BLIGH TANNER

Townsville Regional Stormwater Strategy

Part 3: Recommended Strategy

The Regional Stormwater Strategy seeks to identify a smarter way that stormwater quality can be managed, which reduces the overall cost to developers and ratepayers, while delivering better environmental outcomes.

The strategy is documented in three parts:

Part 1: Literature Review and Stake-holder Consultation

Part 2: Analysis Report

Part 3: Recommended Strategy (this document)

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Stormwater Quality

Stormwater runoff can cause erosion of local waterways and carry increased sediment, nutrients, litter and other contaminants into creeks and rivers, and into the waters of the Great Barrier Reef.

Regulation

Council is obliged to take all reasonable and practical steps to avoid environmental harm under the Environmental Protection Act 2009, and is required to apply the water quality provisions of the State Planning Policy (SPP) 2014 to new development. This requires development to either meet Best Practice Environmental Management, or achieve specified reductions in sediment, phosphorus and nitrogen loads (85%, 65% and 40% respectively). This is typically achieved by applying water sensitive urban design (WSUD) principles.

Growth

Over the next thirty years, as the Townsville population increases to about 300,000 people, an additional 3600 ha of land could be developed.

Stormwater Management Challenges

The dry tropical climate of Townsville, coupled with challenging soils and vulnerability to invasive weeds, makes stormwater quality management particularly challenging. There are concerns about the efficiacy and appropriateness of some treatment measures, and the long term risks to ratepayers associated with poor quality assets.

Local water quality data suggest sediment is a major focus for attention.

Strategy Objective

This strategy seeks to identify a smarter way that stormwater quality can be managed, which reduces the overall cost to developers and ratepayers, while delivering better environmental outcomes.

Recommended approach

Greenfield Development

+ Ensure topsoil and subsoil analyses are undertaken to inform development plans
+ Encourage and reward low-impact design principles that avoid/minimise the generation of stormwater runoff
+ Encourage simple and low cost practices to mitigate stormwater runoff, such as grass swales and passively irrigated street trees
+ Encourage wide shallow drainage swales, and restrict the construction of deep open drainage channels in sodic soils
+ Allow developers to use the Living Waterways framework as an alternative means of satisfying the stormwater quality requirements
+ Allow developers to pay an offset for any shortfall in stormwater water quality targets. The offset application form should include a declaration by the developer that they have received advice in relation to cost effective on-site practices
+ Ensure erosion and sediment control measures are implemented.

Infill development

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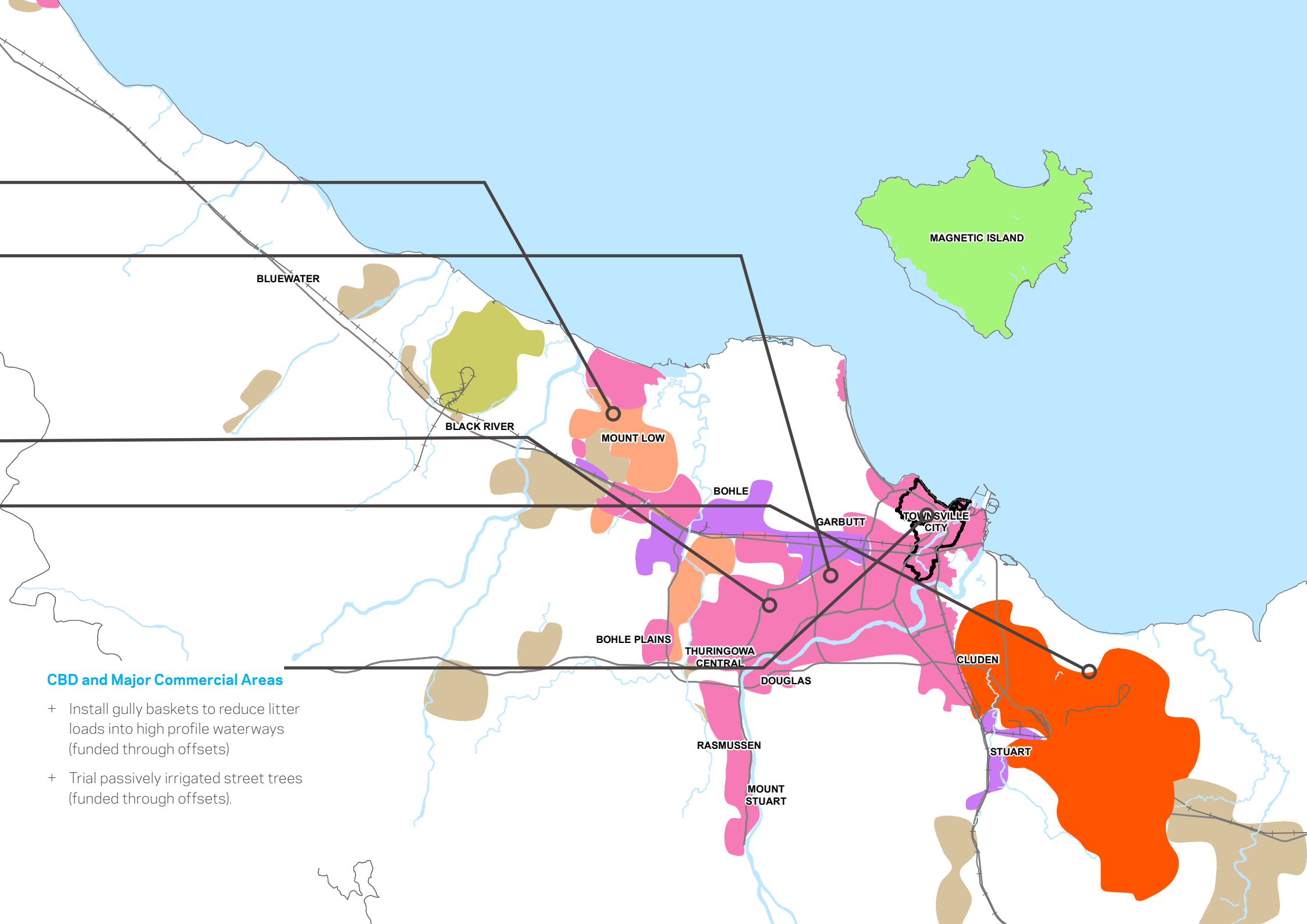
+ Ensure erosion and sediment control measures are implemented
+ Proprietary filtration devices should be discouraged on the basis that they are not cost effective and unlikely to be maintained. The offset price will invariably be less than the cost of such products, and be a cheaper and easier option in most cases.

Existing urban areas

+ Reduce the amount of irrigation through education and incentives
+ Promote water-sensitive gardening techniques such as swales to retain and infiltrate stormwater runoff
+ Trial the use of downpipe diverters
+ Trial passively irrigated 'water smart' street trees.

Stuart Creek Catchment

+ Ensure the urban design and housing achieves a high degree of hydrologic management to avoid significant changes to the geomorphology of Stuart Creek. This will likely involve limitations on impervious surfaces, and the harvesting, infiltration and detention of surplus runoff
+ On site stormwater quality management does not appear to be critical in this catchment, and so default stormwater quality targets could be waived and replaced by a focus on minimising hydrologic change through the retention, infiltration and detention of runoff. This will achieve stormwater quality benefits as a by-product.



CBD and Major Commercial Areas

+ Install gully baskets to reduce litter loads into high profile waterways (funded through offsets)
+ Trial passively irrigated street trees (funded through offsets).

Recommended approach (cont.)

Offsets

+ Council should allow eligible new development to purchase offsets for shortfalls in meeting stormwater quality targets
+ Offsets should be priced based on the principles outlined in Part 2
+ The price should be reviewed every one to two years
+ Offset funds should initially be used for the following suite of activities
    + Erosion and sediment control education and enforcement. The strategy includes a provisional cost of $200k/yr. for a full time officer, vehicle and for the development of promotional material
    + Gully erosion management across the broader Townsville LGA.
    + Retrofit gully baskets into major commercial areas and known litter hotspots.
    + Install passively irrigated street trees as the default option whenever any new street trees are being planted or replaced. Progressive retrofitting of existing trees should occur where this can be done without adversely affecting tree health.
    + Research and development into stormwater issues and locally appropriate and effective stormwater treatments.

Maintain

+ Record all water quality assets wtihin Council's asset management system.
+ Provide sufficient funding to ensure an adequate level of service to achieve water quality outcomes and avoid asset deterioration (e.g. weed infestation)
+ Recognise that this asset base is growing, and increase the year-on-year maintenance allocation accordingly.

Research and Development

+ Monitor base flows and storm events to better understand local water quality issues.
+ Undertake a rigorous economic analysis of rainwater tanks which considers the benefits to the water supply and stormwater networks.
+ Trial downpipe diverters.
+ Quantify the mass of pollutants being removed from waterways as a result of aquatic weed (Salvinia) harvesting, to help determine the cost effectiveness of this activity and its potential to be funded through offsets.
+ Install a bioretention system which has inlets and outlets suitable to installing sampling instrumentation, and monitor its effectiveness over an extended period. In order to conduct effective research, the bioretention system for monitoring needs to be well designed and constructed.
+ Investigate the potential to reduce nutrient loads by tree planting along waterways/drains so as to reducing manicured/slashed areas, increase evapotranspiration, and reduce algal blooms (especially in lakes).

Policy Reforms

+ Adopt the Living Waterways framework as an acceptable solution to meeting stormwater quality requirements.
+ Based on the results of further water quality monitoring, request the Queensland Government review the stormwater quality targets for Townsville.
+ Review development manual and standard drawings to reflect preference for management measures and describe stormwater quality offset scheme.

Capacity Building

+ Industry and Council officers need to be equipped with the knowledge, skills and tools to understand water quality and stormwater issues, diagnose the issues at a particular site, determine the preferred solution, and then be able to design and execute that solution effectively. The skills to do this are not taught in most universities, and there are scarce opportunities for professionals to learn them. This is one of the factors contributing to poor water sensitive urban design outcomes to date.
+ The strategy foresees the continuing design and construction of developer-created stormwater quality assets, and for these to become valuable community assets which are properly designed, built, and maintained, there must be an investment in capacity building in the form of:
    + Up to date guidelines and factsheets.
    + Regular and accessible industry seminars.
    + Field trips to highlight good and poor practice.
    + Longer format training courses.

Review and Adapt This Strategy

This strategy should be reviewed within three (3) years, taking into account:

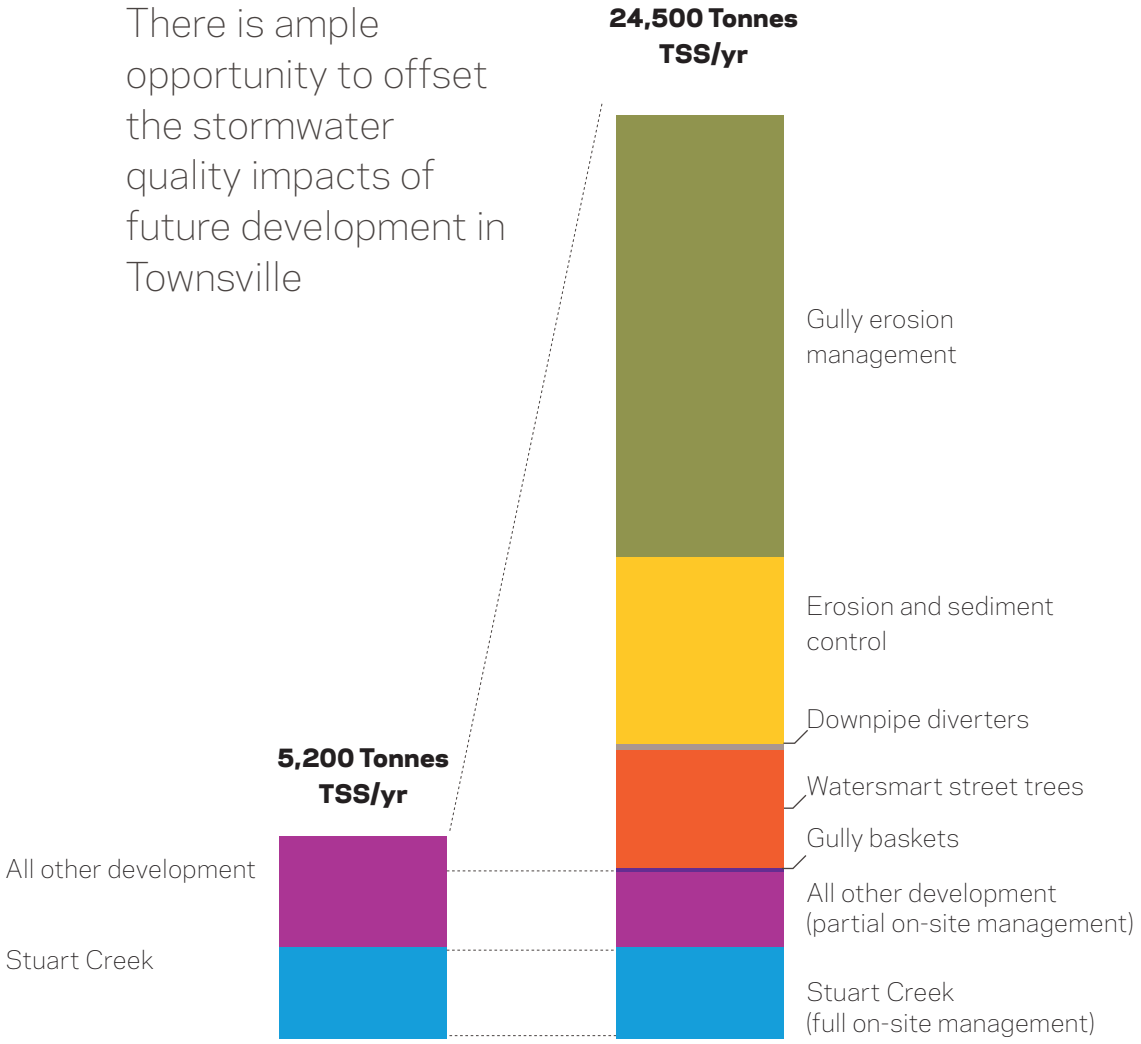
+ Water quality data collected, including on baseflow and stormflows
+ How well stormwater quality management practices are being implemented
+ Experience from other local governments in implementing their stormwater offset schemes
+ Any changes to the State Planning Policy
+ Innovations and improvement in stormwater management.

Stretch Activities

Should Council wish to become a national leader in stormwater quality management, it could also consider:

+ A local container deposit levy and a ban on plastic bags to reduce litter entering waterways
+ A stormwater levy based on impervious areas as a broad and equitable basis to fund waterway health activities including maintenance of stormwater quality assets. This could be included with Council rates.
+ A local waterway health report card.

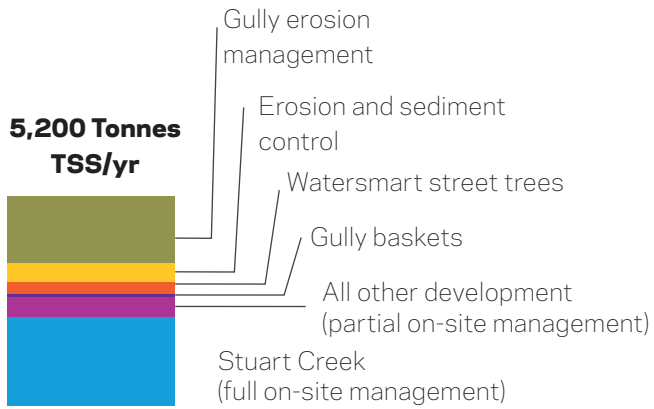
There is ample opportunity to offset the stormwater quality impacts of future development in Townsville



TARGET AMOUNT OF SEDIMENT REDUCTION ASSOCIATED WITH FUTURE DEVELOPMENT

POTENTIAL OFFSET SUPPLY OF PREFERRED MEASURES

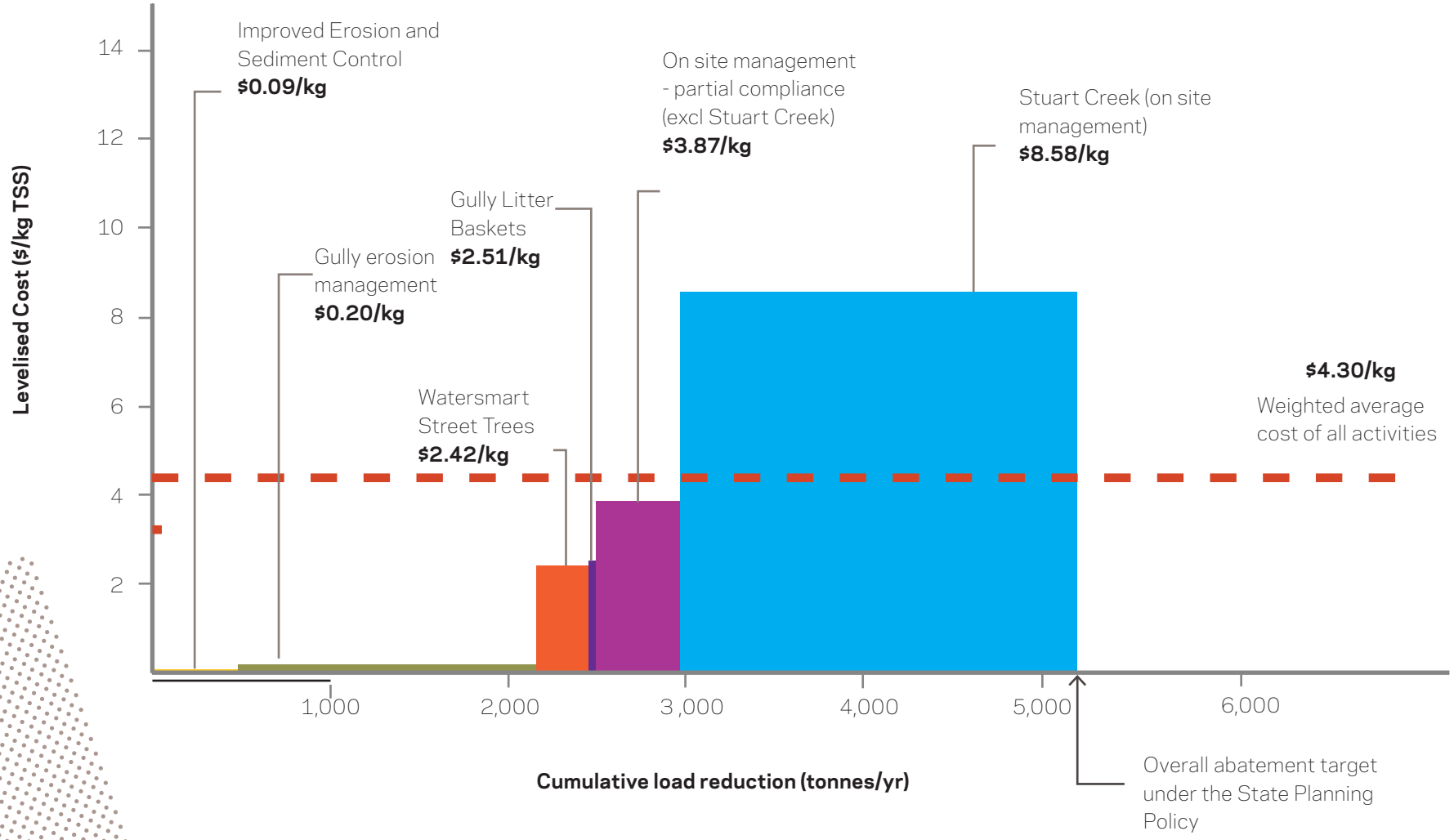
The recommended strategy combines options that are both cost effective and can be practically implemented



RECOMMENDED SUPPLY OF OPTIONS

The recommended strategy will be cheaper than the business-as-usual approach to stormwater quality management.

Capital and maintenance costs are expected to be about 30% lower.



Business Case

Business as Usual

Under a business as usual approach, over the next thirty years, as the population increases to about 300,000 people and an additional 3600 ha is developed, about $350M will have been spent building new bioretention systems to meet the SPP targets. This cost will be initially borne by developers and passed on to residents.

Over 90% of these assets are likely to be dedicated to Council, with an annual maintenance bill of between $1 – 9 million per annum, depending on the quality of assets delivered.

A proportion of those assets will be poorly delivered and require rectification, either paid for by the developer or Council, or if left unattended, poorer environmental outcomes would result.

Under this scenario, regional stormwater pollutant loads would increase by 1%, as sediment loads from construction sites would outweigh the benefits of the treatment systems. Other waterway impacts, such as streambank erosion, would not necessarily be addressed.

The levelised cost of abatement would be about $8.58/kg TSS.

Recommended Strategy

Under the recommended strategy, the weighted average cost of abatement would be about $4.30/kg TSS.

Approximately 50% of the overall abatement is achieved with measures which have no or very little ongoing maintenance costs (improved erosion and sediment control, gully erosion management, and water smart street trees). These measures have additional benefits in preserving valuable soils, enhancing biodiversity and improving the amenity of urban areas.

Note that in this analysis, it has been assumed that the default solution for the Stuart Creek Catchment is bioretention systems sized at 1.5% of contributing catchment area, and for other development areas the solution is bioretention sized at 0.5% of catchment area. Bioretention has been used in this cost analysis as it is likely to provide conservative estimates of cost. Ideally there would be a broader range of solutions implemented within these areas, as has been recommended, and these would have a lower cost.

Note further supporting analysis is included as an Appendix to Part 2 of this Strategy.

	Business as usual	Recommended strategy	% change
Total CAPEX	$350M	$176M	-50%
OPEX ($/yr)	$5.95M	$3.6M	-40%

	Capex ($)	Opex ($/yr)
Business as Usual		
Stuart Creek on site management	156,604,817	2,662,524
On site management (other development)	193,451,644	3,288,977
Totals	**$ 350,056,462**	**$ 5,951,501**
Recommended Strategy		
Stuart Creek on site management	156,604,817	2,662,524
On site management (other development)	12,896,776	219,265
Gully baskets	183,700	82,164
Water smart street trees	6,230,769	173,077
Improved Erosion and Sediment Control	0	200,000
Gully erosion management	339,559	33,956
Capacity Building		200,000
Totals	**$ 176,255,622**	**$3,570,986**

All costs in $AUD2015

Note these costs assume that, where used, bioretention systems are well designed, established and maintained. Maintenance costs can be 10 times higher if this is not the case.

Future Research

Gully erosion management

There is significant potential to upscale the quota of gully erosion management. This management approach is the most cost effective option after improved Erosion and Sediment Control, and has the largest potential to reduce sediment loads.

Currently, the strategy assumes 15% uptake of the gully erosion management potential. This is low because there are several uncertainties associated with the current estimates, and the management approach has not been rigorously analysed in terms of its efficacy, particularly given Townsville's terrain, climate, vegetation and soils.

Under current estimates of gully density, sediment reduction and costs, gully erosion management has the potential to reduce regional sediment loads by **11,300 tonnes per year** at a cost of **$2.3M** in capital works. Compared with the business as usual approach, *this is more than double the sediment reduction, at less than 1% of the cost*.

However, there are several uncertainties associated with the approach and its estimates:

+ There is limited currently available gully erosion mapping for the Townsville region, so the **estimated quantity of gullies** is highly uncertain
+ There is limited reliable or transferable research on the **potential sediment reduction**, and these numbers are vary depending on the gully characteristics
+ The current **costs** do not include provision for maintenance costs, e.g. maintaining fencing to exclude stock from gullies

This is a priority investigation area and has the potential to provide significant cost savings in stormwater management across the Townsville region.

Industry Engagement

The strategy is a sufficiently significant departure from current practice and warrants purposeful industry engagement. The recommended engagement strategy is as follows:

1. Provide direct feedback to the small group of stakeholders who participated in the consultation interviews. This could be via a small group briefing session, with follow-up phone calls for anybody unable to attend.

2. Provide two industry briefing sessions (at two different times and dates) which introduce the key aspects of the strategy relevant to the development industry. This should cover the purpose of the scheme, how it works in practice, how to know if a site is eligible for offsets, and some high-level guidance on how to determine cost-effective strategies combining on-site practices and offsets). This could be held in collaboration with the UDIA and other professional bodies such as the Planning Institute of Australia, Engineers Australia, and Stormwater Queensland.

3. Prepare a succinct factsheet and set of frequently asked questions which can be accessed from Council's website, can be provided to applicants at pre-lodgement meetings, and appended to Requests for Further Information on development applications.

4. Ensure relevant development assessment staff are well versed on the strategy and how it works, and are able to answer queries from industry.

5. There are inevitable 'teething issues' with any new scheme of this nature, and Council should act collaboratively with Industry during the early stages of the strategy's implementation to ensure that the industry has confidence in the scheme.

6. Council should publicise any projects undertaken with offset funds to ensure the industry is aware that offset funds are being used for their intended purpose.