

# INTEGRATED WATER STRATEGY

2015-2031



**A Total Water Cycle Management Framework for Ipswich**

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# EXECUTIVE SUMMARY

Water is essential for human survival. However a number of challenges faced by communities are requiring a new approach for water management. Risks of water shortages, water quality degradation and the increasing impacts of flooding are issues requiring attention and long term planning.

This integrated water strategy establishes a framework for the management of the water cycle in Ipswich in accordance with a total water cycle management approach. Ipswich's water cycle combines a complex and interrelated mix of people, industry, catchments, rivers, dams, reservoirs, water service provider assets (potable water and sewerage networks), stormwater drainage features and flood mitigation works. Some elements of the water cycle are within the Ipswich Local Government Area (LGA), while others – such as Wivenhoe Dam - are outside of the Ipswich LGA but impact on, or are impacted by what happens here.

Integrated water management seeks to cost effectively improve water management in a way that meets community expectations as well as maximising social and environmental benefits. It is about recognising all of the elements of the water cycle and considering the interactions between them when decisions are made.

This strategy considers all elements of the water cycle that Ipswich City Council (ICC) has a responsibility for, such as stormwater, flooding, waterways, Council water use and catchments, as well as the areas where Council's decision making impacts on the water cycle - for example water supply, sewerage and groundwater.

This strategy aims to take the first, most significant step towards a water sensitive future for Ipswich, by developing a shared understanding of the water cycle issues for Ipswich, and providing a framework so that solutions can be identified and delivered in a strategic way to achieve long term outcomes.

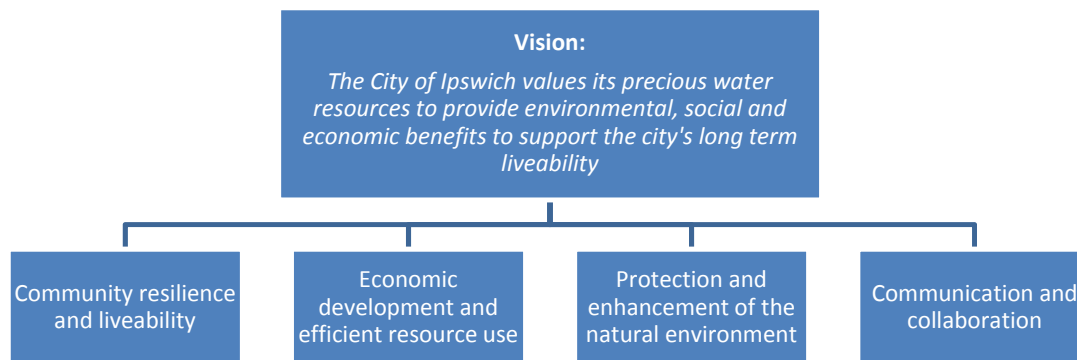
The following key water cycle issues for Ipswich City Council have been identified:

- Floodplain management and flood risk
- Drought resilience
- Urban growth and population increases
- Erosion, sediment and dispersive soils
- Climate change and urban heat island impacts
- Waterway health and wetlands
- Cultural heritage and traditional owner values
- Stormwater quality management
- Stormwater infrastructure planning
- Community engagement
- Consumption of water in Council facilities
- Understanding changing roles and responsibilities
- Recreational water quality
- Catchment and local government boundaries
- Managing salinity

Addressing all of these issues in an integrated way while working towards one clear direction for water management for Ipswich will help to optimise benefits to the community, influence innovative solutions, reduce waste, and avoid duplication across water cycle stakeholders.

A number of stakeholders have a role in water management in Ipswich, including Council, Queensland Urban Utilities (QUU), Seqwater, SEQ Catchments, Ipswich Rivers Improvement Trust, Healthy Waterways Partnership, the Queensland State Government and the community. This strategy identifies roles and responsibilities in collaboration with stakeholders and provides a platform for ongoing communication and collaboration.

A long term vision for integrated water management has been established for ICC, supported by four strategic objectives which are underpinned by a number of integrated water management principles. The vision and objectives are set out below:



The implementation of the strategy will involve an ongoing drive towards the long term vision. Council have led the development of this strategy, however the implementation of actions to achieve the strategic direction will result from actions across multiple stakeholders. The key actions will include the following:

- Development of implementation and action plans to address the key water cycle issues in ways consistent with the principles of this strategy.
- Establishing integrated planning outcomes and enhanced communication with stakeholders.
- Annual reporting on the progress towards Council's integrated water vision and strategic outcomes.

# INTRODUCTION

Ipswich is predisposed to variable weather conditions resulting in a high likelihood of droughts and flooding. It also faces increasing temperatures and potentially more extreme events as the climate changes. These events - and growing recognition of their impacts - have prompted an improved understanding of how the elements in the water cycle collectively contribute towards the City's liveability, particularly as the population grows and the City develops.

The need to address these issues has led to the desire to establish an integrated water management framework for the City.

## WHAT IS INTEGRATED WATER MANAGEMENT?

Integrated water management is an ongoing process of managing water quality and quantity in a coordinated way, recognising interconnections between different parts of the water cycle, increasing communication, and maximising social and economic benefits while protecting the environment.

Integrated water management incorporates a number of concepts to achieve improved water management, in accordance with the following principles of total water cycle management:

- Recognition of the different elements of the water cycle
- Advancement of a “whole of system” approach to managing water
- Enhancement and protection of the environmental values of receiving waters
- Increased understanding of climatic conditions and the likelihood of droughts and floods
- Minimising the impacts of alteration to natural flow and water quality regimes
- Reducing demand by minimising water use and losses, and maximising efficient use and re-use of water
- Considering all potential sources of water when new supplies are needed, including re-using water and stormwater
- Recognition of all stakeholders' roles and responsibilities.

This strategy uses an integrated water management framework to address the water cycle issues within Ipswich City Council's influence, while also providing for integration with other entities' management of the water cycle that they are responsible for.

## PURPOSE AND SCOPE OF THIS STRATEGY

This strategy considers all elements of the water cycle, which includes:

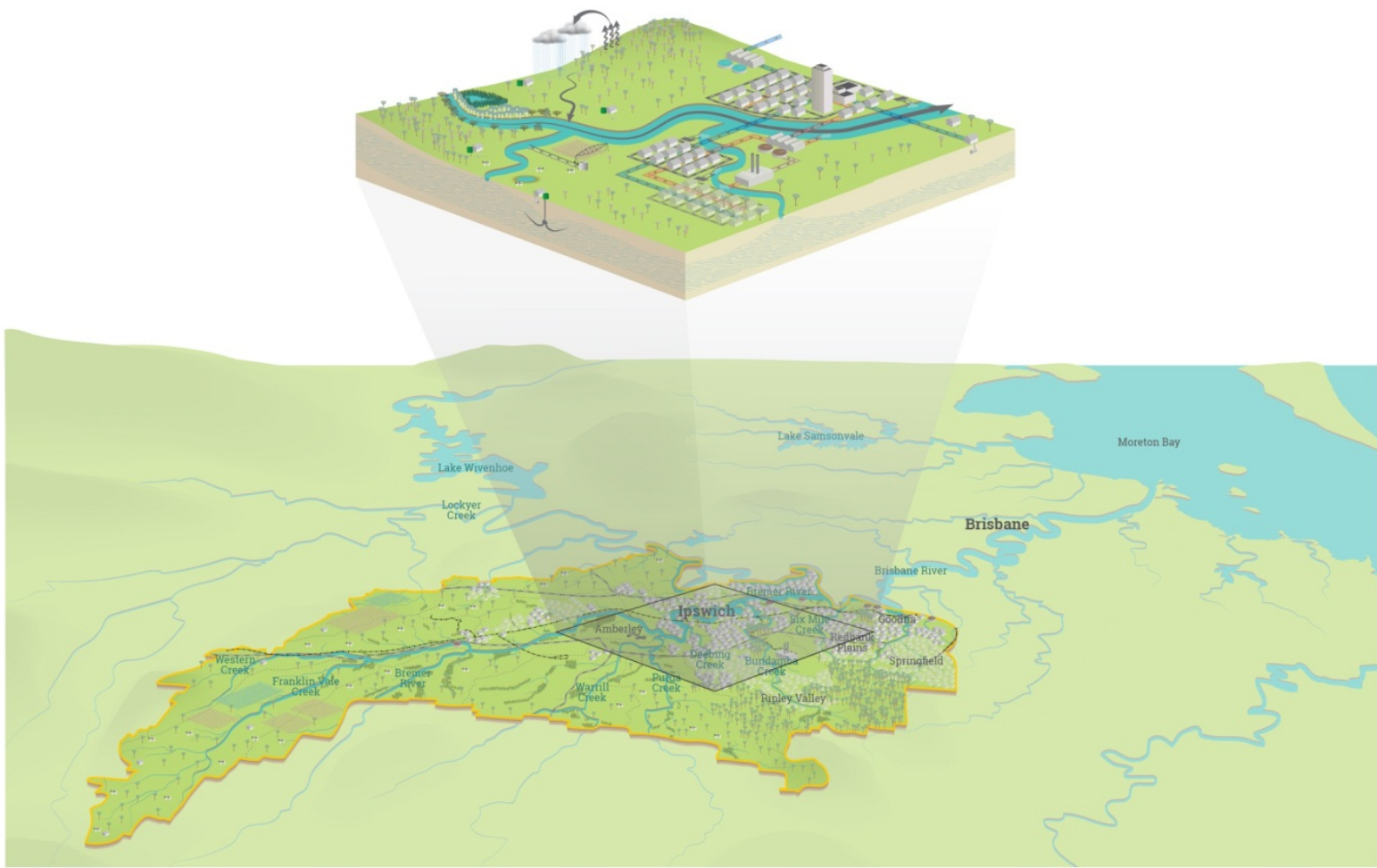
- Stormwater
- Flooding
- Water use and efficiency
- Potable water supply (including recycled water and potential reuse)
- Waterways
- Catchments
- Groundwater
- Sewerage networks and effluent management

Figures 1 and 2 conceptualise these elements of the water cycle within Ipswich. Council has direct responsibility for some of these elements, while for others Council has no direct responsibility but some influence on how a particular element is managed, for example potable water supply and sewerage.

This strategy is a long-term planning document, designed to connect and align wide-ranging stakeholders and their existing plans, strategies and actions to provide a direction for Council's role in management of water resources. The strategy will help improve coordination and management of various Council activities with regard to water management so everyone is working towards a common direction.

## PLANNING TIMEFRAME

This strategy focuses initially on the period from now until 2031. This is consistent with the planning horizons in the South East Queensland (SEQ) Regional Plan and the Ipswich Long Term Community Plan (i2031). However, there is also a need to consider ultimate development and longer timeframes when planning for integrated water management outcomes. Ultimate development for Ipswich (as provided for by the current Ipswich Planning Scheme) will result in a population of more than 500,000 people, but will not have been reached by 2031. The implications of ultimate development will continue to be considered when progressing Council's integrated water management activities and planning.



**Figure 1: Ipswich City Council Water Cycle Conceptualisation**



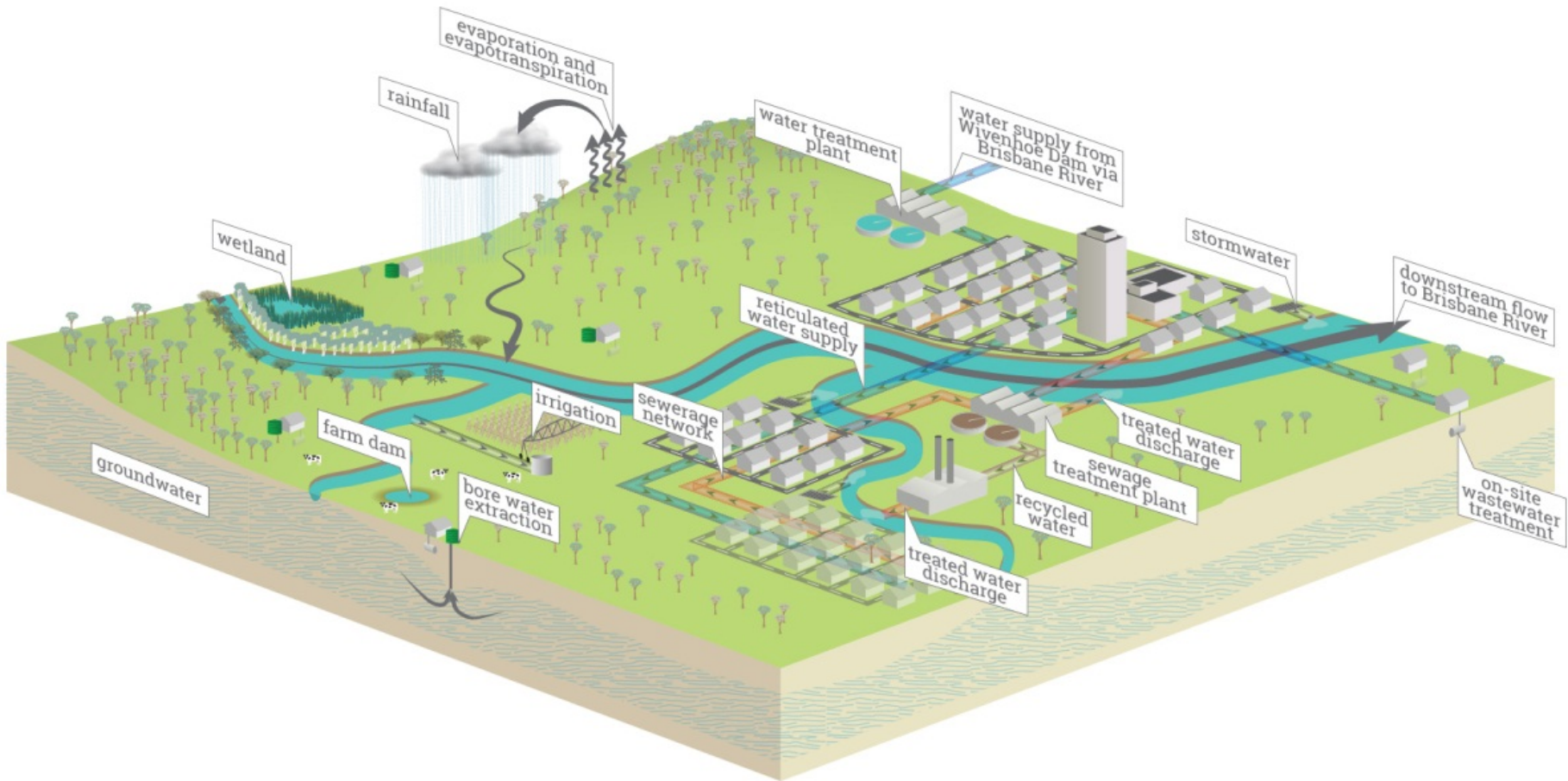


Figure 2: Elements of the Water Cycle in Ipswich

## LINKS TO COUNCIL'S LONG TERM PLANNING

Ipswich has committed to total water cycle management planning in its corporate planning documents: i2031 and Ipswich City Council Corporate Plan. Within the i2031, concepts of integrated water management flow through the long-term vision and filter into the goals and strategies. Development of a total water cycle management framework is identified as a key action.

The i2031 sets a picture of the community in 2031 and beyond, and reflects the aspirations of residents, investors and business operators and other major stakeholders. It sets out how they would like the City of Ipswich to be in 2031. The vision captures a number of matters that integrated water management can help to achieve:

- In 2031.... Ipswich City is alive with stimulating urban and rural centres, thriving business districts, excellent community facilities and infrastructure, and rich natural environments.*
- In 2031... Conservation of the natural environment is paramount, with sustainable development embraced throughout Ipswich City, especially in its newer communities.*
- In 2031... The internationally recognised Ripley Valley features acclaimed urban design and responsible water management standards.*
- In 2031... There is the promotion of a clean and healthy river system.*
- In 2031.... The protection of native flora and fauna is an essential part of development in Greenfield areas.*

Total water cycle management planning is specifically identified as a tool to give effect to the i2031 vision through more specific goals and strategies within the plan. These are set out in Table 1.

**Table 1: Summary of i2031 Themes, Goals and Strategies Requiring TWCM Planning**

Vision Theme	i2031 Goal	Relevant Strategy for Integrated Water Management / TWCM Planning
<b>Infrastructure and Services: Water a Valuable Resource</b>	The City of Ipswich respects the value of its precious water resources and manages them to ensure their sustainable use (Infrastructure and Services Goal 3)	Ensure potable and recycled waters are used 'fit for purpose'
<b>Natural Environment: Planning for Healthy and Sustainable Environments</b>	Ipswich has a rich, biologically diverse and attractive natural environment sustaining a broad range of fauna, flora and ecological systems across its many and varied landscapes (Natural Environment Goal 1)	Implement integrated management measures to protect and enhance important habitat areas under both public and private ownership

**Action:**  
Total Water Cycle Management Planning for Ipswich City Council

The development of the Integrated Water Strategy and ongoing implementation of actions will help achieve some of the City's long-term goals, while playing crucial supporting roles to achieving the long-term vision for the City.

# TRANSITION TO A WATER SENSITIVE CITY

Leading water researchers and policymakers have developed the concept of a water sensitive city to provide a tangible vision for a sustainable water future, emerging from the process of integrated water management planning. This Integrated Water Strategy provides a framework to assist Ipswich to develop in ways consistent with a water sensitive city approach, which will also support Council’s strategic visions.

The water sensitive city concept has three principles:

- Cities as water supply catchments - access to water through a diversity of sources at a diversity of supply scales.
- Cities providing ecosystem services - the built environment functions to supplement and support the function of the natural environment.
- Cities comprising water sensitive communities - socio-political capital for sustainability exists and citizens’ decision making supports water sensitive behaviours.

Figure 3 shows the cumulative drivers and management responses in the transition of a city towards becoming water sensitive. Stakeholders have identified Ipswich as currently sitting between the “drained city” and “waterway city”. Over time, integrated water planning will help transition Ipswich towards a more adaptive, long-term sustainable water sensitive city.

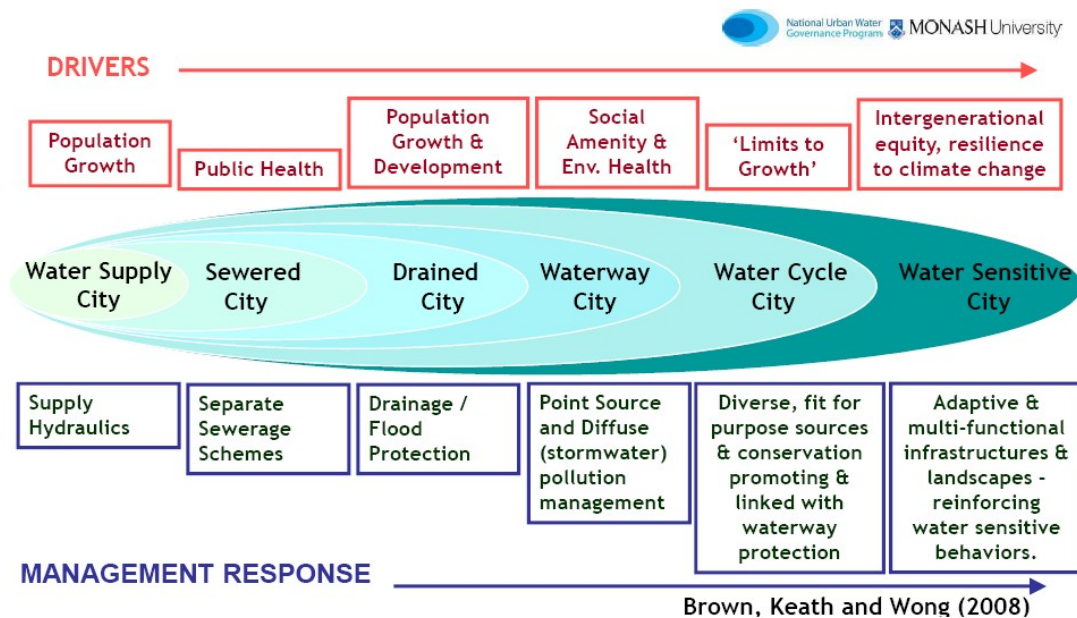




Figure 3: Transitioning to a Water Sensitive City


The concept of water sensitive cities was explored in detail for Queensland in Towards a Water Sensitive Future (2010). That report identified how the shift towards a water sensitive city could occur. These concepts are explained below:

 **> Diverse sources of supply**

A shift away from	To
The traditional reliance on rainfall and surface storages as the sole source of water supply.	A diverse portfolio of supply sources such as dams and reservoirs, groundwater, urban stormwater, rainwater tanks, recycled wastewater, greywater reuse and desalinated water.  A mixture of centralised and decentralised systems.

 **> Healthy waterways and ecosystems**

A shift away from	To
Seeing waterways as a drain, or a vehicle to dilute and transport waste.	Waterways and associated open spaces provide a range of ecological functions such as healthy aquatic ecosystems for flora and fauna, carbon sinks, natural cooling of the urban environment and food production capability.  Managing the whole catchment, and not just the waterway, recognising the role of natural green infrastructure that stores and uses water in productive ways.

 **> Informed and supportive community**

A shift away from	To
Seeing water as an abundant resource that is available on demand for minimal cost.  Seeing engineering solutions as the key to solving all water issues.	Increased capacity of urban water organisations to advance sustainable water management, supported by appropriate institutional arrangements and skilled personnel.  Widespread awareness of water scarcity so that supply/demand gaps in water resources are met by demand reduction as much as possible.  Community involvement in defining and solving urban water issues.

From “Towards a Water Sensitive Future”,  
State of Queensland (Department of Environment and Resource Management), 2010

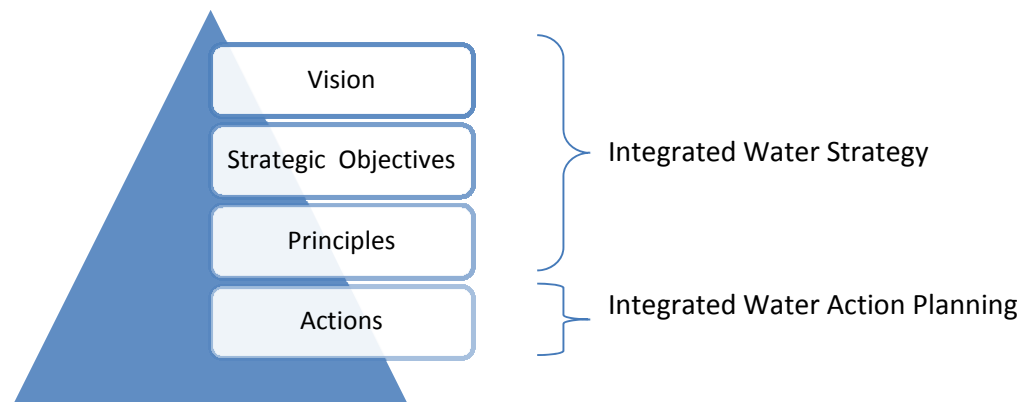
This strategy and the subsequent implementation of actions will help to advance Ipswich towards a water sensitive future.

# STRATEGIC FRAMEWORK

## FUNCTION OF INTEGRATED WATER STRATEGY FRAMEWORK

A key purpose of this Integrated Water Strategy is to provide a strategic direction for Ipswich in addressing its water cycle issues. This is comprised of a framework which includes a vision, strategic objectives and principles.

The principles and strategic objectives underpin the vision, which sets a broad direction for integrated water management in Ipswich. Achieving the vision will occur through implementing a series of subsequent actions, informed by the objectives and principles. The hierarchy of the components of the framework is shown by Figure 4.



**Figure 4: Integrated Water Management Strategic Framework and Relationship to Actions**

An explanation of each of these strategy components is set out in more detail in Appendix 3.

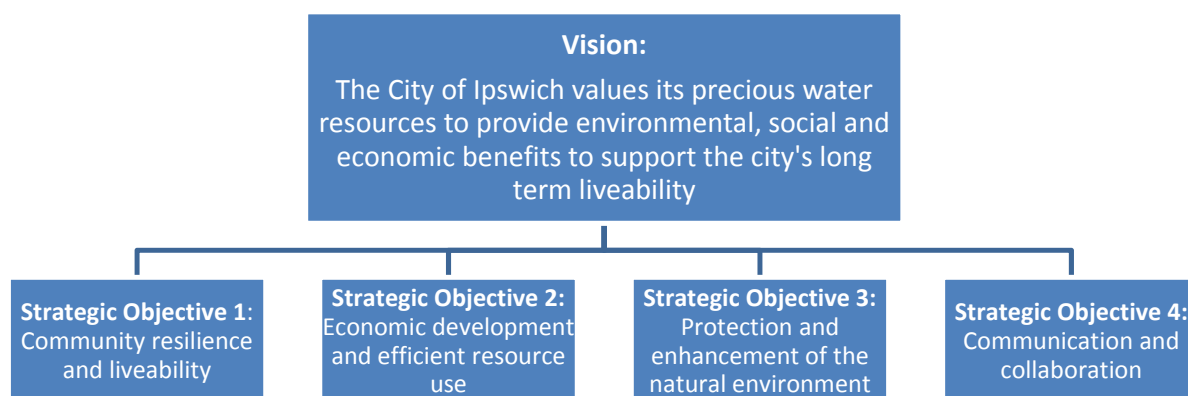
## STRATEGIC DIRECTION – VISION AND OBJECTIVES

The vision for Ipswich’s integrated water management was established in consultation with stakeholders and endorsed by the Council’s TWCM Steering Group. It incorporates stakeholder views and relevant components of Council’s i2031 vision relating to water management.

*The City of Ipswich values its precious water resources to provide environmental, social and economic benefits to support the city’s long term liveability.*

(Adopted by the Total Water Cycle Management Steering Group, 2 December 2013)

The integrated water vision for Ipswich is underpinned by four strategic outcomes which represent core themes for integrated water management (as shown in Figure 5 and further described in each of the Strategic Objective sections).



**Figure 5: Strategic Objectives Underpin the Vision for Integrated Water Management**

The strategic objectives set the desired circumstances and future water cycle management intentions that will result if integrated water management is effectively implemented in Ipswich.

For each of the strategic objectives, a number of supporting principles have been established for Council stakeholders with responsibilities in areas associated with key issues. Each principle provides guidance towards addressing the key water cycle management issues identified for the City and will inform the development and prioritisation of specific strategy implementation actions.

The following sections detail the strategic objectives and their supporting principles.

## STRATEGIC OBJECTIVE 1: COMMUNITY RESILIENCE AND LIVEABILITY

### Community Resilience and Liveability

*The community is prepared for and resilient to the impacts of severe climatic events such as droughts, floods and the impacts of climate change. The water cycle and the natural resources it supports are valued for their contribution to the community's health, amenity, recreation and long-term liveability of Ipswich as it grows.*

Integrated Water Management Principles for Ipswich	Improve the understanding of flood risks and manage and communicate them appropriately to minimise these risks to the community	P 1.1
	Consider environmental and social impacts of flood mitigation options	P 1.2
	Support effective floodplain management to ensure community safety and resilience	P 1.3
	Support efforts to prepare the community for droughts	P 1.4
	Support the appropriate use of recycled water	P 1.5
	Understand the impacts of climate change on the water cycle in Ipswich and develop climate change adaptation strategies	P 1.6
	Ensure multiple functions are provided for within riparian corridors as the City develops	P 1.7
	Utilise water to reduce urban heat island impacts	P 1.8
	Enhance community pride in the Bremer River	P 1.9
	Encourage and support water-based recreation opportunities in appropriate locations	P 1.10
	Provide the community with opportunities to view and access waterways for recreation.	P 1.11
	Ensure recreational water access is accompanied by appropriate water quality information	P 1.12
	Encourage appropriate sewerage and potable water services to Ipswich communities to protect public health and support planned growth	P 1.13
	Encourage the implementation of holistic water sensitive design measures to improve stormwater management and community liveability, integrating systems into the landscape to provide amenity benefits to the community	P 1.14
	Ensure long-term impacts and intergenerational equity are considered in water decision-making	P 1.15
	Protect drinking water catchments to ensure a safe, resilient and efficient drinking water supply	P 1.16
	Demonstrate Council stewardship and leadership in managing our impacts on the water cycle and communicate this to the community	P 1.17



## STRATEGIC OBJECTIVE 2: ECONOMIC DEVELOPMENT & EFFICIENT RESOURCE USE

### Economic Development and Efficient Resource Use

*Efficient and effective water management supports a thriving economy and well-managed growth and development, while negative impacts of land use change on the water cycle are minimised or avoided. New developments have access to cost effective integrated urban water services, utilising financially sustainable water sensitive urban design practices.*

*Water resources are used efficiently to ensure costs to the community are minimised and opportunities for more efficient uses are optimised.*

*The whole of life cycle costs of decisions associated with water management and activities impacting the water cycle are understood, forecasted and budgeted for. Costs are shared equitably by those who gain benefits from activities.*

Integrated Water Management Principles for Ipswich	Understand the long-term costs (including whole of life cycle costs) of decisions impacting the water cycle, particularly in relation to construction of assets, and communicate them to relevant stakeholders	P 2.1
	Consider long-term maintenance and replacement costs when designing, constructing or approving assets for water management	P 2.2
	Encourage diversity of water sources and ensure they are fit for purpose.	P 2.3
	Use water efficiently in Council operations, including facilities and in open space irrigation and seek opportunities for water reductions and cost savings	P 2.4
	Investigate and support opportunities for alternative water supplies, including stormwater harvesting to reduce reliance on potable water supplies in Council operations	P 2.5
	Ensure sufficient and appropriate water and sewerage infrastructure is provided to support development of a growing community and economic activity	P 2.6
	Cost effectively manage stormwater assets to provide for development in the City while also managing water quality impacts	P 2.7
	Increased focus on proactive management of Council's water assets to ensure continued performance	P 2.8
	Support the appropriate use of stormwater offsets / alternative stormwater solutions where they deliver optimised multiple outcomes for stormwater management (environmental, social, economic)	P 2.9
	Provide for resilient economic development in the City by understanding and managing flood risks	P2.10
	Understand and promote the economic benefits and ecological services provided by the City's waterways.	P 2.11

## STRATEGIC OBJECTIVE 3: PROTECTION & ENHANCEMENT OF THE NATURAL ENVIRONMENT

### Protection and enhancement of the natural environment

*Ipswich's waterways, catchments and riparian areas and the life they support are protected and enhanced, leading to improved environmental and waterway health outcomes, improved water quality, increased biodiversity values, and increased ecological services.*

*Development in Ipswich occurs in an ecologically sustainable way with regard to water. The multiple values of Ipswich's waterways are maximised - recognising their multiple functions for amenity, recreation, wetlands, economic values, cooling effects on cities, floodplain and ecological purposes.*

Integrated Water Management Principles for Ipswich	Protect or enhance all waterways and wetlands, recognising the multiple values they provide to the environment and the community	P 3.1
	Manage the impacts of land development on waterways and wetlands	P 3.2
	Ensure waterways, wetlands and riparian corridors are appropriately considered in Council's planning instruments	P 3.3
	Recognise the contribution of lower order waterways to the effective functioning of the water cycle	P 3.4
	Support and prioritise waterway health improvement projects	P 3.5
	Ensure environmental and pre-development flows in Ipswich's waterways are maintained	P 3.6
	Understand and maximise the benefits of catchment and riparian vegetation	P 3.7
	Seek opportunities to protect natural waterways and wetlands prioritised ahead of creating artificial waterways	P 3.8
	Effectively manage stormwater quality and quantity and ensure stormwater assets are well designed (including consideration of soil types), constructed and maintained to achieve water quality benefits.	P 3.9
	Improve water quality in the City's waterways	P 3.10
	Achieve or exceed water quality targets set out in State Planning Policies	P 3.11
	Manage high risk land uses to protect water quality	P 3.12
	Improve erosion and sediment control practices to ensure minimum regulatory standards or better are met for all developments within the City, using methods appropriate for the soils and environmental conditions within Ipswich	P 3.13
	Investigate and understand causes of water quality declines in the City and develop appropriate management strategies and responses	P 3.14
	Ensure the impacts of Council's activities on the water cycle are managed in accordance with the Council's Environmental Management Policy and this strategy	P 3.15
	Support the development of whole of waterway and catchment management plans and creek master plans	P 3.16

Ensure that water and sewerage infrastructure is provided in a way that achieves appropriate water quality outcomes. P 3.17

## STRATEGIC OBJECTIVE 4: COMMUNICATION AND COLLABORATION

### Communication and collaboration

*Ipswich's place within a broader water cycle is understood. The community has an increased awareness, understanding and engagement in water management and decision-making.*

*Council, the community, water providers, industry, government, environmental groups and other water cycle stakeholders have an improved understanding of each other's roles and responsibilities. Opportunities for communication, collaboration and partnerships across the water cycle are encouraged and supported.*

Integrated Water Management Principles for Ipswich	Encourage, support and seek opportunities for cross-boundary partnerships and collaboration on water cycle projects.	P 4.1
	Engage with appropriate water cycle stakeholders and external agencies to advance the principles of total water cycle management for Ipswich	P 4.2
	Clarify and communicate roles and responsibilities for water management within Council and external agencies	P 4.3
	Support opportunities for participation in water cycle research	P 4.4
	Consider impacts on the water cycle at multiple scales (site, sub-catchment, catchment)	P 4.5
	Establish communication protocols across statutory water cycle stakeholders	P 4.6
	Facilitate communication and collaboration across Council to maximise water cycle outcomes	P 4.7
	Prioritise consideration of impacts on the water cycle early in decision-making for Council activities.	P 4.8
	Integrate water planning with other long-term planning within Council	P 4.9
	Ensure cultural heritage and traditional owners are appropriately recognised and provided for in water cycle management	P 4.10
	Support capacity building, regional collaboration and best practice forums regarding water management	P 4.11
	Ensure up to date, relevant best practice is incorporated into Council water management activities	P 4.12
	Provide information to the community about water management to support water smart behaviours, increase water cycle understanding, and build community understanding	P 4.13
	Engage with the community about water cycle management	P 4.14
	Support community education about water cycle management	P 4.15
	Encourage community participation and support for water management initiatives and decision-making	P 4.16
	Support appropriate regulation and enforcement to support water management decision-making	P 4.17

# INTEGRATED WATER STRATEGY IMPLEMENTATION

Establishing Council's Integrated Water Strategy is a significant step towards Ipswich's future as a water sensitive city. Translating the strategy into action to achieve the vision for Ipswich's integrated water management and addressing the key water cycle issues will occur as a result of sustained effort over time through a combination of the following implementation areas:



## IMPLEMENTATION AREA 1: HIGH PRIORITY FURTHER PLANNING

The integrated water management principles will be used to establish further implementation and action plans, in conjunction with the water cycle stakeholders. A yearly implementation plan for integrated water management will be developed, clearly setting out tasks and responsibilities. This planning may recommend further investigations and planning, or the development and implementation of particular infrastructure solutions. Each of the actions should be progressed in accordance with the strategic vision and objectives for integrated water management for Ipswich, with a specific focus on actions addressing the key water cycle issues identified through this process.

Options that optimise the strategic objectives should be allocated the highest priority:

- Community resilience and liveability
- Economic development and efficient resource use
- Protection and enhancement of the natural environment
- Communications and partnerships

The following areas of further investigation were identified as high priorities for consideration in the initial action planning over the first five years of the Integrated Water Strategy:

HIGH PRIORITY IMPLEMENTATION AREAS:
Development of a Council-wide implementation plan for stormwater quality offsets.
Progress improved erosion and sediment control actions, including use of auditing tools and seeking partnership opportunities.
Consider mechanisms for development of infrastructure masterplans (or alternative mechanisms) for the stormwater network.
Establish climate change adaptation policies that consider and respond to impacts on the water cycle.
Continue to engage with Queensland Urban Utilities and other stakeholders regarding appropriate water and sewerage servicing of the City, with a particular focus on Ripley Valley and other growth areas.
Floodplain management strategy development.
Incorporating the Integrated Water Strategy approach into assessment of flood mitigation options.
Review of the 2009 Waterway Health Strategy.
Advancement of a stormwater harvesting pilot project.
Implementation of actions identified in local waterway management plans, particularly Black Snake Creek Catchment Plan and Bundamba Creek Master Plan.
Progress a bio retention basin maintenance and monitoring pilot study to inform the establishment of a proactive maintenance program.
Adopt an Ipswich City Council Irrigation Management Strategy and associated

actions.
Establish waterway design guidelines / natural channel guidelines.
Establish an Ipswich City Council Water Sensitive Urban Design (green infrastructure) guideline.
Establish a riparian management framework for the interface between open space, waterways and stormwater management.
Provide opportunities for engagement with the community about water cycle management.
Develop and adopt decision-making criteria to guide Council-wide decision-making about water cycle issues.
Undertake an assessment of the economic value of water to Ipswich City.

## IMPLEMENTATION AREA 2: INTEGRATED PLANNING OUTCOMES

For Ipswich to work towards its long-term vision for integrated water management there is a need for various Council strategies and plans to achieve consistency and integration. When Council plans and documents are reviewed they should incorporate or refer to this Integrated Water Strategy framework to achieve integrated planning outcomes for Council.

This strategy will be used as a tool to facilitate integration with other strategic Council documents, policies, plans and programs across the City. These may include:

- Long-term plans
- Annual plan
- Planning Scheme
- Open Space and Recreation Strategy
- Ipswich Transport Plan
- Nature Conservation Strategy
- Green Infrastructure Plan
- Waterway Health Strategy
- Capital Expenditure budgets

Due to the wide-ranging impacts that water management has on the function and liveability of the City, there is also the potential for alignment between the Integrated Water Strategy and other Council programs. These include tourism, business and economic development, marketing, rural activities, development of a food security strategy, environmental programs, indigenous and traditional owner issues, road developments, and infrastructure.

## IMPLEMENTATION AREA 3: ENGAGEMENT WITH EXTERNAL STAKEHOLDERS

When engaging with external agencies on matters of relevance to water this strategy will be used as a tool for Council to ensure that the activities of other organisations are consistent with the Integrated Water framework. Examples may include federal or state legislative reviews and policy

development, or Queensland Urban Utilities or Seqwater water storage management regime changes.

#### IMPLEMENTATION AREA 4: STRATEGY ADMINISTRATION

A number of immediate actions are required to ensure this strategy is clearly and effectively communicated and appropriately administered. These actions will be the responsibility of the Integrated Water Unit within the Works, Parks and Recreation Department, along with continued engagement with external stakeholders to advance the ICC Integrated Water Strategy. The following actions are required:

STRATEGY IMPLEMENTATION ACTIONS:
Develop a web based integrated water strategy platform.
Develop and publish an Integrated Water Strategy summary document for circulation.
Hold an Integrated Water Management stakeholder implementation workshop.
Formalise the Council's Water Working Group's role in reporting on the Integrated Water Strategy and subsequent implementation plans.
Develop and maintain an accurate and up to date source of best practice guidance material relating to integrated water cycle management

#### IMPLEMENTATION AREA 5: ANNUAL REPORTING ON OBJECTIVES

An annual report evaluating this strategy's effectiveness will be provided to Council, to ensure continued progress towards the vision and strategic objectives. The TWCM Steering Group will endorse this report, which will be prepared in accordance with the strategy's strategic framework..

#### REVIEW AND UPDATE OF THE STRATEGY

This strategy provides a direction for water cycle management in Ipswich to 2031, in accordance with other relevant planning. A full review of the document should occur within ten years of adoption, but



minor reviews of specific strategy components, such as legislation or stakeholder responsibilities to ensure their ongoing relevance, should occur as required.

# WATER CYCLE BACKGROUND

The natural environment, including climate, soils and the region's topography has shaped Ipswich's water cycle. Over time, changes to how people use the land have modified the water cycle, and influenced how people interact with it.

Ipswich's water cycle is summarised in detail in the report *State of the Water Cycle* (Alluvium, 2014) which provides an overview of the catchment boundaries, waterways and climate in Ipswich.

This section provides an overview and general background on the history of Ipswich's water cycle. It outlines the nature and location of waterbodies and wetlands, the location of groundwater resources, and an overview of climatic conditions influencing the water cycle. It also outlines key changes that have occurred in recent history that have influenced the water cycle including European settlement, the impacts of land use change, infrastructure development and the impacts of flooding and droughts.

## NATURAL ENVIRONMENT

### WATER BODIES – STREAMS, RIVERS, WETLANDS AND GROUNDWATER

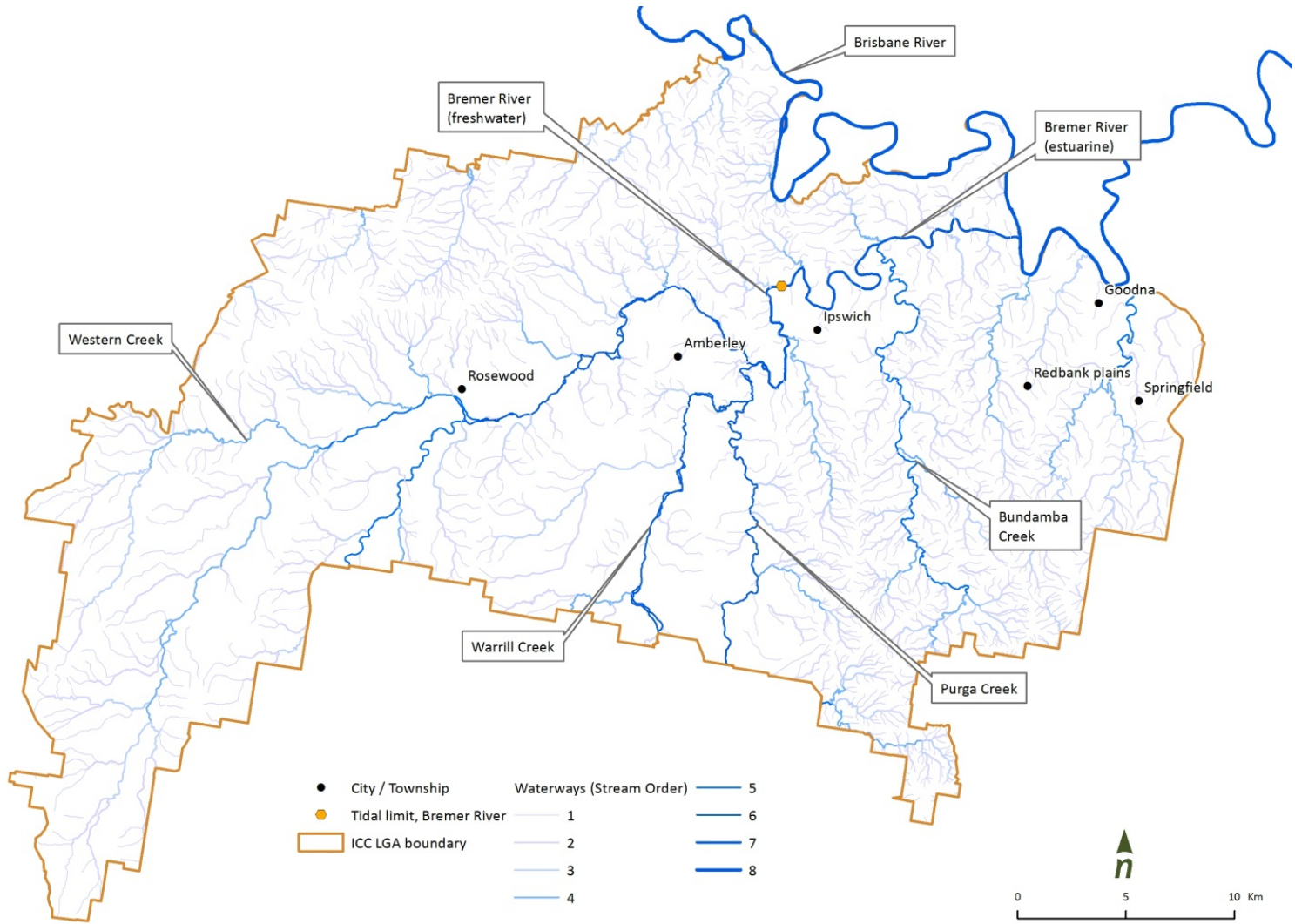
The Ipswich LGA is located in the middle of the broader Brisbane River catchment. This catchment flows out to the coast at Moreton Bay, which is one of Queensland's most important coastal resources. The location of the Ipswich LGA within the broader Moreton Bay catchment is shown in Figure 6.

The Bremer River is the most significant river in Ipswich; Bundamba Creek, Deebing Creek, Purga Creek, Warrill Creek, Western Creek, Franklin Vale Creek are all significant tributaries. The Brisbane River flows along much of the Ipswich LGA's northern boundary, joining with the Bremer River west of Karalee, at Barellan Point. Prior to this point, Black Snake Creek flows north out of the Ipswich LGA into Somerset where it meets the Brisbane River. Six Mile Creek, Goodna Creek and Woogaroo Creek flow into the Brisbane River downstream of its confluence with the Bremer River. Figure 7 shows the locations of waterways within the LGA.

There are a number of natural and created wetlands across the Ipswich LGA. Figure 8 provides an indication of the location and types of wetlands within this area.



Figure 6: Location of Ipswich LGA within broader Moreton Bay catchment



**Figure 7: Rivers and Creeks within the Ipswich Local Government Area**

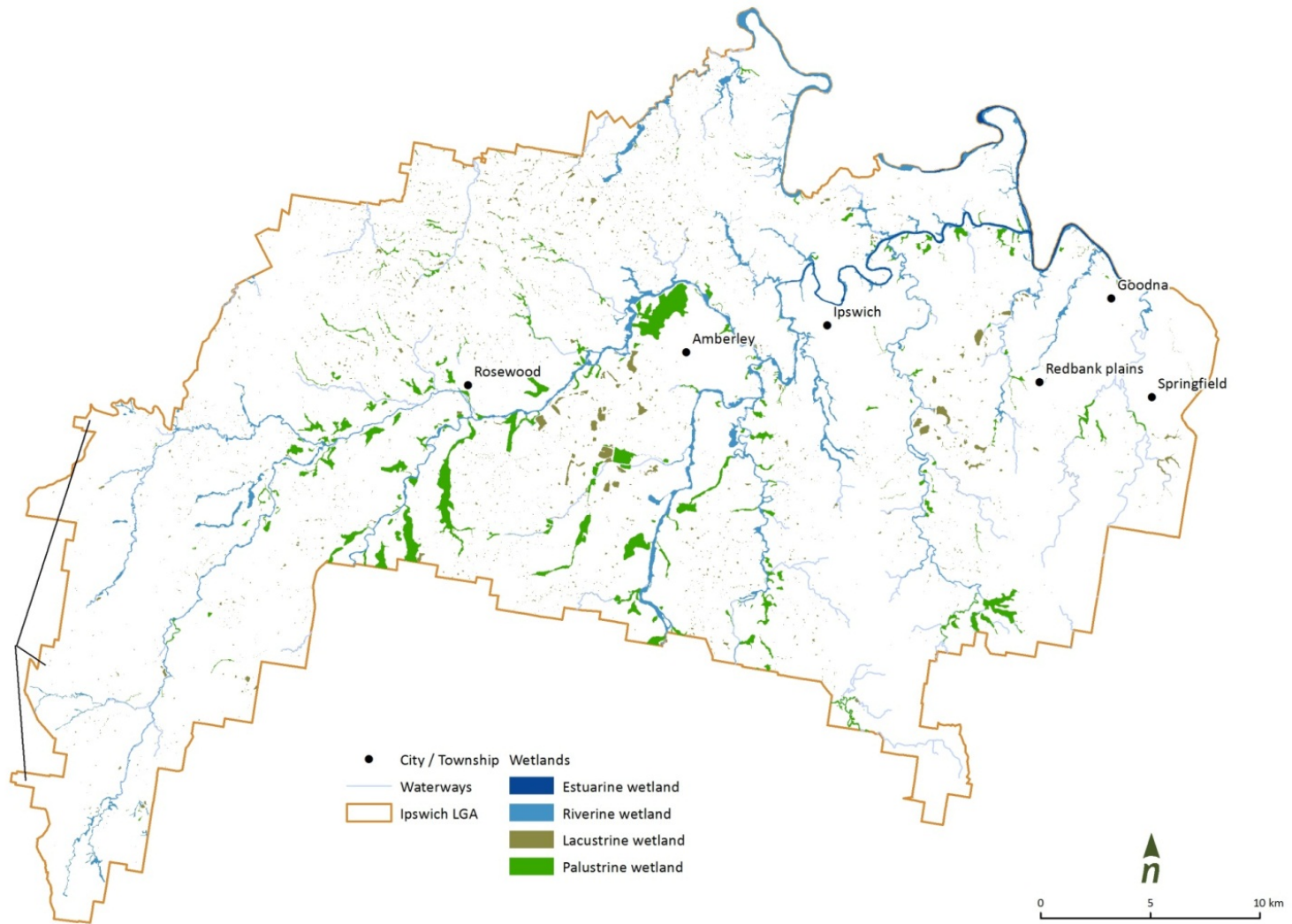
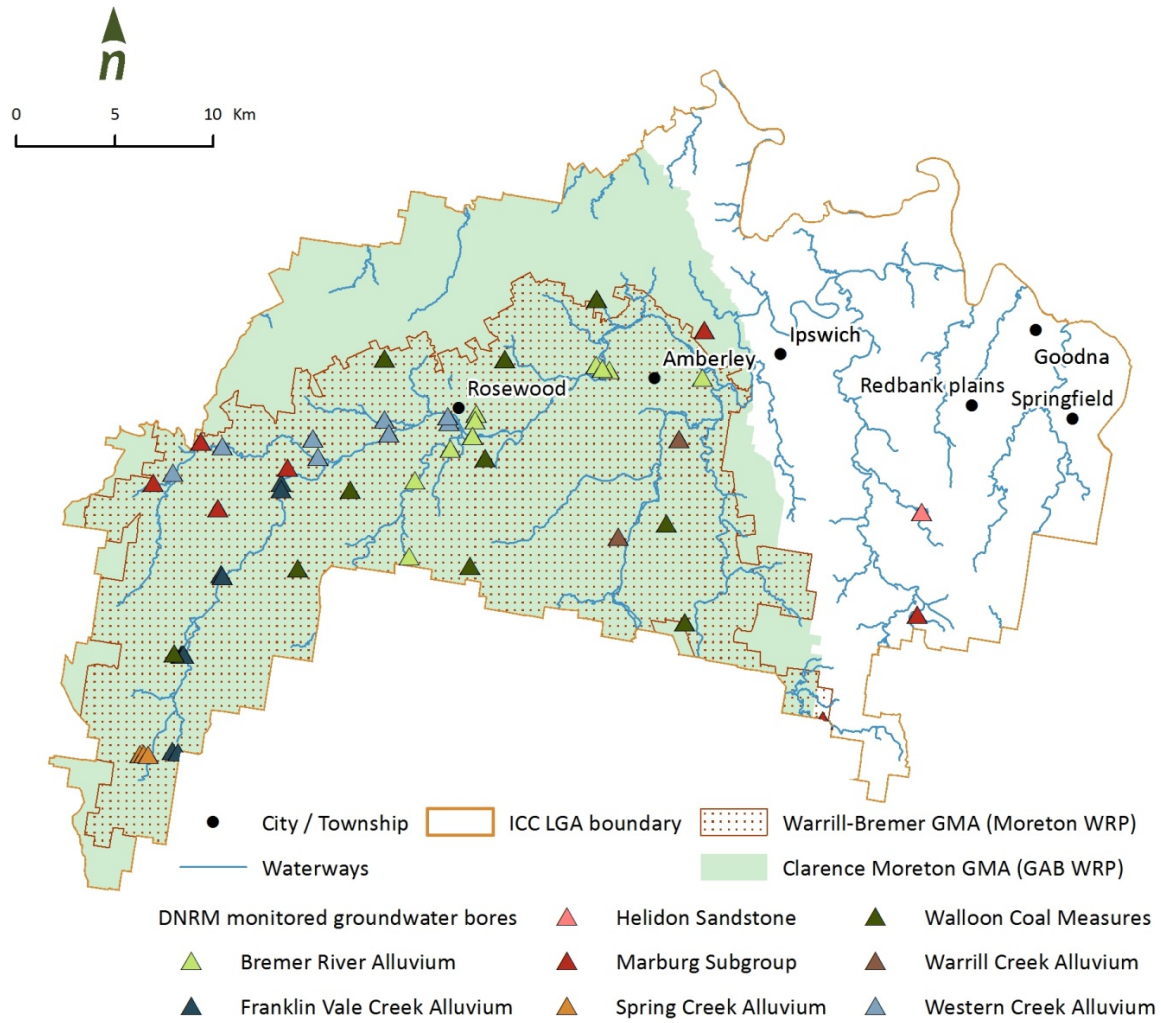


Figure 8: Wetlands in Ipswich City LGA



**Figure 9: Groundwater Management Areas within Ipswich LGA**

There are a number of groundwater resource areas identified within the Ipswich LGA. Towards the western part of the City there are two groundwater management areas – the Warrill-Bremer Groundwater Management Area and the Clarence Moreton Groundwater Management Area. These areas were established to protect groundwater resources with area-specific water licencing requirements.

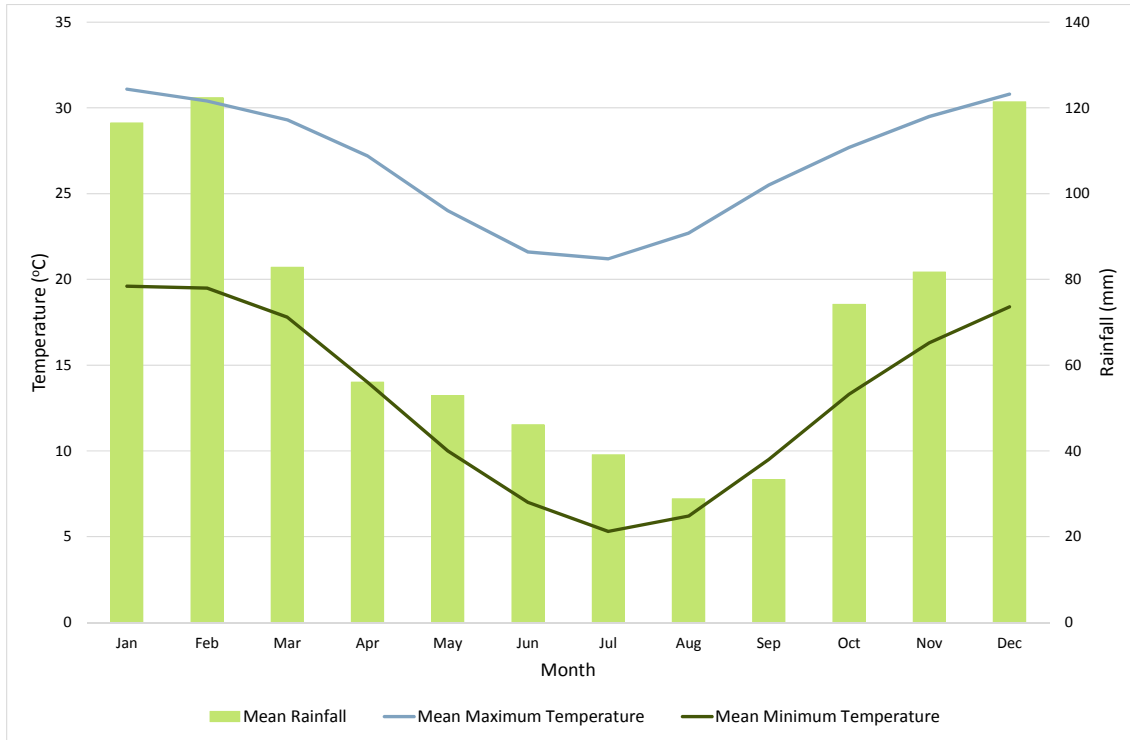
The Warrill-Bremer Alluvial Groundwater Management Area is located within the Moreton Water Resource Plan area. The Clarence Moreton Groundwater Management area is identified within the Great Artesian Basin Water Resources plan. The Great Artesian Basin is a multilayered system of pressurised aquifers underlying much of Queensland and significant parts of New South Wales. The Clarence Moreton Management Area is made up of Walloon Coal Measures, Marburg Sandstone and Helidon Sandstone. The Clarence Moreton Management Area is 400 km in length and 125 km wide. It extends from Toowoomba in the west to Darr Creek in the northwest, Esk in the north, Ipswich in the east and Rathdowney in the south (Great Artesian Basin Resource Operations Plan, 2007). It underlies the Lockyer Valley, Bremer River Valley and Teviot Brook Catchment.

Figure 9 shows the groundwater management areas and a number of monitoring bores within the Ipswich LGA.

The Queensland Government continues to work to identify groundwater dependent ecosystems. These are ecosystems requiring access to groundwater on a permanent or intermittent basis and may include aquifers, caves, lakes, palustrine wetlands, rivers, springs and vegetation (Queensland Government, 2015).

## CLIMATE

Ipswich's subtropical climate is characterised by mild, dry winters (with cool overnight temperatures) and warm, wet summers. The climate in Ipswich (as at the Amberley climate monitoring station) generally has more extreme highs and lows than other parts of SEQ. Average annual maximum and minimum temperatures are 26.8°C and 13.1°C respectively, with December and January being the hottest months (BOM). Climate statistics for Amberley (located to the west of the Ipswich City centre) are shown in Figure 10.

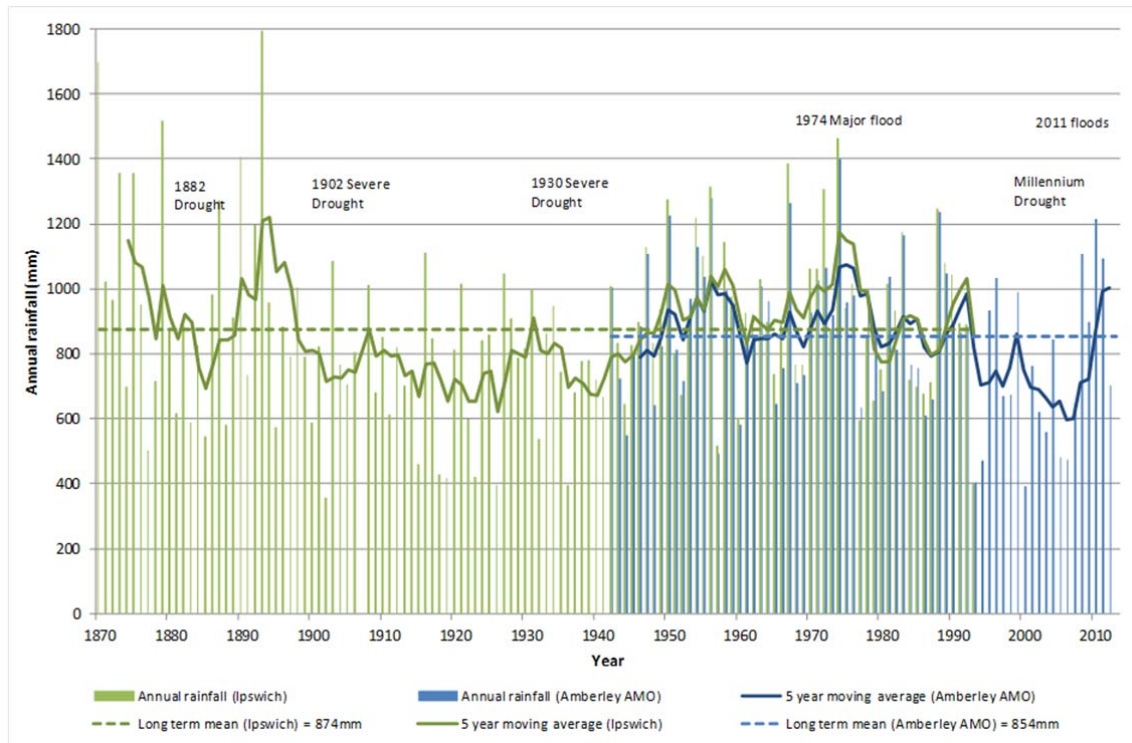


**Figure 10: Monthly Climate Statistics for Amberley**

Ipswich's annual average (mean) rainfall is approximately 850mm. The highest rainfall coincides with warmer summer months. Climate records indicate the actual yearly rainfall is highly variable and the rainfall record shows a range between 400mm and 1800mm per year. Annual average evapotranspiration is approximately 1300mm.



Historical rainfall records show Ipswich has experienced numerous extreme wet and dry periods, leading to severe droughts and floods. Figure 11 shows the annual rainfall record for Ipswich at the Amberley and Ipswich rain gauges since 1870. This record shows extended droughts in the 1880s, 1900s, 1930s, early 2000s and multiple high rainfall years, when flooding occurred in particular, in 1893, 1974, 2011 and 2013.



**Figure 11: Rainfall Record for Ipswich and Amberley**

## HUMAN INDUCED WATER CYCLE CHANGES

The environmental conditions in Ipswich, combined with significant changes to land use within the City's catchment, have led to the current status of Ipswich's water cycle. Some of the key changes in catchment land use are explained below.

Phase of development	Resulting Water Cycle Impacts
Traditional ownership	Largely unmodified
European settlement	Deforestation, hydrology changes
Industrialisation	Increasing water demand and pressure on water quality through industrial activities
Infrastructure development	Changes to flow regimes through development of dams and pipelines and transfer of water between catchments. Changing floodplains and the need for flood protection.
Rapid growth and urbanisation	Increased diffuse pollution, hydrology changes, growing recognition of the value of waterways.

### TRADITIONAL OWNERSHIP

A diverse range of vegetation including rainforest, dry vine forest, soft wood forest, open forests, woodlands, wetlands and grasslands covered Ipswich before European settlement. These vegetation communities supported a variety of wildlife.

As the original custodians of the land and waters in the vicinity of what is now the Ipswich LGA, the Yuggera, Jagera and Ugarapul people living in the area were the first to interact with water, relying on rivers and waterholes for their survival.

### EUROPEAN SETTLEMENT

Ipswich is Queensland's oldest provincial city. European explorers first discovered the mouth of the Bremer River in 1824 (Buchanan, 2009). In 1827 the first steps towards European settlement of Ipswich occurred when a group of convicts were sent to Ipswich to quarry limestone, which was then sent down the Bremer and Brisbane Rivers to be used for construction of buildings in Brisbane.

Settler activity increased over the following years; agricultural uses of the catchment signalled the start of significant clearing of native vegetation. This resulted in one of the most significant impacts on the water cycle. Approximately 79% of natural vegetation within Ipswich's catchments has been cleared since European settlement. This had many impacts on the water cycle: changing the rate of runoff, decreasing waterway stability and decreasing water quality.

### INDUSTRIALISATION

Following the initial European discovery and early settlement, the mid-1800s onwards were a time of increasing industrial activities within Ipswich, with a particular focus on coal mining. The initial vegetation clearance activities would have changed the catchments' hydrology, but increasing industrialisation and population pressures also led to increased water quality impacts within waterways. .

Along with being an important transport link between Ipswich and Brisbane, the Bremer River was also used to dispose of waste and support industrial activities. A boiling-down works was established on the banks of the Bremer River in 1844, negatively impacting water quality. Coal mining started in 1846 in Redbank and 1849 at Woodend and later around Tivoli and other areas (Centre for Queensland Government); however, detailed plans of early mining activities do not exist. Many of the old mine workings are now filled with water which leads to some concerns about contamination and ground stability.

Post World War II was a time of development of major industries, including mining, railway workshops, wool mills, abattoirs and Amberley Air Base.



**Bremer River in 1880 showing vegetation removal and industrial activities**

Ipswich's riverside position was an advantage for transportation of coal from local mines. Paddle steamers and barges supported river trade between Brisbane and Ipswich, with the peak years being 1846–1875. The narrow, shallow river with multiple hazards provided some problems for navigation, with the river being unsuitable for large ships. In the 1860s the Brisbane River bar was dredged for the development of a significant port in Brisbane (Buchanan, 2009). Over time, dredging has changed the natural tidal limit in the Brisbane and Bremer Rivers, moving it far further upstream than its natural limit (Moreton Bay Waterways and Catchments Partnership, 2001). The tidal limit on the Bremer River now extends further west than the Ipswich CBD (Alluvium, 2014).

## INFRASTRUCTURE – WATER SUPPLY, SEWERAGE & FLOOD PROTECTION

Over the course of the City's settlement and development it has become evident that the climate operates between extremes of droughts and floods. Periods of too much or too little water in Ipswich have generated investigation and implementation of various interventions to ensure the community is safe from flooding and has access to safe and reliable drinking water. Multiple stakeholders, most notably Seqwater and Queensland Urban Utilities (QUU), have a role in this, along with Ipswich City Council.

Engineered solutions have been used since European settlement to help the community manage the water cycle. For example, in 1858 the first mechanised water extraction system was built to draw water from the Bremer River. In 1878 Ipswich gained Queensland's first pumped water supply when a waterworks was completed at Kholo to extract water from the Brisbane River. In 1892 the Mt Crosby Weir was completed for water supply. Later in 1979 Ipswich City Council constructed a 19.3 megalitre water reservoir above High Street at Brassall.

Sewage treatment for the City began in 1937. The first wastewater treatment plant was commissioned at Tivoli in 1940. Later the Rosewood and Bundamba treatment plants began releasing treated effluent into the Bremer River and Western Creek. The Bundamba wastewater centre was upgraded in 2007.

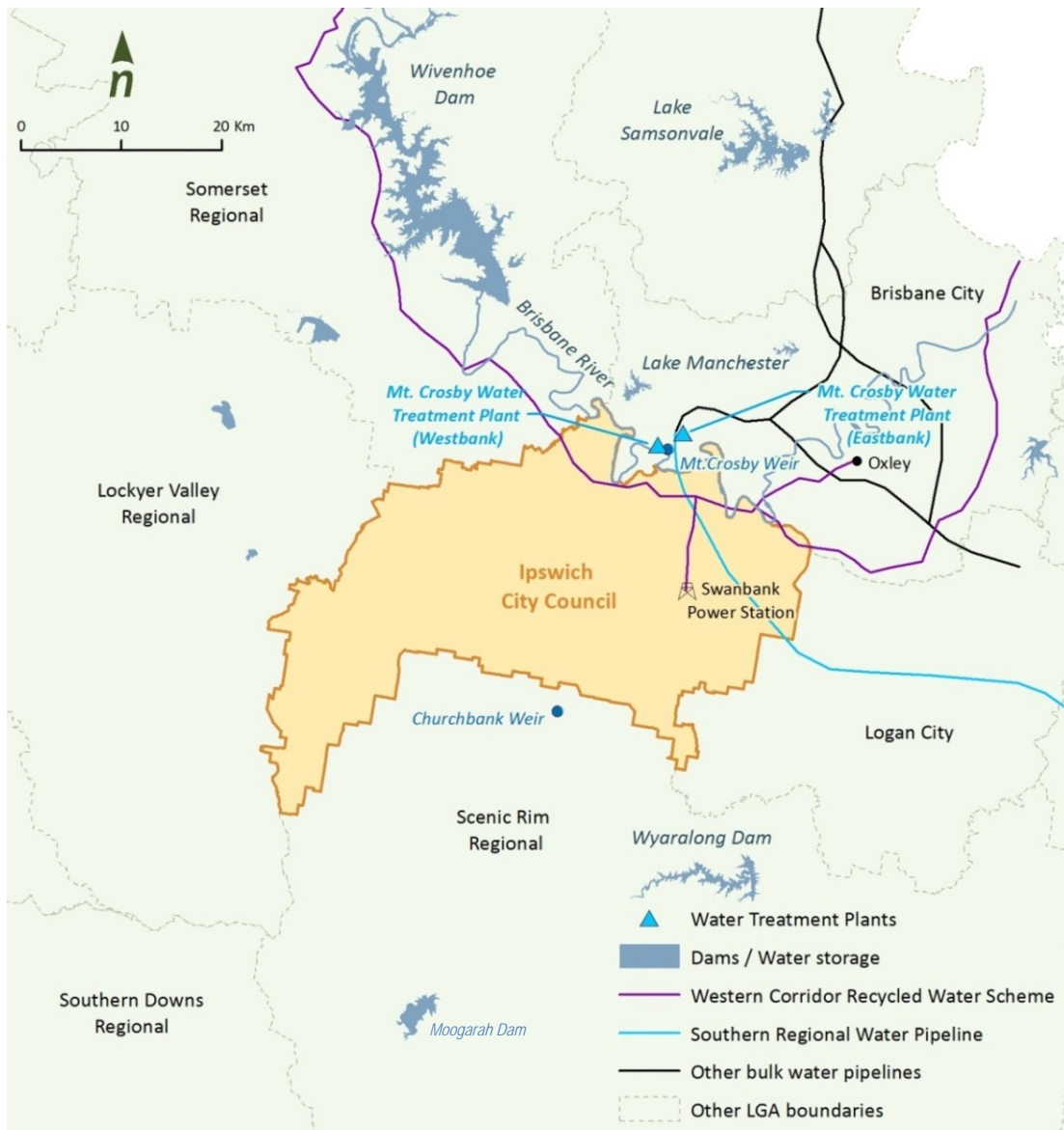
During the height of the Millennium Drought in 2008 the SEQ Water Grid came online and provided an infrastructure link between twelve SEQ water supply dams to provide long-term water security. These are managed by Seqwater, which has an important role in providing regional water supply and flood mitigation infrastructure.

The Ipswich Recycled Water Strategy, prepared by ICC in 2008, provided a useful background into the potential of recycled water. This strategy eventually led to the Queensland Government's Western Corridor Recycled Water Project and the construction of the Bundamba Recycled Water project (which has since been mothballed).

Around the same time, the responsibilities of Ipswich Water were formally assumed by QUU, which was created to provide drinking water and wastewater services across Ipswich and Brisbane City Councils and Lockyer Valley, Scenic Rim and Somerset Regional Councils.

A number of alternative water supply systems are also in place, with large volumes of water transferred around the Ipswich LGA from various sources. Mooggerah Dam releases 7000 megalitres per year for an irrigation scheme in the Warrill Valley (a regulated watercourse), and river water is used in the tidal influence of the Bremer River for irrigation purposes. In some cases water is pumped large distances leading to cross-catchment water use. Examples include transfers of water from Wivenhoe Dam and the Brisbane River to Amberley and Swanbank, which is then released into Bundamba Creek. Pumping of water from the Bremer River Estuary to Jeebropilly also occurs for coal washing. These water transfers lead to modifications of natural flow regimes within the waterways, which can have impacts such as reduced freshwater in the Bremer River tidal zone.

The location of regionally significant potable water supply infrastructure currently in existence is shown in Figure 12.



**Figure 12: Location of Regional Water Supply Infrastructure**

During the Millennium Drought, a number of water conservation measures were implemented, such as the need for rainwater tanks. However, the last of these measures was lifted on 1 January 2013 when the Queensland Water Commission ceased operations. Rainwater tanks are not currently mandatory for development in Ipswich.

Maintaining and improving water quality in drinking water catchments is a priority for Seqwater, in conjunction with other stakeholders. The drinking water catchments of SEQ are shown in Figure 13.

Requirements are in place to ensure the protection of SEQ's drinking water standards. Of particular significance in Ipswich is the area from Blacksoil north to the Brisbane River, which is identified as a water supply buffer area in the State Planning Policy. This includes part of the mid-Brisbane River catchment immediately upstream of the Mt Crosby Weir, which supplies a large portion of SEQ's drinking water supply.

Figure 15 shows the current extent of water and sewerage networks within the Ipswich LGA. This shows there are still significant areas of the City that are unsewered. In these areas dwellings rely on on-site wastewater treatment systems such as septic tanks that discharge to land. Figure 13 shows the location of the sewerage catchments and the locations of sewage treatment plant outfall points.

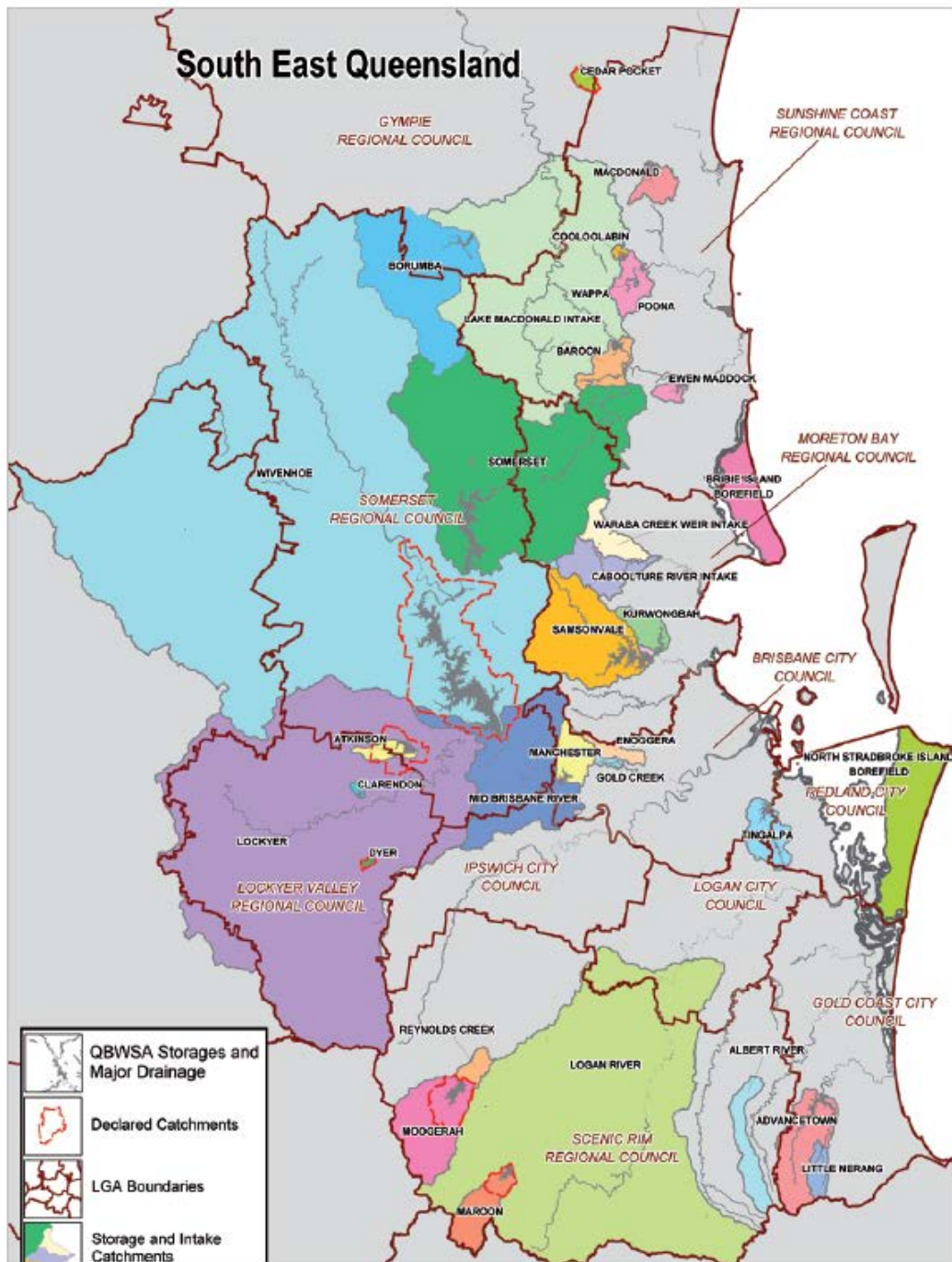
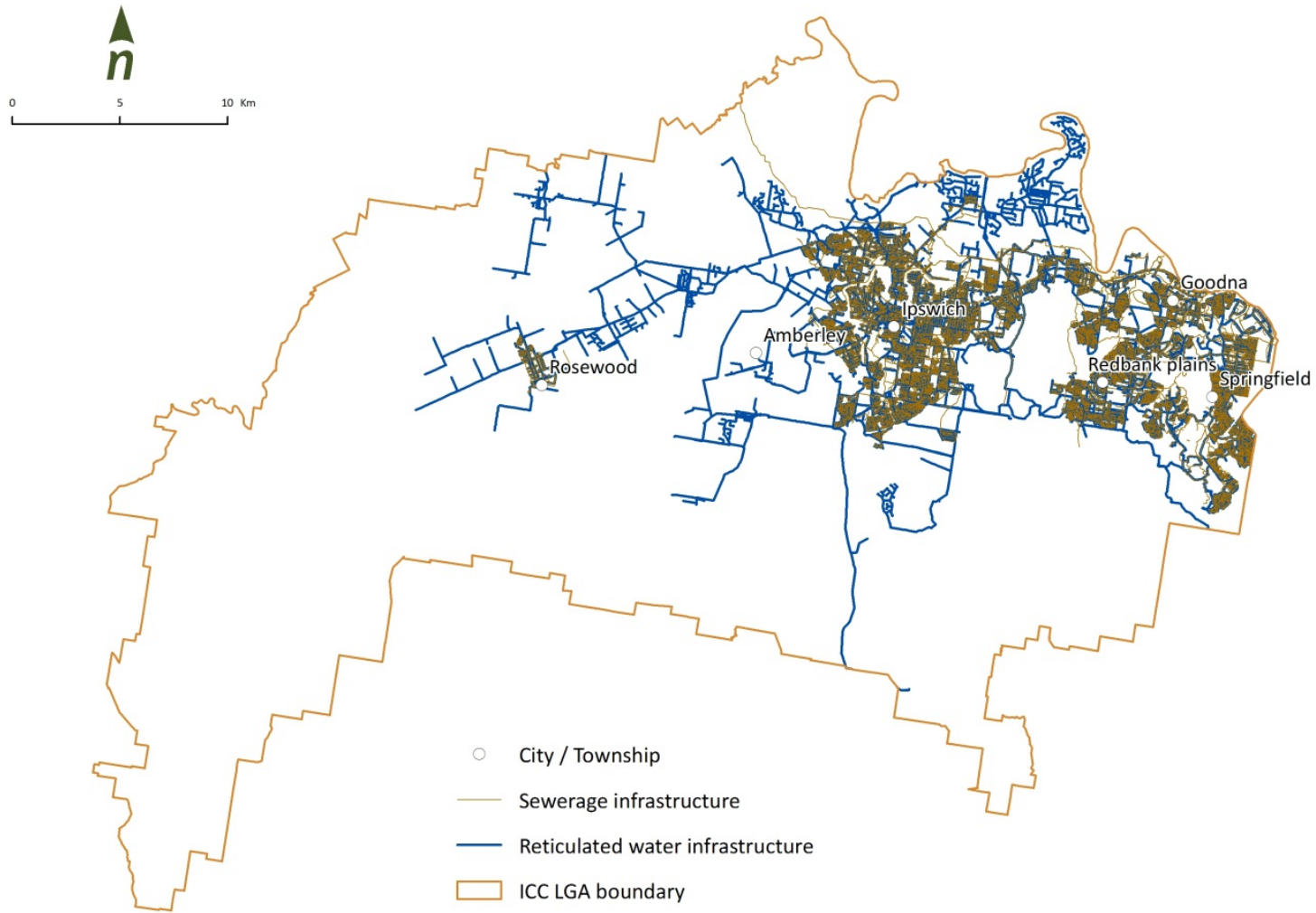


Figure 13: Drinking Water Supply Catchment Areas in SEQ (Seqwater, 2012)



**Figure 14: 2013 Water and Sewerage Network Extents**

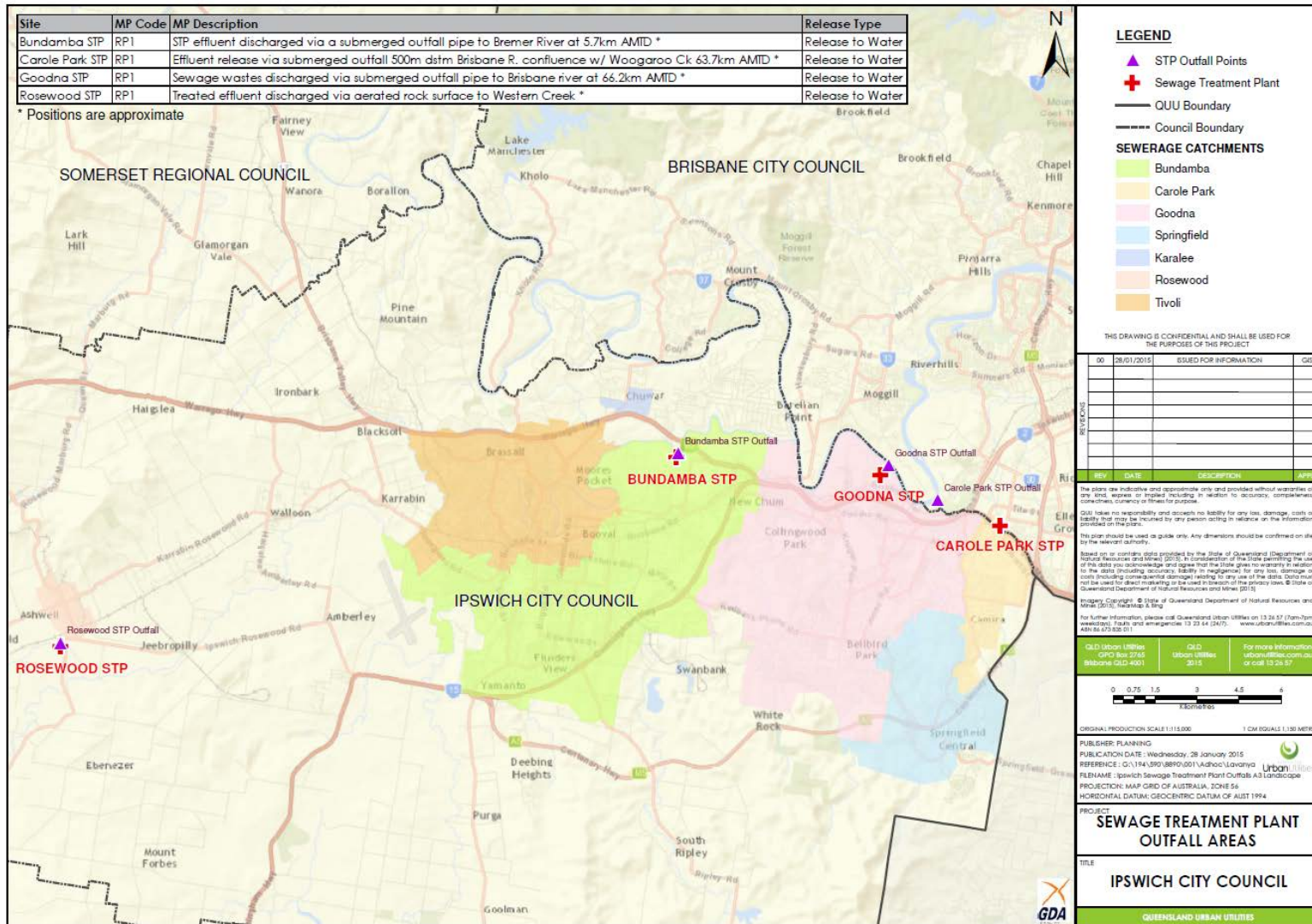
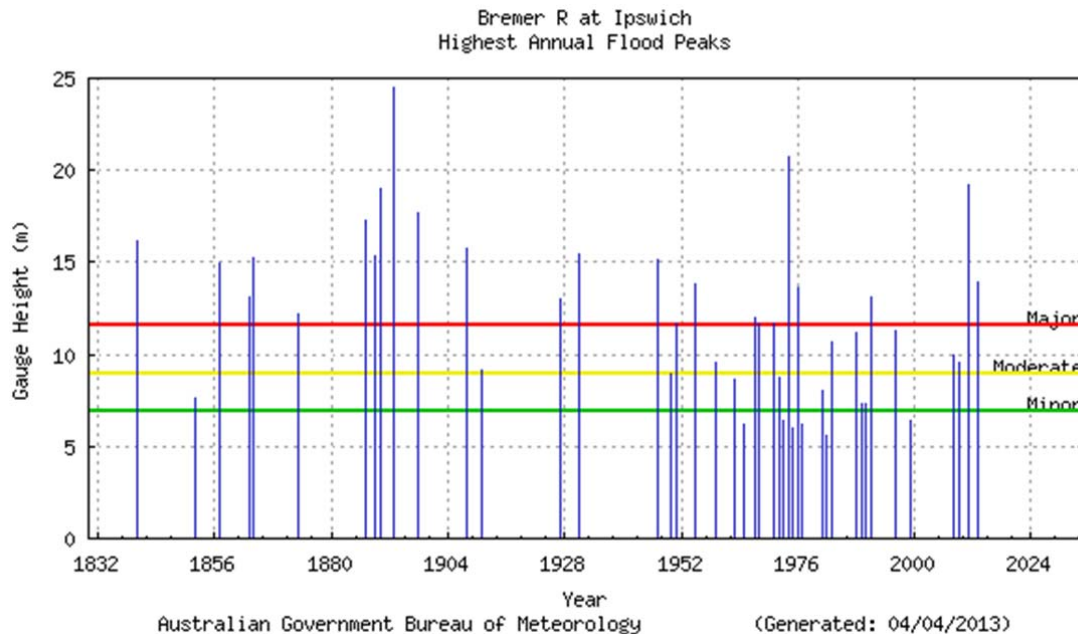


Figure 15: Sewage Treatment Plant Outfalls within Ipswich LGA



Since the 1800s Ipswich has been impacted by many damaging floods, most significantly in 1893, 1974 and 2011. Figure 16 shows the gauge height of floods in the Bremer River at Ipswich since 1832. These events have prompted improved management of the interactions between land use and flood risk in the City.



**Figure 16: Bremer River at Ipswich – Highest Flood Peaks**

As a result, flood control has been significant in the City’s history and development. In 1891 Railway Dam on Western Creek at Grandchester was completed, and in 1913 levee banks were built on Warrill Creek. In 1984 Wivenhoe Dam was completed after the 1974 floods highlighted the need for flood protection in SEQ. Wivenhoe Dam provides flood mitigation benefits for the mid and lower Brisbane River and assists with flood mitigation in the lower Bremer River. Much Ipswich’s flooding is caused by flows arising in the upper Bremer River catchment, which does not currently have flood control dams in place. However, in late 2014 the Queensland Government announced that it was undertaking a feasibility assessment for a flood control dam on the lower Warrill Creek near Willowbank (DEWS, 2014).

## RAPID GROWTH & URBANISATION – GROWING ENVIRONMENTAL AWARENESS

In recent years Ipswich has seen a surge of growth, and more is anticipated. With it has come an increased focus on the long-term liveability of the City, as well as a growing awareness of the importance of natural environments, ecosystem services and sustainable infrastructure.

The Healthy Waterways Ecosystem Monitoring program provides information to the community about the condition of waterways in the City and across SEQ. It has set a benchmark for improvement and attempts to mitigate the impacts of catchment activities on water quality and waterways. Local projects, such as the Bundamba Creek Think Tank process, have led to on-ground waterway enhancement projects like the Habitat Connections program along Bundamba Creek. Innovation in stormwater management has generated increased awareness of water-sensitive urban design and a growing recognition of the multiple values water has for the community.

Climate change looks set to bring further challenges to the City in managing the water cycle, with the potential for increased droughts and temperatures, as well as more intense rainfall all impacting on the management responses to the water cycle. Combined with an increasing population, management of the water cycle looks set to be an issue growing in importance for the future.

# WATER CYCLE ISSUES

This strategy sets out to identify and address a number of pressures and challenges for water management in Ipswich. Variability in climate, population growth and the need for water infrastructure are all high priorities. They need to be considered in an integrated way, taking into account their impacts on the water cycle. As well as these technical challenges there are also several social challenges such as understanding water management responsibilities, community engagement and governance that require consideration to ensure best outcomes are achieved for Ipswich.

This section sets out the key challenges and pressures Ipswich is facing in the management of the water cycle. Each of these issues will need consideration in long- term decision making so the City can be positioned as a liveable City of the future, rather than reacting to problems as they occur.

A number of key water management issues facing the City have been identified<sup>1</sup>. These issues are listed below (in no particular order of importance):

- Floodplain management and flood risk
- Drought resilience
- Urban growth and population increases
- Stormwater quality management
- Stormwater infrastructure planning
- Erosion, sediment and dispersive soils
- Climate change and urban heat island impacts
- Waterway health and riparian corridor management
- Cultural heritage and traditional owner values
- Community engagement
- Water consumption in Council facilities
- Understanding changing water cycle roles and responsibilities
- Catchment and local government boundaries
- Recreational water quality
- Managing salinity

These issues are explained below in further detail.

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<sup>1</sup> Initially in the *Ipswich City Council Total Water Cycle Management Issues and Scoping* paper, as endorsed by Council in 2013.

Floods are a natural part of the water cycle. History shows Ipswich has experienced multiple floods since European settlement (the largest recorded being in 1893) and many parts of Ipswich are prone to the impacts of flooding. Recent floods in 1974, 2008, 2009, 2011 and 2013 have demonstrated Ipswich's vulnerability to local and regional flooding events.

As the population increases, and the City sees more development, landscapes are changed through increased building on floodplains, draining of wetlands and modifying of stormwater flows. This increases the potential impacts of flooding on the community.

Figure 17 indicates recorded flood extents during the 1974 and 2011 flood events. This provides an example of how extensive the flood extents have been in the past.

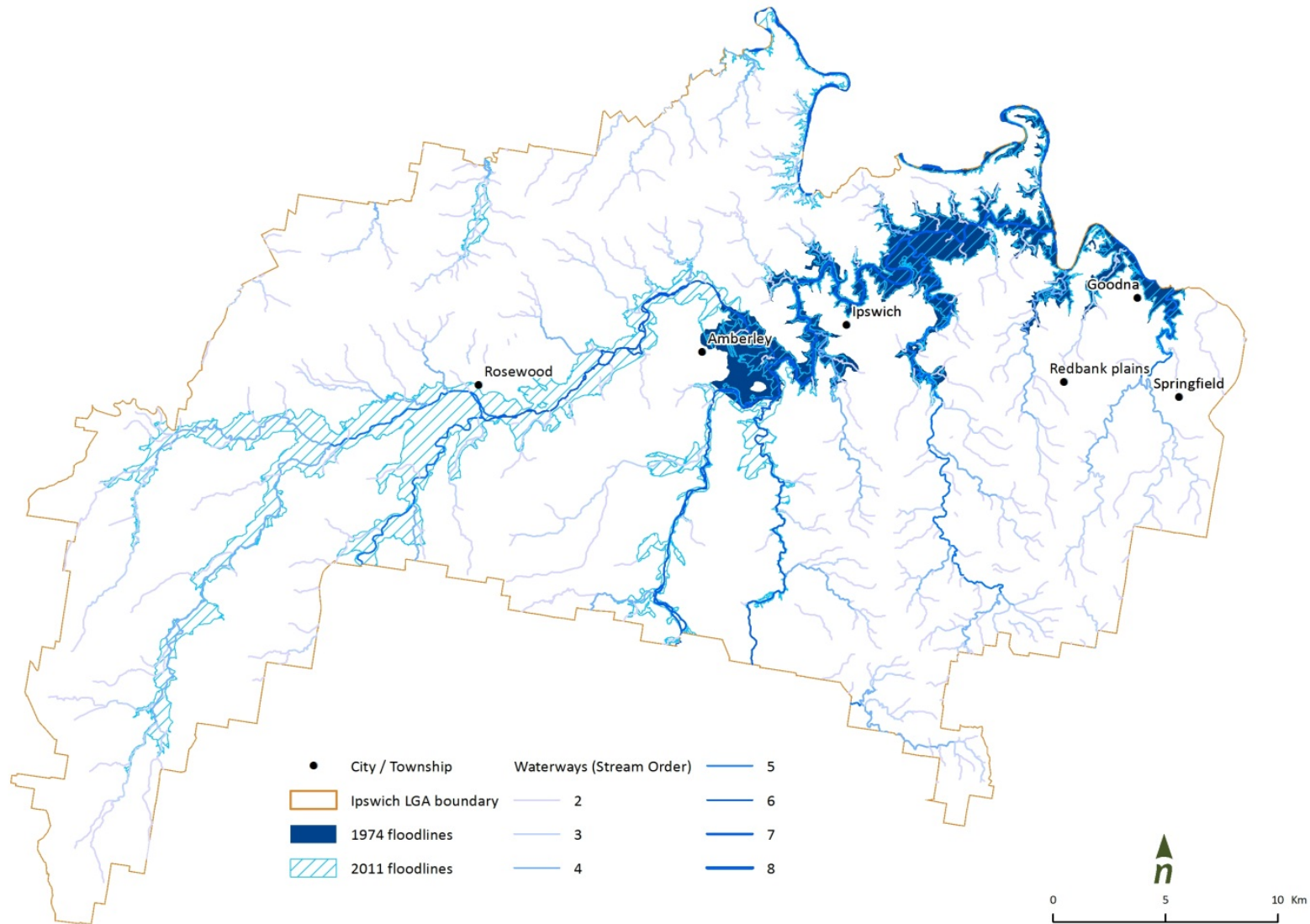
Flooding impacts on the City in many ways: through hardship to those in the community who have suffered the impacts of flooding, impacts on the environment through waterway erosion, damage to Council assets, lost economic opportunities and the costs to rebuild and repair damage.

While flooding cannot be stopped, the risk and impacts can be mitigated through various processes. Council has completed a number of flood and drainage studies across the City to help respond to flood risk. These studies have helped identify flooding impacts and areas of hazard and include recommendations on structural and non-structural mitigation measures to improve the City's resilience to flooding. Figure 18 shows the location of completed flood studies in the City as of January 2015.

In addition, the Brisbane River Catchment Flood Study (BRCFS) is currently underway as an outcome of the Queensland Flood Commission of Inquiry. Council is an active participant in this long-term study, which will provide additional information regarding flood risks across the wider Brisbane River catchment (including the Bremer River).

Along with providing storage for water supply, Wivenhoe Dam (which is managed by Seqwater) provides beneficial flood mitigation to downstream locations, including parts of Ipswich. The dam's operation is governed by a set of release strategies which are dependent on various conditions such as rainfall and level of water in the dam. These strategies are designed to provide the maximum possible flood mitigation to the community. As well as providing benefits, in some circumstances there is also potential for the dam release strategies to have negative impacts. Most of these potential impacts are unavoidable and relatively minor including limiting transport access at College's Crossing and causing damage to downstream riparian corridors and assets in the river reaches. During some flood events there is the potential for dam releases to contribute to backwater flooding in the lower Bremer River; however, during most events the dam acts to reduce backwater flooding in the lower Bremer River. Seqwater has identified that if Wivenhoe Dam did not exist flood events causing these impacts would be more frequent and severe.

Council needs to ensure that risks of flooding are appropriately managed and communicated to minimise risks to the community. It also needs to find a balance between development pressures and managing risk.



**Figure 17: Flood Extent Lines - 1974 and 2011 (note: 1974 lines exclude areas in former Moreton Shire)**

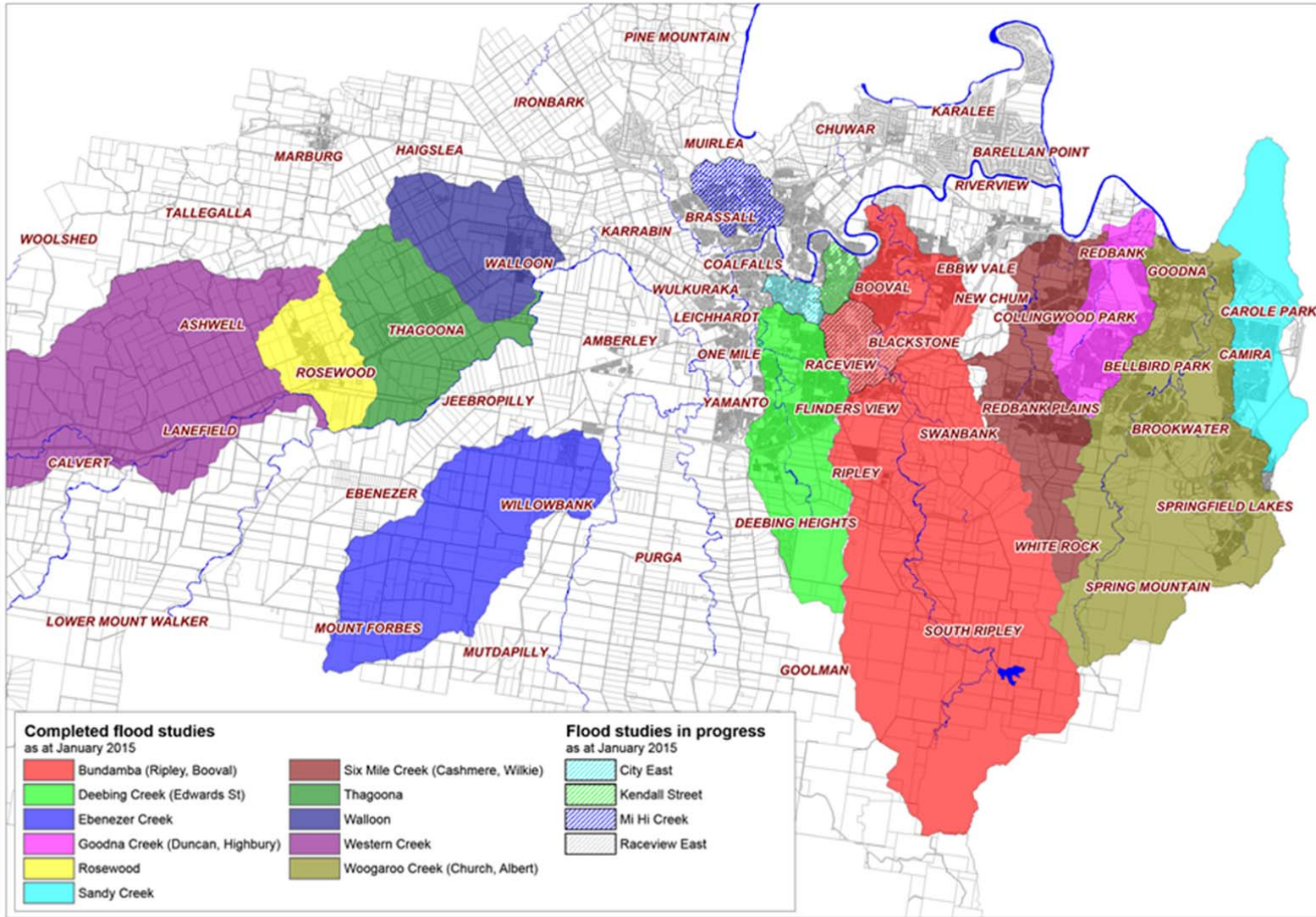


Figure 18: Location of Completed and Underway Flood and Drainage Studies

Figure 19 illustrates the range of potential responses to flood risk that can be considered in developing community and landscape resilience to flooding.



**Figure 19: The floodplain management process provides a comprehensive suite of measures that contribute to building resilience in the floodplain (Queensland Reconstruction Authority)**

The establishment of this integrated water strategy for Ipswich helps flooding to be considered as part of an integrated water cycle, recognising the overlaps between flood management and other areas of decision making. It also highlights the need for environmental, social and economic considerations to inform flood management and mitigation decisions.

## DROUGHT RESILIENCE

Droughts are also a natural part of the water cycle. Despite the reduced focus on droughts due to recent flooding, it is inevitable Ipswich will face droughts again in the future. As a growing community Ipswich needs to consider the impacts future droughts will have on the City's liveability.

As the population of SEQ grows, a number of water supply options will need to be considered to ensure that the water supply is resilient to droughts. This may include a range of water supply options such as recycled water and desalinisation, in addition to conventional rainfall dependent water supply dams.

In addition to increasing demand on water supply, the impacts of drought on the broader liveability of the City could be significant. Design and maintenance of open space, sports fields, riparian corridors and other green infrastructure should consider how those areas would respond during periods of drought, as well as considering how service levels could be maintained if access to potable water supplies decreased.

The Millennium Drought threatened the security and availability of water supply in Ipswich (and beyond), which led to a number of changes in how water was provided and conserved. These measures have since been relaxed or abandoned. However, there are ongoing benefits in ensuring the growing community is exercising water smart behaviours and able to adapt during periods of drought. This might include consideration of alternative supplies, rainwater tanks, water conserving fixtures and low impact design measures that aim to utilise stormwater within urban landscapes.

Council should engage with stakeholders to ensure the ranges of likely climatic conditions in Ipswich are understood and there is an ongoing focus on the resilience of the City to the impacts of drought. The future focus of integrated water management provides for these issues to be considered in further actions by Council, and also provides overall alignment with the direction of QUU towards water recycling and reuse.

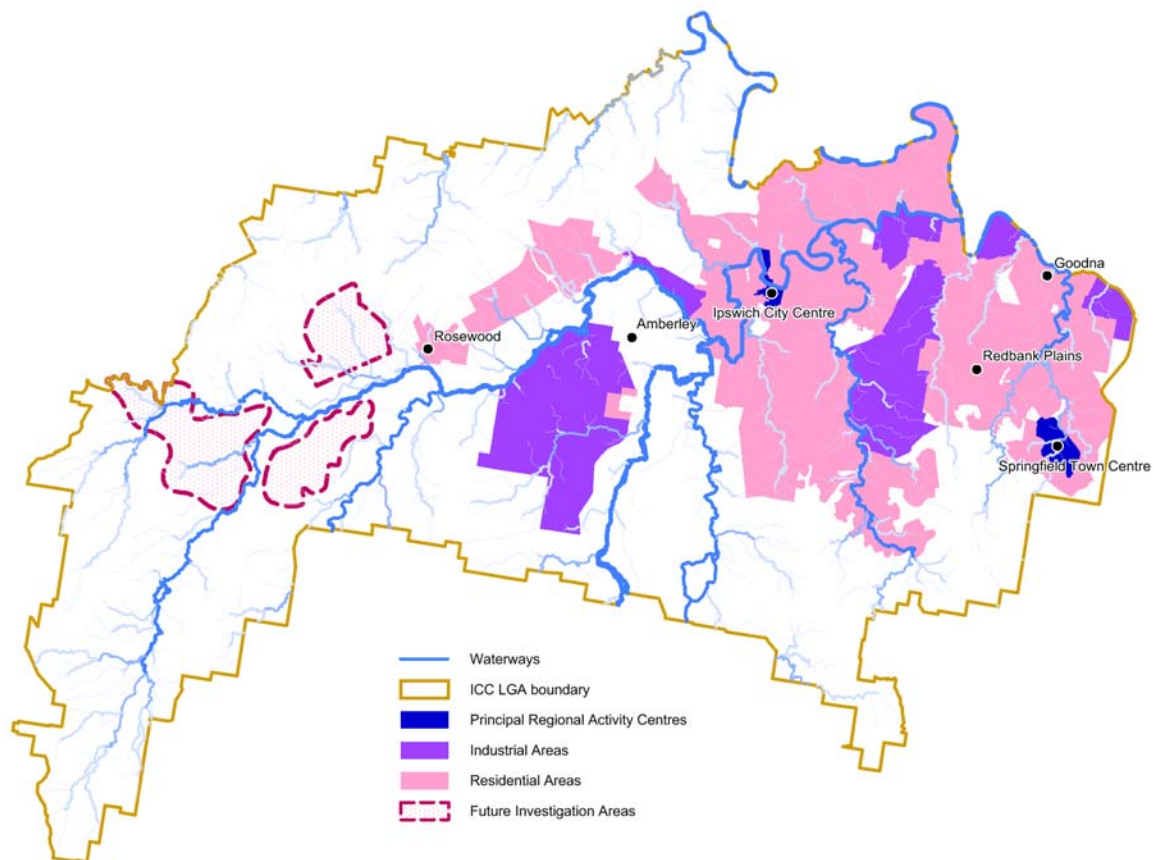


## URBAN GROWTH AND POPULATION INCREASES

The Ipswich LGA is identified as an area of extensive growth. Building on previous rapid growth within the region the SEQ regional population is expected to increase from around three million in 2011 to 4.2 million in 2031. Ipswich's population is expected to increase from around 175,000 in 2011 to 435,000 in 2031 across the LGA. An additional 118,000 dwellings are forecast to accommodate the anticipated regional growth, population increase and demographic change (Queensland Government, 2009).

Figure 20 shows the residential and industrial potential within the city. Significant residential growth is anticipated for Ripley Valley, as well as ongoing development in Springfield, Walloon-Thagoona and Ipswich's eastern suburbs. Major industrial growth is also planned in Ebenezer / Willowbank, Swanbank / New Chum, Wulkuraka, Redbank Peninsula, Carole Park and Dinmore / Riverview. Defence activities are expected to expand in the Amberley Aerospace Precinct. There is also increasing infill development potential in the City.

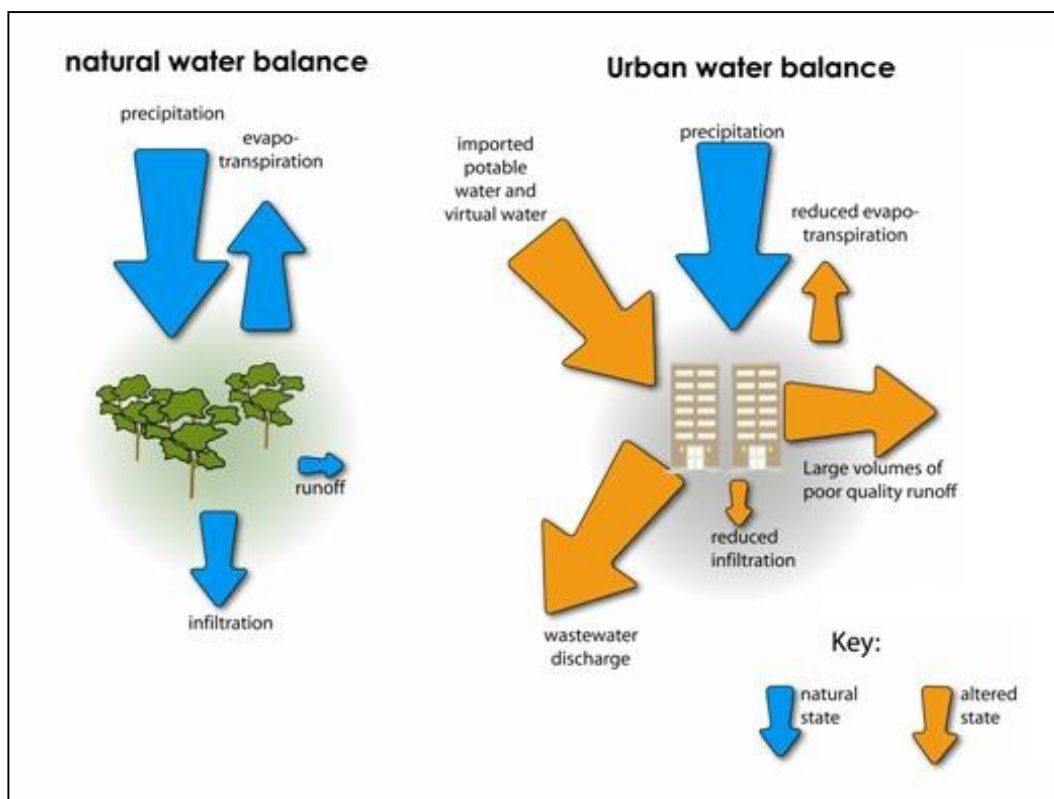
The most significant development is within Ripley Valley. In 2010 the Urban Land Development Authority established the Ripley Valley Urban Development Area. The Ripley Valley has the potential to contribute approximately 50,000 additional dwellings and an extra population of 120,000 to Ipswich City.



**Figure 20: Residential and Industrial Areas within Ipswich LGA**

Urban development results in significant changes to the water cycle. It increases the need for water supply and sewerage (and associated networks). It also changes the function of the water cycle through increased and more frequent stormwater runoff into waterways during rainfall and reduced infiltration into the ground. The development phase can result in impacts on waterways owing to sedimentation and hydrology changes.

These changes are conceptualised in Figure 21 which shows the differences between a natural and urbanised water balance.



**Figure 21: Natural and Urban Water Balance Conceptualisations  
(adapted from Water By Design)**

There is a need to ensure the impacts of development are managed to avoid negatively impacting natural and built assets. Bundamba and Deebing Creeks in the Ripley Valley are two examples of waterways likely to be facing pressures from development.

An increased population will also need to be supplied with water and wastewater services, putting pressure on existing networks and resources and creating demand for additional services. In 2012-2013 the domestic water consumption in Ipswich from the reticulated network was 8,820 megalitres (ML). Demand will increase with an increasing population.

In 2012 the Queensland Water Commission developed a Sub-Regional Total Water Cycle Management Plan for Ripley Valley. This plan considers water supply options for Ripley Valley and should be considered in the development of the Council's water planning, as well as by QUU in its Netserv Plan, which sets out how water and sewerage services will be provided. QUU is currently in

the process of establishing a water servicing strategy for the Ripley Valley.

Further consideration must be given to the impacts of development on drinking water catchments. Development activities (including the intensification of land usage) have the potential to impact on water quality in drinking water catchments. As well as ecological impacts and public health risks these effects can also result in interruptions to water supply or necessitate higher levels of treatment for drinking water supplies. A number of issues within catchments have the potential to adversely affect drinking water quality. These include on-site wastewater treatment and effluent disposal, riparian land management, waste management, water recycling and re-use, stormwater management, management of hazardous substances, vegetation, earthworks, and bushfire prone land (Seqwater, 2012).

Urban development also provides opportunities to incorporate best practice water management techniques and technology such as adopting water sensitive urban design concepts, implementing localised integrated water management systems or incorporating recycled water pipelines. Planning for integrated water management helps to ensure the economic benefits of development are balanced with holistic consideration of the water cycle impacts and assessment of alternatives.

## STORMWATER QUALITY MANAGEMENT

Urban stormwater management is a crucial component of integrated water management. Urban stormwater is the runoff from roofs, roads, car parks and other impervious surfaces within the urban environment, as well as from open space, parks and yards. Urban stormwater flows from urban catchments into waterways at increased volumes and velocities compared to what occurs in naturally vegetated catchments, and brings with it increased contaminants such as nutrients, litter, hydrocarbons, pesticides, herbicides and metals.

The increased flows and contaminants in urban stormwater threaten waterway health; increase risks of stream erosion, and can cause local drainage nuisances. Impacts of increased stormwater pollutant loads within Ipswich also have a cumulative impact on downstream ecosystems, including Moreton Bay.

Management of urban stormwater requires infrastructure and other interventions such as riparian corridor rehabilitation to address the volume and velocities of water and to treat water quality. Urban stormwater management is a requirement for developments exceeding specified thresholds as set out in the State Planning Policy. This policy sets out pollutant removal objectives to be applied in regulating development to reduce the loads of total suspended solids, total nitrogen and total phosphorus in stormwater run-off, while also managing flows to protect downstream waterway stability.

Appropriate land planning and engineering design in ways sympathetic to the natural environment are important to ensure sustainable urban drainage. Stormwater harvesting and reuse provides a significant opportunity to provide a water supply for uses such as irrigation.

However, in Ipswich multiple small developments have resulted in the uncoordinated installation of various stormwater quality improvement devices. When these devices do not function effectively (for example, if they have not been properly established or if they have been clogged with sediment) they are expensive and difficult to maintain.

In 2012 Implementation Guideline 24 of the Ipswich Planning Scheme was amended to allow for a voluntary offset payment for stormwater quality in some situations. The use of stormwater quality offsets needs to be effectively managed to ensure solutions delivered through this initiative are cost effective and achieve appropriate water quality, social and amenity benefits.

While this section focuses largely on urban stormwater management, there is also a need to consider water quality impacts from non-urban runoff, such as from agricultural areas.

Integrated water management planning will help to provide a framework so that decisions about stormwater management can be made in a balanced way, incorporating social, environmental and economic factors.

## STORMWATER INFRASTRUCTURE PLANNING

Management of stormwater drainage infrastructure networks is an important function of Council. It is essential for community resilience and liveability, as well as for managing impacts on waterways.

Current approaches to stormwater quantity management in Ipswich are based on site by site consideration of issues. Council does not currently have a framework which allows the implementation and creation of stormwater catchment master plans to define areas of significant stormwater infrastructure requirements at a regional or sub catchment level. The only current method is through the use of negotiated infrastructure agreements such as the one for the Springfield development. Such agreements can be complex and difficult to negotiate, particular in regions where multiple developers are present.

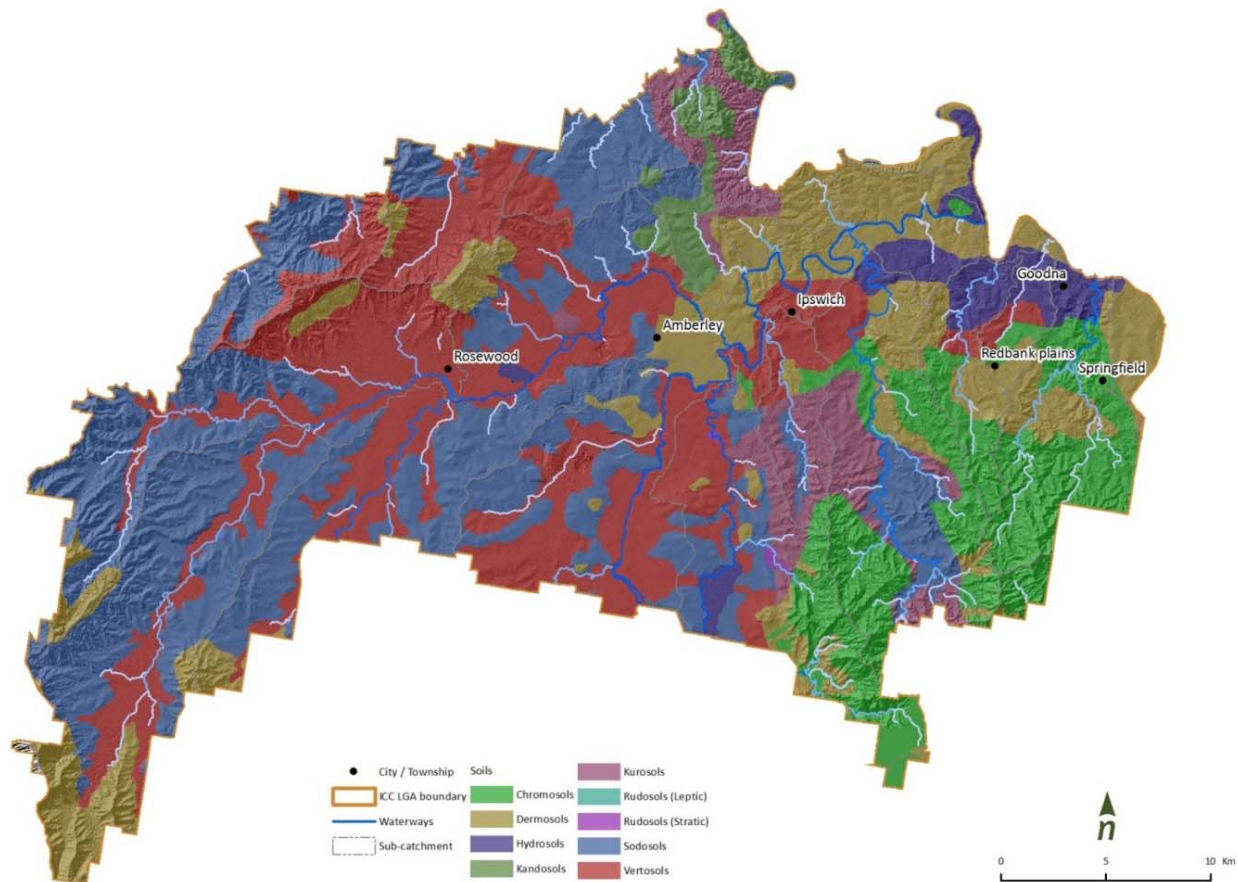
Without a stormwater infrastructure planning framework, Council has limited control on how stormwater infrastructure develops and a limited ability to fund and implement regional floodplain or stormwater management solutions. This can lead to a risk of haphazard infrastructure growth, inadequate capacity of systems following development and an inability to adequately consider cumulative effects on the drainage network.

Integrated water cycle planning will help identify the multiple stakeholders with an interest in stormwater infrastructure management, and will set the direction for further stormwater network planning to help address these risks. In particular, QUU has identified, and an interest in, understanding stormwater network planning opportunities where there may be synergies with planning for sewerage infrastructure.

## EROSION, SEDIMENT AND DISPERSIVE SOILS

Increasing amounts of sediment entering waterways has been identified as the major issue affecting waterway health in SEQ (Healthy Waterways, 2013). High levels of construction activity associated with urban growth, combined with Ipswich's highly erodible soils, are a significant risk to the water cycle in Ipswich and beyond to the broader Moreton Bay catchment. Gully and riverbank erosion also contribute to high sediment loads in waterways.

Construction phase development is a significant cause of erosion. With the large amounts of growth Ipswich is anticipating, erosion prevention and sediment management are significant matters requiring effective management approaches. Many of the soils in Ipswich are sodic and highly prone to erosion, including a number of areas with highly dispersive soils requiring particularly careful management. Figure 22 shows an overview of the soil types in Ipswich.



**Figure 22: Overview of the Soil Types of Ipswich City Council**

Inadequate management of sediment reduces water quality, damages infrastructure, undermines homes and can lead to the loss of productive land. Reduced water quality through erosion and sediment inputs into waterways has broad implications including impacts on aquatic ecosystems, damage to assets and pipe networks, reduced functioning of stormwater management devices, impacts on recreational waterway use, and risks to water supply if sediment levels in source water exceed treatment plants' capacity. (This was the case in January 2013 when previously unseen levels

of turbidity and coloured water at Mount Cosby Weir led to the shutdown of the water treatment plant and threatened SEQ's drinking water supply). Cross-boundary issues are also relevant given the impacts on sediment to water quality in downstream waterways and coastal environments of Moreton Bay.

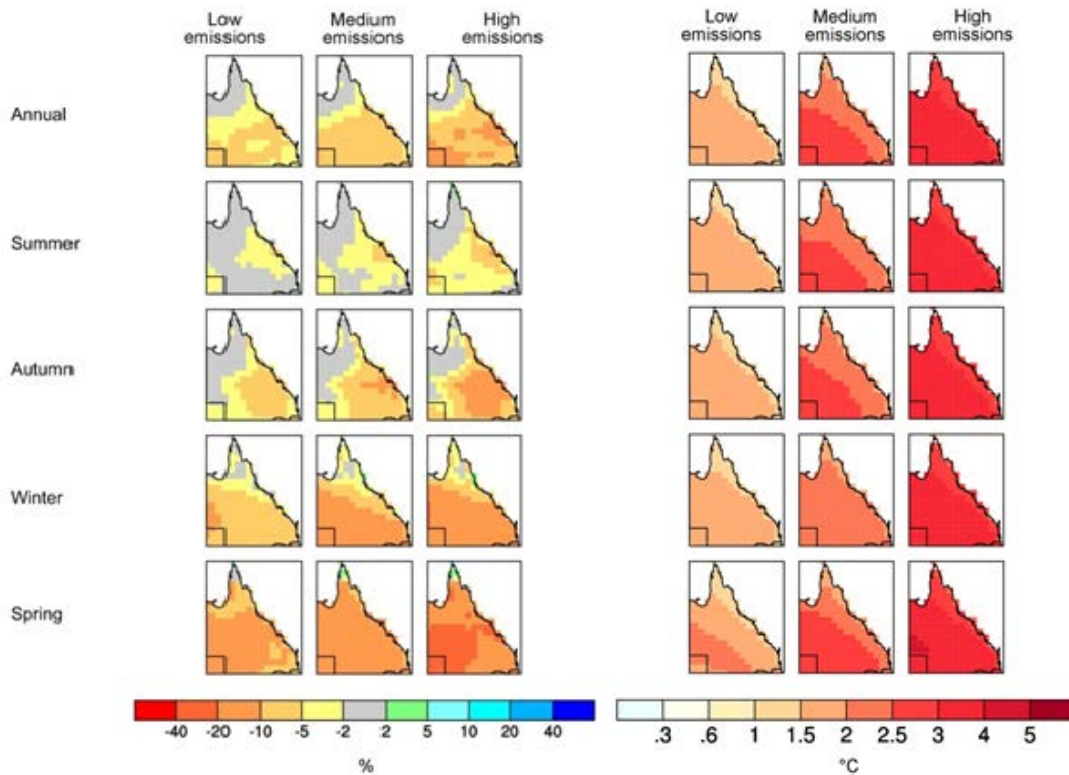
Council has a responsibility to enforce legislative provisions including planning legislation and the *Environmental Protection Act 1994* that require developments to comply with best practice erosion and sediment control measures to avoid impacts on the environment. However studies indicate low levels of compliance currently across SEQ.

Erosion and sediment management is an issue impacting multiple Council sectors. Integrated water cycle planning provides a method of communicating across stakeholders to ensure responsibilities are understood and opportunities for collaboration are increased to avoid negative impacts and increased costs, while also ensuring erosion and sediment controls are relevant to Ipswich's soil and climatic conditions.

## CLIMATE CHANGE AND URBAN HEAT ISLAND IMPACTS

An extensive body of evidence exists regarding existing and predicted changes in climate. Climate change has the potential for broad impacts on Ipswich’s water cycle by increasing the frequency and severity of droughts and floods and increasing temperatures. An increasingly urbanised population is also at risk of urban heat island impacts.

Figure 23 shows CSIRO’s projections for changes in rainfall and projected temperature changes by 2070 based on a range of climate change projections.



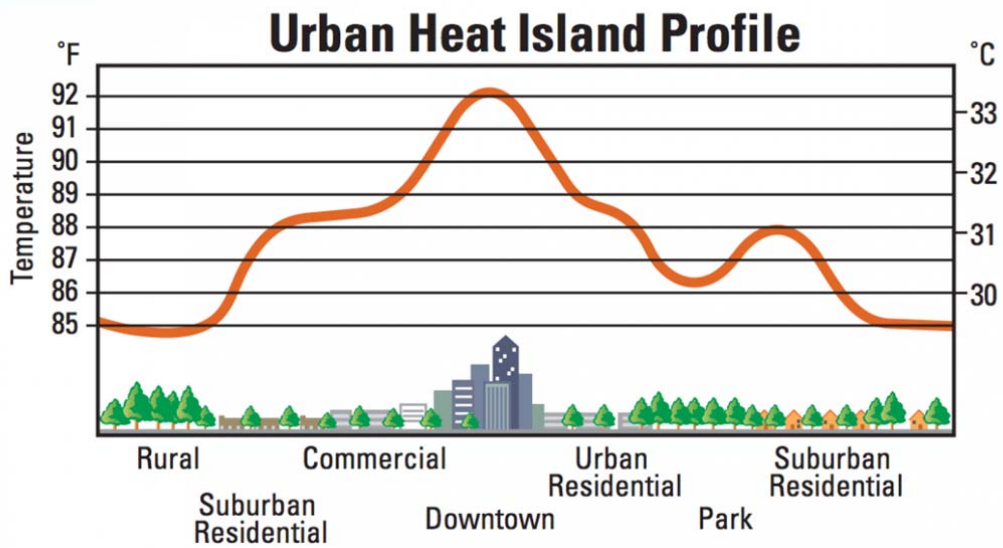
**Figure 23: CSIRO Climate Change Projections by 2070  
Rainfall (left) and Temperature (right)**

Combined with changes in temperature and rainfall are increasing urban heat island impacts. Urban heat island impacts occur when metropolitan areas store heat owing to increased areas of heat-absorbing materials. A conceptual diagram showing urban heat island impacts is shown in Figure 24.

Urban heat island impacts can be a significant public health concern – leading to heat stress mortality. The increased temperatures of impervious areas can also impact receiving water bodies due to increased temperatures of stormwater run-off entering receiving waters. The use of well vegetated riparian corridors and green infrastructure can help to mitigate urban heat island impacts.

In Ipswich, the predicted climate change impacts of decreased annual rainfall and elevated temperatures combined with increased levels of imperviousness in developing urban areas will result in increased urban heat island impacts.





**Figure 24: Conceptualisation of Urban Heat Island**

Climate change and increasing urban heat island impacts will have a number of implications for water cycle management. The Queensland Government’s projected climate change implications for SEQ and their broad water cycle implications are set out in Table 2:

**Table 2: Climate Change Projections and Implications for Water Cycle Management**

SEQ Climate Change Projection <sup>2</sup>	Implications for Water Cycle Management
An increase in temperatures of up to 4°C by 2070	The role of water in mitigating the urban heat island effect by supporting green spaces and providing passive cooling to urban spaces is likely to become of increasing importance to Ipswich as it develops in a changing climate.
The possibility of more than three times as many days above 35°C at Amberley by 2070 (increasing from 12 days per year to 41).	
Decrease in rainfall (according to best estimates)	Managing and preparing for droughts and will become more crucial as decreased rainfall leads to increased demand for irrigation and reduced stream flows.
An increase in evaporation by 6-16% by 2070	Increased demand for irrigation as plants will require more water. Potential impacts on urban stormwater quality devices such as wetlands and other vegetated systems.
More intense extreme storm events	Increased intensity of flooding events – increasing the importance of good planning and mitigation to ensure community resilience.

ICC needs to consider the impacts of climate change and urban heat island impacts on the water cycle and ensure the community is resilient to their effects. Integrated water management planning will take a significant step towards climate change adaptation and urban heat island resilience by identifying these issues for incorporation into further Council decision-making.

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<sup>2</sup> Climate Change in the South East Queensland Region. Queensland Government

## WATERWAY HEALTH & RIPARIAN CORRIDOR MANAGEMENT

Clean, safe and healthy waterways and wetlands are essential to Ipswich's liveability and economic viability and are crucial for sustaining biodiversity. The health of waterways in Ipswich has an impact on terrestrial and aquatic ecosystems locally and in Moreton Bay, as well as supporting ecosystem services to the community.

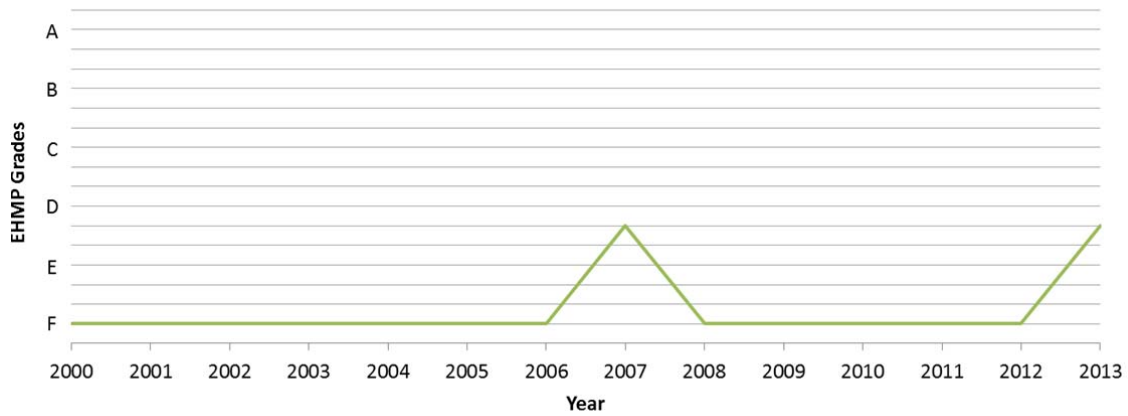
Due to a range of current and historic land use practices and environmental conditions, the water quality of many of the waterways in Ipswich receives poor water quality ratings.

Since 2001 the SEQ Healthy Waterways Partnership has prepared a yearly Ecosystem Health Monitoring Programme (EHMP) Report Card for the waterways and catchments of SEQ. Of most relevance to Ipswich are the monitoring sites within the Bremer River catchment, as shown in Figure 25.

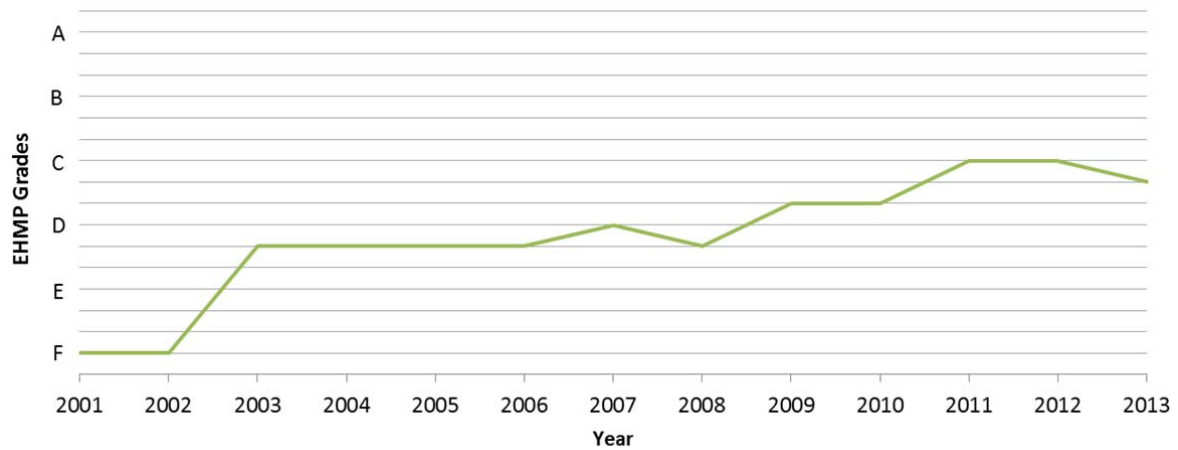


**Figure 25: Bremer Catchment and Estuary Monitoring Sites**

The Bremer Estuary and Bremer catchment (freshwater) EHMP results are shown in Figures 26 and 27 respectively.



**Figure 26: Bremer Estuary Ecosystem Health Monitoring Programme Report Card Grades**



**Figure 27: Bremer Freshwater Ecosystem Health Monitoring Programme Report Card Grades**

Council’s commitment to waterway health is based on protecting, managing and preventing any further declines in waterway condition (Ipswich City Council, 2009). In recent years Council has conducted various projects, studies and investigations into ways to maintain and improve the health and function of its waterways.

An important component of waterway health in Ipswich is the role of riparian and catchment vegetation. Vegetation plays a crucial role in stabilising the bank with their roots. This helps to reduce sediment loads into waterways. Re-vegetating areas in upper catchments slows runoff before water reaches urban areas. Riparian vegetation also shades waterways, reducing the daily variation in temperature and making them more hospitable to invertebrates, fish, bank-dwelling mammals and platypus that inhabit the roots and holes underneath riparian vegetation.

Better waterway health in Ipswich will be achieved through continued coordinated and collaborative approaches across all areas of Council. These approaches are consistent with the principles of integrated water management and this strategy’s objectives.

## CULTURAL HERITAGE & TRADITIONAL OWNER VALUES

It is essential that sites of indigenous cultural importance are treated respectfully. Waterways have special cultural significance for traditional owners. The Jagera, Yuggera and Ugarapul people are the traditional owners of land and waters that have been occupied and cared for by their ancestors for countless generations within the area now defined as the Ipswich LGA. This relationship is formally recognised in the Ipswich City Council's Indigenous Land Use Agreement.

Decisions impacting on the water cycle need to recognise the roles and responsibilities of traditional owners. Integrated water management planning helps ensure cultural heritage representatives are identified as water cycle stakeholders and aids communication and collaboration around water cycle management decisions.

## COMMUNITY ENGAGEMENT

Council acts on behalf of the local community to ensure resources are managed effectively and efficiently to ensure the City's liveability is maintained. Good management of water supports the liveability of the City for now and future generations.

There is significant benefit in ensuring water planning considers and responds to the values of the community and there are many benefits from increasing the role communities have in understanding and managing water.

Council currently provides community information regarding water management through education programs, newsletters and Council's website. Targeted community engagement also occurs through the development of local waterway management plans and with individual landowners who are part of Council's Waterway Conservation Partnerships.

While the broader community has not been directly engaged in the development of this strategy, it has been informed by outcomes of other community consultation. This includes surveys of SEQ residents in 2010 that identified issues related to sustainability – in particular the health of waterways and marine life as having the greatest relative importance on perceptions about population growth in SEQ.

Council's ongoing commitment to integrated water management will ensure further opportunities and mechanisms for meaningful community engagement and developing community understanding of the water cycle are identified and implemented.

## CONSUMPTION OF WATER IN COUNCIL FACILITIES

Ipswich City Council is a significant consumer of potable water in facilities and buildings and for the irrigation of parks and sports fields. This use of water supports a number of social and amenity benefits to the community of Ipswich.

In 2012/2013 Council used 269 megalitres of potable water, much of which is used for irrigation of sports fields and parks (Alluvium, 2014). Improved water efficiency and consideration of alternative supplies (such as stormwater harvesting or utilising recycled water) provide Council with the opportunity to show leadership and best practice by minimising its demand on water resources, while also providing the opportunity for cost savings.

Some of these are already underway across the City, for example:

- Treated effluent from the Rosewood Wastewater Treatment Plant is used at the Rosewood Golf Course.
- A number of Council parks use river water for irrigation.
- Groundwater has been investigated to provide irrigation supply (refer to report).

Opportunities for pilot projects such as water reuse schemes and utilising new technologies such as smarter irrigation technology also have the potential for significant economic and environmental gains. There may also be opportunities to collaborate with other partners such as QUU to identify strategic opportunities, such as utilising recycled water where appropriate for open space irrigation.

Integrated water cycle management will help Council use water in socially beneficial, environmentally sustainable and cost effective ways.

## CHANGING ROLES AND RESPONSIBILITIES

Everyone has a role to play in managing water. Water is used by everyone and the cumulative actions of everyone in the community impact significantly on the on water cycle. Within Ipswich, responsibilities for water management are shared across multiple agencies and stakeholders. These roles and responsibilities are all interrelated.

Overall responsibility for water management in South East Queensland is fragmented. Numerous agencies play a role, but there is no clear lead or overview being given to all aspects of the water cycle by any one agency. In addition, frequent changes have occurred in water management frameworks in recent years. The Federal Government also has an interest in water, and the National Water Initiative has a number of objectives of relevance to Council's integrated water planning.

There are currently a number of Council departments with responsibility for various parts of the water cycle and multiple external organisations with a role in water management.

This fragmentation and the changes in frameworks have led to uncertainty around responsibility of many aspects of the water cycle. This strategy will help to overcome this by showing strong leadership for water related areas under Council's control and by identifying relevant stakeholders (as set out in the Water Cycle Roles and Responsibilities section).

To assist Council's role in water management an internal ICC Water Working Group has been established to facilitate communication and collaboration across Council. The water working group will continue to have an ongoing role in administering the implementation of the Integrated Water Strategy and subsequent actions.

Integrated water planning offers an opportunity for Council to increase communication and collaboration across different water cycle stakeholders to facilitate links and seek alignment of key projects to ensure efficient outcomes and multiple benefits.



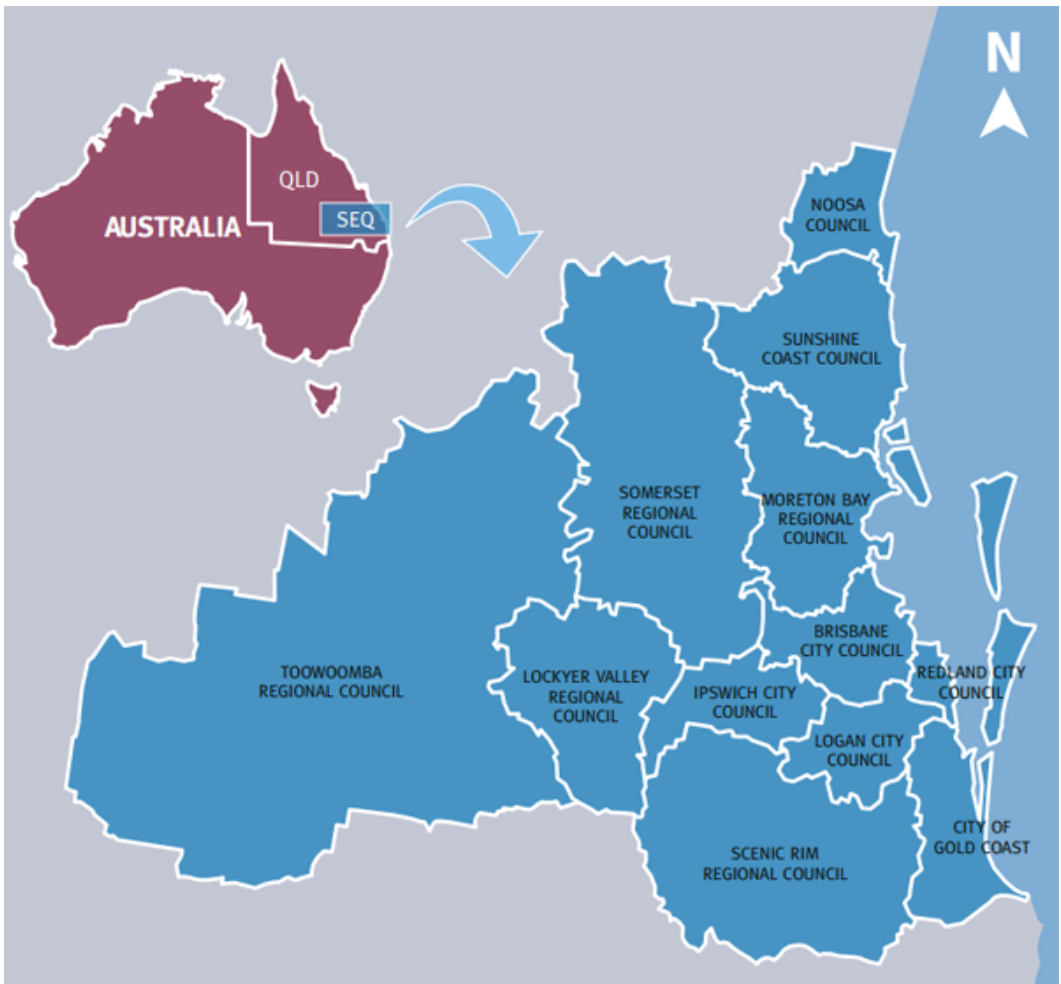
## CATCHMENT AND LOCAL GOVERNMENT BOUNDARIES

The Ipswich LGA does not align with major waterway catchment boundaries. This adds to the complexity of Ipswich's water cycle management and highlights the need for a regional approach when considering the water cycle. Integrated water planning can help facilitate cross-boundary communications about the water cycle.

The upper catchment of the Bremer River is located within the Scenic Rim local government area. The Brisbane River, which forms part of the northern boundary of the Ipswich LGA has the majority of its upper catchment within the Somerset Region before flowing downstream into Brisbane City. Ultimately the waterways that run through Ipswich end up at Moreton Bay.

As was experienced during droughts and floods, events occurring in different parts of the catchment can impact on Ipswich, while activities within Ipswich can influence other parts of the catchment. For example, water supply and sewerage networks cross over local government boundaries. Wivenhoe Dam is a crucial piece of flood control and water supply infrastructure for many parts of Ipswich, even though it is location outside of our LGA boundary. Water quality in Moreton Bay is impacted by activities occurring throughout Ipswich and other parts of the broader Brisbane River catchment.

Different organisations have different approaches to managing the water cycle, so achieving an integrated water management approach across SEQ requires communication and coordination at various levels with neighbouring councils in particular Brisbane City, Scenic Rim Regional Council, and Somerset Regional Council. The location of the Ipswich LGA in relation to SEQ is shown in Figure 28, while the catchment boundaries within the Ipswich LGA and their overlaps with neighbouring LGAs are shown in Figure 29.



**Figure 28: Local Government Boundaries in South East Queensland (SEQCOM)**

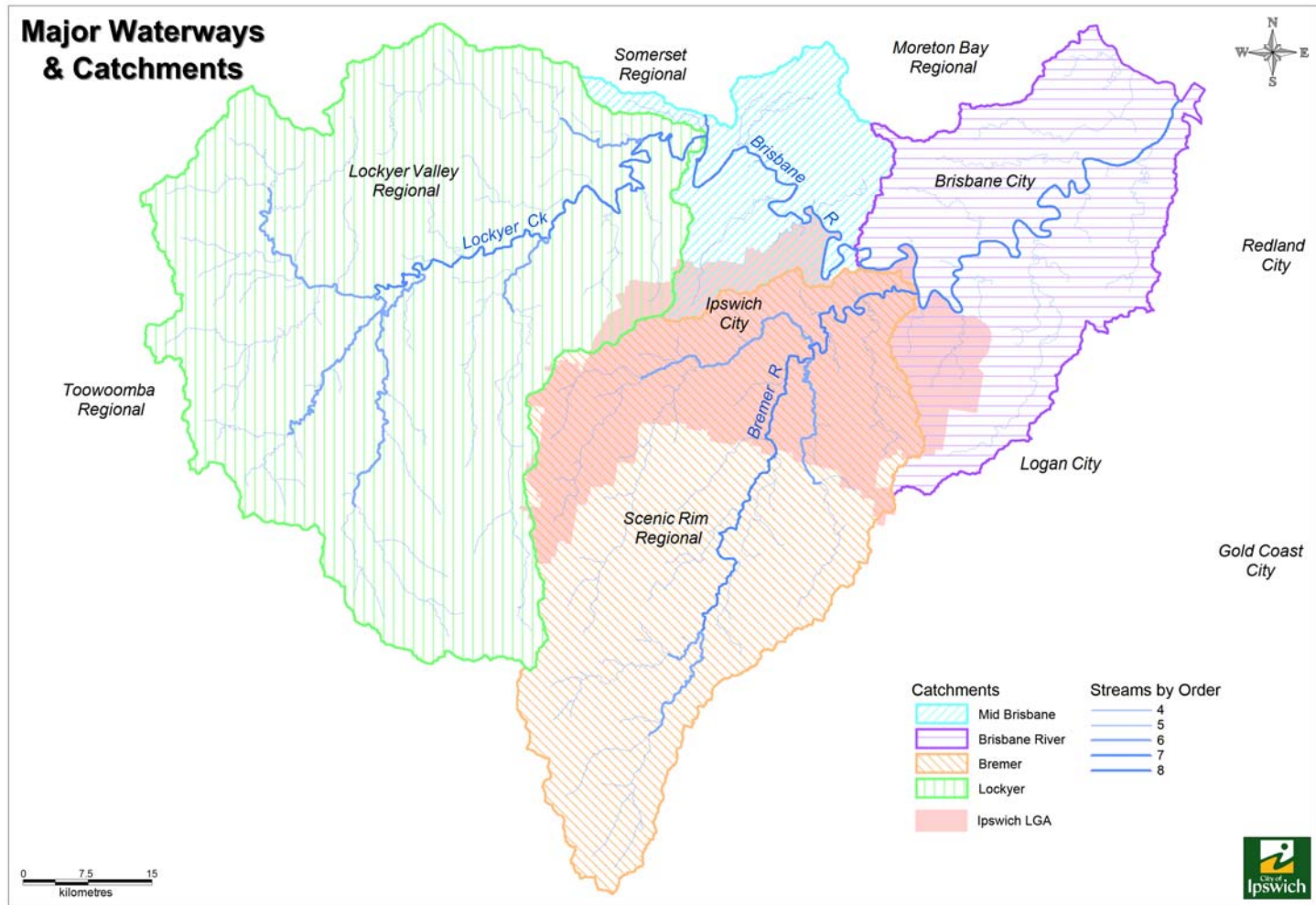


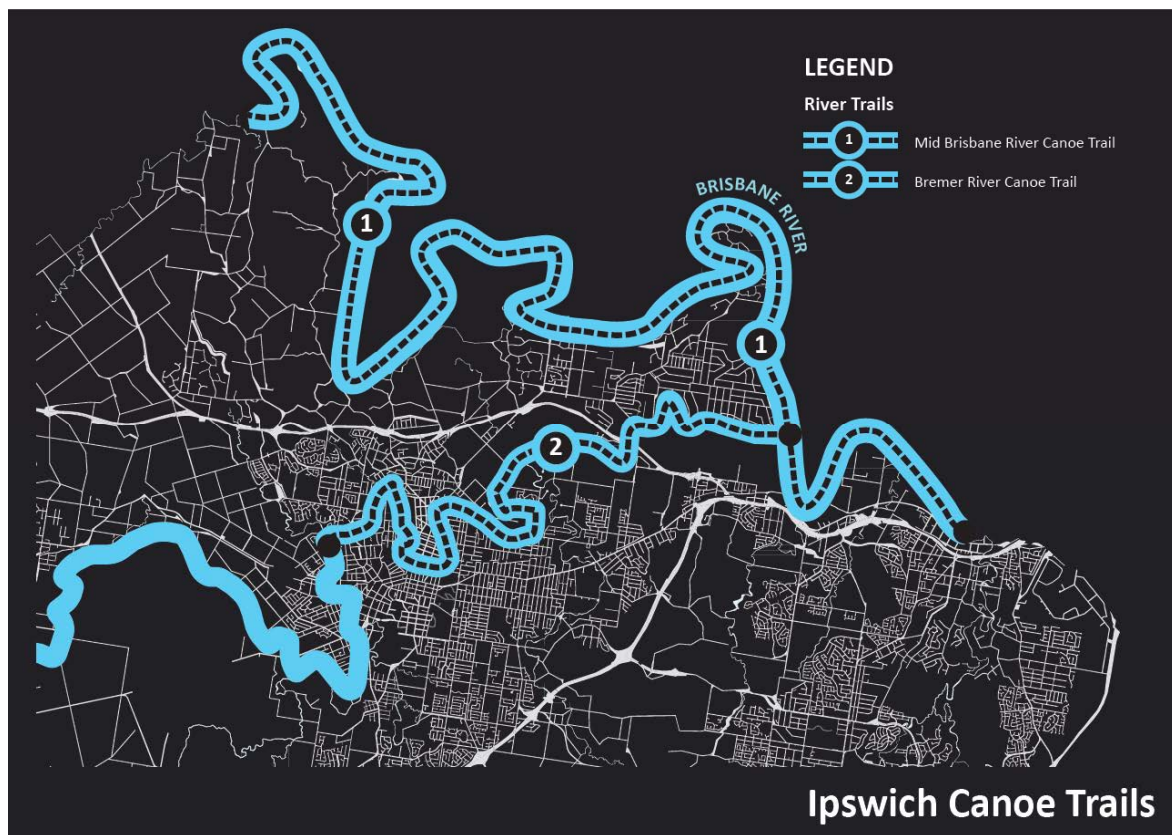
Figure 29: Location of major catchments with Ipswich LGA

## RECREATIONAL WATER QUALITY

Waterway recreation brings a wide range of social and economic benefits to the City of Ipswich. However, there is a need to ensure appropriate information about water quality and public health risks is provided at these access points, particularly if there are risks from high levels of microbial contamination within waterways.

Ipswich is fortunate to have a number of opportunities for waterside recreation on many of its waterways. These waterside recreation opportunities are particularly important for Ipswich as an inland Council without direct access to the coast.

Council provides infrastructure in some locations to support recreational access to the City's waterways. Kayak access points are located on the Bremer River at Cribb Park and Shapcott Park, and on the Brisbane River at Joseph Brady Park, Colleges Crossing, Riverside Park, Kholo Bridge and Richardson Park. In addition, ICC promotes canoe trails on the rivers, as shown in Figure 30<sup>3</sup>. These provide excellent opportunities for water based recreation within the City.



**Figure 30: Location of Ipswich Canoe Trails**

Council needs to ensure that water quality risks arising from promoted waterway recreation opportunities are understood so actions can be taken to ensure those risks are appropriately managed and communicated.

<sup>3</sup> Note – the Brisbane River canoe trail is divided into two sections (upper and lower reach) due to the catchment protection zone associated with the Mt Crosby Treatment Plant.

Integrated water management planning will assist by developing a framework for the water cycle to be considered as a holistic system. This will help to identify impacts on water quality, and recognise relevant stakeholders with a role to play in communicating and minimising risks.

## MANAGING SALINITY

In parts of Ipswich ground and surface water has a high concentration of salts which impact on water quality and productivity of soils. Salinity issues are often linked to geology but can be exacerbated by vegetation clearance. Figure 31 provides an indication of salinity extents within the City.

Salinity impacts on land productivity, ecology and infrastructure. It also has implications for water supply, with highly saline water difficult and expensive to treat to potable standards. This can impact on the operation of water treatment plants.

An example of salinity issues within the Ipswich LGA can be found in the Black Snake Creek catchment where changes in the land use since the 1800s have altered the landscape vegetation and hydrology and led to increased levels of salinity in surface water.

Managing and understanding salinity is a crucial to Ipswich's water management. An integrated water cycle management response to salinity issues will help to understand the issue from a holistic perspective, while recognising the issue and possible solutions have environmental, social and economic implications.

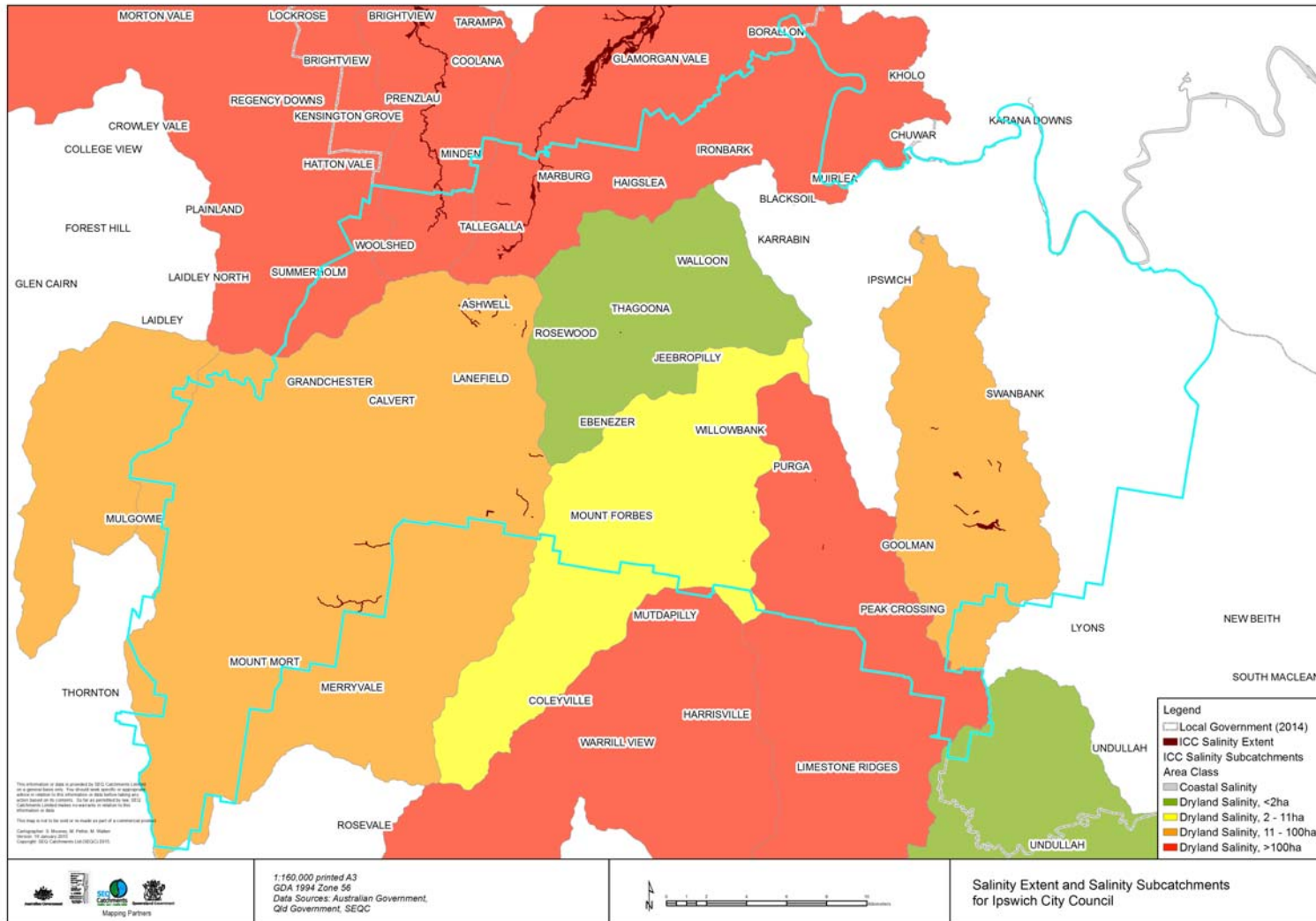
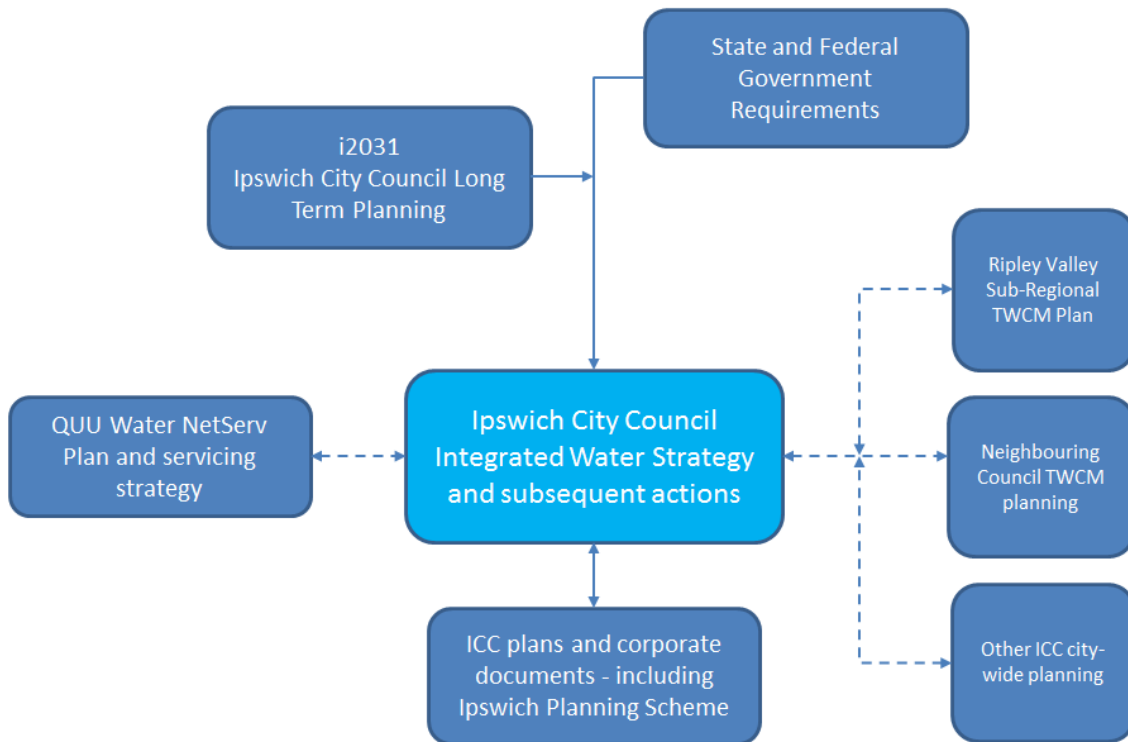


Figure 31: Salinity Extent and Salinity Subcatchments

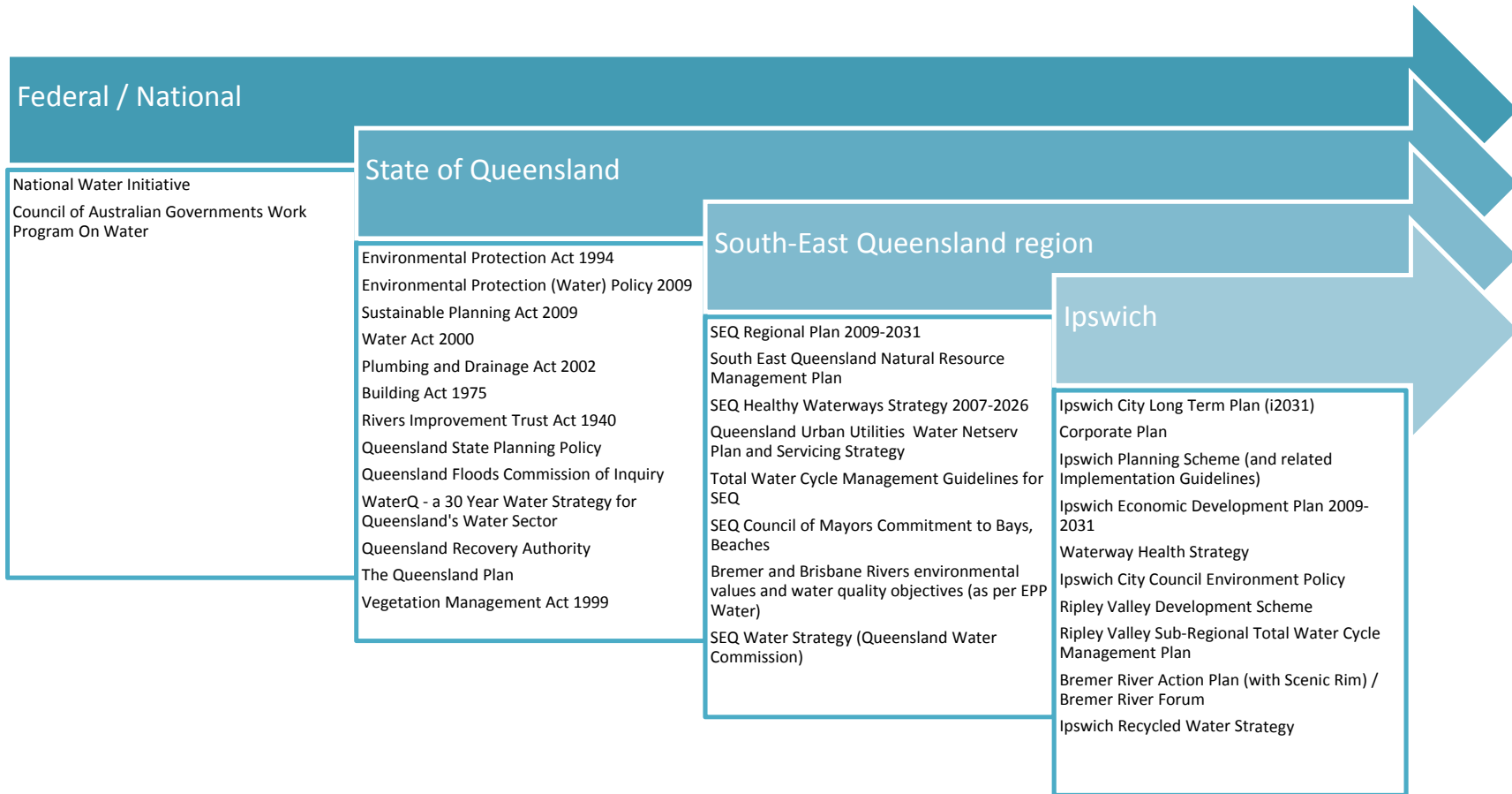
# PLANS AND LEGISLATION

Management of the water cycle in Ipswich is guided by multiple statutory requirements and policy frameworks which apply at various levels – from the whole of Australia, to more specific Queensland, SEQ and Ipswich City Council requirements and supporting documents.

The development of this strategy aims to reflect the strategic intents of these other documents and ensure Ipswich City Council’s integrated water planning builds on the work and direction that has already been set over many years of best practice and legislative development governing and guiding water management. Figure 32 shows how the Integrated Water Strategy fits within the various other planning, while Figure 33 shows the various hierarchy of planning and legislation that supports or informs water management planning.



**Figure 32: Integrated Water Strategy Planning Context at ICC**



**Figure 33: Hierarchy of Planning Provisions Relevant to Water Management Planning for Ipswich**



# WATER CYCLE ROLES & RESPONSIBILITIES

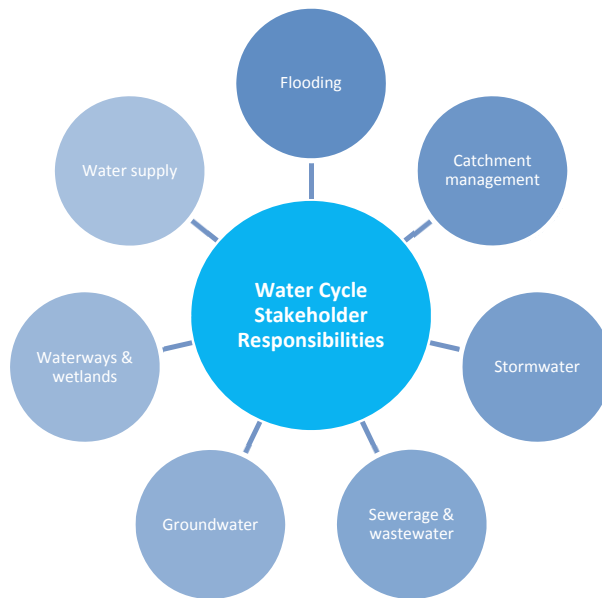
Water management is cross-disciplinary and requires many different technical and professional disciplines to come together to share and develop a holistic understanding about management of interrelated water resources. Integrated water management recognises the interdependencies between different parts of the water cycle, and the implications of decisions across multiple disciplines.

This was recognised in the development of total water cycle management guidelines for Queensland, which identified the following:

*“Historically, specific elements of the water cycle have been managed by separate organisations and professional disciplines. Separation of management created a narrow focus on discrete parts of the water cycle, and no-one had an overall picture of the total water cycle. The result was inefficiencies, market distortions, and unintended negative impacts.”*

Within Ipswich there are multiple functions of Council relevant to water management. The federal and state governments also have an interest, as do many other statutory bodies and external organisations, each with various responsibilities to manage different but interrelated parts of the water cycle.

The interrelated water cycle components that stakeholders have responsibility for in Ipswich are represented by Figure 34. The diversity of water cycle components and stakeholders highlights the importance of good communication and collaboration to achieve more effective and efficient outcomes for the community.



**Figure 34: Interrelated Water Cycle Stakeholder Responsibilities**

The water cycle stakeholder summary table below provides an overview of all of Ipswich's water cycle stakeholders, while the more detailed stakeholder summaries in Appendix 2 provide details on the relevant responsibilities for elements of water cycle management within Ipswich City Council and within other statutory organisations.

There are significant areas of overlap between responsibilities for water cycle stakeholders in Ipswich. The table below outlines the areas of overlap between different stakeholders' areas of interest and responsibility.

			Stakeholder Role in Water Cycle Management							
Stakeholder			Summary of Water Cycle Management Function	Waterways and wetlands	Water Supply	Sewage / Wastewater	Stormwater	Catchments	Groundwater	Flooding
Ipswich City Council	Planning & Development Department	Development Planning / Engineering & Environment Branches	Development assessment	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
		Strategic Planning Branch	Strategic land use planning	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	Works, Parks & Recreation Department	City Maintenance Branch	Stormwater infrastructure maintenance / water use and efficiency	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>
		Indigenous land user partnerships	Indigenous land use agreement administration	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
		Sport, Recreation and Natural Resources	Integrated water cycle management / Floodplain management / waterway health / Open space planning	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
		Strategic Asset Management – Asset Management	Asset management				<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>
	Health, Security & Regulatory Services	Environment Policy & Planning	Environmental protection policy development and regulation	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	Infrastructure Services Department	Infrastructure Planning Branch	Capital delivery of drainage, stormwater quality and flood mitigation projects	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>
Ipswich Rivers Improvement Trust			River improvement works to improve flow of water in rivers within Ipswich LGA	<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
Queensland Urban Utilities			Potable water supply and sewerage services	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				
Seqwater			Bulk water supply	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
SEQ Catchments			Natural resource management	<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Healthy Waterways Partnership			Best practice guidance and capacity building	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
SEQ Council of Mayors			Advocacy on behalf of SEQ Councils	<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
Queensland State Government			Various legislative roles	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Neighbouring local governments			Partnerships and information sharing	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

# STAKEHOLDER PRIORITY AREAS MAP

This stakeholder priority map was developed by Ipswich's key statutory stakeholders to indicate areas that identified as being of particular spatial relevance to their current roles and responsibilities.

These locations provide an indication of opportunities for shared outcomes and collaboration.



Scale: As shown

### Site/Area Issues

- 1 Norman Street Bridge – planned for future
- 2 Motorsport development – Ebenezer / Warrill Creek
- 3 Ebenezer / Willowbank Implementation Guide (Industrial development)
- 4 Bundamba Creek / Deebing creeks – protect from inappropriate development.
- 5 Springfield – management of lakes
- 6 Deebing Creek. Degraded waterway, sediment, Drainage channel development.
- 7 Purga Creek (Agricultural run-off)
- 8 Churchill abattoir (One Mile) (Industrial)
- 9 Australian Meat Holdings (Barellan Point, Bremer River) (Industrial)
- 10 Eastern part of the city (Six Mile Creek, Goodna Creek, Woogaroo Creek)(Industrial)

### Waterway/Catchment Investigations & Enhancements

- 1 Brisbane River – Stabilisation / rehabilitation near Karalee
- 2 Black Snake Creek Total Water Cycle Management Plan
- 3 Bundamba Creek – Power Plant @ Swanbank, Lagoons,
- 4 Bundamba Creek Master Plan
- 5 Ironpot Creek – rehabilitate
- 6 Bundamba Creek, downstream of Swanbank (Blackstone) – IRT Woody Weed Removal
- 7 Franklin Vale Creek- IRT Woody Weed removal
- 8 Bremer River between Lower Mt Walker and Rosewood- IRT Woody Weed Removal
- 9 Purga Creek- IRT Woody Weed Removal
- 10 One Mile Creek- IRT Woody Weed Removal
- 11 Lockyer Creek (NP Ipswich LGA) (SEQWater)

### Stormwater Infrastructure

- 1 Augustine Heights – constructed wetlands
- 2 Redbank Plains- stormwater harvesting potential
- 3 Ipswich CBD- stormwater harvesting potential
- 4 Brassall- stormwater harvesting potential

### Erosion & Sediment Issues

- 1 Ironpot Creek / Mihi Creek (Brassall / Blacksoil)
- 2 Warrill Creek (future industrial)
- 3 Springfield
- 4 Ripley Valley

### Drinking Water Sources

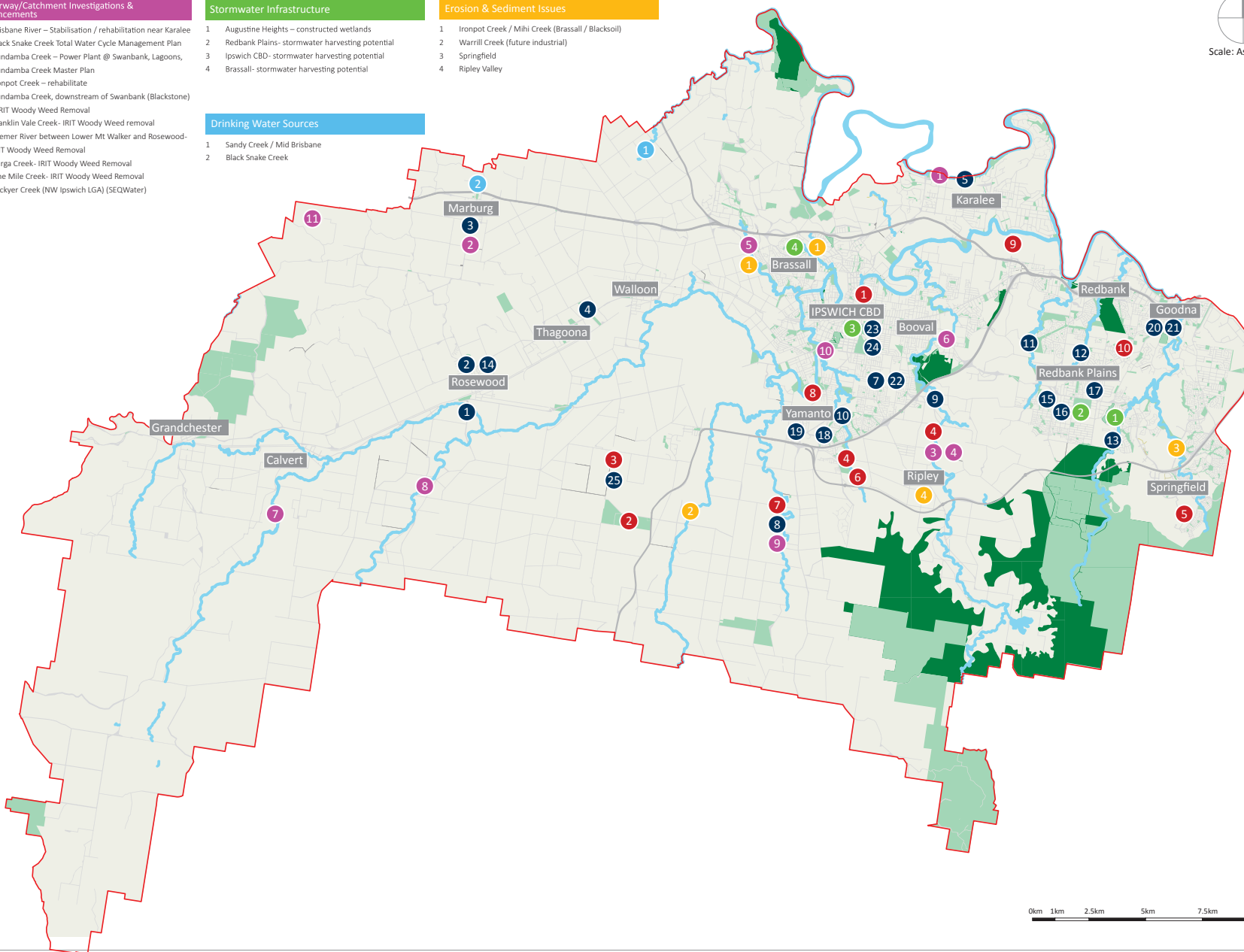
- 1 Sandy Creek / Mid Brisbane
- 2 Black Snake Creek

### Flooding & Drainage

- 1 Western Creek flood mapping study
- 2 Rosewood – mitigation option decision-making
- 3 Marburg Basin
- 4 Walloon / Thagoona – flow paths
- 5 Colleges Crossing – flood resilience?
- 6 City and Kendall Flood study – 2014
- 7 Raceview East Flood Study – 2014
- 8 Purga Creek (Future)
- 9 Bundamba Creek
- 10 Deebing Creek
- 11 Six Mile Creek
- 12 Goodna Creek
- 13 Woogaroo Creek
- 14 Rosewood
- 15 Cashmere Street
- 16 Wilkie Ave
- 17 Highbury Drive
- 18 Kerners Road
- 19 Tristania Street
- 20 Albert Street
- 21 Church Street
- 22 Raceview East
- 23 Kendall Street
- 24 City East
- 25 Ebenezer Stormwater Drainage Overview Study

### LEGEND

- Conservation Zone
- Parks & Reserves
- Waterways
- Major Roads
- Highways
- LGA Boundary
- Concentrated Issues Area



0km 1km 2.5km 5km 7.5km 10km



WORKS, PARKS & RECREATION DEPARTMENT  
August 2014

Prepared for strategic planning and consultation purposes only.

### NOTES

The locations and references depicted on this plan are for illustrative purposes only. The location markers are placed in approximate locations or general vicinity of an interest area.

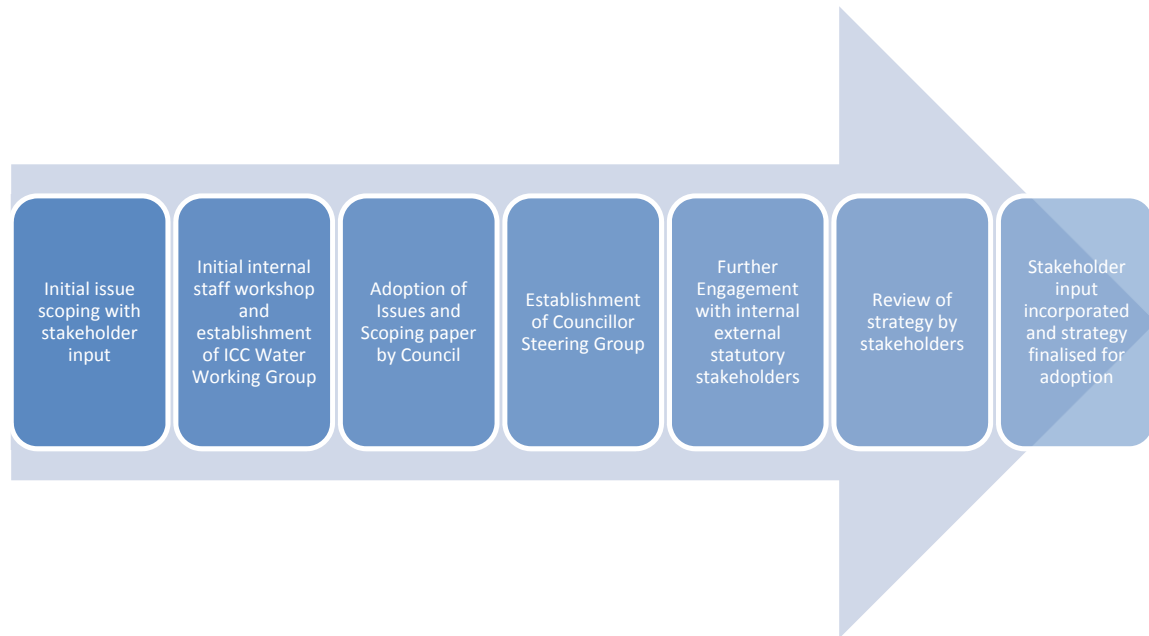
INTEGRATED WATER STRATEGY  
STAKEHOLDER MAP



# APPENDIX 1: STRATEGY DEVELOPMENT PROCESS & STAKEHOLDER ENGAGEMENT

The strategy development has taken into account the views of a diverse range of water cycle stakeholders.

The strategy development process has involved the following stages and opportunity for engagement by key stakeholders within Council and key external stakeholders, such as Seqwater, Queensland Urban Utilities and Ipswich Rivers Improvement Trust.



## APPENDIX 2: WATER CYCLE STAKEHOLDERS

### INTERNAL COUNCIL STAKEHOLDERS

Council Department	Stakeholder Name	Water Cycle Role	Overview of Activities of Relevance	Key Documents	Significant Projects
Planning & Development	Strategic Planning Branch	Consideration of water within land use planning frameworks	<p>Land use planning frameworks need to strike an appropriate balance between economic development, social development and environmental outcomes. This includes integrating water cycle outcomes in the development of the planning framework and consequently the regulation of development.</p> <p>The Ipswich Planning Scheme is the statutory planning document for regulating development in the City. Council prepares and updates the Ipswich Planning Scheme in a way that reflects community needs.</p> <p>The Council engage in policy, plan and legislative development and reforms that relate to land use planning by providing input and comment to relevant agencies or government so that the needs of Ipswich are taken into account.</p>	<ul style="list-style-type: none"> <li>- Ipswich Planning Scheme</li> <li>- Sustainable Planning Act</li> <li>- Queensland State Planning Policy</li> </ul>	<ul style="list-style-type: none"> <li>- Planning Scheme Review – whole of local government area</li> <li>- Ripley Valley urban development</li> <li>- Review of the Ipswich Planning Scheme’s flood regulations</li> </ul>

Council Department	Stakeholder Name	Water Cycle Role	Overview of Activities of Relevance	Key Documents	Significant Projects
	Development Planning and Engineering and Environment Branchs	Development assessment. Consideration of impacts on the water cycle in development application assessment.	<p>Land development has the potential to impact on water quality and quantity in multiple ways, through the creation of additional stormwater and sewerage, through the increased demand for potable water, and by changes to the landscape impacting waterways and catchments.</p> <p>Council assesses the environmental impacts of developments by reviewing development applications, undertaking audits, and interacting with developers to assist them to meet their statutory obligations. This is done to protect waterways, wetlands and vegetation from the impacts of development, by controlling stormwater, implementing riparian buffers, reducing areas of imperviousness and increasing vegetative cover.</p> <p>Council also ensures that water related assets (such as stormwater treatment devices) are of acceptable standard to Council and provide environmental benefits, and develops and manages developer infrastructure agreements.</p> <p>Feedback from the development assessment process also informs reviews of the planning scheme and associated implementation guidelines.</p>	<ul style="list-style-type: none"> <li>- Ipswich Planning Scheme (including relevant codes, Planning scheme policies and implementation guidelines – in particular, Implementation Guideline 24)</li> <li>- Water By Design Guidelines: <ul style="list-style-type: none"> <li>o Bioretention Technical Design Guidelines (BTDG), Version 1 dated October 2012</li> <li>o MUSIC Modelling Guidelines Version 1 (2010)</li> <li>o Construction and Establishment Guidelines</li> <li>o Technical Design Guidelines Version 1 (2006)</li> <li>o Maintaining Vegetated Stormwater Assets Version 1 February 2012</li> </ul> </li> <li>- State Planning Policy</li> <li>- Nature Conservation Act</li> <li>- Sustainable Planning Act</li> <li>- Environmental Protection Act</li> <li>- Water Act</li> <li>- Waterway Health Strategy</li> <li>- Riparian Corridor Revegetation Guideline</li> <li>- Waterway and Channel Rehabilitation Guidelines</li> </ul>	<ul style="list-style-type: none"> <li>- Stormwater offsets</li> <li>- Drafting of Planning Scheme waterway and wetland provisions (future project)</li> </ul>



Council Department	Stakeholder Name	Water Cycle Role	Overview of Activities of Relevance	Key Documents	Significant Projects
Works, Parks & Recreation Department	City Maintenance Branch	Maintenance of Council's stormwater infrastructure.	<p>Council is ultimately the asset owner of various infrastructures that is constructed for the purpose of managing stormwater quality and quantity. Maintenance of these assets is required to ensure they continue to provide benefits to the community and the environment.</p> <p>Waterways and structures that collect stormwater runoff (trash racks, gully traps and various basins / wetlands) are maintained to ensure their continuing function. This is achieved through proactive and reactive cleaning, de-silting, replanting and general repairs.</p> <p>In-stream erosion within waterways is controlled through armouring of banks and slowing velocities.</p>		<ul style="list-style-type: none"> <li>- Review of rock-lined drains to improve maintenance</li> <li>- Modelling of expenditure in operational maintenance of bio-retention basins</li> </ul>
		Management of Council's water use.	<p>Council is a significant user of water, for purposes including maintenance of the unsealed road network, open space irrigation, and in Council facilities. Opportunities to reduce reliance on potable water can reduce Council's costs and well as minimising environmental impacts.</p> <p>Council's water use is managed as follows:</p> <ul style="list-style-type: none"> <li>- Water use is monitored</li> <li>- Comments are provided on water requirements for new facilities.</li> <li>- Irrigation efficiency of Council sports fields is monitoring and reported on, including performance and operation of soil moisture sensors, flow gauges and rain gauges.</li> <li>- water harvesting initiatives are investigated and maintained</li> <li>- Maintenance of potable water infrastructure.</li> </ul> <p>Monthly reports on the MAIT (irrigation) system performance</p>	Ipswich Irrigation Policy (Draft) and Management Strategy Ipswich City Council Water Audit Summary Report – Facilities 2007	Stormwater Harvesting Investigations
	Sport, Recreation and Natural Resources Branch	Integrated water planning	Coordinate planning across Council relating to integrated water management / total water cycle management.	Environmental Protection Policy (Water) Total Water Cycle Management Planning Guidelines for South East Queensland	Water Working Group Development of Integrated water management implementation Plans Implementation of Integrated Water Strategy Actions Healthy Waterways – Water by Design Steering Committee

Council Department	Stakeholder Name	Water Cycle Role	Overview of Activities of Relevance	Key Documents	Significant Projects
		<p>Hydraulics Planning – flood investigations and mitigation</p>	<p>Significant flooding has occurred in Ipswich, most recently in 2011. Flooding has significant implications for the community, while mitigation options need to be considered to ensure they don't worsen effects elsewhere or cause environmental impacts.</p> <p>Hydraulics planning aims to plan for the long term flooding infrastructure and associated frameworks in an integrated manner by developing city-wide strategies, policies, specifications and actions that will shape future infrastructure requirements.</p> <p>Council staff manage existing and future flood studies and models, and provide technical expertise and guidance to Council stakeholders. Key tasks include identification of areas of high hazard, investigation of mitigation options and flood model analysis. This information helps to inform land use planning decisions and mitigation options.</p>	<p>Regional studies:          - Ipswich Rivers Flood Studies Phases 1, 2 and 3          - Various local flood and drainage studies.</p>	<ul style="list-style-type: none"> <li>- Prioritisation of Flood Mitigation Projects</li> <li>- Brisbane River Catchment Flood Study. (in progress &amp; led by state government)</li> <li>- Western Creek flood mapping study – 2014</li> <li>- City and Kendall Flood study – 2014</li> <li>- Raceview East Flood Study – 2014</li> <li>- Rosewood – mitigation option decision-making</li> <li>- Marburg Basin</li> <li>- Black Snake Creek – Salinity, flooding, water quality</li> <li>- Walloon / Thagoona Colleges Crossing – flood resilience (upgrade feasibility investigation by TMR, unlikely to be upgraded)</li> <li>- Norman Street Bridge – planned for future</li> <li>- Bundamba Creek – Power Plant @ Swanbank, Lagoons, Bundamba Creek Master Plan</li> <li>- Custodian / maintenance of stream gauge stations – no clear guardian</li> <li>- Consistency of flood model parameters</li> <li>- Purga Creek – no flood study yet             <ul style="list-style-type: none"> <li>o Motorsport development – Ebenezer / Warrill Creek</li> </ul> </li> </ul>

Council Department	Stakeholder Name	Water Cycle Role	Overview of Activities of Relevance	Key Documents	Significant Projects
		<p>Drainage and stormwater quality Improvements.</p> <p>Managing and prioritising stormwater and flooding infrastructure projects</p>	<p>Stormwater and flooding infrastructure provides water quality and flood mitigation benefits to improve community resilience and reduce environmental impacts of development on waterways.</p> <p>Investigation and concept design of trunk drainage, stormwater quality and flood mitigation projects is achieved considering flood study and stormwater quality outcomes. Funding for these projects often come from grants due to limited capital budget allocated for trunk drainage.</p> <p>The flood warning network (Enviromon) is managed and monitored to ensure its effective operation by remediating faults, and acting on warning. Rolling update programs for the ageing network. Associated disaster management duties to support disaster management officers.</p>	<ul style="list-style-type: none"> <li>- State Planning Policy/Sustainable Planning Act</li> <li>- Water by Design/Healthy waterways</li> <li>- Australian Rainfall and Runoff Guidelines including latest Project Revisions</li> <li>- Queensland Urban Drainage Manual</li> <li>- Ipswich City Council Standard Drawings</li> <li>- Ipswich Planning Scheme/Policy 3, Implementation guideline 24.</li> <li>- Queensland Flood Commission Inquiry Recommendations</li> <li>SCARM - Floodplain Management in Australia: Best Practice Principles and Guidelines</li> </ul>	<ul style="list-style-type: none"> <li>- City-wide stream and rain gauges – refurbishment program and installation of new gauges.</li> <li>- Water Ride flood forecasting and disaster management software implementation.</li> <li>- Thagoona flood mitigation project.</li> <li>- Redbank Plains Recreation Reserve flood mitigation</li> <li>- Stormwater harvesting pilot studies</li> <li>- Hydrological and hydraulic software implementation</li> <li>- Conceptual designs for multiple major trunk drainage projects</li> </ul>

Council Department	Stakeholder Name	Water Cycle Role	Overview of Activities of Relevance	Key Documents	Significant Projects
		Waterway and wetland health planning and projects	<p>Protection, management and enhancement of waterways in Ipswich is an important function of Council.</p> <p>Council undertakes strategic planning, management and delivery of programs on public and private land relating to catchments, waterway health, riparian corridor management, and wetlands – to achieve triple bottom line outcomes and climate change resilience for Ipswich.</p> <p>Waterway health, water quality responsibilities and catchment values are promoted to internal and external stakeholders to ensure integration of waterway health in council plans and projects.</p> <p>Council liaises with regional bodies (regional steering committees and state government working groups), external agencies, community, business and others for waterway health and catchment management.</p> <p>Waterways partnership programs and voluntary conservation agreements are coordinated and supported.</p> <p>Council delivers on ground projects focussing upon catchment regeneration and riparian improvements through revegetation and channel improvements/stabilisation.</p> <p>Liaise with other departments offering advice and guidance on catchment and riparian management with regards to waterway health and water management</p> <p>External relationships and partnerships:</p> <ul style="list-style-type: none"> <li>- Council acts as secretariat and members of the Bremer River Fund.</li> <li>- Council is a member of the Ipswich Rivers Improvement Trust.</li> <li>- Council is a Investing partner with Healthy Waterways</li> <li>- Council develops and maintains partnerships with universities and research organisations, and supports student placement projects.</li> </ul>	<ul style="list-style-type: none"> <li>- Waterway Health Strategy 2009 (to be reviewed in 2014)</li> <li>- Riparian Corridor Rehabilitation Guidelines</li> <li>- Ipswich Wetlands report and mapping</li> <li>- Stream order mapping</li> <li>- Education programs / fact sheets / brochures</li> <li>- Catchment Condition Assessment Report</li> <li>- Bremer River Investment Prospectus (a key document but doesn't belong to Council)</li> </ul>	<ul style="list-style-type: none"> <li>- Waterway Health Strategy - review</li> <li>- Local Catchment management plans (Black Snake Creek)</li> <li>- Corridor Master Plans (Bundamba)</li> <li>- Ipswich Wetlands Project mapping and assessment</li> <li>- Environment matters publication</li> <li>- Water quality monitoring (fish surveys, microbial contamination, turbidity)</li> <li>- Stormwater quality offset implementation plan and delivery</li> <li>- Catchment condition assessment</li> <li>- Soils management guidelines (with Ipswich Rivers Improvement Trust)</li> <li>- Enviroplan and Everyone's Environment Revegetation projects – Bundamba Creek – Evelyn Dodds.</li> <li>- Informing planning scheme review regarding waterways and corridor management.</li> <li>- Natural channel design guidelines (future project)</li> <li>- Community engagement / social research (future project)</li> </ul>

Council Department	Stakeholder Name	Water Cycle Role	Overview of Activities of Relevance	Key Documents	Significant Projects
		<p>Open Space and Recreation - Interface between open space and waterways</p>	<p>Planning for open space is done to ensure the long term provision of open space aligns with the community and Council expectations to satisfy the recreation and physical activity demands of the city.</p> <p>Linear Open Space and Drainage Reserves: Council's linear parks networks are alongside waterways within the city. There is a need to establish appropriate interactions and interfaces between open space and waterways and determine how stormwater management is integrated within linear corridors.</p> <p>The Open Space and Recreation Strategy (adopted 26 August 2014) has classified the open space network in to three sub networks; Trunk, Non-Trunk and Natural Areas.</p> <p>The open space elements which predominantly run parallel to waterways are Citywide and Local Linear Parks (Trunk) and Utility (Non Trunk - drainage/Stormwater assets) and Natural areas (NA).</p> <p>Open Space Water Demand The irrigation requirements of Council's open space and management activities (such as the use of fertiliser on parks) impact on both water quantity and quality through demand for potable water, impacts of run-off on waterways, and opportunities for stormwater harvesting for irrigation reuse.</p> <p>Recreation Access to Waterways Currently, water recreation and access to waterways is a valued component of recreation in Ipswich. The Outdoor Recreation Plan (currently under development) includes a review of the 1998 Waterside Park Strategy and will investigate the current need and future demand of water recreation and associated locations where access to the rivers is required.</p>	<ul style="list-style-type: none"> <li>- (Draft) Open Space and Recreation Strategy</li> <li>- Open space standard drawings</li> <li>- Local Government Infrastructure Plan (Previously Priority Infrastructure Plan) / Public Parks Strategy / Planning Scheme Policy 3</li> <li>- Streetscape Design Guidelines</li> </ul>	<ul style="list-style-type: none"> <li>- Bundamba Creek Master Plan</li> <li>- Water Sensitive Urban Design Guidelines</li> </ul>

Council Department	Stakeholder Name	Water Cycle Role	Overview of Activities of Relevance	Key Documents	Significant Projects
	Asset Management	Stormwater asset management	<p>Asset custodian and manager of stormwater infrastructure assets and other assets including but not limited to bridges and culverts which potentially impact on waterways.</p> <p>The Asset Management team effectively and efficiently manages and maintains an infrastructure asset register. This assists with asset management (life cycle) planning for Council assets and with establishing rehabilitation capital works planning and advice.</p> <p>Asset Management coordinates and/or undertakes frequent inspections and condition assessments of the abovementioned assets to inform potential maintenance works and capital works programs.</p> <p>Communication/negotiation occurs with Council officers, Councillors and community in relation to agreed/sustainable service levels.</p>	<ul style="list-style-type: none"> <li>- Infrastructure asset registers</li> <li>- Asset management plans</li> <li>- Capital works program (up to 20 years)</li> </ul>	
	Indigenous Land Use Partnerships	Consideration of indigenous history in Council decisions.	<p>Aboriginal people place great significance on their Native Title and Cultural Heritage with the State recognizing this through the provision of the Native Title Act and Aboriginal Cultural Heritage Act to protect and preserve elements of both Native Title and Cultural heritage.</p> <p>Both Acts provide the option of an indigenous land use agreement where parties to the agreement can include their own procedures to ensure that Activities avoid, or otherwise reasonably minimise, harm to Aboriginal Cultural Heritage and avoid breaching Native Title.</p> <p>Part 4 of the Indigenous Land Use Agreement between Ipswich City Council (Council) and the Jagera, Yuggera and Ugarapul People (the traditional Owners of the region) sets out the agreed Aboriginal Cultural Heritage Compliance Process. Whereas Part 3 sets out the agreed Native Title Compliance process.</p> <p>As part of the agreed processes, Council is issue the T.O's a Native Title and Cultural Heritage Notice for all activities of a medium or high impact (as defined within the ILUA).</p> <p>The Native Title and Cultural Heritage Compliance Processes are managed by Councils Indigenous Land Use Partnership Coordinator.</p>	<ul style="list-style-type: none"> <li>- Native Title Act</li> <li>- Cultural Heritage Act</li> <li>- Indigenous Land Use Agreement between Council and the Jagera, Yuggera and Ugarapul People</li> </ul>	

Council Department	Stakeholder Name	Water Cycle Role	Overview of Activities of Relevance	Key Documents	Significant Projects
Infrastructure Services Department		Capital delivery of drainage, stormwater quality and flood mitigation projects	Capital delivery of local drainage and associated service requests. Causes of issues are investigated to determine the cause and possible remedies. Mitigation is prioritised via the local drainage assessment matrix.	-	-
Health, Security and Regulatory Services Department	Environmental Protection Policy	<p>Planning for the protection of contamination of water</p> <p>Provision of advice to Council on environmental protection (including water)</p> <p>Provision of monitoring of, and advice about, contaminated land. Environmental protection is achieved by minimising pollution through erosion and sediment control, contaminated land management, and avoidance of stormwater / waterway pollution. This is supported by the provision of advice and direction within Council through environmental policy and strategic planning, and by assisting with regulatory compliance.</p> <p>Liaison occurs with environmental protection regulatory agencies regarding compliance for Council's activities.</p>	<p>Planning for the protection of contamination of water</p> <p>Provision of advice to Council on environmental protection (including water)</p> <p>Provision of monitoring of, and advice about, contaminated land. Environmental protection is achieved by minimising pollution through erosion and sediment control, contaminated land management, and avoidance of stormwater / waterway pollution. This is supported by the provision of advice and direction within Council through environmental policy and strategic planning, and by assisting with regulatory compliance.</p> <p>Liaison occurs with environmental protection regulatory agencies regarding compliance for Council's activities.</p>	<ul style="list-style-type: none"> <li>- Environmental Protection Plan</li> <li>- Erosion and Sediment Control Action Plan</li> <li>- Council's Environmental Policy</li> <li>- Environmental Protection Act 1994</li> <li>- Local Laws (including number 3 – Commercial Licensing, 4 – permits, 6 – Animal Management, 8 – Nuisances and Community Health and Safety, 7 – Local Government Controlled Areas and Roads)</li> </ul>	<ul style="list-style-type: none"> <li>- Environmental Protection Plan Review</li> <li>- Review of Erosion and Sediment Control Action Plan</li> <li>- Corporate Environmental Induction process</li> <li>- Climate change adaptation plan</li> <li>- Auditing of Council operated Environmentally relevant activities</li> <li>- Management of Council owned closed landfills</li> </ul>
	Environmental Protection Regulation	<p>Regulatory compliance to protect water quality.</p> <p>Undertake reactive and proactive regulatory compliance within Council's jurisdiction, principally under the Environmental Protection Act, Public Health Act and Local Laws.</p> <p>This includes issues of stormwater contamination, pollution incidents, permit and licence issuing and conditioning etc.</p>	<p>Regulatory compliance to protect water quality.</p> <p>Undertake reactive and proactive regulatory compliance within Council's jurisdiction, principally under the Environmental Protection Act, Public Health Act and Local Laws.</p> <p>This includes issues of stormwater contamination, pollution incidents, permit and licence issuing and conditioning etc.</p>	<ul style="list-style-type: none"> <li>- Environmental Protection Act 1994</li> <li>- Public Health Act</li> <li>- Local Laws (including number 3 – Commercial Licensing, 4 – permits, 6 – Animal Management, 8 – Nuisances and Community Health and Safety, 7 – Local Government Controlled Areas and Roads)</li> </ul>	<ul style="list-style-type: none"> <li>- Erosion and sediment control – construction sites (transfer from P&amp;D to HSRS)</li> <li>- Citywide erosion and sediment control proactive compliance</li> <li>- Licensing and permitting programs</li> </ul>

## EXTERNAL STATUTORY STAKEHOLDERS

Stakeholder Name	Water Cycle Role	Overview of Activities of Relevance	Key Documents	Relevant Projects of Significance
Seqwater	Provision of bulk water to South East Queensland	<p>Bulk water is collected from catchments within South East Queensland and provided in bulk so that a reticulated water supply can be provided to large parts of Ipswich by Queensland Urban Utilities.</p> <p>Seqwater ensures a safe, secure, resilient and reliable water supply for South East Queensland, as well as providing essential flood mitigation services and managing catchment health.</p> <p>Bulk water supply, treatment and transport services, and associated infrastructure are provided and managed within the SEQ region.</p> <p>Flood management occurs by ensuring dams operate as designed during critical extreme weather conditions by reducing flooding conditions downstream and maintain water levels during flood events to minimise community disruption.</p> <p>Management of water supply catchments by undertaking planning and work in assessing catchment condition related to enhancing stream water quality. Ensure that water supply catchments are maintained and improved to influence positive water quality outcomes, influence community resilience during extreme events, promote liveability and reduce costs of treated water.</p> <p>Recreation areas are managed at water supply dams to improve recreational outcomes for the community.</p>	<ul style="list-style-type: none"> <li>- SEQWater Statement of Obligations</li> <li>- Annual Operations Plan 2014</li> <li>- 2013 Water Supply Asset Plan</li> <li>- Manual for Operational Procedures for Flood Mitigation at Wivenhoe and Somerset Dam, Revision 11 November 2013</li> <li>- Seqwater – Our Catchment Greenprint</li> <li>- Seqwater Development Guidelines – Development Guidelines for Water Quality Management in Drinking Water Catchments</li> </ul>	<ul style="list-style-type: none"> <li>- SEQ Water Security Program</li> <li>- High level agreement of the Management of Catchments in SEQ</li> </ul>



Stakeholder Name	Water Cycle Role	Overview of Activities of Relevance	Key Documents	Relevant Projects of Significance
<p>Queensland Utilities</p> <p>Urban</p>	<p>Provision of reticulated water and sewerage services within Ipswich</p>	<p>Much of Ipswich is provided with reticulated water supply and sewerage services. This ensures a safe drinking water supply and reduces risks associated with on-site wastewater treatment.</p> <p>Responsible for delivering drinking water, recycled water and sewerage services in South East Queensland (Ipswich, Brisbane, Somerset, Lockyer Valley and Scenic Rim local government areas) and protecting public health relating to the provision of water and sewerage services.</p> <p>Demand forecasting and management, asset management / planning / alterations, servicing, operating and maintaining infrastructure, Customer interface and service provision, and enabling functions for business sustainability, growth and economic development.</p> <p>Customer interface aspects are important due to their influence on implementation of TWCM options, eg. Residential billings, demand management etc.</p>	<ul style="list-style-type: none"> <li>- WaterNetserv Plan</li> <li>- Corporate Plan</li> <li>- Operational Plan</li> <li>- Annual stakeholder report</li> <li>- Annual report</li> </ul>	<ul style="list-style-type: none"> <li>- Alternative water strategy in Ripley Valley</li> <li>- Waste to Resource Strategy - overall focus on transitioning our sewage treatment plants (STPs) from traditional service providers to a catchment based system that links with partners and environment.</li> <li>- Recycled water schemes</li> <li>- Nutrient offset trial in Beaudesert</li> <li>- Low energy solutions for water and wastewater management</li> <li>- Refresh of Netserv Plan</li> </ul>

Stakeholder Name	Water Cycle Role	Overview of Activities of Relevance	Key Documents	Relevant Projects of Significance
<p>Ipswich Rivers Improvement Trust</p> <p>* Note – possible changes to the Rivers Improvement Trust Act may change the function of IRIT</p>	River improvement works within Ipswich	<p>River improvement trusts (trusts) are statutory authorities constituted under the River Improvement Trust Act 1940 to protect and improve rivers, repair and prevent damage to rivers and prevent or mitigate flooding of land by riverine floods. The primary role of a trust is to plan, design, finance, undertake and maintain stream improvement works for the benefit of the community within its river improvement area.</p> <p>Ipswich Rivers Improvement Trust carries out works designed to improve the flow of water in the rivers and tributaries within the City of Ipswich to correct erosion and provide flood mitigation.</p> <p>To undertake condition assessments, set priorities and develop projects (with landowners) to remove dense woody weed growth eg. Chinese Celtis to reduce minor flooding impacts, improve biodiversity and stream stability.</p> <p>To promote understanding of and management of soils.</p>	<ul style="list-style-type: none"> <li>- River Improvement Trust Act 1940</li> <li>- River Improvement Trust Regulation 2013</li> <li>- Riparian Weeds Assessment 2007</li> <li>- Annual works program and report</li> </ul>	<p>Current woody weed removal locations:</p> <ul style="list-style-type: none"> <li>- Bundamba Creek, downstream of Swanbank (Blackstone)</li> <li>- Franklin Vale Creek</li> <li>- Bremer River at Churchill, and between Lower Mt Walker and Rosewood</li> <li>- Purga Creek</li> <li>- Woogaroo Creek</li> <li>- Six Mile Creek</li> <li>- Northern Creek Grandchester – Rosewood</li> <li>- Western Creek</li> <li>- Ironpot Creek</li> </ul> <p>Ipswich Soils Management Guideline Project</p>
Healthy Waterways	Region-wide capacity building	<p>A not-for-profit, non-government, membership based organisation working to protect and improve waterway health in South East Queensland.</p> <p>Healthy Waterways facilitates careful planning and coordinated efforts at local and regional levels around a network of member organisations from government, industry, research and the community to deliver our shared purpose (“through partnerships, achieve healthy waterways in South East Queensland, where people live, work and play”) for healthy waterways.</p> <p>The Healthy Waterways approach includes monitoring waterway health to identify issues, applying science and technology to find solutions, and inspiring and supporting collective action.</p> <p>Ipswich City Council is a member of Healthy Waterways.</p>	<ul style="list-style-type: none"> <li>- Healthy Waterways Strategic Plan 2012-2022</li> <li>- Various Water by Design guidelines</li> <li>- Ecosystem Health Monitoring reports</li> </ul>	<ul style="list-style-type: none"> <li>- Ecosystem Health Monitoring Program</li> <li>- Science and Innovation Program</li> <li>- Healthy Country Project</li> <li>- Water by Design program</li> <li>- Communication, Education and Motivation Program</li> <li>- Healthy Waterways Clean Up Program</li> </ul>

Stakeholder Name	Water Cycle Role	Overview of Activities of Relevance	Key Documents	Relevant Projects of Significance
Council of Mayors SEQ	Advocating for the combined interests of SEQ Councils – including cross-boundary water management issues.	<p>An independent political advocacy organisation representing Ipswich City Council (as well as Brisbane, Logan, Lockyer Valley, Moreton Bay, Redland, Scenic Rim, Somerset, Sunshine Coast, Noosa, Gold Coast and Toowoomba).</p> <p>Aims to influence federal and state government policy and funding priorities.</p> <p>There are three key priorities areas – regional planning and growth management, infrastructure, and environment and sustainability. Each of these areas has a standing committee comprising Councillors and senior officers.</p> <p>Each council funds Council of Mayors based on population size.</p>	<ul style="list-style-type: none"> <li>- Council of Mayors Strategic Plan</li> <li>- SEQ Natural Assets Investment Prospectus</li> <li>- Commitment to SEQ Beaches, Bays and Waterways</li> </ul>	<ul style="list-style-type: none"> <li>- Water reform advocacy (relating to potable water / bulk water) - completed</li> <li>- Interim SEQ Environmental Offsets Framework</li> <li>- Drought resistant turf - completed</li> <li>- River recovery initiatives</li> </ul>

Stakeholder Name	Water Cycle Role	Overview of Activities of Relevance	Key Documents	Relevant Projects of Significance
SEQ Catchments	Community based catchment management	<p>SEQ Catchments is a community-based, not-for-profit organisation helping to build a sustainable community that cares for and values the natural resources and biodiversity of South East Queensland, and that recognises the impact of personal and collective actions on the region's natural assets. SEQ Catchments achieves this by:</p> <ul style="list-style-type: none"> <li>- working with all levels of government as well as the corporate sector to influence policy, align planning with the SEQ Natural Resource Management Plan, secure funding for environmental projects and specialist in-stream and on-ground outcomes.</li> <li>- encouraging and assisting partnerships between the community, the corporate sector and governments at all levels to deliver outcomes for the region's natural assets.</li> <li>- mobilising and involving community groups and individual landholders to identify, develop and deliver grassroots projects.</li> <li>- providing technical advice and natural asset solutions in the areas of data collection, mapping, marine and terrestrial ecology, vegetation management, soil conservation, water quality, hydrology and geomorphology, and property management planning to the community and project partners.</li> </ul> <p>SEQ Catchments is the Australian and Queensland Government endorsed natural resource management body for South East Queensland</p>	<ul style="list-style-type: none"> <li>- SEQ Catchments' Strategic Investment Plan</li> <li>- SEQ NRM Plan 2009-2031</li> </ul>	<ul style="list-style-type: none"> <li>- Land management program including Land for Wildlife and the Fire and Biodiversity Consortium and Biodiversity program including environmental offsets and revegetation</li> <li>- Water program including coastal management, community water quality monitoring, mangrove and seagrass protection, environmentally friendly moorings and river restoration</li> <li>- Community partnerships</li> <li>- Regional and local government level natural asset planning, policy, information management, and solutions to complex problems</li> </ul>

Stakeholder Name	Water Cycle Role	Overview of Activities of Relevance	Key Documents	Relevant Projects of Significance
Queensland Government	<p>State wide governance and policy setting</p> <p>Water allocation planning</p>	<p>Integrated water cycle responsibilities of the Queensland State Government are set out in the Total Water Cycle Management Guidelines for South-East Queensland, and are as follows:</p> <ul style="list-style-type: none"> <li>- Planning and managing existing and proposed bulk water sources</li> <li>- Estimating climate change impacts on bulk water supplies</li> <li>- Managing growth and affordable housing</li> <li>- Developing water resource plans and managing groundwater allocations</li> <li>- Setting water quality and flood objectives</li> <li>- Development approvals for new infrastructure</li> <li>- Managing policy issues – eg. Nutrient trading or evaluation of innovative water cycle solutions</li> <li>- Undertaking changes to Queensland’s Development Codes (e.g. water efficiency standards)</li> <li>- Planning and advising the minister on state-significant water cycle infrastructure</li> </ul> <p>Administration and oversight of water authorities as per the Water Act.</p>	<p>State Planning Policy</p> <p>SEQ Regional Plan</p> <p>30 Year Water Strategy Development</p>	

# APPENDIX 3: STRATEGY FRAMEWORK

## DESCRIPTIONS

### **Vision**

The strategy sets out a long-term vision for integrated water management in Ipswich. It builds on the vision expressed within Council's long-term plan (i2031), which sets out seven major themes for where the City aspires to be by 2031:

- Strong diverse economy
- Natural environment
- Integrated transport and movement
- Infrastructure and services
- Growth management
- Community spirit and well being
- Ethical governance

Management of water cuts across each of these areas. A specific vision for water cycle management has been established in consultation with stakeholders to provide long-term direction and alignment for water management in line with Council's long-term vision, and to help shape the path towards a water sensitive city.

### **Strategic Objectives**

The strategic objectives support four key themes of integrated water management:

- Community engagement and liveability
- Economic considerations
- Environmental management and protection
- Communication, collaboration and partnerships

The strategic objectives explicitly set out the desired future scenarios if integrated water management is effectively implemented in Ipswich. Each strategic outcome will be used to identify and explore opportunities for collaboration across stakeholders.

### **Principles**

For each of the strategic objectives, a number of principles have been established for Council. These principles support the vision and help ensure Council activities and approaches to communication will achieve the strategy objectives and assist in overcoming water cycle management issues identified for the City. These principles will help to inform and prioritise specific actions and implementation of this strategy. The principles support the intent of each of the strategic objectives, whilst also providing guidance to stakeholders with responsibilities in areas associated with key issues.

# DEFINITIONS

<b>Aquatic</b>	Something living or growing in the water
<b>Aquifer</b>	An underground layer of permeable rock, sediment (usually sand or gravel), or soil that stores water. The pore spaces in aquifers are filled with water and are interconnected so water flows through them.
<b>Catchment</b>	An area bounded by natural features that directs water flows to drain to a common point – usually a creek, river or sea
<b>Council</b>	Ipswich City Council
<b>Degradation</b>	Decline in the quality of natural resources or the viability of ecosystems, caused directly or indirectly by human activities
<b>Diffuse pollution</b>	Pollution occurring when pollutants from a range of land use activities contaminant waterways, for example from urban stormwater or agricultural runoff (also known as ‘non-point source pollution’)
<b>Ecosystem</b>	A community of organisms interacting with each other and with their environment
<b>Enhance</b>	Improve qualities and values
<b>Erosion</b>	The wearing away of the surface of the earth by water, wind, ice or waves (natural erosion). This can be accelerated by human activities (accelerated erosion)
<b>Estuarine</b>	Transition zone from freshwater to salt water
<b>Eutrophication</b>	Having water rich in mineral and organic nutrients that promote a proliferation of plant life, especially algae, which reduces the dissolved oxygen content and often causes the extinction of other organisms
<b>Evaporation</b>	The change of a liquid into a vapour by heat
<b>Fauna</b>	Animals
<b>Flora</b>	Plants
<b>Flow rate</b>	The amount of liquid that flows in a given time
<b>Flow regime</b>	The variation in the flow of a water course
<b>Groundwater</b>	Water contained within sub-surface aquifers
<b>Impervious</b>	Not allowing the penetration of water into or through the surface
<b>Infiltration</b>	The slow passage of liquid through soil into the ground
<b>Habitat</b>	The physical location of an organism in the environment. The type of environment (vegetation and climate) inhabited by an organism.
<b>Herbicide</b>	A chemical used to kill plants and weeds
<b>Indicator</b>	A device, mechanism or organism used to demonstrate changes
<b>Indigenous Traditional Owners</b>	Aboriginal people who are members of a group that has a particular relationship with land or water under Aboriginal tradition
<b>Maintain</b>	Preserve or continue to keep in good condition
<b>Native</b>	An animal or plant that originated in a particular place or region, also known as ‘indigenous’
<b>NetServ Plan</b>	Plan that is required of water distributors and retailers such as QUU that outlines the current infrastructure and services that currently exist and how

	customers' needs will be met in the future.
<b>Nitrogen</b>	A colourless, odourless gaseous element that forms approximately 80% of earth's atmosphere. Also found in animal and plant tissues and is used in fertilisers
<b>Nutrient</b>	A substance that provides nourishment for growth or metabolism. Plants absorb nutrients mainly from the soil in the form of minerals and other inorganic compounds and animals obtain nutrients from ingested foods.
<b>Organic material</b>	Derived from living organisms (plants and animals)
<b>Pesticide</b>	Chemicals used to kill plants or animals
<b>Phosphorous</b>	A highly reactive, non-metallic element occurring naturally in inorganic phosphate rocks. Phosphorous compounds are used widely in matches, pesticides, toothpaste and detergents.
<b>Point source pollution</b>	A single point of pollutant discharge, such as effluent from a sewage treatment plant or an industrial wastewater treatment plant.
<b>Rehabilitate</b>	Restore to effectiveness or normality
<b>Riparian</b>	On the banks of and adjacent to a waterway or wetland
<b>Riparian vegetation</b>	Plant communities existing in the riparian corridor
<b>Recycled water</b>	Wastewater that has been purified so it can be used again for new purposes
<b>Run-off</b>	The flow of water across land
<b>Sedimentation</b>	The deposit of sediments (soil, rock and organic material), generally by water
<b>Stormwater</b>	Water that runs off land (particularly developed areas) during and after rainfall events
<b>Stream order</b>	A measure of waterway system complexity whereby headwater streams are assigned a 1. A higher order stream order implies a larger waterway.
<b>Total water cycle management</b>	A holistic approach to water management that balances water management decisions across social, environmental and economic factors.
<b>Turbidity</b>	Muddiness created by stirring up sediment or having foreign particles suspended in water
<b>Waterway health</b>	Determined through a range of quantitative and qualitative assessments such as water quality, riparian vegetation condition, surrounding land use, channel modification, and level and diversity of invertebrate and vertebrate life, in both freshwater and estuarine systems.
<b>Water quality</b>	The ecosystem health of aquatic systems (including surface, soil and underground waters), including processes affecting or involving the physical, chemical and biological characteristics of water
<b>Waterway</b>	Includes a river, creek, stream, watercourse or inlet of the sea. May be permanently or intermittently (ephemeral) flowing.
<b>Wetlands</b>	Habitats that are perpetually and periodically flooded (both freshwater, estuarine and marine).



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