



# Queensland Planning Policy

WATER QUALITY STATE INTEREST

A Blueprint for Improving Waterway Management



water by design

May 2020

# Acknowledgement

We would like to thank to the following organisations for participating in the review workshops and for their contributions which made this document possible.



Brisbane City Council

CITY OF  
**GOLDCOAST.**



*alluvium*



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# Document Purpose

The purpose of this document is to recommend improvements to the State Planning Policy (SPP) - Water Quality State Interest. While SPP amendments are just part of the solution, complimentary recommendations have also been made to improve waterway management more broadly.

## Our Goals

We need to protect waterway values as they support all life on earth



### PROTECT

#### HAZARDS

- Clearing
- Erosion and scour
- Flow
- Nutrients
- Disturbance
- Temperature
- Litter
- Bank scour

### MAINTAIN

- Waterway condition
- Treatment train function

### ENHANCE

#### BENEFITS

- Ecosystem dividends
- Drinking water
- Irrigation
- Flood containment
- Recreation
- Fish
- Transport
- Tourism

# Key Proposals for Improving Waterway Management

## PROTECT



### STRATEGY 1 STRATEGIC PLANNING

Categorise and prioritise waterways and target investments to where they have the most significant impact.



### STRATEGY 2 PRISTINE WATERWAY PROTECTION

Put extra protections in place for our High Ecological Value (HEV) waterways.



### STRATEGY 3 FLOW CONTROLS

Reduce detrimental impacts of flow increase.



### STRATEGY 4 'AT SOURCE' WSUD

Target pollution 'at source' by improving the urban development template with underlying Water Sensitive Urban Design (WSUD) principles.

## MAINTAIN



### STRATEGY 5 MONITORING

Gather data to understand the condition of our waterways, our WSUD assets and their impact on waterway health.



### STRATEGY 6 MAINTENANCE

Implement ongoing maintenance of waterways and the systems that protect them.



### STRATEGY 7 QUALITY CONTROL

Align waterway protection and improvement projects to deliver on their design intent.



### STRATEGY 8 IMPROVEMENT

Review, adapt and improve our management systems periodically.

## ENHANCE



### STRATEGY 9 STRATEGIC OFFSITE SOLUTIONS

Offsite solutions: Collect WSUD funding from areas where they make the least impact and invest in high impact areas.



### STRATEGY 10 WSUD INTEGRATION

Encourage WSUD integration and promote multiple benefits.



### STRATEGY 11 WATER FOR COOLING

Utilise water as a tool to cool our suburbs.



### STRATEGY 12 WATER REUSE

Enable fit-for-purpose reuse of stormwater.



# Protect

We need to protect the waterway values that underpin all life on earth



# Strategy 1 – Strategic Planning

Categorise and prioritise waterways and target investments to where they have the most significant impact

## ISSUE 1A - HOTSPOTS

Values and Hazards are not evenly distributed throughout the catchment (**Figure 1**). Our management approach should allow for catchment variation and target high risk confluences.

## SOLUTION

- Prioritise our actions via risk analysis
- Understand and map the values and hazards across the catchment
- Categorise waterways and identify hotspots
- Choose appropriate strategies

## EPP CHANGE:

Ensure every local government implements a strategic plan with risk assessment:

- Total Water Cycle Management Plan (TWCMP) e.g. MBRC
- CAP (i.e. BCC, Redlands)
- LGIP (i.e. CoGC)
- WQIP (i.e. TCC)
- Strategic Waterways

## SPP CHANGE:

Ensure all projects funded via Offsite Solutions are selected based on a risk assessment of the catchment and strategic plan

## OUTCOMES

- Catchment priorities used to inform investment strategy
- Better return on investment
- Achieve multiple benefits

## ISSUE 1B - STORMWATER DETENTION

Because bioretention basins are often co located with stormwater detention basins, this can limit the adoption of alternative WSUD typology (e.g. streetscape solutions).

In the lower third of the catchment stormwater detention can potentially worsen local flooding.

## SOLUTION

Local Governments undertake Strategic Stormwater Detention Planning.

## OUTCOMES

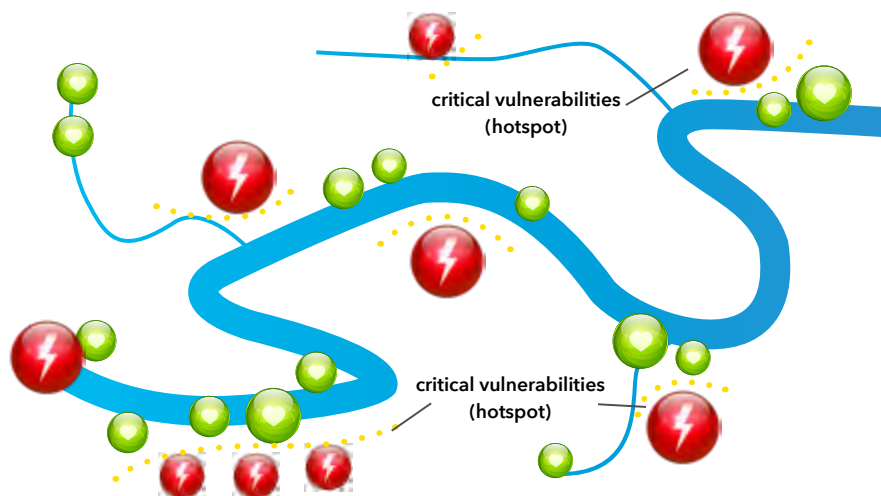
- Where there are no local limitations, this may free up lower third of catchment for at source WSUD treatment or alternative options
- Smaller space allocation to stormwater
- More flexibility

## CASE STUDIES

- Water Quality Improvement Plan (WQIP) Black Ross Townsville
- Local Government Infrastructure Plan (LGIP) City of Gold Coast (GoGC)
- Catchment Action Plan (CAP) Lower Brisbane
- DES Walking the Landscape
- Moreton Bay Regional Council TWCMP
- Strategic Waterways

## ACTIONS

- Approach Queensland Urban Drainage Manual (QUDM) regarding stormwater detention
- Develop and roll out Strategic Waterways



**Figure 1**

Hazards and Values vary across the catchment. Best practice requires identifying and targeting hotspots



# Strategy 2 – Pristine Waterway Protection

Put extra protections in place to for our High Ecological Value (HEV) Waterways

## ISSUE 2A - PROTECTION OF HIGH VALUE WATERWAYS

Once an ecosystem loses its integrity it is very hard to return it to its original condition. Such effort is often at great expense and in many cases a loss of system integrity is irreversible.

Currently there is no mandatory provision under the SPP that addresses HEV waterways.

### SOLUTION

SPP Change: HEV areas would be subject to higher protection as per the Water Quality Objectives under a revised SPP. Local Governments to update their city plans with two new HEV categories:

- HEV1 - Do not disturb / develop
- HEV2 - Neutral or Beneficial Effect (NorBE)

### OUTCOMES

This will guide development away from these areas and encourage ecovillage (see Currumbin Ecovillage) or best practice sustainable village style developments.

## ISSUE 2B - HEV MAPPING

Currently HEV mapping is incomplete and is mainly focused on public land and is limited in which values are covered (**Figure 2**). Quality maps are needed in order to protect the best parts of our landscape.

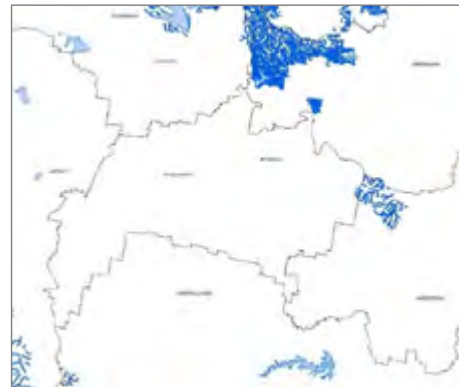
### SOLUTION

Waterway Values need to be mapped irrespective of land tenure (i.e. extend HEV mapping to cover entire state).

Where HEV mapping is currently deficient, a local equivalent may be acceptable.

### OUTCOMES

More geographic coverage of HEV sites.



## ISSUE 2C - MSES MAPPING

Expand HEV mapping to identify pristine sites not currently mapped.

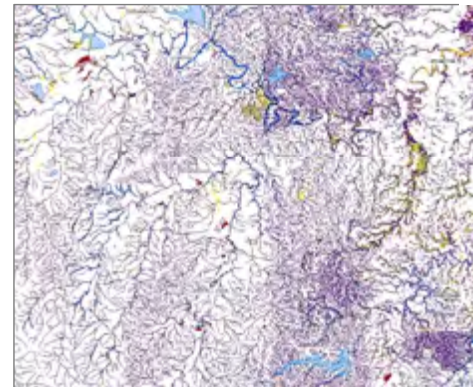
Broaden SMDO's to consider all MSES.

### SOLUTION

Matters of State Environmental Significance (MSES) mapping layers can help identify pristine areas that require protection.

### OUTCOMES

- Better coverage of waterway values
- Council able to actively manage these high value assets via a risk assessment and hazard management plans



## CASE STUDIES

- Aura - Stockland
- Currumbin Ecovillage
- Noosa Flexi Learning Centre

## ACTIONS

- Need to define two types of HEV
  - HEV1 - Do not develop
  - HEV2 - NorBE
- Develop guidelines for GIS mapping of waterway values and hazards
- Link to Water Quality Objective Project (DES)



HEV 1



HEV 2

**Figure 2**  
HHEV Mapping (left)  
MSES Mapping (right)





# Strategy 3 – Flow Controls

Reduce detrimental impacts of flow increase

### ISSUE 3A - DAMAGING FLOWS

Understand and reduce the threat to creeks and rivers posed by the change in flow caused by urbanisation. Adapt to threats caused by climate change and catastrophic floods.

### SOLUTION

- SPP Change:  
For large HEV2 Areas (e.g. Aura) use:
- Urban Streamflow Impact Assessment (USIA) - large scale greenfield
- For all other HEV2 Areas use:
- City of Gold Coast conditions - 25% reduction in Mean Annual Runoff (MAR) and reduction in the number of flow days

### OUTCOMES

WSUD strategies will include increased infiltration and increased rainwater and stormwater harvesting.

### ISSUE 3B - EXCESS FLOW VOLUME

Increase catchment permeability (see Strategy 4) in order to move towards better groundwater infiltration and natural hydrology.

### SOLUTION

- Explore ways to incentivise infiltration (see also Strategy 4).
- Queensland Development Code (QDC):  
Rainwater tanks (Figure 3) to become mandatory.

To ensure proper maintenance and use, consider potential for Utilities to take ownership and maintenance of rainwater tanks (e.g. Aquarevo).

### OUTCOMES

Household rainwater tanks would displace need for potable water for toilet flushing and irrigation. Flow and nutrient impacts at the creek would be reduced.

### JUSTIFICATION

In contrast to previous analysis, recent studies show a rainwater tank can add \$18,000 to the value of a property (Zhang et al. 2015).

In a typical setting, Stormwater Quality modelling (e.g. MUSIC modelling) shows rainwater tanks can reduce flow volumes by about 9% (Alluvium, 2019).

Developing and paving a catchment can increase flows above natural conditions by up to 5 times (Walsh, 2020).

### CASE STUDIES

- Urban Streamflow Impact Assessment
- Aura - Stockland
- South East Water - Aquarevo

### ACTIONS

- Liaise with QDC regarding tanks and stormwater disconnections

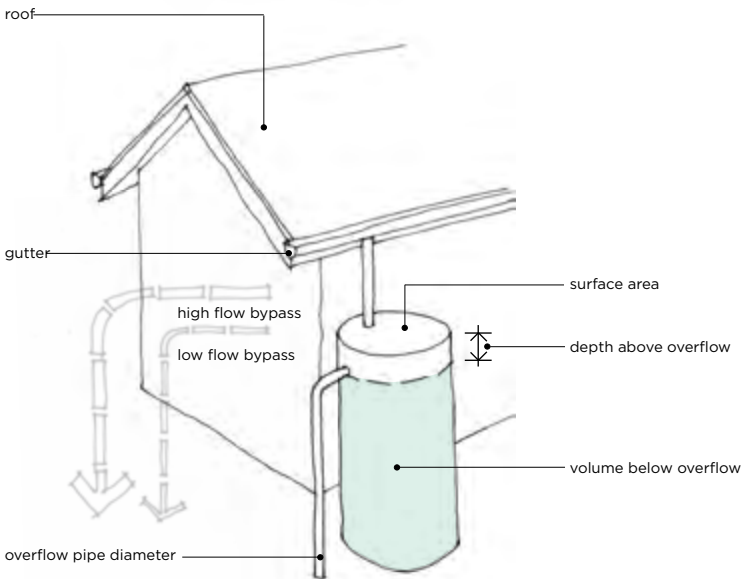


Figure 3 Household rainwater tanks



GAMECHANGER



# Strategy 4 – ‘At Source’ WSUD

Target pollution ‘at source’ by improving the urban development template with underlying WSUD principles

## ISSUE 4A - REDUCING POLLUTION ‘AT SOURCE’

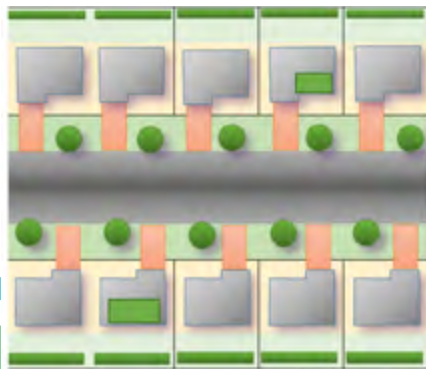
MUSIC modelling does not favour or incentivise low impact solutions including hazard minimisation, green catchments, and at source treatment. Bring WSUD benefits back to street level via ‘at source’ treatment.

### SOLUTION

SPP Change: document to permit an alternative compliance pathway. Engineers to calculate Total Annual Load (TAL). If a ‘low impact’ solution achieves less TAL than a standard approach (i.e. 80/60/45), then proceed with low impact approach and ignore 80/60/45.

### OUTCOMES

Developers could achieve a smaller TAL compared to Business As Usual (B.A.U) and smaller WSUD footprint using rainwater tanks, WSUD street trees and catchment permeability (See Figure 4).



## ISSUE 4B - REDUCE EXCESS FLOW ‘AT SOURCE’

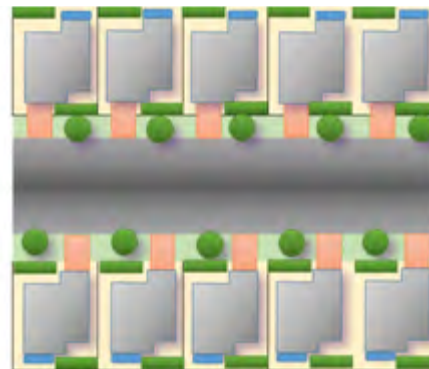
Reduce the detrimental impacts of flow increase on our waterways and improve groundwater infiltration (See also Issue 3b).

### SOLUTION

- Enable permeable catchments and groundwater replenishment
- Research cost / benefit of at source WSUD products
- Find ways to incentivise use (see Greenstar and Basix)

### OUTCOMES

Increase catchment permeability through implementation of infiltration, WSUD street trees, rainwater tanks and irrigation etc.



## ALTERNATIVE SOLUTIONS

Stormwater connections to be licenced in order to discharge (as per sewer).

Private Stormwater Quality Improvement Devices (SQUIDS) to require registration licencing and servicing as per septic tanks.

## DEEMED TO COMPLY (DTC) SOLUTIONS

Sub-threshold\* house lots need to install either:

- Water Wise Street Trees
- Rainwater Tank management
- Permeable driveway
- Two story home with garden space
- Stormwater disconnection
- Raingarden

Flexibility to choose what suits best. Enforced through the QDC.

\*SPP threshold <2500m<sup>2</sup> + 6Lots

## CASE STUDIES

- Currumbin Ecovillage
- Noosa Flexi Learning Centre
- Greenstar
- Basix

## JUSTIFICATION

A study looking at the relationship between urban greenery and mental health found those participants that perceived they had a green neighbourhood, had a 40 to 60% chance of better physical and mental health outcomes, compared to those participants that perceived they did not have a green neighbourhood (Sugiyama et al, 2008).

Cooperative Research Centre (CRC) for Water Sensitive Cities examined property sales in Sydney between Jan 2008 and Sep 2014 and found houses sold for at least \$50,000 more when a rain garden was less than 50 metres away.

## ACTIONS

- Low impact templates to be refined in MUSIC and road tested
- Link to Cooperative Research Centre for Water Sensitive Cities (CRCWSC) infill templates
- Link to [CRCWSC economic benefits tool](#)
- Establish business case for low impact solutions

**Figure 4**  
**Sponge suburbs (left)**  
 Less roofs and roads  
 More gardens and grass

**Low impact suburbs (right)**  
 Rain tanks  
 WSUD trees  
 Permeable paving

## Maintain

Our waterways and the treatment systems that protect them require ongoing monitoring and maintenance



# Strategy 5 – Monitoring

Gather data to understand the condition of our waterways, our WSUD assets and their impact on waterway health

## ISSUE 5A - WATERWAY HEALTH

Without knowledge of the health of our local creeks, we can lose sight of how to best protect and maintain them.

Local Government Authorities (LGAs) need to monitor waterway health metrics, not just water quality (e.g. Total Suspended Solids (TSS), Total Phosphorus (TP) and Total Nitrogen (TN)). Monitoring should include other threats (e.g. invasive species, temperature etc.) and attributes affecting waterway health including riparian condition and hydraulic connectivity.

## SOLUTION

Developing and expanding on existing waterway monitoring networks to ensure consistent standards and research priorities are set across the State.

Develop a monitoring framework that links WSUD asset performance to waterway health.

## OUTCOMES

Monitoring outputs would be analysed and fed back into waterway management improvement.

## ISSUE 5B - WSUD ASSET CONDITION

There is an opportunity to improve industry confidence in WSUD by extending scientific understanding of collective asset condition and effectiveness (e.g. North Queensland WSUD sites).

Research questions to consider include:

- Are the assets being maintained in appropriate condition as needed?
- How could the assets be more effective?

## SOLUTION

LGAs to collect WSUD asset condition data. Data to be digitised, standardised and maintained in an accessible database.

Establish a State-wide Adaptive Asset Management Network (AAMN) to analyse data and set research priorities.

## OUTCOMES

Monitoring outputs would be analysed and fed back into WSUD Asset Management improvement (e.g. via HLW guideline updates).

## FINDINGS FROM ALLUVIUM REVIEW

To improve WSUD impact, there is a need for a clear line of site between our:

- Strategic Intent (i.e. Protect and Enhance)
- Design Objectives (i.e. 80/60/45)
- Management Responses (i.e. bioretention)
- Waterway Outcomes

## CASE STUDIES

- [Healthy Land and Water](#) - Report Card
- State Ambient Water Quality Monitoring Program
- [Water monitoring and sampling manual](#) DES 2018
- State Regional Report Cards

## ACTIONS

- Establish State-wide research networks to improve management of waterway health
- Link with Stewardship Program (Department of Environment and Science)



**Figure 5**  
Monitoring of WQ data  
at the Wakerley Bioretention Basin



# Strategy 6 – Maintenance

Implement ongoing maintenance of waterways and the systems that protect them

## ISSUE 6A - WATERWAY MAINTENANCE

In some LGAs waterways do not receive the maintenance funding to achieve community expectations.

### SOLUTION

Waterway Asset Management Plans (WAMP) to be introduced into the EP Water Policy as mandatory (See Strategy 1a).

### OUTCOMES

- Waterway health trajectories are determined for each waterway and supported by funding streams
- Local governments assign Levels of Service targets to waterways
- Maintenance and renewals are strategically funded
- Monitoring plans established to enable proactive maintenance

## ISSUE 6B - WSUD ASSET MAINTENANCE

Often WSUD assets do not receive the maintenance funding necessary to achieve original design objectives.

### SOLUTION

All stormwater control devices are to be delivered and maintained to achieve WQOs.

Maintenance programs to include Monitoring, Evaluation, Reporting and Improvement (MERI).

Where a cost benefit business case is proven, a portion of Offsets funding contributed to asset rectification.

Encourage and incentivise Gross Pollutant Trap (GPT) asset leasing and long-term maintenance contracts.

### OUTCOMES

Fit for purpose maintenance of assets.  
Achieve design intent of assets.

## JUSTIFICATION

A full GPT or a GPT that has been removed or bypassed achieves zero pollutant reduction.

If a Biobasin malfunctions due to inadequate maintenance treatment performance is reduced (Dalrymple, 2019):

- Ineffective plants (Total Phosphorus [TP] decrease of 38%)
- Plant die-off (TP decrease of 39%, Total Nitrogen [TN] decrease of 68%)
- Filter media blocking (Total Suspended Solids [TSS]) decrease of 14%, TP decrease of 26%, TN decrease of 36%)

Current research suggests an average of 46% of assets are under-performing across several LGAs (Dalrymple, 2019).

## CASE STUDIES

- Waterway Asset Management Plan BCC
- [Stormwater Queensland's asset condition review](#)
- Point Break for the WSUD Asset Wave Dalrymple et al, 2019



**Figure 6**

Maintenance of the water edge at Raceview



# Strategy 7 – Quality Control

Waterway protection and improvement projects need to deliver on their design intent

## ISSUE 7A - UNDERPERFORMING INFRASTRUCTURE

Ensure WSUD treatment measures are delivered to a standard that achieves the design objectives.

## SOLUTION - COMPLIANCE PROGRAM

Appropriately funded central organisation to maintain contemporary, best practice WSUD design / construction / maintenance standards, checklists and guidelines.

Every LGA to implement a compliance program to ensure the State's Stormwater Quality Design Objectives are delivered.

Third party organisations (e.g. HLW, Consultants) to conduct intermittent audits of industry QA (Quality Assurance) compliance (especially for ESC) and LGA compliance programs on behalf of State Government for system improvement purposes.

## OUTCOMES

Delivery of better-quality assets across the State.

## ISSUE 7B - UNDERPERFORMING OFFSETS

Offsets can potentially be an effective way to magnify the potential impact of WSUD investments (refer Strategy 5). Ensure Offsets are delivered in a consistent and transparent manner to meet Stormwater Management Design Objectives (SMDOs).

## SOLUTION - OFFSETS GUIDELINE

Offsets guideline to include measures set out in WbD Offsets Discussion Paper.

Trusted, independent third-party organisation to conduct audits and reporting on behalf of State Govt. to ensure that offset projects are delivering on WSUD load reduction targets.

## OUTCOMES

Delivery of better-quality assets across the state.

## JUSTIFICATION

If a SQID can't be maintained due to design flaws, then treatment performance will drop off soon after. If this occurs, our Ecological Return on Investment is often voided.

For instance, if a Biobasin malfunctions due to design or construction flaws, then treatment performance is reduced (Dalrymple, 2019):

- Ineffective plants (TP decrease of 38%)
- Plant die-off (TP decrease of 39%, TN decrease of 68%)
- Filter media blocking (TSS decrease of 14%, TP decrease of 26%, TN decrease of 36%)

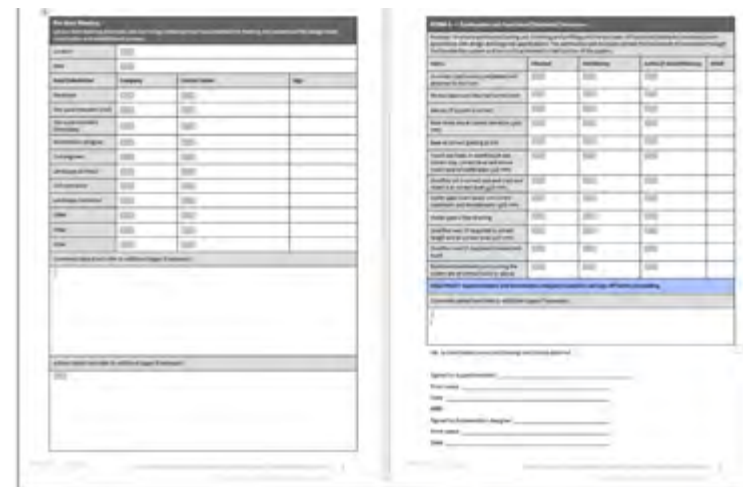
Stormwater Queensland (SQ) offsets review raises serious questions about the delivery of Water Quality benefits of some offset projects (Stormwater Queensland, 2019.)

## CASE STUDIES

- A Review of the Status of Stormwater Quality Offsets (Stormwater Qld, 2019)
- Off-site Stormwater Quality Solutions - Discussion Paper (WbD 2014)
- Point Break for the WSUD Asset Wave Dalrymple et al, 2019

## ACTIONS

- Link with Stewardship Program (Department of Environment and Science)



**Figure 7**  
Water by Design  
Construction QA checklists



# Strategy 8 – Improvement

Periodically adapt and improve our waterway management systems

## ISSUE 8A - WATERWAY MANAGEMENT ADAPTATION

To overcome future challenges such as climate change and population increase, the industry must embrace an adaptive management framework approach. This would require identifying and adjusting to incorporate new technology, trends, science and research.

### SOLUTION

- Expand on waterway monitoring network
- Collect waterway condition data and link this to waterway management practice
- Continually update and refine WSUD Guidelines and Standards (E.g. HLW, CRCWSC) to ensure they are contemporary

### OUTCOMES

Expansion of knowledge and continuous improvement of waterway management practices.

## ISSUE 8B - WSUD DESIGN IMPROVEMENT

The industry needs to:

- Correct persistent design faults
- Improve efficiency - doing things with less resources
- Improve effectiveness - generating bigger impact
- R&D better technology
- Innovation sharing

### SOLUTION

- Establish an Adaptive Asset Management Network (AAMN)
- AAMN lead the collective design and development of a Long-Term Adaptive Monitoring Program (LAMP)
- Coordinated effort to collect WSUD asset condition data from across diverse landscapes and climatic conditions.
- Establish key case study sites for further research on WSUD performance
- Refine WSUD Guidelines and Standards (e.g. HLW)

### OUTCOMES

Expansion of knowledge and continuous improvement of design standards and practice.

## POSSIBLE RESEARCH TOPICS

### Water quality runoff concentrations:

- Pollutant concentrations for various land uses
- Pollutant speciation

### Water quality treatment performance of:

- WSUD street trees
- Basic passive irrigation
- Floating wetlands
- Treatment performance in Central and North Queensland
- Channel naturalisations

### Hydrological performance of:

- Green roofs
- Rainwater tanks
- Permeable driveways and footpaths
- Bioretention basins

### Climate change adaptation:

- Temperature impacts on waterways
- Sea level rise impacts on ecology

### Markets:

- Understand opportunities to fund waterway health improvements through environmental markets and value transfers.

## POSSIBLE RESEARCH TOPICS (CONT.)

### Education:

- Improving communication of ecological issues to public, decision makers and city planners.
- Improving effectiveness of behaviour change programs.

### REFERENCE PAPERS

- Adaptive Asset Management - B. Penhallurick
- Leaky Bioretention - A. Hoban
- SPP Review Workshop notes - Water by Design

### ACTIONS

- Establish State-wide research networks for adaptive waterway management



**Figure 8**  
Collective learning at a HLW training event - Mackay



## Enhance

We need to explore options to nurture our waterways back to good health so that the waterways can in turn provide the community with their best





# Strategy 9 – Strategic Offsite Solutions

Collect WSUD funds from areas where they make the least impact and invest in high impact areas

### ISSUE 9A - IMPROVE IMPACT OF OFFSET VALUE

Seek funding pathways for waterway health and social value enhancing projects (e.g. fish passage, revegetation and habitat reconnection).

#### SOLUTION

SPP Change document updated to ensure all offset spending is guided by a strategic plan (Strategy 1).

Sub-threshold\* lots to contribute to a local Offsite Solution scheme (or use DTC solution - refer Strategy 4).

Consideration for funds to be topped up via an impervious area tax/rates.

Consider allowing offsets to be redirected to fund value enhancing projects. Establish a WSUD Offsets Bank to rectify legacy issues. A portion of offsets (e.g. 25%) to be used for asset rectification where proven by business case.

\*SPP threshold <2500m2 +6Lots

#### OUTCOMES

Larger ecological return on investment.



VALUES

+



NEEDS

=



OPPORTUNITY

### ISSUE 9B - WSUD WITH HIGH INFRASTRUCTURE COSTS

There are instances where expensive retaining walls and pipe infrastructure is required to make WSUD functional. Consider how WSUD is achieving the best ecological / social return on investment (ROI).

#### SOLUTION

Better understand what represents 'value for money' WSUD and identify areas achieving poor ROI.

Within a LG offset scheme, set a benchmark WSUD cost via the CRC economic benefits tool. If a WSUD device exceeds the benchmark costs, this then contributes to an offsets scheme instead where a better ROI can be proven.

#### OUTCOMES

Better use of limited resources.

### ISSUE 5C - NEGLECT OF OFFSET 'DONOR' SITES

By diverting funding from a local street to a regional solution, Offsets can deprive residents of the benefits of WSUD.

#### SOLUTION

For areas contributing to offsets, set minimum on site controls for:

- Litter
- Erosion and Sediment Control (ESC)
- Passive irrigation

#### OUTCOMES

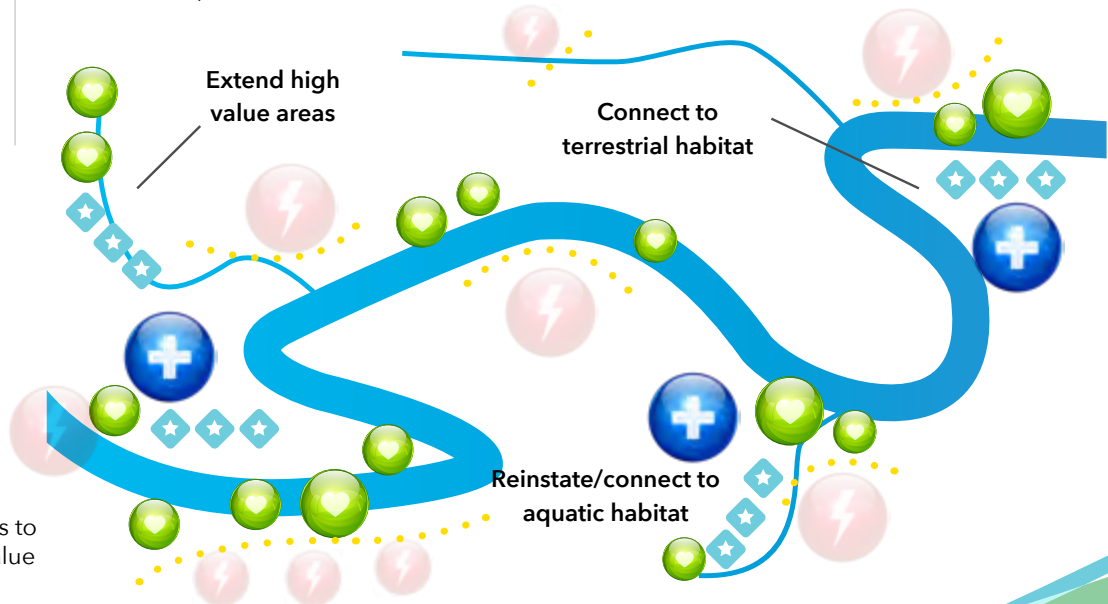
Improved street appearance and microclimate performance.

### CASE STUDIES

- Blackwell Street Wetlands - Logan
- [Redbank Plains Recreational Reserve - Ipswich](#)
- Jim Donald Wetland - Ipswich

#### ACTIONS

- Benchmark WSUD costs
- Set minimum on site controls
- Link to [CRC economic benefits tool](#)



**Figure 9**  
Invest in key locations to improve waterway value



# Strategy 10 – WSUD integration

Encourage WSUD integration and multiple benefits

## ISSUE 10A - INEFFICIENT LAYOUT & POOR INTEGRATION

Opportunities and efficiencies are missed because some councils do not allow co-location of WSUD within parks or riparian areas

### SOLUTION

To improve co-location build on existing documents and knowledge (e.g. Water by Design, Design Flow) and develop a State-wide Urban Design Guideline (**Figure 10**).

Use PDA areas as a pilot site to implement best practice WSUD integration.

### OUTCOMES

- Reduce costs
- Improve the quality of our urban developments in general

## ISSUE 10B - MISSED OPPORTUNITIES

Encourage better WSUD integration via the Living Waterways tool..

### SOLUTION

Living Waterways can be further encouraged in the SPP by:

- Simplifying for small developments
- Linking to small lot development guide
- Linking to other state interests

Ideally all greenfield developments to be assessed via Living Waterways.

### OUTCOMES

- Better integration of WSUD with surroundings
- Delivery of more holistic outcomes

## ALTERNATIVE SOLUTIONS

- Davidson Street, Newmarket
- Small Creek, Raceview
- Little McCreadys Creek, Mackay
- Redbank Plains Recreational Reserve, Ipswich

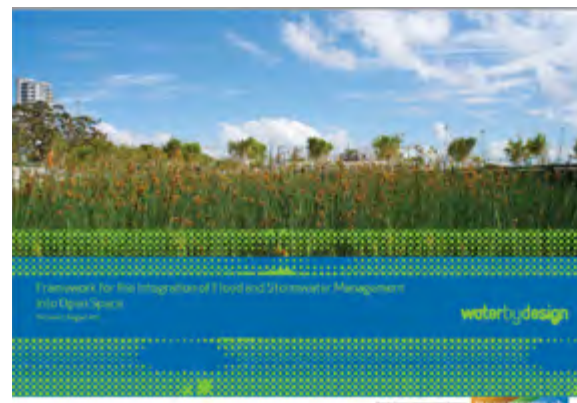
## NEW LIVING WATERWAYS CASE STUDIES (HLW to document)

- Pine Valley - Water Technology
- Spring Cove - McGeggor Coxall
- Pallara - Brisbane City Council

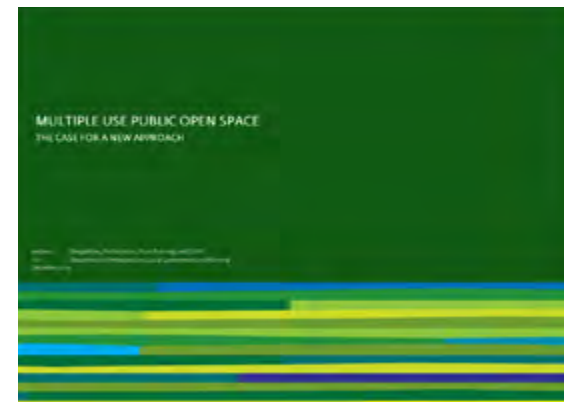
## ACTIONS

- Link to CRC economic benefits tool.
- Link to Small Lot Development Guide - DES
- Develop a state-wide Urban Design Guideline
- Establish a deemed to comply Water Wise Street Tree approach through Living Waterways

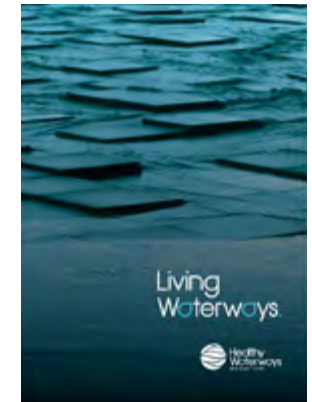
**Figure 10**  
WSUD integration documents



Water By Design



Design Flow



Living Waterways



# Strategy 11 – Water for Cooling

Utilise water as a tool to cool our suburbs

## ISSUE 11A - NEED MORE SHADE

High summer temperatures can make it uncomfortable and unsafe to walk on streets which can lead to higher energy and health costs. Heatwaves are also a silent killer; reducing maximum temperatures in our suburbs by even a few degrees can potentially save lives (see Loughnan et al, Monash).

## SOLUTION

Passively irrigated street trees can greatly influence the microclimate of our streets and need to be encouraged.

SPP Change: Introduce a tree canopy shade target (e.g. 50% of road corridor area - BCC 2031 Target).

Option for the SPP to set a temperature reduction target which can be assessed with CRCWSC Scenario Tool.

Urban Design Guidelines: To make basic passive irrigation for street trees mandatory.

## OUTCOMES

Cooler, greener suburbs with improved liveability

## ISSUE 11B - NEED TO ENCOURAGE COOLING

Barren and dry landscapes can be just as hot as concrete (CRCWSC, 2020). Retaining water in the landscape can reduce the Urban Heat Island effect and help alleviate additional heat stresses induced by climate change (**Figure 11**).

## SOLUTION

By retaining water in the neighbourhood, we can mitigate some of the harmful impacts of heatwaves and improve health and liveability.

- Living Waterways: Strengthen element LE5
- MUSIC Guideline: Incentivise urban wetlands through affirmative action (i.e. kC\* improvements)
- Retain flow paths and 1st order streams

## OUTCOMES

Cooler, greener suburbs with improved liveability

## JUSTIFICATION

A study found a 10% increase in tree canopy in the street was associated with an increase in property sale prices of \$18,707 (Netusil et al., 2014).

A study in Perth found that a 10% increase in canopy cover adjacent to public open space was worth \$17,264 per property (Pandit, 2013).

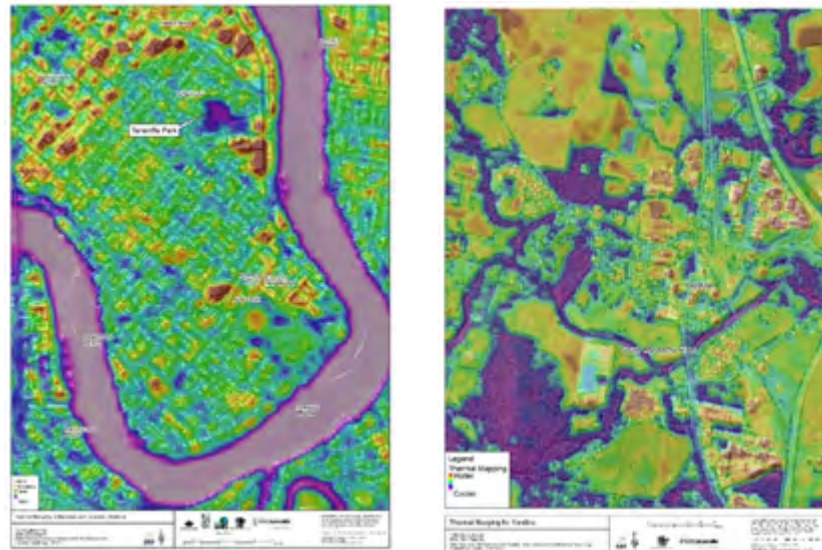
Scenario Modelling at Yarrabilba shows the potential to counteract a Heat Island effect by up to 5 degrees on maximum temperature days by using a Water Sensitive Cities approach (Tanner, 2020)

## CASE STUDIES

- Greater Sydney Tree Canopy Targets
- Ripley Valley cool roofs policy
- Cool City Guideline - CRCWSC
- Queensland Walking Strategy
- Loughnan et al, Monash
- Netusil et al., 2014
- Pandit, 2013
- Tanner, 2020
- CRCWSC Scenario Tool.

## ACTIONS

- Link to [CRCWSC Scenario Tool](#)
- Link with Health and Heat Flagship (DES)
- Define a Water Wise Street Tree solution in Living Waterways
- Temperature Mapping and prioritisation project for urban areas



**Figure 11**  
Temperature maps for New Farm (Left) and Yandina (Right)  
Water and nature reserves reduce local temperatures



# Strategy 12 – Water Reuse

Enable fit-for-purpose reuse of stormwater

## ISSUE 12A - IMPROVE WATER SUPPLY SECURITY

Water resources can be susceptible to drought. Improve the diversity and resilience of our water supply.

Encourage and implement fit-for-purpose stormwater reuse.

Reduce irrigation costs and allow for irrigation during water restrictions.

## SOLUTION

QDC

Rainwater tanks and a basic inexpensive form of passive irrigation for street trees to be made mandatory.

EPP

Total Water Cycle Management Plans (TWCMP) to be reintroduced.

Investigate ways to fund stormwater harvesting schemes (e.g. market incentives, stormwater connection fees, impervious area tax, portion of offsets funding).

## OUTCOMES

Expand cost effective and resilient non-potable water supply network via rainwater tanks and stormwater harvesting.

## JUSTIFICATION

A meta study of various willingness to fund research projects documented the freedom from water restrictions benefit and found it varies from \$3 a month to \$33.50 a month per household (Houtven et al., 2017).

Zhang et al. (2015) used this method in reporting that a rainwater tank has a one-off value of \$18,000 per property.

Undertaking the TWCMP allowed MBRC to reduce waterway associated costs from approximately \$4M to \$800K.

## CASE STUDIES

- Moreton Bay Regional Council TWCMP (Figure 12)
- Fitzgibbon Chase PotaROO
- Southbank Rain Bank

## ACTIONS

- Liaise with QDC regarding tanks
- Insert TWCMP into the EPP
- Update Water by Design (WbD) Stormwater Harvesting Guidelines



Figure 12  
Moreton Bay Regional Council – Total Water Cycle Management Plan



## In Summary

The State Planning Policy has been the catalyst for considerable investment in the protection of our waterways. However, as stated throughout this document, there is now a clear case for improving these regulations. Furthermore, with additional climate change and population pressures left unchecked, our 'business as usual approach' may not be sufficient to prevent the gradual degradation and eventual demise of these waterway assets.

This document has outlined twelve key strategies to Protect, Maintain and Enhance our waterway values and reconnect our efforts back to the original intent of the Environment Protection Policy.

This can be achieved by first acquiring a better understanding of waterway hazards and values and then investing in strategic, evidence-based, high impact solutions.

The condition of the waterways we gift future generations, will depend on the actions we collectively take today.

## Table of acronyms

AAMN - Adaptive Asset Management Network

B.A.U. - Business as Usual

BCC - Brisbane City Council

CAP - Catchment Action Plan

LG - Local Government

CoGC - City of Gold Coast

CRCWSC - Cooperative Research Centre for Water Sensitive Cities

CRC - Cooperative Research Centre

DES - Department of Environment and science

EPP - Environmental Protection (Water) Policy

ESC - Erosion and Sediment Control

GPT - Gross Pollutant Trap

HEV - High Ecological Value

LAMP - Long-Term Adaptive Monitoring Program

LGA - Local Government Authorities

LGIP - Local Government Infrastructure Projects

MAR - Mean Annual Runoff

MRBC - Moreton Bay Regional Council

MSES - Matters of State Significance

PDA - Priority Development Area

MUSIC - Model for Urban Stormwater Improvement Conceptualisation

QDC - Queensland Development Code

QUDM - Queensland Urban Drainage Manual

R&D - Research and Development

SMDOs - Stormwater Management Design Objectives

SPP - State Planning Policy

SQ - Stormwater Queensland

SQID - Stormwater Quality Improvement Device

TAL - Total Annual Load

TCC - Townsville City Council

NorBE - Neutral or Beneficial Effect

TN - Total Nitrogen (Nutrient)

TP - Total Phosphorus (Nutrient)

TSS - Total Suspended Solids (Sediment)

TWCMP - Total Water Cycle Management Plan

USIA - Urban Streamflow Impact Assessment

WbD - Water by Design

WQIP - Water Quality Improvement Projects

WSUD - Water Sensitive Urban Design

WQ - Water Quality

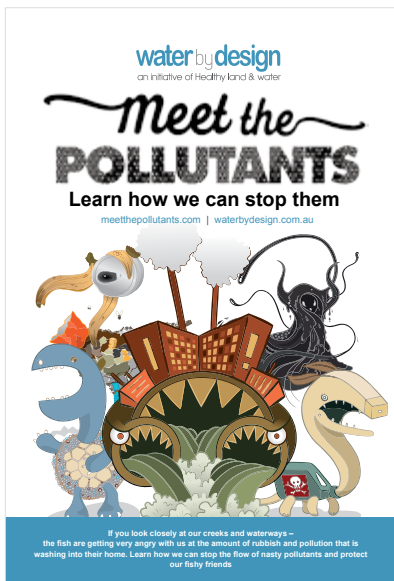
Products by Healthy Land and Water



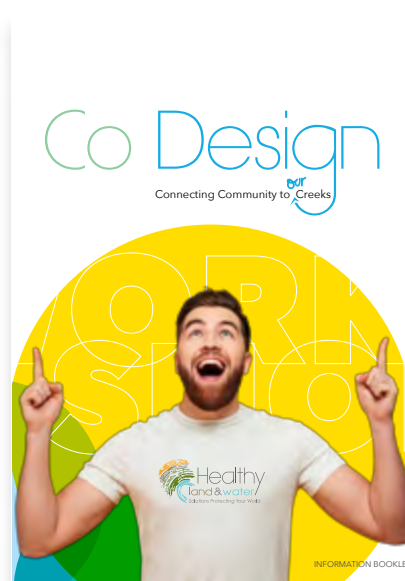
Strategic Waterways

A tool to categorise and prioritise waterway investments

Waterwise Street Trees



Meet The Pollutants



Co Design  
Connecting Community to Our Creeks



Activity Booklet



water by design



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