Case Study 1:

Warner vale Town Centre and Porters Creek Wetland

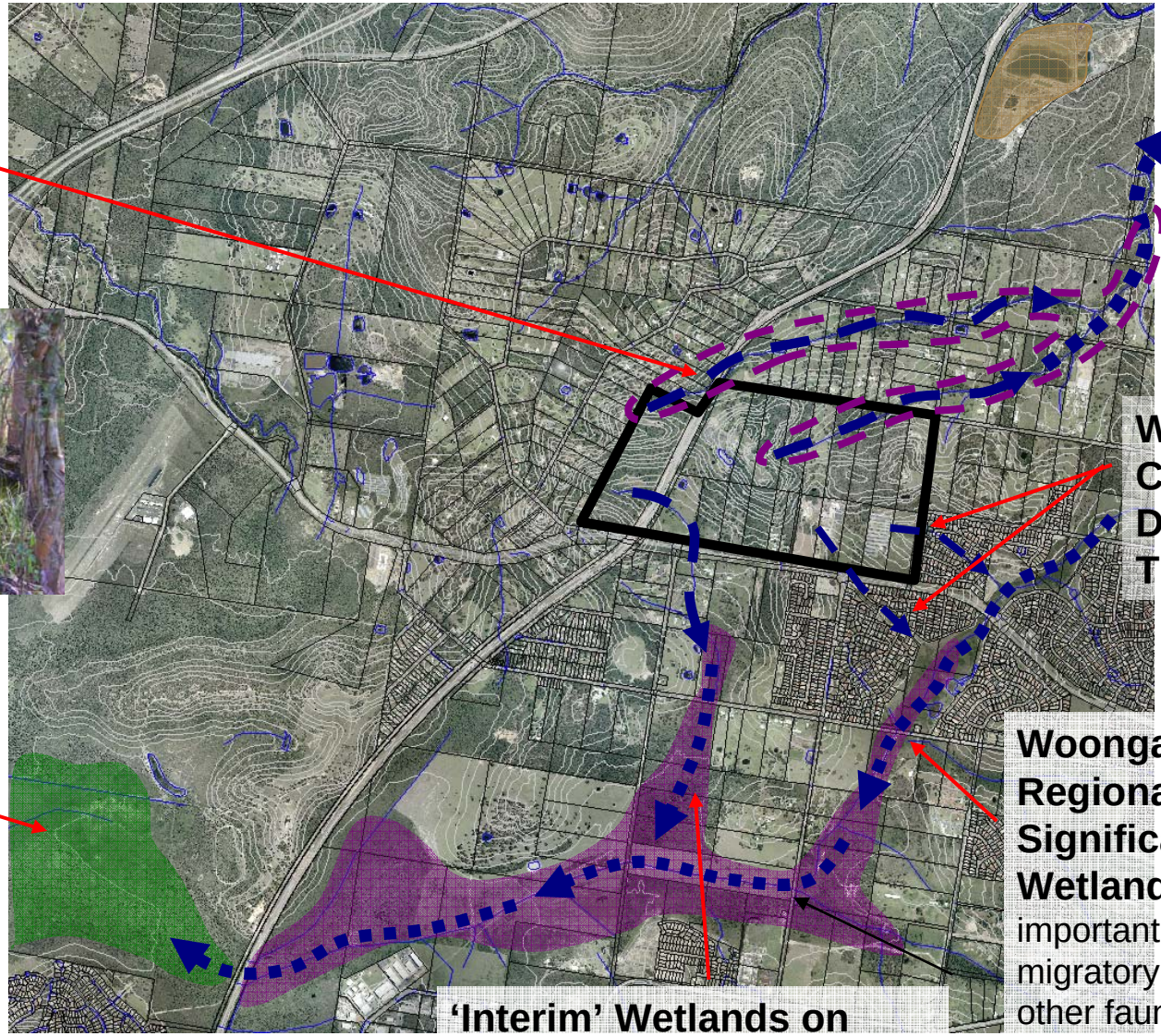
Introduction

- A complex case study that involved many different elements
  - Rapid urban development
  - Very significant pressure on limited water resources
  - Extremely sensitive receiving environment with high biodiversity value

Regional Key Aquatic Habitats

Wallarah Ck Tributaries Regionally Significant Corridors

Porters Creek Wetland
Lage mosaic of wetland communities



Woongarrah Ck Urban Drain Tributaries

Woongarrah Ck Regionally Significant Wetlands provides an important refuge for migratory birds and other fauna.

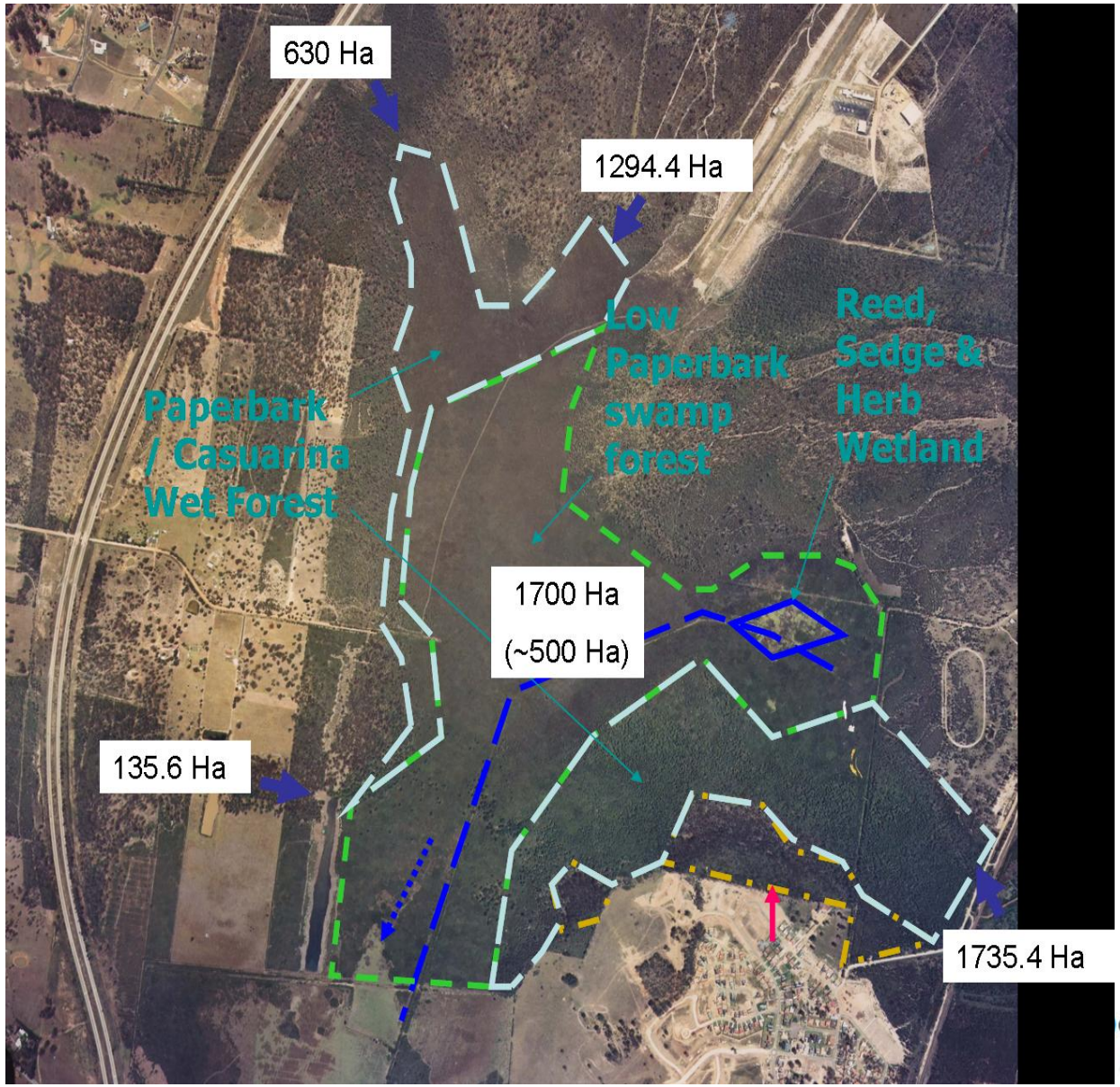
'Interim' Wetlands on Porters Ck Tributary (Unnamed)

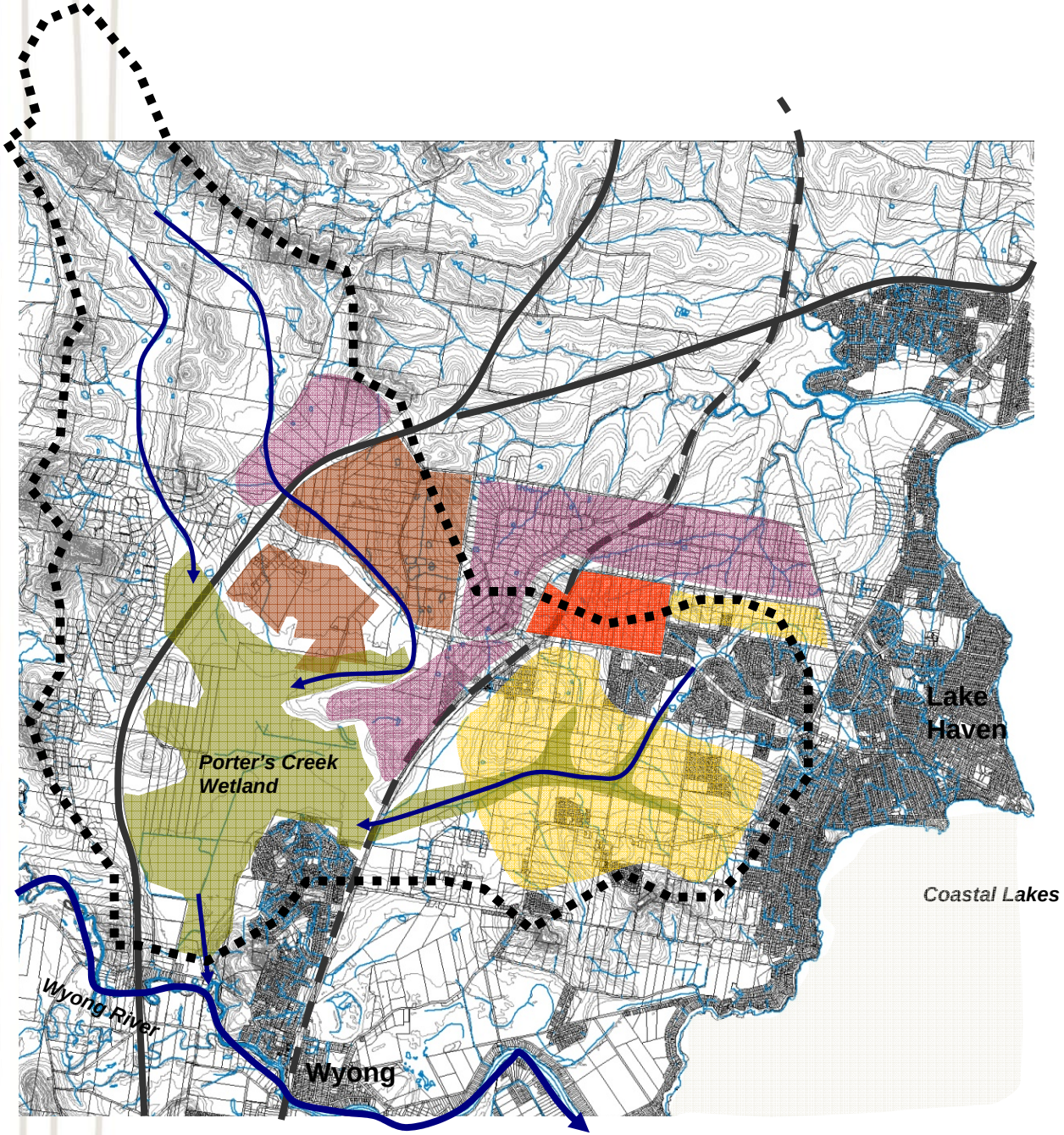
Porters Creek Wetland

- Natural, coastal wetland of state significance (SEPP14)
- Mosaic of Paperbark and Casuarina Wet Forest and Low Paperbark Swamp Forest with an isolated patch of Reed, Sedge & Herb Wetland
- Specific hydrologic regime climates for each

Development in the Catchment

- Run-off from 4,300 ha urbanised catchment
- High development pressure
- 1,500 ha of greenfield development proposed
- Development requires an Integrated Water Cycle Management (IWCM) plan





Wyong Employment Zone (WEZ)

Warnervale Town Centre (WTC)

Future Employment Lands

Residential

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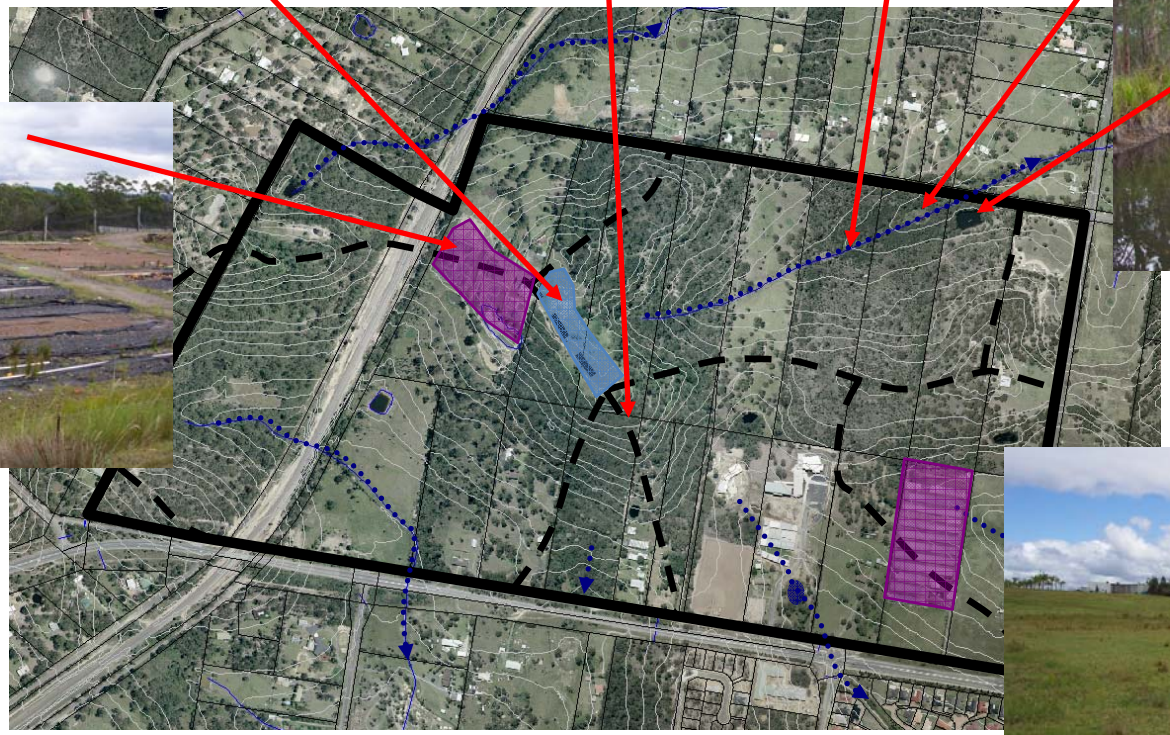
Local Site Context



WTC Objectives

- Southern Catchments (Porter's Creek Wetland) – Protecting 'interim' wetlands and Porter's Creek Wetland requires the flooding and drying hydrology of the development area to be preserved
  - Preserve the pre-development 30 day low flow duration frequency curve for the dry season (October to January)
  - Preserve the low flow spells frequency curve for the dry season
  - Preserve the pre-development 30 day high flow duration frequency curve for the dry season (October to January)
  - Maximise collection and reuse of stormwater in line with above points.

WSUD Strategy

High Density Development in most degraded part of site

Retain Riparian Corridor

Retain Offline Storage

Stormwater Wetland and Storage integrated into POS

Stormwater Storage and Flood Retardation

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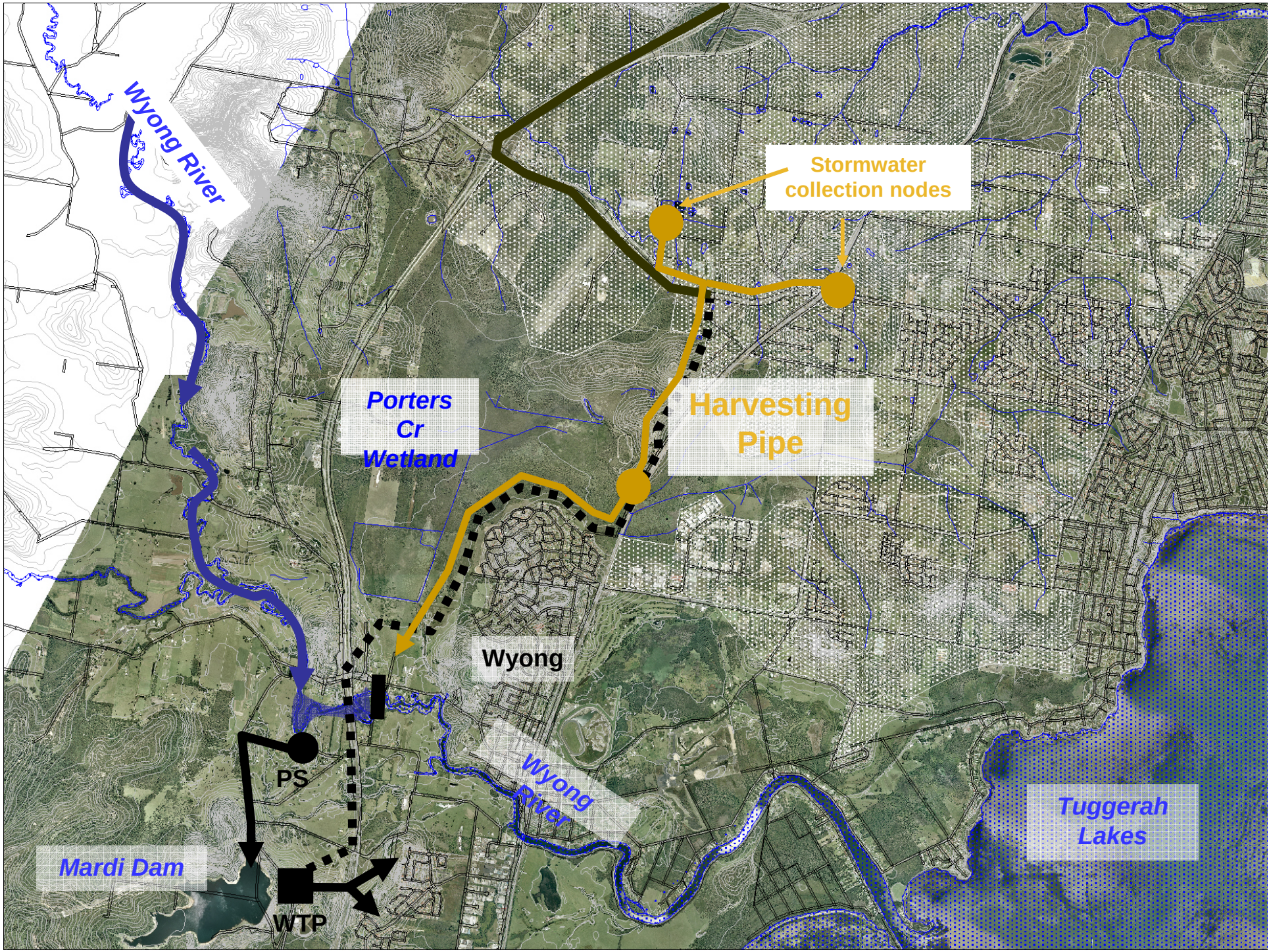
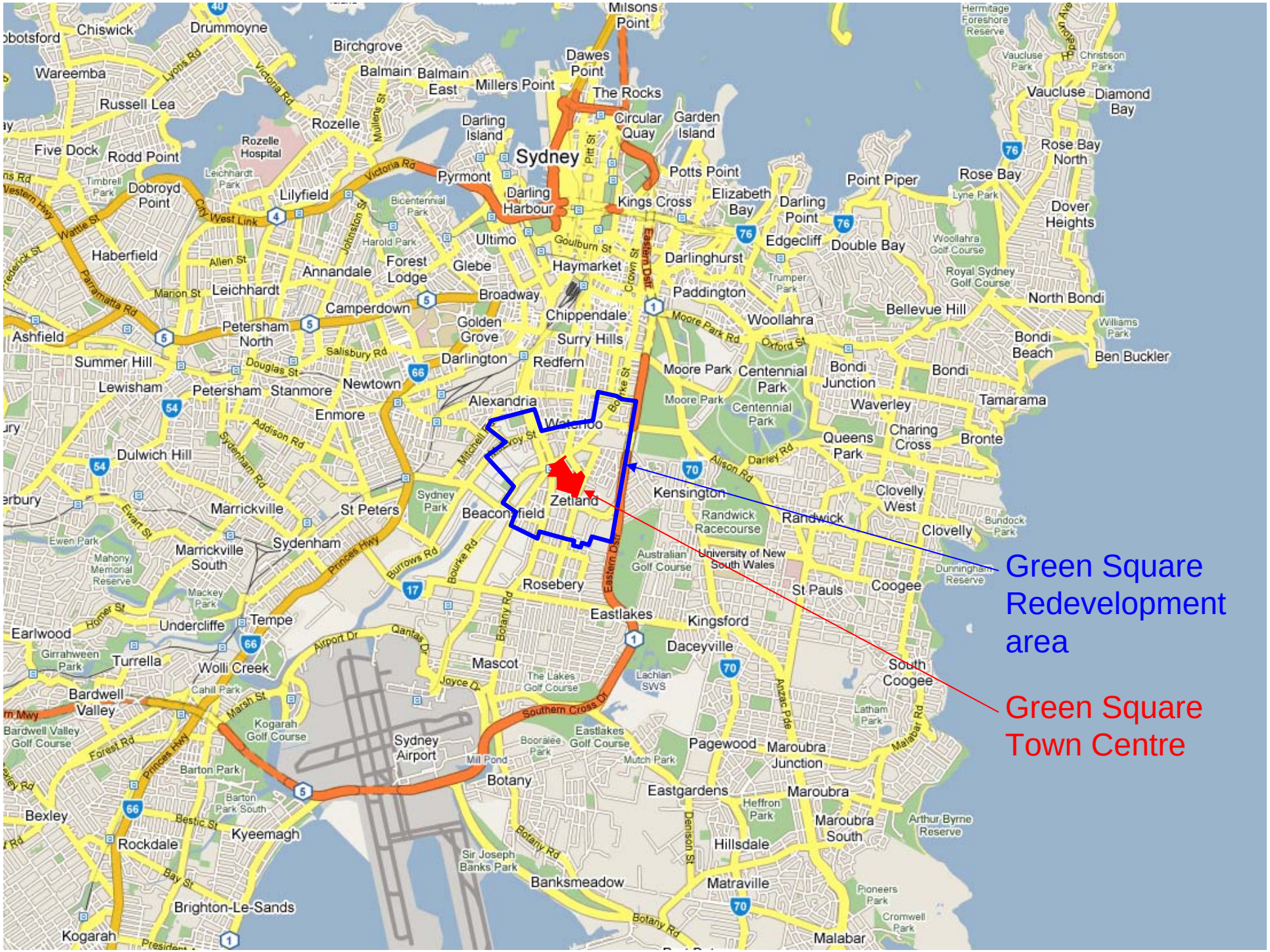
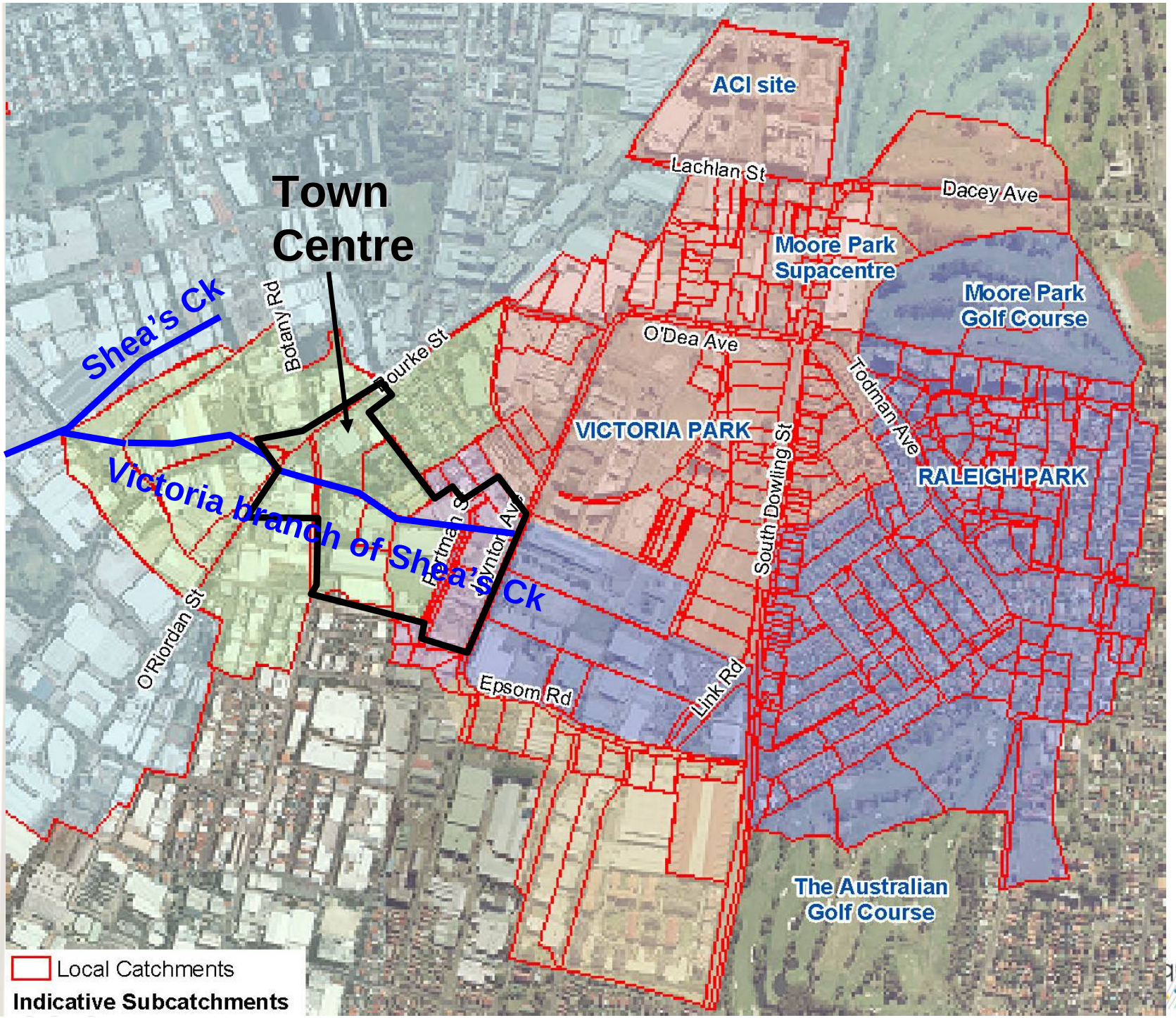

Wyong River
Stormwater collection nodes
Porters Cr Wetland
Harvesting Pipe
Wyong
PS
Wyong River
Tuggerah Lakes
Mardi Dam
WTP

Case Study 2:
Green Square Town Centre


Green Square Redevelopment area
Green Square Town Centre
Sydney
Zetland
Waterloo
Alexandria
Redfern
Darlington
Chippendale
Surry Hills
Haymarket
Ultimo
Glebe
Pyrmont
Darling Harbour
Darling Island
Millers Point
Dawes Point
The Rocks
Circular Quay
Garden Island
Milsons Point
Kings Cross
Potts Point
Elizabeth Bay
Darlinghurst
Paddington
Edgecliff
Double Bay
Darling Point
Point Piper
Rose Bay
Vaucluse
Diamond Bay
Rose Bay North
Dover Heights
North Bondi
Bondi Beach
Bondi
Bondi Junction
Bellevue Hill
Woollahra
Waverley
Tamarama
Bronte
Charing Cross
Queens Park
Centennial Park
Moore Park
Kensington
Randwick
Randwick Racecourse
Clovelly
Clovelly West
Coogee
South Coogee
St Pauls
Kingsford
Daceyville
Eastlakes
Rosebery
Mascot
Botany
Sydney Airport
Pagewood
Maroubra Junction
Maroubra
Maroubra South
Eastgardens
Hillsdale
Matraville
Banksmeadow
Malabar
Kyeemagh
Rockdale
Bexley
Brighton-Le-Sands
Kogarah
Bardwell Valley
Turrella
Earlwood
Wolli Creek
Tempe
Undercliffe
Marrickville
Sydenham
Marrickville South
St Peters
Dulwich Hill
Enmore
Newtown
Petersham
Stanmore
Lewisham
Summer Hill
Ashfield
Haberfield
Leichhardt
Annandale
Forest Lodge
Camperdown
Lilyfield
Rozelle
Balmain
Balmain East
Birchgrove
Drummoyne
Chiswick
Wareemba
Russell Lea
Five Dock
Rodd Point
Dobroyd Point
Victoria Rd
City West Link
Parramatta Rd
Princes Hwy
Anzac Pde
Botany Rd
Bourke St
Eastern Dsr
Southern Cross Dr
Airport Dr
Qantas Dr
Joyce Dr
Burrows Rd
Addison Rd
Darley Rd
Alison Rd
Moore Park Rd
Oxford St
Goulburn St
Crown St
Pitt St
Salisbury Rd
Douglas St
Marion St
Allen St
Wattle St
Johnston St
Mullens St
Lyons Rd
Sydenham Rd
Marsh St
Forest Rd
Bay St
Bestic St
Botany Rd
Malabar Rd
Anzac Pde
Hermitage Foreshore Reserve
Vaucluse Park
Christison Park
Lyne Park
Woollahra Golf Course
Royal Sydney Golf Course
Trumper Park
Williams Park
Ben Buckler
Bundock Park
Dunningham Reserve
Latham Park
Arthur Byrne Reserve
Pioneers Park
Cromwell Park
Heffron Park
Mutch Park
Eastlakes Golf Course
Booralee Park
Mill Pond
Sir Joseph Banks Park
Lachlan SWS
The Lakes Golf Course
Australian Golf Course
University of New South Wales
Sydney Park
Bicentennial Park
Harold Park
Leichhardt Park
Rozelle Hospital
Timbrell Park
Mahony Memorial Reserve
Ewen Park
Mackey Park
Cahill Park
Girrahween Park
Barton Park
Barton Park South
Bardwell Valley Golf Course
Kogarah Golf Course
Botany Bay


Town Centre
ACI site
Lachlan St
Dacey Ave
Moore Park Supacentre
Moore Park Golf Course
O'Dea Ave
Todman Ave
Shea's Ck
Botany Rd
Bourke St
VICTORIA PARK
South Dowling St
RALEIGH PARK
Victoria branch of Shea's Ck
Bertman St
Joynton Ave
O'Riordan St
Epsom Rd
Link Rd
The Australian Golf Course
Local Catchments
Indicative Subcatchments

CONFINED SPACE
NO ENTRY

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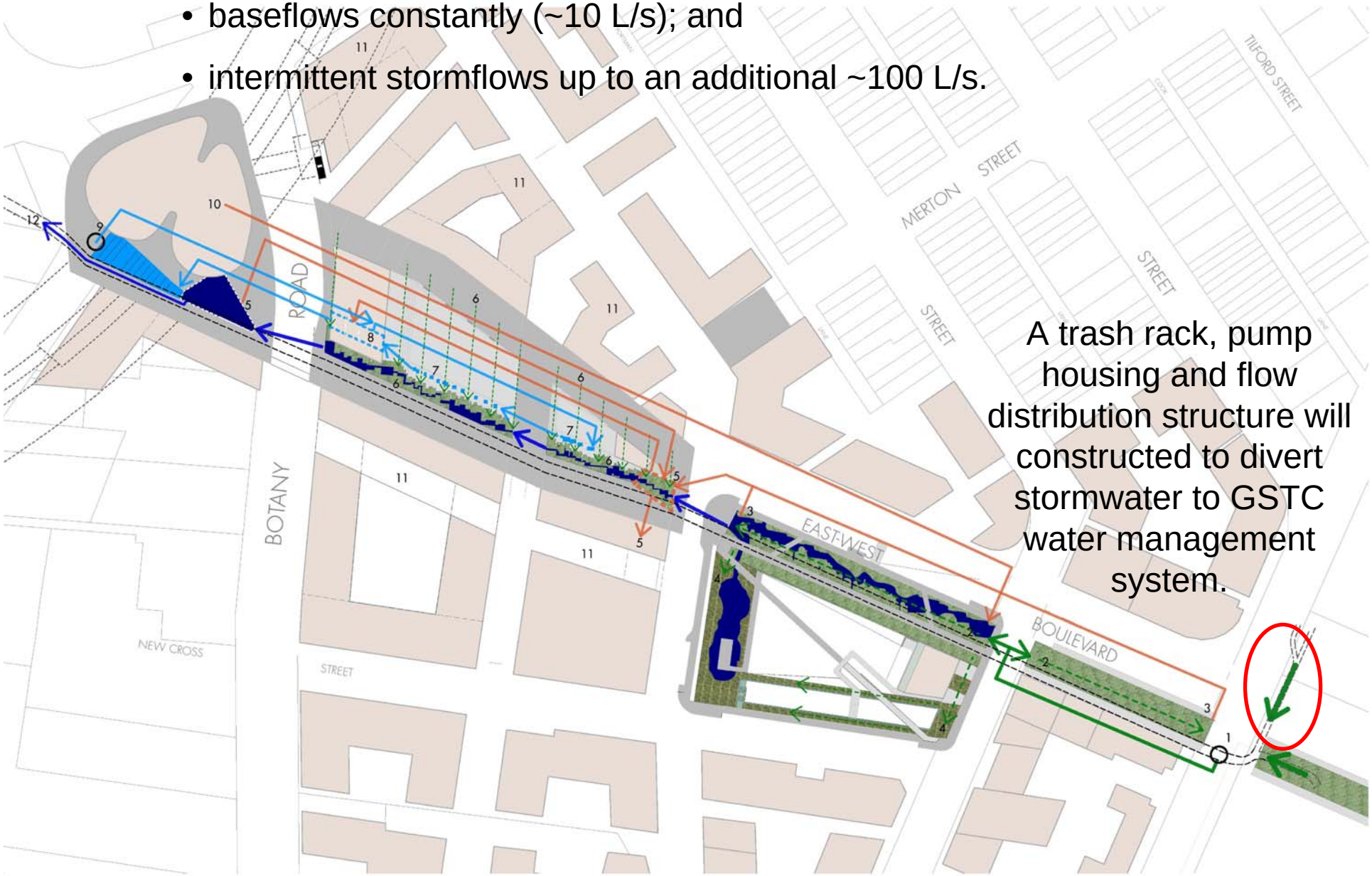
An ecological engine

- The Urban Stream within the Green Square public domain will play multiple roles:
  - A feature of the public domain
  - A stormwater treatment service for the upstream catchment
  - Reduced pollutant loads in Sheas Creek and Alexandra Canal (In terms of TSS, the urban stream would treat an area equivalent to one additional town centre; in terms of TN – three additional town centres)
  - A reliable source of non-potable water for the Green Square Town Centre, able to meet 100% of public domain non-potable demands and a substantial proportion of private domain non-potable demands

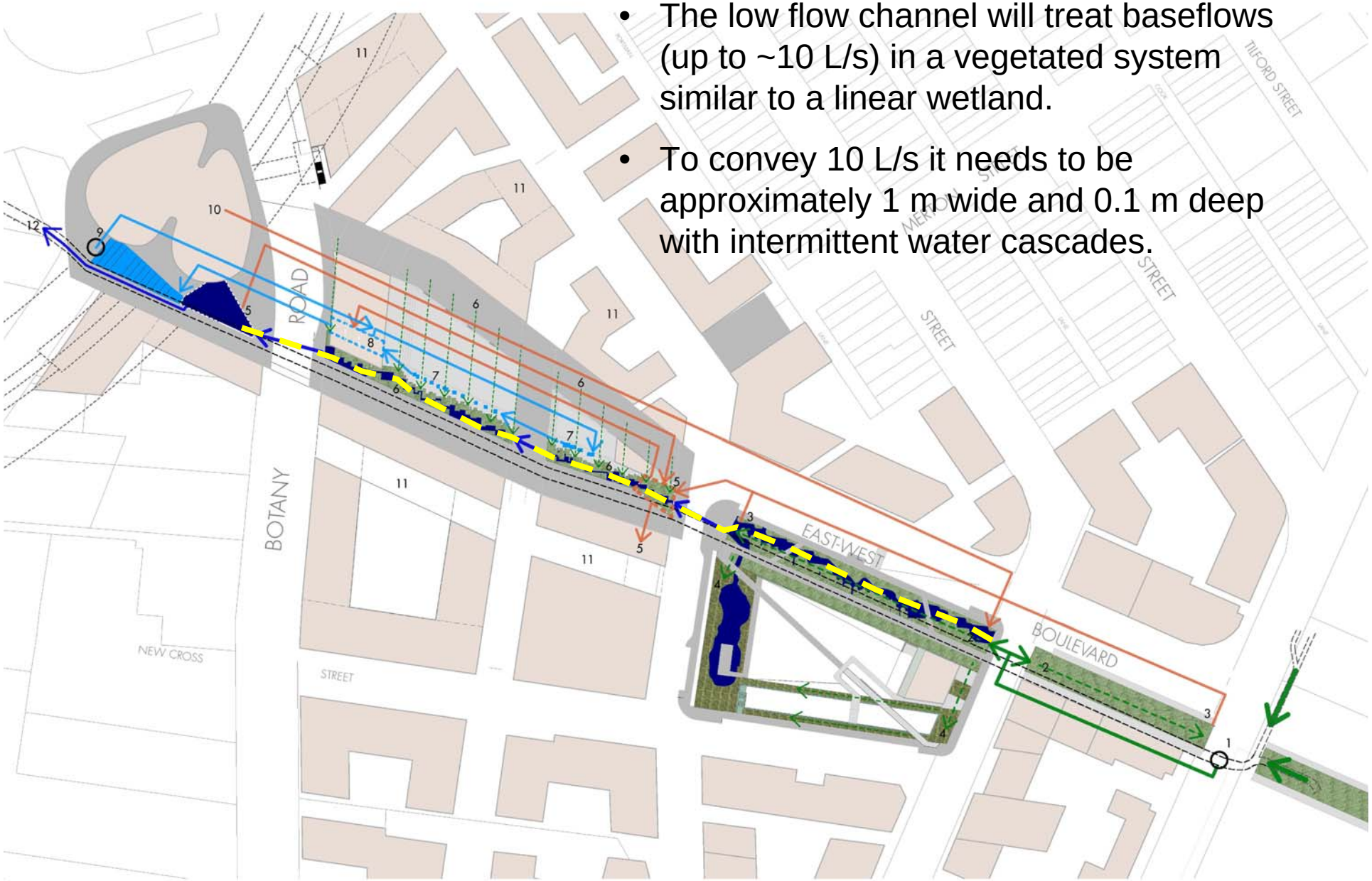
Pumped diversion from stormwater culvert

- baseflows constantly (~10 L/s); and
- intermittent stormflows up to an additional ~100 L/s.



A trash rack, pump housing and flow distribution structure will constructed to divert stormwater to GSTC water management system.

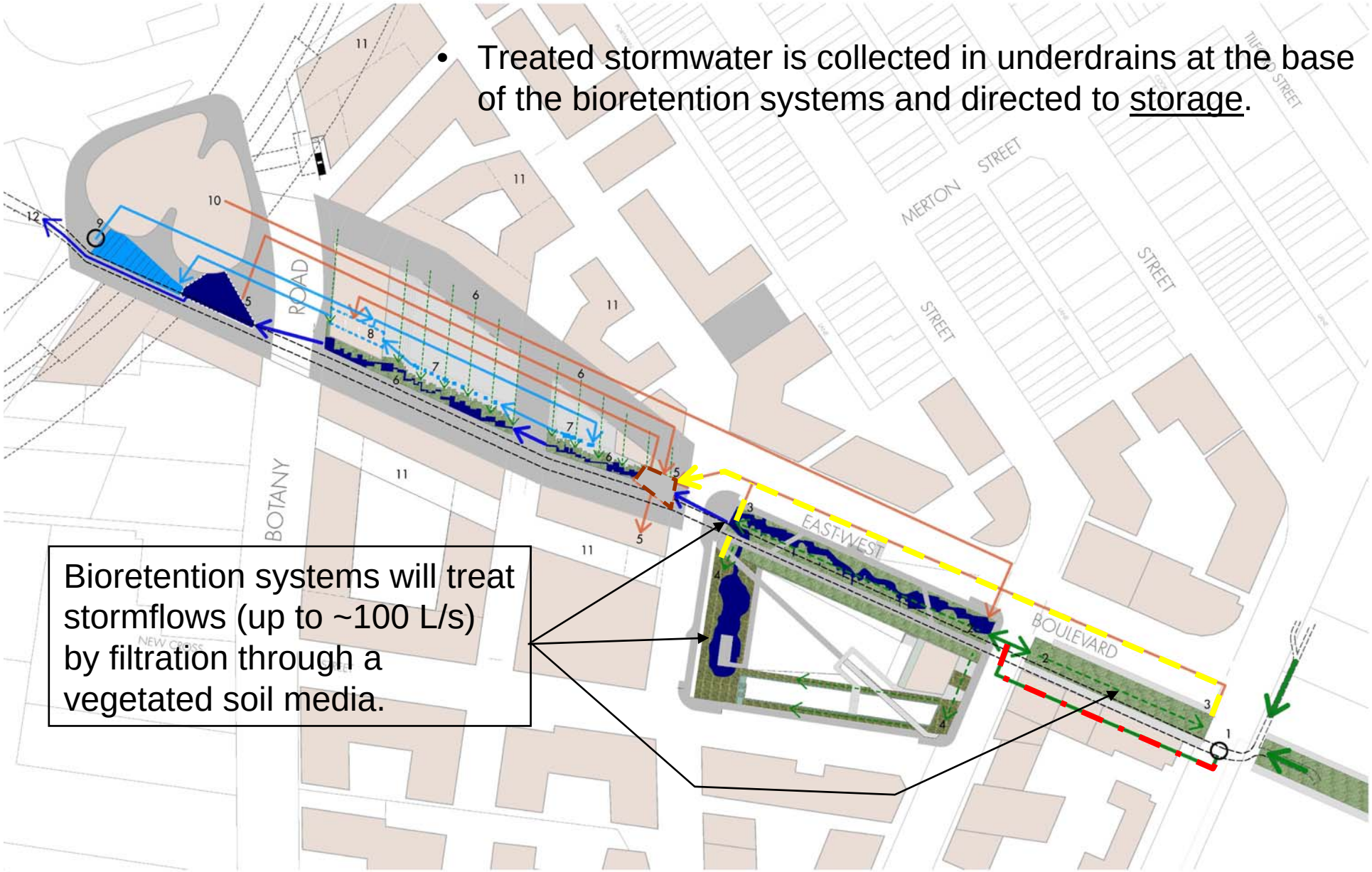
Low flow channels - <u>Baseflow</u>



- The low flow channel will treat baseflows (up to ~10 L/s) in a vegetated system similar to a linear wetland.
- To convey 10 L/s it needs to be approximately 1 m wide and 0.1 m deep with intermittent water cascades.

Stormwater Bioretention systems - Stormflow

- Treated stormwater is collected in underdrains at the base of the bioretention systems and directed to storage.



Bioretention systems will treat stormflows (up to ~100 L/s) by filtration through a vegetated soil media.

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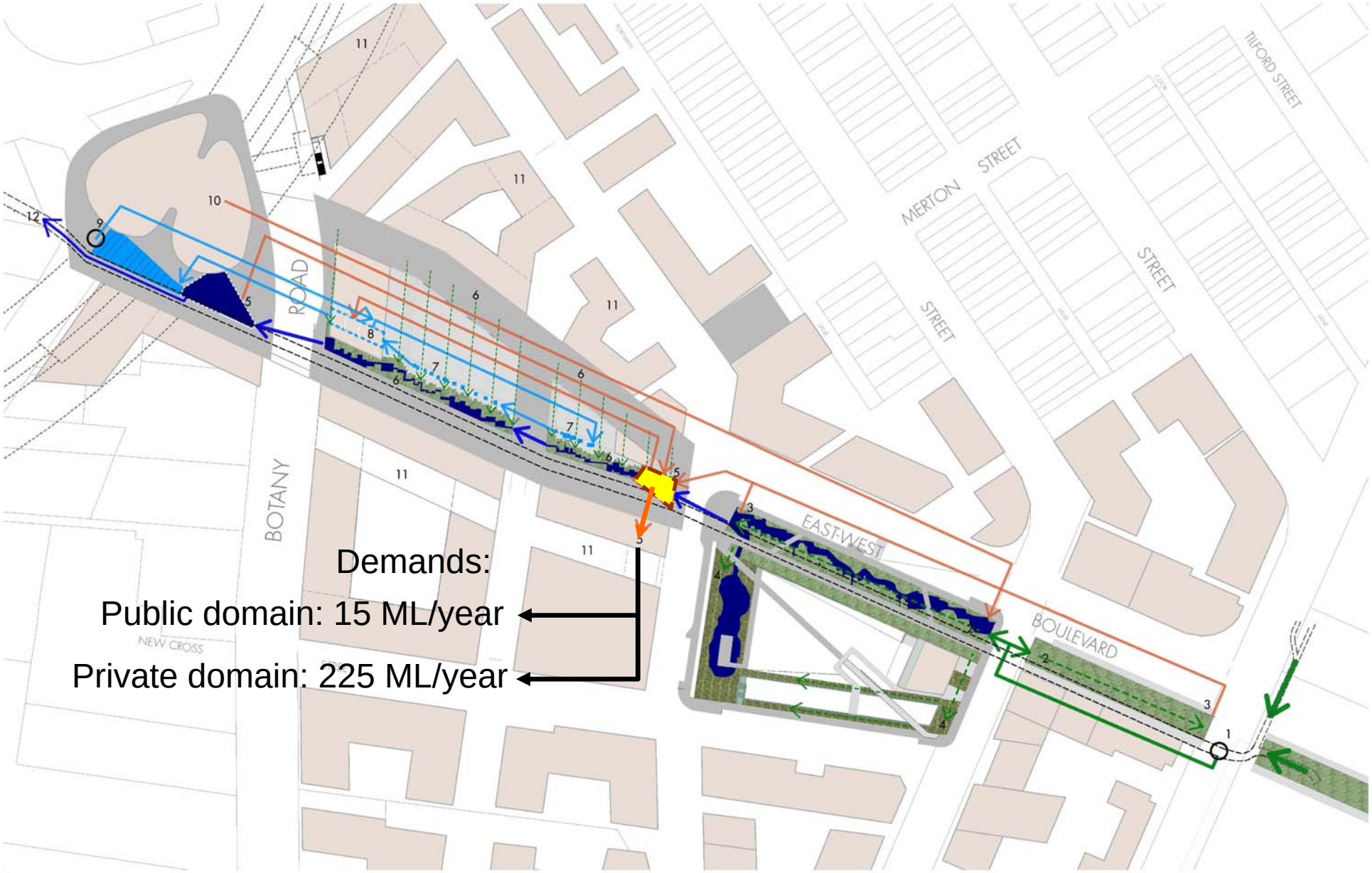
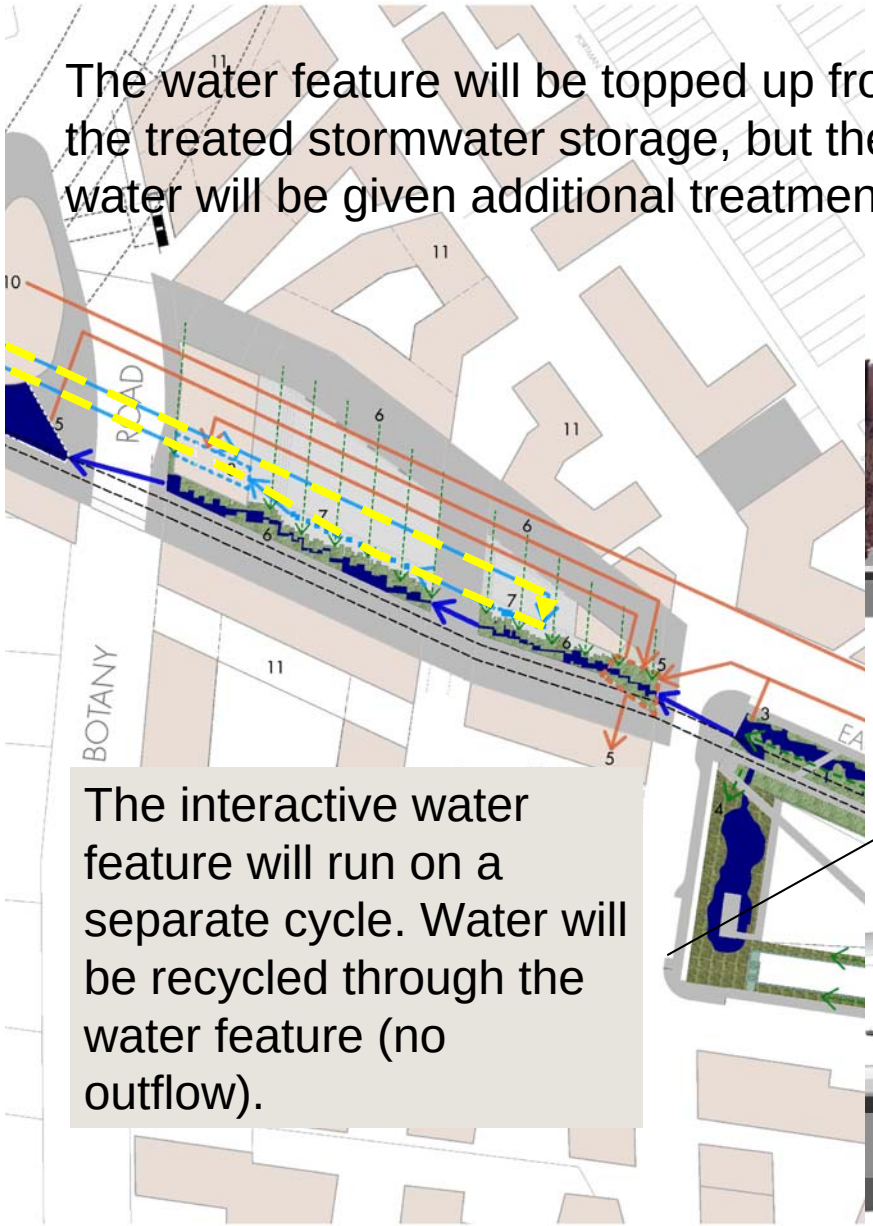
Stormwater Storage.



Plaza wetlands.
Wetland cells in the Plaza section of the urban stream will treat local runoff from the Plaza. Treated water from the wetland cells will discharge into the urban stream.

Water Play

The water feature will be topped up from the treated stormwater storage, but the water will be given additional treatment.



The interactive water feature will run on a separate cycle. Water will be recycled through the water feature (no outflow).

Case Study 3:
Sydney University Redevelopment

Maze Green bioretention and wetland

Lander St
Shepherd St
Darlington
Rd
Maze
Crescent

AREA
1 MAZE GREEN
2 SPORTS AND AQUATIC CENTRE FORECOURT
3 SHEPHERD ST PEDESTRIAN BRIDGE
KEY ELEMENTS
A Main pedestrian link – granite
B Main pedestrian link – timber
C Shepherd St. bio-retention wetland
D Old School bio-retention wetland
E Circular coloured concrete pedestrian access
F Horticultural test plots
G Maze Green grassed amphitheatre
H Biochemistry forecourt
I Taxonomy garden
J Shepherd St. entry
timber boardwalk
granite banded paving
asphalt
in-situ coloured concrete
grass
garden bed
wetland
existing trees
proposed lemon-scented gums
proposed Melaleuca forest edge
realigned Callery Pears
Maze Crescent
Agricultural Glasshouse
Existing Horticultural Test Plot
Proposed extension of Horticultural Test Plot
Wentworth Building
Old School Building
Biochemistry & Microbiology Building
Gordon Yu Hoi Chu Building
Chemical Engineering Building
Engineers' Walk
Civil Engineering Building
University Sports & Aquatic Centre
Chemical Engineering Workshop
Union Childcare Centre
Lander Street

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Tank

Bioretention System

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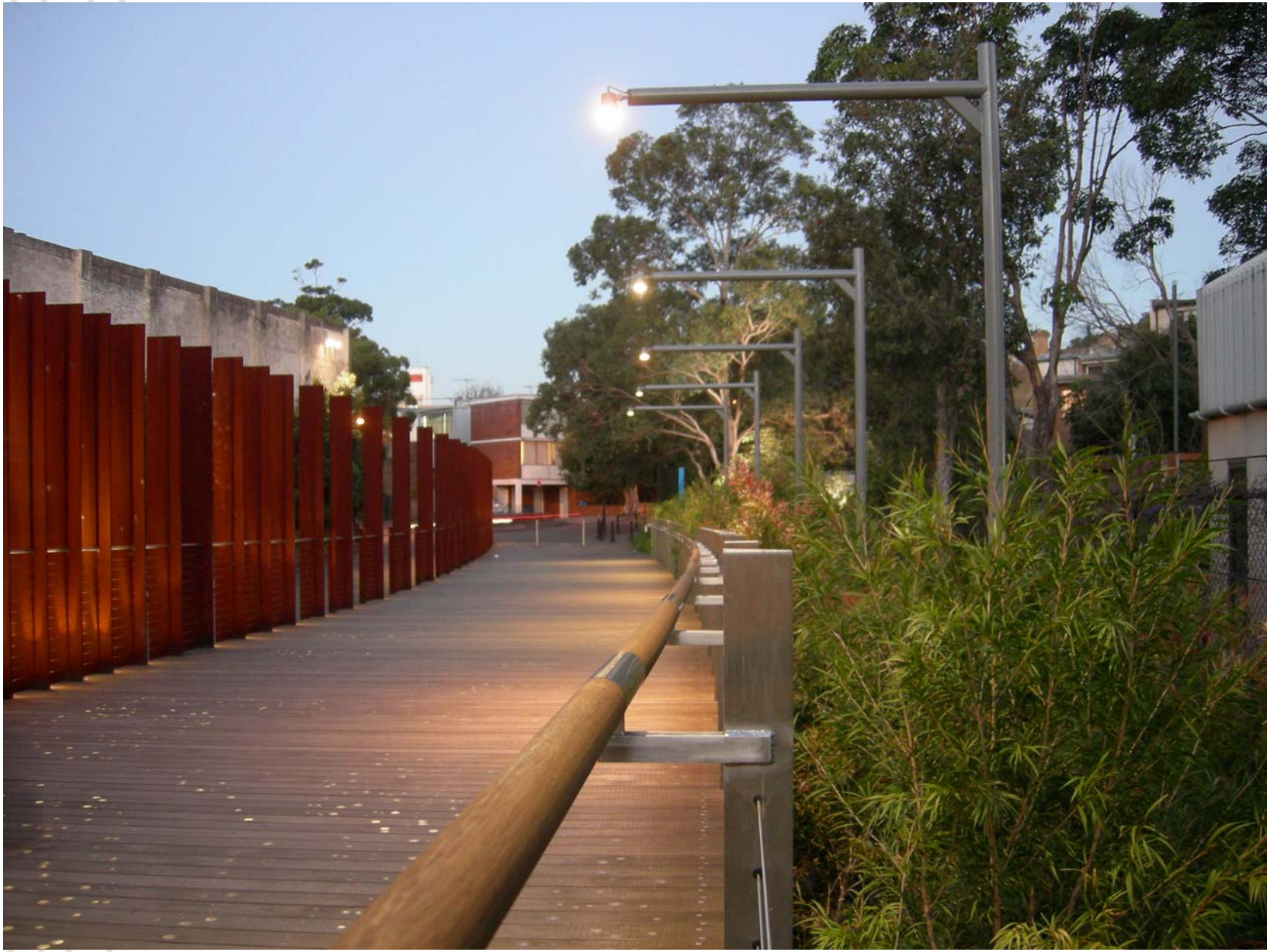

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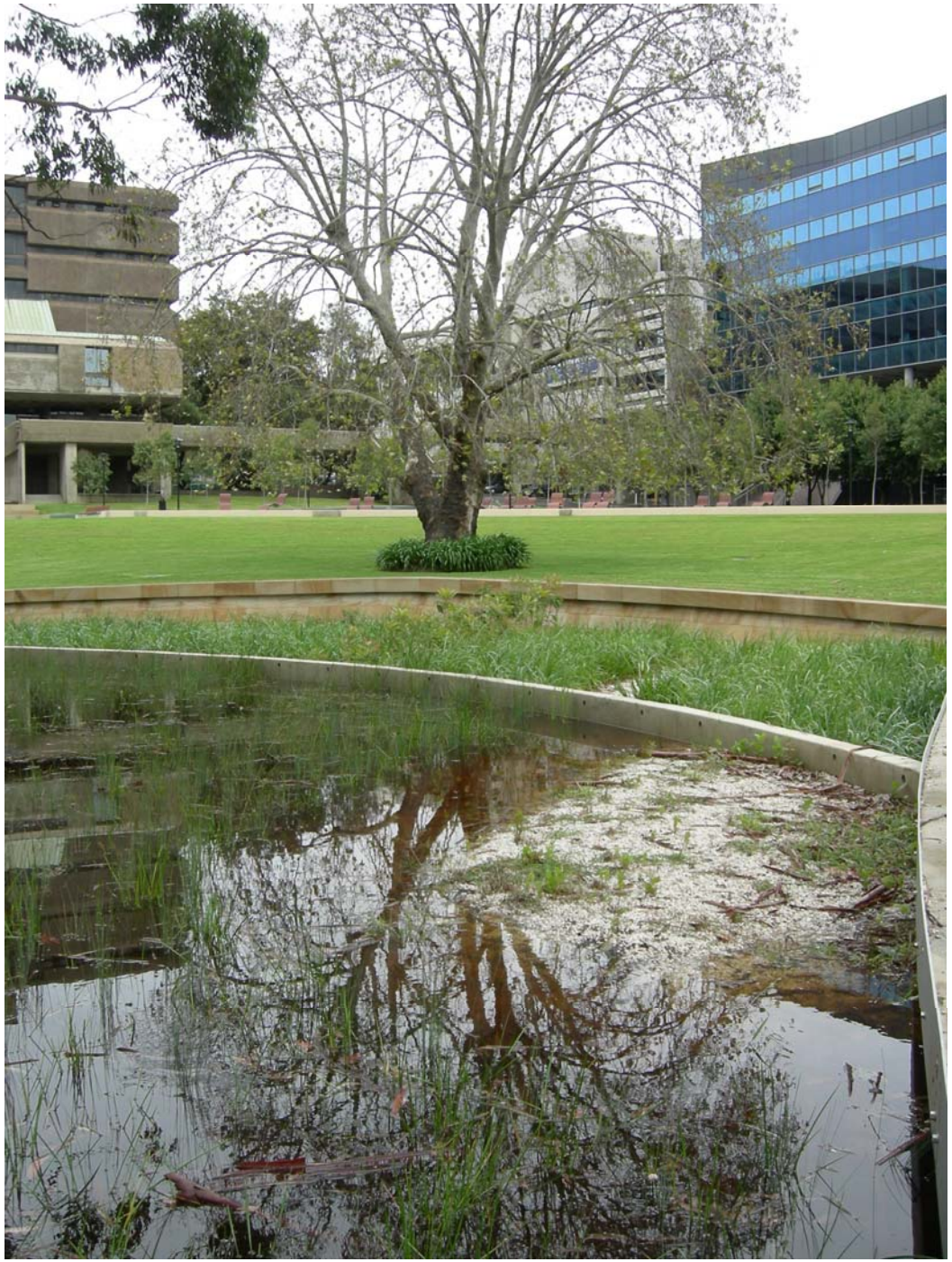
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