



# WSUD Strategy for Darwin

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# Water Sensitive Urban Design

- New approach to development
- Holistic approach to planning and design
- WSUD aims to
  - minimise impacts on the natural water cycle
  - Protect the health of aquatic ecosystems



# WSUD Strategy

- Joint project between
  - DPI
  - NRETA
  - Australian Government CCI
- Provision of
  - Policy
  - Tools
  - Resources
  - Training

# WSUD in Darwin

- Protection of aquatic ecosystems and Darwin Harbour
- Water resource conservation
- Significant pressures from urbanisation
  - 3700 new lots at Palmerston and Northern Suburbs



WSUD Strategy for Darwin

# WSUD Strategy

- Principles for WSUD
  - Protect existing natural resources
  - Protect water quality of surface and ground waters
  - Integration of water into the landscape
- Setting Quantifiable Objectives for
  - Water Conservation
  - Stormwater quality
  - Wastewater minimisation
  - Waterway stability



# Barriers and Opportunities

- Stakeholders interviewed to determine barriers and opportunities
  - NT Government
  - Local Government
  - Industry (Power and Water, Consultants)
  - Developers

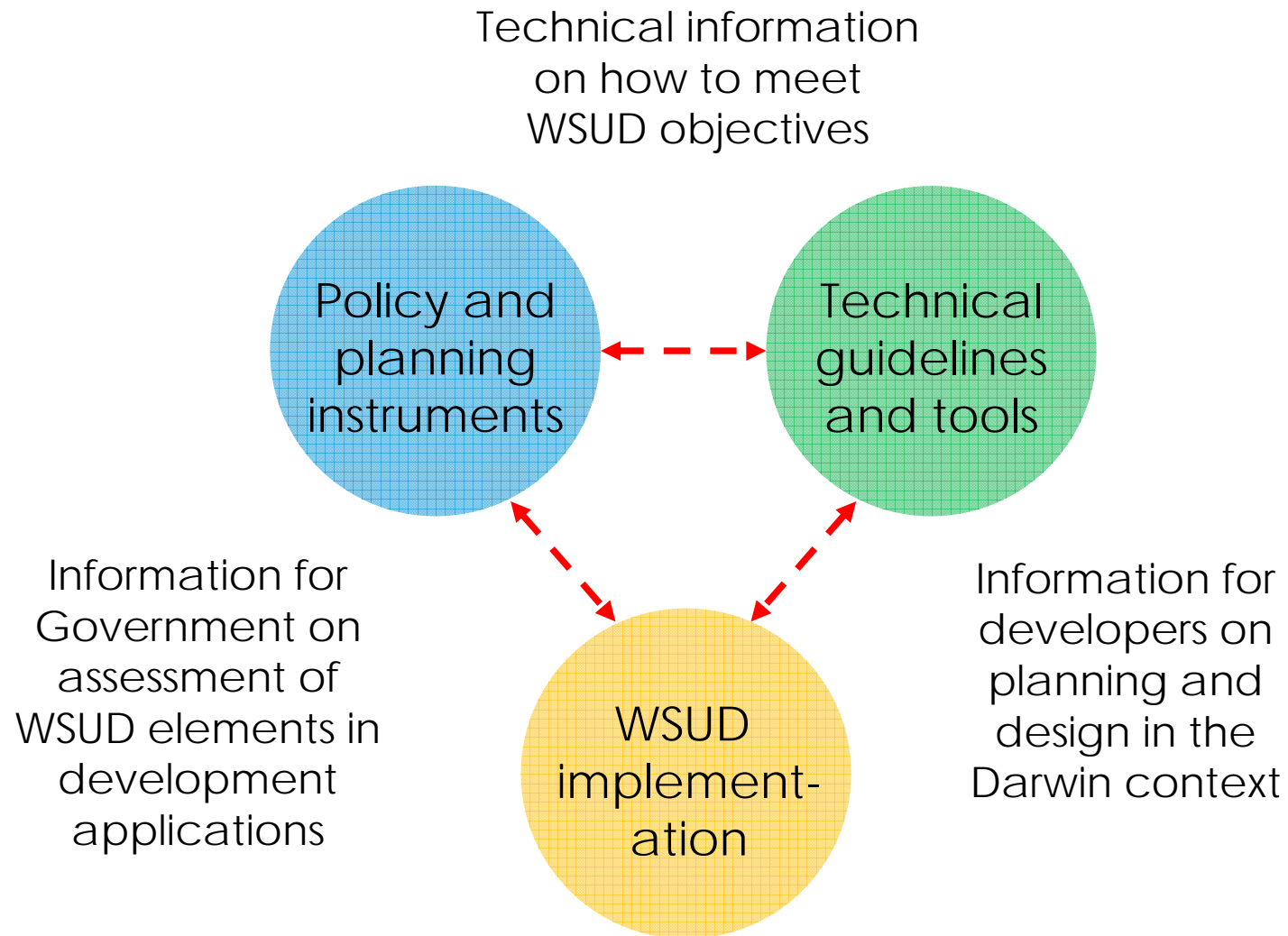


# Barriers to Implementation

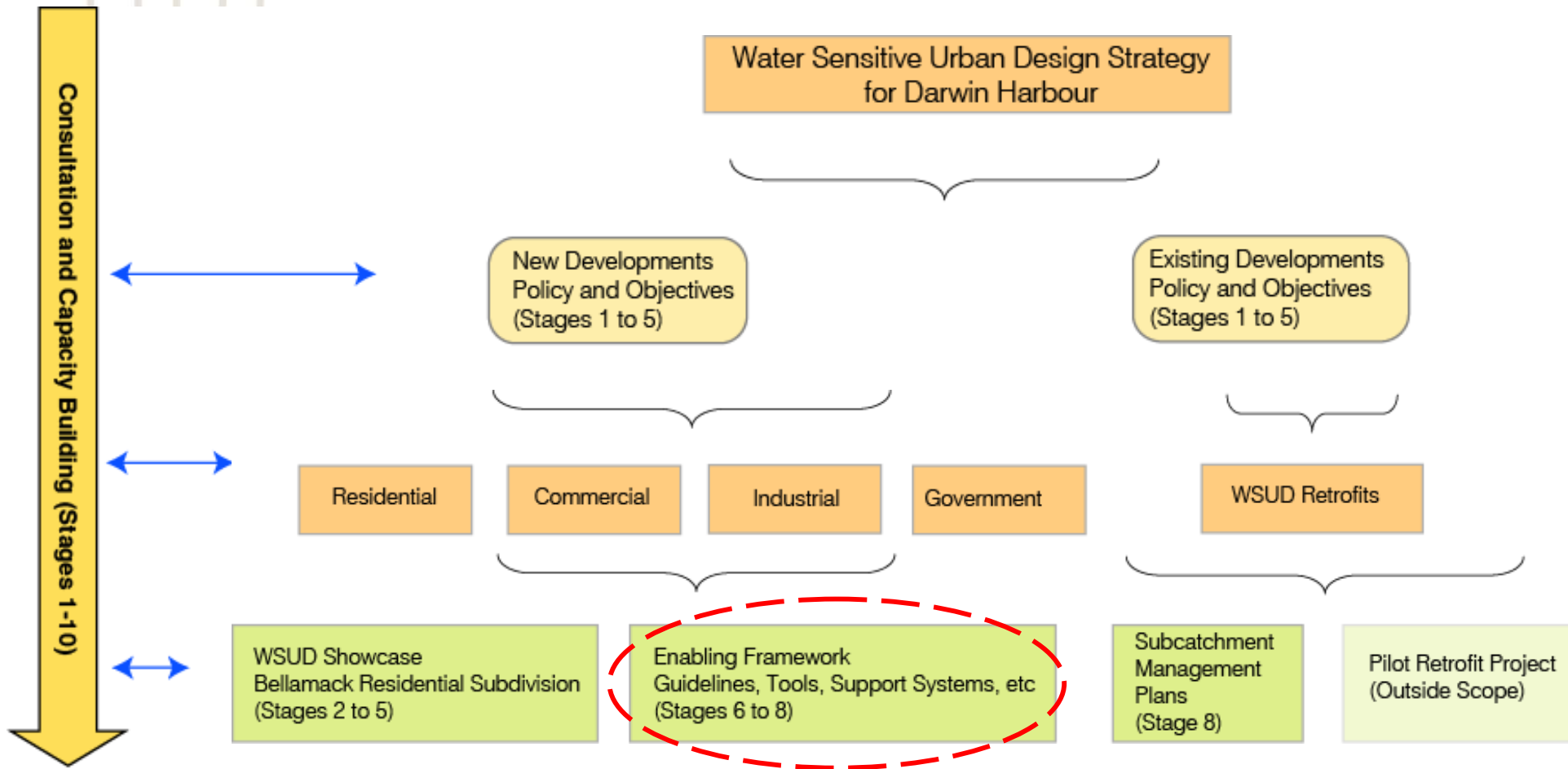
- Little pressure to manage water resources
  - Relatively low population
  - Good water quality
- Community perception of abundant rain
- Enforcement (e.g. sediment and erosion controls)
- Significant technical barriers
  - Climate
  - Appropriateness of existing solutions
  - Waterway stability
  - Water consumption
- WSUD in its infancy



# Three Key Gaps



# WSUD Strategy



Enabling Framework



## Stages in the development process

## Guidelines and Tools available

### Initiation of Development

Preliminary consideration: desktop

Fact Sheet 1: Introduction to WSUD

Fact Sheet 2: WSUD process, tools and resources

### Preparation of Development Application

Site assessment and data collection

Establish design objectives

Device selection

Conceptual design

DA submission

Requirements for new development will be stipulated in the Planning Act

WSUD Planning Guide  
Including:  
WSUD objectives  
WSUD Strategy guidelines  
Assessment checklists

Site assessment guide

WSUD Practice guide

Water quality modelling guide

### Approval for Construction

Approved treatment train

Detailed design:

-Calculations

-Drawings

Design submission

Sub-division Development Guidelines  
Including:  
Technical design guidelines  
Checklists: construction and maintenance

Standard drawings

Vegetation Selection Guide

### Construction, operation & maintenance, ongoing monitoring

Construction

Establishment

Titles Release

Ongoing operation and maintenance

Monitoring

Construction and Asset Handover Guide

Operation and Maintenance Manual

Monitoring Protocol

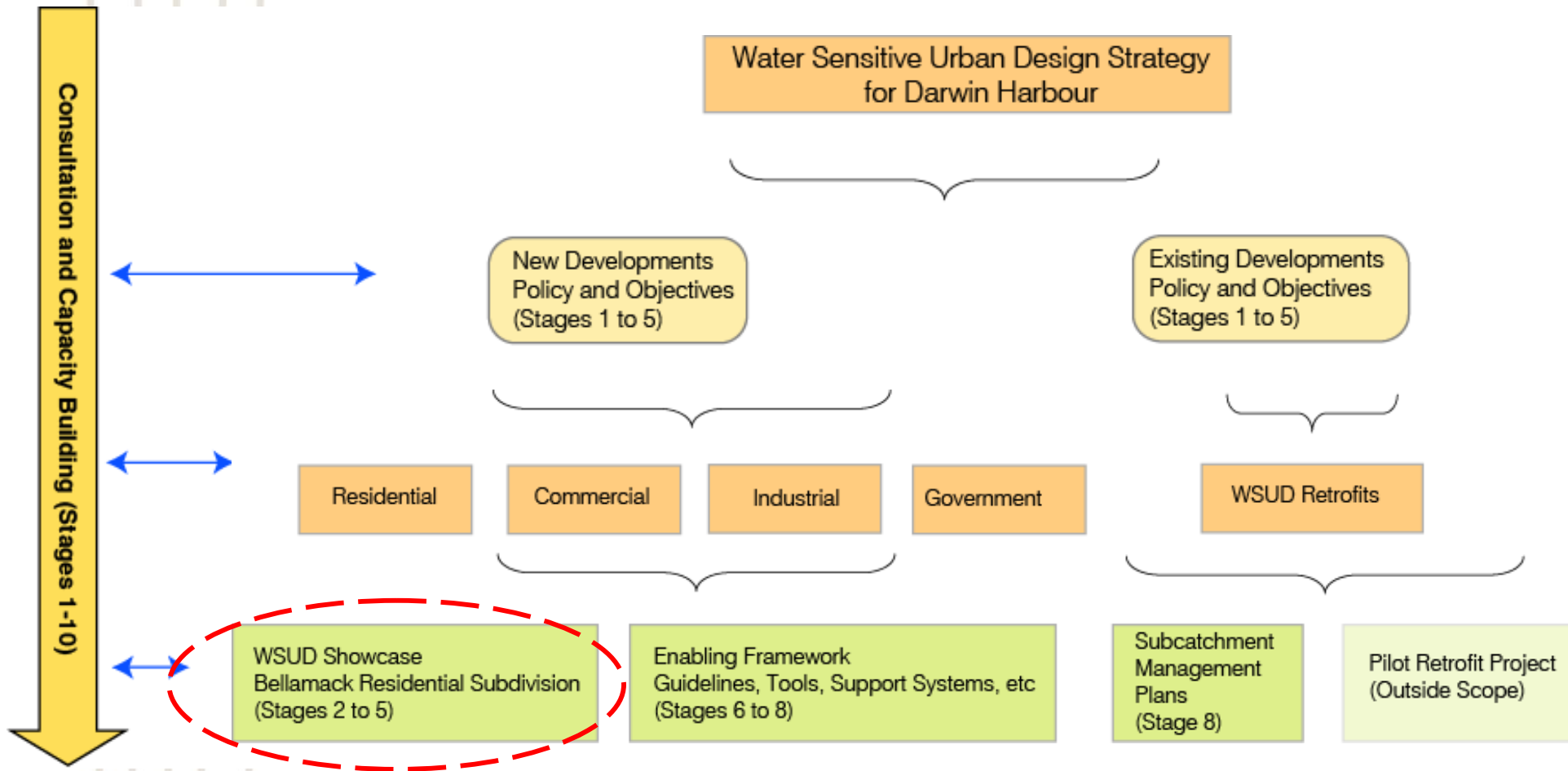
# WSUD Strategy Summary

- **Collaborative** process
- **Local context:**
  - Environmental conditions
  - Nature of development
  - Development process in Darwin
- **Integrated** set of planning provisions, guidelines and tools
- Information is **tailored** for:
  - Small developers
  - Large developers
  - NT Government and Councils

WSUD Showcase - Bellamack



# WSUD Strategy



# Bellamack Location



# WSUD Strategy for Bellamack - Objectives

- **Water quality**

- 80% reduction in the mean annual load of total suspended solids
- 60%           "                   "                   "                   "                   phosphorus
- 45%           "                   "                   "                   "                   nitrogen
- 90%           "                   "                   "                   "                   gross pollutants

- **Water conservation**

- Low water use public landscapes & private gardens
- Water efficient fittings & appliances, including mandatory dual flush toilets
- Utilise treated wastewater and groundwater for non-potable uses, particularly irrigation

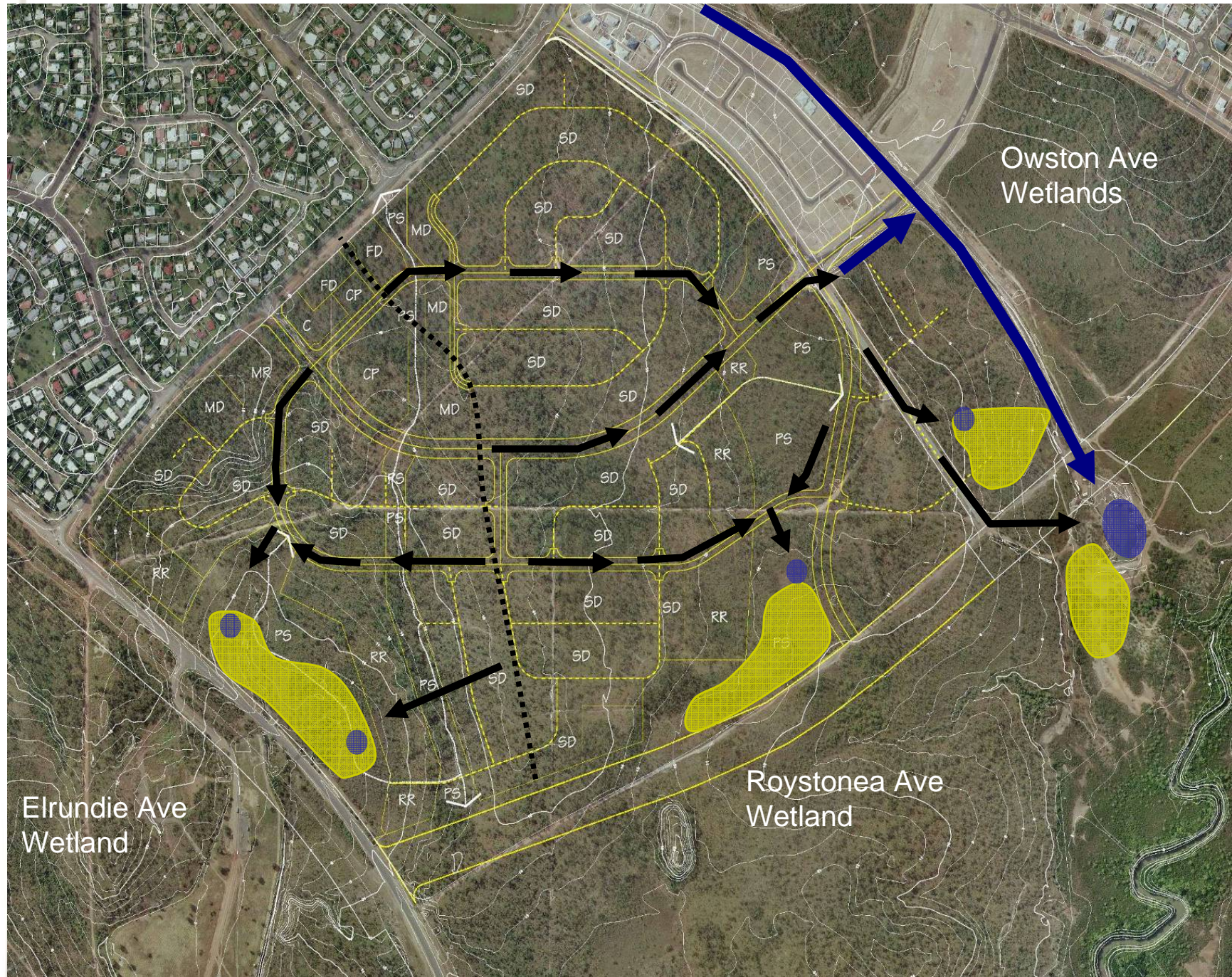
- **Wastewater minimisation**

- Demand management
- Minimise wet weather infiltration
- Maximise reuse

- **Landscape integration**

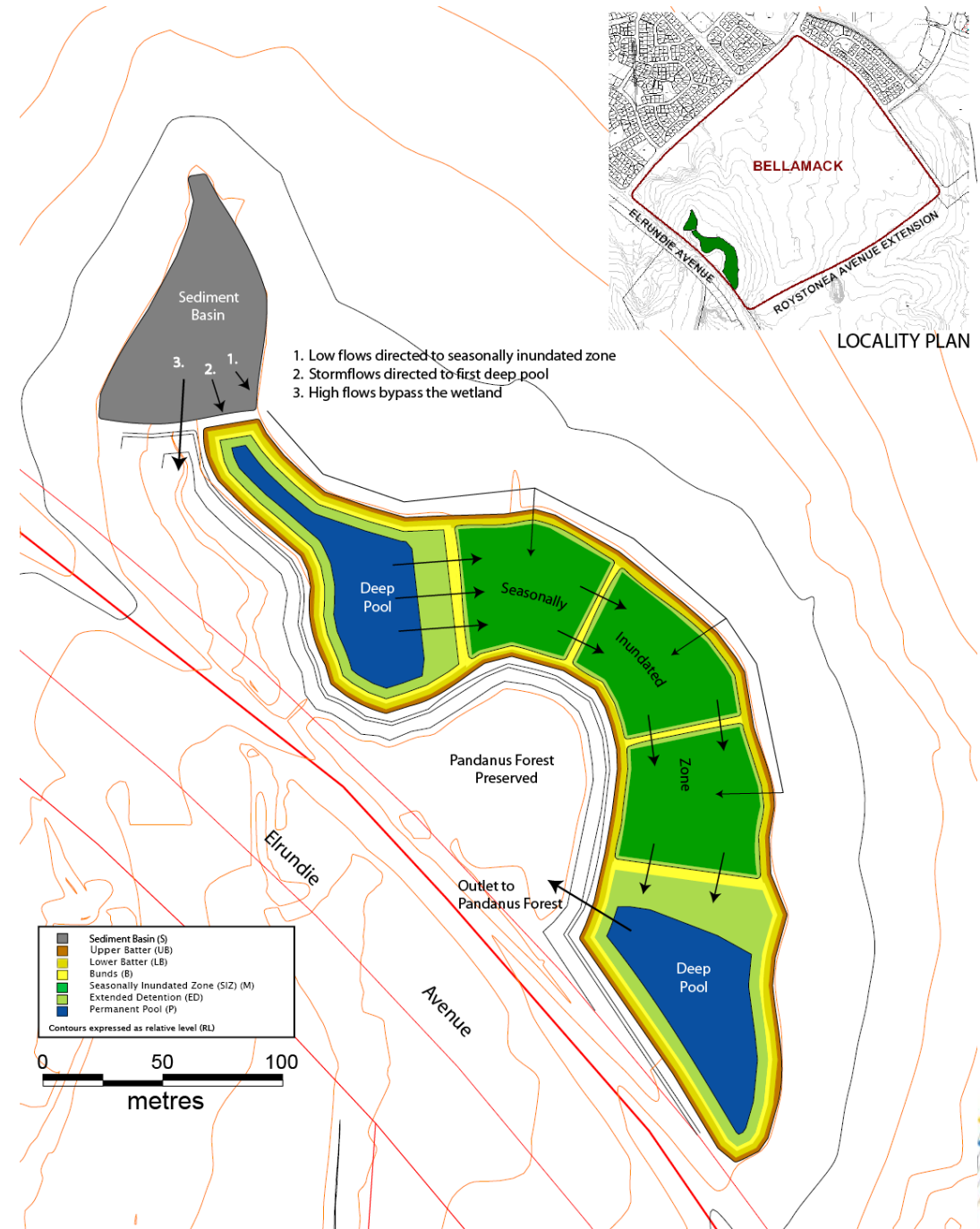
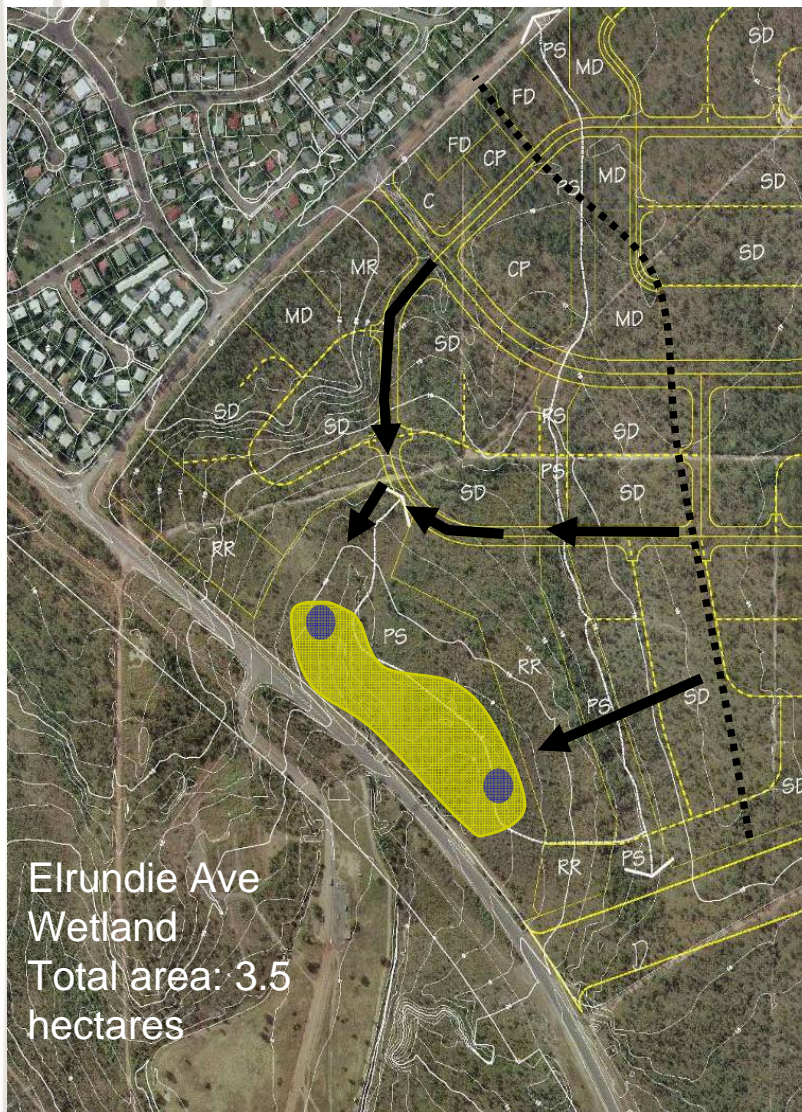


# Stormwater treatment strategy



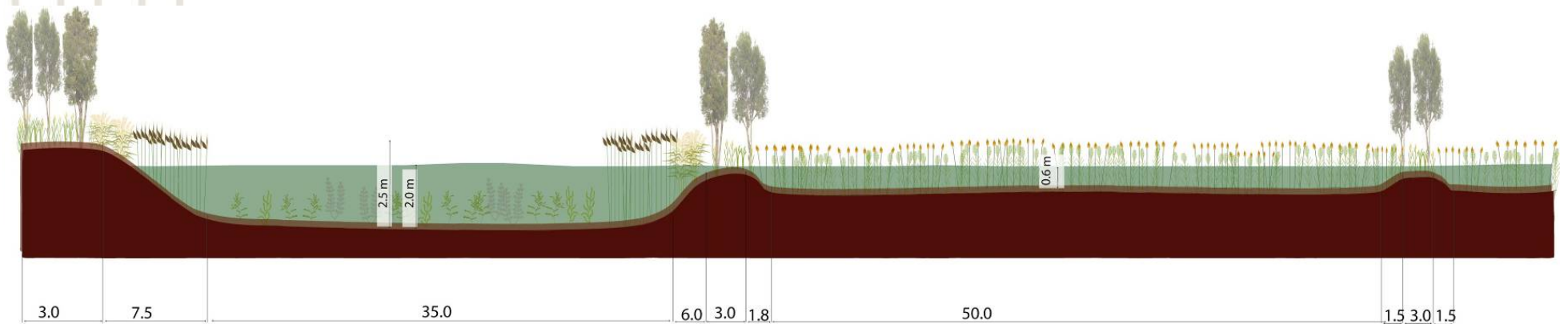


# Bellamack wetlands: Elrundie

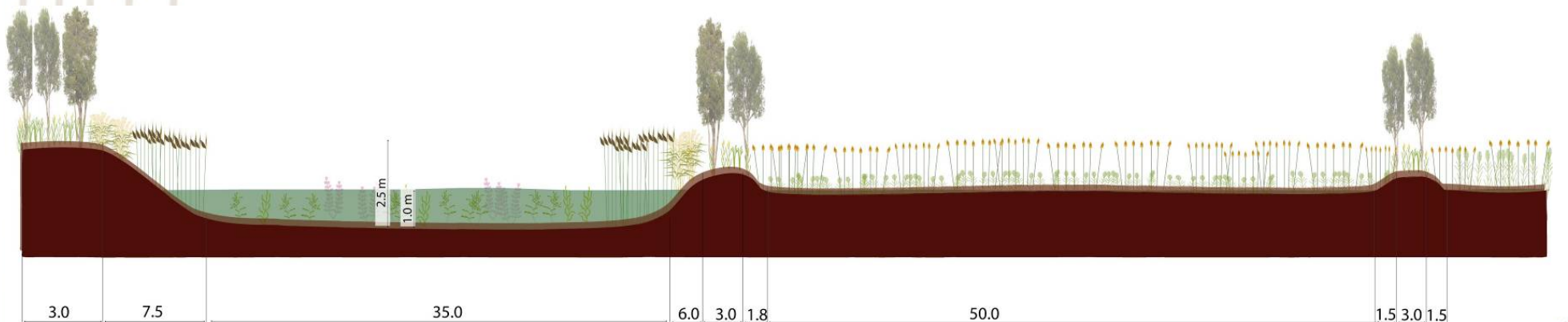


# Bellamack wetlands: sections

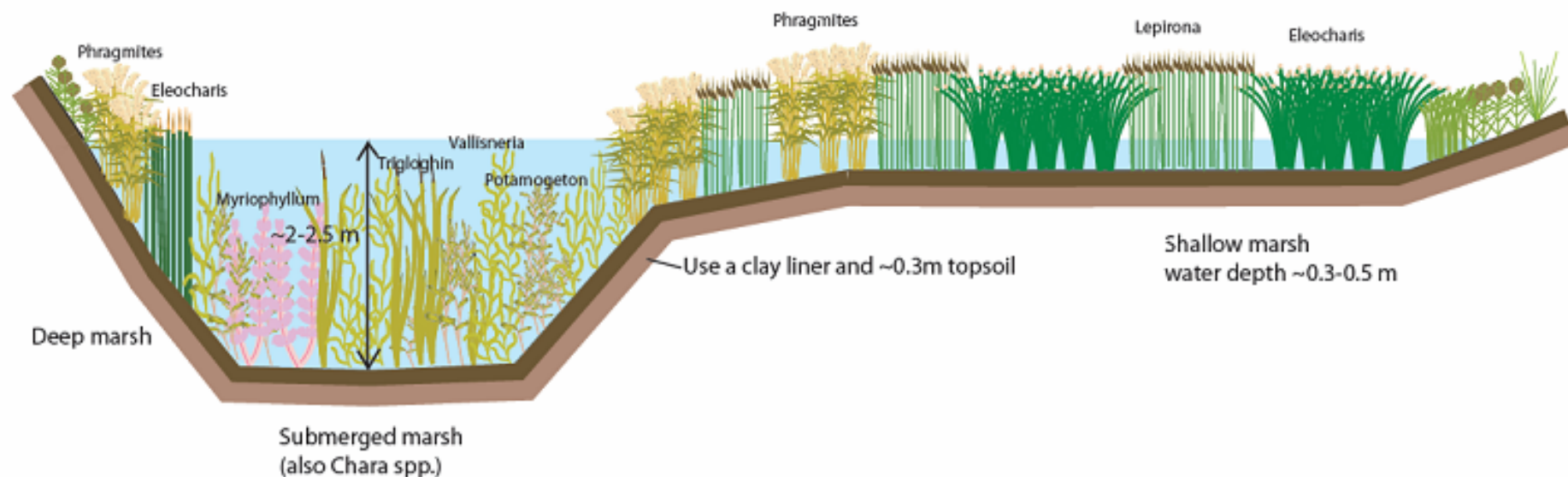
- Wet Season



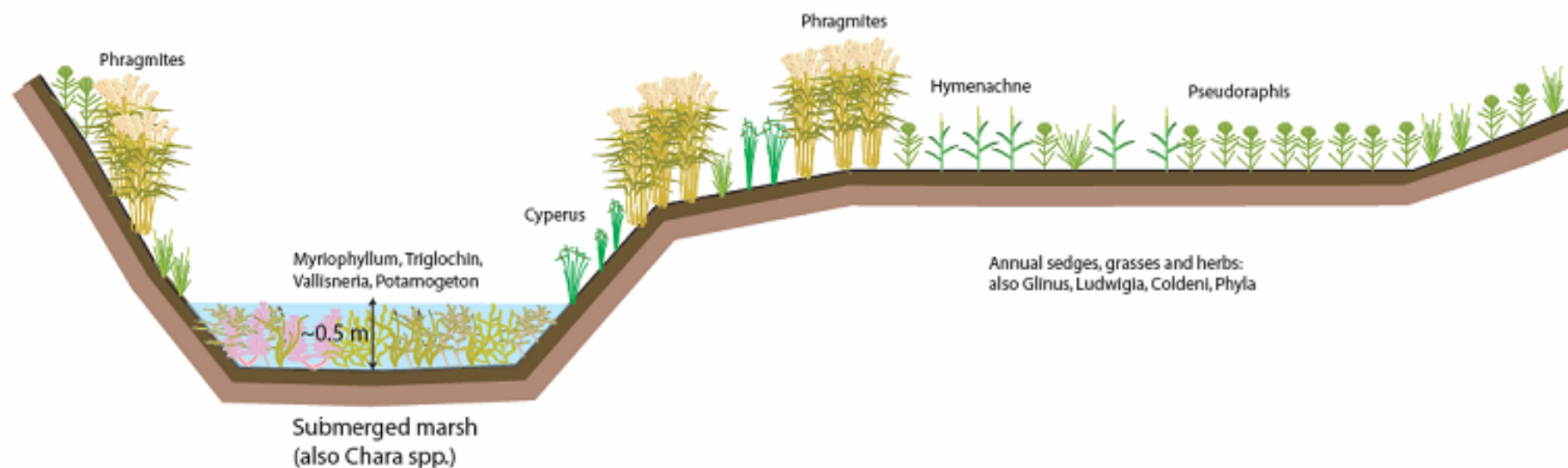
- Dry Season







## Wet season state

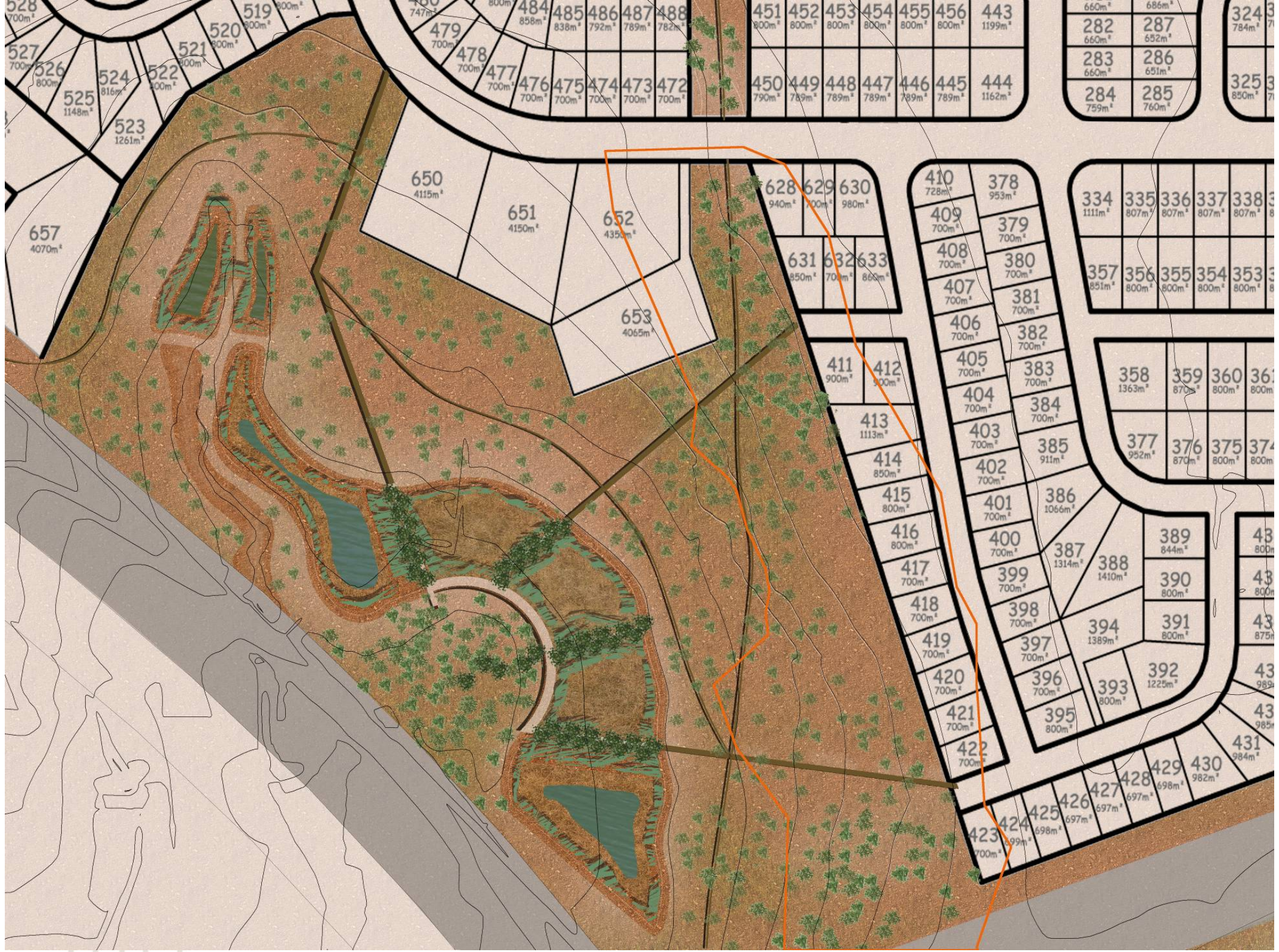


## Dry season state











# Wet Season





# Dry Season



# Bellamack wetlands: design development

- Key design issues
  - Water level fluctuations
  - Vegetation selection
  - Mosquito management
  - Integration into landscape/aesthetics
  - Cost



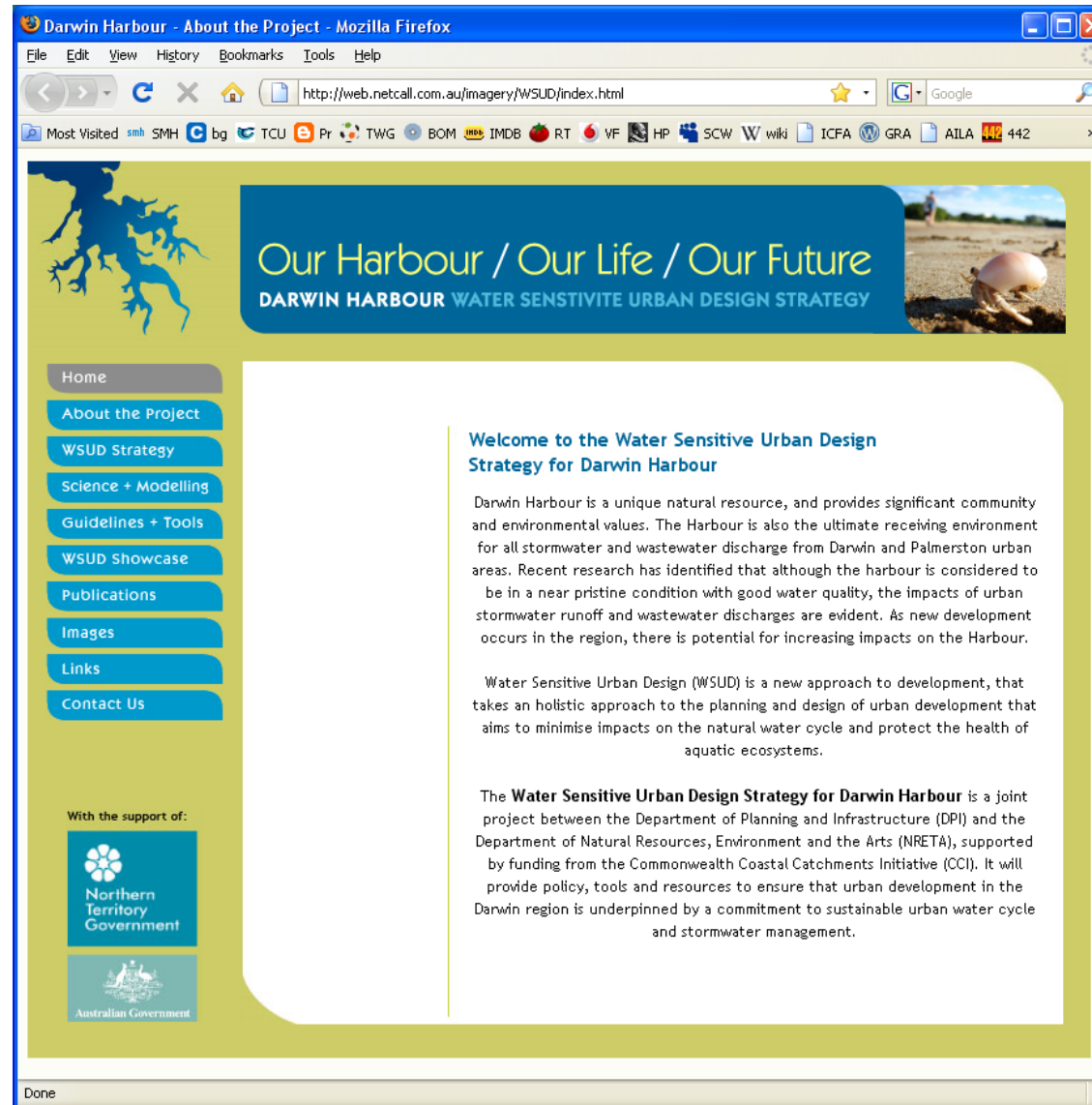


Summary

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- Information is **tailored** for:
  - Developers and Industry
  - NT Government and Councils
- Bellamack – **implementation** of WSUD

# More Information?





# WSUD Strategy for Darwin

