



Government of Western Australia
Department of Water

Water Planning for District Structure Planning and Greater Bunbury Strategy

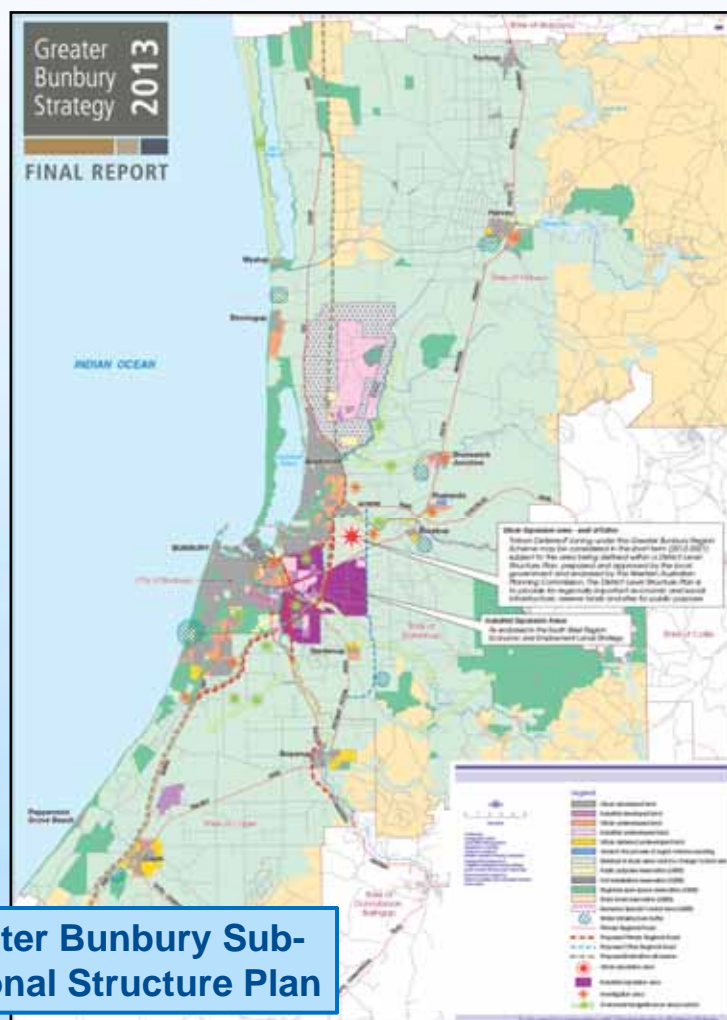


Significant water challenges require:

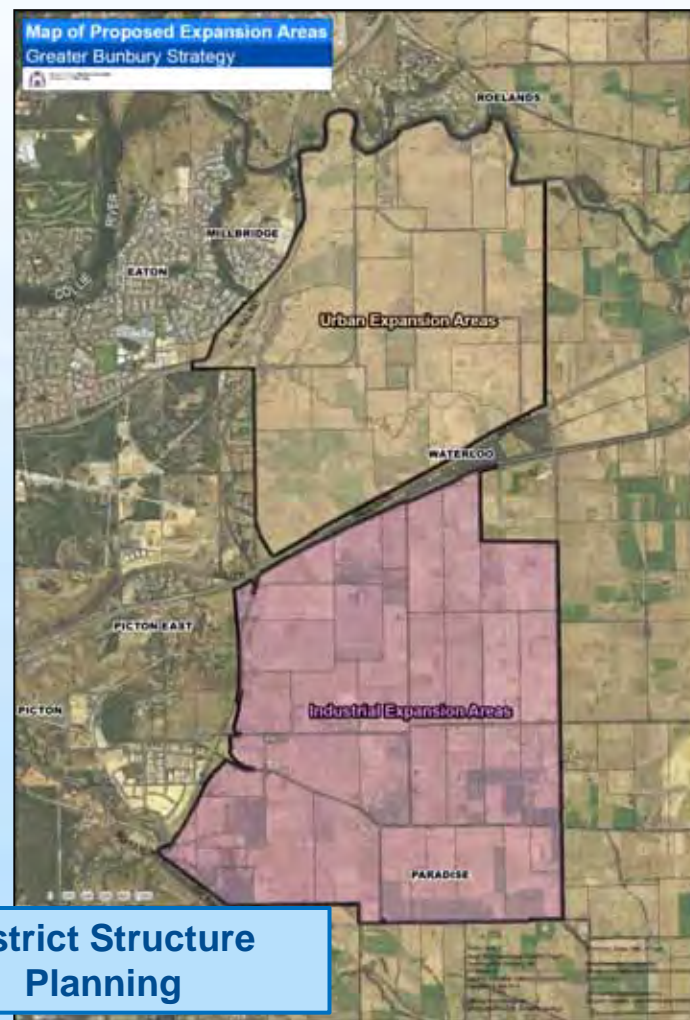
- Good internal and external partnerships
- Innovative modern water management approaches
- To be successful we need:
 - Good planning
 - A clear vision



GBS & DSP Coverage



Greater Bunbury Sub-Regional Structure Plan



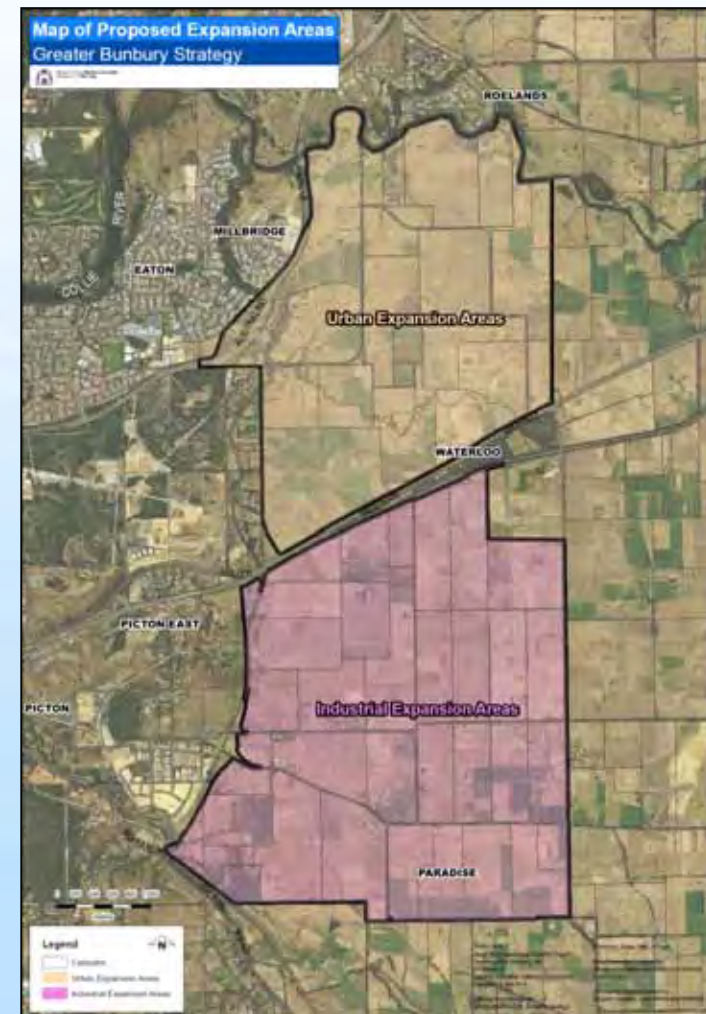
District Structure Planning



DSP Details

Urban area comprises:

- 1,100 hectares
- 70,000 people
- 110ha active open space
- Doubles the population of Greater Bunbury
- Major public transport linkages
- Provision and enhancement of local facilities
- Includes additional POS & ROS
- Integrated into the natural landscape, i.e. waterways

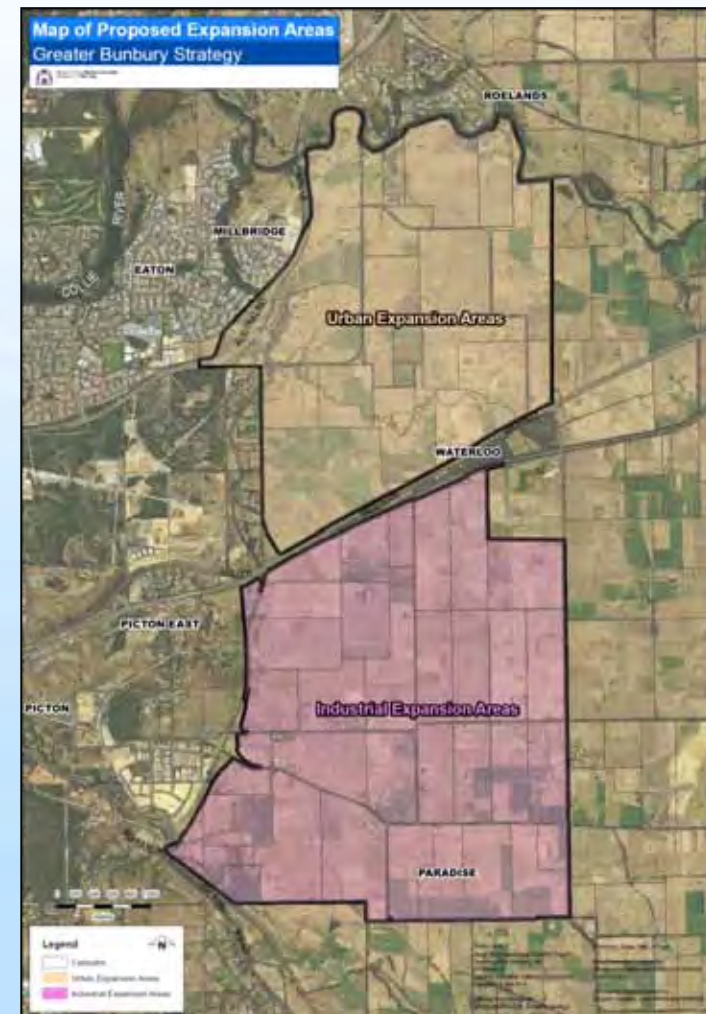




DSP Details

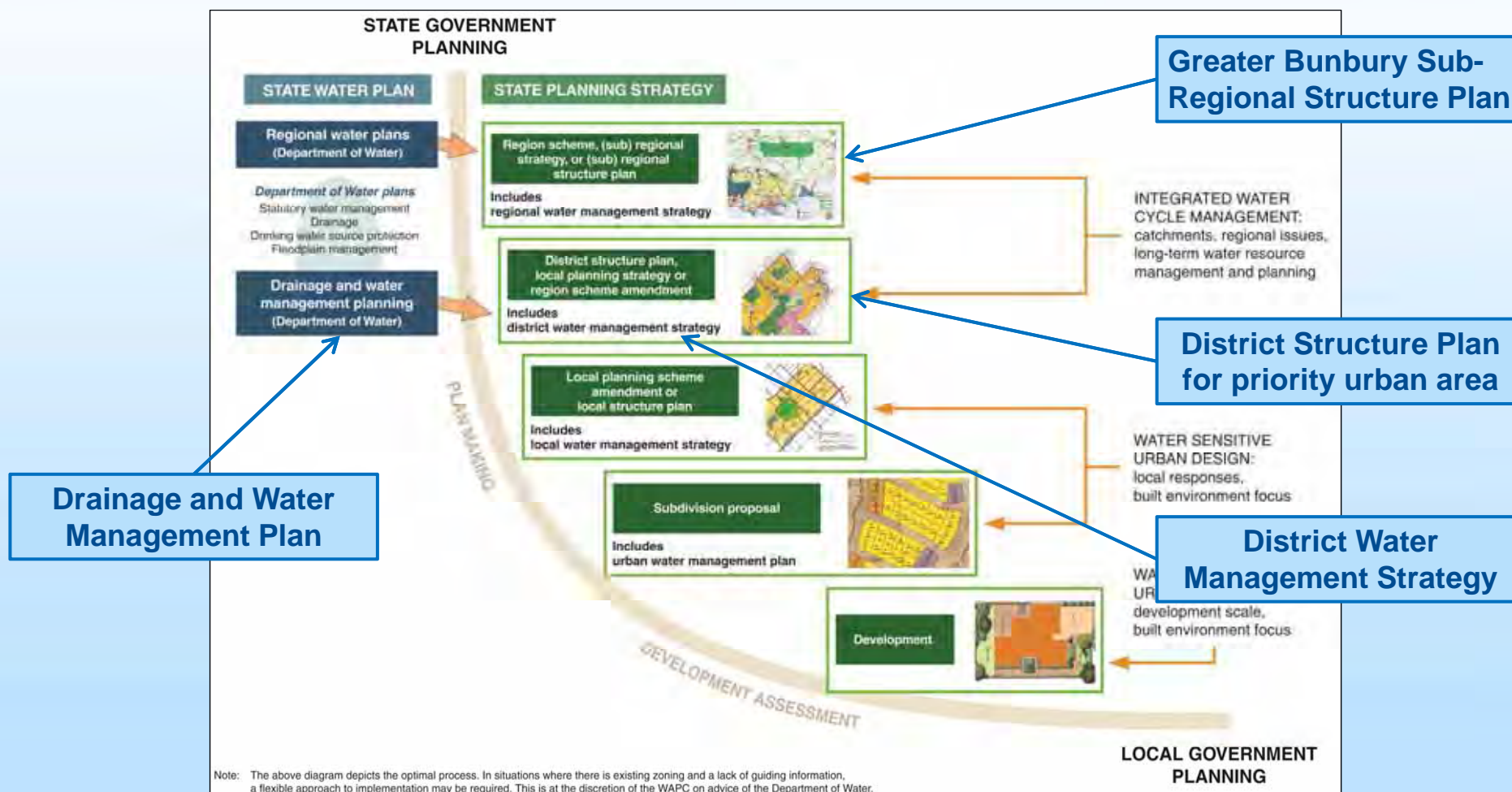
Industrial area comprises:

- $\approx 1,700$ hectares
- Port related activities due to proximity to:
 - Port
 - Major regional roads
 - Freight rail networks
- Likely to result in significant areas of hardstand and warehousing with large roof spaces





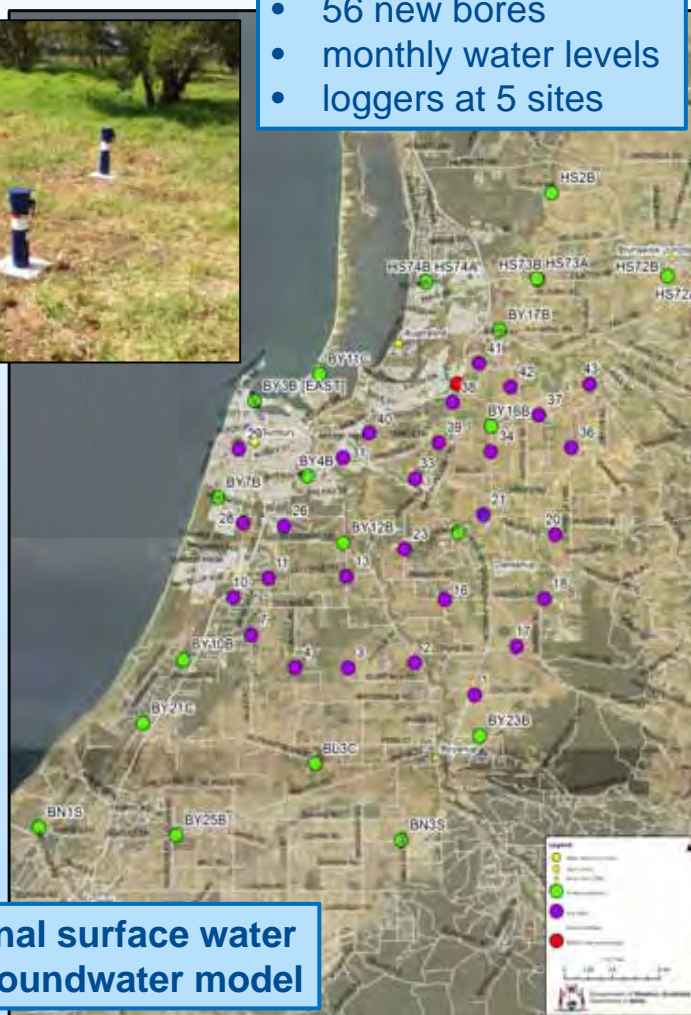
BUWM





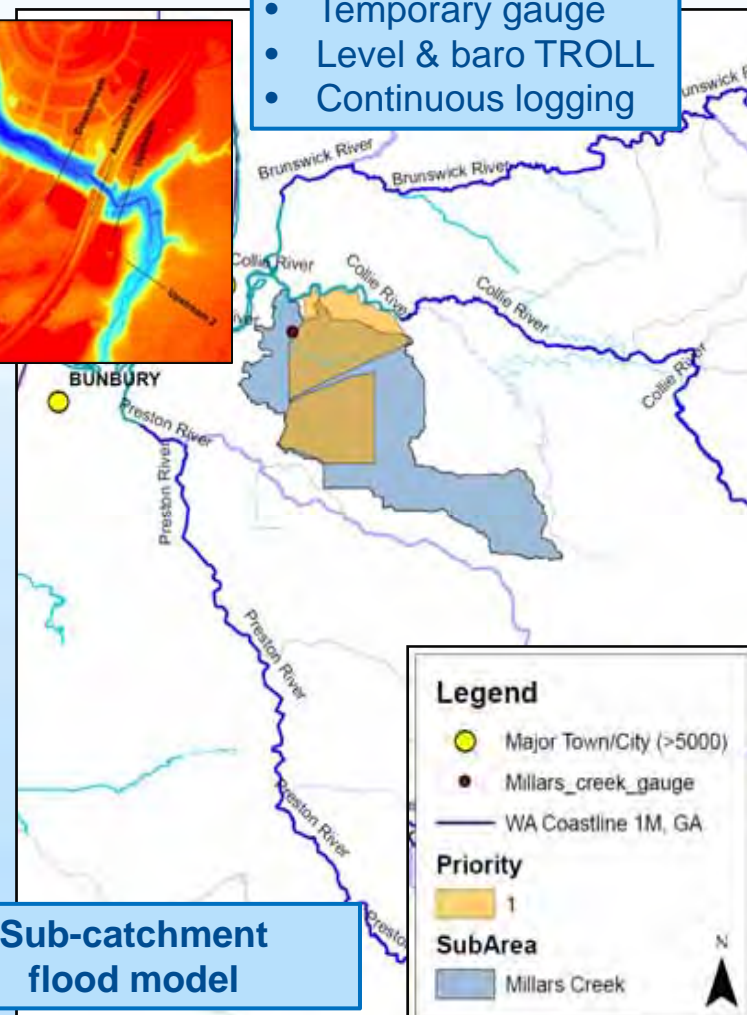
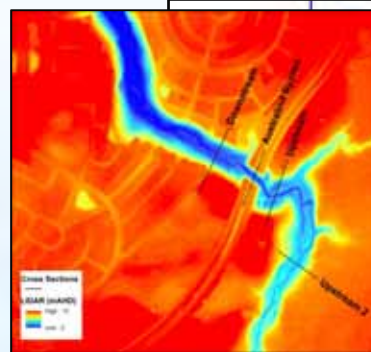
DWMP coverage and monitoring

- 56 new bores
- monthly water levels
- loggers at 5 sites



Regional surface water
and groundwater model

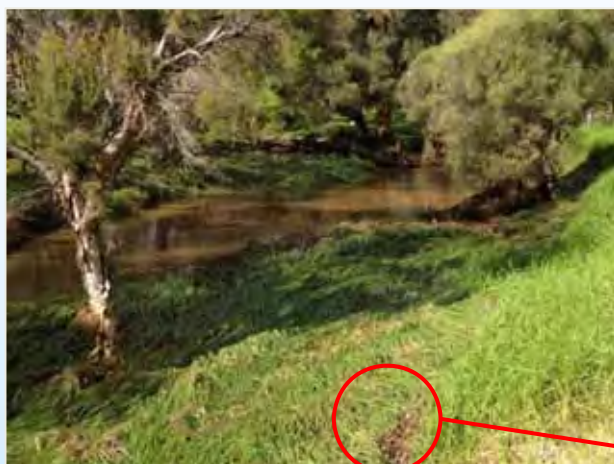
- Temporary gauge
- Level & baro TROLL
- Continuous logging



Sub-catchment
flood model



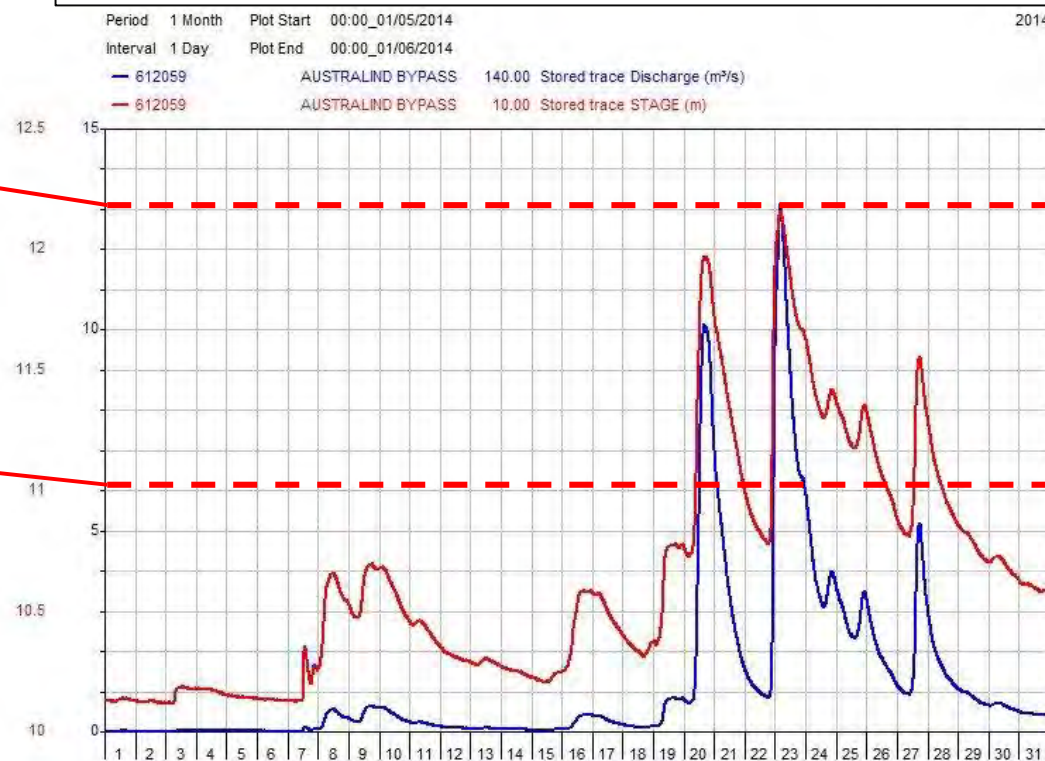
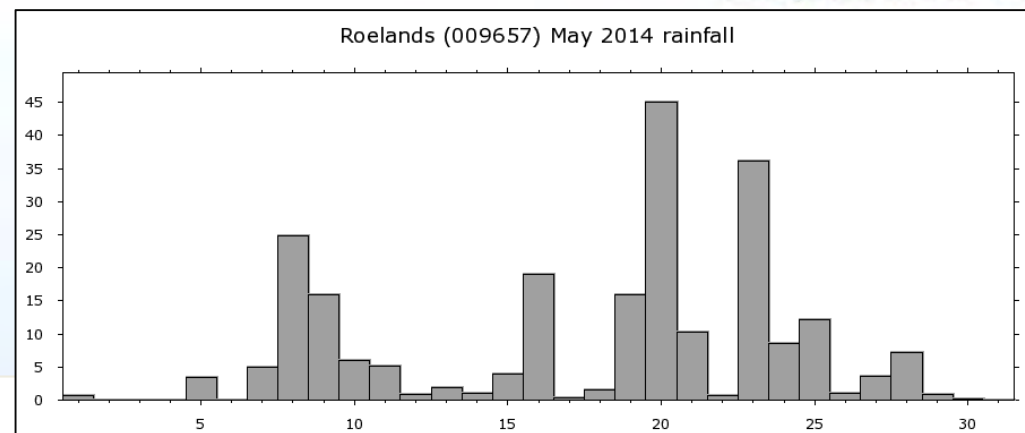
Stream gauge data



Surveyed floodmark = 12.23m

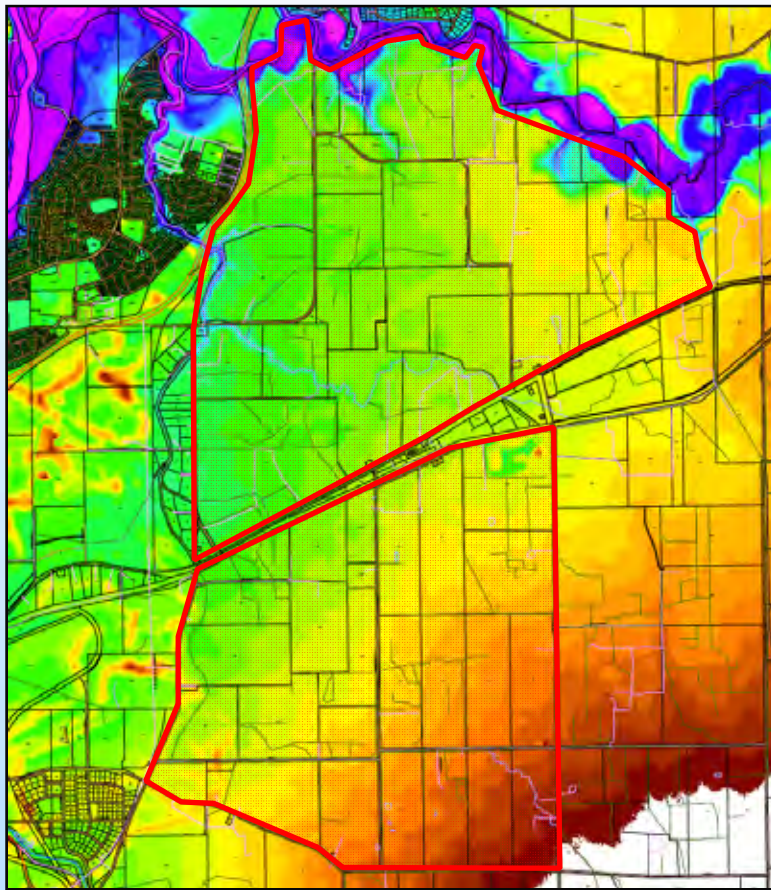


Surveyed water level = 11.05m





Major water management constraints



- Low lying land prone to seasonal inundation

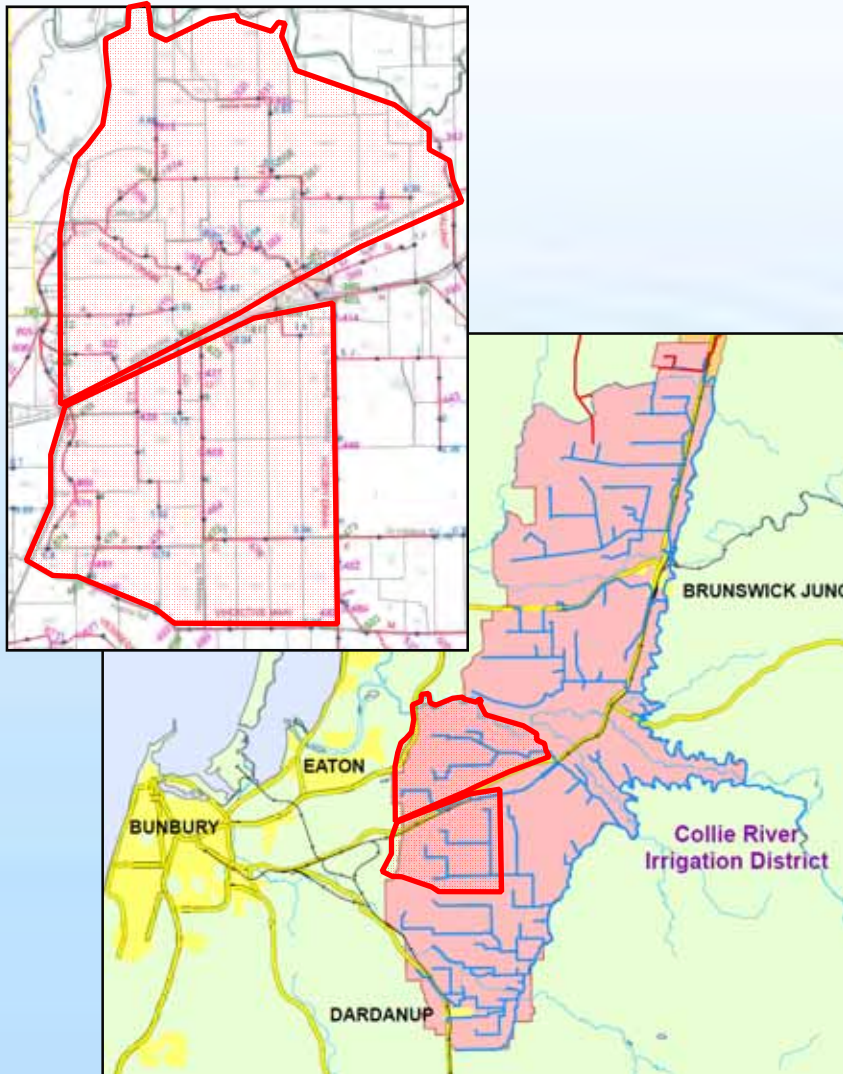
- Constrained outlet

- DWMP:
 - Floodplain extent and mapping
 - Flood levels
 - Flood storage
 - Catchment flow rates

- DWMS:
 - Refine arterial systems



Major water management constraints

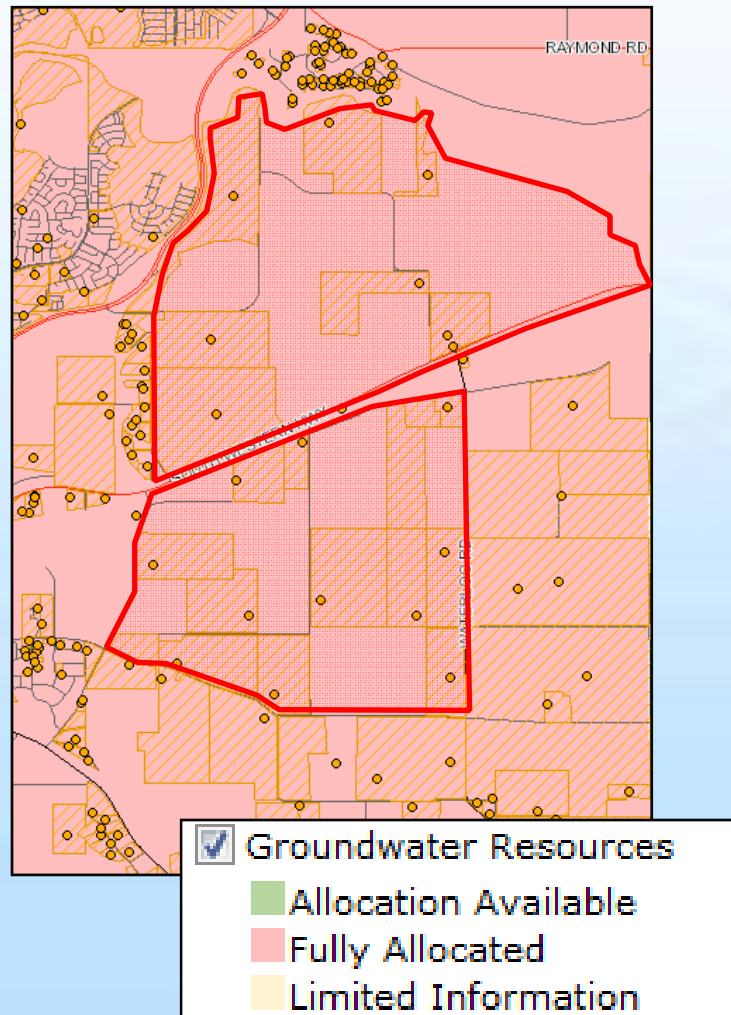


- Serviced by rural drainage and irrigation drainage
- Differing design criteria and management regimes

- DWMP:
 - May identify and recommend key governance transitions options
- DWMS:
 - Urban drainage life cycle costs
 - Urban drainage implementation/staging
 - Agreed roles and responsibilities
 - Agreed governance transitions process



Major water management constraints

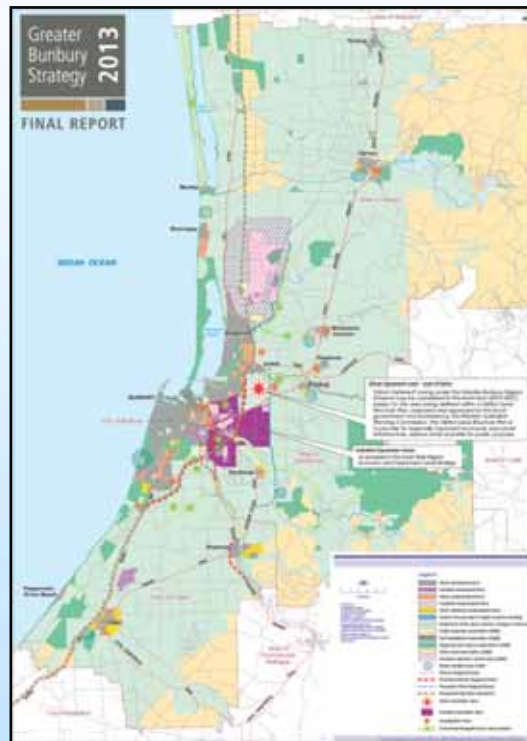


- Groundwater resources fully allocated
- Limited allocations linked to land holdings

- DWMP:
 - identify source(s) and quantify volumes of water for fit for purpose use
 - identify implementation strategies
- DWMS:
 - Identify fit for purpose sources
 - Include contingency plans
 - Service provider identified and confirmed



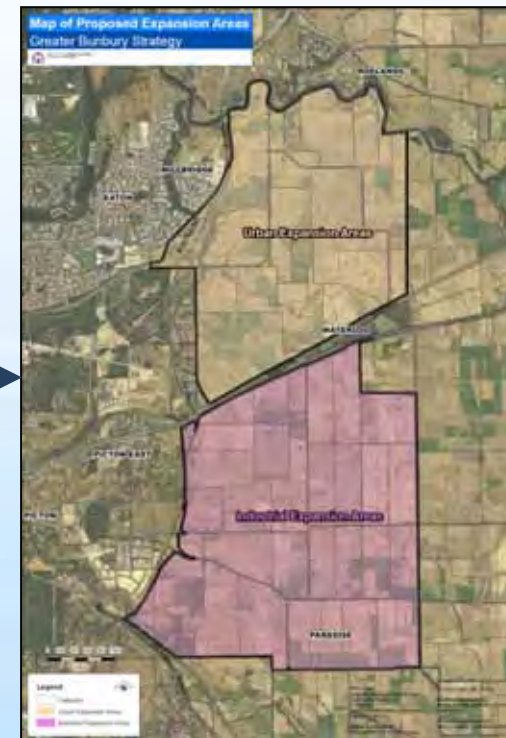
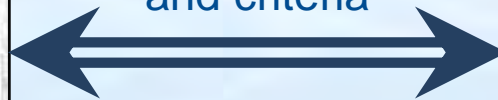
Major water management constraints



**Drainage and Water
Management Plan**

DoW

Ensure synergies in
principles, objectives
and criteria



**District Water
Management Strategy**

DoP



DWMP – DWMS linkages

Planning background and previous studies

Design criteria

Pre-development environment (identification of assets, risks and constraints)

Site characteristics

Hydrology and hydrogeology of the area

Surface water

Groundwater

Water-dependent ecosystems

Water resource issues

Post-development water management

Surface water

Groundwater

Water-dependent ecosystems

Contamination and acid sulfate soils

Water services and efficiency initiatives

Potable water supply

Wastewater servicing

Non-potable (fit-for-purpose) water supply

Implementation framework

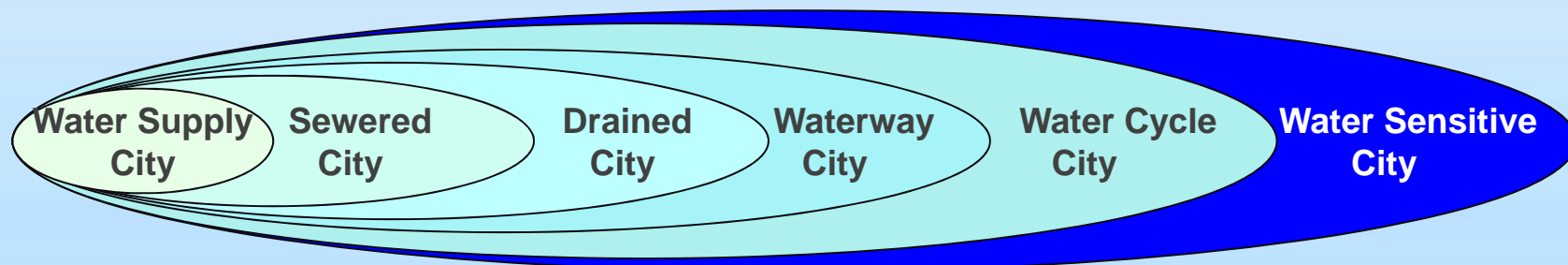


The Vision

Create a liveable, walkable, resilient and sustainable urban community

This will be achieved in part by managing water constraints and maximise opportunities by:

- Developing and integrate blue and green corridors
- Achieving multiple outcomes from stormwater & vegetation
- Identifying precinct scale cost-effective water services
- Using contemporary urban water management approaches



Urban Water Transition Phases



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What if ...

*****Disclaimer – this presentation does not commit the Department of Planning or the WAPC or any of the other stakeholders to undertaking these aspirations ☺***

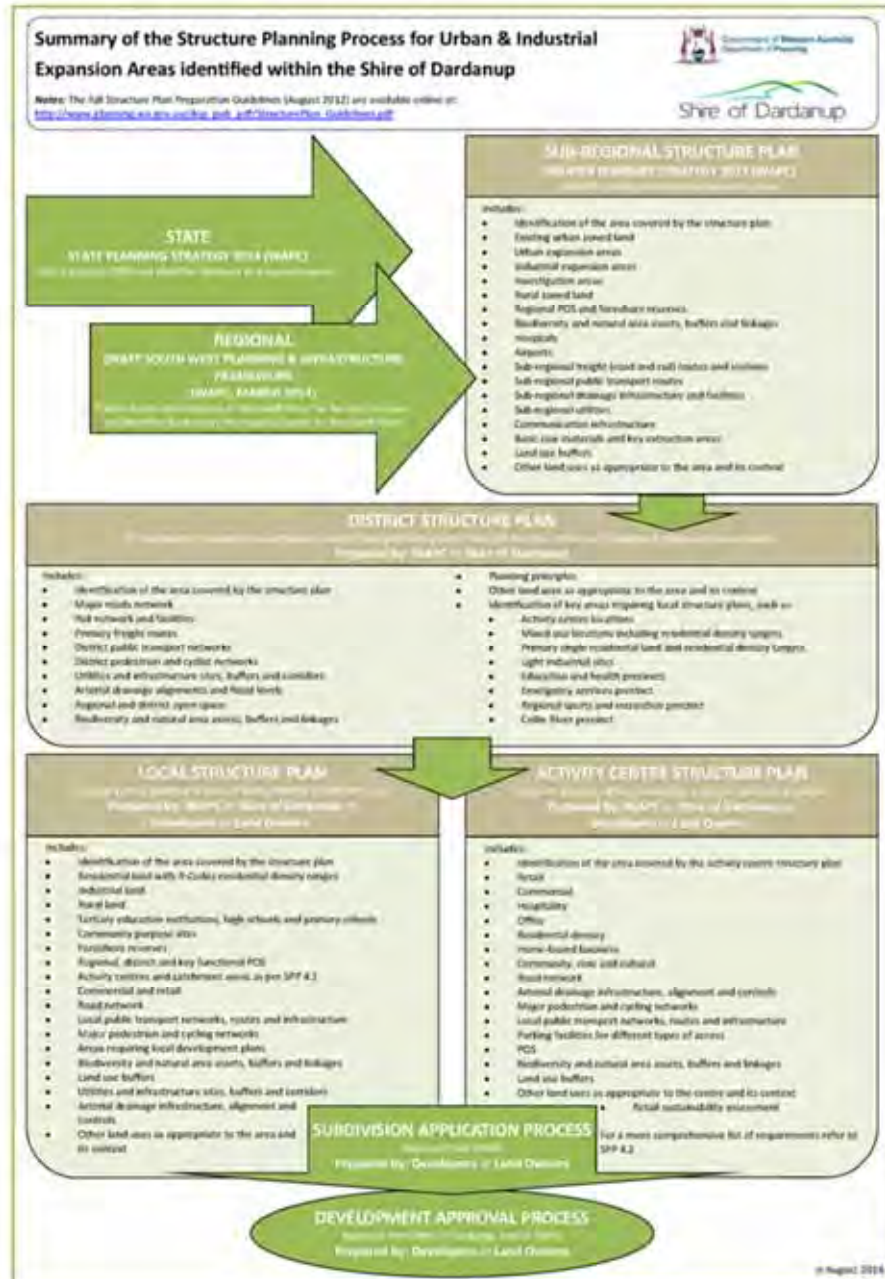
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The Process

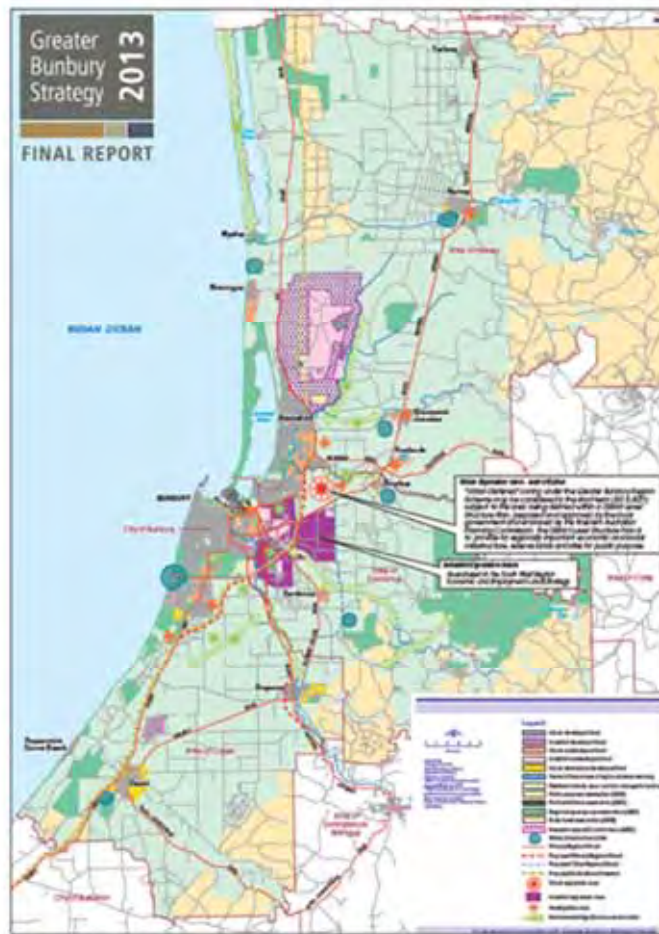
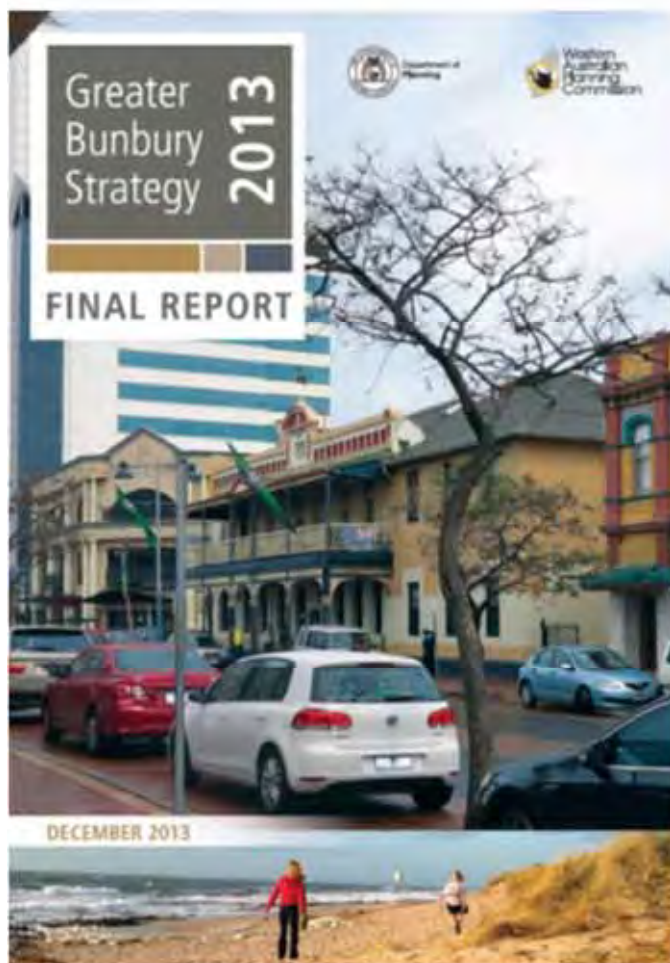
- Sub-regional Structure Plan (Greater Bunbury Strategy 2013)
- District Structure Plan (East of Eaton and Waterloo)
- Local Structure Plan
- Activity Centre Structure Plan



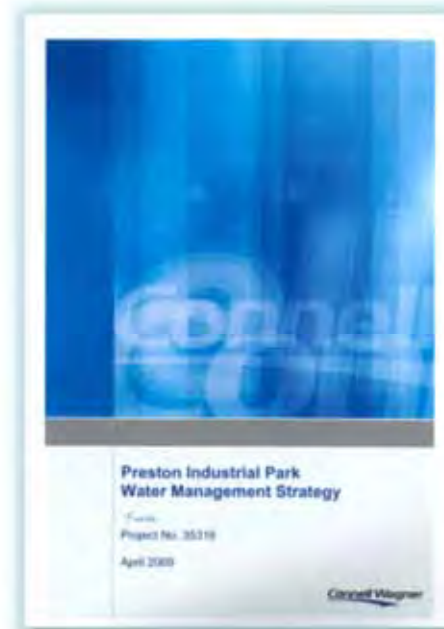


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Greater Bunbury Strategy

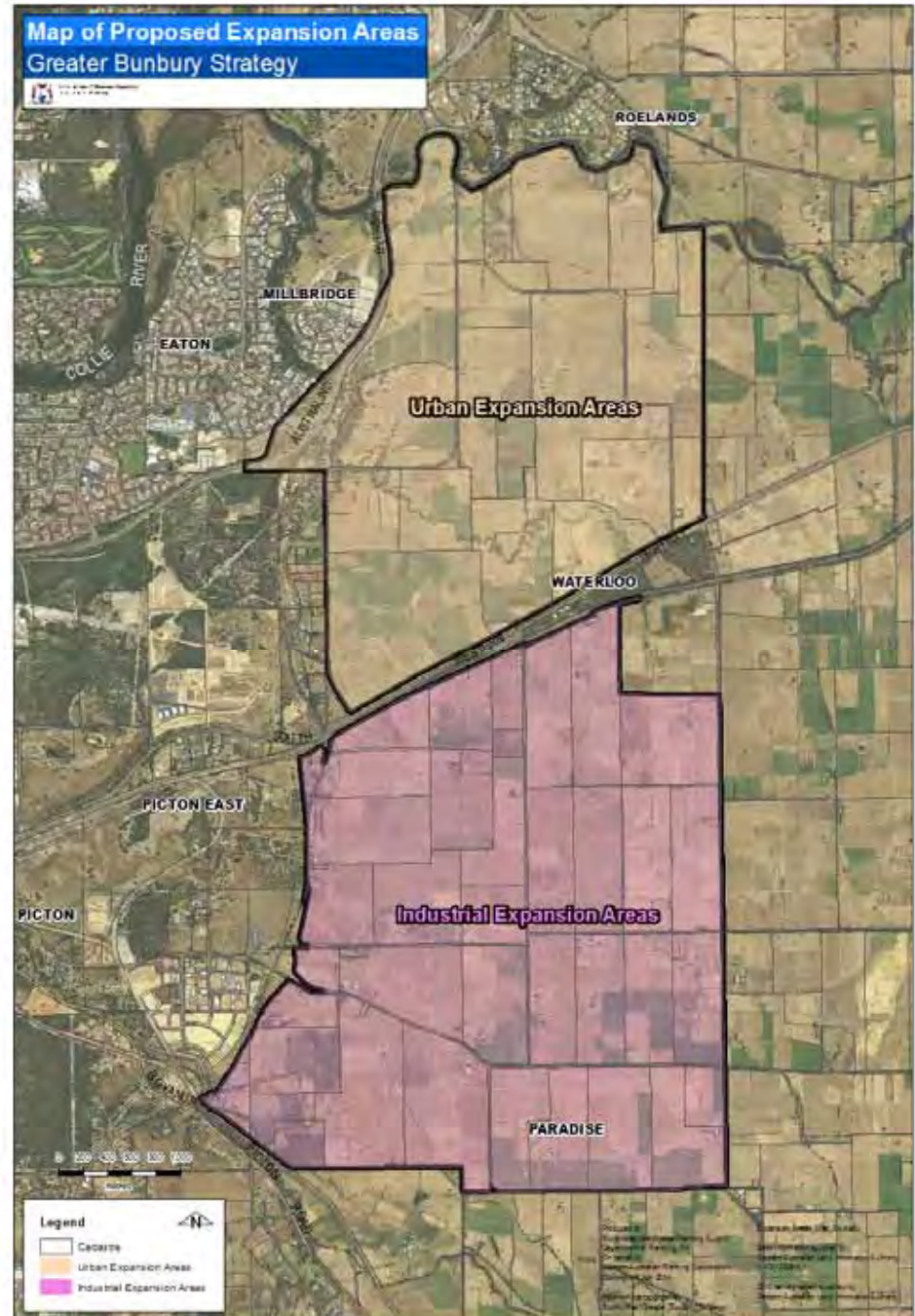


Map: Greater Bunbury Sub-regional Structure Plan 2013





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What have we got to start with?

Irrigation channels
Drainage lines
High groundwater levels
Seasonal inundation





Millars Creek



Collie River





Timeframes

- **District Structure Plans (2)**
 - Project managed by the Department of Planning and Shire of Dardanup
 - Urban area District Structure Plan completed by December 2015 (best case scenario)
 - Industrial area District Structure Plan completed asap (largely end user dependent)

- **District Water Management Strategy**
 - project managed by Department of Planning
 - out to tender within the next 6 months
 - covers both the urban and industrial Structure Plan areas.



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Memorandum of Understanding between the Shire of Dardanup and Western Australian Planning Commission

Technical Report that is likely to require external specialist expertise	Contract Manager	Anticipated timeframe for completion
Ethnographic studies	Shire of Dardanup	2014
Flora and fauna surveys	Shire of Dardanup	2014
Geotechnical report	Shire of Dardanup	2014
Strategic Environmental Impact Statement	Shire of Dardanup	2015
Transport and Access Report	Department of Planning	2015
Economic Infrastructure Report	Department of Planning	2015
Sustainability Strategy: Urban Form	Department of Planning	2015
Contributions and Staging Plan	Department of Planning	2015 - 2016
District Water Management Strategy	Department of Planning	2015 - 2016



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What do we want out of the urban District Structure Plan

Principles that enable a community to:

- Sustainable
- Attractive place to live and work
- Transit orientated development
- High residential density
- Significant proportion of regionally important economic and social infrastructure required in the long term
- Opportunities for innovation



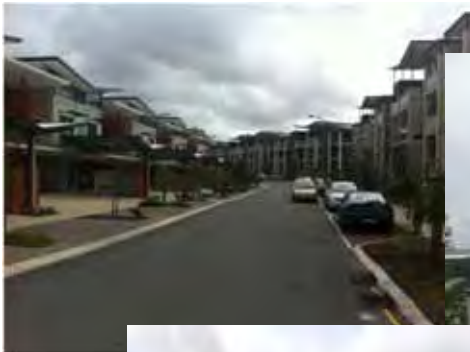
DWELLINGS/HA



Figure 12: Net site density for local government areas in Perth and Peel (excludes Waroona)
Source: VGO 2011, IUD 2012



Mixed use
development Coles
and apartments
Newcastle Street,
Northbridge



Mixed use development
newsagents, cafes,
apartments, Department
of Housing apartments.

Adjacent to Cockburn train
station



**Minimal room on individual
sites for onsite water
management**

.....



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8 storey residential apartments
adjacent to quality public open
space and water
features/drainage

Harold Boas Gardens -
Wellington Street, West Perth



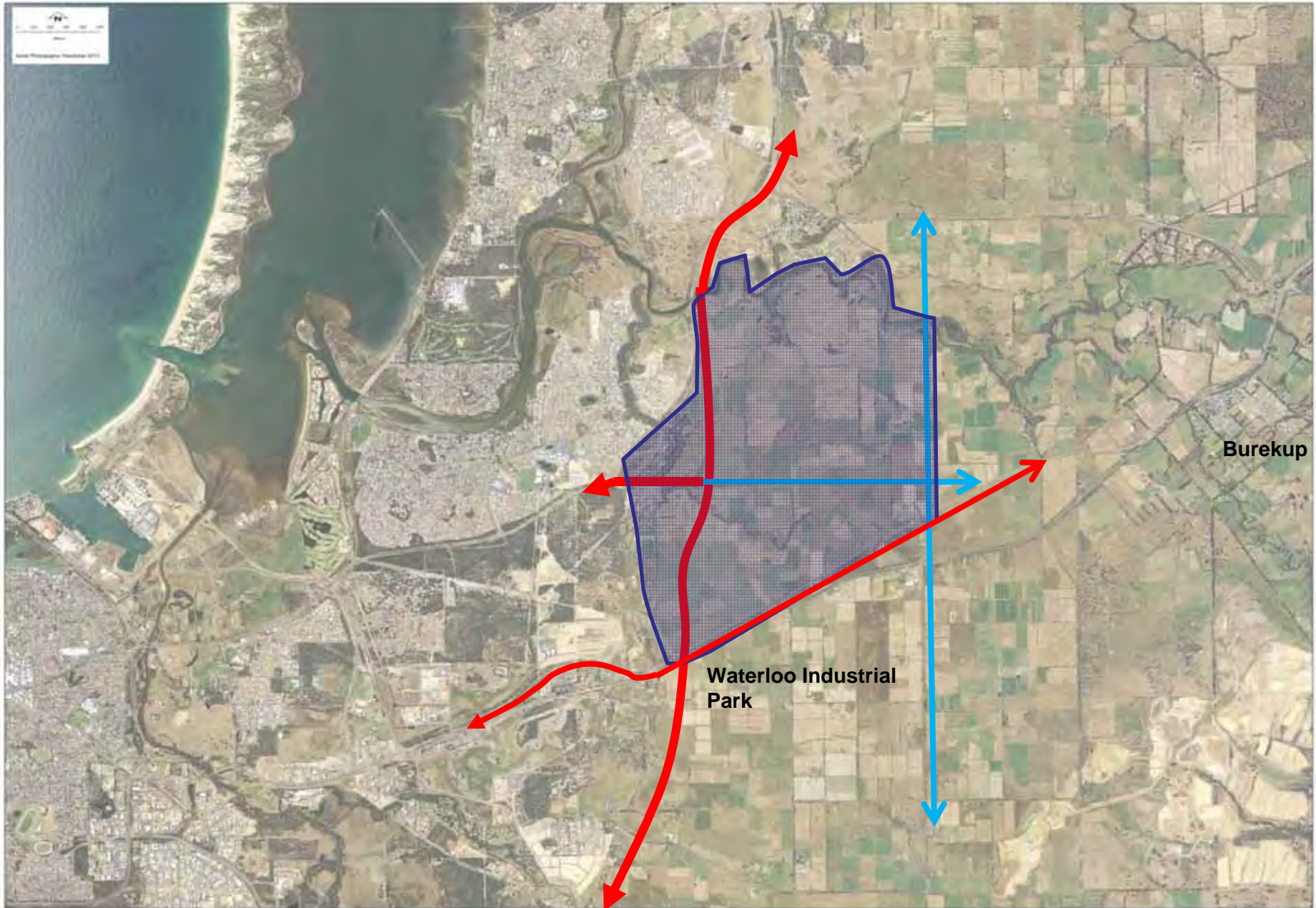


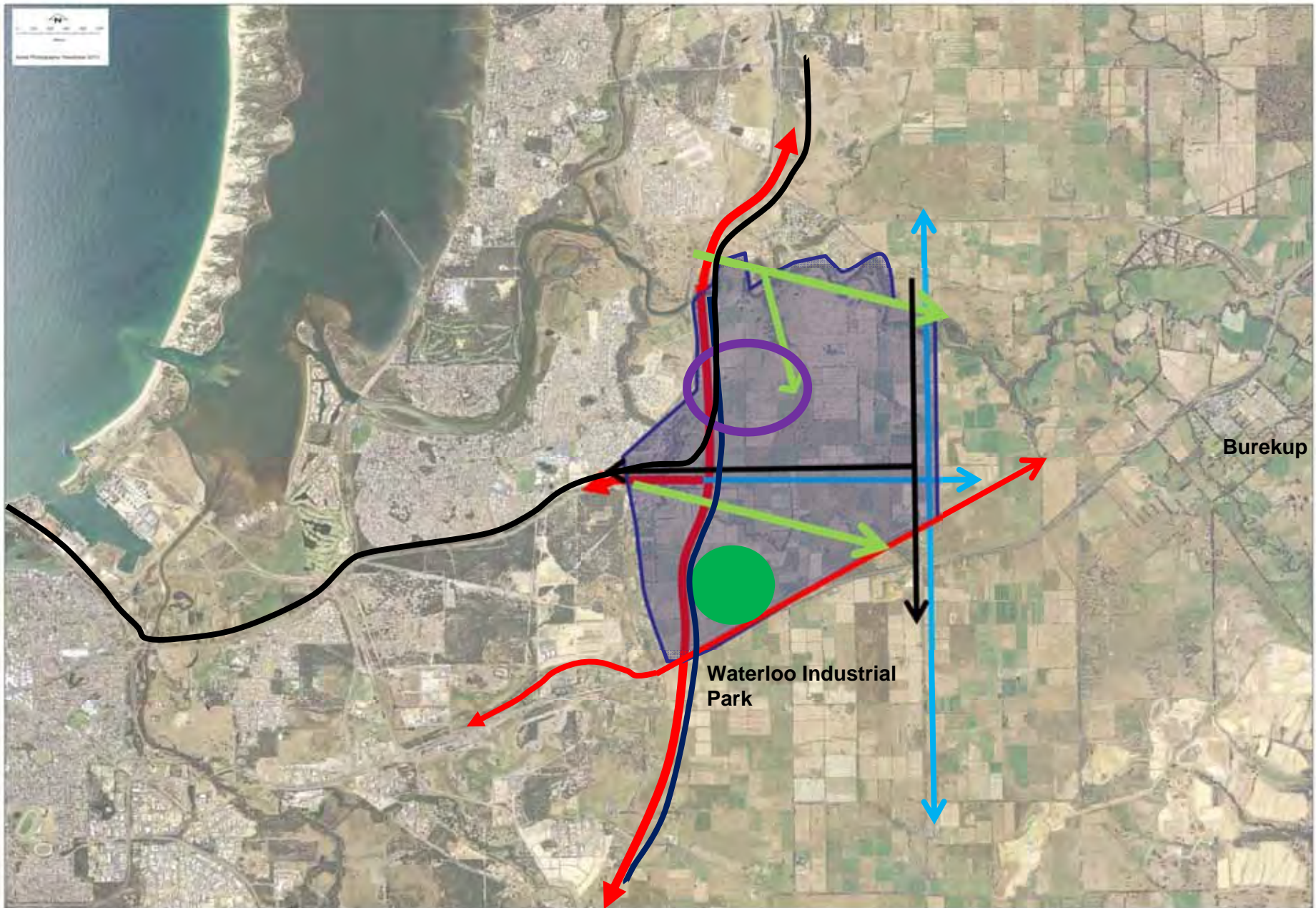
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What do we want out of the District Water Management Strategy

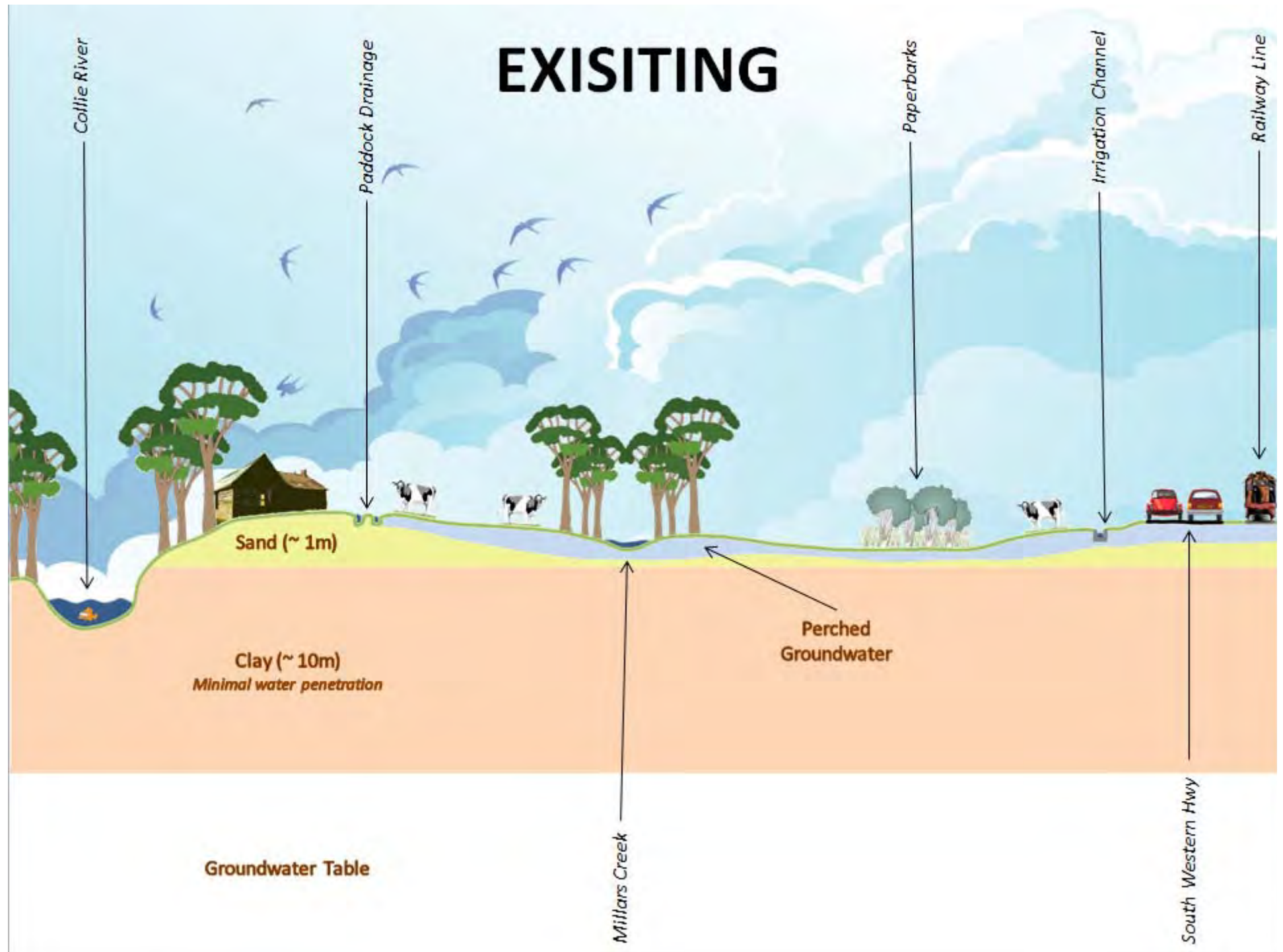
- Whole of water cycle – go for gold 😊
 - Water suppliers
 - Waste water collection and treatment
 - Stormwater collection and treatment
 - Greywater collection and treatment
 - Reuse of treated water within the site
- Innovation
- Integration
- Collaborative
- Multifunctional spaces
- Out of the box
- Opportunity for demonstration projects – federal and state funding for trials,
- University research project
- Best practice
- Education tool for the wider community





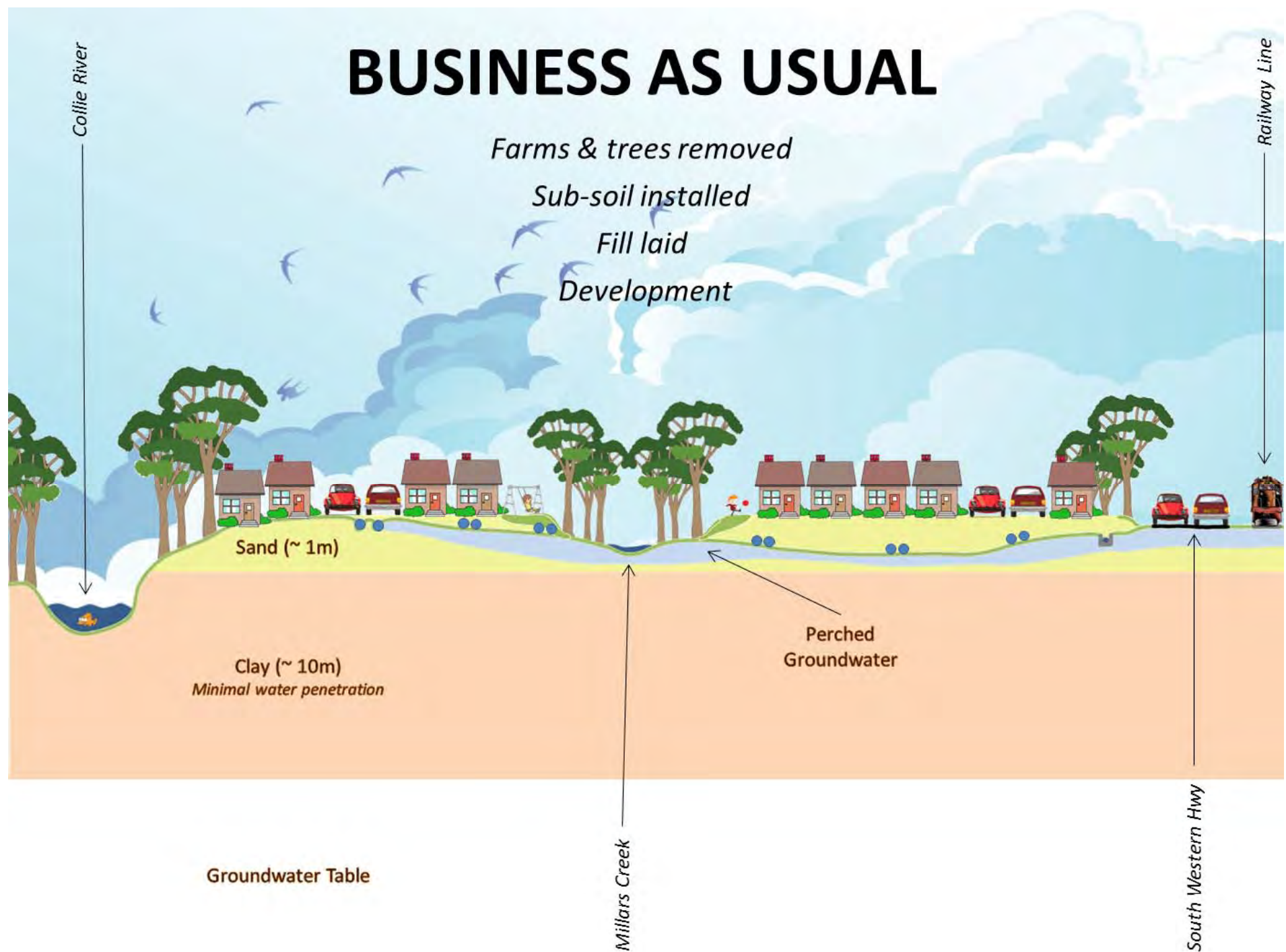


EXISTING



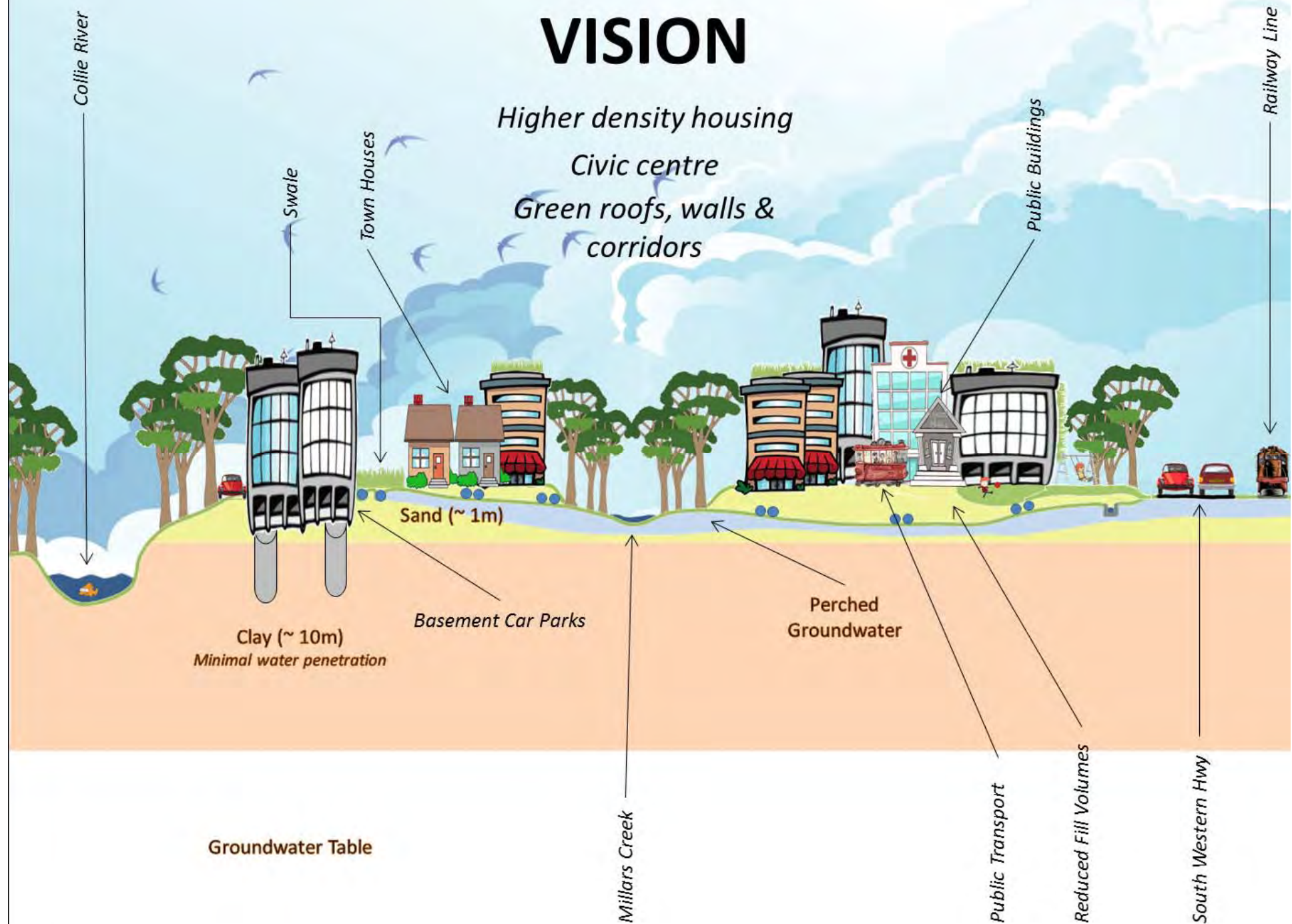
BUSINESS AS USUAL

Farms & trees removed
Sub-soil installed
Fill laid
Development



VISION

*Higher density housing
Civic centre
Green roofs, walls & corridors*





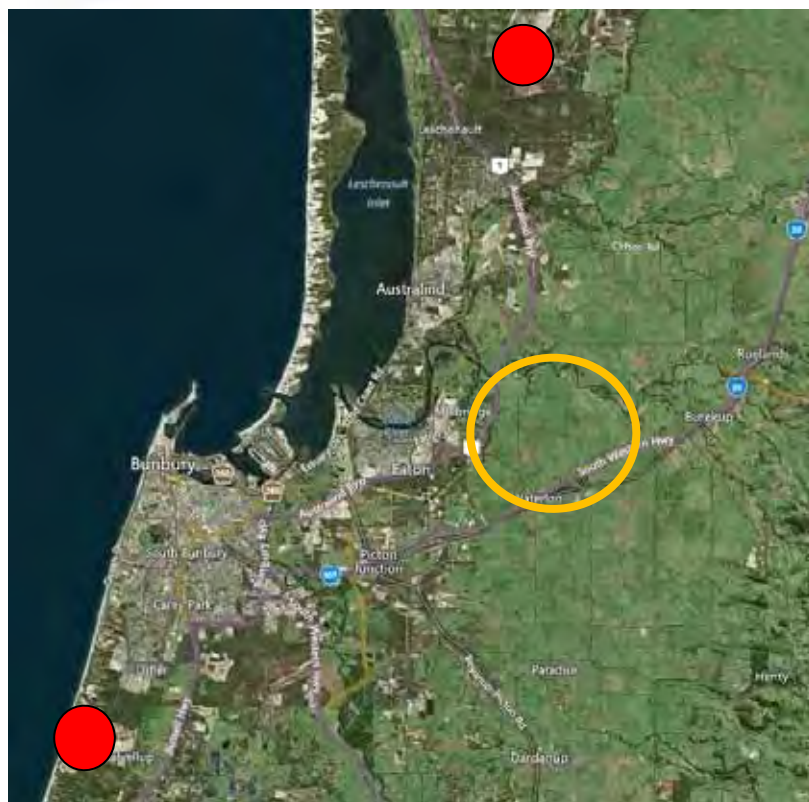
What do we need to integrate into the urban design? How do we deliver?

- Space for infrastructure, space for innovation (m^2/Ha^2)
- Buffers - noise, odour, vibration
- Infrastructure corridors – what is compatible?
- Can we stormwater harvest?
- Can we reuse treated sewerage?
- What is up to the developers – \$ contribution / construction costs / ongoing management?
- How is infrastructure going to be staged?
- Who is paying what?



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Big water infrastructure



Ozone injection



Biological media filters



UV disinfection



Chlorine contact basins





Como Park Stormwater Harvesting Project

City of Stonnington
Williams Street, South Yarra, Victoria

Overview

Como Park is a premier recreational site situated on the banks of the Yarra River, in the City of Stonnington. This inner Melbourne sporting ground is used all year round for social and sporting events. In the face of a prolonged drought, Stonnington Council embarked on a stormwater harvesting project to ensure the park's future. The project aimed to meet the irrigation demands of this site using harvested stormwater instead of relying on potable water.

This innovative project intercepts and diverts stormwater that would otherwise discharge untreated into the adjacent Yarra River. The stormwater is intercepted from two nearby stormwater drains that drain a 365 hectare catchment. Stormwater is diverted from these drains into a large underground concrete tank with a 300kL capacity.

The water is treated before irrigation via a gross pollutant trap and a ultra-violet filter. The water yield for irrigation is between 15-20 ML per year which provides Como Park a guaranteed source of multi-purpose water and independence from Victoria's potable water supply. This project received a merit award in the category of stormwater harvesting and re-use at the 2009 SIA National Stormwater Excellence Awards.

Organisations

- City of Stonnington (Responsible council and funding partner - \$10,000)
- STORM Consulting (Design consultant)
- Federal Government Community Infrastructure Funding (RDCIP) (Funding partner - \$364,000)
- South East Water (Funding partner - \$10,000)

Timeline

- Construction commenced July 2008
- Project completed October 2009
- Irrigation switched on November 2009

Cost

- \$450K (construction)



Sports field prior to stormwater harvesting project



Concrete storage tank during construction



Recreational sporting field irrigated by harvested stormwater

Darling Street Stormwater Harvesting Project

City of Melbourne
Darling Street, East Melbourne, Victoria

Overview

The Darling Street Stormwater Harvesting project in East Melbourne is an innovative stormwater harvesting project that provides treated stormwater to irrigate neighbouring parks and tree medians, including Darling Square, Powlett Reserve and medians in Grey, Simpson, Powlett and Albert streets.

The project took advantage of a local streetscape upgrade - including replacement of poor performing golden elms, modification of tree islands and resurfacing of roadway - to trial a new stormwater harvesting technology that requires infrastructure to be installed below ground.

The project harvests stormwater from two nearby existing drains. After diversion from the drains, the stormwater flows through a Gross Pollutant Trap (GPT) and a sedimentation chamber before being stored in underground tanks. Pumps can then be used to convey the collected stormwater into the above-ground biofiltration systems for treatment. The treated stormwater is finally stored in a holding tank ready for irrigation use.

This project is an initiative derived from City of Melbourne's 'Total Watermark - City as Catchment' strategy and addresses three of its main targets: water demand reduction, use of alternative water sources and stormwater quality improvement. It also provides a range of social, environmental and economical benefits.

Organisations

Design Team

- Concept development - City of Melbourne, Cardno (Civil) & LIS (Landscape)
- Detailed Design - Citywide/Cardno with City of Melbourne

Funding Partners

- City of Melbourne
- Melbourne Water - Living Rivers
- The Victorian Government through the Stormwater and Urban Recycling Fund

Contractors

- Design, construct & operations contractor - Citywide
- System design and head contractor - Biofitta Stormwater Solutions
- Principle sub-contractor - Multipro Civil



Biofitter median strip on Darling Street



Site visit during construction



Underground storage tank construction



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Space and connectivity

– what other infrastructure is compatible?

conveyance,
storage,
retention,
treatment,
reuse,
risk minimisation,
water quality,
infrastructure maintenance





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Drainage from major roads

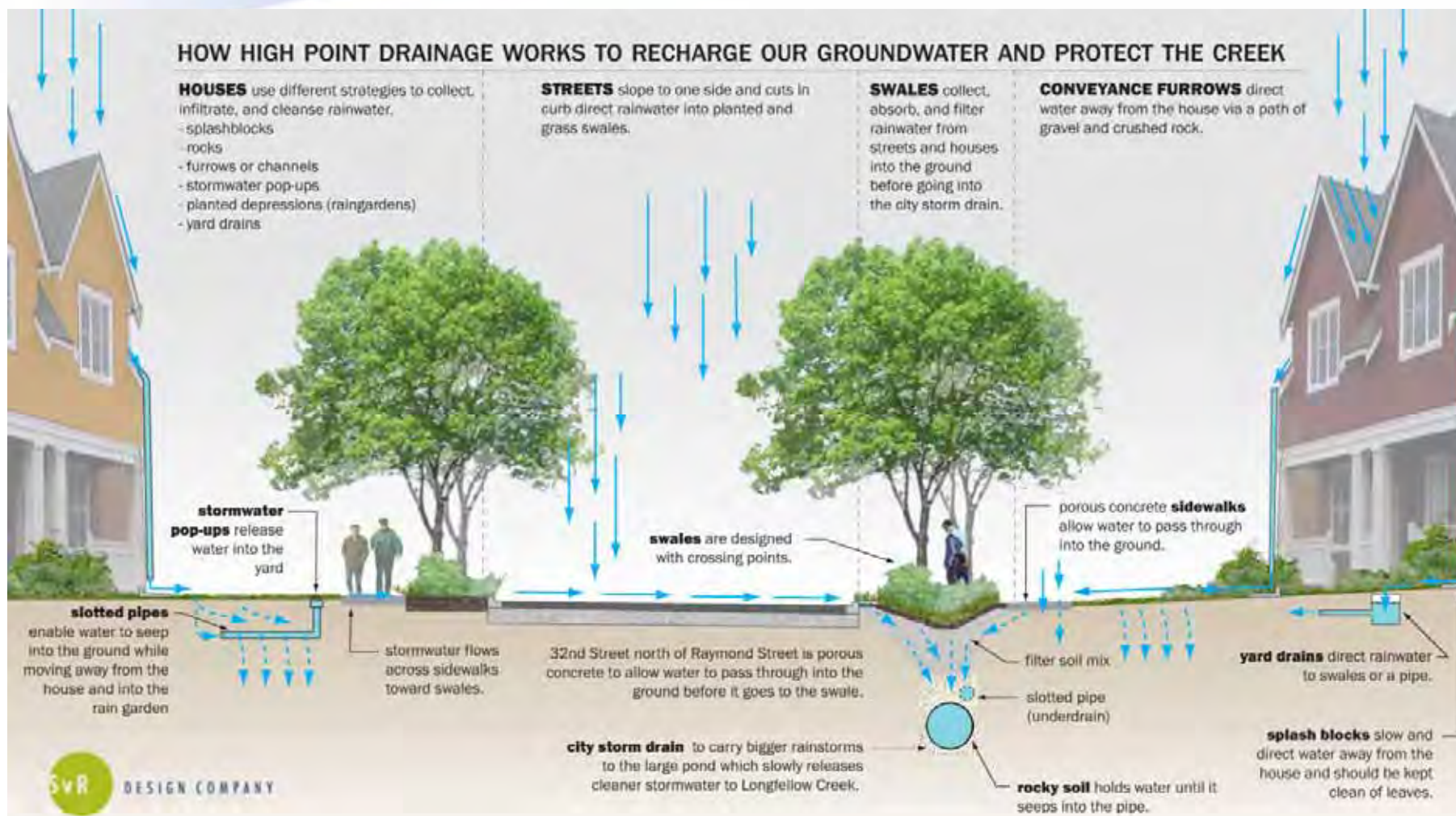




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Drainage from local roads and hard stand in public areas







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Smaller details...

Water management and reuse
for individual houses





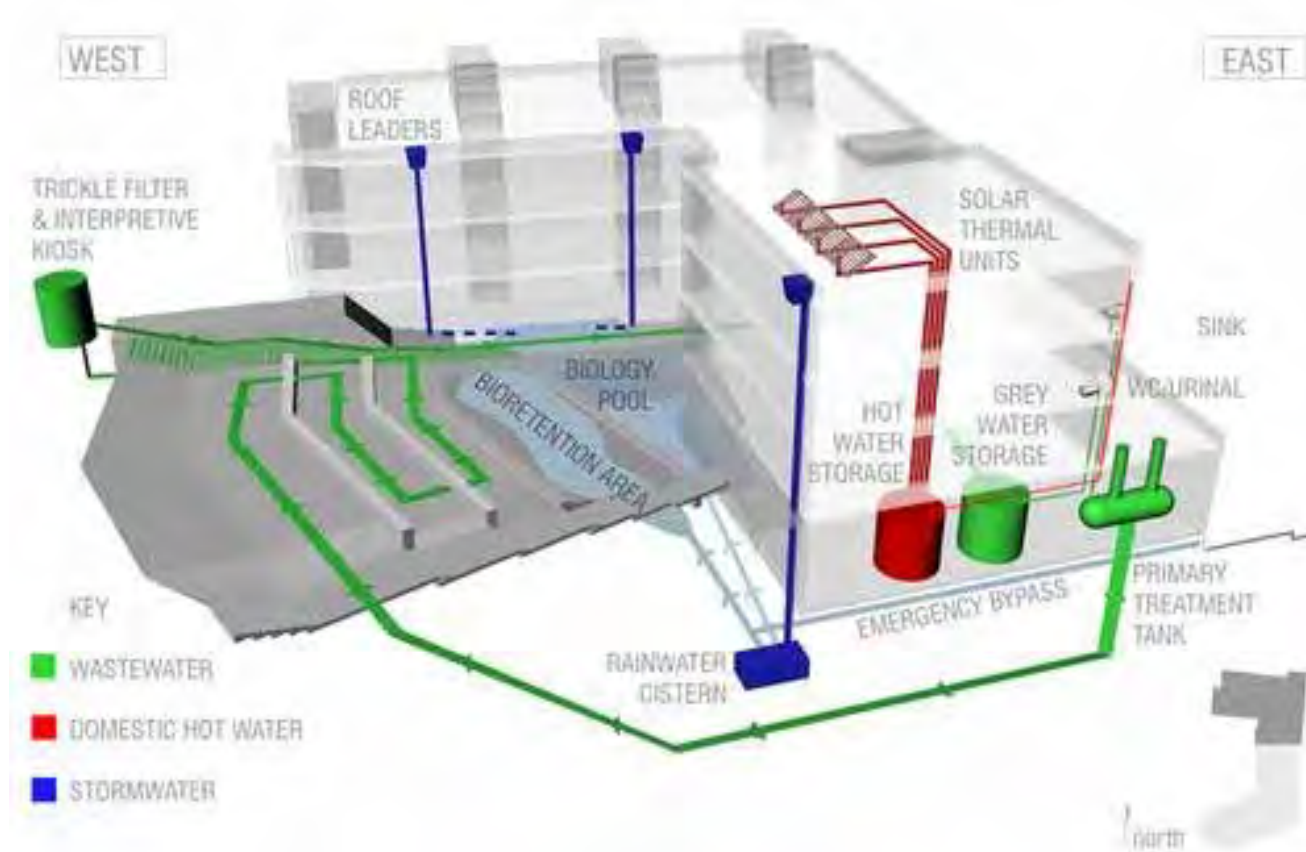
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The potential of apartments and mixed use developments for water management



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Water management from commercial buildings and mixed use buildings and apartments









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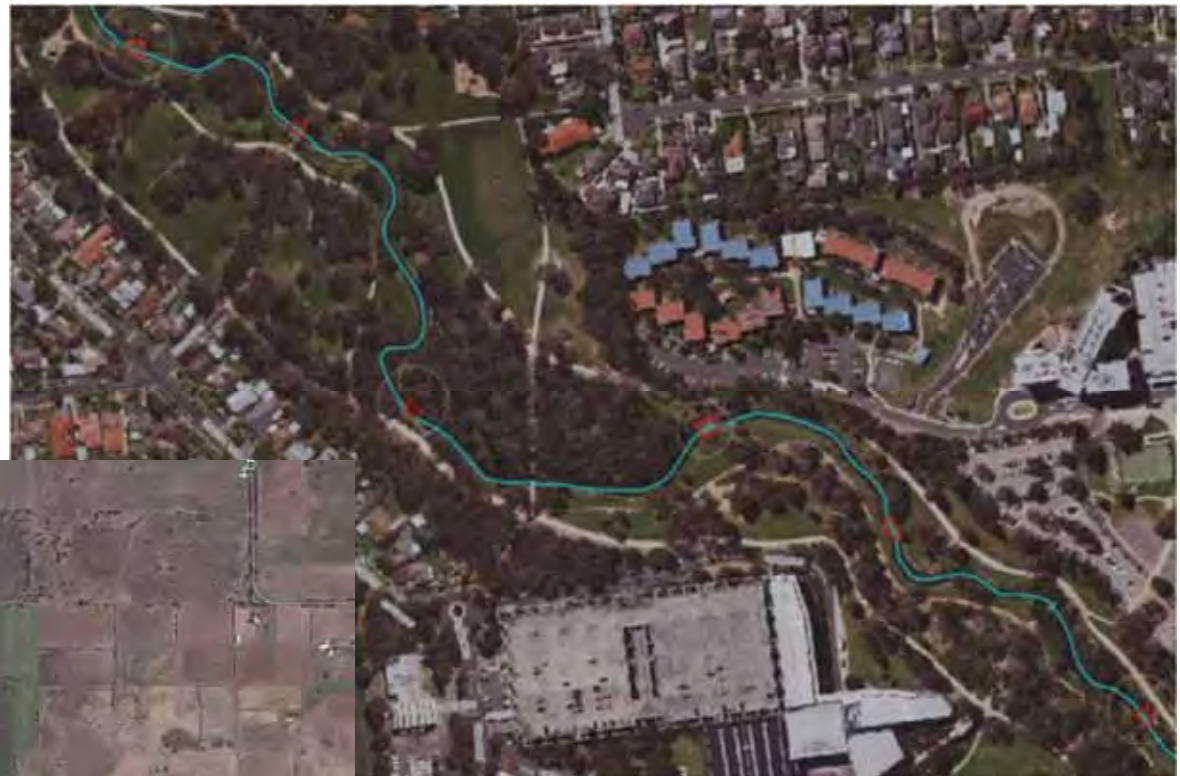
E.g. Apartment complexes along the Collie River





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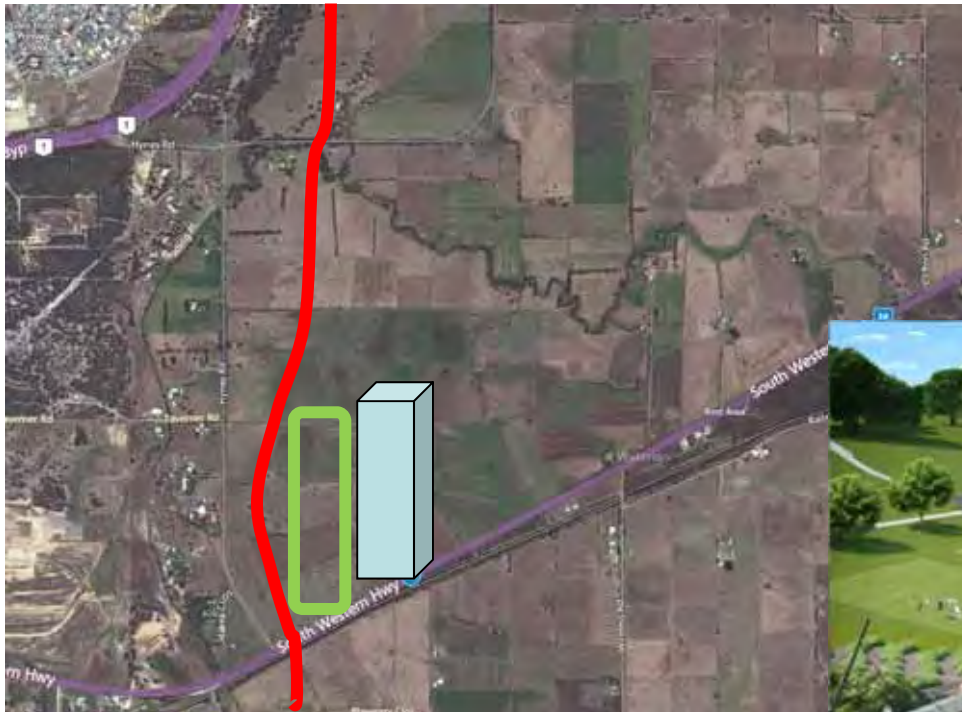
Public open spaces + habitat + water management - Millars Creek





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Regional playing fields = backyard for people in apartments





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The site specific details that make a cumulative impact - car park design adjacent to the train station





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Schools, universities, shopping centres





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Thinking outside of the square



**Making a multifunction and funky link with
infrastructure that makes the place
somewhere that people want to live, work
and play, that can feasibly be created and
maintained, be efficient, affective and
sustainable 😊**



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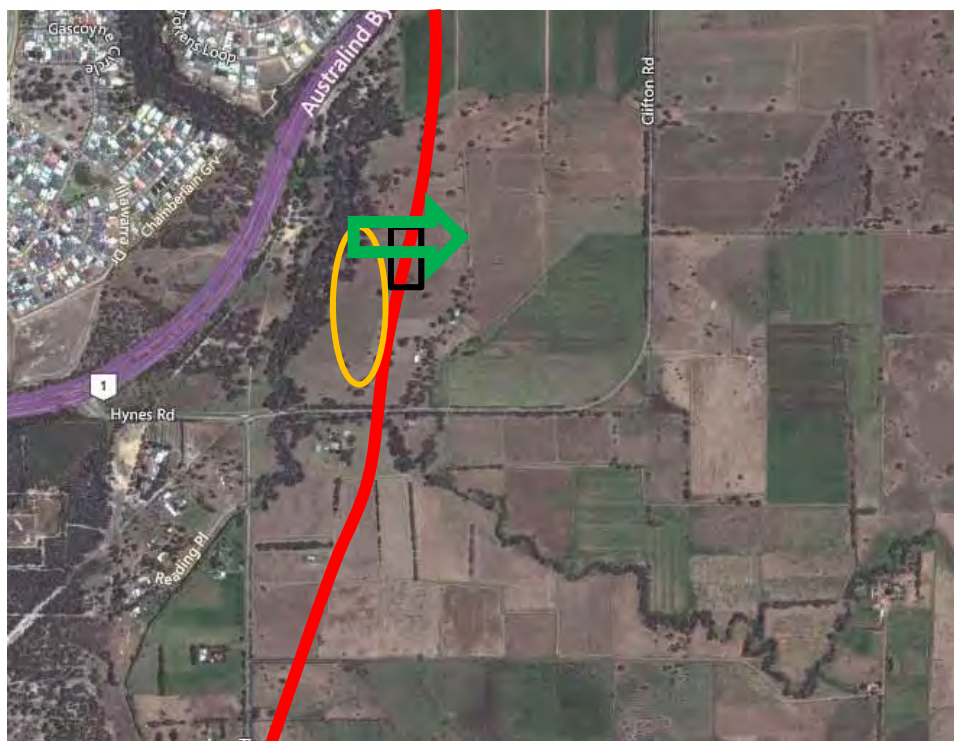
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Integration of active play areas





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Integration of areas for public art





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Green roof, living walls, urban orchards, community gardens





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Highline in New York





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Innovation today ... What will be the 'norm' by 2050





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Soccer field in Rio de Janeiro - “Pavegen”



- Energy capturing tiles underneath the astroturf harness player movements to power the lighting system
- Each tile costs currently approx. \$500
- Low socio-economic area
- An objective is that the new field sparks local kids interest in not only football but in science

***“Harvesting electricity from human activity is the ultimate renewable energy”
Stephen Hawking***





Big infrastructure, big \$, big politics

- Making this a priority project for the South West
- Collaborative work – commitments and buy-in from different government stakeholders and agencies
- Set the tone, set expectations, provide certainty
- Assist developers to be innovative and provide opportunities for investors to take risks
- Demonstration projects
- Funding opportunities
- Create momentum





Think left and think right
and think low
and think high.

Oh, the things you can
think up
if only you
TRY!

-Dr Seuss