

# 8.0 District Water Management Strategy

## 8.1 Planning Background

In accordance with state government planning framework as outlined in Better Urban Water Management (WAPC, 2008), a district water management strategy (DWMS) has been prepared to accompany this document in lieu of a DWMS not being prepared as part of the 2009 Cockburn Coast District Structure Plan. Local water management strategies will be required to support local structure plans and urban water management plans will be required to accompany the subsequent development applications.

This DWMS is to be referred to the Department of Water for formal comment and endorsed as the way forward for preparing local water management strategies.

The planning framework for land and water planning is illustrated in Figure 73. The district water management strategy demonstrated how water resources can be considered in the land use planning system and to ensure consistency with State Planning Policy 2.9: Water Resources (WAPC, 2004).

The strategies presented in the district water management strategy have been prepared to be consistent with the requirements of the following key documents:

- City of Cockburn town planning scheme no. 3
- City of Cockburn local planning strategy
- City of Cockburn guidelines and standards for the design, construction and handover of subdivision within the municipality

## 8.2 Principles and design criteria

The district water management strategy has been prepared based on the Cockburn Coast district structure plan (2009). The Cockburn Coast district structure plan establishes several key objectives for water management within the redevelopment area. The following principles and criteria were adapted from those objectives, taking into consideration the outcomes of more recent investigations to set realistic and achievable targets and were included in the Cockburn Coast district water management strategy. These principles and design criteria will need to be considered during the preparation of the local structure plans.

### 8.2.1 Water Conservation and Efficiency

#### Principle

Achieve the sustainable management of all aspects of the water cycle within the development and ensure that the use of potable water is as efficient as possible. To achieve the above principle the following criteria will be applied:

- Consumption target for water of 80 kL/person/yr, including not more than 40 kL/person/yr scheme water
- No potable water is to be used outside of homes and buildings
- All new fixtures and fittings are to be a minimum of 4 stars WELS rated
- The use of native plants is to be promoted, with native species constituting a minimum of 30-35% of total public open space area

The following water efficiency measures are also proposed for further consideration as part of the local water management strategies:

- Central controls on all irrigation systems constructed within development area;
- Weather stations linked to irrigation systems;
- Soil monitoring devices within POS areas;
- Improvements to the soil structure within POS areas to reduce water percolation and assist in plant development.

### 8.2.2 Water Quantity Management

#### Principle

The post development annual stormwater discharge volumes and peak flows are to be maintained relative to pre-development conditions, unless otherwise established through determination of ecological water requirements for sensitive environments. To achieve the above principle the following criteria will be applied:

- Retain all catchment runoff up to and including the 1 in 100 year ARI event within the development area

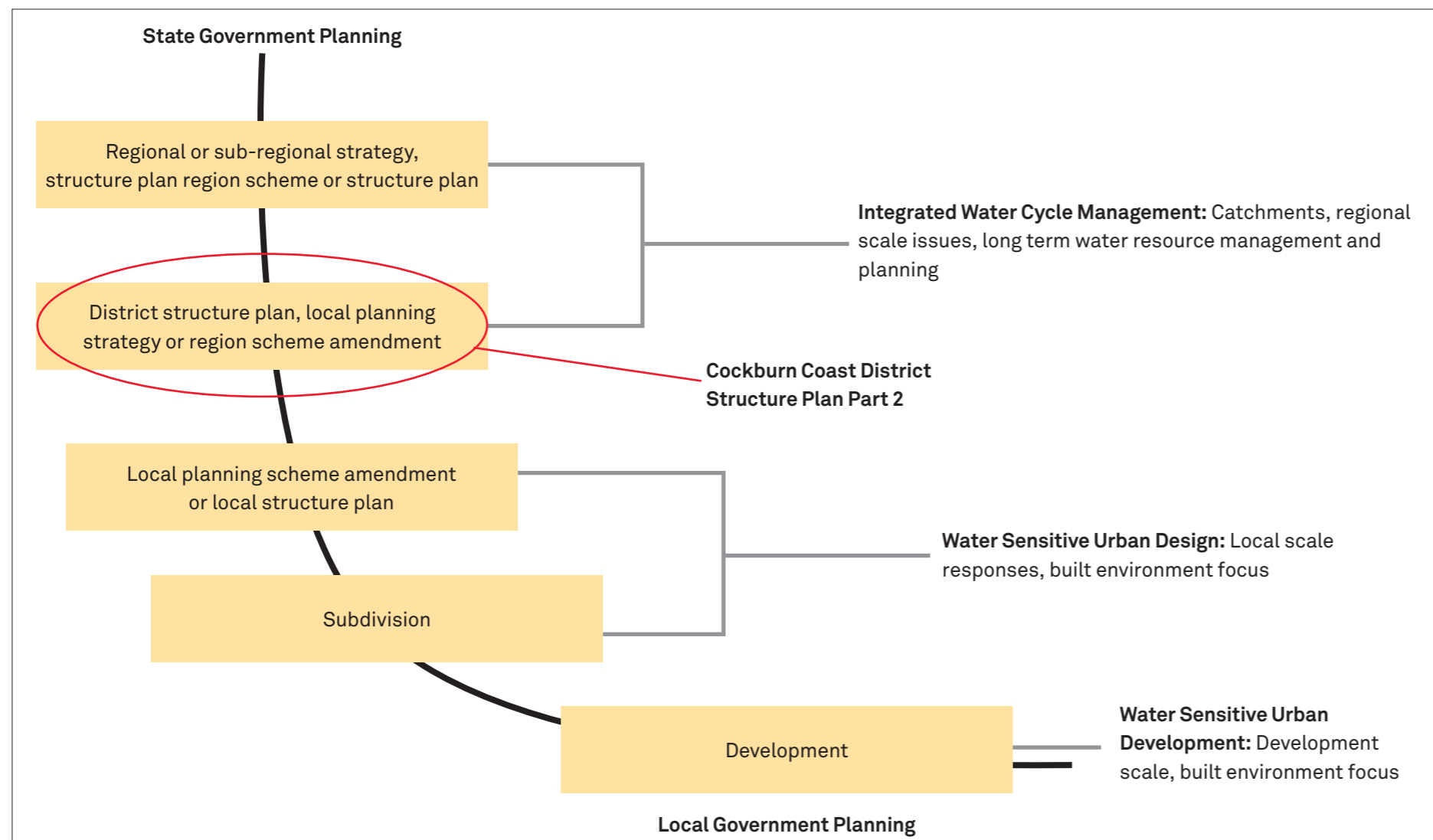


Figure 73\_Planing framework for integrating the drainage planning with land planning  
Source: Better Urban Water Management (WAPC, 2008)

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## 8.2.3 Water Quality Management

### Principle

Maintain water quality at pre-development levels (winter concentrations) and if possible, improve the quality of water leaving the development area to maintain and restore ecological systems. To achieve the above principle the following criteria will be applied:

- Ensure that all surface and groundwater contained in the drainage infrastructure network receives treatment prior to discharge to a receiving environment consistent with the Stormwater Management Manual.

## 8.2.4 Water Sustainability

### 8.2.4.1 Water Efficiency Measures

The criteria as described in Section 1.2.1 was applied in the Cockburn Coast district water management strategy. In addition, the following standards for in-house appliances are to be adopted in Cockburn Coast:

- All tap fittings must be minimum 4 stars WELS rated
- All showerheads must be minimum 4 stars WELS rated
- All sanitary flushing systems must be a minimum 4 stars WELS rated dual flush
- Hot water heaters to be located within 5 m of major hot water using points

The above will be mandated through future Design Guidelines.

### 8.2.4.2 Potable Water

The potable water supply for Cockburn Coast will be provided from the Water Corporation's Integrated Water Supply Scheme from existing water sources.

### 8.2.4.3 Fit-for-Purpose Water Source

Several fit-for-purpose water sources were considered in the Cockburn Coast district water management strategy and have been summarised below. Further assessment of the fit for purpose water source is being undertaken in an Integrated Water Management assessment and confirmation of the preferred source will be required in the local water management strategies. The estimated water demands are also to be included within the local water management strategies.

### 8.2.4.4 Rainwater

There are opportunities for rainwater tanks to be installed in lower density parts of the District Structure Plan, and for small scale rainwater storage and distribution systems to be used for multi-residential dwellings. The use of this water is generally limited to in-house fit-for-purpose demand because rainfall does not occur during the irrigation season and tank sizes to retain sufficient water for year round irrigation demands are likely to be excessive.

### 8.2.4.5 Stormwater

The typically sandy soil types which are prevalent at the site are ideally suited to the promotion of infiltration at, or close to source. This has the advantage of maintaining recharge into the superficial aquifer as well as minimising the need for drainage infrastructure. The existing drainage systems in place within the district structure plan area are therefore limited to onsite soakage devices, small scale collection systems and traditional drainage sumps.

In order to gain additional abstractable water it would be necessary to demonstrate that additional recharge was occurring. However in this area, there is very little additional recharge occurring as there is limited vegetation to be cleared and no discharge of stormwater off-site. This means that there is little to be gained through aquifer storage and recovery.

### 8.2.4.6 Groundwater

The availability of groundwater reserves for licensed abstraction indicates there is approximately 1.2 GL/year available within the superficial aquifer. The Cockburn Coast redevelopment is likely to gain access to a limited proportion of this available resource (potentially only up to 10%). This water source may contribute to the fit-for-purpose demands of the district structure plan but is unlikely to meet them in isolation of another source.

### 8.2.4.7 Imported Groundwater

Additional groundwater reserves imported from the groundwater interception trench at Port Coogee may be able to contribute 2.4 ML/day during the summer to help meet the irrigation demands of the district structure plan. Preliminary information indicates that the quality of this resource is sufficiently good to enable its use for irrigation. Further investigation will be required to establish in more detail the quality and quantity of water available from this source.

### 8.2.4.8 Wastewater

There is a substantial wastewater pumping station (Bennett Ave main PS) within the district structure plan area which collects and conveys wastewater to the Woodman Point Wastewater Treatment Plant. This provides a substantial opportunity for onsite wastewater harvesting for local distribution.

### 8.2.4.9 Stormwater Management

The post development annual stormwater discharge volumes and peak flows are to be maintained relative to pre-development conditions, unless otherwise established through determination of ecological water requirements for sensitive environments. The following criteria has been documented in the Cockburn Coast district water management strategy and will need to be considered during the preparation of the local water management strategies:

- Retain all catchment runoff up to and including the 1 in 100 year ARI event within the development area.

Infiltration testing should be carried out in conjunction with geotechnical investigations at a localised level to confirm areas that are suitable for the proposed infiltration methods and to identify appropriate infiltration rates to enable further refinement of modelling at subsequent stages of development.

### 1 Year ARI Event

Runoff from events up to the 1 in 1 year ARI event will be retained as close to source as possible within raingardens and bioretention areas integrated into the urban form.

Runoff from all (residential and commercial) lots will be captured within rainwater tanks where possible, with the excess disposed of on site via the use of soakwells or other infiltration facilities. For high density lots where retention and infiltration within the boundary of the lot is not possible retention and infiltration areas will be located within local public open space areas as close to source as possible.

The use of permeable paving will be maximised to provide opportunities for infiltration at source.

### 5 Year ARI Event

Road runoff from events greater than 1 in 1 year ARI and up to 1 in 5 year ARI will be conveyed in an underground pipe system designed to maximise infiltration through the use of bottomless pits and permeable joints, to low point infiltration areas integrated into public open space areas.

### 100 Year ARI Event

Roads and public open spaces will be designed to cater for the surface overflow for more severe storms with habitable floors at least 300 millimetres above the 1 in 100 year ARI flood or storage level at any location. Low point infiltration areas will be sized to store and infiltrate the 100 year ARI flood event on site.



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## 8.2.4.10 Commitment to Best Management Practice

The hierarchy of best practice water sensitive design principles is as follows:

- Implement controls at or near the source to prevent pollutants entering the system and/or treat stormwater
- Install in-transit measures to treat stormwater and mitigate pollutants that have entered the conveyance system
- Implement end-of-pipe controls to treat stormwater, addressing any remaining pollutants prior to discharging to receiving environments (eg gross pollutant traps)

Current best practice water sensitive urban design measures at the different scales include:

1. Residential lot scale:
  - On site retention
  - Waterwise and Nutrient-wise landscaping
  - Porous pavements
  - Amended topsoils
  - Rainwater tanks
  - Raingardens and vegetated soakwells
2. Commercial lot scale: As for residential and in addition
  - Landscaped infiltration structures
  - Hydrocarbon management and sediment traps
3. Street scale: As for residential lots and in addition:
  - Landscaped infiltration structures
  - Hydrocarbon management and sediment traps
  - Conveyance biofilter systems.
4. Estate Scale: As for street scale and in addition:
  - End of catchment treatment structures
  - Non-structural strategies such as interpretive signage and community engagement

## 8.2.4.11 Disease Vector and Nuisance Insect Management

To reduce health risks from mosquitoes, retention and detention treatments should be designed to ensure that between the months of November and May, detained immobile stormwater is fully infiltrated in a time period not exceeding 96 hours.

Permanent water bodies are discouraged, but where accepted by the Department of Water, must be designed to maximise predation of mosquito larvae by native fauna to the satisfaction of the local government on advice of the Department of Water and the Department of Health.

## 8.2.4.12 Groundwater Management

Areas of the site where the groundwater level is within 5 m of the surface are limited to the foreshore public open space and therefore no groundwater drainage system or extensive areas of fill are currently proposed. However, local site investigations will be required at subsequent stages of planning to

confirm depths to groundwater are considered satisfactory by the City of Cockburn.

Groundwater quality is to be maintained at pre-development levels (winter concentrations) and if possible, improve the quality of water leaving the development area to maintain and restore ecological systems. The following criteria will be applied:

- Ensure that all surface and groundwater contained in the drainage infrastructure network receives treatment prior to discharge to a receiving environment consistent with the Stormwater Management Manual.

The quality of the stormwater infiltration will be maximised through:

- Soil amendment (where the tested phosphorous retention index is less than 10) within all stormwater infiltration areas and public open space
- Infiltration will not be promoted in areas of known soil contamination
- Xeriscaping to avoid the use of fertilisers
- Recommending a maintenance plan for the upkeep of the stormwater management system

Prior to the use of groundwater for irrigation purposes additional monitoring data, including confirmation of the nature and extent of contamination and the suitability of groundwater for irrigation purposes will be prepared and presented within local water management strategies.

Infiltration testing should be carried out in conjunction with geotechnical investigations at a localised level to confirm local groundwater, areas that are suitable for the proposed infiltration methods and to identify appropriate infiltration rates to enable further refinement of modelling at subsequent stages of development.

Soil phosphorous retention index testing should be carried out in conjunction with geotechnical investigations at a localised level to identify areas where soil amendment will be required to ensure that the ultimate phosphorous retention index will be greater than 10.



## Requirements for Local Water Management Strategies

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The development of local water management strategies will need to include preparation of conceptual designs for drainage infrastructure. Specifically, the following issues will need to be addressed within the local water management strategies:

- Further local contaminated sites investigations where necessary
- Soil permeability and phosphorous retention testing to confirm soil amendment requirements
- Location and sizing of stormwater drainage systems including infiltration areas
- Provision of infrastructure for alternative water supply

