barker Inlet Wetlands and Gulf St Vincent.



Detention Basins

Detention Basins are a common stormwater management technique to mitigate stormwater flows to a level that ensures that the performance of the downstream drainage systems and associated flood risk are not adversely affected.

Detention basins are designed to drain dry after rainfall events, and are therefore able to provide new recreational opportunities for the community. There are a number of places in the surrounding suburbs of the Barker Inlet Central Study Area where detention basins have been incorporated into public reserves.



Infiltration Systems

Infiltration systems generally consist of a shallow excavated trench or 'tank', designed to detain (and retain) a certain volume of runoff and subsequently infiltrate the stored water to the surrounding soils. They reduce runoff volumes by providing a pathway for treated runoff to recharge local groundwater aquifers.

Infiltration systems are designed to infiltrate runoff on site, thereby reducing the overall volume of water that runs off a site to the urban drainage network. This also reduces the impact of development on peak flow volumes.

Infiltration systems also cleanse runoff via a variety of processes, primarily filtration, which improves the quality of water leaving the system.



Gravity Drainage

In the Barker Inlet Central area, underground drains and open channels used to convey stormwater flows to the Barker Inlet Wetlands. Underground drains are often referred to as the "minor system" because their flow capacity is designed to cater for rain events that occur, on average, once every 2 or 5 years.

The underground drains are complemented by the flow capacity of the road carriageway, which is known as the "major system". The combined capacity of underground drains and the road carriageway is designed to cater for large rain events that occur, on average, once every 20 or 100 years.



Bioretention Swales

Bioretention swales, sometimes called filtration trenches or bioretention trenches, are a water filtration system capable of holding runoff to allow it to infiltrate and/or be temporarily detained to achieve some water quality improvement.

Runoff is 'filtered' through a prescribed filter media (for example a sandy loam) as it percolates downwards under gravity. This filtered runoff is then collected at the base of the filter media via perforated pipes and flows to downstream waterways or to storages for potential reuse. Should in-situ soil conditions be favourable, infiltration can be encouraged from the base of a bioretention swale to recharge local groundwater and to reduce surface runoff volumes. Bioretention swales are a stormwater management technique that require ongoing maintenance.



Rain Gardens

Rain gardens are shallow planted depressions designed to take the excess rainwater runoff from a house roof or other building, assisting runoff to infiltrate the underlying soil, recharge the groundwater, and reduce peak flows from the site.

Rain gardens are typically planted with native plants or sustainable species that are adapted to local climate conditions. They are a stormwater management technique that can be used at all scales, and are therefore something that individual homes and businesses can use to play a positive role in stormwater management in the Port River East area. Rain gardens are a stormwater management technique that require ongoing maintenance.



Pump Stations

Pump Stations are required at areas of low elevation that cannot be adequately serviced by gravity drainage alone (as pumps can operate independently of tide levels). There are no significant pump stations within the Study Area as the land predominantly grades towards the coastal outlet.

Pump systems may become increasingly more important in managing current gravity stormwater outflows affected by sea level rise.

