## CRCWSC Research Synthesis

Discussion Paper | CRC for Water Sensitive Cities

# IDEAS FOR RIPLEY VALLEY

January 2015



## Foreword

The mission of the Cooperative Research Centre for Water Sensitive Cities (CRCWSC) is to undertake world-class interdisciplinary research and to synthesise the research outputs such that they can influence urban water management and the delivery of water sensitive Australian cities and towns. It is an ambitious but necessary mission as the challenges of urban water management for sustainability, resilience and liveability facing many Australian cities and towns are multi-dimensional and inherently interconnected. The CRCWSC is currently undertaking 34 research projects, strategically developed to address key knowledge gaps impeding the implementation of water sensitive cities initiatives. These projects span 20 disciplines: from the physical sciences, engineering, planning, and climatology to the social sciences (including economics, and political and behavioural sciences). Our investment is in practically integrating these diverse areas to bring about real change and engage with those who ultimately manage the water systems in our cities.

To assist our industry partners apply new knowledge generated from CRCWRC research, as well as the tacit knowledge of the many experts involved, we have initiated a program of research synthesis. This program facilitates discussion of our research using specific case studies nominated by our industry partners, and provides suggestions on how research outputs could be adapted to them. This forces a shift away from generalised concepts and tools, to specific applications that stress-test the knowledge by asking "What does it mean in this situation?" In those cases that involve urban development, the research synthesis activity often involves a design charrette (a collaborative session or sessions in which a group of designers drafts a solution to a design problem).



*Ideas for Ripley* is the fifth of our research synthesis activities and the first Queensland-based case study. The design charrette for Ripley Valley, convened on 19-20 November 2014, focussed on how water sensitive innovations could be introduced in the Ripley Valley and also to 'give practical expressions' to the strategic priorities of the Queensland Government's 30-year strategy for Queensland's water sector. In addition to the 15 member contingent from the CRCWSC, the design charrette was also attended by representatives from the Queensland Government (Department of Energy and Water Supply), the WaterQ Expert Panel, Sekisui House, AMEX Corporation, Stockland, Queensland Urban Utilities and Ipswich City Council.

The charrette started by hearing the vision for the development and the challenges from the local government, Ipswich City Council, and the water utility, Queensland Urban Utilities. Following this, Ipswich City Council guided us on a site inspection of the development area. In responding to the challenges highlighted by key stakeholders, CRCWSC researchers presented the latest relevant research on:

- urban metabolism;
- sewerage treatment plants of the future;
- predicting stream erosion potential and developing waterway stabilisation and rehabilitation measures;
- urban design for heat mitigation;
- · stormwater offset schemes; and
- urban water governance.

This allowed the group discussion to refine and identify 11 key ideas for Ripley Valley that are presented herein.

Apart from the ideas generated from the design charrette, the process of fostering interorganisational collaboration in synthesising contemporary, new and emerging knowledge has laid an important foundation for realising the strategic objectives of the Queensland Government's aspiration for the Ripley Valley priority development area.

Prof Tony Wong CEO, CRCWSC

## **The Ripley Valley**

The Ripley Valley Priority Development Area (PDA) was declared on 8 October 2010 and covers a total area of 4680 hectares. It is located approximately 5km southwest of the Ipswich CBD and south of the Cunningham Highway. The PDA is in one of the largest industry growth areas in Australia and offers opportunities for further residential growth to meet the region's affordable housing needs to provide approximately 50,000 dwellings to house 120,000 people.

Ripley Valley is a major regional urban development project in South East Queensland with a strong sustainability focus. It affords a unique opportunity to apply new contemporary approaches to water servicing that will actively contribute to the region's liveability by providing economic value and secure water services to these new communities.



## The context

Ripley Valley aims to become a vibrant community; unique neighbourhoods nestled into lush green valleys that surround a prosperous urban hub. The development scheme<sup>1</sup> describes a Ripley Valley that is connected to the natural environment, that will promote an active and sustainable lifestyle that celebrates and preserves the local ecology. It is envisioned that Ripley Valley will demonstrate international best practice for energy, waste and water management to provide a functional, accessible and resilient place for residents to enjoy life. It will be a community with a choice of secure and affordable water services, and the resources to sustain a healthy and prosperous environment.

A number of challenges warrant the consideration of an integrated approach to water, sewerage and drainage services in Ripley Valley:

- Ensuring water services are effective and affordable across a range of future climate and population growth scenarios. Without a long term strategy that includes water conservation and alternative water sources, future water security will be exposed to the growing cost and risks of traditional, centralised approaches.
- Protecting and improving the otherwise degraded Bundamba Creek and Bremer River Catchment. These waterways are already badly eroded as a result of existing land use and the highly dispersive soils in Ripley Valley. The development of these catchments into urban areas will increase the stormwater runoff causing these waterways to further erode as they adjust their size to cope with the higher volumes. The post-development stream erosion potential is estimated at 70 times natural conditions. Left to business as usual, land development will significantly degrade Bundamba Creek and its tributaries with estimated rehabilitation works in excess of \$10 million.
- Maximising the contribution that urban water management can make to the liveability of the urban development. Ipswich City Council has recently completed a strategy for the Bundamba Creek Corridor to improve its environmental value and reconnect the community to the local waterways. Waterways and green areas provide a range of community benefits if properly designed and located.
- Tackling climatic issues such as hot (>30°C) summers with no cooling breezes, cold winter evenings, low and seasonal rainfall and high evapotranspiration. Owing to its geographical location, the Ipswich City region experiences conditions that are typically 3°C to 5°C warmer than the Brisbane City region. The predicted heatwave conditions in future will further exacerbate the vulnerability of the Ripley Valley community.
- The Water Budget The anticipated future population in the Ripley Valley is of the order of 120,000, the projected annual water consumption is approximately 7,300 ML/yr and wastewater generated approximately 5,400 ML/yr. The mean annual rainfall in the Ripley Valley is approximately 440 mm and the mean annual stormwater runoff following development of the valley is estimated to be 38,000 ML/yr, more than 5 times the mean annual water consumption.







## **CRCWSC Research Synthesis**

The Ripley Valley is an opportunity to test the application of emerging sustainable urban water management technologies and principles at a range of scales - from the household to the wholeof-suburb and district. It also enables the integration of state government, local government and private sector interests to trial the application of these emerging 'ideas' in an urban water management context. For the CRCWSC, this project provides an opportunity to apply new and emerging knowledge derived from its research and the latest thinking in a case study environment that can directly benefit CRCWSC industry partners and stakeholders including the Queensland Government, Queensland Urban Utilities, and Ipswich City Council.

The 'ideas' for Ripley Valley were generated through a two-day workshop with leading researchers from the CRCWSC and representatives from a wide range of key stakeholders, including local and state governments, the water utility, and the development sector. The workshop resulted in a melting pot of innovative thinking, shared understanding, and creative solutions to real challenges.

The workshop identified a broad range of ideas for the site in the thematic areas of;

a. Efficient water and sewerage services

Identifying the best mix and operation of water, sewerage and drainage systems to meet the customer needs.

- **b. Rehabilitation of the environment** Restoring the Bundamba Creek and creating a waterway corridor to treat stormwater.
- c. Urban design for communities Creating green corridors to connect communities and enhance microclimates.
- d. Creating an effective enabling environment Planning regionally to facilitate local solutions.

The workshop highlighted the opportunities for collaboration and innovation, provided by the Ripley Valley development. The ideas presented in this report are not intended to be ideas in their own right or to compete with the master plan for Ripley Valley. Rather it was to pose a series of 'what if' scenarios where the results would be able to be used to test and inform further development across the area.

## **11 Ideas for Ripley Valley**

#### a. Efficient water and sewerage services

- 1. Innovative sewerage conveyance options and pump scheduling to increase the efficiency and potentially operational capacity and thus delay the investment necessary to augment the existing sewage treatment facility.
- 2. Use of an Urban Metabolism Framework to develop a holistic urban water servicing strategy for 2020 and beyond.
- 3. Development of a "designer recycled water" approach with:
  - i. base level supply of Class 3 recycled water for bushland irrigation and water supply for horticulture enterprises; and
  - ii. local treatment plants at residential estates to upgrade recycled water to A or A+ quality using new and innovative techniques.
- 4. Support high-profit, high-employment agriculture businesses with recycled water.
- 5. The development of a portfolio of end users of affordable recycled water that will enable the water services provider to gain a flexible discharge licence for infrequent discharge of excess recycled water during periods of extended wet weather conditions without needing to treat sewage to the typical high standard.

#### b. Rehabilitation of the environment

- 6. A "regional oasis" characterised by a network of waterways and lush bushland corridors supported by ready access of affordable water supply.
- 7. Waterway rehabilitation and restoration based on a combination of catchment interventions for peak flow and stormwater quality management, and stream rehabilitation and erosion protection works.
- 8. Strengthen the Ipswich City Council's stormwater offset scheme to link private development and regional public realm initiatives to drive stormwater management practices that deliver the objectives stated in idea 7.

## c. Urban design for communities

- 9. Regional water and bushland areas that provide a regional network of blue and green corridors that enhance the microclimate in Ripley Valley and provide space for flood waters.
- 10. A Multi-Centric Development connected by multi-functional corridors

## d. Creating an effective enabling environment

11. Coordinating institutional and governance arrangements by establishing a Ripley Valley Cooperative for Water Services and Management.



Ripley Valley is located in South East Queensland and features Bundamba Creek running through it

## a. Efficient water and sewerage services

#### Idea 1 Sewerage conveyance innovation

The existing Bundamba sewage treatment plant (STP) will need to be either upgraded or a new plant built within 5-7 years due to the increase in the population. There are a number of operational and design innovations that would extend the operating life of the existing STP.

A pump station to convey sewage from Ripley Valley to the existing STP is to be constructed. Introducing an innovative pumping schedule to take advantage of the available capacity of the STP in between the typical diurnal inflows to the STP from other catchments will increase the efficiency of the existing plant and delay the commissioning of a new STP.

Pressure sewers in the new development have the advantage of eliminating infiltration inflow and therefore any increase in sewer flow during wet weather. In addition to its potential decreased maintenance, a pressure sewer network would leave the option open for future redirection of sewage throughout the network to allow a distributed sewage treatment system to be implemented.

## Idea 2 Developing an urban metabolism framework as a basis for the provision of water services

To evaluate water service alternatives and frameworks, it will be necessary to understand the water supply-demand balance and energy implications so that resource recovery benefits are optimised and energy implications are understood.

The use of an urban water and energy model can quantify the total water mass balance and waterrelated energy for the development precinct, including potable and non-potable centralised and decentralised supplies, stormwater storage, evapotranspiration, flood management (including downstream protection), water consumption and tracking the related value/function/cost of the services, including energy efficiency and related cooling influences.

This framework can then become the terms of services to be provided by Queensland Urban Utilities or a third-party local water utility and serve as a key catalyst for establishing a alternative institutional arrangement for whole-of-water cycle management in the Valley.



#### Idea 3 Affordable designer recycled water

Options for wastewater reuse were considered, which could add benefit by keeping effluent out of the Bremer River, reduce reliance on centralised water supplies, build resilience to drought, and recover resources from wastewater. The augmentation of non-potable water supplies with treated effluent could attract business (intensive horticulture to Ripley Valley and industrial enterprises to Swanbank Industrial Estate), contributing to the social sustainability through economic development and employment.

Sewage as a resource offers potential business development and true localised industry. The Ripley Valley case is a clear opportunity in this context since there is a localised agricultural opportunity that can be used as a model for other established sites. Instead of treating all wastewater to Class A at the Bundamba STP, it could be treated to Class C (using cheaper sand filter treatment technologies), and returned to Ripley Valley as nutrient rich Class C for affordable local reuse, particularly in supporting Ipswich Council's strategy for the Bundamba Creek corridor through drip or sub-surface irrigation methods. Some of the Class C recycled water could then be further treated locally to 'fit-for-purpose' standards for use in residential estates for open space irrigation and domestic non-potable use. Such a 'designer recycled water' scheme maximises the demand for recycled water:

- in supporting a regional network of "oasis" corridors, by maintaining riparian vegetation along the valleys of Bundamba Creek and its tributaries, and
- for non-potable uses in development estates which may include irrigation of active and passive public open spaces, median strips, private gardens, toilet flushing and washing machines.

#### Stormwater harvesting

Stormwater runoff is estimated to be approximately 10 times that of the projected domestic water demand in the Valley and is an important resource that can significantly reduce the dependence of the development on externally sourced water supply. There are a number of ways in which this resource could be harnessed.

In conjunction with the designer recycled wastewater scheme discussed previously, stormwater could be temporarily stored in existing water bodies (in local wetlands and ponds), in pools along the existing waterways, and in constructed ponds and wetlands. Improvement stormwater occurs at these natural systems before it is subsequently released to the wastewater network during low-flow periods, then treated and reused in Ripley. An example of such storage schemes is the potential use of Daley Lagoon as a buffer storage for surplus harvested stormwater.

An alternative scheme could preferentially use harvested stormwater for maintaining 'open spaces in residential estates and therefore avoiding treatment and use of recycled water as the primary water source'.

It is important to note that stormwater storage is an important intervention for reduction in the erosion potential of the already degraded Bundamba Creek and its tributaries and thus stormwater harvesting has multiple objectives beyond its management as a resource (see Idea #7).

## Idea 4 Supporting horticultural businesses with recycled water

The available wastewater resource could also be treated to support a regional horticulture industry. Local reuse for horticulture could utilise 50%-100% of the generated wastewater with agricultural land requirements of the order of 100 m<sup>2</sup>/person or a 1000 Ha if all of the generated wastewater is reused.

Agricultural reuse possibly enables more flexible license agreements compared with green corridor reuse due to it not being an environmental discharge. Assimilation-release technology and/or anaerobic membrane bioreactor (MBR) treatment systems is in development that can remove pathogens and carbon but not other nutrients. The development timeline for this technology is compatible with the Ripley development schedule.

The scale of business enterprise that it could support would conservatively be worth around \$200/ person/year (\$20M/year for 100,000 persons) and provides local jobs and industry. A water market would need to be established to enable water trading.

Another wastewater reuse option is to direct most of Ripley's wastewater to agricultural reuse in the adjacent Warrill and Purga Valleys, with lesser amounts being returned to Ripley Valley. In this case, the resource recovery benefits and business development would be accrued outside Ripley Valley.

## Idea 5 Gaining a flexible discharge licence

The most significant business case for establishing a reliable end-user market for recycled water is to support a more flexible discharge licensing condition for infrequent emergency wet weather discharge of treated effluent to the natural environment.

By demonstrating a significant net reduction in nutrient load discharged to the receiving water environment through reuse, the Department of Environment and Heritage Protection (DEHP) may be persuaded to allow occasional discharge of high nutrient treated effluent to the waterways including the Bremer River during extended periods of wet weather conditions. The portfolio of end-users could include some or all of the above identified potential users of the proposed designer recycled water scheme within Ripley Valley, as well as new horticultural industries established in neighbouring areas.



## b. Rehabilitation of the environment

#### Idea 6 Creating a regional oasis framed by a network of waterways and lush bushland corridors

Ipswich City Council has developed a strategy for the rehabilitation of the Bundamba Creek corridor that is consistent with the vision of a Ripley Valley as a "regional oasis" of the Ipswich City region. The expansion of the broad principles of the Bundamba Creek Corridor Blueprint into its major tributaries would lead to the creation of a regional oasis framed by the waterways and lush bushland corridors. The lush bushland environment will be supported by the ready access of affordable water supply (see Idea #3), and an exemplar of contemporary regional land development blueprint that seeks to enhance the liveability and ecological sustainability in a harsh climatic and geographical landscape.

'Greening' the valley will provide a range of ecosystem services including: mitigating urban heat, increased habitat for birds and animals, and educational and restorative health opportunities from increased interaction with nature.

## Idea 7 Waterway rehabilitation through catchment interventions and instream works

The proposed works as set out in Ipswich City Council's (ICC's) Bundamba Creek Corridor Blueprint is at risk of failure due to ongoing erosion of the banks of the creek. Bundamba Creek has undergone significant historical erosion as a result of past rural land use practices. Cursory observation during the site inspection has highlighted that channel incision in many areas has been arrested by bedrock. However the banks remain unstable and even under current land use practices, channel widening processes are still active.

The observed erosion in the creek is the result of land use changes, exacerbated by the highly dispersive soil characteristics of the local geology. Instream erosion prevention works merely address the symptom of what is largely the effect of changing hydrology attributed to the historical changed land use.

Urbanisation will further change the hydrology of the waterways. Urban development will increase runoff volumes and frequency by 5-6 times, with a prediction of increased stream erosion potential of up to 70 times that under natural, pre-rural land use catchment condition. Channel widening is very likely to be further exacerbated.

Urbanisation has nevertheless presented the opportunity to introduce mitigation works to not just arrest the ongoing degradation of the waterways, but to improve the hydrology of the waterway to minimise instream erosion protection works and facilitate a rehabilitation pathway for Bundamba Creek and its tributaries.

An overall strategy of integrated catchment works directed at stormwater detention and stormwater quality improvement with associated instream works creating flatter stream banks, creation of pools and riffles, regional detention ponds, and wetlands along the riparian corridor is recommended. Facilitating flexible options for a combination of local and regional works will involve close partnerships between the private land development sector, local government and state government agencies. Ideas #8 and #10 describe a possible framework for effective partnership and institutional arrangements to deliver the regional landscape strategy to create the regional oasis espoused in Idea #7.



## Idea 8 Strengthening Council's stormwater offset scheme

Ipswich City Council is committed to delivering best practice in urban stormwater management and in 2014 made a minor amendment to its implementation guidelines for stormwater management<sup>2</sup> introduced in 2012. Part of the implementation guideline is the provision of a voluntary water quality nutrient offset scheme that aims to facilitate voluntary payment made in lieu of providing on-site water quality treatment. According to the guideline provided by Council, this voluntary payment may be provided where:

- a. the catchment is mostly urbanised or is a small parcel of land within a broad land release area (in essence, infill development); or
- b. the waterway downstream is in a poor condition; or
- c. the waterway downstream is not sensitive to hydrologic change resulting from development (i.e. no risk of increased waterway erosion).

Stormwater management for water quality and quantity is crucial to any strategy for stabilisation and rehabilitation of Bundamba Creek and its tributaries and the integrity of Ipswich City Council's Bundamba Creek Corridor Blueprint. The options for mitigating actions in stormwater management, lend themselves to an effective and coordinated local and regional approach to stormwater management. They serve as a catalyst for using the offset scheme to foster better strategic coordination of private development and regional public realm initiatives to drive stormwater management practices that deliver a broader range of management objectives, including stormwater harvesting, stabilisation or rehabilitation of Bundamba Creek and its tributaries and improved water quality [see Ideas #3, #6, #7 and #9].

Key initiatives in strengthening the offset scheme include:

- 1. Identifying/documenting/costing management objectives and action plans for the stabilisation and restoration of Bundamba Creek and its tributaries
- 2. Identifying source control measures and targets as development conditions specific to the requirements of the Bundamba Creek catchment
- 3. Establishing a transparent basis for offset and environmental credit 'trading' through consolidation of catchment initiatives and Bundamba Creek Corridor initiatives



## c. Urban design for communities

#### Idea 9 Enhancing local microclimate

A common challenge facing all developments in the Ripley Valley need to address the local microclimate. Ripley Valley is more susceptible to extremes of summer heat and winter cold than sites closer to Brisbane, and its valley topography further limits access to the cooling summer breezes without mitigating the impact of southwesterly winter winds. The difference in summer temperature maxima and winter minima between Ripley Valley and the coastal strip can be 4°C or more, as a consequence much greater reliance on summer air-conditioning and winter heating.

The urban heat island effect that results from heat capture and radiation from buildings, roadways and impermeable surfaces is already pronounced over the Brisbane/Ipswich conurbation<sup>3</sup> and the urban design of the Ripley Valley development can mitigate or exacerbate this problem.

To maintain competitiveness in the marketplace, Ripley Valley has positioned itself to provide highly affordable land and house & land packages, but the greater temperature extremes of the setting will add additional heating and cooling costs to facing future residents.

Extending the regional green corridor espoused in Idea #6 into estate open spaces and street landscapes is an important urban design strategy for enhancing local microclimate while creating a strong ecological connection with the regional green corridor network.

#### Building orientation, street layout and thermal comfort

As houses get larger and lots get smaller, it becomes important to pay attention to solar orientation to maximize passive enjoyment of the climate and reduce reliance on air-conditioning.

With minimal side boundary clearances, there is an increasingly reliance on windows and doors to front and back yards to allow cross-ventilation and to admit winter sunlight. This simple passive design is best achieved on east-west oriented roads where the front and rear of the house face north and south. Streets running north-south are much harder to keep cool in summer as the front or rear walls are exposed to the low, hot, summer afternoon sun. Streets running diagonal to the cardinal compass directions are equally difficult to shade as the north-west and south-west orientations are equally exposed in summer.

A well-designed subdivision has the principal residential streets running east-west with generous building-to-building in backyards and across street-frontages. Well-oriented two storied houses have half the built footprint of equivalent single-storied buildings and have twice the opportunity for ventilation and winter sun.

Ripley Valley appears to have a reasonable solar orientation for some, but not all of its lots, and this is an area that could be significantly improved in subsequent planning.

<sup>&</sup>lt;sup>3</sup> A conurbation is a region comprising a number of cities, large towns and other urban areas that, through population growth and physical expansion, have merged to form one continuous urban and industrially developed area. http://en.wikipedia.org/wiki/ Conurbation



The extensive use of irrigated green infrastructure can mitigate the urban heat island effect that is typical of traditional urban development designs.

## Idea 10 A multi-centric development connected by multi-functional corridors

The dispersed nature of the development pattern currently allows each developer good control over the development and establishment of their own sales estates. By way of example, Sekisui House's site shows the benefit of focusing the development around a well designed and landscaped bio-retention and flood retention facility, with the associated park the hub of the proposed community. A natural growth pattern for each of these developments is outward from the established core neighbourhood however it would seem the pattern of development for each community is to continue to be somewhat introspective.

Two major endeavours that would act to draw the community together more strongly are;

- 1. The provision of the railway link to Springfield. The experience of the development of Springfield as a necessarily car-based commuter community while waiting for the rail connection is salutary. A strong and timely commitment to the Ripley rail link is necessary to stimulate the growth of the community centre and to provide the catalyst for higher density 'Transit-Oriented' residential development.
- 2. The second unifying element that links the community each side of the highway is Bundamba Creek. The creek can be a multi-use walking, cycling and active and passive recreational facility for use by the whole community. Good quality connections under the highway are important to develop community links before the establishment of the community centre and will be even more to provide active links once the rail station is established.





## d. Creating an effective enabling environment

#### Idea 11 Establishing a new institution for whole-of-water cycle management in Ripley Valley

The long timeframe of the Ripley Valley development provides some significant opportunities for institution building and advanced governance. However, like many large developments, the Ripley Valley Priority Development Area (PDA) is at risk of leaving a legacy of sub-optimal urban design and infrastructure systems, with implications for the liveability and costs of living for future Ripley Valley residents.

The scale of the Ripley Valley development means that it will progress in pockets, as various landholders develop their holdings in isolation and at different rates. The PDA Scheme designed by the former Urban Land Development Authority attempted to establish a consistent approach to the development, improve the planning process and expedite development. The delegation of this Scheme to Ipswich City Council provides improved planning powers and process efficiencies, however, the Scheme is layered onto Council's existing policy frameworks and planning instruments. In trying to find a path through this institutional setting, it can be difficult to find the clarity needed to support the many business, planning and approval decisions that need to be made. Often, the levers for achieving multiple outcomes are not easily applied. Working through this institutional setting to make sure good outcomes are justified and supported is an ongoing task.

#### Missed opportunities for innovation

There are other missed opportunities for innovative and cost-effective solutions in Ripley Valley, because institutional arrangements at other government levels can influence the outcomes. For example, the Catalyst Infrastructure Charges credits and offset scheme provided by Economic Development Queensland has facilitated construction, assisting developers with their infrastructure contribution investments. However, this has had a perverse impact in limiting the opportunities for greater water efficiency through integrated water capture, treatment and reuse, because investment in standard trunk infrastructure has already occurred. Fast-tracking development also has the potential to lose the efficiency savings that could be gained through a regional, staged approach to infrastructure planning and development, as well as removing future opportunities for incorporating technological developments that are already on the horizon.

While these institutional features currently detract from opportunities for efficient, innovative development in Ripley Valley, they are not necessarily barriers. CRCWSC research on the inclusion of a novel stormwater harvesting and reuse scheme in the Kalkallo development in Melbourne found that space can be made for innovation within regulatory frameworks, if the various players are trustworthy and able to work together. The Fitzgibbon Chase development, with its stormwater treatment and rainwater capture system, has demonstrated that more integrated water supply schemes can find a path to realisation in South East Queensland. The difference in Fitzgibbon Chase was that the then Urban Land Development, and an imperative to get land to market quickly. This reduced the number of stakeholders involved, and provided clearer authority in the decisionmaking process. Nevertheless, lessons learned in Fitzgibbon Chase could help Ripley Valley stakeholders navigate institutional frameworks.

The multiple stakeholders and lifespan of developing Ripley Valley may make achieving efficient, cost-effective land development which offers a liveable and sustainable choice for residents a little more challenging. Institutional features precluding good development outcomes need to be worked through, by all stakeholders, and with an appreciation of the constraints facing each organisation. Developers need to get land to market quickly to keep their business viable, water utilities can be exposed to regulatory sanctions, and local governments have to balance on-going maintenance costs with the best long-term benefits that infrastructure systems can provide their communities. The work to develop the Ripley Valley Development Scheme was a starting point for collaboration. These efforts need to continue through the development phase and beyond, to ensure the envisioned outcomes are achieved, and they continue to match the needs of Ripley Valley's evolving community. The long timespan of development provides a testing ground for finding the institutional pathways to realise outcomes with multiple benefits, within efficient and effective land development processes.

## **Driving collaboration**

Collaboration to realize these opportunities calls for authority from higher levels of organisations and governments, so that issues arising in all institutional layers can be addressed, even if it means challenging current rules and conventions. A taskforce can be convened to work through the institutional fragmentation already occurring between the Development Scheme, local policies and planning instruments, State level regulations and policies, and development goals. There is a sense of urgency for such a taskforce as, if left too long, current institutionally sanctioned practices will lock Ripley Valley into a pattern of development which leaves sub-optimal outcomes with limited, short-term benefits. Some priority actions for the taskforce include:

- Developing a region-wide, integrated infrastructure planning process, staged to match development timeframes, and flexible to address changing demands over the progression of the development
- Developing criteria to encourage innovative infrastructure development through the Infrastructure Funding Framework, so as to value-add to State Government investment, as well as avoid systems designs for short-term needs
- Reviewing the Ipswich City Council voluntary water quality nutrient offset scheme (see Idea #8), and other cost-sharing/distribution mechanisms, to ensure the full range of economic, environmental and social benefits of the development can be realised equitably

## **Future Institutional Reform**

Over the longer term, the trust and understanding built through the work of such a task force could begin to capitalise on the opportunities such partnerships breed. For example, the possibilities of providing integrated water services, energy and food production systems could be explored, by finding new business models for service delivery with Queensland Urban Utilities and other third party providers.

An example terms of reference or charter of urban water servicing in the Ripley Valley to ensure a whole of water-cycle, whole of catchment service for the Valley community and stakeholders may consist of the following clauses:

- 1. Communicate the vision and engage with stakeholders to establish standards and key performance indicators for service provision including waterway health considering the entire water balance.
- 2. A focus on integrated water cycle management with objectives that include water security and on-site water harvesting; reticulated decentralised and environmental water quality; wastewater; stormwater; flooding; fire-fighting water; evapotranspiration; groundwater; irrigation and related energy efficiency and nutrient recovery.
- 3. Enable systemic life-cycle efficiency and least cost solutions.
- 4. Publicly report performance for the entire water balance.
- 5. Liaise with all stakeholders, including land-use planners to realise the vision.
- 6. Contribute to local food productivity.
- 7. Deliver Council's Community Services Obligations.
- 8. Manage all sources of funding including water components of headworks charges and rates.

Current institutional and governance arrangements need to support the achievement of these outcomes by the establishment of a Ripley Valley Cooperative for Water Services and Management.



## Conclusion

The synthesis of CRCWSC research outputs and the tacit knowledge of participants of the twoday design charrette have identified 11 high-level ideas for delivering a water sensitive Ripley Valley. Underpinning the innovations identified is the necessary transition to a new institution framework for whole-of-water cycle management in Ripley Valley. The 11 ideas encompass initiatives that can be implemented in the short-term as well as strategies that would guide the transformation of the region into a unique exemplar of a sustainable, resilient and liveable priority development area.

An immediate short-term initiative is the development of innovative scheduling of the pump station to convey sewage to Bundamba STP to increase the efficient operation of the STP and therefore delay the commissioning of a new STP within Ripley Valley. Another is the strengthening of Ipswich City Council's voluntary nutrient reduction offset scheme to foster a more coordinated and integrated stormwater management plan for the valley that delivers multiple objectives including the management of stormwater as a resource, the improvement of stormwater quality and the detention of stormwater for flood protection and protection of the geomorphic integrity of Bundamba Creek and its tributaries.

In the longer term, the Ripley Valley PDA would benefit significantly from a urban water management servicing strategy that is based around an Urban Metabolism Framework that coordinates a holistic effort on accessing multiple sources of water, stabilising and rehabilitating waterways and safe conveyance and detention of flood waters. The notion of water supply services based on a portfolio of water sources, including a designer recycled water scheme would mean that affordable fit-for-purpose water is available to key stakeholders in the valley, particular lpswich City Council who is largely responsible for delivering and maintaining a regional network of waterway riparian and lush bushland green corridors. This network would be extended into residential estates within the valley to improve the biodiversity and microclimates in these estates. The benefit of this green infrastructure to residents in the Valley can only be realised if there is a corresponding finer scale green and blue corridors that links residential estates to these regional infrastructure through sympathetic urban design of the public realm in these estates.

The availability of recycled water may also be an important catalyst for establishing and supporting a regional horticultural industry that potentially converts a wastewater disposal problem into \$20M p.a. business.

The development of a portfolio of end users of affordable recycled water through a "designer recycled water" approach discussed would enable the water services provider to gain a flexible EPA licence for infrequent discharge of excess recycled water during period of extended wet weather conditions without needing to treat sewage to the typical high standard (N3:P1) for disposal of treated wastewater to rivers.

The urban metabolism framework for delivering urban water services could help frame the terms of reference or charter of urban water servicing in the Ripley Valley in defining new business models for service delivery with Queensland Urban Utilities and other third party providers.

## **Participants**

## **CRCWSC Research Synthesis Team**

Tony Wong (CEO), Jamie Ewert (Facilitator), Sandra Hall (Project Manager), Barry Ball, Fiona Chandler, Emma Church, Cintia Dotto, Jon Shinkfield, Peter Skinner, Peter Breen, Yvette Bettini, Jane-Louise Lampard, Steven Kenway, Marguerite Renouf, and Damien Batstone.

## **Department of Energy and Water Supply**

Dinesha Emmery, Adele Mellon, Leanne Clancy and Paul Walsh.

## Water Strategy Expert Panel

Rob Fearon, Poh-Ling Tan, Chris Tanner and Cara Beal.

## Developers

Kell Cronin (Sekisui), Russell Dunster (Amex Corporation) and Jonathon Lawson (Stockland).

## **Queensland Urban Utilities**

Cameron Jackson and Lavanya Susarla.

## **Ipswich City Council**

Brett Davey, Jane Kilgour, Ravi Raveenthiran, Kaye Cavanagh, Phil Smith, Ben Walker and Emma O'Neill.

# CRCWSC Research Synthesis

Discussion Paper | CRC for Water Sensitive Cities

## **CRC for Water Sensitive Cities**

Email	admin@crcwsc.org.au
Phone	+61 3 9902 4985
Address	CRC for Water Sensitive Cities
	Level 1, Building 74 — Monash University
	Clayton, VIC 3800, Australia

