

COUNCIL MEETING AGENDA

Date	Wednesday, 16 December 2020
Time	1.00pm
Venue	<p>Please note that due to COVID restrictions, public access to the Council meeting will be as follows:</p> <p><i>Councillors and senior staff:</i> Council offices (Molesworth Street)</p> <p><i>General public:</i> Video conferencing available on Council’s website</p>

AGENDA

1. Opening of the meeting

2. Acknowledgement of Country

Council would like to show its respect and acknowledge the Traditional Custodians of the Land, of Elders past and present on which this meeting takes place.

3. Apologies and Leave of Absence

4. Confirmation of minutes of previous meetings

- i). Ordinary Council meeting 21 October 2020 1-7

5. Disclosure of Interest

6. Notices of Motion

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Phillip Rudd
General Manager



Rous County Council

MINUTES OF ORDINARY COUNCIL MEETING

21 October 2020

1. OPENING OF THE MEETING

Meeting commenced at 1.03pm.

In attendance:

Councillors (at Molesworth Street, Administration Office, Lismore, NSW)

Keith Williams (Chair), Sharon Cadwallader (Deputy Chair), Darlene Cook, Vanessa Ekins, Sandra Humphrys, Robert Mustow and Simon Richardson.

Councillors (via video conferencing)

Basil Cameron.

Staff (at Molesworth Street, Administration Office, Lismore, NSW)

Phillip Rudd (General Manager), Guy Bezrouchko (Group Manager Corporate and Commercial), and Noeline Smith (minute taker).

Staff (via video conferencing)

Helen McNeil (Group Manager People and Performance), Andrew Logan (Group Manager Planning and Delivery), Phil Courtney (Group Manager Operations), Michael McKenzie (Future Water Strategy Project Manager), Natalie Woodhead-Tiernan (Finance Manager).

Other attendees:

Geoff Dwyer – Thomas Noble & Russell (at Molesworth Street, Administration Office, Lismore)

Brian Wilkinson – Chair, Audit Risk & Improvement Committee (via video conferencing)

2. ACKNOWLEDGEMENT OF COUNTRY

Council showed its respect and acknowledged the Traditional Custodians of the Land, of all Elders, on which this meeting took place.

3. PUBLIC ACCESS

Nil.

4. APOLOGIES AND LEAVE OF ABSENCE

Nil.

5. CONFIRMATION OF MINUTES

i). Ordinary Council meeting 19 August 2020 (182)

RESOLVED [46/20] (Cadwallader/Cook) that the minutes of the ordinary meeting held 19 August 2020 be confirmed as presented.

6. GENERAL MANAGER REPORTS

Chair Cr Williams vacated the Chair.

i). Election of Chair and Deputy Chair

RESOLVED [47/20] (Cook/Humphrys) that Council proceed with the election of a chairperson and deputy chairperson consistent with the election requirements for chairpersons of county councils in the *Local Government Act 1993* and the *Local Government (General) Regulation 2005* and that:

- i). If there is more than one nomination, council resolve the method of election be open voting.
- ii). The result of the election (including the names of those elected) be declared at the meeting and that those elected hold office for one year.

- Election of chair

The General Manager advised the meeting that one nomination for chair was received: Cr Williams.

The General Manager declared Cr Williams elected as Chair for the ensuing 12 months.

- Election of deputy chair

The General Manager advised the meeting that two (2) nominations for deputy chair were received: Cr Ekins and Cr Cadwallader.

Following a *show of hands*, Cr Cadwallader was elected as Deputy Chair for the ensuing 12 months.

Chair, Cr Williams resumed the chair.

7. DISCLOSURE OF INTEREST

Nil.

8. PRESENTATIONS

- Geoff Dwyer (Thomas Noble and Russell) presented on the Annual Financial Reports and Audit Report for the year ending 30 June 2020 (*refer to Item 11. i) of the agenda*).

Council thanked Geoff Dwyer for his attendance and presentation.

- Brian Wilkinson, Chair (via Zoom) - (Audit, Risk and Improvement Committee) presented on the '*Audit, Risk and Improvement Committee Performance Review: period 2019-2020*' (*refer to Item 13. i) of the agenda*).

Council thanked Brian Wilkinson for his attendance and presentation.

9. NOTICES OF MOTION

i). Increased installation of water tanks

MOVED (Richardson/Ekins)

That Rous County Council undertakes the following investigations and modelling in order to provide comparative information when considering other preferred future water strategies:

1. Increased installation of water tanks

- a).
 - i. An estimation of the number and capacity of rainwater tanks required for installation of tanks on all currently existing properties, including those properties that are connected to a recycled water scheme, and new properties within expected growth patterns.
 - ii. That this estimation includes the number and capacity required for delivery of non-potable and potable water.
- b). The level of rainwater tank installation taken into consideration as part of the demand forecast with the Future Water Project.
- c). Particulars concerning dwellings utilising a dual reticulation system.
- d). Requirements, costing and issues involved in providing a decentralised model where the entire house is completely plumbed and connected only to the rainwater tank.
- e). The issues concerning non-potable use only restrictions for water tanks.
- f). Complete modelling of offsetting the total potable and non-potable use within each property so as to not rely on the town water system.
- g). Restrictions and requirements with NSW health guidelines to meet Australian Drinking Water Guidelines and Standards.
- h). The historical work completed on rainwater tanks as a demand management option.
- i). The costs for various ownership schemes, including:
 - i. Capital and maintenance by Rous (or part of) and all maintenance and electricity, and managed by landholder
 - ii. Capital and maintenance and on-going costs by house owner
 - iii. Rous to provide the tanks and provide a periodic repayment plan
- j). Legal barriers present concerning all the issues being considered.
- k). Modelling that considers the impact of significant increases in the installation of water tanks on Rocky Creek Dam (RCD) and changes of probability of the RCD reservoir becoming empty and unable to provide the water required.

2. Demand Management

- a). Modelling effectiveness of developing further pricing structure fluidity that fluctuate in relation to Dam levels, with in-built subsidies for those in the lower economic brackets.
- b). Wider social, legal and local government implications and considerations.

3. Use of recycled (purified) water

- a). Requirements, costs (capital and operating), barriers, timeframes and general issues involved in providing purified recycled water, for drinking and non-drinking, to current and future Rous customers, and that this also consider:
 - i. Restrictions, barriers and requirements with NSW Health Guidelines to meet Australian Drinking Water Guidelines and Standards.
 - ii. Legal and legislative barriers present concerning the utilisation of purified recycled water.
 - iii. Implications of the current level of decentralised sewerage sources.

The following updated wording for point 3. (as above) was provided by Cr Richardson prior to the meeting:

3. Use of Recycled Water for Non-Drinking Purposes Only

3. a. Requirements, costs (capital and operating), barriers, timeframes and general issues involved in providing recycled water for non-drinking purposes only, to current and future Rous customers, and that this also consider:
 - i. Restrictions, barriers and requirements of the NSW Government, including Department of Planning, Industry and Environment and NSW Health.
 - ii. Legal and legislative barriers concerning the use of non-potable recycled water.
 - iii. Sustainable water yield that could realistically be achieved by non-potable recycling.
 - iv. Opportunity costs (if any) associated with redirecting and reusing treated effluent.
 - v. Broader environmental benefits (if any) associated with reducing discharge of treated effluent.

Use of Purified Recycled Water for Drinking

3. b. Requirements, costs (capital and operating), barriers, timeframes and general issues involved in providing purified recycled water to supplement current drinking water supplies, to current and future Rous customers, and that this also consider:
 - i. Restrictions, barriers and requirements of the NSW Government, including Department of Planning, Industry and Environment and NSW Health.
 - ii. Legal and legislative barriers concerning the use of purified recycled water for drinking.
 - iii. Sustainable water yield that could realistically be achieved through purified recycled water for drinking.
 - iv. Opportunity costs (if any) associated with redirecting and reusing treated effluent.
 - v. Broader environmental benefits (if any) associated with reducing discharge of treated effluent.

-
4. That these reports be presented as soon as practicable and prior to any decision made on RCC's long term future water strategy priority infrastructure projects, being either the new Dunoon Dam or long-term groundwater schemes and that items 4. and 5. of Council's resolution 24/20 remains unaffected by this resolution of Council.

The motion on being put to the meeting was lost.

Voting against: Crs Williams, Cadwallader, Mustow, Cook and Humphrys.

Foreshadowed Motion

MOVED (Mustow/Cadwallader) that Council consider the issues identified in the Notice of Motion as above - Item 9. i) '*Increased installation water tanks*' at Council's 18 November 2020 information session.

The foreshadowed motion on being put to the meeting was carried.

RESOLVED [48/20] (Mustow/Cadwallader) that Council consider the issues identified in the Notice of Motion as above - Item 9. i) '*Increased installation water tanks*' at Council's 18 November 2020 information session.

ii). Increase water conservation requirements of BASIX

RESOLVED [49/20] (Cadwallader/Cook) that:

1. Rous County Council seek support from the constituent councils to increase the water conservation requirements of BASIX as outlined in this Notice of Motion.
2. Should letters of support be received from the constituent councils, that council authorises the General Manager and Chair to write to the relevant NSW Minister and LGNSW to seek support of same.
3. Council be advised on any future response received from the Minister and LGNSW.
4. Council submit a Notice of Motion to NSW Local Government conference to increase the water conservation requirements of BASIX.

9. GENERAL MANAGER REPORTS

i). Council meeting schedule 2021

RESOLVED [50/20] (Mustow/Cadwallader) that Council determine its meeting schedule for 2021 with meetings to be held at 1.00pm at Rous County Council Administration office (or via Zoom) on: 17 February; 21 April; 16 June; 18 August; 20 October and 15 December.

10. GROUP MANAGER CORPORATE AND COMMERCIAL REPORTS

i). Annual Financial Report and Auditor's report for year ending 30 June 2020

Tabled report

As noted in the 'Annual Financial Report and Auditor's report for year ending 30 June 2020' Councillors were to be provided with a copy of the *Audit, Risk and Improvement Committee minutes of 19 October 2020 report*. The report was tabled for Councillors' information.

RESOLVED [51/20] (Cook/Cadwallader) that Council:

1. In accordance with section 413 (2c) of the *Local Government Act 1993* and clause 215 of the *Local Government (General) Regulation 2005*, adopt the 2019/20 Audited Financial Reports and “Statement by Councillors and Management” for both the General Purpose Financial Reports and the Special Purpose Financial Reports, with the Chairperson and Deputy Chairperson delegated to sign on behalf of Council.
2. Advertise the presentation of the draft 2019/20 Financial Reports to the public from Monday, 2 November 2020 for a period of two weeks, and invite both inspection and submissions.
3. Forward a copy of the 2019/20 Audited Financial Reports to the Office of Local Government.
4. Present the 2019/20 Audited Financial Reports to the public at Council’s 16 December 2020 meeting.

ii). Quarterly Budget Review Statement for quarter ending 30 September 2020

RESOLVED [52/20] (Humphrys/Cadwallader) that Council note the results presented in the Quarterly Budget Review Statement as at 30 September 2020 and authorise the variations to the amounts from those previously estimated.

iii). Retail water customer account assistance

RESOLVED [53/20] (Cadwallader/Cook) that Council in accordance with section 356 (1) of the *Local Government Act 1993* and its ‘Retail Water Customer Account Assistance’ policy, approve financial assistance as listed in Table 1 of the report.

12. GROUP MANAGER PLANNING AND DELIVERY REPORTS

i). Deferral and refund of developer contributions – Ballina Community Men’s Shed

RESOLVED [54/20] (Cadwallader/Humphrys) that Council, under clause 2.5 of Council’s Development Servicing Plan 2016, approve the deferral and refund of the Rous County Council developer contributions levied to Ballina Community Men’s Shed Inc. in relation to DA2020/69.

13. INFORMATION REPORTS

i). Information reports

RESOLVED [55/20] (Mustow/Cadwallader) that:

1. Council receive and note the following information reports.
 - a). Audit, Risk and Improvement Committee Performance Review period 2019-2020: Chairpersons Report (*Note: Report presented by the ARIC Chair at the commencement of this meeting during “Presentations”*).
 - b). Investments – September 2020.
 - c). Water production and usage – August 2020 and September 2020.

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- d). Fluoride plants' dosing performance report July to September 2020 – Q3.
 - e). Disclosure of Interest Returns.
 - f). Reports pending.

In relation to report a). '*Audit, Risk and Improvement Committee Performance Review period 2019-2020: Chairpersons Report*', Council extended its appreciation to members of the Audit, Risk and Improvement Committee for their continued work and support.

14. MATTERS OF URGENCY

Nil.

15. QUESTIONS ON NOTICE

Nil.

16. CLOSE OF BUSINESS

There being no further business the meeting closed at 3.31pm.



Notice of Motion

Council meeting 16 December 2020

**Subject: Updating materials for the Northern Rivers
Watershed Initiative**

I hereby move the following motion:

That Council contribute \$5,000 sourced from within an existing budget allocation towards a joint project with Whian Whian Landcare and Southern Cross University (SCU) to update natural flood mitigation materials and references used to support the Northern Rivers Watershed Initiative (NRWI).

Councillor Keith Williams

Date: 3 December 2020

Councillor comment

The Northern Rivers Watershed Initiative, developed by Rous County Council and adopted by the Northern Rivers Joint Organisation in 2019, proposes the use of natural flood mitigation practices to address upper catchment health and downstream flooding impacts.

It was hoped the initiative would be supported by a substantial research program from the SCU based National Centre for Flood Research.

Professor Carolyn Sullivan of SCU has recently advised that the proposed Natural Flood Mitigation Grant Application under the Australian Research Council's (ARC) Linkage Projects scheme has been delayed.

Given that natural flood mitigation is a new and rapidly developing discipline, it is important that the knowledge base of the Watershed Initiative is regularly updated.

The Watershed Initiative is currently under consideration as part of the draft *Far North Coast Regional Water Strategy*.

As Chair, I was recently approached by representatives of Whian Whian Landcare asking whether Rous County Council could make a \$5,000 contribution towards a joint project to research and update materials and references supporting natural flood mitigation strategies. Whian Whian Landcare will contribute \$2,000.

Dr Mitchell Kirby of SCU has provided some initial advice to Whian Whian Landcare regarding costs and outputs that recognises the non-profit nature of the group. Prof Sullivan advises Dr Kirby has suitable expertise and experience to complete the project.

I recommend the project to Councillors and ask for your support.

Staff comment

The research and updating of materials and references surrounding worldwide, Australian and local approaches and learnings to natural flood mitigation in catchments is a necessary step in progressing an activity such as the Northern Rivers Watershed Initiative.

The delay in submitting the grant to the Australian Research Council's (ARC) Linkage Projects scheme, which is also aiming to investigate the potential of 'green infrastructure' and nature-based solutions to flood mitigation, provides an opportunity to assess the current state of play in the relatively new field, so that it can better inform the outputs from the grant, if it is successful during 2021.

Nature based flood mitigation is supported through the key documents of the Draft *Far North Coast Regional Water Strategy* and the Rous County Council \ Lismore City Council's draft *Lismore Floodplain Risk Management Study*.

Council resolved [58/19] to allocate funding of \$30,000 per year for three years commencing in 19/20. With the delay in submitting the grant application, these funds of \$60,000, remain unspent. Given the links to ARC Linkage Projects scheme grant, it is proposed that the \$5,000 contribution to update materials for the Northern Rivers Watershed Initiative be funded from the existing \$60,000 budget.



Notice of Motion

Council meeting 16 December 2020

Subject: Barriers to rainwater tank installations

I hereby move the following motion:

That staff investigate and report back to Council the opportunities to maximise water savings associated with the residential rainwater tank rebate program. In particular, rebates for second water tanks with connections to toilets and washing machines, and also, connections to washing machines and toilets of existing tanks.

Councillor Sharon Cadwallader

Date: 17 November 2020

Councillor comment

Outcome sought

The intent of this Notice of Motion (NOM) is to identify opportunities to maximise water savings associated with the Rous residential rainwater tank rebate program to ensure that residents, where possible, are installing a minimum size of 10,000 litres rainwater storage that is connected to all toilets, outdoor taps and clothes washing machines.

This would ensure that rainwater tank retrofits to existing properties would align with new residential properties as outlined in my previous NOM "*Increase water conversation requirements BASIX*" presented at the 21 October 2020 meeting.

Staff comment

Staff are currently undertaking an evaluation of the residential rainwater tank rebate program, through a survey and analysis of water consumption data. Part of this survey has included questions around the barriers that rebate recipients have experienced with tank size and connection to indoor fixtures.

The results of the survey, water consumption data and the insights of those staff involved in administering the program, can be presented to Council in a workshop in the first half of 2021.

It is proposed that the outcomes of this workshop inform the development of the next Regional Demand Management Plan (RDMP) which is planned to occur during 2021/22. With the current RDMP having around 18 months to run, it is considered important to maximise the achievements under this Plan and minimise any substantial changes at this time.

In addition, the Terms and Conditions around the rebate program can be clarified to ensure that it is clear to the community that more than one rebate application is possible.

The rebates are scaled around the size of the tank and there are separate rebate amounts for connections to toilets and the washing machine. More than one rebate is payable where a resident has previously received a rebate for a tank, and at a later date they are now installing a second tank and/or connecting the toilets and/or washing machine. The program currently approves a tank capacity up to a maximum of 10,000 litres, regardless of whether this is through multiple tanks or multiple rebate applications.

Rous Regional Water Supply – Integrated Water Cycle Management Strategy Adoption (Future Water Project 2060)

(D20/7051)

Business activity priority	Strategy and planning
Goal 2	Align strategic direction to core functions and sustainability

Recommendation

That Council:

1. Receive and note the public exhibition review document titled 'Rous County Council Future Water Project 2060 Public Exhibition Outcomes' attached to this report.
2. Note that submissions to the public exhibition process are available on the Rous County Council website (personal / confidential information redacted):
www.rous.nsw.gov.au/fwp2060submissions
3. Adopt the draft Integrated Water Cycle Management (IWCM) Strategy attached to this report and undertake the following actions as described in Section 4 of this report:
 - i) Immediate actions
 - 4.1.1 Water Loss Management Plan
 - 4.1.2 Smart Metering
 - 4.1.3 Marom Creek WTP and Alstonville groundwater site
 - 4.1.4 Marom Creek WTP upgrade
 - 4.1.5 Alstonville groundwater site
 - 4.1.6 Contingency option – Woodburn groundwater coastal sand scheme
 - ii) Ongoing action
 - 4.2 Enhanced demand management and water efficiency program
 - iii) Innovative action
 - 4.3 Perradenya Estate pilot purified recycled water scheme
 - iv) Investment action
 - 4.4 Detailed assessment of the proposed Dunoon Dam all-round viability
4. Note that environmental, ecological, cultural heritage and economic impacts were identified during the development of the IWCM and were also raised as concerns during the public exhibition period and will remain key considerations going forward.
5. Note the progress of discussions with Ballina Shire Council regarding the potential transfer or lease of Marom Creek Water Treatment Plant and that a further report will be provided.
6. Transfer \$200,000 from bulk water reserves for the 2020/21 financial year for actions that are detailed in the Budget section of this report.
7. Authorise the General Manager to write to the constituent councils inviting participation in the Rous Smart Metering project commencing 1 July 2021.

Purpose

The purpose of this report is to ensure Rous County Councillors have access to the reliable and relevant information required to pursue the strategic direction needed to address the critical and complex challenges facing the regional water supply's long-term security.

This report details the evolution of Council's Integrated Water Cycle Management ('IWCM') process over many years to identify a viable suite of water supply security management options that provide certainty as well as the best possible social, environmental and economic outcomes.

The updated, preferred IWCM strategy set out in this report for Council's adoption – the Future Water Project 2060 – has taken into account extensive investigations of virtually every possible new water source option, analysis of Council's longstanding demand management initiatives and the outcomes of the recent public exhibition period.

The report also provides the most up-to-date evidence and other data available from authoritative sources that Council must rely on in relation to forecast climate conditions, population growth and many other factors putting pressure on our water supply.

Importantly, it is not the purpose of this report to seek the Council's approval for construction of the long-proposed Dunoon Dam.

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1. BACKGROUND

Several decades of studies and investigations have been undertaken to identify potential water source augmentation options and enable selection of a preferred long-term strategy to secure Council's regional water supply.

In 2014 Council adopted the Future Water Strategy, a long-term plan for the region's water security which identified a number of critical and complex challenges that needed to be confronted.

A key finding of this strategy was that the existing bulk water supply would meet forecast demand around the year 2024, meaning Council had about 10 years to act to ensure regional water security could be maintained.

Initiatives across the region to promote the more efficient use of water would prolong Council's existing water sources and reduce the amount of water required, but these initiatives on their own would not be enough to ensure the region's water security – especially until 2060, when it was forecast that more than 6,000 megalitres of additional water would be needed each year.

Council recognised that new water sources were required.

Groundwater and water reuse were selected as new water sources for investigation, with the long-proposed Dunoon Dam not to be further progressed unless these new sources proved to be unsuitable.

Council has completed its investigations into new water sources. This confirmed the preferred long-term plan for the region's water security, which included the proposed Dunoon Dam.

The Future Water Project 2060 clearly identifies those same critical and complex challenges that Council still needs to confront.

Modelling indicates that additional water sources will need to be brought on-line within four years, to ensure demand does not exceed the regions secure yield. Council must adopt a suitable, integrated long-term strategy for its regional bulk water supply.

1.1 Integrated Water Cycle Management – what is it?

As a local NSW water utility, Council is required to demonstrate best practice water supply management by implementing the NSW Government's *Best Practice Management of Water Supply and Sewerage Guidelines*.

One of the six key criteria Council must meet is Integrated Water Cycle Management ('IWCM').

IWCM is a framework to help water utilities identify water management problems, address these problems, determine the appropriate management responses and manage the impacts of the problems so that social, environmental and economic objectives are met.

This process results in Council adopting a long-term IWCM strategy for the integrated delivery of its water supply services to the community. An IWCM strategy is subject to regular review to ensure currency with new information and changing conditions.

Council adopted an IWCM strategy in 2014 (the Future Water Strategy) to, amongst other things, enable enhanced demand management options to be developed and studies of new water source options to be undertaken.

Following a review of the outcomes of, and issues raised by, the Future Water Strategy implementation over the past six years, Council now needs to endorse a revised IWCM strategy. The revised IWCM strategy is the draft Future Water Project 2060 set out in this report.

1.2 Future Water Strategy 2014

Council commenced development of its Future Water Strategy in 2009 to ensure a secure and sustainable regional water supply for at least the next 50 years. The *Strategy* was informed by a Project Reference Group which included members of the community.

It was endorsed by Council in December 2013 and placed on public exhibition for eight weeks from 17 February to 11 April 2014.

The outcomes of the public exhibition period provided overall endorsement of the Future Water Strategy and a mandate to commence its implementation.

As a result, Council officially adopted [46/14] the Future Water Strategy 2014 at its ordinary meeting on 21 May 2014, including the following:

.....

2. *An enhanced Demand Management Strategy be developed ...*
3. *Groundwater investigations commence ...*
4. *[Council] maintain existing commitments and policies regarding the proposed Dunoon Dam, pending further review following the completion of an updated demand management strategy and proposed groundwater and water re-use investigations.*

Council's resolution accorded with community feedback at the time, which indicated that the Dunoon Dam proposal should be maintained as a potential future water supply option but deferred while enhanced demand management initiatives were implemented, and alternative groundwater and water reuse source options were investigated.

Enhanced water efficiency and conservation measures now form part of Council's recurring four-year Regional Demand Management Plan.

Earlier in 2020, Council completed extensive investigations into the long-term suitability of groundwater, water reuse and desalination as potential new water source options for securing a sustainable regional water supply.

With the ongoing implementation of a demand management strategy and completion of further investigations into groundwater, water reuse and desalination, Council management have addressed the expectations of the 2014 Council resolution, thus positioning Council to consider the suitability of the long-proposed Dunoon Dam source option.

1.3 Draft Future Water Project 2060

The draft Future Water Project 2060 was endorsed by Council at its ordinary meeting in June 2020 for public exhibition in July 2020.

It sets out what are considered the most viable combination of solutions for securing Council's bulk water supply for at least the next 40 years.

This was based on options that can cost-effectively meet the forecast demand for water in light of changing climate conditions and population growth without having to burden the community with longer and more severe water restrictions.

The draft Future Water Project 2060 takes into account a number of important factors, including:

- A forecast **increase** in the demand for water of around 37%¹ over the next 40 years.
- A forecast **decline** in the secure yield of Council's existing water supply system (due to climate change etc.) of around 12% by 2030 and almost 22% by 2060².
- The need for a new water source by at least 2024, without which demand for water is forecast to exceed reliable supply.
- The inability to augment existing sources (e.g. raising Rocky Creek Dam and Emigrant Creek Dam walls) to provide the required increase in yield to meet future forecast demand.
- The outcome of recent investigations into the viability of groundwater, water reuse and desalination as long-term water source solutions.

The proposed project's preferred option involved two key actions to secure Council's medium to long-term water supply:

1. Securing and upgrading the existing Ballina Shire Council Marom Creek Water Treatment Plant near Wollongbar and sourcing groundwater from the Alstonville area's underground aquifer; and
2. Constructing a new 50 gegalitre dam at Dunoon (downstream of the existing Rocky Creek Dam).

2. PUBLIC EXHIBITION OUTCOMES

Council released the draft Future Water Project 2060 for public exhibition on 1 July 2020, for a period of six weeks.

Due to the impact of COVID-19 constraints as well as community feedback, this draft IWCM strategy was publicly exhibited for an extended period of 10 weeks with public submissions accepted until 9 September 2020.

The purpose of the public exhibition period was threefold:

- Update the community on the outcome of Council's new water source investigations undertaken since the Future Water Strategy was adopted in 2014.
- Based on the outcome of these new water source investigations, advise the community of Council's preferred, revised IWCM strategy – the draft Future Water Project 2060.
- Invite written submissions in relation to the draft Future Water Project 2060.

Section 2 of this report provides a summary of the analysis of the public exhibition outcomes.

¹ Future Water Project: Demand Forecast (Hydrosphere 2020)

² Future Water Project: 2060 Integrated Water Cycle Management Development: Assessment of Augmentation Scenarios

Appendix A to this report provides a more detailed analysis of the key themes arising from the public exhibition period.

Attachment B provides the full report on the public exhibition period's outcomes prepared by an external consultant.

2.1 Communication and engagement approach

The recent public exhibition phase was intended to 'inform' and 'consult' on the IAP2 public participation spectrum,³ following the earlier Future Water Strategy which sought community involvement through 'consult' and 'involve'.

A range of public engagement, communication and other information resources were developed and deployed as part of the public exhibition period.

Due to COVID-19 precautions, the public exhibition period was conducted primarily via online platforms, including:

- A dedicated project page on Council's website that hosted all project documentation (including PDF summaries for download).
- An innovative 3D virtual water supply catchment tool.
- Council's new Facebook social media account.
- Three YouTube videos.

Council elected not to host regional briefings or meetings based on COVID-19 restrictions and public health guidance. The community was provided with phone and email access to the project team.

Council widely promoted the opportunity for the community to be involved and make comment about the draft Future Water Project 2060, with the following actions undertaken:

- Two media releases
- Fifteen social media posts
- Eight public advertisements
- Forty-five direct mail / email to identified key stakeholders
- Five direct email to registered stakeholders.

Council structured various channels to receive feedback in a variety of ways, including a project email (to receive enquiries and submissions), an online survey and by phone.

2.2 Response rate

A total of 1,298 online survey responses and other written submissions were received.

Of these, at least 75% were received from residents within Council's service area (Ballina Shire, Byron Shire, Lismore City and Richmond Valley).⁴

³ International Association for Public Participation (www.iap2.org.au).

⁴ There were 100 online surveys and written submissions where the respondent did not nominate or specify their location.

At least 70% of the responses and submissions received from within Council's service area were provided by Lismore City residents – particularly those living in Dunoon, The Channon and other nearby areas.

The significant concentration of respondents in these Lismore City areas was expected given local concerns about the proposed Dunoon Dam.

This result highlights how crucial Council's relationship with directly affected landowners and nearby residents will be in identifying an acceptable balance between local needs and those of the wider region, should Council decide to move ahead with the detailed investigation and assessment of the proposed dam.

Unfortunately, there was a relatively low response rate from residents within the Ballina Shire, Byron Shire and Richmond Valley areas.

This result highlights the ongoing work Council needs to do to improve engagement with communities across its entire service area, especially in relation to critical regional issues such as water security.

On 16 November 2020, nine weeks after the close of the public exhibition period, Council received a petition not in favour of the dam containing approximately 450 signatures. This submission was received after the public exhibition period had closed.

2.3 Response to key drivers

Council's key drivers for the draft Future Water Project 2060 (see [Section 1.3](#) of this report) were exhibited extensively.

A majority of online survey respondents (63%) understood Council's reasoning for the draft project. 81% agreed that Council should act now to secure the region's future water supply, a number of written submissions raised concerns about the regional population projections relied upon for the draft project (see [Section 3.1](#) of this report for more details about this issue).

2.4 Response to preferred short-term water security option

Around 53% of online survey respondents did not agree with the draft IWCM strategy's short-term water security option involving the Marom Creek Water Treatment Plant and Alstonville groundwater aquifer.

Unfortunately, there was a relatively low response as to why respondents specifically agreed or disagreed with this short-term option.

However, the majority of online survey responses and written submissions generally did not support the increased use of groundwater as a water security option, preferring the use of other alternative water supply security options instead (see [Section 2.6](#) below).

This result was not expected given the community's preference for groundwater during the development of the Future Water Strategy.

2.5 Response to preferred long-term water security option

Of the total number of surveys and written submissions received, around 90% of respondents did not agree that a new Dunoon Dam was the most suitable long-term water security solution.

Environmental, ecological, cultural heritage and economic impacts were the most common concerns referred to by those respondents who did not agree with the suitability of the dam.

2.6 Other relevant responses

The majority of respondents who did not agree with the suitability of the proposed Dunoon Dam most commonly preferred using the following alternative water supply security options:

- a. Enhanced demand management and water efficiency measures (especially greater use of rainwater tanks on private property and implementing permanent water restrictions); or
- b. Water recycling.

This result suggests Council did not adequately inform the community about its ongoing, longstanding regional demand management initiatives as well as its support for the use of purified recycled water (Sections 3.3, 3.4, 4.2 and 4.3 of this report provide more information about these issues).

Ongoing communication and engagement with key stakeholders and the broader community will be a key action when a preferred long-term water security plan has been endorsed by Council.

3. KEY CONSIDERATIONS INFORMING THE FUTURE WATER PROJECT 2060

In light of the outcomes of Council's extensive new water source investigations and enhanced demand management initiatives as well as submissions received during the public exhibition period, there are five key considerations to which Council's Future Water Project 2060 must respond.

3.1 Regional Water Demand

Council previously engaged Hydrosphere Consulting to help develop a long-term water supply demand forecast as part of the 2014 Future Water Strategy.

Table 1 below shows the significant reduction in demand per connection since 1991, including the slowing of the reduction over the last 5 years.

Table 1: Change in Regional Demand per Connection 1991 to 2019

	Connections	Annual average demand (ML)	Average Consumption per Connection per Annum
1991	25,993	12,580 ML	484 kL ⁵
2014	43,371 ⁶	11,130 ML ⁶	256.6 kL
2019	46,982 ⁶	11,600 ML ⁶	246.9 kL ⁶

As the bulk water supply authority, Council has a duty to ensure there is enough water available to meet the long-term needs of the Ballina Shire, Byron Shire, Lismore City and Richmond Valley Councils and their communities.

⁵ Future Water Strategy Integrated Water Planning Process (MWH July 2014)

⁶ Future Water Project: Demand Forecast (Hydrosphere 2020)

3.1.1 Demand forecast 2020–2060

As part of the development of the draft Future Water Project 2060, Council re-engaged Hydrosphere Consulting to prepare an updated demand forecast for 2020–2060, with Table 2 summarising the estimated 2060 values.

Table 2: Estimated 2060 Regional Connections and Demand

	Estimated Connections	Estimated Annual average demand (ML)	Estimated Average Consumption per Connection
2060	66,922 ⁷	16,054 ML ⁷	239.9 kL

There are a number of factors that influence how many properties are connected to Council's bulk water supply, how much water these properties use, and how this all changes over time.

Changes in rainfall and climate patterns, industry and business development, tourism, population and housing growth, as well as the ongoing adoption of water efficient appliances and other water conservation measures, are the main factors that cause fluctuations in water use from year to year.

Council's current water demand forecast for 2020–2060 takes into account all these factors – together with modelling based on historic water usage as well as forecast rainfall, climate, connections and demand management trends – to estimate how much water will be needed in the future.

In particular, Council has relied on the regional growth predictions determined by its four constituent councils to forecast how many properties will be connected to the bulk water supply in the future.

These include:

- Growth assumptions used by Ballina Shire Council in the development of its local strategic planning statement.
- Growth management strategies prepared by Byron Shire Council for its urban land, rural areas and business/industrial land.
- Advice provided by Lismore City Council as to what it expects the growth in both residential and non-residential properties to be.
- Development projections derived from sewerage and other servicing strategies related to Richmond Valley Council.

The long-term predictions about future water demand always involve a degree of uncertainty. Ongoing monitoring and modification of the forecast will be required.

⁷ Scenario 2a – Rous Regional Supply: Future Water Project 2020 IWCM Development: Assessment of Augmentation Scenarios

3.2 Existing water supply system

3.2.1 Council's regional bulk supply system currently utilises a range of water sources

- Rocky Creek Dam
- Emigrant Creek Dam
- Wilsons River

Council completed construction of Rocky Creek Dam in 1953.

Rocky Creek Dam was originally built to supply an estimated population of around 25,000 people in the Lismore and Byron Bay areas as well as some parts of the Richmond Valley. At that time, Rocky Creek held enough water for 5 years of supply.

Since then, Ballina Shire has joined Council's regional bulk supply.

Growth throughout the Lismore City, Byron Shire, Richmond Valley and Ballina Shire local government areas since 1953 has led to Rous supplying an estimated population of more than 100,000. Currently Rocky Creek Dam holds enough water for around one year's supply for the community.

As a result, over time Council has added the Emigrant Creek Dam, Wilsons River and Alstonville and Woodburn groundwater sources to its regional bulk supply system.

Demand management has also been an integral part of Council's regional bulk water supply system since the 1990s (see [Section 3.3](#) below).

Council's *Regional Water Supply Drought Management and Demand Management Plans* identify a number of emergency water supply options that can be implemented if necessary – including additional groundwater extraction and temporary, portable desalination plants.

While these options provide a necessary safeguard and greater level of resilience in the event of a drought emergency, they do not provide a viable solution for securing Council's regional bulk water supply over the long term.

3.2.2 Secure yield

The current NSW Security of Supply Methodology in NSW defines 'secure yield' as the highest annual water demand that can be supplied from a water supply headworks system without water restrictions that are too severe, too frequent nor of excessive duration.

Council uses water supply industry best practice design rules in relation to water restrictions to determine the secure yield of its regional bulk water supply system.

The secure yield of Council's existing regional bulk water supply system (Rocky Creek Dam, Emigrant Creek Dam, Wilsons River Source, groundwater bores) is currently 13,350 ML per annum.

The existing system's yield will decline over time due to numerous factors – including changing climate conditions, operational impacts and other constraints.

By 2060, the secure yield of Council's existing bulk supply system is forecast to be 10,427 ML per annum.

Based on forecast demand, this is a forecast yearly yield deficit of 5,515 ML² in 2060.

Taking into account the forecast decline in the system's secure yield, it is currently estimated the existing system's secure yield will be sufficient to supply demand until around 2024.

After this time, the existing system cannot meet forecast demand without the potential for more frequent, longer and severe water restrictions.

Existing source augmentation (i.e. raising Rocky Creek Dam and/or raising Emigrant Creek Dam) cannot provide the increase in yield required to meet this future demand.

As such, a new water source will be required from 2024.

3.3 Demand management

In addition to those new water sources commissioned since Rocky Creek Dam was built, demand management has also been an integral part of Council's bulk water supply planning and management since 1995.

Council's ongoing demand management initiatives have been successful in significantly reducing water demand over the last 25 years.

In 1991, the 25,993 properties connected to Council's regional bulk water supply system used on average 484 kL⁸ per connection.

In 2019, the 46,982 properties connected to Council's regional bulk water supply system used on average 247 kL⁸ per connection.

Despite an 81% increase in the number of properties connected to Council's bulk supply system over the last three decades, Council has overseen a 50% decrease in the amount of water being used per connection.

This has been achieved through a combination of the following measures⁸, stretching back to 1997:

- Residential home retrofit program, where a plumber visited 5,772 homes to target water use from showers, taps and toilet cisterns.
- Rainwater tank rebates which commenced in 2013, and continue today, and have provided more than 15 million litres of storage and rebates to the value of \$1.1M for 1,900 homes.
- Dual flush toilet rebates, where 1,762 rebates of \$50 each were provided to convert single flush cisterns to dual flush.
- Washing machine rebates, where 1,921 rebates of \$50 each were provided to replace older and less water efficient washing machines.
- Mulch rebates of up to \$100 per household to target outdoor water use.
- Outdoor water efficiency packs, where 1,000 were sold at a subsidised rate to target outdoor water use.

⁸ Future Water Strategy Integrated Water Planning Process (MWH July 2014)

- Showerhead rebate of up to \$50 for almost 150 showerhead replacements.
- Rebates for specific water saving products in the shower, cisterns and pool \ spa covers.
- Support for 48 businesses between 2007 and 2012 as part of the Blue and Green Business Program.
- Support for businesses to connect to Byron and Ballina Shire Councils' recycled water mains.
- Engagement and support of approximately 15 high water consuming businesses since 2019 around the Sustainable Water Partner Program.

3.3.1 Relationship between demand management and new water sources

A key goal of Council's regional demand management planning has always been to defer investment in new water sources as much as possible.

However, experience around Australia has highlighted the problem of relying solely on reducing water use to achieve water security.

This is because demand management cannot address the forecast decline in the secure yield of Council's existing water supply system of 22%² over the next 40 years due to changing climate conditions.

As such, water efficiency works best when coupled with source development as part of an integrated, multifaceted water plan.

Due to Council's current demand and secure yield forecasts, investment in new water sources cannot be continuously deferred and eventually a new water source will be required to meet the region's long-term water needs.

3.3.2 Demand hardening

Figure 1

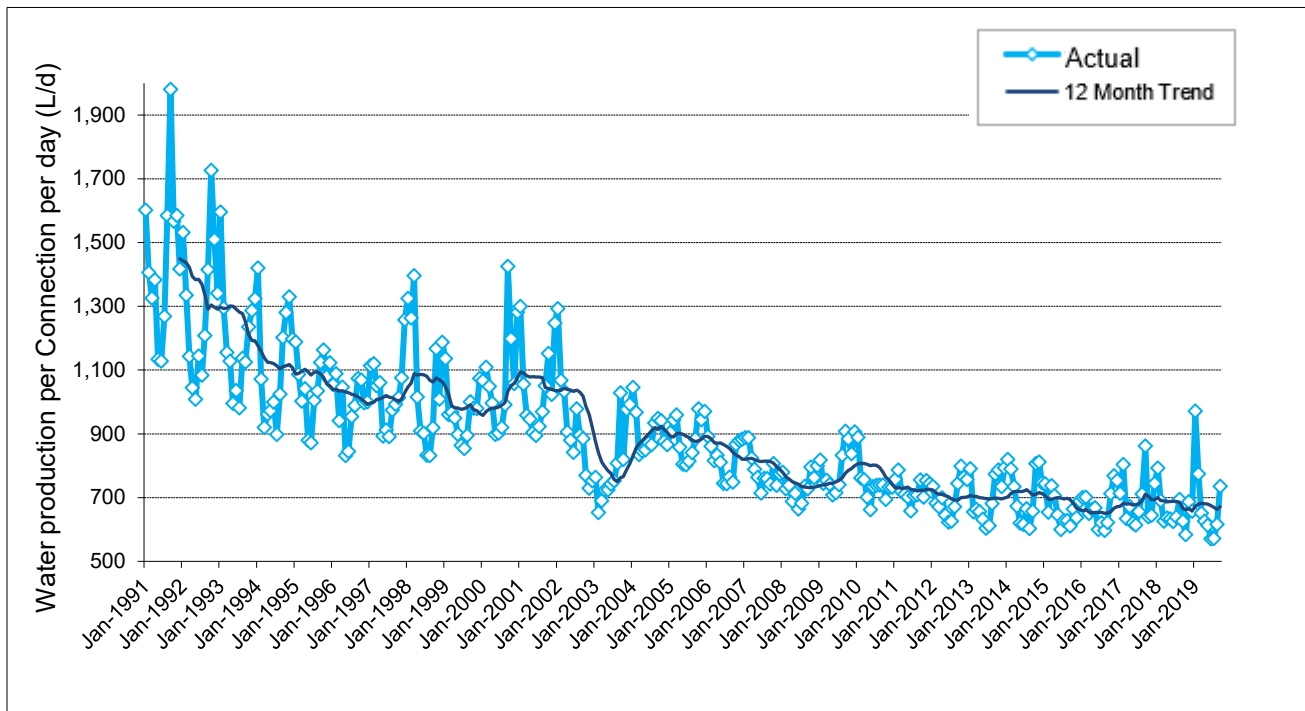


Figure 1 above shows that the reduction in per connection consumption has slowed, particularly over the last 5 years.

This phenomenon is referred to as ‘demand hardening’ and occurs as a result of the long-term use of efficient and effective water conservation measures – such as education, restrictions, rebates and pricing changes.

While the implementation of these measures has delivered significant reduction in water use, eventually over time their effectiveness reaches a level where further reductions become more difficult to achieve.

3.3.3 Regional Demand Management Plan: 2019–2022

Council remains committed to responsible water use and ongoing initiatives aimed at reducing demand.

The current *Regional Demand Management Plan’s* actions focus on:

- Monitoring, Evaluation and Reporting
 - Standardisation of customer terminology across the region.
 - Standardisation of reporting of water data across the region.
 - Reporting on status of actions.
- Water Loss Management
 - Preparation and then implementation of Water Loss Management Plans for and by each Council.

- Development of non-revenue water targets within particular parts of each Council's network.
- Sustainable Water Partner Program
 - Active engagement with high water users to promote Program.
 - Preparation and implementation of water efficiency plans with businesses.
- Smart Metering
 - Review of available technology and providers.
 - Roll out of preferred technology across the region.
- Recycled Water
 - Engagement with Ballina and Byron Shire Councils and businesses, to maximise the opportunities to connect to existing and proposed recycled water networks
 - Direct non-potable reuse – see [Section 3.4](#) below for more details.
- Rainwater Tank Rebates
 - Continuing to promote and support the rebate for rainwater tanks for residential properties connected to town water.
- Community Engagement
 - Establishment and ongoing promotion of the 160L Challenge for household water use.
 - Ongoing engagement with schools through support for the *Green Innovation Awards* and partnering with the *Dorrroughby Environmental Education Centre*.
 - Roll out of a home water audit tool, through the *Smart Water Advice's Home Water Calculator*.

These actions align with current demand management trends, community desires for water conservation and best practice management to achieve a range of demand management objectives.

The preferred option set out in the draft Future Water Project 2060 takes into account the estimated water savings from ongoing demand management initiatives across the region.

It also takes into account the reduction in water use from NSW Government BASIX sustainable building requirements and Ballina Shire Council's dual-reticulation non-potable water reuse scheme.

Additional actions of implementing the recommendations of the 2019 *Water Loss Management Plan*¹⁰ and the smart metering review, stemming from the current *Regional Demand Management Program*, are explored in [Sections 4.1.1 and 4.1.2](#) respectively.

¹⁰ Detection Services Pty Ltd, Rous County Council, Water Loss Management Plan, Bulk Water Supply and Reticulation, August 2019.

3.4 Recycled water

There are two main forms:

3.4.1 Direct non-potable reuse (constituent council responsibility)

Direct non-potable reuse can only be used for certain non-drinking purposes.

It involves supplying treated wastewater directly to properties via a dedicated reticulation system (purple-coloured pipes and taps).

This recycled water cannot be used for cooking, showers, baths, hand basins, personal washing, recreational activities (e.g. playing under a sprinkler) nor topping up rainwater tanks or swimming pools.

Both Ballina Shire and Byron Shire Councils are progressing with the implementation of direct non-potable recycled water reuse across their CBDs and in Ballina's case across new residential areas in Ballina and Lennox Head. The reduced potable consumption as a result is already being considered in the future demand forecasts.

3.4.2 Indirect potable reuse (Rous and constituent council responsibility)

Indirect potable reuse is a form of purified recycled water that can be used for all drinking and non-drinking purposes. It involves taking treated effluent from a wastewater treatment plant and putting it through an advanced water treatment process.

This recycled water is then released into an existing, natural water source (groundwater aquifer or dam) to be further treated at an existing drinking water treatment plant and eventually distributed to the community as part of the existing water supply network.

Council's investigations into new water source options have focused on indirect potable reuse.

The main reasons for this are:

1. Indirect potable reuse can be used for all drinking and non-drinking purposes as well as replenishing natural water sources in drinking water catchments, rather than only reducing demand on current water supplies through limited non-drinking uses.
2. Indirect potable reuse does not require the construction and operation of a dedicated reticulation system.
3. Direct non-potable reuse already forms part of Council's Regional Demand Management Plan (see Section 3.3).

However, there are a number of reasons why indirect potable reuse is currently not considered a viable solution for securing the region's long-term water supply, including:

- Significant implementation and operational costs, particularly in relation to the advanced treatment systems needed and pumping requirements.
- Large energy demand.
- Wastewater treatment plants are scattered across the region – as such many recycled water treatment systems would be needed, rather than one centralised system.

- Significant regulatory and planning requirements mean the approvals process would be lengthy, costly and uncertain, especially given there are no indirect potable reuse schemes operating in NSW.
- Safety of the water produced needs to be rigorously tested and validated, meaning identifiable non-potable uses of this water is ideally required, while this process is undertaken.
- Broad community acceptance would likely be needed.
- Vast amounts of wastewater are required to produce small amounts of usable water. Significant challenges managing concentrated waste streams generated by this process would also occur, especially for inland schemes.

Despite these challenges, the position of Council, as resolved in June 2020 (24/20), is that direct potable reuse (purified recycled water) should one day form part of drinking water supplies throughout NSW.

Council is currently in discussions with the NSW and Federal Governments about potentially building a pilot recycled water scheme to supply Perradenya Estate near Lismore in a bid to try and overcome the many challenges above, as described in [Section 4.3.1](#).

3.5 Proposed Dunoon Dam

Council's preliminary investigations to date continue to show the proposed Dunoon Dam is technically viable and the most suitable solution for securing the community's water supply to 2060 and beyond.

Based on a whole-of-life assessment the proposed dam is the lowest cost option (compared to all other new water source options investigated) for securing the region's long-term water supply.

Cultural heritage and ecological concerns have always been and remain key considerations in relation to the proposed dam.

To determine whether the proposed dam could be delivered in a sustainable way that appropriately addresses these concerns, Council ultimately needs to finalise all its related investigations.

Current timelines estimate it could take at least three years to complete the detailed assessments involving planning, cultural heritage, environmental, ecological, engineering, design, survey and geotechnical still required. For a comprehensive list of Council's planned investigations, please refer to [Section 4.4](#).

It is only when these detailed assessments are completed that Council could consider whether to proceed with the next phase of the approvals process required for the dam's construction.

It should be noted that these planned investigations could reveal the proposed dam is not a suitable option.

4. STRATEGIC DIRECTION

In response to the key considerations outlined in [Section 3](#) of this report, the Future Water Project 2060 reflects the combination of actions Council considers necessary to ensure it continues developing a diversified portfolio of water supply options to meet the region's water security needs.

The combination of actions required as part of the Future Water Project 2060 are:

- A. Immediate** action to increase the system's secure yield from 2024.
- B. Ongoing** action to continue reducing water demand per connection.
- C. Innovative** action to pioneer the use of purified recycled water in NSW.
- D. Investment** actions to determine the proposed Dunoon Dam's all-round viability.

4.1 Immediate actions

The current *Regional Demand Management Plan* has identified two key projects for adoption - implementation of the Rous Water Loss Management Plan (WLMP) and smart metering.

4.1.1 Water Loss Management Plan

A WLMP was developed in August 2019 for Rous, which noted that Rous has an infrastructure leakage index (ILI) of 1.02, putting it in Band A1 of the World Bank Institute classification. The International Water Association recommends for Band A1 (ILI<2) – "Further loss reduction may be uneconomic unless there are shortages; careful analysis is needed to identify cost effective improvement".

While this is a great result that has highlighted the ongoing commitment to water loss reduction within Council, further investment in areas such as metering, pressure management and active leak detection could further reduce water loss within the bulk network. A comprehensive program has been developed within the Rous WLMP for implementation over four years with a total project estimate of \$1.9M.

4.1.2 Smart metering

Currently manual reading of customer water meters is undertaken on a quarterly basis and while this may be adequate for billing requirements, it provides limited information for Rous and the customer on actual water use behaviour and leakage.

A smart metering pilot project was undertaken during 2014 to 2017 with ten businesses who were considered high water users (greater than 5ML/a). The project was successful in obtaining water savings of between 10 to 15% for those businesses who were adequately engaged and motivated.

As outlined in the Regional Demand Management Plan (RDMP), a study was undertaken in 2018/2019 to review technologies and suppliers for smart metering infrastructure and software. The RDMP contemplated developing a business case for the roll-out of smart metering across the region. Unfortunately, some of the constituent councils have proceeded with their own roll-out of smart metering, so the option of a cohesive regional approach is no longer available.

A smart metering project has been developed for Council's 2,000 retail customers with a total project cost of \$1.1M and an implementation period of two years. Tender specification development would occur during the first half of 2021 with implementation commencing in 2021/2022.

Even though a fully integrated regional smart metering approach is no longer possible, it is proposed that the General Manager write to each of the constituent councils to advise of Rous' intended approach with its 2,000 retail customers and invite their participation for a roll-out from 1 July 2021. Given the distribution of Rous' customers across much of the region, there are likely to be efficiencies in sharing communication infrastructure (at a minimum) if the constituent council chose to join in that area.

Further to the smart metering project, a project with Richmond Valley Council has been identified to extend the smart metering installation to Woodburn and surrounding areas to better inform planned bulk water main augmentation within the area. The demand and consumption data that would come from this project would better inform this augmentation and may allow the deferral of the augmentation for several years with an estimate deferral of \$2.1M.

Smart metering for Rous retail customers, in conjunction with the actions within the WLMP, represent the best value for money opportunities to further reduce water loss within the Rous bulk water network.

4.1.3 Marom Creek Water Treatment Plant and Alstonville groundwater site

Upgrading the existing Marom Creek Water Treatment Plant ('WTP') and utilising existing groundwater infrastructure at Alstonville provides the quickest and most cost-effective option for Council to increase the system's secure yield from 2024.

4.1.4 Marom Creek WTP upgrade

The Marom Creek WTP is currently owned and operated by Ballina Shire Council.

Ballina Shire Council currently uses the WTP to supply a population of about 830 people with a maximum demand of up to 550 kL a day.

The WTP has a capacity of 2.9 ML a day.

The existing plant has the capacity to supply the area currently serviced by Ballina Shire Council until 2036, however the plant requires upgrading in order to meet water quality targets.

An assessed of the yield of the regional bulk supply system with Marom Creek water supply found that the secure yield would increase by 417 ML/a with Wardell demand, and when augmented with Alstonville groundwater sites, the secure yield would increase to 1467 ML/a.

Discussions with Ballina Shire Council have commenced with two key models under consideration and currently being developed - asset transfer and leasing of Marom Creek WTP. Ballina Shire Council resolved at its 27 August 2020 meeting to progress discussions with Rous in this regard.

4.1.5 Alstonville groundwater site

This source augmentation action involves utilising the existing Marom Creek WTP to treat additional groundwater from the Alstonville bore field.

The existing Alstonville bore field, owned by Council, consists of two production bores (one at Lumley Park and one at Convery's Lane), which extract groundwater to augment supply during dry periods.

This option proposes that the bore at Lumley Park be retained while the bore at Convery's Lane would be replaced with a new deeper bore adjacent to the existing bore.

It also proposes the construction of a standby bore at Elvery Lane to provide operational security.

The existing Marom Creek surface water supply would be blended with the groundwater supply from the three bores in the Alstonville area.

Cost savings would be achieved by utilising the existing Marom Creek WTP and an existing pipeline to transfer groundwater to the WTP.

A new pipeline from the Marom Creek WTP to Wollongbar reservoir would be required to allow the supply to Wollongbar and Alstonville.

The yield benefit in 2060 of the Alstonville groundwater option is 916 ML a year.

4.1.6 Contingency option – Woodburn groundwater coastal sand scheme

The Woodburn groundwater coastal sand scheme development is a contingency in the event that the Marom Creek WTP and Alstonville groundwater sites are not secured.

There is an historical bore supply at Woodburn in the coastal sands aquifer which augments the supply to the Lower Richmond River supply area (Woodburn, Broadwater, Evans Head and Coraki) during dry periods.

This portion of the project would consist of constructing three new production bores, adding to the existing bore at the site, and a new 5ML/d water treatment plant. The treated water would then be transferred to the existing Lower Richmond River supply system. This scheme is not preferred as the whole of lifecycle costs are equivalent in value to Marom Creek WTP and Alstonville groundwater scheme. The supply zone demand for water is lower, making the benefits of this scheme less favourable.

4.2 Ongoing action: Enhanced demand management and water efficiency program

Ensuring water is used wisely and helping the community reduce its water use through established demand management programs will always form part of Council's water supply security response.

As noted in Section 3.3.3 of this report, due to Council's current demand and secure yield forecasts, investment in new water sources cannot be continuously deferred and eventually a new water source will be required to meet the region's long-term water needs.

Importantly, Council's ongoing implementation of enhanced demand management initiatives (in conjunction with the **immediate actions** described above) as part of the Future Water Project 2060 will not only continue to deliver water savings, but is critical in providing Council the time and opportunity to:

- a) Develop the Perradenya Estate pilot purified recycled water scheme (see [Section 4.3 – Innovative action](#) below); and
- b) Undertake the specialist studies and other detailed assessments required to determine whether the proposed Dunoon Dam is an all-round viable solution (see [Section 4.4 – Investment action](#) below).

4.2.1 Development of enhanced demand management strategies

A comprehensive review will need to be undertaken of demand management programs as well as emerging demand management trends across relevant jurisdictions, together with a detailed analysis of the relative costs and benefits of various water efficiency measures.

This review would include those measures highlighted by the community as part of the recent public exhibition period for the draft Future Water Project 2060.

As a result of this review, a further suite of measures – in addition to those already in place – will be developed for consideration to form the next regional demand management plan.

This action involves expanding Council's already successful, ongoing demand management actions as part of its recurrent *Regional Demand Management Plan*.

Any additional enhanced demand management measures that Council eventually implements will ultimately need to be:

- Based on better defined governance arrangements for Rous across the region.
- Evidence-based.
- Subject to prior, successful pilot testing programs.
- Able to address the issue of demand hardening by providing further water savings over and above those already being achieved through the Regional Demand Management Plan.
- Based on the exploration and identification of innovative methods of engagement with the community on water efficiency and conservation.

4.3 Innovative action: Perradenya Estate pilot purified recycled water scheme

Council's Perradenya residential estate comprises 168 lots on a 70-hectare site located south-west of Lismore.

To date, 108 lots within the Perradenya Estate have been developed.

Council has a longstanding commitment to provide the Perradenya Estate with access to a recycled water supply system.

Producing recycled water for use throughout the estate has always formed a key part of its ecologically sustainable development model.

Through the Future Water Project 2060, Council has the opportunity to lead the way in developing the potential use of purified recycled water as an additional drinking water source – not only for its regional bulk supply, but also the rest of NSW.

4.3.1 Pilot scheme development

In June 2020, Council resolved to progress discussions with the NSW Government and Southern Cross University in relation to delivering a pilot recycled water supply scheme at the Perradenya Estate.

Ultimately, partnering with the NSW Government and Southern Cross University would give Council access to the funding and expertise needed to successfully deliver the scheme.

At this stage, Council will continue to seek up to \$4 million in Government funding assistance to build a pilot treatment plant.

Council would contribute a further \$6 million needed to build the plant, with Southern Cross University providing in-kind support by way of its expert academics.

It is proposed to initially construct and operate a pilot plant to supply the Perradenya Estate to test the treatment equipment's capability to produce purified recycled water of a drinking standard.

Should regulatory approval and community support be gained, the pilot plant's purified recycled water would then be supplied for use throughout the Perradenya Estate.

To overcome the challenges outlined in [Section 3.4.2](#) above, the objectives of the pilot plant and, if approved, the pilot supply scheme include:

- Early and ongoing community engagement – prior experience with recycled water schemes illustrates the critical importance of engaging the community to sustain acceptance of purified recycled water.
- Demonstrate safe operating protocols to assist development of the regulatory framework.
- Implement an evidence-based process (including socioeconomic assessments) that drives a culture of transparency and community acceptance.
- Understand emerging health risks (such as with antimicrobial resistance) and continuously improve sustainable treatment options (for energy and nutrient recovery) as well as risk management approaches whilst providing national guidance.
- Demonstrate improved understanding of the design and multiple barrier processes involved in the treatment train that delivers purified recycled water of acceptable quality.
- Embed feedback mechanisms from users to define acceptable quality, socio-economic outcomes and appropriate water safety management oversight.
- Incorporate the results of the pilot scheme into systems analysis of the Northern Rivers region to understand the economic and environmental values of purified recycled water schemes.

- Provide a better understanding of regional water security given climatic and demographic change scenarios, along with the potential regional health and well-being improvements the pilot scheme is expected to bring.
- Deliver rigorous testing and validation that provides the essential data needed before significant investment is considered in large-scale purified water recycling plants and the wider use of purified recycled water for drinking purposes (both regionally and across NSW).
- Engage with all relevant NSW agencies to both consider not only a quantitative and qualitative public risk assessment and comprehensive waste stream management framework.

At this stage, it is expected construction of the pilot recycled water treatment plant would take up to 18 months to complete. The verification and approval process is expected to take a minimum 10 years.

However, the start of construction would depend on the timeline for funding discussions with Government.

4.4 Investment action: Detailed assessment of the proposed Dunoon Dam all-round viability

The outcome of the IWCM is that the proposed Dunoon Dam delivers the most cost-effective, long-term solution for securing Council's regional bulk water supply. It is prudent as part of the Future Water Project 2060 to invest the time and resources to determine the dam's overall viability at this time.

To determine whether a new Dunoon Dam is an all-round viable solution, data gaps and project risks still need to be addressed via a number of detailed assessments. This phase is expected to be completed during the 2022/23 financial year.

These detailed assessments would be completed prior to Council consideration of a decision on whether to formally proceed with the statutorily mandated environmental planning assessment and approvals process (which would include an Environmental Impact Statement) required for the dam.

By taking the **immediate** and **ongoing actions** described above as part of the Future Water Project 2060, Council will be able to invest the necessary time to ensure:

- Assumptions about the dam are made on sufficient evidence.
- Conclusions about the dam's impacts are substantiated and justified.
- Impact assessments can identify well-defined mitigation and offset measures that do not represent a significant risk of failure.

Should the detailed assessment of the proposed dam show it is not an all-round viable solution, the implementation of the project's **immediate** and **ongoing actions** will also ensure Council has ample opportunity to develop another new source option – especially if the project's **innovative action** is successful.

5. BUDGET

5.1 Current financial year budget requirements

To ensure that Council can commence with the detailed assessments and consultation as outlined in this report, a budget of \$200,000 for the remainder of 2020/21, from restricted reserves is recommended.

Table 3 summarises the required actions and associated budgets to progress the detailed assessments for the Dunoon Dam as a part of the Future Water Project 2060.

Table 3 2020/21 financial year budget – Future Water Project 2060

Cultural heritage consultation	\$100,000
Other investigations and assessment including associated staff costs	\$100,000
2020/21 Financial Year - Dunoon Dam Detailed Assessments Project budget	\$200,000

All future budgets for the Future Water Project 2060, including the detailed assessments required, will be developed through the Integrated Planning and Reporting process.

5.2 Impact on Long Term Financial Plan (LTFP)

5.2.1 Introduction

Various financial scenarios are presented in an abbreviated form based on current financial and engineering estimates. The focus is to show the different price paths on constituent council's bulk water contributions should Council adopt the IWCM as recommended in this report.

The modelling to date has focused on three main variables:

1. Construction costs,
2. Loan borrowing terms, and
3. Government grants.

5.2.2 Primary assumptions

The scenarios focus on the Bulk Water Fund of Council operations only, as this is the Fund that will finance the new water source. The LTFP model is designed to forecast 30 years in advance however the focus for this report is from 2022 to 2032. This is because the main financial issue with the Dam option is positioning Council to pay loans associated with the Dam construction within this time frame. Also, the broader forecast capital works beyond this time has a lower level of maturity that will improve over time.

The different scenarios shown in Table 4 all include numerous assumptions. Information is provided on those assumptions considered to be the most influential on the outcomes of the models. The comments are primarily in relation to the Future Water Project 2060 rather than a multitude of other activities residing within Bulk Water Fund.

Operating Income: The primary income source is from constituent council contributions. It has been assumed that there will be no change to the current method of calculating and levying the contributions raised against each Council.

Operating Costs: Standard operating expenses are incremented annually by a cost-of-living adjustment of 2%.

Dam operating costs are estimated to commence at \$580,000 in 2032. Once the Dam is operational the existing operational mix of existing sources will change. It has been estimated that due to the revised operational status of these water sources, expenses will decrease by \$1.6 million in 2033.

5.2.3 Loans

Existing Loans: Council currently pays just over \$4 million annually in capital and interest loan repayments. All existing loans will be repaid by 2027. This is a significant point in the modelling because it means that the impact of new loans on the price path is significantly reduced, as just before Council must commence repayment of new loans for the Future Water Project 2060, a \$4 million reduction in annual expenses occurs.

Loan Rates: Key assumptions affecting the model are the estimated percentage of the loan rate and timing of the drawdown.

This is because the model assumes borrowings in 2025 and 2030.

The current model requires further refinement, as in reality, Council would likely secure access to a loan facility and interest expense would only apply once funds are drawn, which would be over several years. This means that the current model should be conservative in this respect.

A loan interest rate of 3.5% has been selected for the 2025 loan and 3.95% for the 2030 loan. The modelling assumes an increase to rates over the medium term, consistent with advice from Council's banking relationship executives based on where the (futures) market is expecting rates to be in 5 and 10 years' time. The LTFP uses a maximum ten-year fixed rate, regardless of the length of the loan. Ten years fixed allows both Rous and constituent councils to set medium term budgets and it caps market risk over a term that is significantly less than the total length of the loan. To assist comparison between the options, all scenarios use the same estimated loan rates.

It is worth reiterating that borrowing of this size will require sophisticated financial engineering at the time.

Capital Expense: Current estimates have the Dam total cost at \$220 million reflecting 2020 dollars. These costs are converted to future dollars based on an annual 3% increase, compounded. The figure of 3% has been chosen because historically the cost of construction is at least 1% higher than a typical cost of living increase.

Capital Income: Unless it is associated with the Dam construction and is noted in Table 4, there are no capital grants included in the models. This is a conservative approach as it is likely that Council will receive government grants for some of the other capital program. For example, there are indications that grant funding will be available for the Marom Creek upgrade.

Developer contributions, which are Council's second largest income stream, are estimated to remain similar to current figures plus an allowance for annual cost increases.

5.2.4 Scenarios

The scenarios presented below are based on the length of time that loans are taken out to finance all preliminary and construction costs plus whether any Government grant funding is received.

Table 4 shows the forecast Constituent Council contribution price path on a compounded percentage basis.

It then estimates the effect the price increase will have on the cost per kilolitre (kL) of bulk water supplied to the constituent councils.

Finally, the third section of the table shows the interest cost relating to Future Water 2060 loans.

Table 4: Estimated price path of Bulk Water

Scenario	Compounded Percentage Increase to contributions 2022 to 2032 incl			Cost of Bulk Water/kl in 2032			Total Interest cost of Dam Loans		
	No Grant Income %	25% Grant Income %	50% Grant Income %	No Grant Income \$	25% Grant Income \$	50% Grant Income \$	No Grant Income \$	25% Grant Income \$	50% Grant Income \$
40 year loans	72.4	61.2	50.7	2.96	2.77	2.59	256 M	188M	119M
30 years loans	79.1	66.0	55.2	3.07	2.85	2.66	185 M	135M	86M
20 year loans	93.2	75.7	62.9	3.31	3.01	2.79	118 M	87M	55M

Notes

1. To assist comparison the cost of Bulk Water in 2021 is \$1.71/kL
2. Compounded percentage interest increase to contributions includes cost of living adjustment (2%).
3. Grant income percentages are based on the estimated total Dam cost.
4. Loan cost refers to the combined cost of loans taken out for Dam detailed preliminary expenses in 2025 and construction in 2030.

Table 4 shows that the contribution price path is minimised for the first ten years by raising loans over an extended period. For example, a forty-year loan results in a price increase of 72.4% to 2032 compared to 93.2% for the 20-year loan. This is because contribution income must be raised much higher to meet the 20-year loan repayment.

However, the interest cost of the forty-year loan is over double that of the 20-year loan. Also, it has been assumed that the loan interest rates will be reset to market every 10 years which may impact contribution price paths at that time.

The modelling indicates that the largest amount of pressure on the price path will be over the next decade. This is because in this time frame contributions need to be elevated to pay for loan repayments associated with the Future Water Project 2060 and other projects in the works program. In addition to the Dam, the works program over the next 10 years includes capital works of over \$75 million.

It is pointed out that the external borrowings have been kept consistent for 'no' grant income scenarios and similarly each of the 25% and 50% grant options. This has been done to assist comparison but, by changing the borrowing amount you can increase or decrease the price path. For example, borrowing more than is immediately required will ease the price path.

Forecasts indicate that once contributions are elevated to meet the initial cost of new Future Water Project 2060 loans the price increases required in the 2020's will not be necessary in the 2030's. Clearly this is subject to numerous variables including the future capital works program beyond 2032 and the reduction of existing operating expenses following the optimisation of existing current water sources assisting the price path in the 2030's.

So, one of the primary issues for Council to determine should the dam proceed will be whether to take longer term loans and minimise the contribution price path and spread the burden over two or more generations. This approach will enhance intergenerational equity but will come at a higher loan interest cost. Council has received advice that the financial markets would (most likely) provide a forty-year loan for the Dam.

5.2.5 Other scenario comments

Due to the extent of the borrowing all scenarios predict that Council will have operating deficits for several years, however once depreciation is eliminated a cash surplus will be achieved. Indeed, the forecast suggests that cash will be accumulated in the 2030's.

Operating deficits will gradually cease, and a surplus will occur as the capital portion of loan repayments increases and the interest cost decreases.

Similarly, various ratios, such as the debt service cover ratio, will not achieve benchmarks for an extended period. However, Council will remain sustainable as recurrent income will be sufficient to satisfy forecast expenditures.

6. CONSEQUENCES OF NOT ADOPTING THE IWCM

An IWCM is a framework to identify water security problems, address those problems, determine the appropriate management responses and manage the impacts of the problems so that social, environmental and economic objectives are met.

An IWCM is necessary to obtain a *section 60* Ministerial approval under the *Local Government Act 1993* to undertake certain water supply works.

A secure water supply is critical to ensure the regional community's health and quality of life as well as a sustainable environment and continued economic prosperity.

Council is responsible for effectively managing the bulk water supply to ensure it has the capacity to meet the region's needs now and well into the future.

Managing the increasing pressure on the water supply from variable climate patterns as well as population and economic growth are critical issues.

Due to Council's current demand and secure yield forecasts, investment in new water sources cannot be continuously deferred and eventually a new water source will be required to meet the region's long-term water needs.

Not addressing these water security impacts through the adoption of the IWCM has the potential to force Council to:

- Try and develop new water sources with inadequate time and increased costs, resulting in unfavourable operational conditions and return on investment.
- Carry out costly emergency drought works with potentially detrimental environmental impacts.

- Implement longer and more severe water restrictions that significantly impact the community, local businesses, including tourism and industries as well as overall regional investment.

In addition, Council will also need to consider the development of a land management strategy for Council-owned land in the proposed Dunoon Dam catchment.

7. CONCLUSION

Council is in an enviable position of having a variety of water security options available. An integrated mix of viable water supply options is necessary to ensure the region is well-prepared. Due to Council's current demand and secure yield forecasts, investment in new water sources cannot be continuously deferred and eventually a new water source will be required to meet the region's long-term water needs.

The draft Future Water Project 2060 provides the most suitable IWCM strategy to respond to the critical water security challenges facing Council.

The revised IWCM strategy has been developed based on the outcomes of, and issues raised by, the implementation of Council's previous IWCM strategy (the Future Water Strategy) adopted in 2014.

This includes extensive investigations into groundwater, water reuse and desalination, which ultimately showed these new water source options are not viable solutions for securing the region's long-term water supply – even if delivered in conjunction with Council's ongoing demand management initiatives.

The majority of community feedback received during the public exhibition period focused on the proposed Dunoon Dam water source option. The purpose of the process was to inform the community of the options considered and the progress made since the Future Water Strategy adoption in 2014.

It is important to remember that the draft Future Water Project 2060 provides a viable mix of integrated water supply security management options for either implementation, development or further investigation.

The revised IWCM strategy recommends taking immediate action to utilise and upgrade existing infrastructure so that more groundwater can be sourced from Alstonville and then treated at the Marom Creek WTP. Council resolved at its June 2020 meeting (24/20) to:

.....

4. *Authorise the General Manager, as the first key action, to progress discussions with Ballina Shire Council, in relation to the Marom Creek Water Treatment Plant and associated groundwater infrastructure, including the approval of the associated budget as outlined in the report.*
5. *Authorise the General Manager to commence the development of the Woodburn coastal sands groundwater scheme as an alternative to Recommendation 4, if Council is unable to secure the Marom Creek Water Treatment Plant and associated groundwater infrastructure before 31 December 2020.*

Since then, Council management has met with Ballina Shire Council staff and are further progressing discussions regarding asset transfer and leasing options.

This immediate action ensures Council can maintain short-term regional water security from 2024.

The IWCM also recommends the ongoing implementation of enhanced demand management initiatives to continue saving water and prolong available water sources. In relation to development options, the revised IWCM strategy recommends taking innovative action to develop the Perradenya Estate pilot purified recycled water scheme.

The revised IWCM strategy recommends undertaking detailed assessments to determine whether the proposed Dunoon Dam is an all-round viable solution. Council will need to make a decision before progressing to any statutorily mandated environmental planning assessment and approval processes (which would include an Environmental Impact Statement) required for the proposed dam.

Should the detailed assessment of the proposed dam show it is not an all-round viable solution, the implementation of the IWCM strategy's immediate and ongoing actions will also ensure Council has ample opportunity to develop another new source option.

For the implementation, development and further investigation of the IWCM strategy's portfolio of water supply security management options to commence, Council needs to adopt the revised IWCM set out in this report.

Phillip Rudd
General Manager

Attachments

- A. Rous Regional Supply: Future Water Project 2020 – IWCM: Assessment of Augmentation Scenarios
- B. Rous County Council: Future Water Plan 2060 – public exhibition outcomes

Submission key theme – alternative options to the preferred FWP2060 Strategy	Staff comment
Pricing mechanisms	<ul style="list-style-type: none"> • There was a high level of support for an inclining pricing strategy for town water customers, however the majority of the region’s residential water customers are already subject to such a pricing policy. • An alternative drought pricing policy was also suggested, however there is no mechanism currently available in the NSW Government’s <i>Best Practice Framework</i>. • Whilst price has a direct impact on water demands, this option by itself is not a satisfactory solution to meet future demands for water.
Re-use/ recycling/ stormwater harvesting/ indirect potable re-use	<ul style="list-style-type: none"> • Most of these options have already been considered through Council's IWCM process and documented in the <i>Future Water Strategy 2014</i>. • These source augmentation options have either been ruled out as they cannot be practically implemented (legislative barriers) or are more expensive than the two nominated scenarios. • Many of these options could be viable as a supplementary option, should Council prefer groundwater, as its long-term source augmentation strategy.
Water tanks (large scale deployment of rainwater tanks)	<ul style="list-style-type: none"> • While there was a high level of support, especially amongst those that are not connected to the town water supply, better community awareness of current NSW planning requirements is needed – especially the State-based BASIX requirements for greater water efficiency for new residential buildings. • In addition, there needs to be better community understanding of the practical limitations of such a strategy as well as consideration of the impacts on town water customers created through the increased burden of maintenance and other associated costs. • The other potential options, such as localised stormwater management, are the responsibility of the individual constituent councils, with each having a different approach in addressing these issues.
Demand Management (reference to UTS Institute of Sustainable Futures advice)	<ul style="list-style-type: none"> • The alternative Demand Management approach raised in the submissions does not align with previous advice received by Council. • Independent advice commissioned on the plan elements indicated that Pilot programs are recommended for residential program elements to further define potential water savings, costs, and implementation risks prior to any change to the current Demand Management Plan. • Non-residential programs are delivered under the existing Sustainable Water Partners Program. • Consideration could be given to increasing the current level of investment to increase customer uptake and to provide a more hands-on approach to customer audits. However, a cost-benefit analysis is recommended.

Submission key theme – alternative options to the preferred FWP2060 Strategy	Staff comment
	<ul style="list-style-type: none"> • The most prospective elements of the plans are not within Rous' control and will require significant support and action from constituent councils. • Historically, Rous performs well in delivering elements of the Demand Management Plan under its control, but significant challenges exist when a united regional approach is needed, especially given the level of investment recommended and where there is conflicting advice on the benefit of program elements. • The Level of Service change suggested in the submissions does not align with information in the Future Water Strategy and does not account for changes over time. The Level of Service criteria is set by NSW agencies. Any changes to these criteria run a greater risk of implementing critical water supply measures and incurring significant costs from all levels of governments during severe droughts.
Desalination for coastal communities	<ul style="list-style-type: none"> • The most likely desalination site is in the same demand centre as the most prospective groundwater resource area, creating an unsuitable duplication of source options. • Desalination is a more expensive option than groundwater, without offsetting carbon emissions from the power needs. If groundwater is preferred as a long-term water supply option, desalination remains a viable supplementary option to that strategy.
Restrict population growth	<ul style="list-style-type: none"> • It is clear that numerous submissions had strong preferences for growth restrictions, however, existing Federal, State and Local government policies enable population growth within the regional supply area. • Rous does not have any authority to make policy decisions regarding land re-zonings, building approvals or population restrictions in the Ballina, Byron, Lismore and Richmond Valley Council areas.

Submission key theme – concerns surrounding the Dunoon Dam proposal	Staff comment
Ecological damage (including rare / protected flora and fauna)	<ul style="list-style-type: none"> • This is a key consideration for this proposal. • Further investigations are needed to consider the potential offset options and review further opportunities to reduce the impacts associated with the project. Once completed, Council would be in a better position to consider its preferred direction.
Impacts on Aboriginal cultural heritage and inconsistent with Reconciliation Action Plan	<ul style="list-style-type: none"> • This is another key consideration for this proposal. • Rous acknowledges the Widjabal/Wia-bal people's deep relationship with the land and water, and strongly values their traditional laws, knowledge and lessons about places and sustainability. Rous is committed to the reconciliation process. • It is critical that Rous undertake meaningful and committed engagement with the Traditional Custodians to inform both current and future management of areas held by Council. As this continues, Council will be in a better position to consider a preferred direction.
Loss of environment flows (ecological impact)/ water quality issues	<ul style="list-style-type: none"> • Previous investigations indicate that with nominated actions and recommendations these issues can be adequately addressed. • Further assessments are recommended to ensure that a broader range of aquatic species are contemplated in any further preferred environmental flow release strategy.
Will increase cost of water	<ul style="list-style-type: none"> • This is another key consideration for this proposal. • Several submissions contain incorrect or unsupported claims about the increased cost to the region's bulk water supply. • Section 5 of the report contains analysis on the likely increases that would occur should the Dunoon Dam proposal form part of the region's water supply. • The most likely alternative long-term strategy to secure the region's water supply, has a higher whole of life cost. These costs are related to the operation and maintenance of these alternative source options which cannot be recovered through external grants and subsidies.
Operational and construction noise and impacts	<ul style="list-style-type: none"> • Future assessment would be required to determine that the preferred proposal can meet the respective planning approval requirements. • Should the project proceed, these short-term impacts need to be adequately assessed and mitigated.
Population increase does not justify the scale of the proposed dam	<ul style="list-style-type: none"> • Rous relies on the planning strategies developed at the Constituent councils. • Recently the NSW government updated some of its projections, however this information has not been deemed suitable by the region's councils and their respective Local Strategic Planning Statements have relied on other sources of information.

Submission key theme – concerns surrounding the Dunoon Dam proposal	Staff comment
	<ul style="list-style-type: none"> Rous has taken a precautionary approach and has projected lower growth than what has occurred over the last 20 years.
Dam is ‘old’ thinking / sustainability leadership opportunity for RCC	<ul style="list-style-type: none"> Surface water systems supply most of the water to town water customers in NSW. Many other water supply authorities are augmenting their surface water systems to address the issues of a growing population and to mitigate some of the effects of climate change.
Council’s climate change modelling does not represent current conclusions from other studies	<ul style="list-style-type: none"> Rous’ modelling for the effects of climate change are based on the current NSW Government guidelines. Recently, some NSW Departments and Agencies are transitioning to another modelling approach. However, the underlying climate models have not substantially changed and based on advice from these Departments, Rous’ current results are unlikely to change significantly.
Increased local flood risks	<ul style="list-style-type: none"> This concern is based on observations in a resource model that was undertaken as a part of the initial Dunoon dam environmental flows report. Due to the limitation of this type of analysis, the report recommended that Council should consider undertaking specific flood modelling. If undertaken, this flood assessment would examine a range of flood events using more detailed information and will use a much finer time-step to understand the actual flood peak magnitude. These assessments would be undertaken in accordance with the Australian Rainfall and Runoff Guidelines.

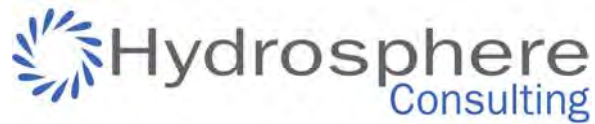
Technical investigations and studies completed

Future Water Project 2060 reports and documents

- *Future Water Project 2060*: Information for the community about the preferred options for securing the region's water supply (Rous, 2020)
- Rous County Council Future Water Plan 2060 Public exhibition outcomes (Vaxa, 2020)
- Regional Demand Management Plan: 2019 – 2022 (Hydrosphere Consulting, 2018)
- Rous County Council Desalination Investigation (GANDEN, 2020)
- Rous Regional Supply: *Future Water Project 2060* Integrated Water Cycle Management Development: Assessment of Augmentation Scenarios (Hydrosphere Consulting, 2020)
- Future Water Strategy Course Screening Assessment of Options (Hydrosphere Consulting, 2020)
- Demand Forecast: 2020 – 2060 (Hydrosphere Consulting, 2020)
- Future Water Strategy Ground Water Schemes and Whole of Life Cycle Costings – Report B (Jacobs, 2020)
- Preliminary Feasibility Report Investigation of Water Reuse as an Additional Water Source (CTW, 2020)

Future Water Strategy 2014 reports and documents

- Future Water Strategy: Water security for our future (Rous, 2014)
- Future Water Strategy consultation report (The Comms Team, 2014)
- Stakeholder engagement report (The Comms Team, 2013)
- Integrated Water Planning Process (MWH, 2014)
- Demand forecast (Hydrosphere Consulting, 2013)
- Desalination study (GeoLINK, 2011)
- Groundwater investigations (Parsons Brinckerhoff, 2011)
- Geotechnical investigations (NSW Public Works, 2013)
- Cultural heritage (Ainsworth Heritage, 2013)
- Aquatic ecology (Eco Logical Australia, 2012)
- Environmental flow assessment (Eco Logical Australia, 2012)
- Terrestrial ecology (SMEC, 2011)



Rous Regional Supply:

Future Water Project 2060

Integrated Water Cycle Management
Development: Assessment of Augmentation
Scenarios

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20-017: ROUS FUTURE WATER PROJECT 2060

REV	DESCRIPTION	AUTHORS	REVIEW	APPROVAL	DATE
0	Draft for RCC review	R. Campbell, K. Menzies	M. Howland	M. Howland	1 June 2020
1	Minor edits	R. Campbell		R. Campbell	5 June 2020
2	Public exhibition	R. Campbell		R. Campbell	9 June 2020

EXECUTIVE SUMMARY

The Rous Future Water Project 2060 identifies new water supply sources to ensure long-term water supply security for the region. This project builds on extensive investigations undertaken by Rous County Council (RCC) over the last few decades to identify potential source augmentation options and enable selection of a preferred long-term strategy. This report documents the outcomes of detailed investigations undertaken regarding potential source augmentation options and implementation scenarios.

Future demand predictions have been developed from the growth predicted in the region. The dry year demand for water at 2060 is predicted to be between 16,000 ML/a and 16,700 ML/a, an increase of approximately 5,000 ML/a over current (2020) dry year demand. The water supply demand has been compared to the secure yield of the system (13,350 ML/a) which has shown that a new water source will be required from 2024. The yield deficit is predicted to be 5,630 ML/a at 2060.

A coarse screening assessment considered a range of new as well as previously identified supply options. The following options passed the coarse assessment and are discussed in detail in this report:

1. Dunoon Dam (20 GL – 50 GL).
2. Connection to Marom Creek WTP (upgraded) with or without local groundwater supplies.
3. Groundwater harvesting – Woodburn, Tyagarah, Newrybar and Alstonville.
4. Desalination.
5. Indirect potable reuse (treated wastewater from constituent council wastewater treatment plants transferred to RCC surface water supplies).

A summary of the options is provided in the following table.

Table 1: Summary of source augmentation options

Option	Yield benefit (2020 – 2060) ML/a	Net present value (NPV, 2020 \$, 80 years @ 5%)	NPV (2020 \$, 40 years @ 5%) per ML secure yield ¹
20 GL Dunoon Dam	7,179	\$204,346,000	\$15,000
50 GL Dunoon Dam	15,057	\$234,597,000	\$27,300
Marom Creek WTP	198	\$24,562,000	\$111,600
Woodburn (5.0 ML/d)	698	\$55,817,000	\$73,400
Newrybar (7.2 ML/d)	1,883	\$98,567,000	\$49,700
Tyagarah (12.5 ML/d)	3,448	\$146,240,000	\$38,200
Alstonville (4.0 ML/d)	916	\$44,110,000	\$43,700
Desalination (10 ML/d)	1,550	\$84,663,000	\$51,000
Indirect potable reuse (10 ML/d)	1,272	Not estimated	Not estimated

1. Calculated from the 40-year NPV @ 5% and the yield benefit at 2060.

This report compares two potential source augmentation scenarios to provide water security to 2060:

- Scenario 1 – Groundwater (with Marom Creek). Scenario 1 includes the connection of Marom Creek WTP to the Rous regional supply in the short term with staged implementation of groundwater schemes and treatment plants until the required supply yield is achieved.
- Scenario 2 – Dunoon Dam. Scenario 2 includes the connection of Marom Creek WTP to the Rous regional supply in the short term with construction of a new dam at Dunoon. Scenario 2A considers a 20 GL dam designed to allow for future augmentation to 50 GL (expected to be required at approximately 2080). Scenario 2B considers a 50 GL dam. Both scenarios include initial implementation of the Marom Creek and Alstonville groundwater options. The Dunoon Dam scenarios include the upgrade of Nightcap WTP in 2034 from 70 ML/d to 100 ML/d.

RCC has developed these two scenarios as they are the only combinations of feasible options that passed the coarse screening and can provide the required secure yield over the long term. The staging and secure yield for each scenario are shown in the following figures compared to the dry year unrestricted demand forecast.

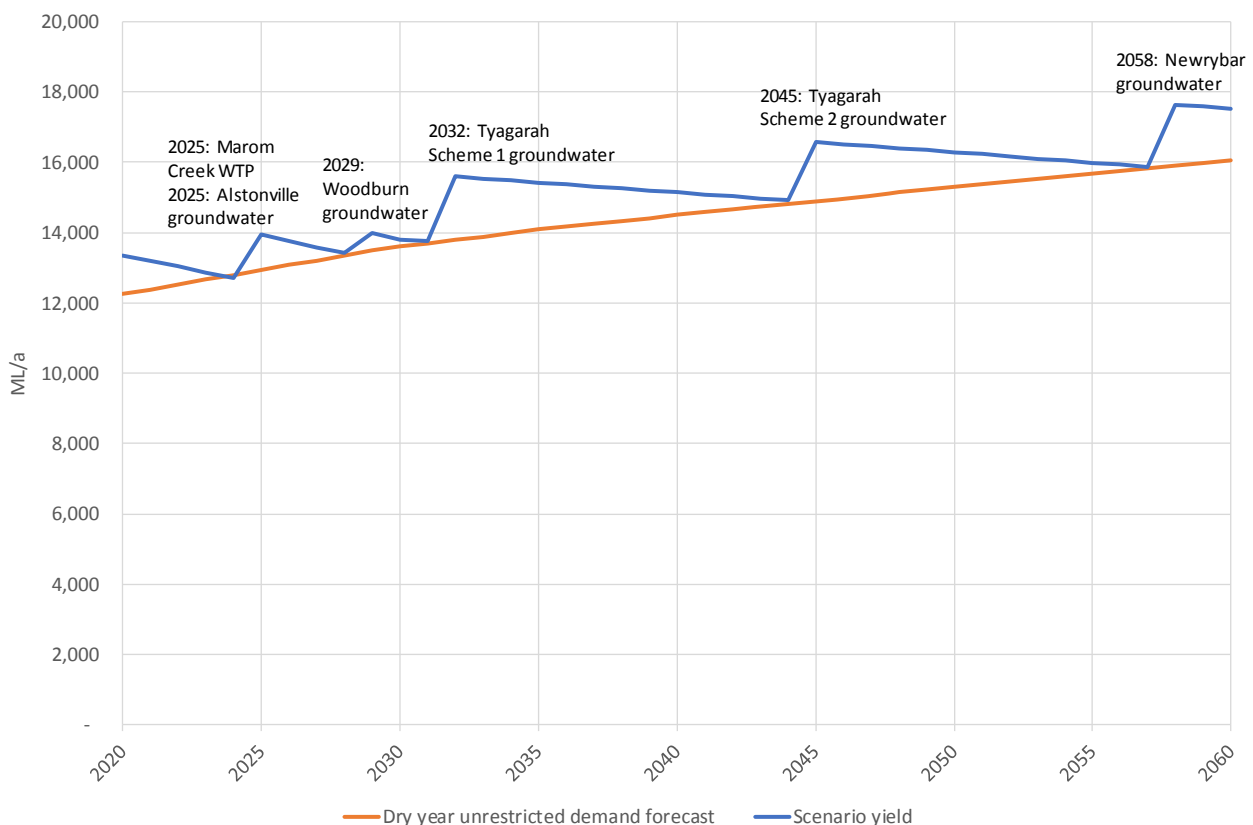


Figure 1: Secure yield and staging for scenario 1: Groundwater

The groundwater schemes identified for Scenario 1 will be able to meet demand until approximately 2072 assuming a similar rate of growth in demand is experienced beyond 2060.

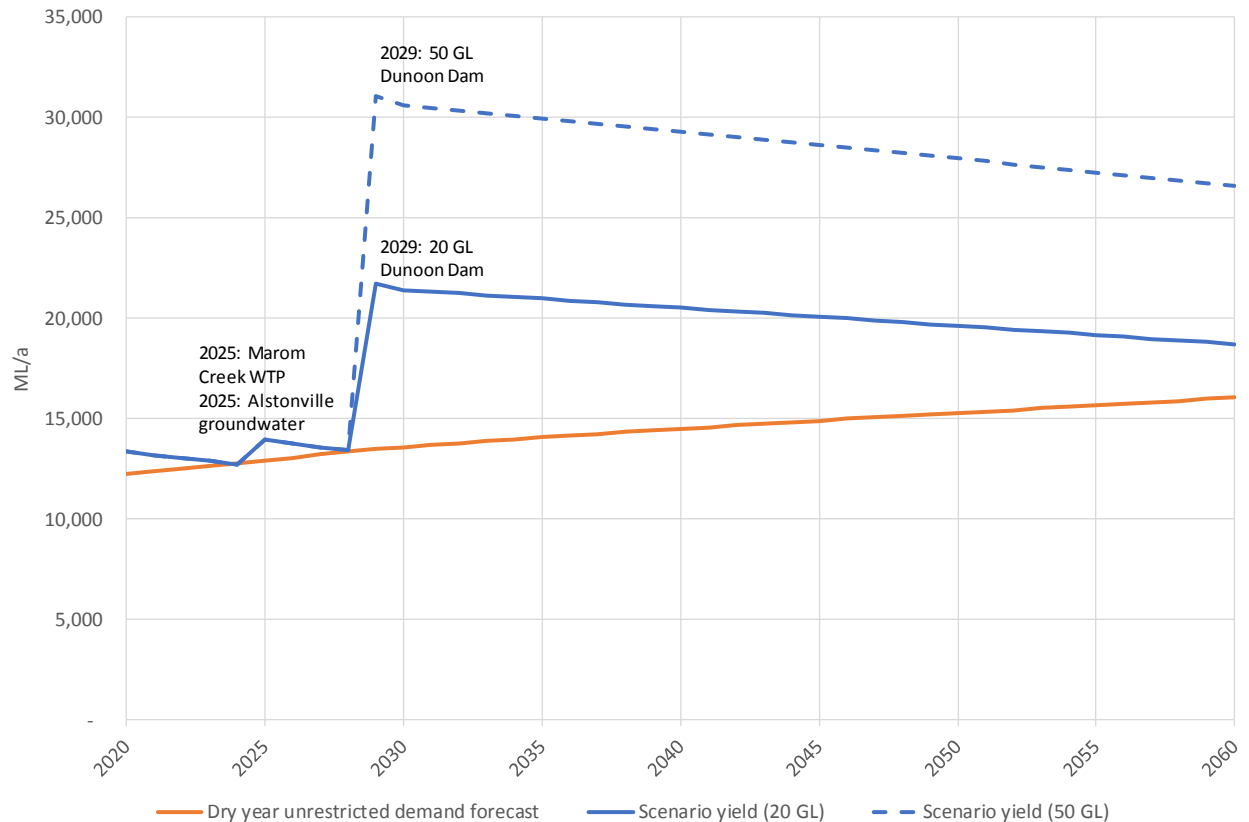


Figure 2: Secure yield and staging for scenario 2: Dunoon Dam

Scenario 2A (20 GL Dunoon Dam) would require augmentation to the 50 GL dam in approximately 2080 assuming a similar rate of growth in demand is experienced beyond 2060 and assumptions about future yield are realised. The 50 GL Dunoon Dam (Scenario 2B) will be able to meet demand until approximately 2115.

Whole of life and NPV cost estimates for the water supply scenarios are shown in the following table.

Table 2: Scenario cost estimates

Component	Scenario 1: Groundwater (2020 \$)	Scenario 2A: 20 GL Dunoon Dam (2020 \$)	Scenario 2B: 50 GL Dunoon Dam (2020 \$)
Whole-of-life (80 years)	\$836,397,007	\$619,141,183	\$658,907,966
NPV (80 years @ 5%)	\$195,922,792	\$242,778,718	\$267,518,613
NPV (40 years @ 5%)	\$169,299,256	\$228,151,363	\$252,602,785
Yield benefit (2020 – 2060)	4,170	5,370	13,249
NPV/ML secure yield (40 years)	\$40,597	\$42,484	\$19,066

The scenarios have also been compared using a multi-criteria analysis (MCA) considering environmental, social and financial outcomes. A summary of MCA outcomes is provided in the following table.

Table 3: Summary of MCA outcomes

Scenario	Environmental score (/5)	Social score (/5)	Total score (per \$ NPV)	Rank (based on MCA)
1: Groundwater	3.05	3.50	16.2	1
2A: Dunoon Dam (20 GL)	2.65	1.98	9.9	2
2B: Dunoon Dam (50 GL)	2.30	1.65	7.8	3

Based on the MCA, the most favourable scenario is groundwater. The groundwater scenario has a lower NPV (lower initial capital cost but higher and increasing recurrent costs with implementation of each stage) as well as less significant environmental and social impacts. However, the groundwater scenario has a higher whole-of life cost (total cost over 80 years in present dollars) and a higher NPV per ML of secure yield as shown in Table 2. Implementation of the groundwater scenario will require ongoing investigations (and associated costs and problem-solving) for the four groundwater schemes.

Although the MCA is informative, it is focussed on the 2060 planning horizon and RCC should consider longer-term issues such as potential source options beyond that timeframe and financial commitment and funding requirements imposed by the schemes. Dams have a long design life and there is excess secure yield in the Dunoon Dam options well beyond the 2060 timeframe considered by this study. When the long-term yield benefit provided by the scenarios is considered, the 50 GL dam option (with high initial cost and lower recurrent costs) with the higher yield benefit is more cost-effective. Although there is a large upfront investment, the dam options can provide long-term certainty and cost efficiencies. The largest dam for the given physical constraints, with planned staging and upgrades, provides only a small incremental risk over the smaller dam. There is a trade-off between the high initial cost and environmental/social impact of the dam and the long-term cost-effectiveness and certainty provided.

Implementation risks have been identified in this report for both scenarios. RCC should continue to conduct detailed investigations for its preferred scenario and address these risks. Although the yield information suggests that definitive action is required in the short-term, adaptive management approaches should also be identified.

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1. INTRODUCTION

Rous County Council (RCC) provides bulk water to four local water utilities (LWUs) on the far north coast of NSW, servicing the urban areas of the following constituent council local government areas (LGA):

- Ballina Shire Council (BaSC), excluding Wardell and surrounds.
- Byron Shire Council (BySC), excluding Mullumbimby.
- Lismore City Council (LCC), excluding Nimbin.
- Richmond Valley Council (RVC), excluding Casino and all land west of Coraki.

RCC also provides water supply services to rural and urban connections direct from the bulk supply trunk main system (retail customers).

The Rous Future Water Project 2060 identifies new water supply sources to ensure long-term water supply security for the region. This project builds on extensive investigations undertaken by RCC over the last few decades to identify potential source augmentation options and enable selection of a preferred long-term strategy. This report documents the outcomes of detailed investigations undertaken regarding potential source augmentation options and implementation scenarios. The scenarios have been compared using a multi-criteria analysis considering environmental, social and financial outcomes.

2. BACKGROUND

2.1 History of Strategy Development

In 1995 RCC adopted the following long-term water supply strategy after investigation of a range of options and consultation with stakeholders:

1. Implementation of demand management strategies to promote efficient water use among consumers (implemented through the Regional Demand Management Plan).
2. Promotion of alternative water supply initiatives, such as dual reticulation of recycled water in new urban developments (implemented through the Regional Demand Management Plan).
3. Development of the Wilsons River Source (WRS), drawing freshwater from the upper limits of the Wilsons River tidal pool, upstream of Lismore.
4. Nomination of the proposed Dunoon Dam, to be developed if and when required to maintain water supply security following the implementation of the other options.

Detailed investigations into options for Dunoon Dam, a concept design, environmental and cultural heritage assessments commenced in 2008 and were completed in 2013 (refer Section 7). Public consultation undertaken at the time indicated that the community's preference was for RCC to consider the future water supply issues more broadly before proceeding with Dunoon Dam. As a result, RCC commenced work on the Future Water Strategy (FWS). The available information at that time indicated that existing water supplies would be sufficient to meet annual demand until 2024 and by 2060 there would be a likely secure yield shortfall of approximately 6,500 ML/a (considering climate change). The background information and the decision-making process for the development of the FWS were captured in the integrated water planning (IWP) process (MWH, 2014). The integrated planning approach involved (MWH, 2014):

- Identification of future water management issues over a long-term planning horizon.
- Development of strategy assessment triple-bottom-line objectives and criteria in response to the water management issues.
- Assessment of options and scenario development in order to address the water management issues.
- A participatory approach with stakeholder feedback.
- Recognition of future uncertainties and implementation risks, requiring ongoing monitoring and review.

The FWS was adopted in 2014 with three key actions – demand management, increased use of groundwater and potentially water re-use. Since the adoption of the FWS, RCC has undertaken extensive investigations into groundwater as an additional source. These studies included extensive reviews and consultation with stakeholders to identify appropriate groundwater investigation areas as well as conducting groundwater drilling programs (refer Section 9). These studies found that groundwater sources investigated in Newrybar (coastal sands), Woodburn (coastal sands) and Dunoon (fractured rock aquifers) will require higher cost than previously estimated, additional treatment and may not be as reliable as assumed in the FWS IWP process. In addition, the *Water Sharing Plan for the North Coast Fractured and Porous Rock Groundwater Sources* excludes additional aquifer access licences in the Alstonville Basalt Plateau groundwater source as the long-term average annual extraction limit is less than existing water requirements. Potential groundwater schemes have been further investigated as part of the Rous Future Water Project 2060 (refer Section 9).

2.2 Demand Management

Demand management has been an integral part of planning and management of water supply assets and ongoing supply management in the region since 1995 and these initiatives have been successful in reducing water demand. The demand per connection has decreased with these water conservation measures as well as pay-for-use pricing and water restrictions imposed during the 2002/03 drought. In recent times, the rate of reduction in per connection consumption has reduced as the level of water conservation in the community already achieved means that there is less opportunity for further reduction in consumption. Although further reduction in per connection demand is likely to be more difficult to achieve in the future, the water utilities in the region are committed to responsible water use and ongoing reduction in demand. Enhanced demand management initiatives presented in the FWS were reviewed in 2018 to build on the successes of previous demand management initiatives and continue to deliver comprehensive and effective water conservation programs throughout the region. The Regional Demand Management Plan (RDMP, Hydrosphere Consulting, 2018b) describes the water supply demand management initiatives to be implemented by RCC and its constituent councils between 2019 and 2022. Demand management actions adopted in the plan area are as follows:

- Monitoring, evaluation and reporting.
- Water loss management.
- Sustainable water partner program (businesses and community groups).
- Smart metering.
- Recycled water.
- Rainwater tank rebates.
- Community engagement and education – households, schools and high residential water users.

2.3 Specialist Studies

As part of the Rous Future Water Project 2060, specialist studies have been undertaken to further investigate the following source augmentation options:

- Groundwater supplies.
- Indirect potable reuse.
- Desalination.
- Dunoon Dam.

A revised demand forecast (Section 0) and assessment of secure yield of the above options were also undertaken. The findings of these studies are documented in this report.

2.4 Regional Investigations

2.4.1 Northern Rivers Regional Bulk Water Supply Study (2013)

In 2013, the Northern Rivers Regional Organisation of Councils (NOROC, now the Northern Region Joint Organisation) developed a long-term (50-year) regional water supply strategy in order to evaluate the potential benefits to future water supply security resulting from a regionally integrated system. The study (Hydrosphere Consulting, 2013b) investigated numerous interconnection and supply scenarios to identify options that warrant further investigation in future stages of the strategy development. To progress the development of a regional water supply strategy, the study recommended various investigations including:

- Regional investigations that are specific to the regional approach and would require cooperation between the Local Water Utilities (LWUs, RCC; Tweed Shire Council, TSC; Kyogle Council, KC; BaSC, BySC, LCC and RVC).
- Strategic planning including yield studies, monitoring, water loss management and demand management.

The 2013 study found that major additional water supplies will be required to meet the growth in demand within the RCC bulk supply area and the TSC Bray Park system and actions to address the yield deficit in these systems have not yet been finalised. TSC is pursuing investigations relating to the raising of Clarrie Hall Dam and the drought security connection to South-east Queensland (SEQ) water link. RCC's priority from the FWS was the investigation of groundwater supplies and more recently, the potential for indirect potable reuse or the Marom Creek (Wardell) water supply to partially meet water supply needs within the bulk supply area (refer Section 8).

The 2013 study concluded that a regional approach may provide improved financial outcomes through economies of scale as well as access to a wider range of options to improve efficiency, system resilience and operational flexibility. The interconnection of RCC and TSC systems is considered to be a major component of a true regional approach. The potential non-regional supply options (raising Clarrie Hall Dam, SEQ link and groundwater supplies) have not yet been developed to a point where the future TSC and RCC supplies can be considered secure. TSC has confirmed that its current priority is the investigations for the raising of Clarrie Hall Dam and an emergency connection to SEQ water grid, with the resulting augmented supply expected to be sufficient to 2046. A review of the action plan (Hydrosphere Consulting, 2018a) found that the recommendations of the 2013 study in relation to interconnection of the RCC and TSC systems were still considered to be appropriate, even if they are not implemented in the short-medium term.

2.4.2 Toonumbar Dam

Local councils have been in discussions with Water NSW during 2019 about the potential to access additional releases from Toonumbar Dam. Utilisation of water from Toonumbar Dam is generally low as existing licence holders do not fully exhaust their entitlements as unregulated surface water and groundwater sources are also available and these are preferred by the major water users due to lower water usage charges. Licence holders use from 55 to 950 ML/a from Toonumbar Dam (Hydrosphere Consulting, 2020b). Anecdotal evidence suggests that surface water licences are currently used as a drought security measure. During summer 2019/20, the level in Toonumbar Dam was very low which is attributed to increased use of Toonumbar Dam licences and low inflows.

Toonumbar Dam has 3,000 ML/a of available general security supply which is predicted to be equivalent to 1,250 ML/a of high security town supply (Hydrosphere Consulting, 2020b). However, it is not possible to convert existing water entitlements to town water supply licences under the existing Water Sharing Plan for the Richmond River. The Water Sharing Plan is due for review and update by June 2022.

WaterNSW is currently undertaking modelling to confirm the available capacity for allocation of additional extraction licences as part of the 20-year infrastructure options study and the NSW Government may consider options involving increased use of Toonumbar Dam for town water supply as part of that study. Options involving raising of Toonumbar Dam and increased access to water for town water supply needs are potentially viable source augmentation options for the RCC regional supply although there is insufficient information available at present to pursue these options (refer Section 6).

3. EXISTING BULK WATER SUPPLY

The RCC bulk and retail water supply transfer network is shown on Figure 3. The supply network extends from Ocean Shores in the north and Byron Bay in the east, west to Lismore and south to Evans Head. Surface waters are the primary water resource utilised by RCC although there are also some groundwater sources available for use during dry periods (Table 4). The principal component of the RCC bulk supply is Rocky Creek Dam (RCD) situated 25 km north of Lismore near the village of Dunoon. Water from RCD is treated at the Nightcap Water Treatment Plant (WTP) and is distributed through three trunk mains owned and operated by RCC. One trunk main supplies treated water to Lismore and to the Richmond Valley area. The other two mains supply Byron Bay and Ballina Shires. Water from the WRS upstream of Lismore is pumped directly from the Wilsons River to the Nightcap WTP for filtration and distribution to consumers. Water from Emigrant Creek Dam (ECD) is treated at the Emigrant Creek WTP and is distributed to supplement supplies to Ballina and Lennox Head.

Table 4: RCC raw water sources

Details	Rocky Creek Dam	Emigrant Creek Dam	Wilsons River Source	Converys Lane bore	Lumley Park bore	Woodburn bores
Water Source ¹	Terania Creek	Alstonville Area	Wyrallah Area (Wilsons River)	Bangalow Groundwater	Alstonville Groundwater	Richmond Coastal Sands
Source Type	Large in-stream storage	Large in-stream storage	Run-of-river abstraction	Groundwater extraction	Groundwater extraction	Groundwater extraction
Storage capacity	14,000 ML	820 ML	-	-	-	-
Area served	Lismore City, Richmond Valley, Ballina and Byron Shires	Ballina and Lennox Head	Lismore City, Richmond Valley, Ballina and Byron Shires	Alstonville, Wollongbar	Alstonville, Wollongbar (dry periods)	Woodburn, Evans Head, Broadwater (dry periods)
Water Treatment	Nightcap WTP (68 ML/d)	Emigrant Creek WTP (7.5 ML/d)	Nightcap WTP	Chlorination	Chlorination	Chlorination
Licence entitlement	12,358 ML/a ²	2,620 ML/a ²	5,400 ML/a ²	150 ML/a ³	530 ML/a ³	242 ML/a ⁴

1. As specified in the relevant Water Sharing Plan.

2. Water Sharing Plan for the Richmond River Area Unregulated, Regulated and Alluvial Water Sources (2010).

3. Water Sharing Plan for the Alstonville Plateau Groundwater Sources (2003).

4. Not subject to a Water Sharing Plan.

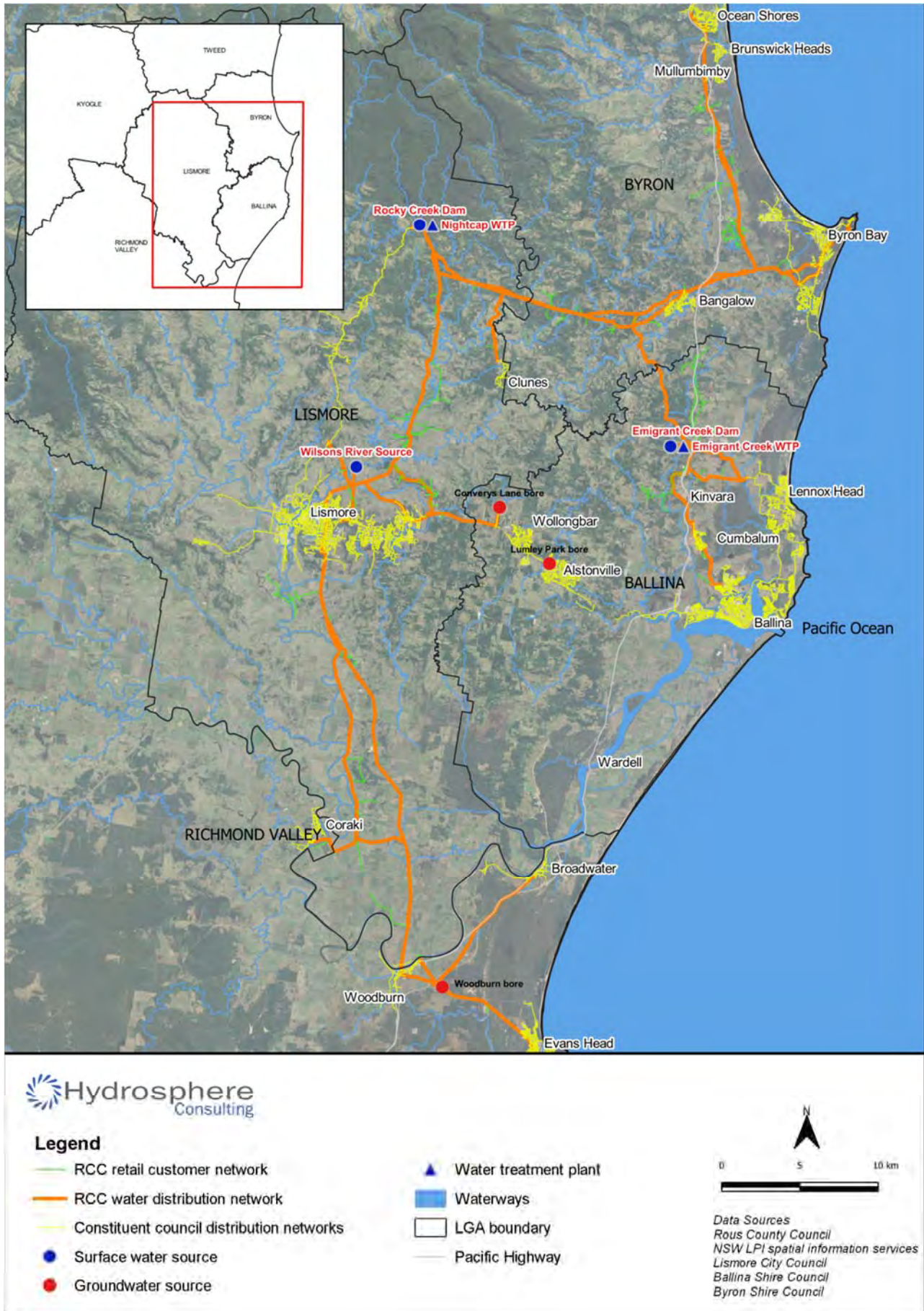


Figure 3: Regional bulk supply network

Table 5 summarises the current operating rules for the regional supply which are based on RCD storage levels.

Table 5: Bulk water supply operating rules

RCD supply level (% of full supply volume)	Status	Source Usage
100%	Normal Operation	RCD only
95%		Start WRS and ECD
60%	Dry Period Operation	Start Woodburn bores, Converys Lane bore
30%		Start Ballina Shire Council's plateau bores
20%	Emergency Operation	Start emergency supply source
15%		
10%		

4. DEMAND FORECAST

RCC previously developed a long-term water supply demand forecast as part of the development of the 2014 FWS (Hydrosphere Consulting, 2013a). The demand forecast has been updated as part of the Rous Future Water Project 2060 (Hydrosphere Consulting, 2020a).

The Rous regional bulk supply currently services 41,870 connected residential properties and 5,110 connected non-residential properties (total 46,980 connections). By 2060, the Rous regional bulk supply is predicted to serve 57,560 connected residential properties (based on estimated lot yields) and 9,360 connected non-residential properties (total 66,920 connections). The Rous regional bulk supply currently produces 11,300 ML/a (five-year average). The predicted average demand per connection has been estimated for each connection type in each supply area. Dry year demand per connection has also been estimated based on climate correction of the bulk supply demand.

Future demand predictions have been developed from the growth predicted in the region (two growth scenarios for Ballina Shire and one growth scenario for other supply areas as provided by the constituent councils) and predicted water loss reduction (nil savings – using current water losses and savings predicted by the council water loss management plans) as follows:

- Demand Scenario 1A: Revised forecast dry year demand (estimated Ballina lot yield, current water losses).
- Demand Scenario 1B: Revised forecast dry year demand (upper estimated Ballina lot yield, current water losses).
- Demand Scenario 2A: Revised forecast dry year demand (estimated Ballina lot yield, reduced water losses).
- Demand Scenario 2B: Revised forecast dry year demand (upper estimated Ballina lot yield, reduced water losses).

The dry year demand for water at 2060 is predicted to be between 16,000 ML/a and 16,700 ML/a, an increase of approximately 5,000 ML/a over current dry year demand. The four demand scenarios are compared to the 2013 forecast demand in Figure 4.

The annual demand in each five-year period for each scenario (current supply area) and the local supply areas are provided in Table 6.

RCC has indicated that water loss reduction actions will be implemented, therefore Scenario 2A will be used for future water supply planning.

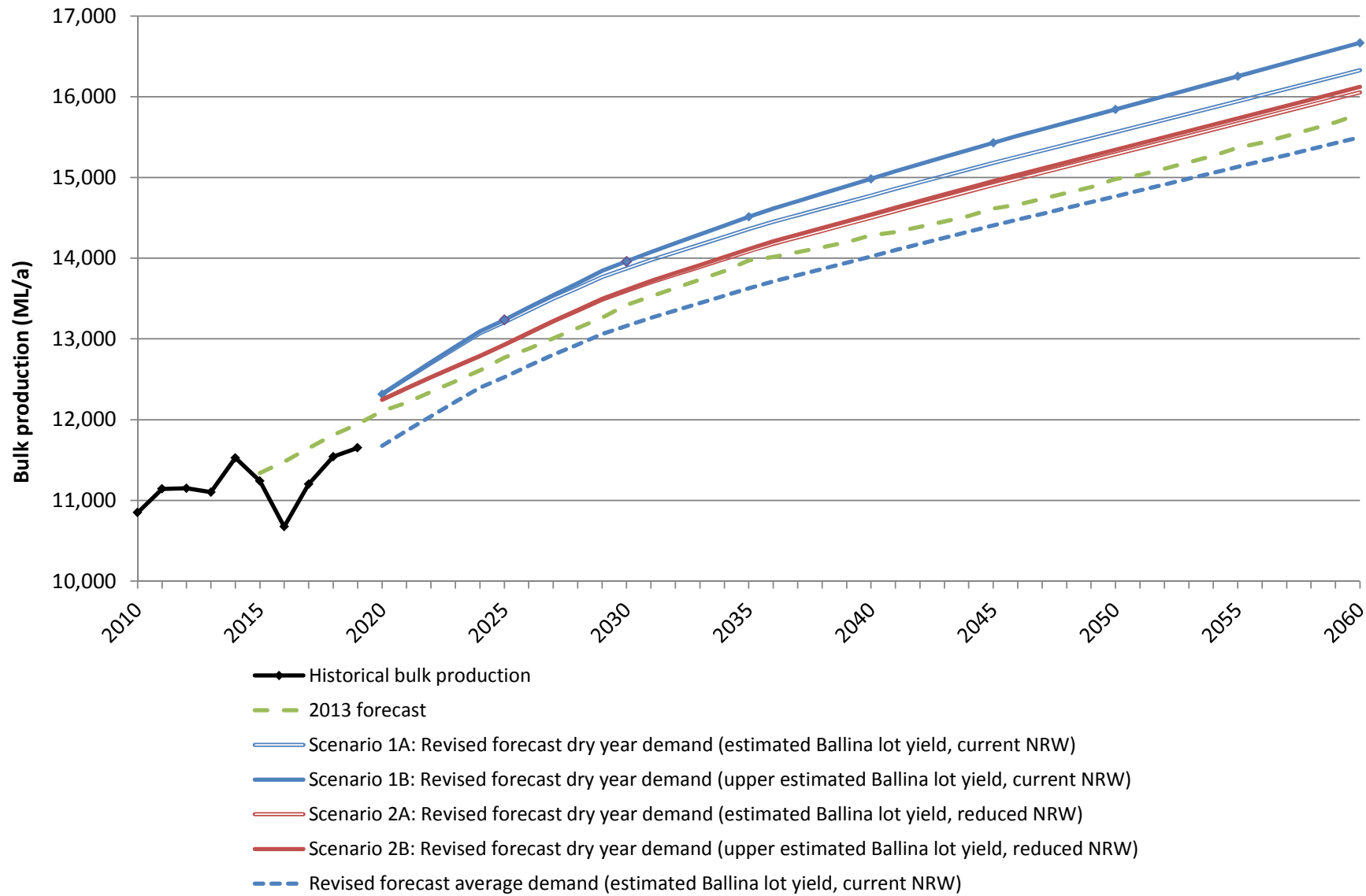


Figure 4: Forecast demand (bulk production) scenarios and comparison with the 2013 forecast – Rous bulk supply area

Table 6: Demand forecast scenarios – Rous bulk supply area (ML/a)

Scenario	2020	2025	2030	2035	2040	2045	2050	2055	2060
<i>Existing bulk supply area</i>									
Scenario 1A: Revised forecast dry year demand (estimated Ballina lot yield, current water losses)	12,315	13,208	13,872	14,359	14,775	15,179	15,560	15,943	16,328
Scenario 1B: Revised forecast dry year demand (upper estimated Ballina lot yield, current water losses)	12,319	13,236	13,959	14,512	14,982	15,429	15,842	16,253	16,667
Scenario 2A: Revised forecast dry year demand (estimated Ballina lot yield, reduced water losses)	12,247	12,925	13,595	14,084	14,500	14,905	15,286	15,669	16,054
Scenario 2B: Revised forecast dry year demand (upper estimated Ballina lot yield, reduced water losses)	12,247	12,930	13,610	14,112	14,540	14,954	15,342	15,731	16,121

5. SECURE YIELD

5.1 Secure Yield Methodology

The current NSW Security of Supply Methodology in NSW has been in use for over 25 years and modelling approaches have been developed to determine the secure yield based on this methodology. The security of supply basis has been designed to cost-effectively provide sufficient storage capacity to allow a water utility to effectively manage its water supply in future droughts of greater severity than experienced over the past 100 or more years. 'Secure yield' is now defined as the highest annual water demand that can be supplied from a water supply headworks system while meeting the '5/10/10 design rule'. This rule dictates that water restrictions must not be too severe, not too frequent, nor of excessive duration, hence under the NSW Security of Supply requirement, water supply headworks systems are normally sized so that:

- a) Duration of restrictions does not exceed 5% of the time; and
- b) Frequency of restrictions does not exceed 10% of years (i.e. 1 year in 10 on average); and
- c) Severity of restrictions does not exceed 10%. Systems must be able to meet 90% of the unrestricted dry year water demand (i.e. 10% average reduction in consumption due to water restrictions) through simulation of the worst recorded drought, commencing at the time restrictions are introduced.

This enables water utilities to operate their systems without restrictions until the volume of stored water approaches the restriction volume. If at this trigger volume, the utility imposes drought water restrictions which reduce demand by an average of 10%, the system would be able to cope with a repeat of the worst recorded drought, commencing at that time, without emptying the storage. Water security is achieved if the secure yield of a water supply is at least equal to the unrestricted dry year annual demand (NSW Office of Water, 2013).

Estimating the yield of a headworks system involves two stages:

- Stream flow estimation: Developing an appropriate sequence of stream flows for the water sources; and
- System behaviour modelling: Modelling the behaviour of the headworks system subject to operating constraints using the stream flows to assess what demand subject to reliability or security criteria can be satisfied.

Consideration also needs to be given to possible impacts of climate change. Draft *Guidelines on Assuring Future Urban Water Security* (NSW Office of Water, 2013) provide guidance to NSW local water utilities on assessing and adapting to the impact of variable climatic patterns on the secure yield of urban water supplies. The methodology in these guidelines enables local water utilities to estimate their future secure yield taking into account the expected impact of future climatic patterns.

Determining the impact of climate change on the secure yield of a water supply system involves two modelling steps:

- Modification of daily rainfall and evapotranspiration data and calibrated rainfall-runoff models to produce climate changed daily stream flows; and
- The daily climate changed streamflow, rainfall and evapotranspiration are input into the water supply system simulation models to determine climate changed secure yields.

The methodology has been developed from a pilot study (Samra and Cloke, 2010) which involved undertaking hydrological and system modelling to determine the impact of climate change on secure yield. The pilot study incorporates the scientific logic of the CSIRO's Murray Darling Basin Sustainable Yields

Project which used daily historical data from 1895 to 2006 and applied the relevant global climate models (GCMs) to provide projected (~2030) climate changed data for each GCM for this period.

The rainfall-runoff model is used to estimate daily stream flows for each GCM and for the historical data provided with the GCM data. The current system simulation model is used to determine the secure yield for each of the 15 GCMs, as well as for the above historical data on the basis of the 5/10/10 design rule.

Whilst the 15 GCMs represent a range of plausible climate futures for around the year 2030, there is some uncertainty which needs to be acknowledged when considering the full range of possible outcomes. The secure yield is determined for all 15 GCMs under the 5/10/10 design rule as well as the secure yield for the GCM with the lowest yield for a more severe restriction regime (10/15/25). The critical results are for:

- GCM with the median secure yield under the 5/10/10 design rule.
- GCM with the lowest secure yield under the 5/10/10 design rule.
- GCM with the lowest secure yield under the 10/15/25 design rule.

5.2 Secure Yield of Existing System

The secure yield assessment has been undertaken using the RCC Bulk Water Supply Security Model which was developed by Engeny Water Management in 2019 using GoldSim 12.1. The secure yield of the existing system for the climate experienced over the last 120 years and with 1°C climate warming is presented in Table 7.

Table 7: Secure yield – existing system

Historic climate (5/10/10)	Reduction factor	1°C climate warming
13,350	0.882	11,776

Source: Engeny (2020)

The guidelines do not specify the year to apply the yield with the climate experienced over the last 120 years, the decline in yield to the projected 1°C climate warming and the decline in yield beyond that time. The following assumptions have been made:

- The secure yield with the current climate is assumed to represent the available supply in 2020.
- The secure yield with projected 1°C climate warming is assumed to represent the available supply in 2030.
- Between 2020 and 2030, there is assumed to be a linear reduction in secure yield.
- Beyond 2030, the secure yield is assumed to reduce at a slower rate until 2060.

The dry year unrestricted demand forecast (Demand Scenario 2A: estimated Ballina lot yield, reduced water losses) is shown in Figure 5 compared to the secure yield. Figure 5 shows that the existing system yield will be sufficient to supply the dry year unrestricted demand until approximately 2024. The yield deficit at 2060 is 5,630 ML/a.

The above secure yield estimates do not consider the impact of changed environmental flow regimes as discussed in Section 5.3.

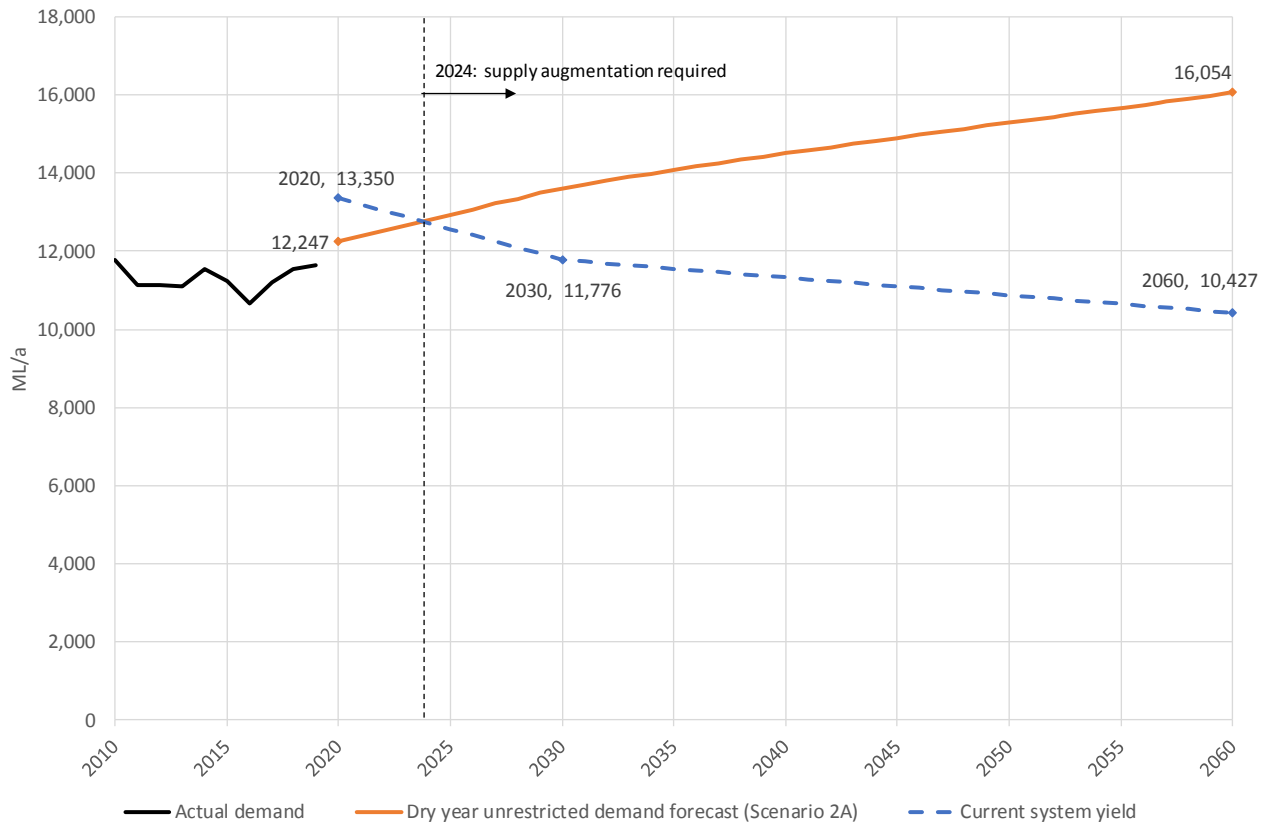


Figure 5: Comparison of existing system secure yield and demand forecast

5.3 Review of Environmental Flow Regimes

Hydrosphere Consulting (2020c) documents a review of environmental flow regimes for each existing surface water source and Dunoon Dam to identify any potential implications for the operation of the supply sources and hence determine the impact of changed regimes on the secure yield. The desktop review documents the likely extent of influence of current riverine extractions on downstream environments considering the influence of other catchment impacts on these reaches. Recommended environmental flow requirements were developed through critical review of available information, previous studies of downstream environments and the likely impacts of extraction assessed through analysis of modelled hydrological data and reference to other relevant literature. Key outcomes of the review for the existing surface water sources are summarised as follows:

Rocky Creek Dam (RCD):

- There are no currently provisions for environmental flow releases from RCD and it is not a requirement of the current water access licence. Downstream flow in Rocky Creek below the dam occurs as a result of overflows (spilling) of the dam during high flow conditions and seepage through the dam wall (approx. 0.7 ML/d). These conditions have been in place for approximately 70 years since dam construction in the early 1950s.
- RCD is having a large hydrological impact on all flow components in Rocky Creek, except for the highest flood flows (> 500 ML/d). Impacts are particularly pronounced during low flow periods occurring from late winter, through spring into early summer when the dam spills very infrequently. Previous assessments have identified that there are downstream ecological impacts due to RCD and associated water extraction and that these impacts are exacerbated by modified catchment conditions downstream of the dam (e.g. catchment clearing and altered land use leading to water quality decline and habitat degradation).

- Previous assessment of pre-determined environmental flow scenarios for RCD determined that none of the scenarios were adequate to protect aquatic ecosystems, a conclusion that is supported by the 2020 review.
- Any future environmental flow scenario for RCD would need to be formulated and justified through a robust assessment of existing environmental conditions and associated flow requirements. It is acknowledged that provision of environmental flows at RCD is likely to significantly affect secure yield of this water source and require infrastructure modifications to allow for regulation of releases and physical monitoring of dam inflows and outflows. Therefore, the environmental benefits for Rocky Creek will need to be considered holistically in comparison to the impacts of alternative source augmentation to determine an appropriate balance.

Emigrant Creek Dam (ECD):

- The current water access licence requires that when flow is entering ECD, the flow in the downstream watercourse should be equivalent to the flow entering the storage or sufficient to maintain visible flow at Tintenbar downstream of the dam, whichever is the lesser.
- Environmental flow releases at ECD occur via a water outlet pipe in the base of the dam which remains open with an estimated discharge of approximately 0.8 ML/d. This is the only current provision for environmental flow during low flow (non-spilling) periods.
- The modified hydrology as a result of ECD operations appears to be having the greatest impact on low to moderate flows in Emigrant Creek with a pronounced impact on moderate flow events which occur during late spring and early summer. During these times naturally occurring peaks in flow or 'freshes' are not passed downstream of ECD, due to dam filling after a prolonged dry period. This is expected to impact downstream water quality, overall water levels and habitat availability as well as fish passage and enhance drying of habitat and substrate. The modelling indicates that high flows and flood flows are not greatly impacted by current water supply operations and therefore impacts on channel geomorphological processes and high flow biological triggers for species are expected to be minimal in Emigrant Creek.
- The current environmental flow regime, with a minimum estimated flow of 0.8 ML/d has been in place for many years. This flow is likely to exceed natural flows at some times of the year when there is no inflow to ECD, however given the modified nature of the catchment, it is considered that this elevated baseflow during these periods is beneficial, particularly in relation to water quality, and it is likely that the aquatic environment now has some dependence on this minimum flow. Despite this, the current provision for base environmental flow at ECD of 0.8 ML/d is regarded as unlikely to be sufficient to fully protect downstream aquatic ecosystems and is likely to be leading to sub-optimal outcomes for the ecological functioning of the creek.
- It is acknowledged that the provision of more onerous environmental flows for ECD is likely to reduce overall water supply security and increase or bring forward the need for additional water supply sources. In this case, the environmental benefits for Emigrant Creek will need to be considered holistically in comparison to the impacts of source augmentation to determine an appropriate balance.

Wilson River Source (WRS):

- Environmental flow requirements for the WRS are built into the water access licence pumping rules that are based on Wilsons River flows. Abstractions from the WRS tidal pool cause changes to flow rates in the Wilsons River below the abstraction point creating a slight decrease in the rate of low to moderate flows. This causes minor upstream movements of saline water under average and low flow conditions.

6. COARSE SCREENING ASSESSMENT

The coarse screening assessment undertaken for the 2014 FWS has been updated (Hydrosphere Consulting, 2020b). The source augmentation options considered included all options from the 2014 FWS as well as new options identified since then. The outcomes of the coarse screening assessment are given in Table 8.

Table 8: Coarse assessment outcomes – supply options

No.	Option	Description	Conclusion	Result
<i>1 - Do nothing – status quo</i>				
1	River/creek raw water extraction (current system)	Existing RCC supply – RCD, ECD and WRS.	Existing sources will not meet future demand.	Fail
<i>2- Existing source augmentation</i>				
2a	Raise RCD	Raising the existing dam by up to 8 metres to a height of up to 36 metres and increasing the storage capacity from 14,000 ML to 35,000 ML. Because of the need to provide environmental flows, this would only increase the yield of the dam by about 1,200 ML/a.	High capital cost and environmental impact for low future yield.	Fail
2b	Raise ECD	Raise the existing dam.	Site geology significantly limits the height to which the dam could be raised, and the relatively small catchment area results in only a very small increase in yield.	Fail
<i>3 - Toonumbar Dam</i>				
3a	Purchasing or trading existing water entitlements from Toonumbar Dam	Accessing existing low security water entitlements within the Toonumbar regulated water source. Water would be transferred to the Casino WTP for treatment to potable standards and then pumped into the RCC supply.	RCC may be able to buy existing licences, but these would not provide the level of security required.	Fail
3b		New town water supply licence within the Toonumbar regulated water source under existing Water Sharing Plan. Water would be transferred to the Casino WTP for treatment to potable standards and then pumped into the RCC supply.	Town water supply licences are not permitted under the existing Water Sharing Plan. High security water available from Toonumbar Dam is not sufficient to meet supply deficit (estimated 300 ML/a).	Fail

No.	Option	Description	Conclusion	Result
3c	Pipeline from Toonumbar Dam or Eden Creek to Casino or RCD	Water Sharing Plan modified to allow town water supply licences.	High security water available from Toonumbar Dam is not sufficient to meet supply deficit (estimated 300 ML/a).	Fail
3d	Raising Toonumbar Dam	10 m or 20 m raising has previously been considered. Water would be transferred to the Casino water treatment plant and then pumped into the RCC supply.	Availability of high security water is unknown.	Pass
4 - Dunoon Dam				
4a	Staged Dunoon Dam (20 GL – 50 GL)	Initial 20 GL storage on Rocky Creek with provision for future raising to 50 GL. Water would be treated at Nightcap water treatment plant.	Provides long-term yield benefit. Environmental and cultural heritage impacts will need to be assessed and potentially offset.	Pass
4b	Toonumbar Dam environmental flows to offset Dunoon Dam release requirements	Operational changes may be considered by the NSW Government.	No details available. Further consideration is recommended as a complementary action with Dunoon Dam.	Pass
5 - Regional interconnection				
5a	Connection to Tweed Shire Bray Park system and Dunoon Dam	Interconnection of the Rous and Bray Park systems with source augmentation (raising Clarrie Hall Dam with Dunoon Dam).	Tweed Shire Council is planning to raise Clarrie Hall Dam as a short-term augmentation option for the Bray Park water supply and therefore does not support this option. This is a long-term (>30 years) option only.	Fail
5b	Connection to Tweed Shire Bray Park system and Toonumbar Dam	Interconnection of the Rous and Bray Park systems with source augmentation (raising Clarrie Hall Dam with Toonumbar Dam).	Tweed Shire Council is planning to raise Clarrie Hall Dam as a short-term augmentation option for the Bray Park water supply and therefore does not support this option.	Fail
5c	Connection to Casino (Jabour Weir)	Interconnection of the Rous supply with the Casino water supply sourced from Jabour Weir.	Has been considered by Richmond Valley Council to augment Casino water supply but provides insufficient yield for Rous bulk supply.	Fail
5d	Connection to Marom Creek water treatment plant	Raising of Marom Creek Weir and reinstatement of aquifer supplies and upgraded WTP to supply Alstonville/Wollongbar with excess to Lismore.	Offers diversification of surface water sources for RCC with expected secure yield of approximately 800 – 1,000 ML/a (NUWS, 2018).	Pass

No.	Option	Description	Conclusion	Result
<i>6 - Groundwater</i>				
6a	Groundwater extraction	Various groundwater supplies have been considered (reinstatement of bores at Woodburn and Alstonville, new borefields at Tyagarah, Newrybar and Alstonville)	Scheme costs are likely to be higher than first thought but localised groundwater supplies can provide a diversified supply to some areas of the bulk supply network. However, the Water Sharing Plan limits new licences in some groundwater sources.	Pass
<i>7 - Stormwater</i>				
7a	Urban stormwater irrigation	Collection and storage of urban stormwater runoff, followed by treatment and irrigation of the treated water onto open space areas.	Due to climate dependence, stormwater reuse does not provide a significant yield benefit.	Fail
7b	Non-potable urban stormwater reuse (dual reticulation)	Dedicated reticulation system to supply treated stormwater for outside use and toilet flushing within new urban development areas.		Fail
7c	Indirect potable urban stormwater reuse	Stormwater collected and transferred to an existing water treatment plant (e.g. Nightcap or Emigrant Creek) for subsequent supply to consumers.		Fail
<i>8 - Desalination</i>				
8a	Desalination	Conversion of saline water to fresh water suitable for potable use. Potentially staged desalination plant capacity.	Climate resilient water source but with significant power requirements and brine management constraints to be addressed.	Pass
<i>9 – Wastewater recycling</i>				
9a	Indirect potable reuse to surface waters	Highly treated reclaimed water supply into RCD, ECD or WRS for subsequent extraction, treatment and transfer using existing infrastructure.	Climate resilient water source. Quantity of water available has not been confirmed. NSW government policy has not been developed for planned indirect potable reuse.	Pass
9b	Dual reticulation (urban)	Dedicated reticulation system to deliver treated reclaimed water for outside use and toilet flushing within new urban development areas.	Included in Regional Demand Management Plan (Ballina Shire and Byron Bay).	Pass

No.	Option	Description	Conclusion	Result
9c	Managed aquifer recharge with treated wastewater effluent.	Intentional recharge of an aquifer under controlled conditions, either by injection or infiltration, in order to store a water source for later abstraction and use (indirect reuse), or for environmental benefits.	RCC does not currently utilise groundwater apart from emergency sources. Groundwater options including aquifer recharge may be considered feasible pending outcomes of the current studies. This will be treated as a groundwater supply option (similar to the 2014 FWS) as aquifer recharge is not an augmentation option by itself. Based on recent investigations, groundwater options are expected to be limited by location and water quality rather than quantity and therefore aquifer recharge may not be required.	Fail
9d	Potable reuse	Treating sewage effluent to produce reclaimed water of a quality that would be suitable for drinking purposes. This water would then be provided direct to consumers.	The community/regulators are unlikely to support/approve this option while other options are feasible, even though they may have a greater whole-of-life cost.	Fail

The following options were not considered in detail in the development of the 2014 FWS (due to low yield benefit and/or other risks). The findings of the original IWP process are still considered valid and these options will not be considered further in this report:

- Raise RCD.
- Raise ECD.
- Purchasing or trading existing water entitlements from Toonumbar Dam.
- Regional interconnection with Casino water supply (Jabour Weir).
- Managed aquifer recharge with treated wastewater effluent.
- Direct potable reuse.
- Stormwater reuse.

The following new options have been considered but did not pass the coarse assessment and will not be considered further in this report:

- Pipeline from existing Toonumbar Dam or Eden Creek to Casino or RCD.
- Regional interconnection with the Tweed Shire Bray Park system.

The “do nothing” option (reliance on existing surface water sources) will not form part of the long-term strategy but will be used to compare the benefits and costs of supply scenarios.

The following options passed the coarse assessment and are discussed in detail in this report:

1. Staged Dunoon Dam (20 GL – 50 GL).
2. Connection to Marom Creek WTP (upgraded) with or without local groundwater supplies.

3. Groundwater harvesting – Woodburn, Tyagarah, Newrybar and Alstonville.
4. Desalination.
5. Indirect potable reuse (treated wastewater from constituent council wastewater treatment plants transferred to RCC surface water supplies).

Options involving use of water from Toonumbar Dam will not be considered in the Rous Future Water Project as the NSW Government's infrastructure options study will not be completed within the required timeframe.

Demand management will not be considered as a source augmentation option but will be an integral part of the long-term strategy through the implementation of the RDMP (Section 2.2).

7. OPTION 1: DUNOON DAM

7.1 Concept Design

The Dunoon Dam site is located on Rocky Creek downstream of the existing RCD. The site is approximately 2.5 km west of the village of Dunoon. The dam would store inflows from its catchment up to the existing RCD and from spills over the RCD spillway. Water from Dunoon Dam would be pumped to the Nightcap WTP and subsequently used for town water supply throughout the RCC service area.

Three possible dam types were considered in an Options Study (Public Works Dams and Civil, 2013a). The two options considered viable were:

- Earthfill type embankment across the creek with an excavated spillway in the left abutment.
- Roller compacted concrete gravity structure where spill flows are accommodated over the central part of the wall into the creek below.

Although the roller compacted concrete dam would involve a much larger haulage of materials from off-site locations, it requires a significantly smaller footprint on the site, reducing both the physical and visual impact on the local environment and was therefore preferred in the Options Study. A concept design for a 50 GL roller compacted concrete has been prepared (Public Works Dams and Civil, 2013b) including:

- A roller compacted concrete gravity structure with a 30 m wide central overflow spillway.
- A concrete dissipator at the toe of the spillway to collect spill flows and prevent erosion of the foundation and potential undermining of the dam wall.
- An intake structure attached to the upstream face of the wall with facilities for selective withdrawal of water from the storage.
- A conduit located in the creek bed under the dam wall, used initially for creek diversion during construction and then converted to a permanent outlet pipe connecting the base of the intake structure to the valve house immediately downstream of the dam.
- A valve house structure housing the main guard valves and downstream discharge valves as well as the main branch line to the adjacent raw water pumping station.
- A concrete dissipator at the downstream end of the valve house to accommodate outlet flows and avoid erosion of the foundation.
- A pumping station and associated equipment to enable the transfer of raw water from the toe of the dam to existing water mains at Dorroughby.
- 8 km long rising main from the pumping station to Dorroughby.
- 3.3 km of new access road (including two bridges) plus 9 km of upgraded road.
- Power supply, electrical and telemetry facilities.

A 50 GL storage provides a full supply level (FSL) at RL 82.25 mAHD. The maximum flood level (MFL) is at RL 90.02 mAHD with the dam crest level at RL 90.60 mAHD which allows for appropriate freeboard as required by the NSW Dams Safety Committee (Public Works Dams and Civil, 2013b).

A 20 GL storage has also been investigated as a possible staged approach to construction of the dam (Public Works Dams and Civil, 2013c). As for the 50 GL arrangement, the 20 GL dam would incorporate a concrete gravity structure with a 30 m wide spillway at the centre of the dam and plunge pool at the downstream toe. A diversion tunnel would be located at creek bed level, just left of the spillway through the dam wall. This would be converted to an outlet tunnel once construction of the dam has been completed. An

intake structure would be attached to the back of the wall while an outlet/valve house would be located at the downstream end together with an associated pumping station. Design features would be incorporated in the 20 GL arrangement to facilitate future raising of the dam:

- The positions of the valve house and pumping station are located downstream of the dam to suit a larger dam.
- Sizing of the pumping station, valve house, pipework and associated equipment has been determined to suit a larger dam.
- The section dimensions for the intake tower allow for possible future raising of the storage to 50 GL.

The 20 GL storage provides a FSL at RL 67.20 mAHD, MFL at RL 74.36 mAHD and the dam crest level at RL 74.96 mAHD.

Figure 6 shows the dam inundation area for the two storage options. The surface area at FSL is 1,650,000 m² and 2,430,000 m² for the 20 GL and 50 GL storage volumes respectively (based on dam stage storage data provided in Public Works Dams and Civil (2013a)). Figure 6 also shows the route of the rising main to Nightcap WTP and the new access road.

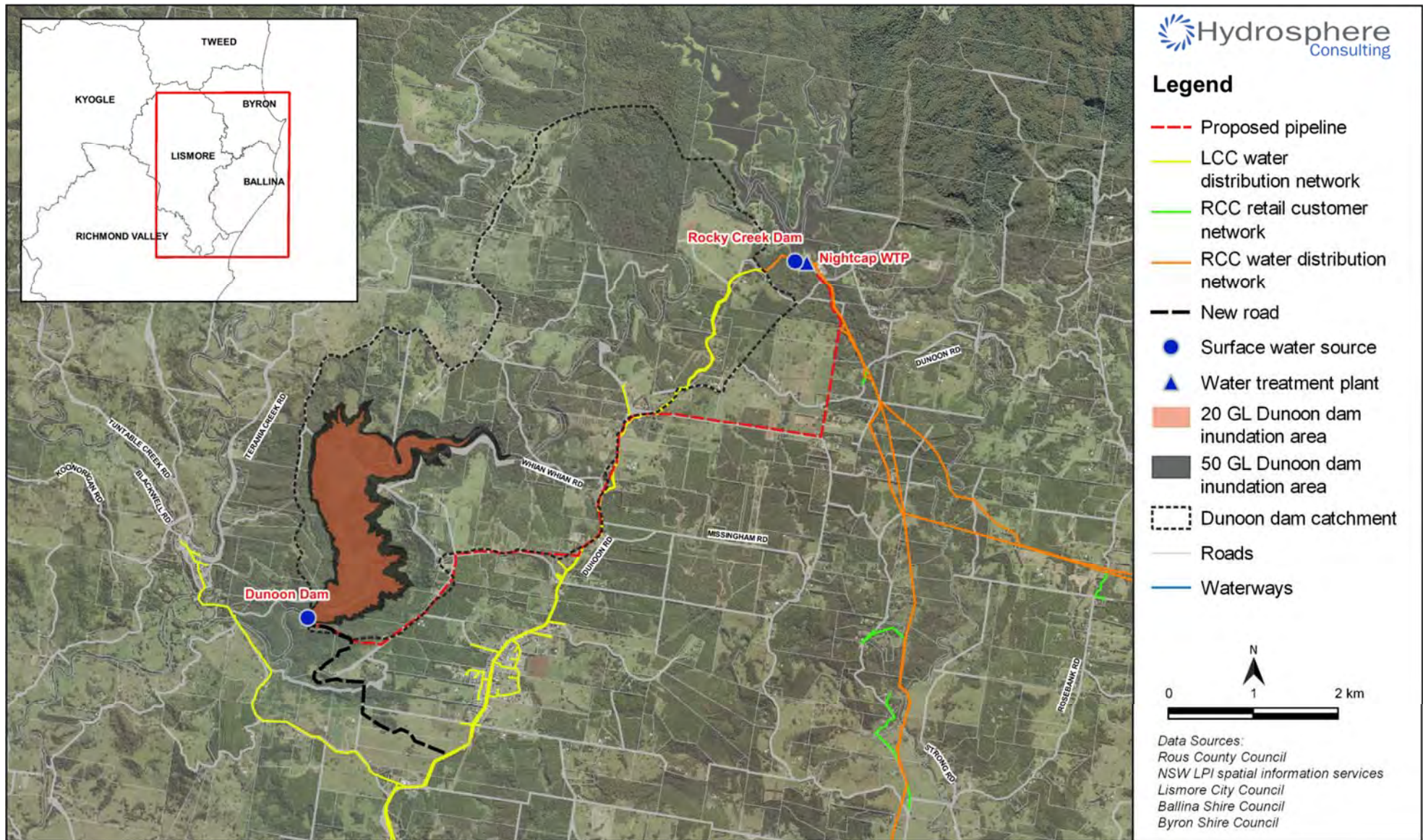


Figure 6: Dam location and inundation area for 20 GL and 50 GL storage options

7.2 Catchment Description

The Dunoon Dam would have a catchment area of approximately 19 km². Dunoon Dam would also receive overflows from RCD and therefore when RCD is spilling, the Dunoon Dam catchment area also incorporates the RCD catchment, giving a total catchment area of 50 km² (Hydrosphere Consulting, 2020d). Figure 7 provides an overview of mixed land use in the catchment. RCC currently owns several parcels of land within the Dunoon Dam catchment and would seek to purchase the remaining land within the buffer zone surrounding the dam, should this option be adopted for future water supply. The remaining catchment areas are either protected as parks and reserves or are under private ownership. Whian Whian Falls is a popular recreational location with easy access from the public road. If constructed, the upstream extent of the 50 GL Dunoon Dam would be just downstream of the base of the falls. Currently, cleared grazing land makes up approximately 40% of the catchment, horticulture (primarily macadamia farms) occupy 30%, and approximately 18% of the catchment is classified as parks and reserves (the majority of which is within Nightcap National Park). The remaining land uses comprise rural residential lots (4.6%), cropping (2.2%), forestry (1.3%) and rivers and drainage channels (4.4%) (Hydrosphere Consulting, 2020d).

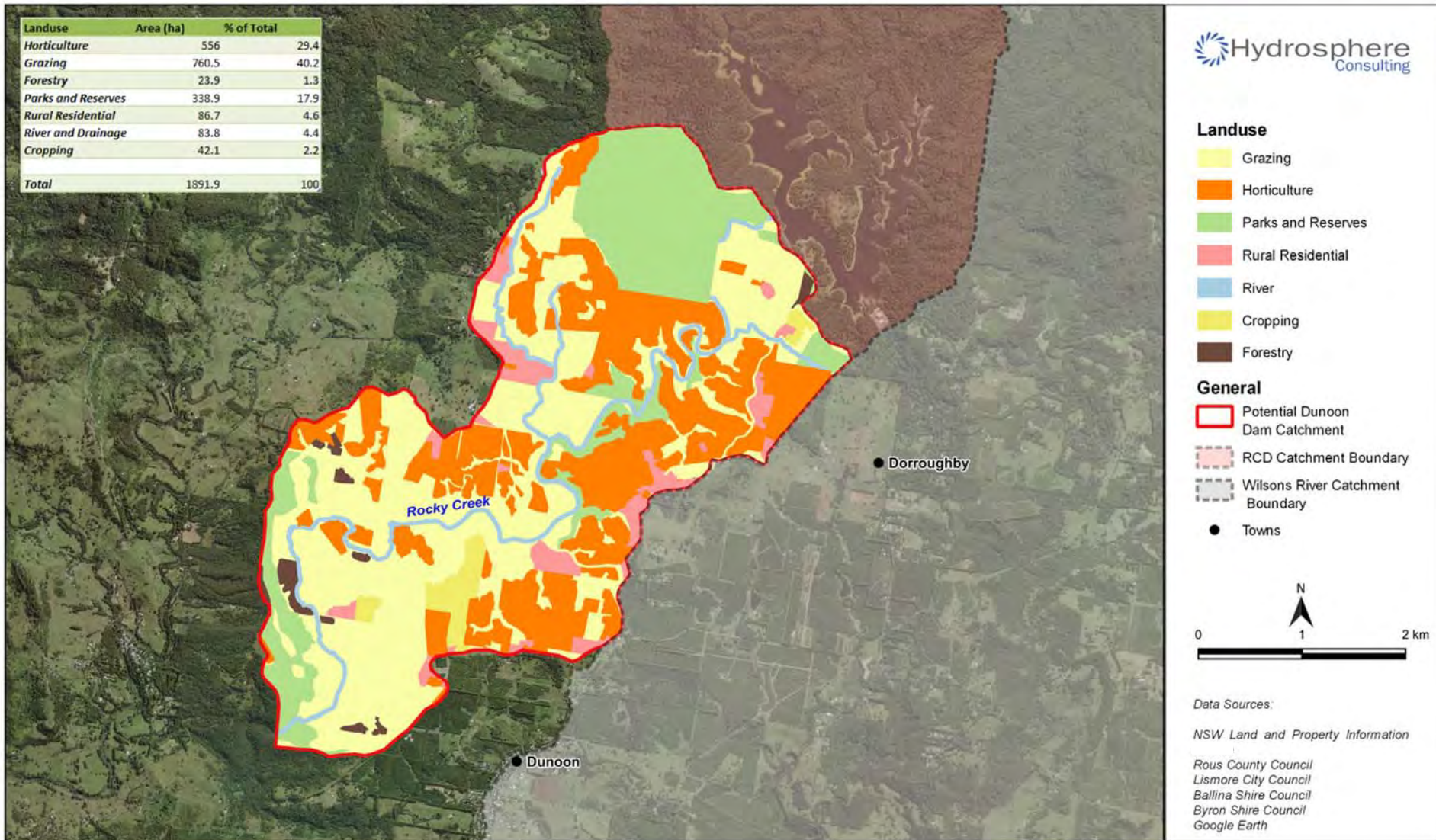


Figure 7: Dunoon Dam catchment and existing land use

Source: Hydrosphere Consulting (2020d)

7.3 Planning and Approvals Pathway

RCC has obtained preliminary planning pathway advice for the Dunoon Dam proposal (Public Works Advisory, 2020a). *State Environmental Planning Policy (State and Regional Development) SEPP 2011* designates development that is state significant development, state significant infrastructure, critical state significant infrastructure and regionally significant development. The Dunoon Dam would be State Significant Development in accordance with the requirements of the State and Regional Development SEPP as the development has a capital investment value of more than \$30 million and is permitted with development consent in land use zone W1 Natural Waterways under the Lismore Local Environmental Plan 2012 and permitted without consent in land use zone RU1 Primary Production under SEPP (Infrastructure) 2007 (as per current land zonings under the LEP). The Minister for Planning (or the Independent Planning Commission) would be the consent authority.

An Environmental Impact Statement (EIS) would need to be prepared in accordance with Schedule 2 of the *Environmental Planning & Assessment Regulation, 2000*. The approvals expected to be required are summarised in Table 9.

Table 9: Summary of likely approvals required

Agency	Requirements	Reference
Department of Planning, Industry and Environment (DPIE)	Development consent	Pt 4, Division 4.7, <i>Environmental Planning and Assessment Act, 1974</i>
Department of Primary Industries - Fisheries	Notification to the Minister for the construction of a new dam	Section 218, <i>Fisheries Management Act, 1994</i>
	Permit for dredging or reclamation work undertaken by a local government authority	Section 200, <i>Fisheries Management Act, 1994</i>
Environment Protection Authority (EPA)	Environment protection licence for extractive activities and concrete works (possible)	Chapter 3, <i>Protection of the Environment Operations Act, 1997</i>
DPIE - Water	Water Access Licence for water use	<i>Water Management Act, 2000</i>
Department of Agriculture, Water and the Environment (Commonwealth)	Referral for significant impact on Matters of National Environmental Significance (MNES)	<i>Environment Protection and Biodiversity Conservation Act, 1999</i> (Commonwealth)

Source: Public Works Advisory (2020a)

7.4 Terrestrial Ecology

A survey and assessment of the terrestrial ecology for the footprint of the dam, the buffer region surrounding this footprint and associated access to the dam wall area (SMEC, 2011) was undertaken to identify ecological constraints to inform feasibility assessments and concept planning for the dam. The study consisted of a desktop assessment and seasonal flora and fauna surveys undertaken between April and October 2010. A summary of the findings of the terrestrial ecological assessment from SMEC (2011) is provided below.

The study area is characterised by extensively cleared agricultural land containing remnant fragments of native vegetation occurring primarily along riparian corridors and a larger fragment within the sandstone escarpments of the west and south of the proposed dam wall. The condition of native vegetation and habitat varied from poor (areas infested with exotic species) to good (less accessible areas around the proposed

dam wall), depending on the level of historic clearing and disturbance from agricultural activities (SMEC, 2011).

One endangered ecological community (EEC), Lowland Rainforest which is listed under the *Threatened Species Conservation Act 1995* (TSC Act), was recorded during field investigations. In addition, nine flora and 17 fauna species (including one frog, one mammal, one fruit-bat, six microbats and eight birds) listed as threatened in NSW under the TSC Act were also recorded. Of these species, eight flora and one fauna species are also listed nationally under the *Environment Protection and Biodiversity Conservation Act, 1999* (EPBC Act). An additional seven fauna species listed as migratory or marine under the EPBC Act as well as two Rare or Threatened Australian Plants (RoTAP) and three regionally significant plant species were also recorded (SMEC, 2011).

The proposed dam would clear a total of 272 ha of vegetation, of which 57 ha is predominantly native (Warm Temperate Rainforest, Subtropical Rainforest with 34 ha of Lowland Rainforest EEC, Tallowood Open Forest and Flooded Gum-Tallowood-Brush box Open Forest). The loss of rainforest communities is considered to be particularly significant, given the regional history of clearance for timber and plantations and thus fragmented nature of the remnants of these communities (SMEC, 2011).

The dam would remove important habitat features and local linkages for threatened fauna species. In particular, movement pathways for the threatened Koala will be impeded from the installation of the dam wall, spillway and the inundation area. Loss of feeding resources for the listed Grey-headed Flying Fox, Rose-crowned Fruit-dove and White-eared Monarch and nesting resources for migratory birds from the removal of rainforest and Camphor laurel communities is also likely to be significant within the study area. Further, the loss of foraging resources provided within the dry sclerophyll forests, which are rare in the region, will impact on the threatened Glossy-black Cockatoo and Scarlet Robin. Loveridges Frog (*Philoria loveridgei*) was also found just outside the footprint of the proposed dam at a lower elevation and more southerly point than has been previously recorded. Habitat for this species may also be impacted by the proposal (SMEC, 2011).

The works will also remove threatened flora species within the inundation and dam infrastructure areas and their habitat. There is also the potential for indirect impacts through key threatening processes such as the spread of *Lantana camera* and dieback caused by the root-rot fungus (*Phytophthora cinnamomi*) (SMEC, 2011).

Assessment of the impacts (without mitigation) has determined that the works would significantly impact all threatened flora species detected (nine species) and 15 of the recorded threatened fauna species and their habitat within the study area. Mitigations measures have been identified to minimise impacts on terrestrial ecology including design considerations, pre-construction and construction phase actions. Measures to minimise wildlife connectivity impacts, removal of threatened flora and endangered ecological communities and minimising impacts on fauna habitat have also been identified including fauna bridges.

However, residual impacts that cannot be minimised to acceptable levels through mitigation will still be present. Significant impacts are still likely to occur as a result of:

- Loss of Lowland Rainforest EEC.
- Loss of threatened flora species and RoTAP species.
- Loss of threatened fauna habitats.
- Severance of local wildlife corridors.

Habitat and conservation offsets are an option to compensate for these significant impacts to terrestrial biodiversity as a result of the proposed dam. The buffer area surrounding the dam could be used as an offset for the dam, however additional areas may also be required to be reserved for conservation, managed and improved as part of an offset package for the dam, should it proceed. SMEC (2011) recommended that an

Offset Strategy is prepared detailing the location of offsets, ecological restoration requirements, and ongoing management requirements and to investigate opportunities to improve the habitat linkage between Nightcap National Park (5 km to the north and a listed World Heritage Area) along Rocky Creek to the dam site. Although the proposal is likely to have a significant impact on important vegetation within the study area (both endangered ecological communities and habitat for threatened species), there are also large areas within the study area and around it that were once rainforest or wet sclerophyll forest but are now infested with weeds (SMEC, 2011). These areas could benefit from improved management as part of offsets for the project. This has the potential to reduce the significance of the impact of the dam, if managed appropriately. Further assessment of these options would be required prior to seeking project approval.

An assessment of terrestrial ecology impacts will be required in accordance with the provisions of the *Biodiversity Conservation Act, 2016* including requirements of the Biodiversity Offsets Scheme using the Biodiversity Assessment Method.

7.5 Buffer Zone Planning

The establishment of vegetated buffer zones around water supply reservoirs is a recognised catchment management strategy which helps to protect the water quality and reduce risks to water supply. Hydrosphere Consulting (2009) developed a Buffer Zone Strategic Plan through a desktop assessment which analysed the environmental requirements for the buffer zone of the proposed Dunoon Dam (50 GL) through an evaluation of industry standards, catchment conditions and water quality risk.

Hydrosphere Consulting (2009) recommends a three-part approach to water quality management in the catchment involving the protection of high-risk areas with the storage buffer, targeted riparian management in the upstream catchment and community education to encourage improved farming practices and land management in the catchment.

The recommended buffer zone identified by the assessment has an average width of approximately 180 m from the maximum inundation area and covers approximately 224 ha of land surrounding the storage. The boundaries for the proposed buffer zone are shown in Figure 8. Despite a high degree of existing vegetation within the proposed buffer zone, there is also a large amount of weed infestation. Significant weed management and/or native planting effort will be required to maximise the biodiversity benefits and water quality protection characteristics of the buffer zone (Hydrosphere Consulting, 2009).

The extent of individual landholdings that form part of the buffer zone would need to be acquired by RCC to implement the buffer zone strategy.



Figure 8: Proposed Dunoon Dam (50 GL) buffer zone

Source: Hydrosphere Consulting (2009)

7.6 Aquatic Ecology

An aquatic ecology assessment was undertaken to examine the potential impacts of the proposed dam on aquatic habitats and communities upstream, within and downstream of the proposed dam inundation area (ELA, 2012a). The assessment was updated following a peer review (SMEC, 2012). A summary of the findings of the aquatic ecological assessment from ELA (2012a) is provided below.

A detailed program of desktop and field-based survey was undertaken to examine key aspects of the aquatic ecology. Desktop surveys included review of previous studies in and around the study area and searches of the relevant databases for potential threatened species presence. Field studies included assessment of aquatic and riparian flora, aquatic and riparian habitat, water quality and fauna surveys including fish, other vertebrates (primarily birds, platypus and amphibians) and macroinvertebrates (ELA, 2012a).

The desktop assessment, including database searches, found one EEC, 30 flora, six frog, 24 bird and three mammal species listed as threatened within or around the study area. Three fish species, Eastern Freshwater Cod, Purple Spotted Gudgeon and Oxleyan Pygmy Perch were identified as potentially occurring in the study area (ELA, 2012a).

Flora surveys showed variable habitat condition along the reach with poorer condition generally relating to the level of disturbance or clearing in the immediate catchment surrounding the site. Areas with more intact tree cover showed few exotic species and better overall condition. The number of exotic species showed a general increase downstream from RCD to the Terania Creek sites. Small-leaved Privet, Camphor Laurel and Lantana were significant weed species found in several riparian zones. Brazilian Watermilfoil was identified as a potentially significant exotic macrophyte (ELA, 2012a).

The water quality assessment identified that the current water quality is good with most key parameters falling within or below the ANZECC specified range. The large pool below the proposed dam wall remained weakly thermally stratified for the entire survey period and there were several short periods where the temperature difference between the surface and bottom temperatures was greater than 1°C, indicating that stratification is a normal part of the function of that pool. Flows of approximately 20 ML/d (at RCD) for several days were sufficient to reduce thermal stratification to less than 1°C. Water quality is maintained in this system by low and even base flow levels (ELA, 2012a).

Aquatic macroinvertebrates surveys recorded 5,055 individuals from 73 families and 23 orders. Vertebrate surveys identified 13 fish species, two frog species and 28 bird species, with no rare or threatened species recorded. No introduced fish species were found. Platypus surveys identified individuals at several sites during various surveys and burrow clusters were found at the three sites surveyed (ELA, 2012a).

Wildlife database searches identified that the Eastern Freshwater Cod, Purple Spotted Gudgeon, Oxleyan Pygmy Perch and Black Necked Stork may occur in the study area, however, these species were not recorded during the field surveys. An assessment of significance determined that the proposed dam is unlikely to have a significant impact on these species (ELA, 2012a). Given records and potential habitat for this species in the area, ELA (2012a) recommended that additional survey work undertaken for a more detailed impacts assessment should consider the occurrence of these species and whether assessment under the EPBC Act is required.

Mitigation measures and monitoring requirements were recommended to address the impacts on aquatic ecology resulting from the altered flow patterns in Rocky Creek as a result of the construction and operation of the proposed dam. As there are no current provisions for controlled release of water from RCD, there are few if any flow related management measures that can be implemented upstream of Dunoon Dam. The channel form and ecological function of impacted reaches has stabilised following the adjustment to the impact of the current operation of RCD and has an armoured bed, as such this reach is resistant to impacts from change in flow regime including the reduction in spilling flows from RCD. ELA (2012a) recommended that practical management upstream of the Dunoon Dam should focus on improving general catchment and riparian condition to minimise sedimentation processes through stock exclusion and the planting of riparian

endemic native species. Minor flow-based management may be achieved through refinement of operating rules to achieve balance between sustainable yield of both dams and minimise hydrological impacts on this reach may be possible.

Potential mitigation measures within the inundation area were also identified including stratification, algae control, sediment and nutrient trapping, foreshore management and offsetting the loss of aquatic and riparian habitat within the inundation area. Offsetting and/or conservation options within the larger Terania Creek catchment are recommended in the assessment of environmental flows (ELA, 2012b).

The assessment of environmental flows (ELA, 2012b) discussed in Section 7.7 has proposed an environmental flow regime for the proposed dam to protect the key aspects of creek hydrology, ecology, process and function. Maintaining (or improving) the environment through the environmental flow regime will largely negate the requirements for further significant mitigation measures. The low flow contingency releases will act to improve the environment for key species with connecting releases and other habitat provision when the current flow regime would remain unconnected (ELA, 2012a).

The construction of a fish ladder or lift is not recommended by ELA (2012a) as it would likely only provide artificial lake habitat for migrating species as Whian Whian Falls at the upstream end of the proposed dam lake acts as a natural migration barrier to habitats further upstream. If species were able to migrate beyond Whian Whian Falls they could only access the additional reach to the RCD wall. In this case the potential habitat quantity and quality above the proposed dam wall does not justify the expense of a fish ladder (ELA, 2012). In preference to a fish ladder, options to improve the aquatic and riparian habitat in the larger Terania catchment through fencing from stock and establishment of an endemic native riparian buffer are preferred by ELA (2012a). This buffer will act to improve the riparian and aquatic habitat through the reduction of inflowing sediment and nutrients, improve water quality through shading and provision of endemic organic material and the creation of habitat for riparian and semi-aquatic species.

Hydrosphere Consulting (2020c) considered that the proposed dam will present a barrier to both upstream and downstream fish migration. It is important that environmental flow design is undertaken with due consideration of fish passage and options for integrated design to achieve optimum outcomes. For example, there is potential for any environmental flows to attract fish to the base of the dam and without a fishway to facilitate movement further upstream, the fish may aggregate at this location and be susceptible to increased predation and potentially poor water quality which could result in fish kills. Additionally, fishways require water to run, which provides opportunities for using this operational water to provide a base environmental flow.

The aquatic ecology and environmental flows assessment may also require more detailed assessment to focus on the proposed dam disturbance and inundation area. ELA (2012a) also recommended that the Offset Strategy (refer Section 7.4) should include mitigation of potential impacts on aquatic and riparian habitat.

7.7 Environmental Flows

An environmental flow assessment was undertaken to determine if an environmental flow regime within the Rocky Creek system could be developed that would maintain and/or improve the downstream environment, in consideration of ecological needs and the current legislative framework (ELA, 2012b). The assessment was updated following a peer review (SMEC, 2012). A summary of the findings of the environmental flow assessment from ELA (2012b) is provided below.

A holistic study was undertaken to examine the environmental flow requirements of the current system. This approach integrated information from a range of disciplines including ecology, hydrology, water quality and geomorphology. A combination of desktop review, hydrological and geomorphic modelling and field studies was undertaken by ELA (2012b) to determine the key flow requirements of the system.

Modelled flows at a daily time-step at several points along Rocky Creek, Terania Creek and Leycester Creek using the Integrated Quantity Quality Model (IQQM) were used in the review for a 114-year period. Flow data for the natural and current (with RCD online and current system operating rules) were compared to determine the nature of the hydrological regime in the creek system. Assessment and comparison of data was undertaken via examination of hydrographs for different periods, key flow statistics such as mean, maximum and minimum, flow duration analysis, flood frequency analysis and determination of the rates of rise and fall of flood events.

Field investigations undertaken by ELA (2012b) included detailed survey of the physical stream environment including channel morphology and the relationship between flow and physical processes. Ecological and environmental surveys were undertaken to detail key species (flora and fauna), water quality and habitat at three time periods from October 2010 to June 2011 to capture seasonal variations. Field surveys were conducted at a range of locations to facilitate comparison between different potential impact zones and an unimpacted control area.

Hydrological assessment showed that both the natural and current Rocky Creek flow regimes are highly variable with extended periods of low flows and floods occurring at any time of the year. RCD has reduced flows downstream of the dam from the base flow to moderate flow range, but larger flood events are largely unaffected as they tend to fill and spill the dam. Data for natural flows show key flow components of base flows (2-6 ML/d), low flows (6-30 ML/d) and moderate flows (30-200 ML/d) are responsible for maintaining key ecological, water quality and channel functions. High flows (>200 ML/d) including floods greater than 17,000 ML/d provide for channel disruption and formation processes through movement of large cobbles and high energy flows (ELA, 2012b).

Geomorphic assessments showed that Rocky Creek below RCD is largely confined, with limited potential for erosion. The main unarmoured zone of Rocky Creek will be inundated by the proposed dam. Below RCD, the character of the channel is dominated by boulder and bedrock structures. These channel types are predominantly controlled by large flood events (ELA, 2012b).

Water quality in the system was indicative of good condition throughout the survey period. Nutrients, turbidity and chemical characteristics were all either well within the recommended ANZECC guidelines or where these guidelines were not met were in a range that is not critical to biota, ecological processes or physical function or the creek system (ELA, 2012b).

The flora and fauna in Rocky Creek are adapted to a flow regime dominated by disruptive high flows that move large and small sediments, and scour in-stream and riparian vegetation. Maintenance of a flow regime that provides for irregular high flows and maintains base to moderate flow variability, including natural rates of rise and fall, should maintain and/or improve channel habitats and ecological condition in the Rocky Creek system downstream of the proposed Dunoon Dam. At the key flow level of 100 ML/d the main fish barriers downstream of the proposed Dunoon Dam infrastructure are open for migration to all potential fish species including the threatened Eastern Freshwater Cod (ELA, 2012b).

Following detailed survey and assessment of the hydrology, geomorphology, water quality and aquatic ecology of the Rocky Creek system a set of environmental flow rules was established by ELA (2012b) with the specific objective to maintain or improve the environmental and habitat values downstream of the proposed dam. These flow rules provide for a largely unchanged flow regime for flows up to 100 ML/d with contingency flows provided for prolonged dry periods. The general flow rules are:

- Transparency of inflows up to 100 ML/d at Dunoon Dam.
- If inflow to Dunoon Dam exceeds 100 ML/d, maintain release of 100 ML/d.
- When inflow to Dunoon Dam drops below 100 ML/d, allow natural rates of fall.
- If the unregulated spill exceeds 100 ML/d, no transparent release.

Further a set of contingency rules was developed by ELA (2012b) to permit longitudinal channel connection in key fish migration periods during prolonged dry periods. These rules are:

- If inflow to Dunoon Dam is less than 0.7 ML/d, maintain release from Dunoon Dam of 0.7 ML/d.
- If, by March 1, there has been < 3 days of inflows \geq 100 ML/d (either as one or multiple events) over the preceding 60 days, release 100 ML/d for 3 consecutive days.
- If, by August 1, there has been < 3 days of inflows \geq 100 ML/d (either as one or multiple events) over the preceding 60 days, release 100 ML/d for consecutive 3 days.
- If, by October 1, there has been < 3 days of inflows \geq 100 ML/d (either as one or multiple events) over the preceding 50 days, release 100 ML/d for consecutive 3 days.

These general environmental and contingency flow rules provide for a largely unchanged flow regime for flows up to 100 ML/d. Field assessment undertaken by ELA (2012b) showed that at this level all key barriers downstream of the main proposed dam infrastructure are open to Eastern Freshwater Cod movement. In addition, flows in this range (base to moderate flows) provide for the other key environmental processes of fauna habitat provision, movement of smaller fish and other vertebrates, fine sediment flushing and water quality maintenance. Contingency flows potentially enhance the system by introducing flow pulses in periods where the current system had sustained low flows (ELA, 2012b).

Detailed assessment of the potential impacts of the proposed dam on the flow regime of the Rocky Creek system considering the proposed environmental flow regime and changes to the operation of other water supply resources was undertaken by ELA (2012b). The environmental flow regime provides a substantial mechanism to minimise the impacts of dam operation on the Rocky Creek system while maintaining the downstream environment. Whole-of-catchment solutions will also assist in mitigating impacts of the proposed dam. The conservation of native vegetation riparian zones, including the buffer zone surrounding the dam as well as the creeks that make up the Terania system (i.e. Rocky Creek, Tuntable Creek and Terania Creek) will help to maintain and improve water quality and habitat for aquatic species, including those identified threatened species (ELA, 2012b).

The environmental flows assessment also recommended that mitigation measures should be incorporated into environmental management plans relating to both construction and operation to manage impacts on the system as a result of the proposed environmental flow regime. Monitoring of hydrology, water quality and aquatic ecology during the pre-construction and operational phases of the project was also recommended.

The review of environmental flow regimes (Hydrosphere Consulting, 2020c) concluded the following in relation to Dunoon Dam:

- Previous assessment of environmental flows by ELA (2012b) followed a holistic approach incorporating multi-faceted ecosystem components and supported by field survey data and modelled flow data under a range of flow scenarios. The study was completed over 8 years ago but the methods employed remain valid and reflect contemporary environmental flow assessment methods.
- One exception was the reliance on a small number of benchmark fish species to establish environmental flow requirements. Further investigation of fish species within the subject site and connected aquatic environments is recommended to update species information and allow for a comprehensive assessment as to the suitability of the environmental flow regime proposed by ELA (2012b). This would include providing more information to determine whether the presence of key species used in determining environmental flows (e.g. Eastern Freshwater Cod) occur naturally or only exist through artificial stocking.
- Should Dunoon Dam be considered further as a future source, there may be opportunities for development of a balanced system of synergistic operating rules and environmental flow releases from RCD to Dunoon Dam, providing benefits for Rocky Creek in the reach between the two dams (approximately 8 km).

7.8 Cultural Heritage

A preliminary Heritage Impact Assessment was undertaken for the proposed Dunoon Dam (Ainsworth Heritage, 2013). The assessment was updated following a peer review (Australian Museum Business Services, 2012). A summary of the findings of the heritage assessment from Ainsworth Heritage (2013) is provided below.

Ainsworth Heritage (2013) reviewed the Aboriginal and non-Aboriginal history of the Dunoon area. Settlement of the area was undertaken first by the Widjabul people of the Bundjalung Nation, who were then displaced from the land by white settlers. The arriving white settlers first cleared and then cultivated the land for various crops, a process that has continued to the current day.

Based on the information gleaned from the research phase of the assessment, a field survey was undertaken which sought to identify and record both Aboriginal and Non-Aboriginal sites. Thirteen Non-Aboriginal sites were located, which were assessed to have varying significance of a local nature. The most notable sites were the Depression era causeway and the Fraser Road and McPherson Homesteads. Numerous Aboriginal sites were located, consisting of scarred trees, grinding grooves, artefacts and a collection of burials. The collection of Aboriginal sites together is generally of State significance, allowing assumptions on how the Widjabul utilised and accessed the valley over time. Large sections of the dam area were inaccessible due to a combination of thick vegetation and steep terrain in conjunction with inclement weather patterns. The recommendations of the assessment have outlined where additional research will be required to ensure that any future impact is properly assessed and mitigated if the proposed dam is to go ahead.

Due to the nature of the proposed development, the vast majority of sites will undergo high impact which will result in the loss of most of the sites unless mitigation measures are put in place. As part of the review of the draft report, the views of both the Aboriginal Stakeholders and the wider community was sought in order to ensure that the management and mitigation measures, largely concerned with recording and recovery, are undertaken in consultation and conjunction with the relevant stakeholders. This is in accordance with OEH guidelines and will provide much greater certainty for the recommendations and conclusions of the report.

Non-Aboriginal heritage within the proposed dam site which would see high impact has been determined to be of little or no significance and presents no impediment to any future plans for the site. However, management recommendations have been developed by Ainsworth Heritage (2013b) for individual sites

Ainsworth Heritage (2013b) considers that there remains a risk that the approval of the proposed development may be refused on heritage grounds. The assessment recommends that further investigations of the burials with limited excavation is undertaken, subject to relevant approvals and not before all other water augmentation options have been considered. Areas for future assessment for Potential Archaeological Deposits (PADs) have also been identified. Continued consultation with Aboriginal stakeholder groups as to the best methods of protection for all identified sites is also required (Ainsworth Heritage, 2013).

Based on the inundation area (Figure 6), most cultural heritage sites are likely to be impacted through inundation for both the 20 GL and 50 GL storages (apart from the eastern-most site and the historic site to the south-east) although the elevation of the sites has not been documented. The two historic sites to the north may be outside the inundation area for the 20 GL dam. The Aboriginal marked trees in the dam infrastructure area could potentially be protected. Inundation of the sites with a smaller dam (FSL at lower elevation) has not been determined.

7.9 Secure Yield

NSW Urban Water Services (2013) assessed the yield benefit from the 20 GL and 50 GL Dunoon Dam for the current climate and 1°C warming as part of the IWP process (Table 10).

Table 10: Increase in system secure yield with Dunoon Dam

Option	Historic climate (5/10/10)	Reduction factor ¹	1°C climate warming
20 GL Dunoon Dam	9,750	0.858	8,366
50 GL Dunoon Dam	20,450	0.858	17,546

Source: NSW Urban Water Services (2013)

1. Reduction factor was not calculated for the 20 GL option and the factor for the 50 GL option has been applied.

The secure yield will be re-assessed using the RCC Bulk Water Supply Security Model to optimise transfer and operating rules. The 2020, 2030 and 2060 secure yield of the Dunoon Dam options is shown in Figure 9, using a similar approach as for the current system (Section 5.2).

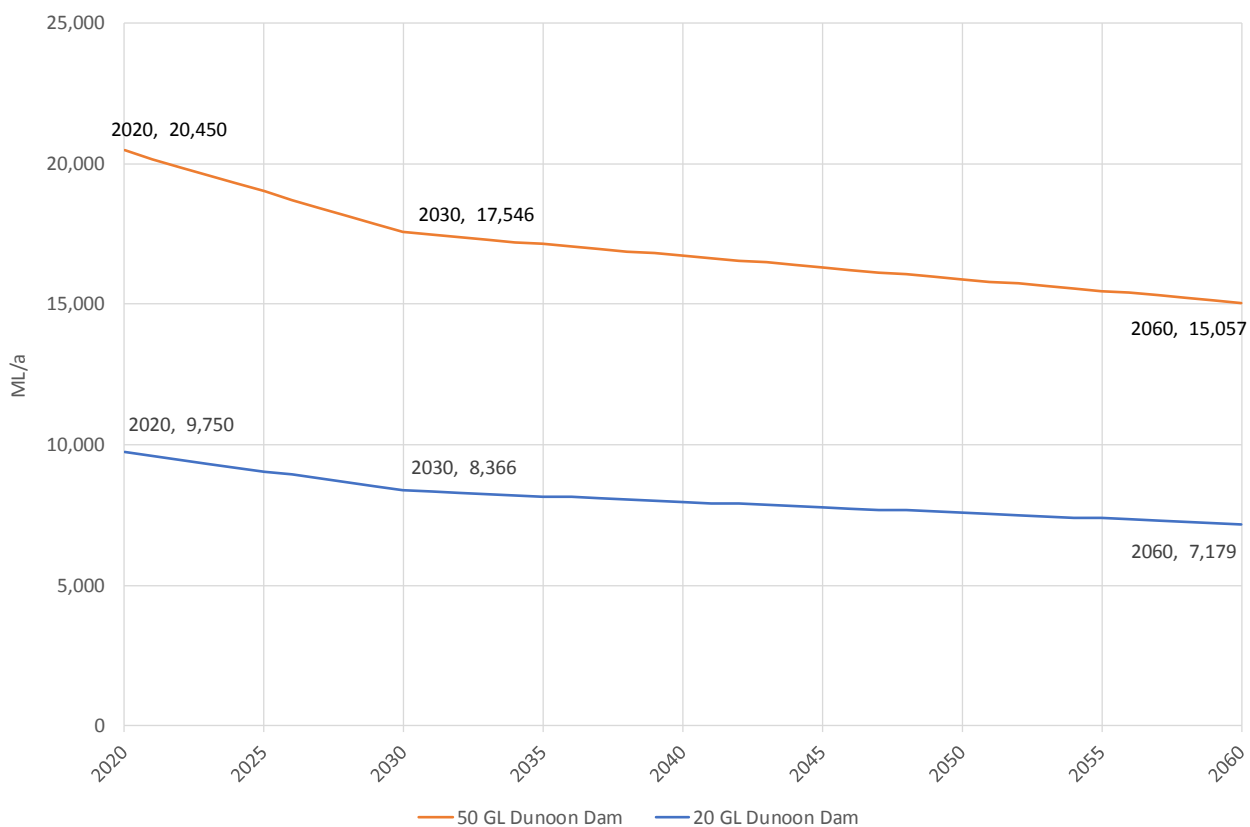


Figure 9: Secure yield estimates – Dunoon Dam options

7.10 Cost Estimates

Preliminary cost estimates have been developed by NSW Public Works Advisory (2020b) for the capital and operating costs of the 50 GL and 20 GL Dunoon Dam options as detailed in Table 11. Net present value (NPV) calculations are included in Appendix 1. The cost estimates for the 20 GL dam assume that it will be raised in future to a 50 GL dam (i.e. transfer systems and other infrastructure are sized for the 50 GL dam). The cost of a 20 GL dam without provision for the dam raising has not been estimated.

Table 11: Dunoon Dam preliminary cost estimate

Component	20 GL dam, (2020 \$)	50 GL dam, (2020 \$)
Roller compacted concrete dam	\$80,473,250	\$112,275,735
Pumping station	\$16,091,790	\$16,091,790
Rising main	\$18,901,740	\$18,901,740
Roadworks	\$17,345,900	\$17,345,900
Indirect costs	\$55,384,835	\$55,384,835
Total initial capital cost	\$188,197,515	\$220,000,000
Renewal costs (80 years)	\$53,660,100	\$54,280,200
Maintenance costs (80 years)	\$11,750,275	\$12,190,755
Operating costs (80 years)	\$110,083,461	\$110,515,416
Whole-of-life (80 years)	\$363,691,351	\$396,986,371
NPV (80 years @ 5%)	\$204,345,989	\$234,596,513
NPV (40 years @ 5%)	\$196,325,548	\$226,526,974
Yield benefit (2020 – 2060) ML/a	7,179	15,057
NPV/ML secure yield (40 years)	\$27,347	\$15,045

7.11 Data Gaps and Key Risks

To progress the development of the Dunoon Dam option, data gaps and risks need to be addressed as discussed in the following table. These would be undertaken as part of planning stages and would be completed prior to a decision to proceed with the planning and approvals for the dam option (outlined in Section 7.3).

Table 12: Data gaps and project risks – Dunoon Dam

Item	Discussion	Action required
Additional concept design	<ul style="list-style-type: none"> Preliminary longitudinal elevation plans for the proposed rising main and construction and easement acquisition costs. Infrastructure maintenance and renewal requirements. Design basis for all aspects of the project to provide the basis for detailed design. Destratification options. Review of capacity of Corndale quarry to supply aggregate. Dam amenities, site security landscaping and revegetation. Confirmation of power supply arrangements. Environmental monitoring requirements. Construction strategy. Procurement and contracting strategy. Detailed project program. 	RCC has commenced these investigations.
Dam break study	<ul style="list-style-type: none"> Dam design in accordance with the latest (2019) Dam Safety Regulations and ANCOLD Guidelines. 	RCC has commenced these investigations.

Item	Discussion	Action required
Road upgrade requirements	<ul style="list-style-type: none"> Assessment of road transport network and road improvements required. 	RCC has completed these investigations.
Cost estimates	<ul style="list-style-type: none"> Review of total project (capital) cost estimations for both the 20 GL and 50 GL dam. Peer review of capital and recurrent costings. Identification of RCC costs. Risk and opportunity assessment to identify contingency allowances. 	RCC has commenced these investigations.
Hydrology	<ul style="list-style-type: none"> Revised flood hydrology to provide updated loading on the dam structures for the dam break study with additional hydrographs to assess downstream flood impact. A review of all hydrology in accordance with Australian Rainfall and Runoff (2016/2019). Flood impact assessment. 	RCC has commenced these investigations.
Mini hydropower	<ul style="list-style-type: none"> Assessment of economic viability of downstream discharge structure to incorporate mini-hydroelectricity generation plant feeding power to the site and/or the electricity grid. 	RCC has commenced these investigations.
Geotechnical investigations	<ul style="list-style-type: none"> Comprehensive geotechnical investigations are required for the storage basin and the roller compacted concrete wall and all appurtenant structures to refine the geological model and to prove the properties of construction materials. Geotechnical investigations are also required for the raw water rising main and new access road. 	Detailed design stage - while the geotechnical conditions of the site represent significant risk to the project, the intrusive nature of the investigations precludes further work at this stage.
Community engagement	<ul style="list-style-type: none"> Development and implementation of a community engagement strategy is required. 	Strategy to be developed as part of Future Water Project 2060.
Survey	<ul style="list-style-type: none"> Detailed survey of the pipeline route, access road and dam infrastructure locations is required. Downstream development data would also be required for the dam break study. 	Detailed design stage.
Detailed design	<ul style="list-style-type: none"> Detailed design of all infrastructure. An updated seismic hazard assessment and time history analysis should be obtained from the Seismic Research Centre from which appropriate earthquake load accelerations and parameters could be derived. 	Detailed design phase
Biodiversity offset strategy	<ul style="list-style-type: none"> Preparation of Biodiversity Development Assessment Report in accordance with <i>the Biodiversity Conservation Act, 2016</i>. Review of offset requirements to include mitigation of potential impacts on aquatic and riparian habitat. Development of an offset strategy and potential stewardship arrangements. 	Specialist studies

Item	Discussion	Action required
Aquatic ecology and environmental flows	<ul style="list-style-type: none"> • A fishway is not currently included in the concept design. More detailed investigation of fish species within the subject site and connected aquatic environments, the interactions between the environmental flow regime, upstream and downstream environments and aquatic ecology is required. • Development of a balanced system of synergistic operating rules and environmental flow releases from RCD to Dunoon Dam may provide benefits for Rocky Creek in the reach between the two dams. • The ELA (2012b) recommends further study of the increase in the peak magnitude of flood events given that the current modelling of flow regimes that included RCD and Dunoon Dam at full capacity indicated that some flow events may lead to increased flood peaks above those that might have occurred in a natural regime. This model should include capacity to model water temperature, sediment and other water quality parameters to provide for a detailed hydro-dynamic assessment of the proposed dam. • Consultation with DPI-Fisheries. 	Specialist studies
Buffer zone planning	<ul style="list-style-type: none"> • Land acquisition of buffer zone area. • Vegetation survey to confirm the level of rehabilitation work required in the area. • Development of management plans for the water quality protection areas and for the remaining catchment outside of the buffer zone. • Development of a water quality management system for the Rocky Creek/Dunoon Dam system. 	Specialist studies
Cultural heritage	<ul style="list-style-type: none"> • Ainsworth Heritage (2013b) recommends that further investigations of the burials with limited excavation is undertaken, subject to relevant approvals and not before all other water augmentation options have been considered. • Areas for future assessment for PADS have also been identified. • Continued consultation with Aboriginal stakeholder groups. 	Specialist studies

8. OPTION 2: MAROM CREEK WTP

8.1 Background

The Marom Creek water supply and WTP are owned and operated by BaSC. The Marom Creek water supply serves Meerschaum Vale, Wardell, Cabbage Tree Island and some rural customers. Water is sourced from a weir pool on Marom Creek. The water access licence entitles BaSC to extract 200 ML/a. The Ellis Road and Lindendale bores were formerly used to supply drinking water however they have been decommissioned. BaSC has existing licences to extract groundwater from these supplies (350 ML/a and 200 ML/a respectively).

Marom Creek WTP currently supplies a population of approximately 830 people with a maximum demand of up to 550 kL/d. The WTP has a capacity of 2.3 ML/d, limited by the capacity of the clear water pumps (CWT, 2018). The existing plant and raw water source have the capacity to supply the existing BaSC service area until 2036 (750 kL/d), however the WTP requires upgrading in order to be able to meet water quality targets. The existing surface water licence (548 kL/d) is sufficient to supply the current demand.

BSC has developed a 20-year Master Plan for the Marom Creek WTP and related assets (City Water Technology, 2018). The Master Plan identifies WTP improvements required to address operational issues, process performance and monitoring, maintaining compliance with drinking water quality standards, refurbishment or replacement of existing assets and maintaining capacity to meet current and future demands. The Master Plan covers the Marom Creek catchment and supply from Marom Creek Weir including demand requirements for existing Wardell customers and potential servicing of Alstonville and Wollongbar (currently served by the RCC bulk supply system).

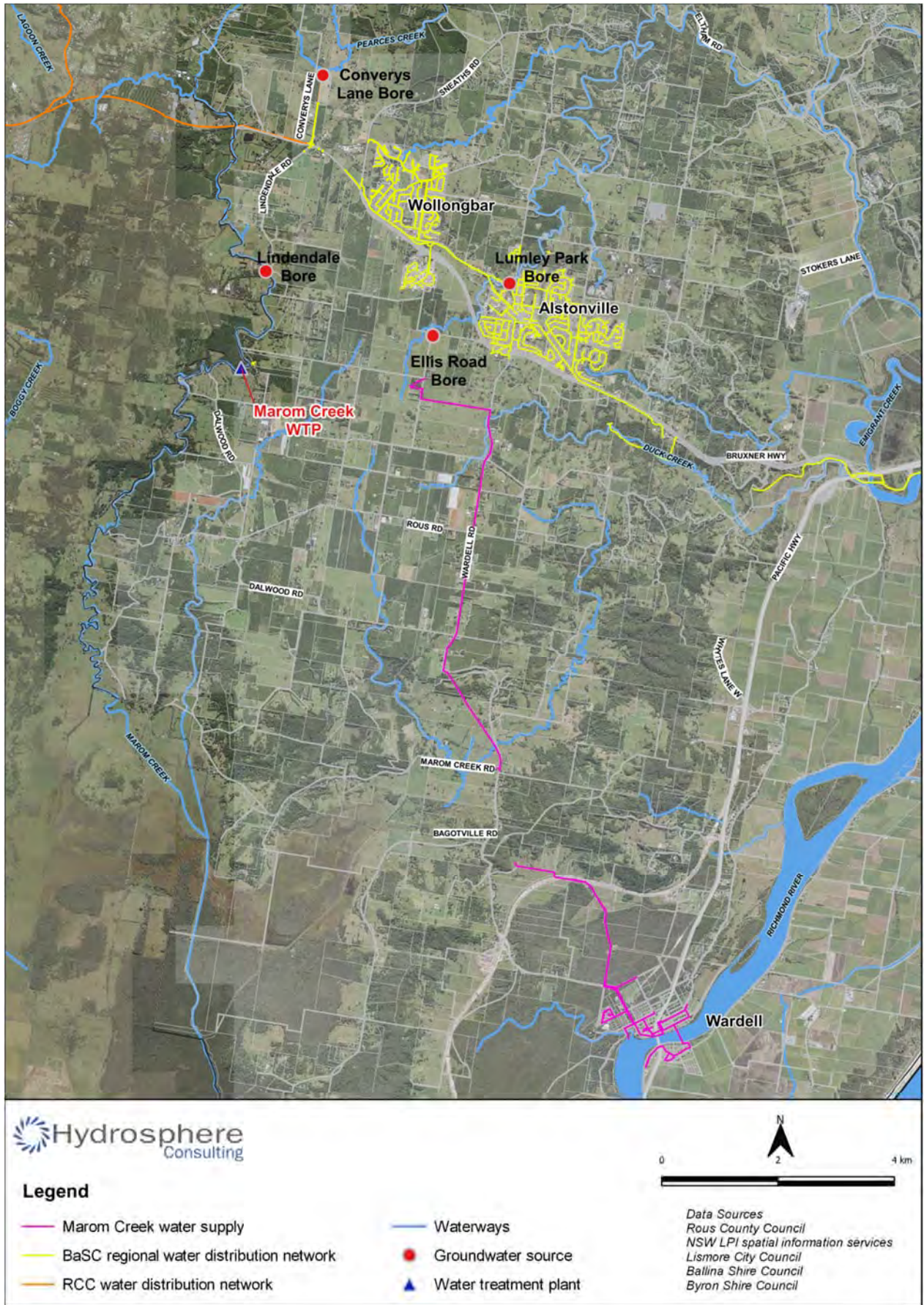


Figure 10: Marom Creek water supply

GIS data for the groundwater transfer and treated water distribution pipelines provided by BaSC appear to be incomplete.

8.2 Secure Yield

Data on current secure yield of Marom Creek Weir assumed in the Master Plan was based on a secure yield study (NSW Urban Water Services, 2017). This study assesses the current and future secure yield from the weir storage with capacity of 66 ML and 420 ML (based on two different estimates of existing storage capacity), Marom Creek WTP capacity (existing 225 kL/d and upgraded to 4.75 ML/d) and the licence extraction limit (200 ML/a).

The yield of the existing Marom Creek weir has been assessed as sufficient to service Wardell into the future (City Water Technology, 2018). The yield of the surface water with storage capacity of 66 ML with no limit on raw water transfer was found to be 417 ML/a, reducing to 299 ML/a with climate change (NSW Urban Water Services, 2017). However, the yield is limited by the existing licence limit of 200 ML/a. Source augmentation would be required to service other areas e.g. Alstonville or parts of Lismore. The existing yield of the Marom Creek water supply is shown on Figure 11.

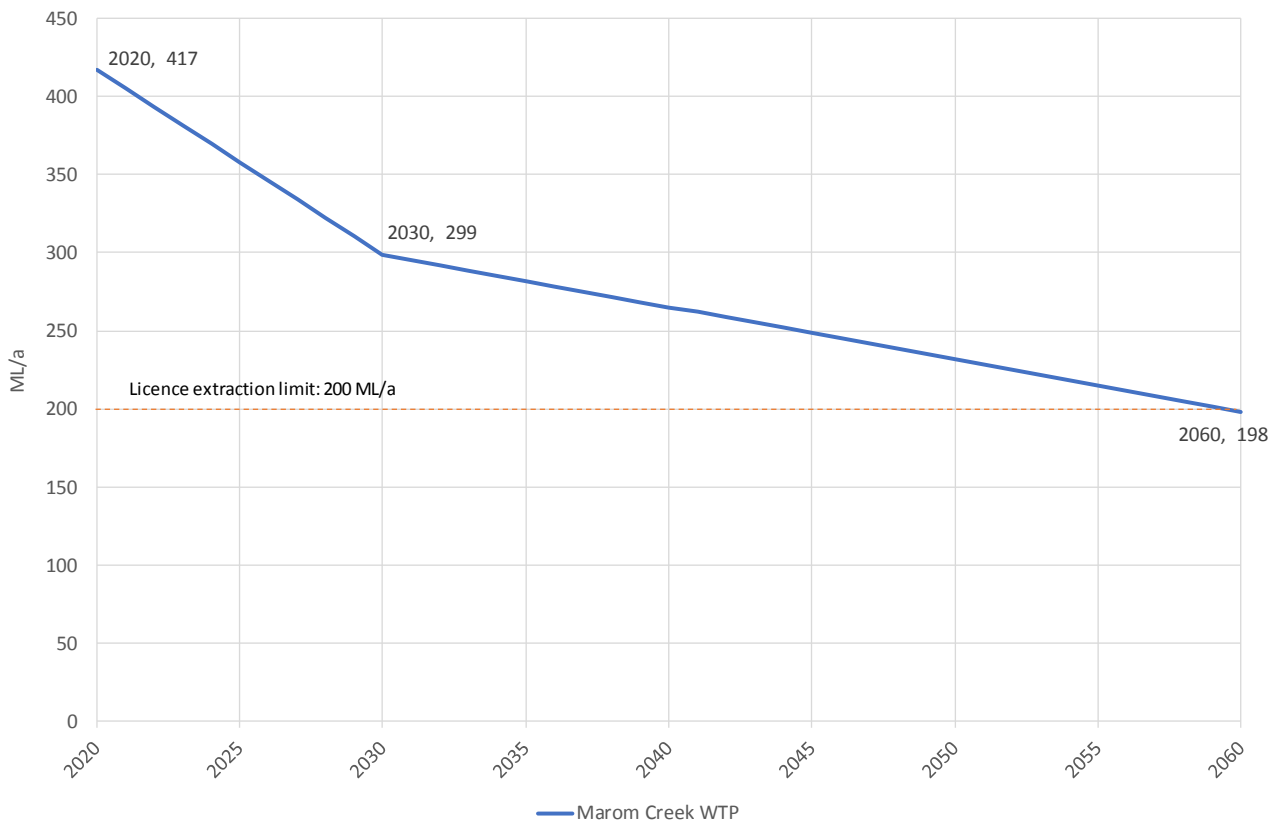


Figure 11: Secure yield estimates – Marom Creek

Options considered in the Master Plan (City Water Technology, 2018) to increase the supply of water were:

- Raising Marom Creek weir to increase storage to 420 ML.
- Gum Creek Weir - a small, disused weir located near the intersection of Gum Creek and Dalwood Road.
- Lindendale bores - aquifer supply previously used for drinking water.
- Ellis Road bore - aquifer supply previously used for drinking water.

The Master Plan recommended a supply strategy including raising Marom Creek Weir and increasing the licence extraction limit to 1,258 ML/a (future demand of Wardell, Alstonville and Wollongbar is predicted to

be 1,126 ML/a) and refurbishment of Ellis Road bore and connection to Marom Creek WTP (to be upgraded).

The RCC yield study report (NSW Urban Water Services, 2018) assessed the yield of the RCC bulk supply system with Marom Creek water supply included and found that the secure yield with historic climate would increase by 932 – 1,011 ML/a depending on the Wardell demand (not considering the existing licence limit or WTP capacity).

The option considered in this report involves transfer of the Marom Creek WTP to RCC with the excess capacity used to serve Alstonville, Wollongbar and potentially Lismore. The current spare capacity of the WTP is 0.8 ML/d (198 ML/a). Future augmentation of the Marom Creek WTP is possible (e.g. to 4.3 ML/d as proposed by CWT (2018)). This relies on increasing the surface water licence limit to supply the extra raw water demand. WTP upgrades would also be required to meet water quality requirements.

8.3 Cost Estimates

Preliminary cost estimates have been developed by CWT (2018) for the capital and operating costs of the Marom WTP upgrade as detailed in Table 13. NPV calculations are included in Appendix 1.

Table 13: Marom Creek WTP upgrade preliminary cost estimate

Component	Cost Estimate (2020 \$)
Engineering	\$1,831,750
WTP upgrade	\$7,327,000
Total initial capital cost	\$9,158,750
Renewal costs (80 years)	\$5,641,791
Maintenance costs (80 years)	\$49,365,702
Operating costs (80 years)	\$19,402,383
Whole-of-life (80 years)	\$83,568,626
NPV (80 years @ 5%)	\$24,561,843
NPV (40 years @ 5%)	\$22,088,688
Yield benefit (2020 – 2060) ML/a	198
NPV/ML secure yield (40 years)	\$111,559

8.4 Data Gaps and Key Risks

To progress the development of the Marom Creek option, data gaps and risks need to be addressed as discussed in the following table. These would be undertaken as part of planning stages and would be completed prior to a decision to proceed with the planning and approvals for the option.

Table 14: Data gaps and project risks – Marom Creek

Item	Discussion	Action required
Licence limit	Increased extraction limit will be required to meet future demand	RCC has had preliminary discussions with DPIE – Water which indicate that it will be possible to increase the extraction limit. Further liaison with DPIE-Water is required.
Asset ownership	Assets are currently owned by BaSC.	RCC will liaise with BaSC regarding the potential for transfer of assets.
Secure yield	<ul style="list-style-type: none"> Existing system – storage volume is to be confirmed and yield to be re-assessed if required. Groundwater options – requires assessment. Weir raising – requires re-assessment following detailed storage survey. Optimisation of yield with connection to existing regional supply. 	RCC will liaise with BaSC regarding the investigations required.
Concept development	Confirmation of water source, WTP, service area and transfer system concept.	RCC will liaise with BaSC and regulatory agencies regarding the investigations required.
Community engagement	Development and implementation of a community engagement strategy is required.	Strategy to be developed as part of Future Water Project 2060.
Detailed design	Detailed design of all infrastructure.	Detailed design phase
Cost estimates	Review of total project cost estimates	Detailed design phase

9. OPTION 3: GROUNDWATER

9.1 Background

Detailed investigations into the identification and assessment of groundwater sources were undertaken in 2015 (Jacobs, 2015a; Jacobs, 2015b; Jacobs, 2015c; Jacobs, 2015d; Jacobs, 2015e) to review the available data and information on regional groundwater sources. Based on an assessment of the geology and hydrogeology, the initial studies identified three areas with the potential to host groundwater supply schemes at North Lennox Head-Newrybar (coastal sands aquifer), Woodburn (coastal sands aquifer) and Dunoon (basalt). In 2016, three stages of drilling programs were undertaken in these three areas to further investigate the groundwater yields and water quality (Jacobs, 2017a; Jacobs, 2017b; Jacobs, 2017c). As a result, the investigations were expanded to include the Tyagarah area and the basalt aquifer in the Alstonville area. Further desktop, surface geophysical and hydrogeological investigations of the areas identified at Tyagarah and Newrybar were undertaken to identify the areas with the potential to provide groundwater supply (Groundwater Imaging, 2017).

The final locations for groundwater supply options have been identified in the detailed investigations as follows:

1. Woodburn.
2. Newrybar.
3. Tyagarah.
4. Alstonville.

The water quality risk assessment carried out for each of these areas provided guidance for development of these options including the appropriate drinking water treatment processes that should be applied in each area to deliver water that complies with the Australian Drinking Water Guidelines and the level of risk mitigation required to address the potential hazards identified due to the location of the bores and the nature of the borefield recharge areas.

9.2 Environmental, Land Use and Heritage Considerations

Jacobs (2015b) provided a high-level review of environmental, land use and heritage issues within the study area to provide context to potential source areas and schemes. Issues covered included:

- Planning and statutory requirements – there were no issues identified that would present a risk to approvals for investigation or development stages for the final locations.
- Land contamination – no areas of contamination were identified that would make the final sources unsuitable as a source of water.
- Heritage – potential impacts on known heritage sites were considered.
- Environmental issues that may impact on the sustainability of different sources. Environmental issues considered for the development of the permanent bores were:
 - Potential impact on groundwater dependent ecosystems (GDEs) and flows in waterways where groundwater contributes significantly. While these impacts can generally be managed, potential impacts were avoided.
 - Proximity to acid sulphate soil areas – lowering of groundwater tables may result in the oxidation of these soils and associated impacts.

- o Direct and indirect impacts of supporting infrastructure to permanent bores. This includes pipelines to connect the bores to regional water reticulation networks, pumping stations, water treatment facilities etc. In terms of direct impacts, the supporting infrastructure may have more substantial impacts than the actual bore infrastructure. This may include impacts on threatened ecological communities, flora and fauna, Aboriginal heritage and cultural sites, non-Aboriginal heritage sites, acid sulphate soils and sensitive receptors for noise and waterways

Jacobs (2015d) provided a multi-criteria assessment of all potential groundwater options considering the impact on GDEs at the proposed depth, the likelihood of increasing acid sulfate soil risk and known heritage issues. The results of the assessment for the Woodburn, Newrybar, Tyagarah and Alstonville options are summarised in Table 15. Further assessment will be required, however significant impacts can be avoided through site selection.

Table 15: Environmental and heritage assessment outcomes – groundwater options

Criteria	Woodburn	Newrybar	Tyagarah	Alstonville
Impact on GDEs at the proposed depth	Few GDEs but impacts manageable	Some GDE impacts, management unknown	Several GDEs, management difficult	Some GDE impacts, management unknown
Likelihood of increasing acid sulfate (ASS) soil risk	Medium probability of ASS <3m. Receptors >300m distance. Management required	Low probability of ASS <3m. Receptors >500m distance. Minor management required	Medium probability of ASS <3m. Receptors >300m distance. Management required	No known ASS to occur, no nearby receptors, no management required
Known heritage issues	No listed heritage sites, no management required	Known heritage in source area but impacts can be managed	No listed heritage sites, no management required	Some heritage areas but not adjacent to bore sites, no management required

Source: Jacobs (2015d)

The groundwater options are discussed in the following sections.

9.3 Option 3-1: Woodburn

There is an existing bore supply at Woodburn consisting of three bores (No. 1, No. 2 and No. 3) in the coastal sands aquifer which augments the supply to the Lower Richmond River supply area (Woodburn, Broadwater, Evans Head and Coraki) during dry periods (Section 3). In 2007/08 the borefield produced 46 ML. The existing borefield has a licence entitlement of 726 ML/a. Bores 1 and 2 have been compromised by the development of the Pacific Highway and are no longer used. Bore 3 has been replaced and is used as an emergency supply.

Based on the findings of the initial groundwater investigations, desktop investigations were undertaken for a potential new borefield scheme at Woodburn. Jacobs (2017d) provided preliminary aquifer modelling and determined borefield production estimates for the coastal sands aquifer in the Woodburn area and found that the Woodburn aquifer is capable of supplying the 2060 annual day demand for the Lower Richmond River supply area. Water quality was determined to be suitable for drinking water if appropriate treatment is implemented (iron and manganese removal) (Jacobs, 2018a). A concept design and capital cost estimate have been prepared for the scheme (Jacobs, 2018b).

The concept design for the Woodburn borefield includes four production bores (existing No. 3 and new No. 4, No. 5 and No. 6) which would operate 22 hours per day at 16 L/s providing a maximum borefield capacity of 5.0 ML/d. Bore pumps would be designed to operate with a 10 m maximum draw down in each bore (Jacobs, 2018b).

Treated water would be transferred to the existing Lower Richmond River supply system. The groundwater WTP would be located on the site of the existing chlorination facility and have a daily production capacity of 5.0 ML/d (Figure 12). The WTP would require the following treatment processes:

- Aeration unit with provision for pre-chlorination.
- Pre lime dosing for pH correction and alkalinity (if necessary) for reliable coagulation.
- Chemical coagulation with alum and flocculation.
- Upflow clarification to settle and remove floc (as waste sludge).
- Filtration of clarified water through multi-media gravity filter with filter air and water backwash.
- Collection of clarifier waste sludge and filter backwash water to enable recovery of washwater for blending.
- Thickening and disposal of sludge.
- UV disinfection designed for 4.0 log removal for Cryptosporidium.
- Post soda ash dosing for pH correction, and fluoridation.
- Chlorination to provide effective disinfection and a free chlorine residual to protect the treated water transfer system against recontamination.

If required ozonation and biologically activate carbon (BAC) filtration would be included between filtration and UV disinfection as a barrier to potential organic pollutant and taste and odour precursors.



Figure 12: Woodburn groundwater WTP inlet and layout

Source: Jacobs (2018b)

9.4 Option 3-2: Newrybar

Two options for groundwater supply at Newrybar have been identified (north and south) which may be combined to reduce capital costs. Concept designs and cost estimates for the Newrybar groundwater scheme are provided in Jacobs (2020b). The groundwater supply from these two sources would be combined with existing supplies to the Knockrow reservoir.

Based on the results from test bores in the vicinity, the total dissolved solids (TDS) of the water drawn from continuous operation of bores at the Newrybar south site would be around 5,000 mg/L resulting in the need for brackish water desalination of the groundwater to produce drinking water quality. The groundwater would require conventional treatment to clarify the water before reverse osmosis (RO) to remove salinity (Jacobs, 2020b). The method and costs associated with waste disposal from this treatment process have not yet been determined.

Up to 5 production bores and a standby bore each capable of producing 15 L/s (75 L/s in total) for a period of 22 hrs/day resulting in a daily brackish groundwater production of capacity of 6.0 ML/d from the south borefield. The estimated final output is 5.4 ML/d of drinking water discharged to the Knockrow reservoir and 0.6 ML/d of brine. A supply of low TDS groundwater is proposed in north Newrybar from 5 production bores and one standby bore each capable of producing 5 L/s (25 L/s in total) for 22 hrs/day with a daily production capacity of 2.0 ML/d. It is proposed to combine the two borefield supplies with treatment at a single WTP. The integrated Newrybar groundwater scheme would require a WTP comprised of a conventional clarifier and RO.

9.5 Option 3-3: Tyagarah

Concept designs and cost estimates for the Tyagarah groundwater scheme are provided in Jacobs (2020b). There are two schemes which have been identified for utilising the groundwater produced at Tyagarah. Scheme 1 would transfer the treated groundwater to the Ocean Shores reservoirs (Saddle Road, Yamble and Warrambool) and Rous retail customers and Scheme 2 to the St Helena reservoir.

Jacobs (2020b) considered that the schemes could be constructed in two stages:

- Scheme 1:
 - Stage 1 - supply 6.4 ML/d of treated water from four production bores and one standby bore. Groundwater treated at a new WTP with the capacity to treat both stages.
 - Stage 2 - construction of an extra bore to supply 7.5 ML/d.
- Scheme 2:
 - Stage 1 - supply 10.8 ML/d of treated water from six production bores and one standby bore. Groundwater treated at a new WTP with the capacity to treat both stages.
 - Stage 2 - construction of an extra bore to supply 12.5 ML/d

The option considered in this report includes initial construction of Scheme 1, stage 1 with future expansion to include Scheme 2 with an ultimate capacity of 12.5 ML/d. The future scheme would supply all of the Byron Shire apart from Bangalow with treated water distributed to the Ocean Shores reservoirs, retail customers along the Brunswick 300 trunk main and St Helena reservoir (servicing Byron Bay and Rous retail customers).

9.6 Option 3-4: Alstonville

The existing Alstonville borefield consists of 2 production bores, one at Lumley Park and one at Converys Lane which extract groundwater from fractured basalt to augment supply during dry periods (Section 3). This option proposes that the bore at Lumley Park be retained while the bore at Converys Lane would be replaced with a new bore adjacent to the existing bore. Concept designs and cost estimates for the Tyagarah groundwater scheme are provided in Jacobs (2020b). The two bores would operate 22 hours per day and a minimum of 320 days per year. This option proposes the construction of a standby bore at Elvery Lane to provide operational security. The existing water licence for the Converys Lane bore can be transferred to the replacement bore providing it is constructed within 20m of the existing bore. A new WTP and a transfer pump station and pipeline to transfer the groundwater to the Wollongbar reservoir would be required. The estimated long-term capacity of the two bores is 4.5 ML/d

Jacobs (2020b) also considered the option of utilising the existing Marom Creek WTP (refer Section 8) to treat groundwater from the Alstonville borefield. The existing Marom Creek surface water supply would be blended with the groundwater supply. Cost savings would be achieved by utilising the existing Marom Creek WTP and the existing pipeline from the Marom Creek WTP to Wollongbar reservoir (not presently used) to transfer groundwater to the WTP. A new pipeline from the Marom Creek WTP to Wollongbar reservoir would be required.

The option considered in this report is the new bores (CL1 and AL2) at Wollongbar and Alstonville, with groundwater transferred to the Marom Creek WTP with distribution to customers from the Wollongbar reservoir.

9.7 Summary of Groundwater Options

9.7.1 Borefield and WTP capacity

A summary of the four groundwater options considered in this report is given in Table 16.

Table 16: Summary of groundwater options

Borefield	Groundwater inflow to WTP (ML/d)	WTP capacity (ML/d)	Treatment process
Woodburn	5.0	5.0	Conventional
Integrated Newrybar	8.0	7.2	Conventional and RO
Tyagarah (Scheme 1, Stage 1)	7.5	6.4	Conventional
Tyagarah (Scheme 2)	13.9	12.5	Conventional
Alstonville	4.5	4.0	Conventional

Source: adapted from Jacobs (2020b)

9.7.2 Secure yield

The secure yield of the groundwater schemes has been assessed using the RCC Bulk Water Supply Security Model (Engeny, 2020) with results shown in Table 17. The 2020, 2030 and 2060 secure yield of the groundwater options is shown in Figure 13, using a similar approach as for the current system (Section 5.2).

Table 17: Increase in system secure yield with groundwater schemes

Option	Historic climate (5/10/10)	Reduction factor ¹	1°C climate warming
Woodburn	800	0.932	745
Integrated Newrybar	2,100		1,956
Tyagarah (Scheme 1, Stage 1)	2,050		1,910
Tyagarah (Scheme 2)	3,950		3,679
Alstonville	1,050		978

Source: Engeny (2020).

1. Reduction factor was only calculated for the combined groundwater schemes and has been applied to each scheme.

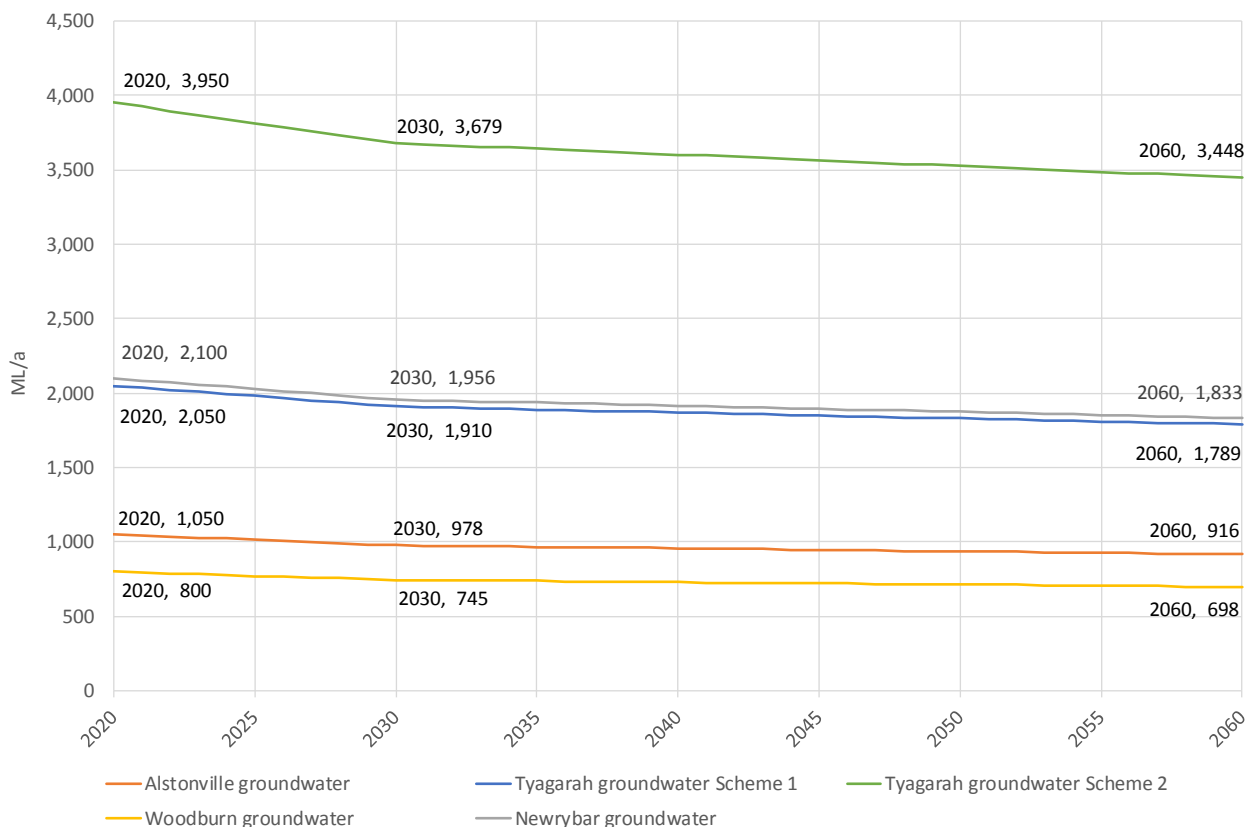


Figure 13: Secure yield estimates – groundwater options

9.7.3 Cost estimates

Preliminary cost estimates for each groundwater option have been provided by Jacobs (2020b) as detailed in Table 18. NPV calculations are included in Appendix 1.

Table 18: Groundwater preliminary cost estimate

Component	Woodburn (2020 \$)	Integrated Newrybar (2020 \$)	Tyagarah (Scheme 1, Stage 1) (2020 \$)	Tyagarah (Scheme 2) (2020 \$) ¹	Alstonville (2020 \$)
Pre-construction costs	\$3,812,000	\$14,535,000	\$11,355,000	\$2,930,000	\$7,612,000
Construction costs	\$31,685,000	\$47,160,000	\$37,250,000	\$25,206,250	\$31,190,000
Integration costs	\$985,000	\$1,460,000	\$1,175,000	\$635,000	\$985,000
Total initial capital cost	\$36,482,000	\$63,155,000	\$50,852,000	\$30,462,250	\$25,941,000
Renewal costs (80 years)	\$67,928,077	\$79,534,935	\$96,773,395	\$127,695,494	\$67,433,077
Maintenance costs (80 years)	\$13,104,300	\$18,984,800	\$9,242,510	\$23,261,600	\$4,546,510
Operating costs (80 years)	\$52,288,000	\$113,316,000	\$72,420,960	\$108,479,120	\$45,843,200
Whole-of-life (80 years)	\$169,802,377	\$274,990,195	\$229,288,865	\$277,659,139	\$143,763,787
NPV (80 years @ 5%)	\$55,817,346	\$98,566,607	\$76,008,100	\$70,231,337	\$44,109,829
NPV (40 years @ 5%)	\$51,230,292	\$91,091,988	\$69,888,062	\$61,558,652	\$40,065,265
Yield benefit (2020 – 2060) ML/a	698	1,883	1,789	3,448	916
NPV/ML secure yield (40 years)	\$73,396	\$49,696	\$39,065	\$38,213	\$43,739

1. RCC has adjusted costs presented in Jacobs (2020b) to allow for the staged construction of the Tyagarah scheme. The ultimate scheme would provide a yield benefit of 3,448 ML/a with costs from both stages.

9.8 Data Gaps and Key Risks

To progress the development of these four groundwater options, the items outlined in Table 19 should be addressed by RCC. These would be undertaken as part of planning stages and would be completed prior to a decision to proceed with the planning and approvals for the groundwater options.

Table 19: Data gaps and project risks – groundwater

Item	Discussion	Action required
Concept development	Further bore testing to confirm the sustainable yields, impacts on other water users within the aquifers and water quality.	Bore testing
Wastewater disposal	Development of options for disposal of brine waste from Newrybar RO plant.	Concept development
Concept design	Concept designs for Newrybar, Tyagarah and Alstonville groundwater options (bores, collector systems, treatment and integration with existing network) are required.	Concept designs
Detailed design	Detailed design of all infrastructure.	Detailed design phase
Cost estimates	Review of total project cost estimates.	Detailed design phase
Environmental investigation	Detailed investigation of the environmental impacts of bore construction and associated infrastructure.	Specialist studies
Land acquisition	<ul style="list-style-type: none"> Assessment of property acquisition costs (land and administration charges) under the <i>Land Acquisition (Just Terms Compensation) Act 1991</i>. Subsequent purchase of land. 	Land valuation and acquisition
Community engagement	Development and implementation of a community engagement strategy is required.	Strategy to be developed as part of Future Water Project 2060.

10. OPTION 4: DESALINATION

Desalination is the process of removing salt and other minerals from water. Desalination of seawater provides an unlimited, climate independent and reliable new water supply. However, energy consumption is very high.

10.1 Site and Treatment Options

Detailed investigations into desalination investigations were undertaken by GANDEN (2020). The investigations included a review of previous studies, confirmation of plant capacity and identification and assessment of potential locations of the plant considering network connectivity, power supply, social and environmental factors. Various desalination technologies, intake and outlet structures were considered. Single facilities of 5-10 ML/d capacity were considered to ensure economic viability.

The following three potential site locations were identified for the assessment based on previous information and in consultation with RCC:

- Byron Bay (adjacent to the existing West Byron wastewater treatment plant (WWTP)).
- Lennox Head (adjacent to the existing WWTP).
- South Ballina.

These locations were selected based on the following considerations:

- Proximity to seawater sources.
- Water supply demand in areas of large population growth or existing high population to justify the capital expenditure.
- Proximity of electrical infrastructure and water reticulation networks that can support the proposed facilities.

The opportunities, risks and constraints identified for each location in the desktop study are outlined in Table 20.

Table 20: Risk and opportunities of different desalination plant locations

Location	Opportunities	Risks and Constraints
Lennox Head	<p>Location of large population growth.</p> <p>Likely good access to land adjacent to existing WWTP.</p> <p>Co-location of existing WWTP ocean outfall.</p> <p>Simple to connect to power.</p>	<p>Expensive to connect intake underneath Skennars Head properties.</p> <p>Connection to East Ballina reservoirs would be required as current population does not warrant a new 5 – 10 ML/d plant.</p> <p>Emigrant Creek WTP and Knockrow reservoir already provide more supply redundancy than other LGAs (e.g. Byron Shire).</p>

Location	Opportunities	Risks and Constraints
South Ballina	<p>Large baseline population in Ballina Shire.</p> <p>Cheaper land compared to alternative locations.</p> <p>5 ML/d would serve current population and 10 ML/d would serve Ballina, Skennars Head and Lennox Head.</p>	<p>Expensive to connect power and treated water pipeline across the Richmond River, adding \$5.0 - \$10 million using horizontally direct drilling.</p> <p>Would require connection to Skennars Head and Lennox Head to justify 10 ML/d capacity.</p> <p>Location at risk of inundation and being isolated during floods.</p> <p>Intake/outfall in area of high erodibility.</p> <p>Water quality risk due to flood waters creating sediment plume at the Richmond River mouth.</p> <p>Additional expense to extend intake/outfall past observed Richmond River sediment plume.</p>
Byron Bay	<p>High demand area with high population growth.</p> <p>RCC may operate the facility to deal with additional potable demand associated with seasonal events and tourism influx.</p> <p>Simple connection to existing electrical infrastructure and potable water mains.</p> <p>No perceived risk of flood inundation.</p>	<p>Potentially expensive building envelope.</p> <p>Tyagarah Nature Reserve runs along coast and is highly sensitive to erosion.</p> <p>Community perception would need to be managed carefully.</p>

Source: GANDEN (2020)

Based on the risks and opportunities identified in Table 20, Byron Bay was chosen as the preferred location as it located in an area with large projected growth with the future projected demand of the wider area (Byron Bay, Suffolk Park, Ocean Shores, Brunswick Heads and Bangalow) predicted to grow to 11 ML/d by 2036 making it a suitable area to be served by a 10 ML/d desalination plant (Figure 14). Furthermore, the site is located close to power supplies and the existing water reticulation network (GANDEN, 2020).

Multi-criteria analysis was undertaken to compare a range of desalination technologies and a range of seawater intake technologies able meet the following three mandatory criteria:

- Achieves water quality objectives (i.e. will meet the Australian Drinking Water Guidelines).
- Possible to implement in Rous regional supply area.
- Practical to implement in Rous regional supply area.

The MCA assessed the technologies on their whole life cost, proof of the technology, resourcing, support and process resilience (considering environmental changes such as beach erosion, salinity and turbidity resulting from heavy rain) and their value for money. Seawater Reverse Osmosis (SWRO) was chosen over Electrodialysis Reversal as the preferred desalination technology. Offshore Open Intake was chosen over a Subsurface Ranney Collector as the preferred seawater intake technology. Other desalination (nanofiltration, Capacitive Deionisation/ Membrane assisted Capacitive Deionisation, Ion exchange and thermal and solar distillation) and seawater intake technologies were assessed by GANDEN (2020) however they did not meet the mandatory criteria.



Figure 14: Proposed desalination plant location in Byron Bay

Source: GANDEN, 2020

A cost comparison was used to compare conventional pre-treatment (coagulation-flocculation-media filtration) and microfiltration (MF) and ultrafiltration (UF) systems. MF/UF filtration was provisionally recommended by GANDEN (2020) however the report acknowledges this preference is based on limited data on feedwater quality.

10.2 Preliminary Concept Design

A concept design layout and cost estimates were provided by GANDEN (2020) for the preferred option which includes a seawater desalination plant with a production capacity of 10 ML/d. The plant would be constructed in stages of 5 ML/d initially followed by two incremental increases of 2.5 ML/d to achieve the ultimate capacity of 10 ML/d.

The preliminary concept design was developed by GANDEN using Suez Water Technologies & Solutions' 'skid-based' technology to allow for a staged construction approach. The concept design comprises the following components:

- Ocean offshore seawater intake system.
- Pre-treatment screens.
- Chemical dosing.
- UF/MF pre-treatment filtration.
- 4 x 2.5 ML/d scalable 'SeaPAK' (A Suez Water product) trains.
- High pressure pumps, membrane pressure vessels and energy recovery devices.

- Post treatment systems, including pH adjustment and fluoridation requirements.
- Backwash wastewater settling tank, belt press and sludge disposal systems.
- Brine outfall systems.
- Building and amenities.

The concept design for the seawater intake and waste outfall has not been finalised as these are dependent on the final site selection. However, as they would be located in the Cape Byron Marine Park, potential impacts and approval requirements would need to be addressed. The intake would most likely comprise a directionally drilled pipeline with a dual intake/outfall system.

Chemicals such as sodium hypochlorite, anti-scalant, biocide, sodium bisulphite, sulphuric acid, remineralisation chemicals and 'clean in place' solution are required for dosing and would be stored in either 20 L drums, itemised bulk containers or small tanks and directly dosed from the storage device. Disinfection of the treated water would be undertaken at the treated water reservoir/chlorine contact tank. Concentrate disposal would be achieved by depositing the reject concentrated brine water through the outfall system and hence treatment chemicals would be selected to allow for environmental discharge (to be confirmed during detailed environmental assessment and monitoring). Pre-filtration of the intake water would be achieved using membrane ultrafiltration. Cartridge filters would be situated between the UF units and RO membranes to act as a second line of defence in case of UF filtration failure.

The SWRO membranes would be fixed inside fiberglass reinforced plastic pressure vessels (normally between 5 and 7 membranes per vessel). Multiple pressure vessels would be located on a rack, called "arrays" or modules. The RO permeate would then be transferred to post treatment and the concentrate to disposal via an ocean outfall. The feed water would pass through the RO membranes once (i.e. a one-pass system) to produce approximately 40% RO permeate and 60% concentrate. Approximately 252 membranes and 36 RO pressure vessels would be required for each 2.5 ML/d train.

The desalination plant concept design is shown in Figure 15. The concept design includes future filtration and RO membranes which would be installed when the capacity of the plant is required to be increased.

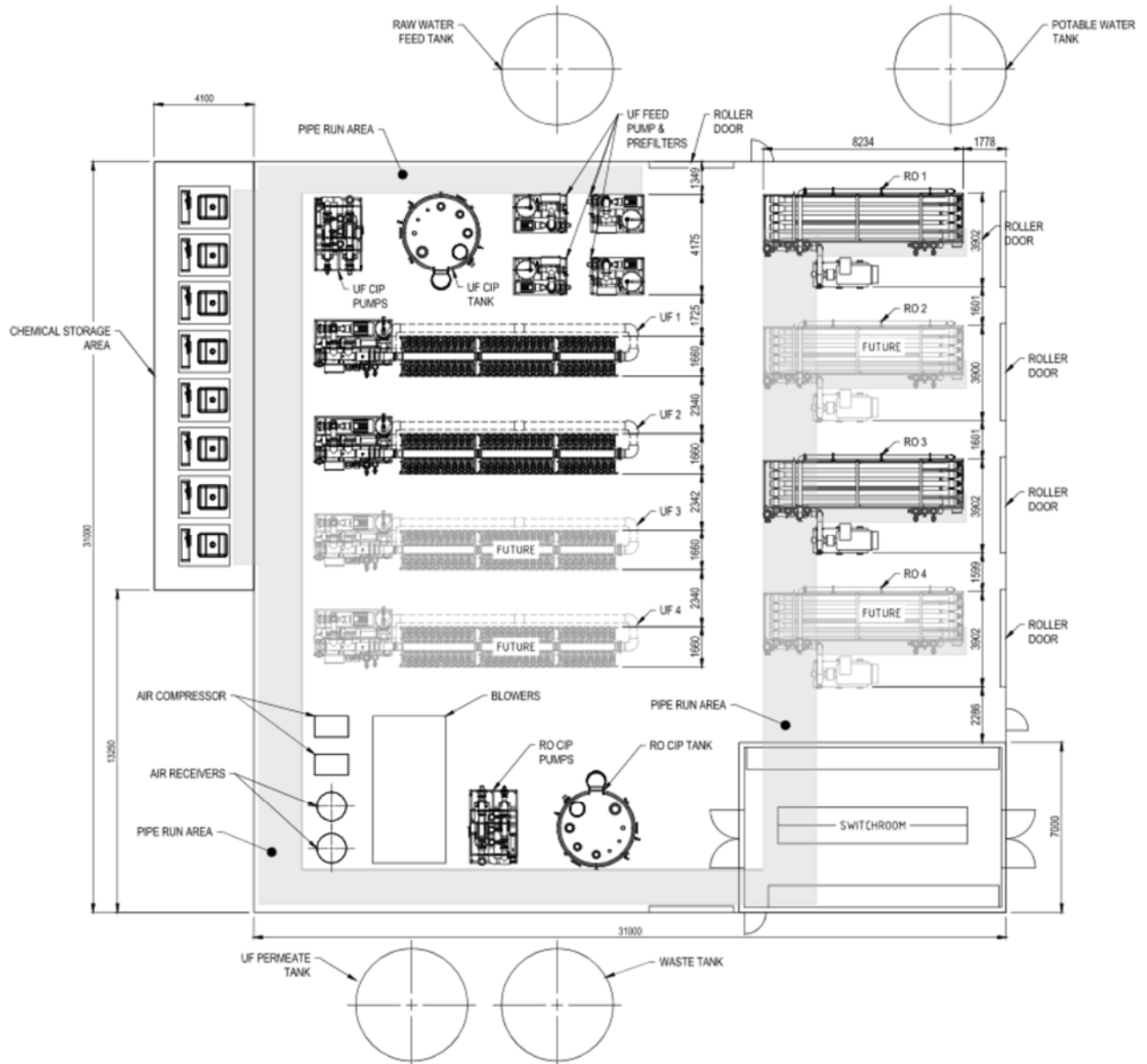


Figure 15: Concept design plant layout

Source: GANDEN, 2020

10.3 Environmental and Social Considerations

Desalination schemes that have been implemented in Australia have generally been met with significant community resistance and criticism (GeoLink, 2011, GANDEN, 2020). GeoLink (2011) suggested that for a desalination scheme in the Rous supply area to be accepted by the community, a multi-criteria assessment that is effectively communicated to the community would be necessary.

A desalination option was included in the IWP (MWH, 2014) which identified desalination as a potential new source to be considered as a safeguard should other sources prove unviable and insufficient. The IWP included desalination as a future component in a scenario in combination with groundwater sources to be implemented when demand exceeded the additional supply provided by the groundwater sources.

Based on a review of existing literature GANDEN (2020) identified and documented the following environmental challenges and potential impediments associated with developing desalination facilities:

- Potential ecological impacts associated with seawater intakes.

- Potential environmental and ecological impacts associated with brine discharge.
- Potential environmental impacts on coastal land.
- Native title considerations.
- Energy consumption.

An environmental impact assessment would be required to assess environmental conditions and establish design parameters. A Marine Parks permit would be required to construct an intake/outfall pipeline at the Byron Bay site (permissibility of this activity has been assumed).

The *Northern Rivers Regional Bulk Water Supply Study* (Hydrosphere Consulting, 2013) found that the incorporation of marine water desalination would be an attractive source augmentation option for a regional scheme (including interconnection with the Tweed Bray Park system) as this is easily scalable to match demand and is independent of climate, thus providing a highly secure water supply. Desalination provides climate independence that is currently missing from the region's water supplies. Desalination schemes have been successfully developed elsewhere and improvements in technology are likely to improve the attractiveness in future.

10.4 Secure yield

The secure yield of the desalination option has been assessed using the RCC Bulk Water Supply Security Model (Engeny, 2020) with results shown in Table 21.

Table 21: Increase in system secure yield with desalination

Option	Historic climate (5/10/10)	Reduction factor ¹	1°C climate warming
Desalination (10 ML/d)	1,550	1.0	1,550

Source: Engeny (2020).

1. Desalination is independent of climate.

10.5 Cost Estimates

The capital cost for the proposed plant was developed by GANDEN (2020) by benchmarking against a desalination plant in Agnes Waters as the most representative example of a similar sized desalination project executed in Australia (Table 22). NPV calculations are included in Appendix 1.

Table 22: Desalination preliminary cost estimate

Component	Cost Estimate (2020 \$)
Stage 1 – 5 ML/d capital cost	\$47,000,000
Stage 2 – 2 x 2.5 ML/d capital cost	\$7,000,000
Renewal costs (80 years)	\$36,794,547
Maintenance costs (80 years)	\$20,765,000
Operating costs (80 years)	\$103,138,940
Whole-of-life (80 years)	\$214,698,487
NPV (80 years @ 5%)	\$84,662,855
NPV (40 years @ 5%)	\$78,991,236
Yield benefit (2020 – 2060) ML/a	1,550

Component	Cost Estimate (2020 \$)
NPV/ML secure yield (40 years)	\$50,962

10.6 Data Gaps and Key Risks

To progress the development of Byron Bay desalination option, the items outlined in Table 23 should be addressed by RCC. These would be undertaken as part of planning stages and would be completed prior to a decision to proceed with the planning and approvals for the desalination options.

Table 23: Data gaps and project risks – Byron Bay desalination

Item	Discussion	Action required
Location	Further investigation is required to confirm the most suitable plant location including further environmental assessment.	Detailed design phase
Integration	Further assessment of network integration and electrical headworks is required.	Detailed design phase
Cost estimates	Review of total project cost estimates.	Detailed design phase
Environmental investigation	Investigation of the environmental impacts	Specialist studies
Marine Park impacts	Investigation and consultation regarding impacts on Cape Byron Marine Park and approvals required.	Specialist studies
Land acquisition	<ul style="list-style-type: none"> Assessment of property acquisition costs (land and administration charges) under the <i>Land Acquisition (Just Terms Compensation) Act 1991</i>. Subsequent purchase of land. 	Land valuation and acquisition
Community engagement	Development and implementation of a community engagement strategy is required. RCC considers that community opposition to desalination on the basis of high energy consumption is a significant risk.	Strategy to be developed as part of Future Water Project 2060
Detailed design	Detailed design of all infrastructure.	Detailed design phase

11. OPTION 5: INDIRECT POTABLE REUSE

11.1 Indirect Potable Reuse Scheme Options

This option involves reusing advanced treated wastewater effluent by transferring it to the surface water sources. The feasibility of indirect potable reuse (IPR) options was explored in a desktop study which considered opportunities to reuse wastewater effluent to reduce or replace potable water demand within the bulk supply area (CWT, 2020). The study considered the following six WWTPs for their potential to provide effluent for water reuse:

- Ballina WWTP (BaSC).
- Lennox Head WWTP (BaSC).
- Alstonville WWTP (BaSC).
- Bangalow WWTP (BySC).
- South Lismore WWTP (LCC).
- East Lismore WWTP (LCC).

CWT considered the current wastewater production, existing recycled water schemes and the location of each of the plants to consider how a reuse scheme could be configured. The potential quantity of source wastewater provided by each WWTP is provided in Table 24.

Table 24: Current wastewater production and recycling levels at WWTPs

Treatment plant	Annual Wastewater production (ML)	Current water reuse scheme	Current reuse rate/amount	Additional wastewater yield
Ballina WWTP	2,400 – 3,400	Dual reticulation recycled water scheme	NA	1,300 ML/a ¹
Lennox Head WWTP	1,400 – 1,700		10-80%	
Alstonville WWTP	600 – 750	Local recycled water scheme	Average- 50% Dry weather periods- 70-90%	70-120 ML/a ²
Bagalow WWTP	140 - 170	Previous scheme- recycled water for bamboo crop irrigation	0% Previously 13%	70-110 ML/a ²
South Lismore WWTP	NA	None	0	2,700 ML/a ¹
East Lismore WWTP	NA		0	

Source: CWT (2020), MWH (2014)

1. These values were assumed in the IWP process (MWH, 2014) but should be confirmed through further investigation.

2. These values have been estimated by CWT.

3. LCC data were not provided for the study.

Based on the potential additional yield, Ballina and Lennox Head (combined) and South Lismore and East Lismore (combined) were considered to be potential options for providing source effluent. The treated effluent from these sources may be transferred to a potable water supply source (ECD or Wilson River Source) where it would be further treated in an advanced water recycling plant (AWRP) or the existing

WWTPs could be upgraded and the effluent treated to a high standard before being transferred to the water supply source. Table 25 outlines the potentially feasible schemes for utilising these effluent sources to provide additional potable water supply (CWT, 2011). Cost estimates have not been prepared for the schemes.

Table 25: Summary of potentially feasible scheme options

Water source	Scheme description	Source(s)	Infrastructure cost
WRS	Pump treated effluent to WRS at treat in a common AWRP	East Lismore and South Lismore WWTP	High
	Individual AWRP upgrades at existing WWTPs then pumping recycled water to WRS	South Lismore WWTP	High
		East Lismore WWTP	High
ECD	Pump treated effluent to ECD and treat in a common AWRP	Ballina and Lennox Head WWTP	High
	Individual AWRP upgrades at existing WWTPs then pump recycled water to ECD	Ballina WWTP	Medium
		Lennox Head WWTP	Medium

Source: CWT, 2020

CWT (2020) identified the preferred IPR scheme to be the transfer of treated effluent from Ballina WWTP to Lennox Head WWTP where the two effluent sources would be combined and further treated in an upgraded AWRP at Lennox Head before being transferred to ECD. This arrangement was considered to result in the lowest infrastructure cost for the most potable water replacement. Figure 16 shows the arrangement of the scheme.

Further investigation is required to determine the potential additional yield that could be achieved by recycling the effluent from the East Lismore and South Lismore WWTPs and the best potential site for an AWRP. CWT (2020) anticipates that the best option would be to transfer effluent from East Lismore WWTP to South Lismore WWTP where the combined effluent would undergo advanced treatment before being transferred to the WRS.

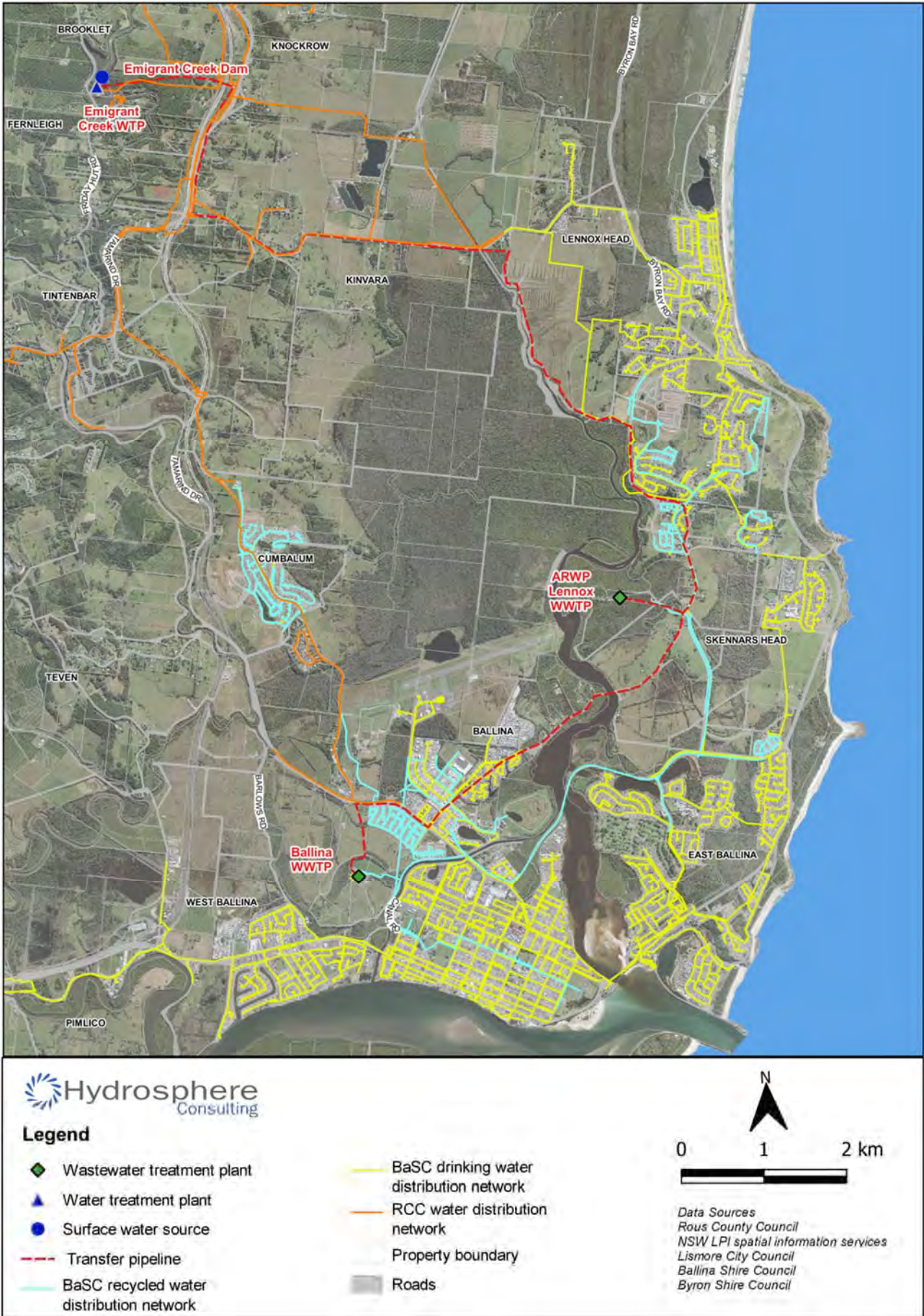


Figure 16: Ballina IPR scheme

11.2 Secure Yield

The secure yield of the IPR options has been assessed using the RCC Bulk Water Supply Security Model (Engeny, 2020) with results shown in Table 26. The 2020, 2030 and 2060 secure yield of the IPR options is shown in Figure 17, using a similar approach as for the current system (Section 5.2).

Table 26: Increase in system secure yield with IPR

Option	Historic climate (5/10/10)	Reduction factor ¹	1°C climate warming
East and South Lismore AWRP (5 ML/d to WRS)	750	0.969	727
Lennox Head AWRP (5 ML/d to ECD)	900		872
Combined schemes	1,350		1,308

Source: Engeny (2020).

1. Reduction factor was only calculated for the combined IPR schemes and has been applied to each scheme.

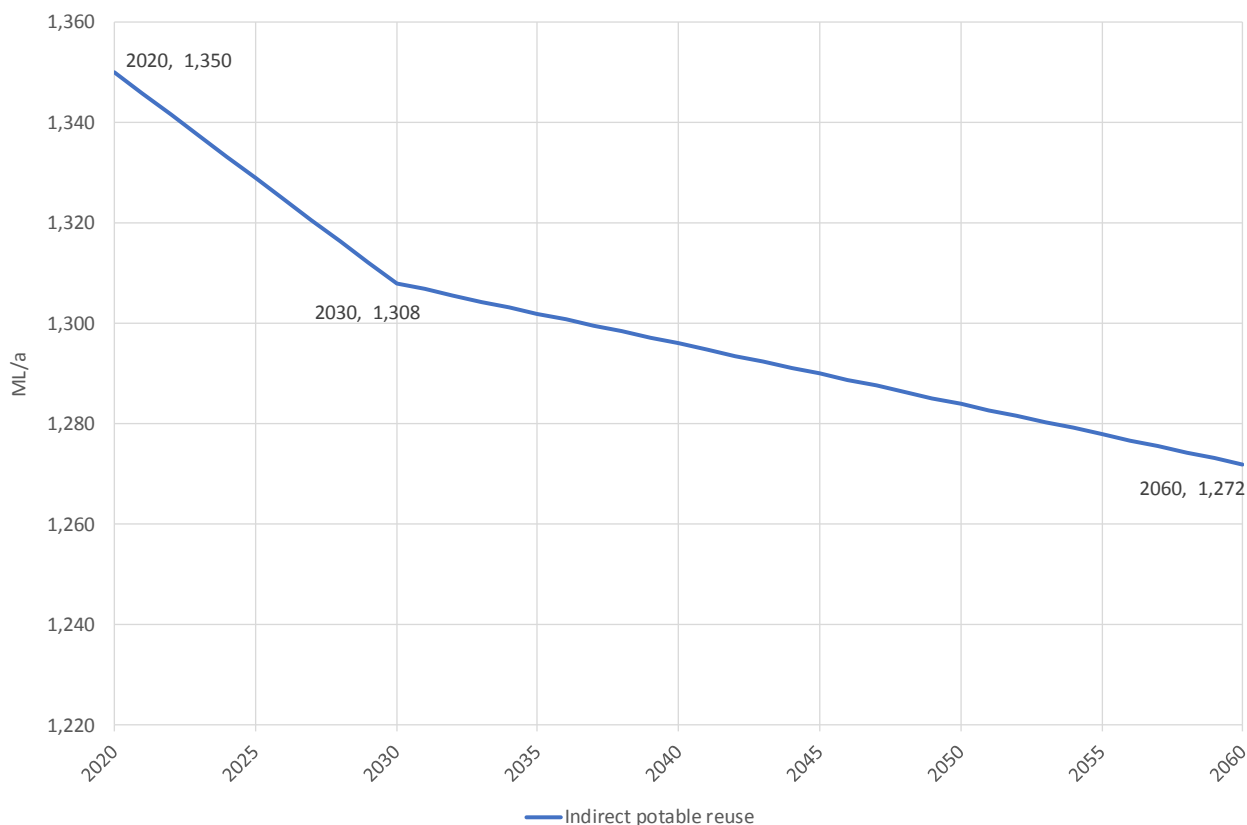


Figure 17: Secure yield estimates – IPR option

11.3 Data Gaps and Key Risks

To progress the development of the IPR options, the items outlined in Table 27 should be addressed by RCC. These would be undertaken as part of planning stages and would be completed prior to a decision to proceed with the planning and approvals for the IPR options.

Table 27: Data gaps and project risks – IPR

Item	Discussion	Action required
Concept development	<ul style="list-style-type: none"> Confirmation of wastewater volumes Treatment plant concepts Transfer system concepts 	Concept design
Cost estimates	Development of total project cost estimates. The cost of the scheme is likely to be high.	Concept design phase
Detailed design	Detailed design of all infrastructure.	Detailed design phase
Environmental investigation	Investigation of the environmental impacts including the impact on water quality.	Specialist studies
Regulator consultation	Investigation of compliance with the Public Health Act, 2010 and ADWG. One of the critical considerations for this option is the approval by NSW Health that the scheme complies with public health requirements.	RCC has commenced consultation with NSW Health.
Community engagement	Development and implementation of a community engagement strategy is required. RCC considers that community opposition to IPR on the basis of public health concerns is a significant risk.	Strategy to be developed as part of Future Water Project 2060.

12. SOURCE AUGMENTATION SCENARIOS

12.1 Scenario Development

Despite the risks and data gaps identified in this report, Option 1 (Dunoon Dam), Option 2 (Marom Creek) and Option 3 (groundwater) are considered to be feasible and will be included in the source augmentation scenarios:

- Option 1 - implementation of Dunoon Dam will have a lead time of approximately 9 years (to allow for additional investigations, approvals, construction and filling of the dam). Hence a scenario including Dunoon Dam will require an interim solution to meet demand until approximately 2029.
- Option 2 - Connection to the Marom Creek water supply has a low initial cost with minimal planning and development required. The WTP is an existing asset (requiring upgrade). However, asset ownership and future supply to Wardell will need to be resolved with BaSC. This option is considered to be worth pursuing to meet the short-term demand deficit.
- Option 3 - implementation of groundwater options will have a lead time of approximately 2.5 to 4.5 years (to allow for additional investigations, approvals and construction). Groundwater options may be implemented in stages and the following have been considered in the development of staging for a groundwater scenario:
 - Alstonville groundwater – optimises Marom Creek option and expands on an existing scheme and licences but has low yield.
 - Woodburn groundwater – expands on an existing scheme, licences and land but has low yield and high cost.
 - Tyagarah groundwater – relatively low-cost groundwater, with high yield but requires a new scheme and potential impacts on GDEs need to be managed.
 - Newrybar groundwater - relatively high cost groundwater, high yield, but requires a new scheme and potential risk with wastewater disposal need to be addressed.

RCC considers that Option 4 (desalination) and Option 5 (IPR) are not as attractive due to operational constraints and expected stakeholder opposition:

- Option 4 - desalination has a high yield, is independent of climate but has a high cost. In addition, the energy consumption is very high due to the treatment processes required (2.5 times the energy consumption of a groundwater scheme with conventional treatment, based on data provided in MWH (2014)). Impacts on the Marine Park and approval requirements have not yet been determined.

The preferred desalination scheme would supply Byron Shire. Hence a groundwater scheme in Tyagarah and a desalination scheme in Byron cannot be included in the same scenario as local demand would be provided by only one option.

As discussed in Section 10.3, a regional desalination facility with interconnection of the Tweed and Rous regional supplies may be considered in future. This provides additional options regarding service area, site location and capacity which may make this option more attractive.

- Option 5 - IPR schemes have a low yield benefit and a potentially high cost. There is also a significant risk that the scheme would not meet public health requirements. Hence IPR has not been considered further.

12.2 Source Augmentation Scenarios

This report compares two potential source augmentation scenarios to provide water security to 2060:

- Scenario 1 – Groundwater (with Marom Creek). Scenario 1 includes the connection of Marom Creek WTP to the Rous regional supply in the short-term with staged implementation of groundwater schemes and treatment plants until the required supply yield is achieved. The components of Scenario 1 are shown on Figure 18.
- Scenario 2 – Dunoon Dam. Scenario 2 includes the connection of Marom Creek WTP to the Rous regional supply in the short-term with construction of a new dam at Dunoon. Scenario 2A considers the 20 GL dam with potential future augmentation to 50 GL. Scenario 2B considers the 50 GL dam. Both scenarios include initial implementation of the Marom Creek and Alstonville groundwater options. The Dunoon Dam scenarios include the upgrade of Nightcap WTP in 2034 from 70 ML/d to 100 ML/d. The components of Scenario 2 are shown on Figure 19.

If further investigations find that Marom Creek is not a viable option, the Woodburn groundwater scheme could be reinstated in the short-term.

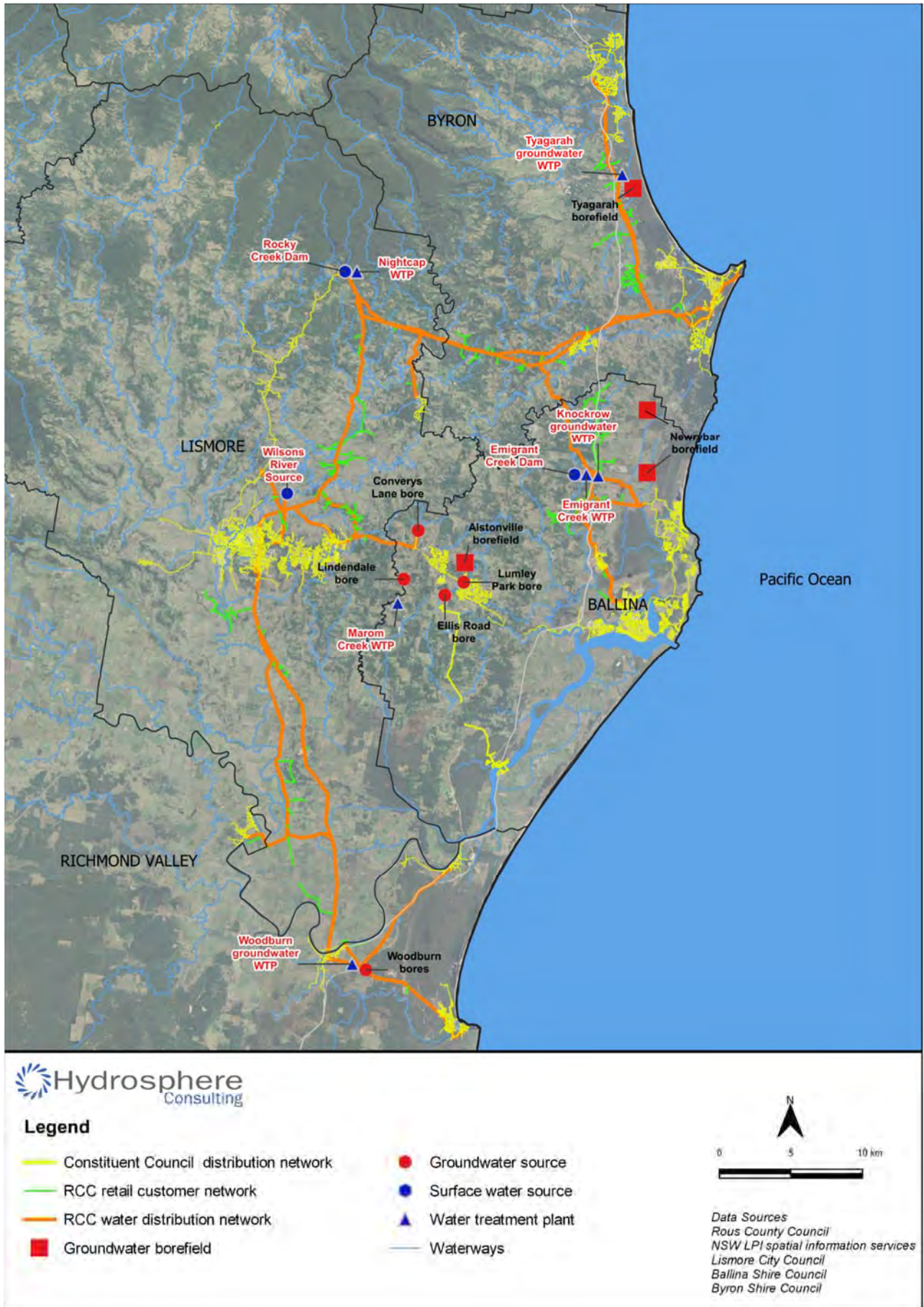


Figure 18: Scenario 1: Groundwater (with Marom Creek WTP)

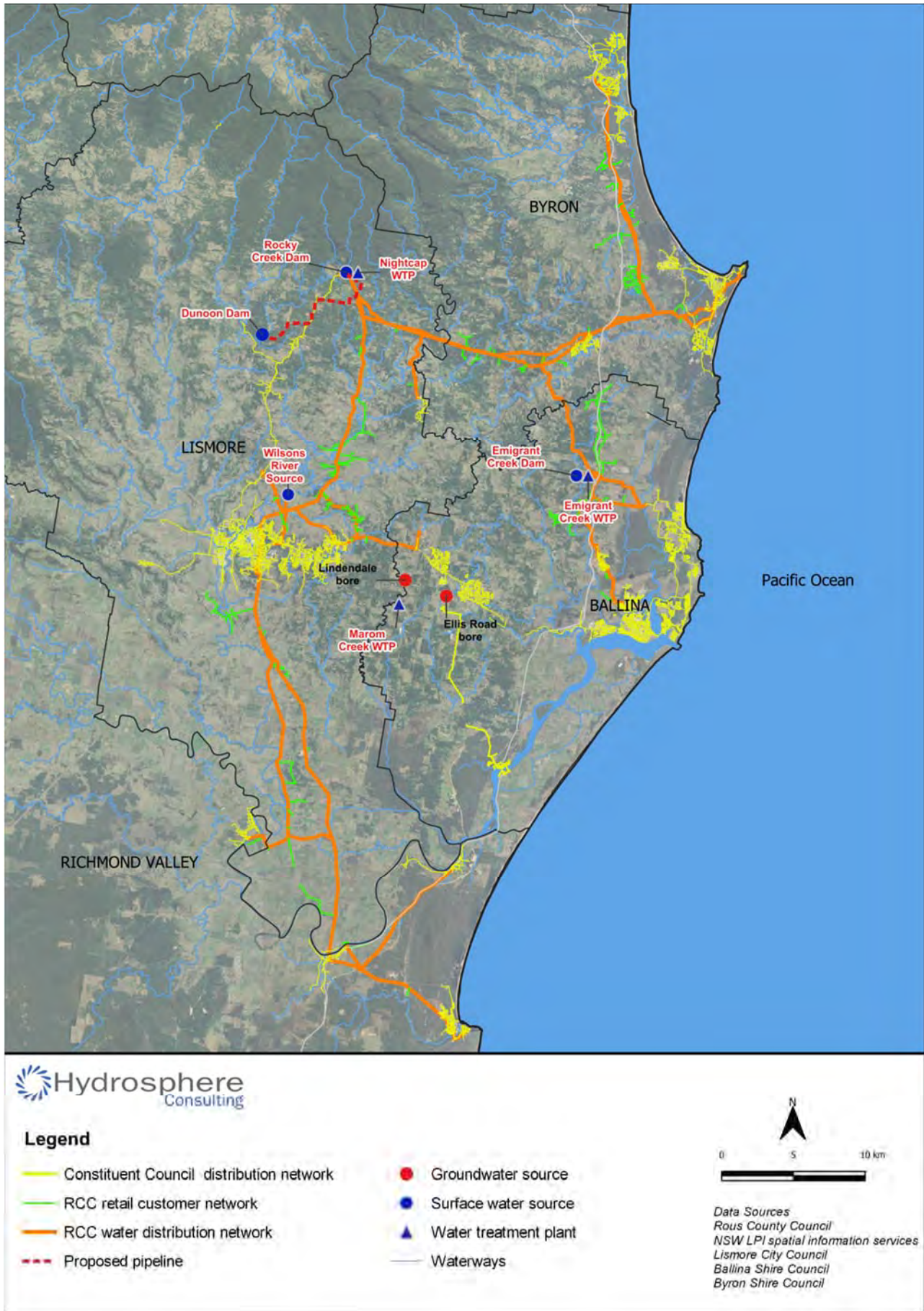


Figure 19: Scenario 2: Dunoon Dam (with Marom Creek WTP)

12.3 Secure Yield

RCC has developed these two scenarios as they are the only combinations of feasible options that passed the coarse screening and can provide the required secure yield over the long term. The staging and secure yield for each scenario are shown in the following figures compared to the dry year unrestricted demand forecast.

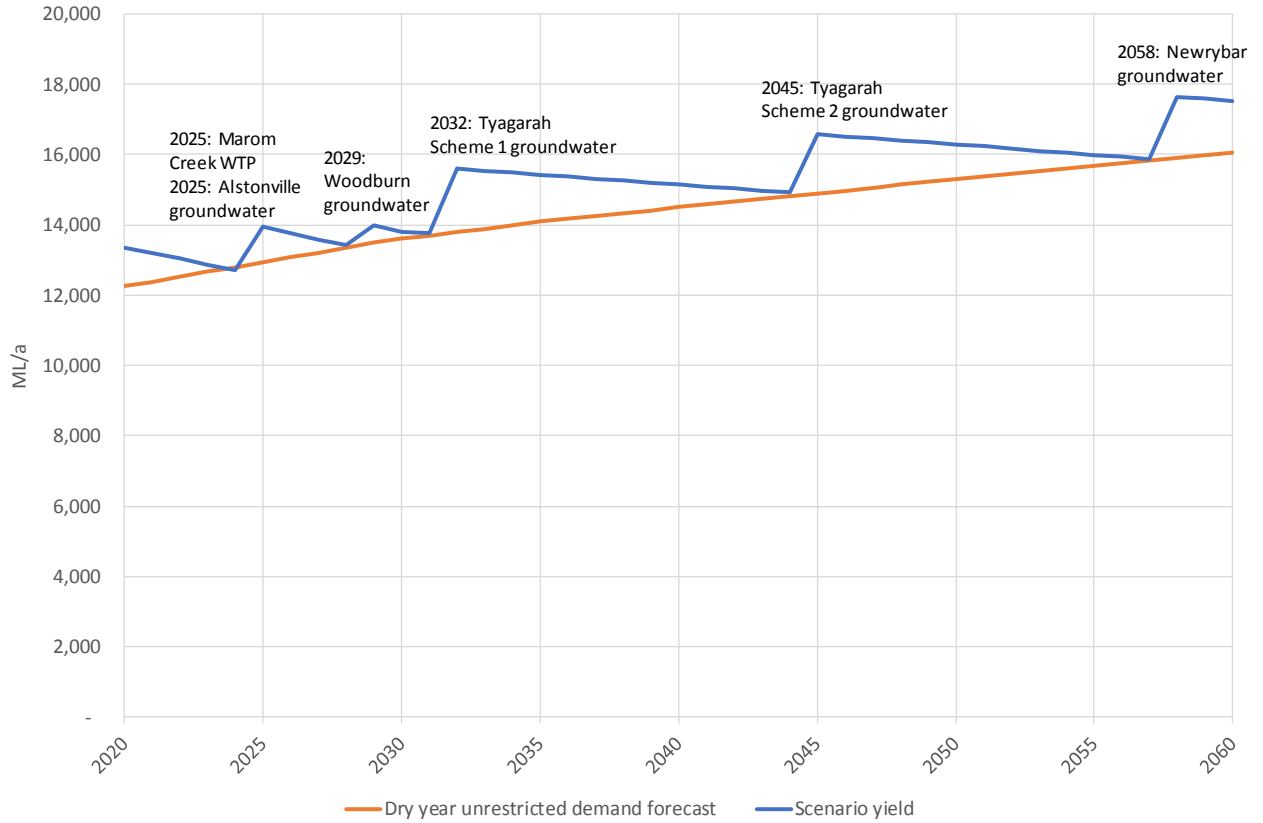


Figure 20: Secure yield and staging for scenario 1: Groundwater

The groundwater schemes identified for Scenario 1 will be able to meet demand until approximately 2072 assuming a similar rate of growth in demand is experienced beyond 2060.

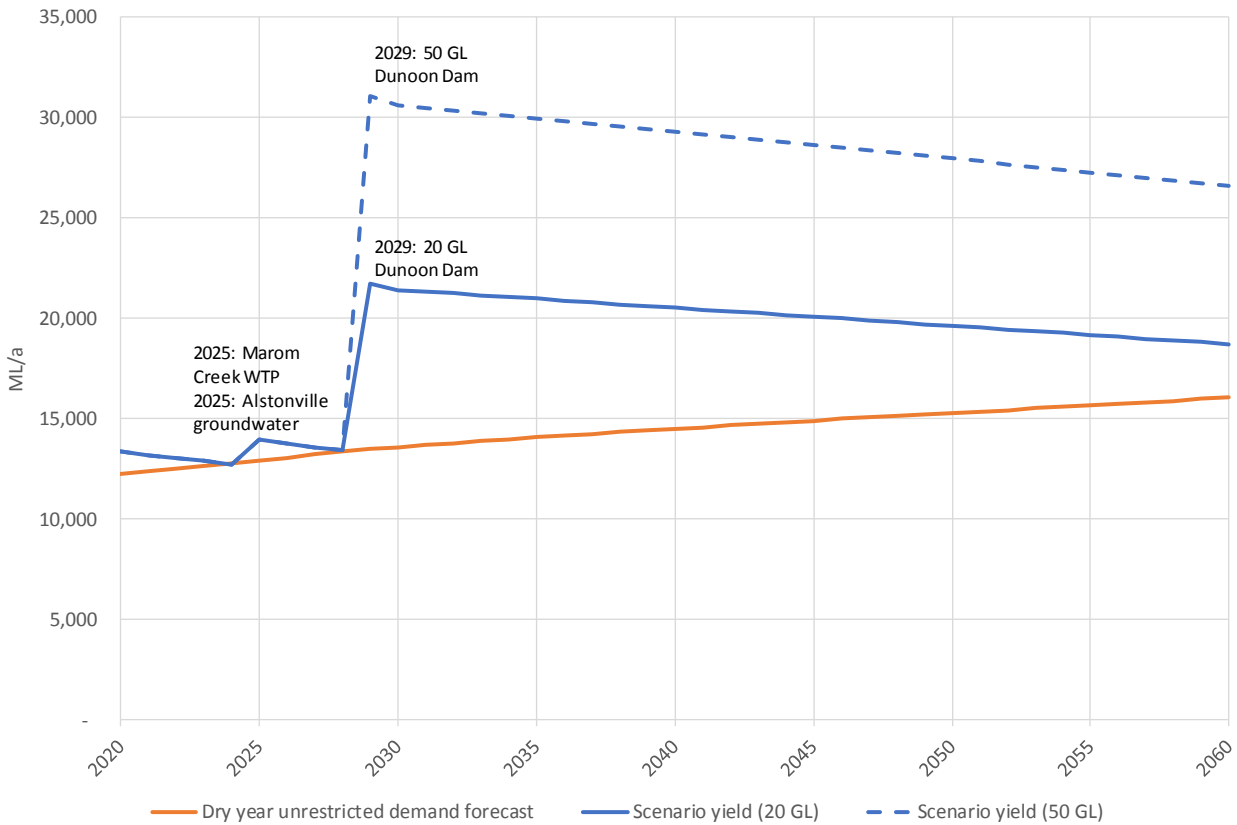


Figure 21: Secure yield and staging for scenario 2: Dunoon Dam

Scenario 2A (20 GL Dunoon Dam) would require augmentation to the 50 GL dam in approximately 2080 assuming a similar rate of growth in demand is experienced beyond 2060 and assumptions about future yield are realised. The 50 GL demand (Scenario 2B) will be able to meet demand until approximately 2115.

12.4 Multi-Criteria Analysis

12.4.1 Methodology

The multi-criteria analysis (MCA) methodology used in this project has been developed with consideration of previous studies undertaken by RCC in 2014, the coarse assessment (Section 0) and the IWCM Information Sheet 2 – *Evaluation of integrated water cycle management scenarios* (NSW Department of Industry, 2019).

The triple-bottom-line (TBL) assessment criteria are discussed in Table 28. Assessment criteria have been arranged into environmental and social groups.

Table 28: TBL assessment criteria

Criteria	Description	Information used
<i>Environmental (ranked considering the biodiversity management hierarchy – avoid, minimise, rehabilitate, offset)</i>		
Aquatic	Impact on groundwater and surface water quality and aquatic ecology and measures to offset those impacts.	Aquatic biodiversity impacts (e.g. high value aquatic ecosystems, threatened species, water quality, groundwater dependent ecosystems) and offsets proposed (e.g. environmental flows).

Criteria	Description	Information used
Terrestrial	Impact on terrestrial ecology and measures to offset those impacts.	Terrestrial biodiversity impacts (e.g. high value terrestrial ecosystems, threatened species) and offsets proposed (e.g. stewardship/ compensation).
Energy consumption	Operational energy consumption per kL of water produced.	Operational energy consumption (kWh/kL).
<i>Social</i>		
Typical residential bill	Impact on the typical residential bills for each Council from the revised notional cost.	Change in notional cost of bulk water supplied (\$/ML) and predicted impact on typical residential bills.
Water users	Impact on other water users and measures to offset those impacts.	Changes to groundwater and surface water flow regime and water available for other users.
Heritage	Impact on cultural heritage and measures to offset those impacts.	Aboriginal and European heritage impacts (sites, artefacts and significance) and management measures.
<i>Economic</i>		
NPV	NPV of capital and operating costs (80 years) at 5% discount rate.	Capital and operating costs.

The environmental and social criteria are further discussed in the following sections.

A weighted score has been calculated for each scenario. Ranking has been calculated as follows:

$$(Environmental\ Score + Social\ Score)/NPV$$

Weightings are assigned to each criterion based on relative importance so that the sensitivity of the weightings can be tested.

12.4.2 Environmental Criteria

Terrestrial and aquatic impacts have been based on the available information as summarised in this report. Detailed studies have been undertaken for the Dunoon Dam options (Section 7) and significant impacts on terrestrial and aquatic ecology have been identified. Actions to reduce these impacts (environmental flow regime and terrestrial biodiversity offsets) and the costs of these actions have been included in the dam scenarios. RCC considers that suitable measures can be put in place to obtain planning approval and ensure stakeholder acceptance of the dam scenarios.

While limited environmental investigations have been undertaken for groundwater options, identified impacts are considered to be manageable (potential impacts on GDEs in Tyagarah area require further assessment). RCC considers that suitable measures can be put in place to obtain planning approval and ensure stakeholder acceptance of the groundwater scenarios.

The energy consumption for each option has been estimated from data used in previous reports (Table 29).

Table 29: Energy consumption rates assumed for MCA

Option	Source	Energy Consumption (kWh/kL)	Production rate
Dunoon Dam	MWH (2014)	1.6	Annual production rate has been identified by RCC to supplement RCD extraction.
Marom Creek	CWT (2018)	0.91	1,570 ML/a
Groundwater – Alstonville	MWH (2014)	0.52	1,280 ML/a
Groundwater – Woodburn	MWH (2014)	0.30	1,600 ML/a
Groundwater – Tyagarah	MWH (2014)	0.70	4,000 ML/a (ultimate)
Groundwater – Newrybar	MWH (2014)	0.40	2,304 ML/a
Conventional groundwater WTP	CWT (2018)	0.91	As for Woodburn and Tyagarah
Conventional groundwater WTP with RO	Estimate	1.82	As for Newrybar

12.4.3 Social Criteria

The impact on customer bills has been assessed using the estimated increase in the notional cost of bulk water (the charge applied to bulk water sales to the constituent councils) at 2060 as a result of funding requirements for the scenarios as estimated by RCC using its financial planning model. The impact of the increase in the cost of water on the typical residential bill charged by the constituent councils at 2060 has been estimated based on the current costs for purchase of water and total expenses for each council. This assumes that the portion of bulk sales to each council remains the same. Other changes to council expenses have also not been considered.

Water sharing plans under the *Water Management Act, 2000* govern the sharing of water in a water source between water users and the environment and rules for the trading of water in the water source. Water access licences (WALs) entitle licence holders to specified shares in the available water within a particular water management area or water source (the share component) and to take water at specified times, rates or circumstances from specified areas or locations (the extraction component). WALs may be granted to access the available water governed by a water sharing plan under the Act.

Rocky Creek is subject to the *Water Sharing Plan for the Richmond River Area Unregulated, Regulated and Alluvial Water Sources 2010*. Use of water captured by Dunoon Dam would be subject to a WAL and may require a new or amended licence. The environmental flow regime proposed for the Dunoon Dam options is a key consideration for the water use and works approvals. RCC considers that suitable measures can be put in place to obtain approval and ensure stakeholder acceptance of the dam scenarios.

Similarly, for groundwater use, water sharing plan provisions are in place for environmental water allocations, basic landholder rights, domestic and stock rights and native title rights. RCC considers that suitable measures can be put in place to obtain approval and ensure stakeholder acceptance of the groundwater scenarios.

Cultural heritage impact assessments undertaken for Dunoon Dam have identified significant Aboriginal cultural heritage values and sites. This remains a key risk to be addressed for this scenario.

Preliminary assessment of cultural heritage impacts undertaken for the groundwater options have not identified any impacts that cannot be managed.

12.4.4 Cost Estimates and Expenditure Profile

Whole of life and NPV cost estimates for the water supply scenarios are shown in the following table. NPV calculations are included in Appendix 1.

Table 30: Scenario cost estimates

Component	Scenario 1: Groundwater (2020 \$)	Scenario 2A: 20 GL Dunoon Dam (2020 \$)	Scenario 2B: 50 GL Dunoon Dam (2020 \$)
Whole-of-life (80 years)	\$836,397,007	\$619,141,183	\$658,907,966
NPV (80 years @ 5%)	\$195,922,792	\$242,778,718	\$267,518,613
NPV (40 years @ 5%)	\$169,299,256	\$228,151,363	\$252,602,785
Yield benefit (2020 – 2060) ML/a	4,170	5,370	13,249
NPV/ML secure yield (40 years)	\$40,597	\$42,484	\$19,066

The expenditure profile of each scenario and a comparison of the scenarios is shown in the following figures.

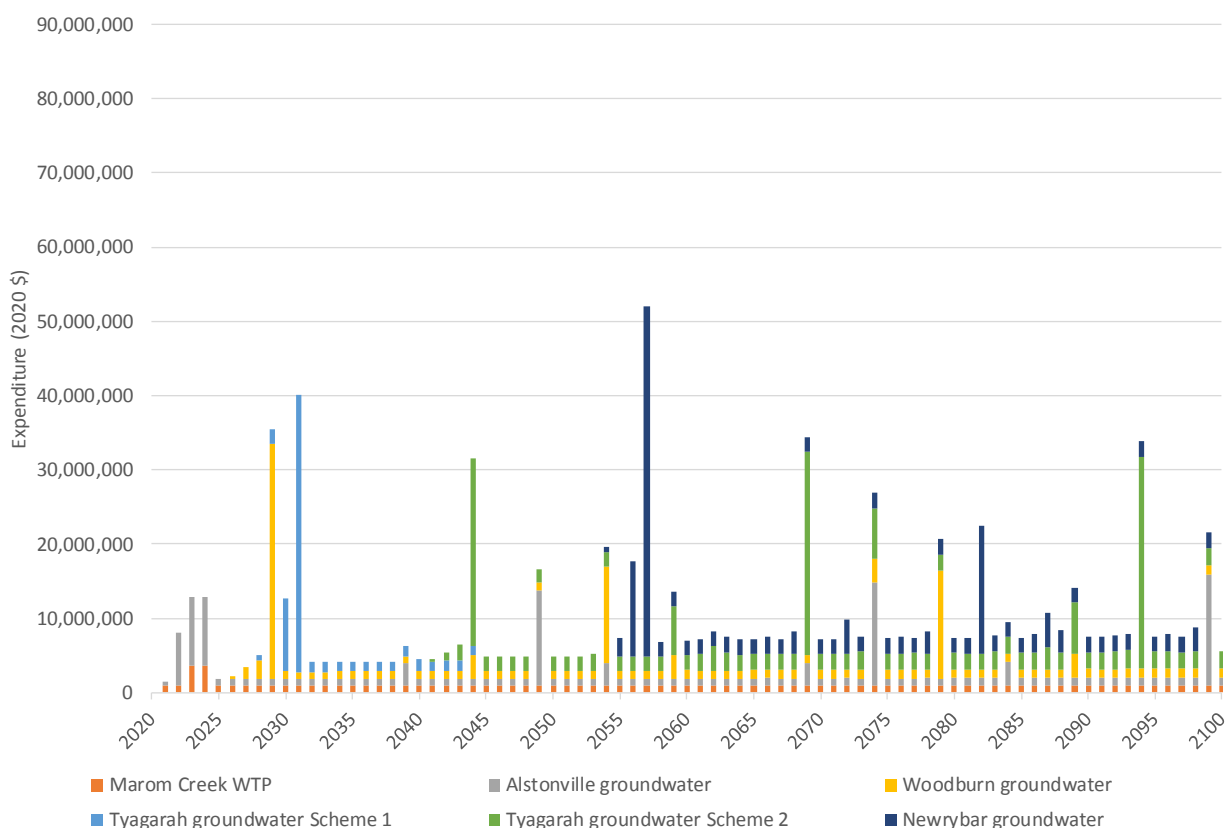


Figure 22: Expenditure profile – Scenario 1: groundwater

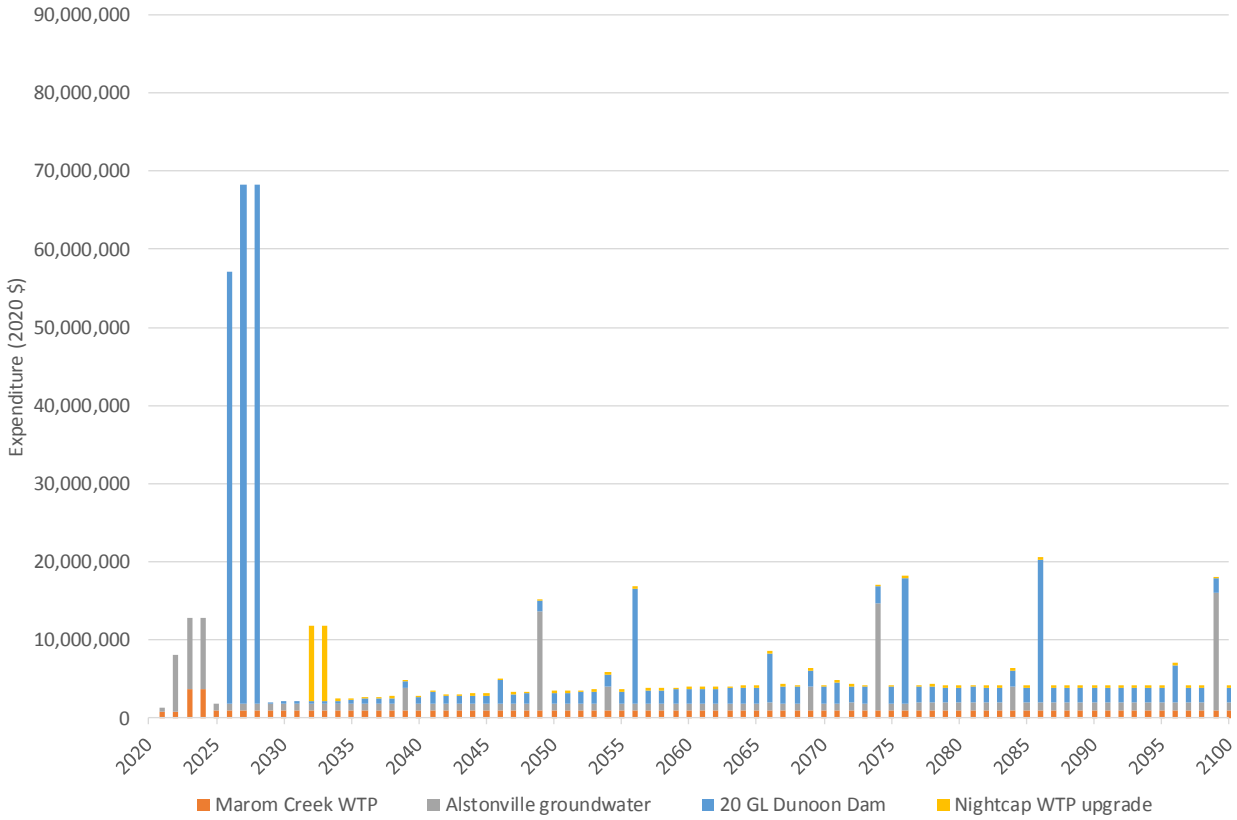


Figure 23: Expenditure profile – Scenario 2A: Dunoon Dam (20 GL)

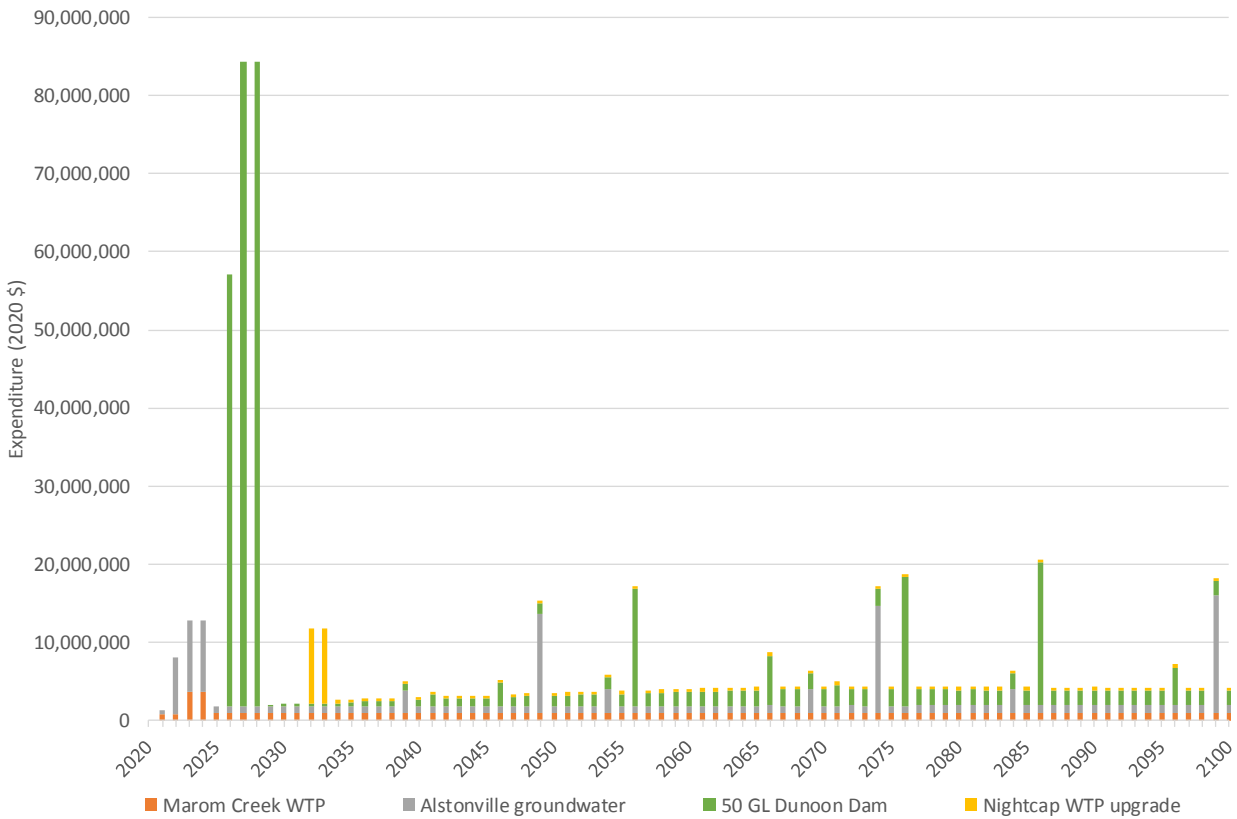


Figure 24: Expenditure profile – Scenario 2B: Dunoon Dam (50 GL)

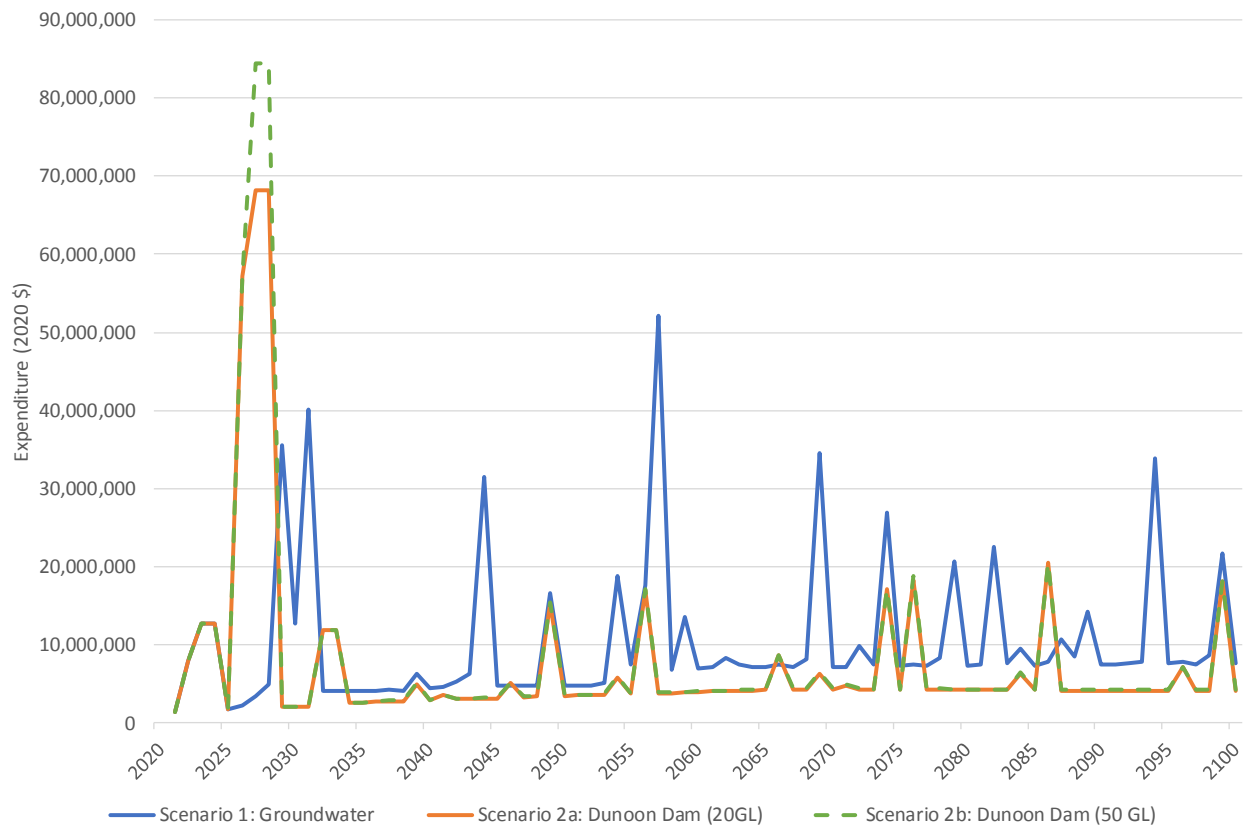


Figure 25: Expenditure profile – scenario comparison

12.4.5 Results

The full MCA is included in Appendix 2. A summary of MCA outcomes (with equal weighting for each criteria) is provided in the following table. Changing the weightings does not change the outcomes of the MCA ranking.

Table 31: Summary of MCA outcomes

Scenario	Environmental score (/5)	Social score (/5)	Total score (per \$ NPV)	Rank (based on MCA)
1: Groundwater	3.05	3.50	16.2	1
2A: Dunoon Dam (20 GL)	2.65	1.98	9.9	2
2B: Dunoon Dam (50 GL)	2.30	1.65	7.8	3

Based on the MCA, the most favourable scenario is groundwater. The groundwater scenario has a lower NPV (lower initial capital cost but higher and increasing recurrent costs with implementation of each stage) as well as less significant environmental and social impacts. However, the groundwater scenario has a higher whole-of life cost (total cost over 80 years in present dollars) and a higher NPV per ML of secure yield as shown in Table 30. Implementation of the groundwater scenario will require ongoing investigations (and associated costs and problem-solving) for the four groundwater schemes.

Although the MCA is informative, it is focussed on the 2060 planning horizon and RCC should consider longer-term issues such as potential source options beyond that timeframe and financial commitment and funding requirements imposed by the schemes. Dams have a long design life and there is excess secure yield in the Dunoon Dam options well beyond the 2060 timeframe considered by this study. When the long-term yield benefit provided by the scenarios is considered, the 50 GL dam option (with high initial cost and

lower recurrent costs) with the higher yield benefit is more cost-effective. Although there is a large upfront investment, the dam options can provide long-term certainty and cost efficiencies. The largest dam for the given physical constraints, with planned staging and upgrades, provides only a small incremental risk over the smaller dam. There is a trade-off between the high initial cost and environmental/social impact of the dam and the long-term cost-effectiveness and certainty provided.

Implementation risks have been identified in this report for both scenarios. RCC should continue to conduct detailed investigations for its preferred scenario and address these risks. Although the yield information suggests that definitive action is required in the short-term, adaptive management approaches should also be identified.

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GLOSSARY AND ABBREVIATIONS

ADD	Average day demand
AHD	Australian height datum
ASS	Acid sulfate soil
BASIX	Building Sustainability Index
BaSC	Ballina Shire Council
BySC	Byron Shire Council
DPIE	(NSW) Department of Planning, Infrastructure and Environment
ECD	Emigrant Creek Dam
EEC	Endangered ecological community
EIS	Environmental Impact Statement
EPBC	<i>Environment Protection and Biodiversity Conservation Act, 1999</i> (EPBC Act)
FSL	Full supply level
FWS	Future Water Strategy
GDE	Groundwater dependent ecosystem
GL	Gigalitres (one million litres)
IWP	Integrated Water Planning (process)
kL	Kilolitres
kL/a	Kilolitres per annum
L	Litres
L/d	Litres per day
LCC	Lismore City Council
LEP	Local Environmental Plan
MCA	Multi-criteria analysis
MFL	Maximum flood level
ML	Megalitres
ML/a	Megalitres (one thousand litres) per annum
ML/d	Megalitres per day
NOROC	(former) Northern Rivers Regional Organisation of Councils
NPV	Net present value - the present value of a series of future payments
OEH	Office of Environment and Heritage
PADs	Potential archaeological deposits
PDD	Peak day demand
RCC	Rous County Council

RCD	Rocky Creek Dam
RDMP	Regional Demand Management Plan
RL	Reduced level (relative to Australian height datum)
RO	Reverse osmosis
RoTAP	Rare or Threatened Australian Plants
RVC	Richmond Valley Council
Secure yield	The highest annual water demand that can be supplied from a water supply headworks system while meeting the '5/10/10 design rule'
SEPP	State Environmental Planning Policy
SEQ	South-east Queensland
TSC	Tweed Shire Council
WRS	Wilson's River Source
WTP	Water treatment plant
WWTP	Wastewater treatment plant

Appendix 1. NET PRESENT VALUE CALCULATIONS

NPV Analysis Scenario 1: Groundwater		Year available	ML/a Ultimate Prox kWh/L		CWT (2018)		177 kW	22 hrs/d	4300 kl/d																																					
Stage 1 Marom Creek WTP	2025		1,570	0.91																																										
Stage 1 Altonville groundwater	2025		1,280	0.52	groundwater + WTP as in Marom Creek																																									
Stage 2 Woodburn groundwater	2029		1,600	1.21	Scheme 1, Stage 1 groundwater + WTP as in Marom Creek																																									
Stage 3 Tyagarah groundwater Scheme 1	2032		2,048	1.61	Same as Stage 1																																									
Stage 4 Tyagarah groundwater Scheme 2	2045		4,000	1.61	groundwater + WTP as in Marom Creek																																									
Stage 5 Newrybar groundwater	2058		2,304	2.21																																										
Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40					
Lifecycle expenditure	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060					
Stage 1 Marom Creek WTP		915,875	915,875	3,663,502	3,663,500	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362		
Stage 1 Altonville groundwater		492,000	7,120,000	9,164,500	9,164,500	818,023	820,423	822,837	825,265	827,707	880,164	832,635	835,121	837,622	840,138	842,670	895,216	847,778	850,356	2,942,949	855,558	858,184	910,825	863,483	866,158	868,849	871,557	874,283	927,025	12,739,785	882,563	885,358	888,172	891,003	3,033,853	896,721	899,608	902,514	905,439	908,383	961,347					
Stage 2 Woodburn groundwater						492,000	1,720,000	2,585,000	31,685,000	1,015,425	1,017,825	1,020,239	1,022,667	1,025,110	1,027,566	1,030,038	1,032,524	1,035,025	1,037,541	1,040,072	1,042,619	1,045,181	1,047,758	1,050,351	1,052,961	1,055,586	1,058,228	1,060,886	1,063,560	1,066,252	1,068,960	1,071,685	1,124,428	12,937,188	1,074,428	1,077,188	1,079,965	1,082,761	1,085,574	1,088,406	3,231,256	1,094,124				
Stage 3 Tyagarah groundwater Scheme 1																																														
Stage 4 Tyagarah groundwater Scheme 2																																														
Stage 5 Newrybar groundwater																																														
Total Scheme		1,407,875	8,035,875	12,828,002	12,828,000	1,784,385	2,278,785	3,509,199	4,966,627	35,534,069	12,746,951	40,066,822	4,123,692	4,131,622	4,139,600	4,197,628	4,205,707	4,213,836	4,172,017	6,270,249	4,488,534	4,561,871	5,370,262	6,398,707	31,518,456	4,786,587	4,795,420	4,854,312	4,863,263	16,682,274	4,881,344	4,840,475	4,849,668	5,208,922	18,868,239	7,437,619	17,642,063	52,056,572	6,871,945	13,645,584	7,003,310					
80 year whole-of-life cost		836,397,007																																												
80 year NPV		306,176,008	228,911,776																																											
		141,351,422	169,299,256																																											
			191,624,542																																											
Yield benefit NPV/ML yield			4,170 ML																																											
			40,597 \$/ML																																											
			2020-2060																																											

NPV Analysis Scenario 1: Groundwater		Year available																																															
Stage 1 Marom Creek WTP	2025																																																
Stage 1 Altonville groundwater	2025																																																
Stage 2 Woodburn groundwater	2029																																																
Stage 3 Tyagarah groundwater Scheme 1	2032																																																
Stage 4 Tyagarah groundwater Scheme 2	2045																																																
Stage 5 Newrybar groundwater	2058																																																
Year	0	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80								
Lifecycle expenditure	2020	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100								
Stage 1 Marom Creek WTP		966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362					
Stage 1 Altonville groundwater		914,330	917,333	920,356	923,400	926,463	929,548	932,653	935,779	938,927	942,096	945,287	948,499	951,734	13,804,991	958,271	961,573	964,899	968,248	971,620	975,016	978,436	981,880	985,349	3,128,842	992,360	995,903	999,472	1,003,067	1,006,687	1,010,334	1,014,007	1,017,707	1,021,434	1,025,188	1,028,969	1,032,779	1,036,616	1,040,482	14,994,377	1,044,380	1,048,300							
Stage 2 Woodburn groundwater		1,097,011	1,099,917	1,102,842	1,105,786	1,108,749	1,111,733	1,114,736	1,117,759	1,120,802	1,123,866	1,126,950	1,130,056	1,133,182	3,226,329	1,136,329	1,139,499	1,142,689	1,145,896	1,149,137	1,152,413	1,155,724	1,160,071	1,164,444	1,168,844	1,173,271	1,177,724	1,182,204	1,186,711	1,191,244	1,195,804	1,200,391	1,204,994	1,209,624	1,214,281	1,218,964	1,223,674	1,228,411	1,233,174	1,237,964	1,242,781	1,247,624	1,252,494	1,257,391	1,262,314	1,267,264	1,272,241		
Stage 3 Tyagarah groundwater Scheme 1																																																	
Stage 4 Tyagarah groundwater Scheme 2		2,266,560	3,321,491	2,416,162	2,120,152	2,124,173	2,128,223	2,132,304	2,236,416	27,265,559	2,144,733	2,148,939	2,153,177	2,157,448	6,866,751	2,166,087	2,170,457	2,219,860	2,179,298	2,183,769	2,288,276	2,192,817	2,197,394	2,500,007	2,206,656	2,211,341	2,316,063	2,900,822	2,225,619	6,835,454	2,235,328	2,240,240	2,390,191	2,550,182	28,565,212	2,260,283	2,265,395	2,270,547	2,375,741	2,280,978	2,286,256								
Stage 5 Newrybar groundwater		1,974,860	1,977,921	2,081,002	1,984,104	1,987,227	2,290,371	1,993,537	2,996,724	2,099,934	2,003,165	2,006,419	4,569,695	2,012,994	2,016,316	2,119,661	2,323,029	2,026,422	3,029,838	2,033,278	2,036,743	2,140,233	17,203,747	2,047,286	2,050,851	2,054,442	2,358,058	4,721,701	3,065,370	2,069,065	2,072,788	2,076,538	2,080,315	2,184,121	2,087,954	2,091,815	2,395,705	2,099,625	3,103,573	2,207,550	2,111,558								
Total Scheme		7,219,123	8,283,024	7,486,724	7,099,804	7,162,974	7,476,237	7,139,592	8,253,040	34,481,583	7,180,222	7,243,957	9,817,789	7,521,720	26,880,749	7,349,880	7,564,111	7,373,445	8,342,882	20,652,423	7,422,070	7,436,824	22,511,685	7,716,654	9,521,733	7,396,923	7,812,225	10,767,640	8,443,169	14,203,813	7,524,574	7,490,453	7,651,450	7,922,567	33,848,805	7,605,166	17,921,650	7,588,259	8,704,995	21,671,857	7,638,848								
80 year whole-of-life cost		836,397,007																																															
80 year NPV		306,176,008	228,911,776																																														
		141,351,422	169,299,256																																														
			191,624,542																																														
Yield benefit NPV/ML yield			4,170 ML																																														
			40,597 \$/ML																																														
			2020-2060																																														

NPV Analysis			Scenario 2a: Dunoon Dam (20GL)																																									
Year available	Production	ML/a																																										
Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40			
Stage 1 Marom Creek WTP	2025	1,570	0.91	1,421																																								
Stage 1 Alstonville groundwater	2025	1,280	0.52	666																																								
Stage 2a 20 GL Dunoon Dam	2029		1.60																																									
Nightcap WTP upgrade	2034		1.60																																									
Assume increase in energy usage as for Marom Creek WTP, increase production as for DD																																												
Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40			
Lifecycle expenditure	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060			
Stage 1 Marom Creek WTP	915,875	915,875	3,663,502	3,663,500	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362			
Stage 1 Alstonville groundwater	492,000	7,120,000	9,164,500	9,164,500	818,023	820,423	822,837	825,265	827,707	880,164	832,635	835,121	837,622	840,138	842,670	895,216	847,778	850,356	2,942,949	855,558	858,184	910,825	863,483	866,158	868,849	871,557	874,283	927,025	12,739,785	882,563	885,358	888,172	891,003	3,033,853	896,721	899,608	902,514	905,439	908,383	961,347				
Stage 2a 20 GL Dunoon Dam						55,384,835	66,406,340	66,406,340	291,448	291,448	331,448	340,697	389,945	439,191	488,436	577,680	662,394	711,636	760,876	810,116	1,460,316	906,972	956,209	1,005,444	1,054,678	2,994,966	1,186,835	1,236,066	1,285,295	1,334,524	1,423,751	1,434,597	1,483,822	1,533,046	1,582,269	14,761,294	1,654,886	1,704,106	1,753,325	1,802,543				
2034 capital+1.5%p.a. recurrent												9,691,073	9,691,073	290,732	290,732	290,732	290,732	290,732	290,732	290,732	290,732	290,732	290,732	290,732	290,732	290,732	290,732	290,732	290,732	290,732	290,732	290,732	290,732	290,732	290,732	290,732	290,732	290,732	290,732	290,732	290,732	290,732	290,732	
Nightcap WTP upgrade																																												
Total Scheme	1,407,875	8,035,875	12,828,002	12,828,000	1,784,385	57,171,620	68,195,539	68,197,967	2,085,518	2,137,974	2,130,446	11,833,253	11,885,002	2,536,424	2,588,200	2,729,990	2,767,266	2,819,085	4,960,919	2,922,768	3,575,594	3,074,892	3,076,786	3,128,696	3,180,621	5,123,618	3,318,212	3,420,185	15,282,175	3,474,181	3,566,204	3,579,863	3,631,919	5,823,993	3,736,085	16,917,996	3,814,494	3,866,639	3,918,802	4,020,984				
80 year whole-of-life cost	619,141,183																																											
80 year NPV	315,021,565																																											
	242,778,718																																											
	201,127,184																																											
Yield benefit	5,370 ML																																											
NPV/ML yield	42,484 \$/ML																																											
2020-2060																																												
Energy use	Marom Creek WTP	kWh/kL	0.91																																									
	Alstonville groundwater	kWh/kL	0.52																																									
	20 GL Dunoon Dam	kWh/kL	1.60																																									
	(from RCC supply data)	kWh/kL	1.60																																									
	Nightcap WTP upgrade	kWh/kL	1.60																																									
Total Scheme			666																																									
80 year NPV	256,243	3%																																										
	127,091	5%																																										
	70,647	7%																																										

NPV Analysis			Scenario 2a: Dunoon Dam (20GL)																																									
Year available	Production	ML/a																																										
Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40			
Stage 1 Marom Creek WTP	2025																																											
Stage 1 Alstonville groundwater	2025																																											
Stage 2a 20 GL Dunoon Dam	2029																																											
Nightcap WTP upgrade	2034																																											
Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40			
Lifecycle expenditure	2020	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100			
Stage 1 Marom Creek WTP	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362		
Stage 1 Alstonville groundwater	914,330	917,333	920,356	923,400	926,463	929,548	932,653	935,779	3,028,927	942,096	945,287	948,499	951,734	13,804,991	958,071	961,373	964,699	968,047	971,426	974,836	978,276	981,745	985,243	3,128,842	992,769	995,303	997,854	1,003,427	1,006,027	1,008,654	1,011,307	1,014,000	1,017,727	1,021,494	1,025,308	1,029,169	1,033,077	1,036,931	1,040,832	14,998,377	1,044,780			
Stage 2a 20 GL Dunoon Dam	1,891,760	1,900,976	1,950,191	1,999,405	2,048,618	6,371,368	2,111,500	2,103,586	2,095,709	2,087,867	2,080,070	2,072,307	2,064,578	2,056,882	2,049,219	2,041,589	2,033,992	2,026,428	2,018,898	2,011,402	2,003,940	2,016,507	2,029,102	2,041,724	2,054,373	2,067,049	2,079,751	2,092,480	2,105,236	2,118,019	2,130,828	2,143,663	2,156,524	2,169,411	2,182,324	2,195,263	2,208,228	2,221,219	2,234,236	2,247,270	2,260,321			
2034 capital+1.5%p.a. recurrent																																												
Nightcap WTP upgrade																																												
Total Scheme	4,063,184	4,075,403	4,127,641	4,179,898	4,232,175	8,608,010	4,301,247	4,296,460	4,291,673	4,286,886	4,282,100	4,277,313	4,272,527	4,267,741	4,262,955	4,258,169	4,253,383	4,248,597	4,243,811	4,239,025	4,234,239	4,229,453	4,224,667	4,219,881	4,215,095	4,210,309	4,205,523	4,200,737	4,195,951	4,191,165	4,186,379	4,181,593	4,176,807	4,172,021	4,167,235	4,162,449	4,157,663	4,152,877	4,148,091	4,143,305	4,138,519	4,133,733		
80 year whole-of-life cost	619,141,183																																											
80 year NPV	315,021,565																																											
	242,778,718																																											
	201,127,184																																											
Energy use	Marom Creek WTP	kWh/kL	0.91																																									
	Alstonville groundwater	kWh/kL	0.52																																									
	20 GL Dunoon Dam	kWh/kL	1.60																																									
	(from RCC supply data)	kWh/kL	1.60																																									
	Nightcap WTP upgrade	kWh/kL	1.60																																									
Total Scheme			666																																									
80 year NPV	256,243	3%																																										
	127,091	5%																																										
	70,647	7%																																										

NPV Analysis																																								
Scenario 2b: Dunoon Dam (50 GL)																																								
	Year available	ML/a																																						
	Production	kWh/L	Energy use kWh p.a.																																					
		ind in Alstonville																																						
Stage 1 Marom Creek WTP	2025	1,570																																						
Stage 1 Alstonville groundwater	2025	1,280																																						
Stage 3 50 GL Dunoon Dam	2029	0.52																																						
2034 capital+2%p.a. recurrent																																								
Nightcap WTP upgrade																																								
Total Scheme	1,407,875	8,035,875	12,828,002	12,828,000	1,784,385	57,171,620	84,389,955	84,392,384	2,087,244	2,139,700	2,132,172	11,834,979	11,886,728	2,635,060	2,686,837	2,828,627	2,867,629	2,919,448	5,061,282	3,023,131	3,675,957	3,175,254	3,177,149	3,229,058	3,280,984	5,223,981	3,419,325	3,521,298	15,383,288	3,575,294	3,667,317	3,680,975	3,733,032	5,925,106	3,837,198	17,211,859	3,915,083	3,967,228	4,019,391	4,121,573
80 year whole-of-life cost	658,907,966																																							
80 year NPV	343,939,167																																							
2034 capital+2%p.a. recurrent	222,665,849																																							
Nightcap WTP upgrade	217,217,821																																							
Energy use	same as 2a																																							

NPV Analysis																																									
Scenario 2b: Dunoon Dam (50 GL)																																									
	Year	ML/a																																							
	Production	kWh/L	Energy use kWh p.a.																																						
		ind in Alstonville																																							
Stage 1 Marom Creek WTP	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	
Stage 1 Marom Creek WTP	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362	966,362
Stage 1 Alstonville groundwater	914,330	917,333	920,356	923,400	926,463	929,548	932,653	935,779	3,028,927	942,096	945,287	948,499	951,734	13,804,991	958,271	961,573	964,899	1,018,248	971,620	975,016	978,436	981,880	985,349	3,128,842	992,360	995,903	999,472	1,003,067	1,006,687	1,010,334	1,014,007	1,017,707	1,021,434	1,025,188	1,028,969	1,032,779	1,036,616	1,040,482	14,994,377	1,048,300	
Stage 3 50 GL Dunoon Dam	1,895,438	1,904,654	1,953,869	2,003,083	2,052,296	6,375,046	2,115,928	2,108,014	2,100,137	2,092,295	2,687,898	2,073,873	2,067,360	2,059,658	2,051,991	16,510,066	2,036,999	2,029,434	2,021,904	2,014,408	2,046,945	1,999,911	1,993,740	1,986,377	1,979,048	18,247,810	1,913,562	1,906,331	1,899,133	1,891,967	1,924,834	1,877,732	1,870,663	1,863,625	1,856,619	4,754,718	1,881,815	1,874,903	1,868,022	1,861,172	
2034 capital+2%p.a. recurrent	387,643	387,643	387,643	387,643	387,643	387,643	387,643	387,643	387,643	387,643	387,643	387,643	387,643	387,643	387,643	387,643	387,643	387,643	387,643	387,643	387,643	387,643	387,643	387,643	387,643	387,643	387,643	387,643	387,643	387,643	387,643	387,643	387,643	387,643	387,643	387,643	387,643	387,643	387,643	387,643	387,643
Total Scheme	4,163,773	4,175,992	4,228,230	4,280,487	4,332,764	8,708,598	4,402,586	4,397,799	6,483,069	4,388,396	4,987,189	4,426,377	4,373,099	17,218,654	4,364,267	18,825,645	4,355,903	4,401,687	4,347,529	4,343,429	4,379,386	4,335,796	4,333,093	6,469,224	4,325,413	20,597,718	4,267,039	4,263,403	4,259,825	4,306,306	4,292,845	4,249,444	4,246,101	4,242,818	4,239,593	7,191,502	4,272,436	4,269,390	18,216,404	4,263,478	
80 year whole-of-life cost	658,907,966																																								
80 year NPV	343,939,167																																								
2034 capital+2%p.a. recurrent	222,665,849																																								
Nightcap WTP upgrade	217,217,821																																								
Energy use	same as 2a																																								

Appendix 2. MULTI-CRITERIA ANALYSIS

Criteria	Environmental Criteria			Environmental Score	Environmental Weighting	Social Criteria			Social Score	Social Weighting	Net present value (\$ million)	Total Score per \$NPV		
	Aquatic	Terrestrial	Energy consumption			Typical residential bill	Water users	Heritage						
Description	Impact on groundwater and surface water quality and aquatic ecology and measures to offset those impacts.	Impact on terrestrial ecology and measures to offset those impacts.	80 year energy consumption (MWh)	Weighted criteria score	Weighting compared to social criteria	Impact on the typical residential bills for each Council from the revised notional cost.	Impact on other water users and measures to offset those impacts.	Impact on cultural heritage and measures to offset those impacts.	Weighted criteria score	Weighting compared to environmental criteria	NPV of capital and operating costs (80 years) at 5% discount rate	10 ^{3x} (Environmental Score + Social Score)/NPV		
Criteria weighting	33%	33%	33%	100%	50%	33%	33%	33%	100%	50%				
Scenario 1: Groundwater														
Result	Some potential impacts on GDEs. Impacts can be minimised through site selection and monitoring	Impacts can be minimised through site selection	154,000	3.00		1.21	Impacts can be minimised through site selection and monitoring	Impacts can be minimised through site selection	3.35		196	16.2		
Score	3	4.0	2.0			2.55	3.5	4.0						
Scenario 2A: Dunoon Dam (20 GL)														
Result	Significant impacts are partially offset by environmental flow regime	Significant impacts are partially offset by compensatory measures	127,000	2.67		1.30	Significant impacts are partially offset by environmental flow regime and extraction rules	Significant impacts are unlikely to be mitigated	2.16		243	9.9		
Score	2.5	2.5	3.0			2.48	2.5	1.5						
Scenario 2B: Dunoon Dam (50 GL)														
Result	Significant impacts are partially offset by environmental flow regime	Significant impacts are partially offset by compensatory measures	127,000	2.33		1.30	Significant impacts are partially offset by environmental flow regime and extraction rules	Significant impacts are unlikely to be mitigated	1.83		268	7.8		
Score	2.0	2.0	3.0			2.48	2.0	1.0						
Score out of 5	5 - highest													



Rous County Council Future Water Plan 2060 Public exhibition outcomes

November 2020

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Rous County Council engaged the Vaxa Group, a specialist stakeholder engagement and communications agency to independently review the data and report to Council.	4
The key author, Greg Bourke, was previously involved in stakeholder engagement during the preparation of the Future Water Strategy (2014).	4
Greg was selected to review data and prepare the following report based on his subject matter expertise, knowledge of the region and demonstrated impartiality during engagement and reporting to prepare the Future Water Strategy.	4
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Rous County Council consultation statement

The Future Water Project 2060 (FWP2060) provided an update to the Future Water Strategy which was adopted by Rous County Council in 2014.

These planning cycles were undertaken to meet Rous County Council's obligation to the community to ensure ongoing and long term water security in response to gradually rising water consumption and current supply limitations.

The recent consultation phase was positioned as 'inform' and 'consult' on the IAP2 public participation spectrum; following the earlier Future Water Strategy which sought community involvement through 'consult' and 'involve'.

The Future Water Plan 2060 informed the community of planned direction to secure long term water security, following the investigations completed as a result of the 2014 Future Water Strategy.

Information provided as part of the recent FWP2060 Public Exhibition phase explained Rous County Council needs to shortly nominate a preferred and definitive long-term water security plan. This is to provide long term water security for residents and business, and reduce the risk of critical water shortages.

Rous County Council greatly appreciates the time invested by constituents, residents, consumers and others who made a submission, and recognise there are also many stakeholders who are interested in and value water security, but didn't make a submission at this time.

Rous County Council will carefully consider the following public submission outcomes along with the detailed Future Water Strategy 2014 scenarios developed through extensive stakeholder and community engagement. This requires balancing a number of priorities including environmental, social, and economic outcomes.

Ongoing communication and engagement with key stakeholders and the broader community will occur when a preferred long-term water security plan has been endorsed by Rous County Council.

November 2020.

Independent assessment

Rous County Council engaged the Vaxa Group, a specialist stakeholder engagement and communications agency to independently review the data and report to Council.

The key author, Greg Bourke, was previously involved in stakeholder engagement during the preparation of the Future Water Strategy (2014).

Greg was selected to review data and prepare the following report based on his subject matter expertise, knowledge of the region and demonstrated impartiality during engagement and reporting to prepare the Future Water Strategy.

1. Executive summary

Rous County Council (RCC/Council) is responsible for assured delivery of bulk and potable water supply for the majority of areas across the four (4) constituent Councils of Lismore, Ballina, Byron, and Richmond Valley.

An important part of RCC's strategic responsibilities is to ensure there is sufficient water security to meet current and longer-term demand. This factors variables such as population growth, consumption trends, climate change and existing capacity and capability of assets, such as the Rocky Creek Dam.

To meet these responsibilities and consumer expectations, across 2018 and 2019 RCC reviewed and updated their strategic outlook on water demand and supply.

This process led to the development of the **Future Water Project 2060 (FWP2060)**, a plan to secure water supply for the next 40 years. This built upon the direction set within the Future Water Strategy, adopted by RCC in 2014.

The FWP2060 presented options to ensure water security to at least 2060, including short and longer term actions. This included new water supply options such as the proposed Dunoon Dam and groundwater sources.

Highlights

- 1,298 submissions received
- Very high recognition of the role of Rous County Council
- Majority of respondents agree is important to act now to secure long-term water supply (81%)
- Majority of submissions from the Lismore City Council area
- High levels of objection to Dunoon Dam based on concerns about environmental and cultural heritage concerns
- Preference for alternative water supply options submitters regard as more sustainable (including strong preference for broader application of water tanks).
- Conditional and cautious support for groundwater as a water supply option.

In addition to community input provided during the preparation of the FWP2060, RCC placed the report on Public Exhibition from **1 July – 9 September 2020** to encourage community review and comment. This was an extended Public Exhibition phase to maximise input, particularly given difficulties and distractions during the height of the COVID-19 pandemic.

RCC structured various channels to receive feedback in a variety of ways, including a project email (to receive enquiries and submissions), an online survey and by phone. In total, 1,298 submissions were received. These were received via:

- Written Submissions received by email, post or hand delivered – **920** (872 unique submitters and ~600 proformas)
- Online surveys through project webpage – **372** (370 unique submitters)
- Responses through the general RCC website feedback form - **7**

These are not all individual submitters, as content was submitted through the various channels, and some residents made multiple written submissions.

The majority of feedback was received by residents of Lismore, the Channon and Dunoon, and nearby surrounding areas.

The amount and type of feedback has been influenced by a large number of submissions based on a proforma or standardised wording. This was particularly evident in the written submissions, and was also common within the online surveys.

1.1 High level findings:

Based on the information received:

The majority of respondents accept the need to act now to secure water supplies for the future (81%).

The majority of respondents do not support the Dunoon Dam proposal as part of the region's water security solution (75% - survey; 99% - written submissions).

The majority of respondents prefer water security through:

- Water tanks and greater self-sufficiency, along with capture and re-use of stormwater
- Enhanced demand management
- Permanent water restrictions
- Water recycling, including indirect potable re-use
- Addressing leaks and losses within the reticulation system.

Within the submissions received there was majority support expressed for the extraction, treatment and use of groundwater, provided this is sustainable and creates no unacceptable environmental impacts.

However there were contrary positions that groundwater extraction is not sustainable, as extraction impacts surface water and groundwater dependent ecosystems.

The majority of respondents expressed support for the conservation of potable water (e.g. not water gardens or washing cars with potable standard water), with alternatives made available for non-potable purposes.

A smaller number of respondents recommended desalination as an option, particularly for coastal areas.

High level summary – the majority of submitters recognise the important role of Rous County Council and agree action is needed to secure longer-term water supply, but do not support the FWP2060, inclusive of Dunoon Dam.



2. Context and communications & consultation methodologies

RCC developed the Future Water Project 2060 (FWP2060) to secure water supply for the next 40 years. This built upon the direction set within the Future Water Strategy, adopted in 2014.

The key premise of the project is additional water supplies will be needed to meet forecast demand based on population growth, and to increase resilience to variable climatic conditions, including drought. This plan is also complemented by ongoing programs to use available water supplies more sustainably and responsibly (through demand management).

Public exhibition: In addition to input provided during the preparation of the Future Water Project 2060, RCC placed the report on Public Exhibition from **1 July – 9 September 2020** to encourage community review and comment. RCC extended the Public Exhibition phase to 2 months to provide sufficient time for residents and stakeholders to review documentation and make informed comment.

RCC created a dedicated project page on the RCC website to host all project documentation. To ensure the content was accessible and engaging, RCC provided information and tools in the following formats:

- You tube video summaries (x 3) including call to action
- 3D visual tool
- Project summaries (PDF for review and/or download).

RCC widely promoted the opportunity for the community to be involved and make comment about the FWP2060, with the following actions undertaken:

- 2 Media releases
- 15 Social media posts
- 8 Public advertisements (estimated viewer reach 150,900)
- 45 Direct mail/ email to identified key stakeholders
- 5 Direct email to registered stakeholders.

2.1 Planning, communicating and consulting during pandemic restrictions -

RCC elected to not host regional briefings or meetings based on COVID-19 restrictions and public health guidance.

The emphasis was on-line access to information, with phone and email access to the project team.

RCC extended the Public Exhibition phase to 2 months to provide sufficient time for residents and stakeholders to review documentation and make informed comment.

Based on the quantity of data received this appears to have been an effective means of gathering feedback. However, there was relatively low responses from coastal populations outside of the Lismore City Council area.

2.2 Stakeholder access to FWP2060 information

RCC report the following levels of engagement through communications channels, assets and documentation:

- **5,372** visits to website, with 2,596 unique visitors
- **12,200** Video views
- Download of FWP2060 documents
 - **604** - FWP 2060 (summary) brochure
 - **88** - Demand Forecast 2020
 - **77** - Desalination Investigation
 - **56** - Water Reuse Feasibility Study
 - **39** - Groundwater Schemes Whole of Life Cycle Costings
 - **115** - Future Water Strategy Coarse Assessment
 - **137** - IWCM Development: Assessment of Augmentation Scenarios
- **59 requests** for information or specific questions
- **1,086** people viewed the virtual landscape

Allowing for test downloads, constituent Council downloads and others, there was only modest access to the technical documents relative to 1,298 submissions. However there was good access to website, visual virtual landscape, and the FWP2060 (summary) brochure.

RCC invested in leading visual technology to demonstrate the water supply system and options. Over 1,000 visitors to the website viewed the tool, developed jointly by RCC and QUT. In some submissions respondents mentioned the usefulness of the tool.



3. Knowledge about the FWP2060

Response	Count of 'How did you hear about the Future Water Project 2060?'	Percentage of 'How did you hear about the Future Water Project 2060?'
Word of mouth + other	91	24.5
Print newspaper + other	80	21.5
Facebook	47	13
Facebook + other	32	8.5
Online newspaper	14	3.75
Local council e-news + other	11	3
Radio	9	2.5
Radio + other	9	2.5
Rous County Council website + other	9	2.5
Online newspaper + other	8	2
Television + other	7	2
Rous County Council website	4	1
Television	2	0.5
Other	14	3.75

Social media print advertising and word-of-mouth were the highest rating responses. This information explains that multi-channel promotion is important to communicate about planning and opportunity for community comment. Traditional print advertising remains important to RCC constituents and stakeholders.

3.1 Participation through the Public Exhibition phase

The Public Exhibition phase generated two (2) core sets of data:

- 372 online surveys (370 unique submitters)
- 920 written submissions (872 unique submitters and ~600 proformas)
- 7 submissions through general feedback section of the RCC website (non-project page).

Of the two large data sets:

- 341 (of 372) of submitted online surveys were from constituent Council areas (92% of surveys)
- 636 (of 920) of written submissions were from constituent Council areas (69% of submissions)

The larger numbers of written submissions can be explained by the preparation and completion of ‘proforma’ style documents, which presented opposition to the Dunoon Dam proposal and preferences for other water security and supply options.

The online survey appeared to offer a practical way for people interested in the FWP2060 to structure their feedback, while also allowing opportunity for open comment through the ‘freetext’ fields.

4. Submission data – online survey

To help structure stakeholder submissions, RCC prepared an online survey seeking:

- High-level demographic data
- Degree of access to available information about the FWP2060
- Opinions about the FWP2060 options, along with rationale for personal stance.

Methodology explanation – data calculation and representation

Anecdotal information generated within survey freetext responses provided rationale and ‘rich’ qualitative data.

The qualitative data was reviewed and ‘coded’ into specific categories to record responses. Examples of distinct coding of responses, include: desalination, the raising of Rocky Creek Dam wall and further installation of rain water tanks. These codes, and many others, can be seen within the survey data reporting that follows.

‘Like’ responses are counted together to aggregate data. This is intended to be helpful for readers to understand key trends. For example, when respondents have recommended (a) water-reuse and water recycling these are combined as there is no useful distinction. In this case, the intention is to provide the reader with an appreciation of the combined intent of respondent comments for greater efficiency and re-application of available water.

While this should be a benefit compared to long, unsorted and highly specific reporting, there may be reduced appreciation of nuance and difference in a small number of cases. This is unlikely to be a limitation as the following report provides distinct outcomes.

The report has been prepared to be as literal as possible and an ‘other’ code or category has been avoided. This has been done as ‘other’ is meaningless for reviewers and decision makers, and it is important for submitters and readers to see the detail, including their detail if they are a submitter.

Percentages have been rounded to 0.25. This was done to reduce the distraction of precise percentages (e.g. 14.67) as the review of the findings doesn't require exact understanding of fractions of a percent. Therefore the percentage count may not always add up to 100%.

4.1 Demographic data

Age

Response	Count of age category	Percentage (%)
15-24 years	16	4
25-34 years	33	9
35-44 years	65	17.5
45-54 years	84	22.5
55-64 years	74	20
65-74 years	75	20
75-84 years	19	5
85 years and older	3	1
Unspecified	3	1
Grand Total	372	

Gender

Response	Gender count	Percentage (%)
Female	179	48
Male	167	45
Rather not say	11	3
No response	15	4

Identification as Aboriginal and Torres Strait Islander

Response	Count of Do you identify as Aboriginal and/or Torres Strait Islander	Percentage
No	359	96.5
Yes	13	3.5

Identifying as Aboriginal or Torres Strait Islander

Response	Count of How do you identify as Aboriginal and/or Torres Strait Islander	Percentage
Aboriginal	13	3.5%
Torres Strait Islander	0	0%

A high level view of the demographic data reveals this is an older population profile compared to the regional population profile, however, appears to be representative of residents with an interest in water security and who are likely to participate in formal consultation processes.

An older demographic are also likely to be responsible for water consumption (i.e. making decisions about their level of water consumption or paying bills etc.)

Location by Local Government Area

Response	Count of 'local government area is your usual place of residence? '	Percentage of responses (Constituent Council area)
Constituent Council (341 surveys/ 92% of surveys received)		
Ballina Shire Council	53	15
Byron Shire Council	64	19
Lismore City Council	211	62
Richmond Valley Council	13	4
Miscellaneous		
Other LGA	25	-
Not nominated	6	-
Grand Total	372	

As is clear from the above data, there was a disproportionately large representation from the Lismore City Council area, and under-representation from other Council areas.

The proportions are not explained by population variations, as for example the Ballina Shire Council and Lismore City Council areas have similar populations.

This is most likely due to the influence of the inclusion of the Dunoon Dam within the FWP2060, which is within the Lismore City Council area.

4.2 Water source and customer base

In response to the question as to whether the respondent is or isn't a 'town' water consumer, the following responses were received:

Answer	Count of 'Are you a town water customer?'	Percentage (%)
No	118	32
Yes	224	60
No response*	31	8

*The 'no response' value is generated, as this the number of respondents who were outside of the constituent Council area. See previous table.

Discussion

Evidently the majority of submitters live in the Lismore City Council area (greater than 50%).

Within the freetext fields of the survey, many respondents explained they lived within or close to The Channon and Dunoon.

The count of 'town' water customers, or not, identifies that a greater proportion of non-town water customers participated in the survey. The approximate ratio of regional water consumers is:

- 'town' water consumers (27% compared to 32% of submitters)
- non 'town' water consumers (73%, compared to 60% of submitters).

The proportion of Aboriginal involvement appears to be consistent with the regional demographic population profile.

Further in this report there is more detailed analysis of the profile of responses from 'town' water and non-'town' water consumers.

4.3 Responses to survey questions

Involvement in Future Water Strategy (2014)

The FWP2060 was a refresh and recap on RCC's earlier work to secure regional water security: the Future Water Strategy, which RCC adopted in 2014.

Respondents were asked whether they were involved in the Future Water Strategy. This was not a mandatory question within the survey.

In response to this question, the minority of respondents in 2020 were involved in the earlier strategy, as follows:

Response	Count of involvement in the FWS 2014 consultation process	Percentage of involvement in the FWS 2014 consultation process
No	350	94
Yes	22	6

How were you involved in the FWS 2014

Of the small number of people (6%) who said they were involved in the Future Water Strategy, explained they either:

- attended community meetings
- made contact with Council by phone or email, and/or
- made a written submission.

The low response rate may also be explained by the question being non-mandatory.

Respondent review of FWP2060 documents

In response to the question as to whether respondents reviewed FWP2060 documents, the following responses were received:

Response	Count of Have you reviewed any of the Future Water Project 2060 documents?	Percentage of responses (%)
No	103	28
Yes	269	72

This figure indicates a relatively significant proportion of respondents provided comment to Council without reference to the technical detail.

Understanding of Rous County Council role

Respondents expressed confidence in their understanding of RCC's role and responsibilities, as demonstrated by the following responses:

Answer	Count of I am familiar with RCC and understand what they do.	Percentage of responses (%)
Agree	228	61
Strongly agree	121	32.5
Total Agree	349	93.5
Disagree	18	5
Strongly disagree	5	1.5
Total Disagree	23	6.5

Information provided enables me to understand why RCC decided on specific strategies to secure water supplies

In response to the documentation available about the FWP2060, the following information was provided:

Answer	Understanding why RCC decided on specific strategies:	Percentage (%)
Agree	162	
Strongly agree	72	
Total Agree	234	63
Disagree	103	
Strongly disagree	35	
Total Disagree	138	37

Discussion

While respondents didn't necessarily agree with some of the priorities, as follows, the majority understood the reasoning. Within the information provided within the survey 'freetext' fields there is explicit and implicit support for decisions and actions to ensure regional water security.

This is also reinforced by responses to the survey question about the importance of securing water supplies (81% support, as reported following).

Which documents did you find most useful?

RCC provided a variety of specific reports, tools and a summary of the FWP2060 on a specific webpage. The survey sought information about the documents accessed, and whether they were useful.

Documents	Number of responses
Future Water Project 2060 (summary) brochure	51
All available documents	28
IWCM Development Assessment of Augmentation Scenarios	13
Water Re-use Feasibility Assessment Report 2020	13
Future water strategy and document suite	12
(Water) Demand Forecast 2020	12
3-D model	8
Future Water Strategy Coarse Screen Assessment	6
Website (only)	4
Videos	3
Media coverage	3
Regional Demand Management Plan	2

Discussion

The range of documents and tools provided options for people interested in the FWP2060 and earlier Future Water Strategy. This provided people with access to the level of detail they may prefer.

This response indicates the relativity of documents of most interest, with most respondents accessing the key summary document. (This is also evident in the website analytics).

While relative, there is likely to be some unreliability based on low response rate as only a third (1/3) of respondents indicated they had reviewed any specific material (as above) and some said they hadn't reviewed any on the basis of inclusion of Dunoon Dam.

There may have also been some resistance to stating documents they have referenced, based on opposition to the dam and therefore the FWP2060. This is a possibility as over 400 people downloaded the summary brochure (which will include people who completed an online survey and others).

Irrespective of the relatively low rate of reference to technical documents, the responses across the survey fields demonstrates the local community is highly-engaged, informed about water supply and security and are certain about their views.

The findings indicate that many people didn't need the FWP2060 or technical information to further inform their understanding or opinions about water security, and in particular the Dunoon Dam.

Usefulness and ease of access to information

In addition, some respondents expressed their level of satisfaction with the amount and quality of information. The findings are as follows:

Response	Number of responses
Useful, easy to read, informative	20
Inadequate, not useful, insufficient, incomplete	12

In addition to the above responses, elsewhere in the survey a small number of respondents explained they expected more detailed technical information to be made available. They explained this would have allowed them to be more confident in their decision-making and feedback.

4.4 Response to FWP2060

We should act now to secure the water supply we will need for our future:

Response	Number of responses	Percentage of responses (%)
Agree	143	
Strongly agree	159	
Total Agree	302	81
Disagree	32	
Strongly disagree	36	
Total Disagree	68	19

Discussion

This response demonstrates that the FWP2060 audience supports planning and actions to secure regional water supply, even if they don't support some of the proposed options (as demonstrated following).

Some trend in the above responses which may be notable, include:

- Agree and strongly agree and disagree and strongly disagree were near identical in numbers for this category, whereas in other categories the responses are more polar, with tendency to respond as strongly agree or strongly disagree. For example this can be seen in the following question. This can be interpreted as more cautious support, as presumably respondents who don't support the dam didn't want to strongly endorse the FWP2060.
- Respondents who expressed strong disagreement to this proposition, consistently did not to support the Dunoon Dam proposal.
- Respondents who expressed strong support for this proposition, tended to support the Dunoon Dam proposal.

Support the FWP2060 Direction for securing future water

Response	'Support the Future Water Project 2060's direction'	Percentage (%)
Agree	29	8
Strongly agree	86	23
Total Agree	115	31
Disagree	60	16
Strongly disagree	197	53
Total Disagree	257	69

Discussion

This response is relatively consistent, but slightly weaker than the above response about the need to secure future water supplies. Those that disagree with the direction were all opponents of the Dunoon Dam proposal.

Reasons for response

The online survey sought explanation about the reasons for the previous response.

Respondents who opposed the dam provided the most detail, as itemised in the following table:

Response #	Number	Percentage (%)
Reasons for not supporting plan with Dunoon Dam/ FWP2060		
Ecological damage/ loss of flora & fauna/ no practical offsets/ impact environmental flow	157	21
Unacceptable Aboriginal cultural heritage impacts	71	10
'Outmoded model'/ 'old-school' thinking/ over-engineered/ lack of innovation	41	6
Many available and more sustainable alternatives	31	4.25
Expense too great/ higher cost of water	27	4
Loss of valuable farmland	22	3
New dam will further encourage wasteful water behaviour	15	2
Localised flood impacts	15	2
Lack of genuine consultation, including with impacted community & traditional owners	14	2
Modelling and projections are unreliable/ inflated	14	2
Decline in regional appeal for visitors	13	2
Construction duration and impacts	6	1
Alternatives		
Demand management/ control consumption/ restrictions/ pricing signals	85	11.5
Mandate/ increase water tanks and self-sufficiency	50	6.75
Reduce waste and losses (including addressing leaks)/ reduce unnecessary use of potable water for toilet flushing etc.	46	6.25
Water recycling and re-use	37	5
Indirect potable re-use	31	4.25
Stormwater harvesting	20	2.75
Population cap/ restriction	16	2.25
Desalination (esp. for coastal communities, including with solar energy)	10	1.5
Do not support groundwater extraction	10	1.5
Preference for modular small-scale, local solutions	6	1

Like responses have been assembled to make findings material and clearer

Discussion

In addition to the anecdotal information provided above, a small number of specific responses were also received. These include:

- Reduced road safety/ degradation of local roads/ wildlife road kill
- Concerns over dam wall failure
- Dam will impact community and social cohesion
- Residual pesticides and cattle dip sites will impact water quality
- RCC is compromised because they are in the business of selling water
- Need for a regional water supply authority (removing local Council responsibilities)
- Need to address higher consumption in tourism areas
- Greenhouse gas concerns
- Loss of fish/ fish kills
- Long lead-time for dam approvals and construction makes the dam inflexible as a responsive, adaptive measure
- Dam is unlikely to achieve environmental approvals and should be abandoned
- Modelling needs to be based on 2 degrees increase in global temperature regarding changing rainfall and evaporation projections etc.
- Dam may not receive regular environmental flows/ become 'white elephant'/ stranded asset.

Discussion

It is clear that for the majority of respondents, the FWP2060 is primarily about whether the Dunoon Dam should or should not proceed.

Therefore the above data has been coded to explain the reasons why the majority of respondents don't support the dam as an option, along with alternatives.

Of respondents who do not support the dam, there is near identical alignment for their preference for alternatives which they regard as more sustainable; including:

- enhanced demand management
- more self-sufficiency, with greater application of rain water tanks
- water re-use and recycling

Notably, there appears to be a level of acceptance among respondents for:

- indirect potable re-use
- desalination for coastal communities (i.e., some positive responses, and no negative responses to the prospect of desalination, at least in preference to Dunoon Dam).

Support the preferred options to secure the region's future water, inclusive of the Dunoon Dam project

Answer	'Support the preferred options, inclusive of the Dunoon Dam project'	Percentage (%)
Agree	12	3
Strongly agree	83	22
Total Agree	95	25
Disagree	30	8
Strongly disagree	247	67
Total Disagree	277	75

Discussion

This response has relatively consistent ratios to the above questions about the need to secure water supplies and the FWP2060. However, with reference to inclusion of Dunoon Dam the ratio of support inverses.

I support the alternative options to secure the region's future water being multiple groundwater sources within our region.

Following are the outcomes, from the 278 people who provided a response to this proposition:

Responses	Support the alternative multiple groundwater sources within our region.	Percentage of support (%)
Agree	104	28.5
Strongly agree	18	5
Total Agree	122	44
Disagree	102	27.5
Strongly disagree	54	14.5
Total Disagree	156	56

Discussion

It is significant that a more than half of people that completed a survey did not support the alternative option.

Of people who provided a response:

- 44% supported the alternative
- 56% did not support the alternative

This is somewhat consistent with other responses where some caution is expressed about use of groundwater, but is preferred in comparison to the Dunoon Dam.

The online survey outcomes indicate there is no definitive support for groundwater as a long-term strategy to increase water supply and water security.

Please provide your views on how we should provide water security for our region.

In response to this question, 133 people provided comments which equates to around 1/3 of respondents.

Response	Measures to provide water security	Percentage of responses (%)
Rainwater tanks/ greater self-sufficiency and regard for water/ stormwater harvesting	71	53.5
Demand management	58	43.5
“Water recycling”	56	42
Indirect potable re-use	42	31.5
Fix leaks/ reduce water loss	28	20
Permanent water restrictions	19	14.5
Reduce water mining/ groundwater access	19	14.5
Reduced unnecessary use of potable water for e.g. flushing toilets, watering gardens	15	11.5
Groundwater, if sustainable	14	10.5
Localised adaptive measures (various)	14	10.5
Desalination	13	10
Population caps	10	7.5
Land regeneration	8	6.0
Build dams elsewhere/ raise Rocky Creek Dam (wall)	6	4.5
Increase charges for high water consumers	3	2.5
Stormwater aquifer recharge	2	1.5
Collection from air humidity	2	1.5
Dunoon Dam	2	1.5

Discussion

Evidently, respondents expressed more certainty about whether they supported the Dunoon Dam or not, compared to alternatives as only 1/3 of respondents provided suggestions. Consistent with other sections of this surveys, the preference is - in their words - sustainable and self-sufficient solutions.

In terms of actual new sources of water groundwater access (if sustainable) and desalination (for coastal communities) were near equal; but supported by around 10% of respondents. Some favour the raising of the Rocky Creek Dam.

The relatively low support for groundwater use, was explained by environmental impacts such as interference with groundwater dependent ecosystems and impacts upon springs and surface water.

4.5 Concerns as structured through the survey

Main reason for their concern:

Respondents were asked whether they held concerns on the basis on environmental, cultural heritage and economic reasons. The responses follow.

Environmental implications

Response	'I am concerned about the environmental implications of the Future Water Project 2060'	Percentage of respondents
Agree	23	
Strongly agree	250	
Total Agree	273	98.5
Disagree	0	
Strongly disagree	4	
Total Disagree	4	1.5

Of people who provided a response:

- 98.5% expressed concern
- 1.5% expressed no concern.

Cultural heritage

Response	'I am concerned about the cultural heritage implications of the Future Water Project 2060'	Percentage of respondents (%)
Agree	52	
Strongly agree	220	
Total Agree	272	98.5
Disagree	2	
Strongly disagree	3	
Total Disagree	5	1.5

Of people who provided a response:

- 98.5% expressed concern
- 1.5% expressed no concern.

Economic implications

Response	'I am concerned about the economic implications of the Future Water Project 2060'	Percentage of respondents
Agree	122	
Strongly agree	95	
Total Agree	217	78
Disagree	51	
Strongly disagree	9	
Total Disagree	60	22

Of people who provided a response:

- 78% of respondents expressed concerns about economic implications (i.e. future cost of water)
- 22% of respondents were not concerned.

Discussion

There was a relationship between respondents who support the Dunoon Dam and lack of expressed concerns within the above three (3) fields.

Support of the short-term actions (re: Marom Creek Water Treatment Plant and Alstonville Groundwater Aquifer)

Following are the outcomes, from the 277 people who provided a response to this proposition:

Response	'I support the short-term actions as a part of the decision'	Percentage of responses (%)
Agree	116	31
Strongly agree	13	3.5
Total Agree	129	46.5
Disagree	94	25
Strongly disagree	54	14.5
Total Disagree	148	53.5

Of people who provided a response:

- 46.5 agreed with the proposed short term actions
- 53.5 disagreed with the proposed short term actions.

Please comment on why you agree/disagree:

Response	Number of responses
Greater water recycling, waster re-use, harvesting and use of water tanks	34
No dam, no ecological or cultural heritage destruction	28
More sustainable, less wasteful usage, demand management	22
More detailed viability studies and consultation needed	15
Do not support plan or actions	13
Unsure what short term solution are/ don't understand question	13
Prefer other more sustainable options	11
Groundwater use is unsustainable, do not support	8
Support plan, support Marom Creek WTP option	4
Limit residential and business expansion	4
Address water loss and leaks	3
Desalination is preferable	3
Support dam and longer term strategy	3
Do not support Alstonville proposal	2
Need to wait for State Government review and findings as to regional water requirements.	1

Discussion

Of all survey fields this question generated the least responses, with only 95 respondents providing information (~25%).

This suggests this was the least understood question, which appears to follow findings in relation to whether respondents accessed information, or it may have been difficult to identify or understand the efficacy of the short-term actions.

Some respondents used the opportunity to reinforce their position from other questions or about the FWP2060. This generated similar feedback as other fields.

Do you have any further feedback about any aspect of the Future Water Project 2060?

The final freetext field generated 246 responses (66% of respondents), with the following results:

Response	Number	Percentage (%)
Do not support dam		
Do not support Dunoon Dam – ecological and cultural heritage (multiple reasons)	99	40
Expense/ increase to water costs/ over-capitalising/ over-engineering	22	9
Risk of local flooding	11	4.5
Other – long lead times for approvals and determination to protest	10	4
Local community impacts	7	3
Will encourage ongoing wasteful practices	7	3
Impact regional character and visual amenity	7	3
Effective offsets are not practical	5	2
Water quality concerns – dips and fertiliser use	4	1.5
Concern about energy use and greenhouse gas emissions	4	1.5
RCC not meeting responsibility for environmental and cultural heritage protection	4	1.5
Climate change is too unpredictable, need local, flexible adaptive responses	3	1.25
Operational noise and impacts on local roads	3	1.25
Negative impacts on fish	2	1
Impact on local roads	2	1
Construction impacts/ concern about liability if not properly constructed	2	1
Risk future dam would be privatised	2	1
Unsuitable geology	1	0.5
Sub-total	195	
Support dam		
Support dam/ need to be more resilient to drought	28	11.5
Economic opportunities	7	3
Recreation and tourism opportunities	6	2.5
Rocky Creek Dam built in 1950s for Lismore/ much smaller population then	6	2.5
Achieved as much as possible with demand management	5	2
Low confidence in indirect potable re-use (as alternative to dam)	4	1.5
Preference for other dams	2	1
Promote planned land regeneration as part of dam works	2	1
Shouldn't be on water restrictions in a high rainfall environment	2	1
Sub-total	63	

Discussion: This is similar to earlier results regarding support for the Dunoon dam, or not.

Other options and preferences (to dam)

Response	Number	Percentage (%)
Other options/ preferences		
Demand management/ less wasteful use/ pricing mechanisms/ more self-sufficiency	59	24
Re-use/ recycling/ stormwater harvesting/ indirect potable re-use	53	21.5
Water tanks and stormwater capture (larger scale tanks)	46	19
Prefer more sustainable options (reference to Professor White advice)	29	12
Reduce unnecessary use of potable water/ need double pipe	17	7
System audit for efficiencies/ address water leaks	13	5
Do not support groundwater harvesting/ environmental impacts	12	5
Groundwater, if sustainable	12	5
Desalination for coastal communities	9	4
Restrict population growth	8	3
Land regeneration	7	3
Need for more contingencies within network, local flexible options	6	2

Response	Number	Percentage (%)
About planning and strategy		
Plan (including dam) represents old fashioned thinking/ more techniques now available to secure water/ sustainability leadership opportunity	35	14.25
Support plan (general comment)	14	6
Acknowledge important role of FWP and role of RCC/ water security	9	4
Oppose plan (general comment)	8	3
RCC is guided by profit motive through water sales	5	2
Flawed assumptions within planning (e.g. climate change impacts)	4	1.5
Insufficient detail	2	1
Consultation		
More/ better consultation needed, including with traditional owners, public meetings needed, consultation during Covid-19 was inappropriate	11	4.5
Object to format and framing of questions within survey	3	1
Expected to be able to upload submissions as part of survey	1	-
Expect results to be made public	1	-

Discussion

Respondents tended to reinforce their previously stated positions when providing statement through this field.

Consistent with the earlier question about support for FWP2060, inclusive of Dunoon Dam, the split of support was 75-25, against.

Note – this completes reporting on the raw data from the online survey fields. Following is analysis and discussion about trends relating to ‘town’ water customers and residents who aren’t ‘town’ water customers.

5. Assessment of responses relative to water consumer type

Additional analysis was undertaken as to whether there were differences in support and preferences between non-‘town’ water customers and ‘town’ water customers.

In response to the question as to whether the respondent is or isn’t a ‘town’ water consumer, the following responses were received:

Response	Count of ‘Are you a town water customer?’	Percentage of responses (%)
No	118	32
Yes	224	60
Unspecified	30	8

Please note – some of the following totals differ from the above numbers, as not all respondents provided replies to every question.

Agree with direction of FWP2060

Connection type		
Not Connected	Count	Percentage (%)
Agree with direction of FWP2060	19	16
Don’t agree with direction of FWP2060	99	84
Connected		
Agree with direction of FWP2060	89	40
Don’t agree with direction of FWP2060	135	60

Discussion:

The above data indicates there is more support for FWS2060 from residents who have ‘town’ water connections or who are a customer of RCC; compared to residents who are not water customers.

Based on the anecdotal information provided in other fields, non ‘town’ water respondents feel people should be more self-sufficient, as they tend to be. They also tended to be concerned about the impacts they expect to experience should the Dunoon Dam be constructed.

However the majority of people who are ‘town’ water customers do not support FWP2060.

Support inclusive of Dunoon Dam -

Connection type		
Not Connected	Count	Percentage (%)
Agree	13	11
Don't agree	105	89
Connected		
Agree	77	34
Don't agree	147	66

Support the alternative options to secure the region's future water being multiple groundwater sources within our region.

Connection type		
Not Connected	Count	Percentage (%)
Agree	41	39
Don't agree	64	61
Connected		
Agree	71	45^
Don't agree	77	65^

^Potentially unreliable as 76 respondents didn't provide information for this field, which is ~ a third of the total people who have a reticulated water connection and supply.

Count of 'I am concerned about the economic implications of the Future Water Project 2060'.

Connection type		
Not Connected	Count	Percentage (%)
Agree	85	81
Don't agree	20	19
Connected		
Agree	114	77.5
Don't agree	33	22.5

Count of 'I am concerned about the environmental implications of the Future Water Project 2060'.

Connection type		
Not Connected	Count	Percentage (%)
Agree	104	99
Don't agree	1	1
Connected		
Agree	144	98.5
Don't agree	3	1.5

Count of 'I am concerned about the cultural heritage implications of the Future Water Project 2060'.

Connection type		
Not Connected	Count	Percentage (%)
Agree	105	100
Don't agree	1	0
Connected		
Agree	142	96.5
Don't agree	5	3.5

Discussion: As the data indicates, submitters who aren't 'town' water consumers tend to not support the direction of the FWP2060 compared the average identified in the overall data.

6. Written submissions received

In addition to survey responses, RCC also received a total of **920** written submissions. Of the 920 submissions, 872 were unique submitters, as 41 respondents provided more than one (1) submission.

Of these submissions, around **600** (~70%) were in proforma format or included standardised wording from the proforma. The focus of these responses is to express opposition to the Dunoon Dam, with accompanying rationale for this position, and to recommend alternatives. This is also evident in the email titles, for submissions emailed to Council. The email titles commonly included terms such as 'opposition to Dunoon Dam' and the like.

Of the submissions received **636** (70%) were from the constituent Council areas.

41 respondents made more than one (1) submission. Some respondents provided both email submissions and online survey inputs based on names, addresses and identical content provided through these channels.

6.1 Locations

A total of **636** written/email submissions were received from the constituent Council areas:

Location	Count	Percentage (%) option total <i>Constituent Council area</i>
Constituent Council Areas		
City of Lismore	469	74
Most common locations - Lismore – 189 & Dunoon/ Channon - 177		
Byron Shire Council	105	16.5
Most common location - Mullumbimby- 25		
Ballina	50	7.5
Most common location - Lennox Heads - 15		
Richmond Valley	12	2
Non-Constituent Council Areas		
Other Council areas (NSW and Australia)	153	-
Location not specified	94	-

Note – 70% of written submissions can be confirmed to have been submitted by residents and businesses within constituent Council areas. It is also likely some of the 94 submissions received are also from locations within constituent Council areas.

A significant percentage (~17%) originated from non-constituent Council areas. This percentage may be greater, as some of the 94 submissions where location is not specified are likely to be from non-constituent Council areas.

City of Lismore – most common locations:

Lismore – most common locations	Specific location
Dunoon/ Channon	177
Lismore	189
Nimbin	27
Terania Creek	20
Whian Whian	15
Clunes	14
Rosebank	11

Other locations

In addition to submissions from these Local Government Areas, submissions were also received from:

State and Council	Count
NSW	
Tweed Shire	74
Kyogle Council	29
Coffs Harbour City Council	2
Snowy River Shire Council	2
Upper Lachlan Shire Council	2
Tenterfield Shire Council	1
Camden Council	1
Kempsey Shire Council	1
Clarence Valley Council	1
Nambucca Valley Council	1
Clarence Valley Council	1
Queensland	
Brisbane City	14
Sunshine Coast Council	10
Logan City Council	10
Scenic Rim Regional Council	1
Victoria	

State and Council	Count
Nillumbik Shire Council	1
Western Australia	
Shire of Corrigin	2

Emphasis and focus of responses

Although the FWP2060 proposed a suite of water security measures, respondents focused on whether the Dunoon Dam should be built, or not.

Outside of responses to Dunoon Dam, within the submissions there was very little critique of the specifics of the FWP2060, with the exception of discussions as to whether groundwater should be a complementary or alternative water supply.

The following reporting is based on the submission content and does not follow the same structure as the online survey, as there is insufficient alignment.

6.2 Views on Dunoon Dam

Following is the expressed level of support and opposition for the Dunoon Dam to form part of the FWP2060:

Support/Do not Support	Count	Percentage
Support for Dunoon Dam	18	2
Do not support dam construction	899	98
Position not specified	3	0.25
Total Submissions (Written)	920	

6.3 Explanation of position to oppose Dunoon Dam and other commentary

Respondents who don't support the Dunoon Dam provided the following justification:

Responses	Count	Percentage of respondents (%)
Ecological damage (including rare/ protected flora and fauna)	848	92
Destruction of Aboriginal cultural heritage (and inconsistent with Reconciliation Action Plan)	705	77
Loss of environment flows (ecological impact)/ water quality issues	573	62
Will increase cost of water/ over-capitalisation/ an expensive liability	555	60
Dam will encourage ongoing inefficient water use	532	58
Operational and construction noise and impacts/ will become an industrial zone	523	57
Population increase doesn't justify the scale of the proposed dam	520	56.5

Responses	Count	Percentage of respondents (%)
Dam will facilitate further (unwanted) development	188	20
Dam is 'old' thinking/ sustainability leadership opportunity for RCC	131	14
Intention to oppose dam/ community will continue to oppose dam	115	12.5
Increased local flood risks	108	11.5
Dam proposal is/ will create community conflict	52	5.5
Visual impact, loss of regional appeal	40	4
Region receives high rainfall	37	4
Creating/ will create community conflict	35	3.5
More consultation and studies are needed, insufficient information to make a decision	33	3.5

Many respondents expressed appreciation of RCC's extension of time to receive additional submissions.

Other comments and concerns in relation to the prospect of the Dunoon Dam included:

- Concern about cost calculations and population projections relied upon for proposal (this also referenced uncertainty about actual population increases in a post COVID-19 pandemic 'world')
- Unsuitable geology
- Greenhouse gas emissions
- Rural residents and property owners shouldn't be compensating higher water use in tourism and urban areas
- Concern about construction methodology (may present similar risk as Paradise Dam in Queensland/ Risk of dam wall collapse)
- RCC has a conflict of interest, as it needs to sell water and less motivated in water conservation
- Need for different water authority model to assume municipal responsibilities (to harmonise and reduce conflicts).

In addition to expressing this position and explanation, respondents provided alternatives and preferences, which provided indirect, but relevant feedback in relation to the FWP2060.

Water security/ water supply alternatives from respondents who do not support the proposed Dunoon Dam:

Responses	Count	Percentage of respondents
Suite of smarter water options needed/ Enhanced water use efficiency/ demand management ^	725	79
Water recycling (including greywater and indirect potable re-use) ^^	596	65
Need for contingency and scenario planning, need integrated and adaptive options, not one solution	504	55
Stormwater harvesting and rainwater tanks ^^^	619	68
Groundwater, where environmentally safe and sustainable	543	59
Water audit, address system losses such as leaks	130	14
Permanent water restrictions	63	7
Raise Rocky Creek Dam wall and alternative dam locations	31	2
Land regeneration needed	28	3
Desalination (particularly on coast and combined with renewable energy.	28	3

^ Includes the exclusion of potable water use for flushing toilets, watering gardens, hosing driveways etc. Some respondents also included greater/ mandatory use of rainwater tanks in this response. Also includes various anecdotes that the community needs 'to live within its means'.

^^ These terms were provided in combination and generally infer greater use of available water, rather than new sources.

^^^ See above – support for rainwater tanks often referenced as a demand management strategy.

In addition to the above a small number of submitters also:

- Provided support for direct potable re-use
- Explained desalination was likely to be cost-prohibitive, but provided flexible, scalable and modular solutions particularly for coastal populations.

Discussion

There was strong and consistent recommendation of water supply alternative options. In the case of submissions provided through the proforma format, this guided the majority of alternatives as listed.

Support for dam within submissions

As noted, there was only small support for the Dunoon Dam within the submissions received.

Supporters explained the Dunoon Dam would provide certainty and the volume of water needed in the long-term.

They reasoned the Rocky Creek Dam was not intended to service an entire region as it was primarily built for the Lismore district, and other measures were either marginal or not going to deliver a reliable volume of water for the entire region.

7. Sentiment registered through RCC website

In addition to the two key sources of stakeholder input (survey and submissions), an additional seven (7) submitters provided feedback through the general feedback function on the RCC website.

Of the seven submitters, five (5) expressed objection to the prospect of the Dunoon Dam and two (2) submitters expressed support for the Dunoon Dam.

It is unknown whether these submitters also provided responses through the online survey or written submissions, as this was not identified. However, based on the comments made this seems unlikely.

8. Data comparison and discussion

The two data sets have been coded and reported separately, as they have originated through different channels, and a number of respondents provided both online survey responses and submissions.

There are differences and similarities; with the differences drawn from specific fields within the online survey. To the extent relevant, some general comparison is made, as follows:

The majority of respondents are from the Lismore City Council area, with a strong concentration of respondents from Dunoon, The Channon and nearby locations, relative to regional population.

There was comparatively low engagement through the public submission phase from the other Council areas. In this sense, regional water security may be seen as the responsibility of the Lismore 'district', for the following reasons:

- The profile of the Dunoon Dam proposal within the FWP2060
- The local and immediate community consider they will be most impacted, and are more motivated to respond.
- Lismore has historically been the region's centre and RCC is headquartered at Lismore
- The Lismore district has historically hosted most of the core bulk water and treatment assets.

It may be seen as a shortcoming that stakeholders within the coastal urban areas were either less engaged or involved. However, the distraction of COVID-19 across 2020 would undoubtedly be a factor, as the pandemic will have drawn attention to other local issues, such as travel restrictions to and from Queensland.

Engagement with the available FWP2060 documentation was relatively low compared to the number of submissions, with the majority of respondents providing a forthright case against or for Dunoon Dam.

However, there is a demonstrable depth of understanding of the strategic intent of the FWP2060 and RCC's role to secure regional water supply, which the majority of respondents support.

The majority of respondents who expressed opposition to the Dunoon Dam also expressed alternatives, with some of these options somewhat aligned with FWP2060 (e.g. accessing groundwater resources).

The prospect of Dunoon Dam is clearly the greatest area of interest for respondents and motivation to submit. Evidently, many more respondents do not support the dam across both data sets, than respondents who support the dam.

The reasons respondents object to Dunoon Dam are generally consistent across both data sets, including:

- Ecological damage and loss
- Damage, impact and loss of Aboriginal cultural heritage
- Concern about the loss of environmental flows (related to ecological damage)
- High capital expense which would likely confer higher water charges for consumers
- The dam will encourage ongoing inefficient use of water.

The reasons people provided for their support for the dam, included:

- Need a new large water source, and need to be more resilient to drought
- Economic, recreation and tourism opportunities
- Rocky Creek Dam was built in 1950s for Lismore and not intended to service a larger region
- Demand management has achieved as much as possible and more secure sources of water are now needed
- Low confidence in alternative water sources.

Leaving enhanced demand management to one side, the majority of respondents prefer additional water supplies which they regard as more sustainable, such as:

- Water (stormwater) harvesting, and additional adoption of rainwater tanks for self-sufficiency
- Water re-use and re-cycling, with reference to indirect potable re-use
- Groundwater harvesting, with the caveat that it needs to be environmentally safe and sustainable
- Desalination (smaller number of responses compared with the above)

NOTE – the above list is not strictly in rank order, as across the entire data set these alternatives received various preferences, however they were regularly mentioned. Addressing losses from the reticulation system was also regularly mentioned.

In the case of groundwater use, the strong response through written submissions was driven by the proforma format, while in other more specific submissions and freetext fields within the online survey more concern and caution was expressed.

The support for greater application of water tanks was consistent across all submission types. Through anecdote within proformas and 'freetext' online survey fields participants expressed expectations that water consumers should be more self-sufficient. They explained new residential and non-residential development must include water tanks*.

A number of submitters who explained they are self-reliant, tended to have a number of water tanks with significant water storage volumes.

*RCC provided information about the state-based BASIX requirements for greater water efficiency with new buildings and major renovations on the project webpage.

Within, RCC explained that Rainwater tanks can reduce demand for reticulated water supplies, but cannot alone provide longer-term water security.

As the majority of written submissions were proforma, it is possible submitters did either not access or rely on this information.

Retail water customer account assistance

(D20/8699)

Business activity priority

Strategy and planning

Goal 2

Align strategic direction to core functions and sustainability

Recommendation

That Council in accordance with section 356 (1) of the *Local Government Act 1993* and its 'Retail Water Customer Account Assistance' policy, approve financial assistance as listed in Table 1 of this report.

Background

Applications for financial assistance in accordance with section 356 (1) under Council's 'Retail Water Customer Account Assistance' policy are tabled below:

Table 1

Account	Property owner/s	Date application received	Nature of leak	Original water charges due	S356 financial assistance to be approved	Adjusted water charges due after approval
10452-11000-9	F Esposito	27-Oct-20	Main supply line from meter to dwelling split underground due to tree roots and livestock	\$3,951.18	\$2,052.14	\$1,899.04
10424-10000-5	LC & TA Graham	6-Nov-20	Burst pipe from underground poly fitting failure, 150m from house near meter	\$6,590.65	\$3,994.24	\$2,596.41
Total				\$10,541.83	\$6,046.38	\$4,495.45

Governance

Finance

The 2020/21 financial year budget allocation for applications made in accordance with the 'Retail Water Customer Account Assistance' policy is \$25,000.

2020/21 financial year budget	\$25,000.00	<u>No. of applications</u>
S356 assistance approved financial year to date	\$8,279.63	3
S582 assistance approved financial year to date	\$0.00	
S582 assistance approved since last Council meeting	\$0.00	
Proposed S356 assistance approval this Council meeting	\$6,046.38	2
Proposed S582 assistance approval this Council meeting	\$0.00	
Budget remaining 2020/21 financial year	\$10,673.99	

Legal

Section 377(q) of the *Local Government Act 1993* provides that a decision under section 356 to contribute money or otherwise grant financial assistance may not be delegated and that the decision must be made by resolution of Council.

Conclusion

The total value of section 356 financial assistance equates to \$4,495.45 by application of Council's '*Retail Water Customer Account Assistance*' policy. It is proposed that Council grant the recommended financial assistance.

Guy Bezrouchko
Group Manager Corporate and Commercial

Interest on overdue water charges

(D20/8620)

Business activity priority	Results and sustainable performance
Goal 7	Sustainable performance

Recommendation

That Council:

1. Approve the interest rate of 0.0% on overdue water charges for the period 1 January 2021 to 25 March 2021 to align with COVID-19 pandemic - recovery of unpaid rates covered under section 747AB of the *Local Government Act 1993*; and
2. Approve further extension of the 0.0% interest on overdue water charges should the NSW Office of Local Government further extend the prescribed period for COVID-19 pandemic - recovery of unpaid rates.

Background

Interest on overdue water charges

On 26 May 2020 the NSW Office of Local Government (OLG) released Circular 20-19. The circular included advice to councils on the maximum interest rates on overdue rates and charges.

In response to the financial impacts faced by the community as a result of the COVID-19 Pandemic the OLG advised the interest rate had been set at 0.0% for the first half of the 2020-21 financial year and from 1 January 2021 to 30 June 2021 the maximum interest rate was set at 7.0%.

The interest rate on overdue water charges included in Council's Fees and Charges 2020-21 was in accordance with the OLG circular and was adopted by Council at 17 June 2020 meeting.

COVID-19 pandemic—recovery of unpaid rates

On 22 September 2020 the OLG released Circular 20-37. This circular included advice that the prescribed period for the purpose of section 747AB of the *Local Government Act 1993* (Act) had been extended to 25 March 2021.

Section 747AB limits the ability of councils to commence proceedings to recover unpaid rates and charges during the prescribed period unless certain steps have been taken to identify and address financial hardship.

Retail water customers experiencing hardship

Council's retail water customers who have a direct retail water connection and are experiencing hardship represent 1.86% of Council's retail water customer base.

To assist our impacted customers to continue to reduce the debt owed to Council, staff propose that the interest rate of 0.0% on overdue water charges continue for the period 1 January 2021 to 25 March 2021 to align with COVID-19 pandemic - recovery of unpaid rates prescribed period.

Governance

Finance

There is no budget allocation for interest revenue on overdue water charges, therefore there will be nil impact on Council's overall financial position.

Legal

Section 566(3) of the Act allows the rate of interest on overdue rates and charges to be set by council as long as the rate does not exceed the rate specified for the time being by the Minister.

Should the OLG further extend the prescribed period for the COVID-19 pandemic - recovery of unpaid rates and charges, it is recommended that Council allow the General Manager to review and approve further extension of the 0.0% interest on overdue water charges, but not beyond 30 June 2021.

Conclusion

It is proposed that Council approve the interest rate of 0.0% on overdue water charges for the period 1 January 2021 to 25 March 2021 to align with COVID-19 pandemic - recovery of unpaid rates prescribed period; and approve further extension of the 0.0% interest on overdue water charges should the OLG further extend the prescribed period for COVID-19 pandemic - recovery of unpaid rates.

Guy Bezrouchko
Group Manager Corporate and Commercial

Deferral and refund of developer contributions – Friends of the Lismore Botanic Gardens

(D20/7164)

Business activity priority

Strategy and planning

Goal 2

Align strategic direction to core functions and sustainability

Recommendation

That Council, under clause 2.5 of Council's Development Servicing Plan 2016, approve the deferral and refund of the Rous County Council developer contributions levied to Friends of the Lismore Botanic Gardens Inc. in relation to DA 5.2019.348.1.

Background

The purpose of the report is to recommend to Council that it approve the deferral and refund of the bulk water developer contributions in relation to Lismore City Council Development Application No: 5.2019.348.1.

The proposed development being undertaken by the Friends of the Lismore Botanic Gardens Inc., is a publicly accessible *Amenities building (two accessible toilets) and pedestrian bridge within the rainforest* at 313 Wyrallah Road, Monaltrie (Lot 2 DP1213261).

The President of the Friends of the Lismore Botanic Gardens Inc., Hazel Bridgett, wrote to Rous County Council (RCC) on 1 November 2020 requesting a deferral and refund of developer contributions in relation to Development Application number 5.2019.348.1 (Attachment 1). Payment of \$6,986.40 was made to Lismore City Council, who act as agent for collection of RCC bulk water developer contributions and will be subsequently remitted to RCC.

The RCC Development Servicing Plan for Bulk Water Supply 2016 makes provision for Council to defer developer contributions in certain circumstances. The applicable clause in the Plan is reproduced below:

“2.5 Exemption

Rous Water may defer developer contributions where the proponent demonstrates to Rous Water's satisfaction that it is a non-profit and charitable organisation, which by virtue of carrying out such development, is considered by Rous Water to be making a significant and positive contribution to the community and is unable to recover the charge from the end user”.

Friends of the Lismore Botanic Gardens Inc. is a non-profit, community-based organisation registered with the Australian Charities and Not-for-profits Commission. The organisation's Australian Business Number is 18903132928. The publicly available information on the organisation, from the Australian Charities and Not-for-profits Commission website, is included as Attachment 2.

Governance

Finance

Council's Development Servicing Plan for Bulk Water Supply 2016 provides for the deferral of developer contributions for a non-profit and charitable organisation (clause 2.5).

Based on the organisation's non-profit and charitable status and considering the organisation's significant and positive contribution to the community, granting the request for deferral would be appropriate.

Historically, the number of requests received, and subsequent financial impact of deferrals granted has been low and is considered insignificant in terms of impact on Council's overall financial position.

Legal

Refer to comments in the body of the report.

Consultation

Consultation has been between Rous County Council staff and Hazel Bridgett, President of the Friends of the Lismore Botanic Gardens Inc.

Conclusion

It is recommended that the developer contributions, payable to Rous County Council be deferred and refunded, in accordance with clause 2.5 of the RCC Development Servicing Plan, in relation to Development Application No: 5.2019.348.1 for Friends of the Lismore Botanic Gardens Inc. located at 313 Wyrallah Road, Monaltrie (Lot 2 DP1213261).

Refund of the contributions would be processed once the funds have been remitted to Rous County Council from Lismore City Council. Subject to Council's decision, this could occur during December 2020.

Andrew Logan
Group Manager Planning and Delivery

Attachments:

1. Letter from Hazel Bridgett, President of the Friends of the Lismore Botanic Gardens Inc.
2. Australian Charities and Not-for-profits Commission Information Form - Friends of the Lismore Botanic Gardens Inc.

The General Manager
Rous County Council
PO Box 230
LISMORE NSW 2480

1 November 2020

Dear Mr Rudd,

**REQUEST FOR REIMBURSEMENT OF SECTION 64 CONTRIBUTIONS
PAID BY THE FRIENDS OF LISMORE RAINFOREST BOTANIC
GARDENS INC.**

The Friends committee is concerned that, as part of the DACC process for new amenities at the visitor's centre in Lismore Rainforest Botanic Gardens, it was required to pay section 64 contribution of \$8,172 towards the water supply.

The Friends of the Lismore Rainforest Botanic gardens Inc (FLRBG) is a small community organisation of volunteers which develops and maintains the botanic gardens on land owned by Lismore City Council with whom it has a Memorandum of Understanding. The FLRBG committee receives an annual grant from Lismore City Council (currently \$16,500 including GST) and council employs a gardener who works in both the botanic gardens and the neighbouring waste facility. The LCC grant pays for operating costs including equipment, materials, plant purchases and necessary work by contractors.

After the initial earthworks by LCC the development of the gardens, its plant nursery, structures and paths would not have been possible without the help of significant donations by our benefactors and grant funding. The Committee was very worried, when it was faced with the unexpected payment of the section 64 ~~contributions~~ that the proposed building of the amenities at the visitor's centre would have to be abandoned. Fortunately the FLRBG committee was successful in receiving a CBP grant from the State Government which has meant the project could proceed and it is nearing completion. However, the FLRBG has used accumulated funds to pay the balance of the project not covered by grant funding including the section 64 contributions. The result is that there will be a delay in commencing the build of the single span bridge over upper fern gully by the LCC fabrication team unless we can receive a significant reimbursement of the section 64 contributions.

The committee does not understand why it was required to pay such a huge fee from its limited resources when it is building a facility for the benefit of the general public on public land. The gardens are open to the public every day and admission is free. The additional amenities have been built to cater for visitors who visit the gardens and expect to find toilets at the visitor's centre as well as to cater for the significant numbers of school children who visit the gardens as part of the education programmes conducted in conjunction with the waste facility, the two toilets at the EEC were insufficient to cope especially on the occasions when two classes visited at the same time. The amenities, like those at the EEC will also be open daily and will be maintained by the FLRBG from its operating funds provided by LCC.

The Committee therefore requests that the Rous County Council give favourable consideration to the reimbursement, from any discretionary measures available to it, of all or part of the section 64 contributions paid by FLRBG Inc as part of the DACC process.

Yours Sincerely,

Hazel Bridgett
President
Friends of Lismore Rainforest Botanic Gardens Inc
president@friendslrbg.com.au
04114492113

11/6/2020

Friends Of Lismore Rainforest Botanic Gardens Incorporated | Australian Charities and Not-for-profits Commission



FRIENDS OF LISMORE RAINFOREST BOTANIC GARDENS INCORPORATED

- Charity is registered
- Charity reporting is up to date

Charity details

ABN:

18903132928

Address:

313 Wyrallah Rd
 Monaltrie NSW 2480
 Australia

Email:

secretary@friendslrbg.com.au

Address For Service email:

secretary@friendslrbg.com.au

Website:

www.friendslrbg.com.au

Charity Size:

Small

Who the charity helps:

General community in Australia

Date established:

1998

Last reported:

30 December 2019

Next report due:

31 January 2021

Financial Year End:

30/06

Summary of activities

continued development of the gardens, structures and pathways. Weekly workdays, monthly guided walks, participation in community environmental activities like botanic gardens open day, Big Scrub day etc. Schools education programme research collaboration with Southern Cross University Propagation of rainforest plants including endangered species and seed collecting for RBG Sydney Increased number of native bee hives Collaborated with Arakwal NR staff in planning for 'Encounters 2020'

St. Helena trunk main upgrade Stage 2 - Supply and Delivery of Pipes and Materials Contract

(P20/6962)

Business activity priority

Strategy and planning

Goal 2

Align strategic direction to core functions and sustainability

Recommendation

That Council:

1. Accept the tender submitted by Steel Mains Pty Ltd, in the Recommended Tender Amount of \$758,810 (excluding GST).
2. Approve an additional amount of \$113,822 (excluding GST) - being 15% of the contract amount, as an allowance for Schedule of Rate items and/or variations due to unforeseen circumstances.

1. Background

As part of the augmentation of the existing bulk water supply to the Byron Bay and Ballina areas, Rous County Council (Council) is in the process of upgrading the existing DN300mm trunk main from Dorrroughby to the St Helena Reservoir, Byron Bay. The Stage 2 St Helena pipeline alignment will run from Goreman's Road, Dorrroughby, to a point east of Friday Hut Road, Binna Burra, approximately 8.2km.

The recommendation in this report relates to the proposed award of a contract to supply and deliver 2km of DN660mm Mild Steel Cement Lined (MSCL) pipeline in 6m and 12m lengths to Council's Kyogle Street Depot in Lismore.

Due to the long lead times for DN660mm pipe, it is proposed to provide the successful Stage 2 contractor with surplus pipe from the stage 1 contract (approximately 0.8km), plus an additional 2km of pipe material, the subject of this report recommendation. This will ensure there are no project delays caused by the contractor sourcing required pipe materials.

In this way, successive pipe orders placed by the Stage 2 contractor can be undertaken without causing interruptions to site works or excessive disturbance to landholders through construction delays.

2. The Tender Process**2.1 Tenders received**

Tenders were called on 27 October 2020 and closed 9.00am on 17 November 2020. Three tenders were received as follows:

Tenderer	A.B.N.	Tender amount including GST	Assessed tender amount ¹	Total score ²
Clover Pipelines Pty Ltd	55 166 929 700	\$934,548.44	\$934,548.44	74.12
Steel Mains Pty Ltd	73 004 843 056	\$834,691.00	\$834,691.00	80.00
Pipe Lining and Coating Pty Ltd	84 002 752 490	\$1,011,813.00	\$1,011,813.00	68.55

Notes:

1. The 'Assessed Tender Amount' is the Tender Amount plus (or minus) the Assessed Values of qualifications and departures (anomalies) in the tender and any loadings that apply and includes GST.
2. The 'Total Score' includes the scores for price and non-price criteria.
3. The 'Recommended Tender Amount' is the Tender Amount plus (or minus) adjustments offered by the Preferred Tenderer to withdraw qualifications and departures and includes GST.

2.2 Examination of tenders

Pre-evaluation actions

The tendering process is required to comply with the *Local Government (General) Regulation 2005* (the *Regulation*).

The evaluation method included a weighted price and non-price criteria with a ratio of 80:20 (price: non-price). A management decision was made to adopt a 80:20 price and non-price criteria due to the nature of the contract being supply and delivery only with hurdle criteria included to ensure all products supplied comply with the relevant standards and specifications (Australian Standards, WSAA etc).

A Tender Evaluation Plan consistent with the *Regulation* and the Conditions of Tendering in the Request for Tender (RFT) documents was prepared and endorsed by the Tender Evaluation Committee (TEC) prior to close of tenders.

Evaluation of non-price criteria

The information submitted by the Tenderers was evaluated against the specified non-price criteria. All Tenderers were required to submit information demonstrating their understanding of project scope and risks.

The Tender document nominated specific input for each Non-Price Criterion with the aim of providing the TEC with certainty and assurance of the Tenderers' understanding of the project scope and key risks, including the capacity to mitigate key risks.

The following table shows a high-level summary of non-price criteria used for the evaluation:

Non-price criterion	Weighting
Manufacturing QA/Verification Testing Methodology	4%
Delivering Methodology and Program Timeline	4%
Demonstrated Recent Experience in Undertaking Supply of similar pipes in Australia	4%
Demonstrated Long term Technical Support Services in Australia	4%
Demonstrated longevity and reliability of the pipes in service	4%

The non-price scores were weighted, totalled and normalised:

Tenderer	Total normalised non-price score	Rank
Clover Pipelines Pty Ltd	20	1
Steel Mains Pty Ltd	20	1
Pipe Lining and Coating Pty Ltd	19	2

2.3 Evaluation of price

Initial examination of tendered prices and rates

The amounts tendered in the Schedule of Rates, and Schedule of Prices – Lump Sum were compared with the pre-tender estimate.

All Tenders were above the Pre-Tender Estimate (PTE) \$803,000 including GST, for the pipe supply.

Errors

There were no errors by any of the Tenderers in respect to the lump sum price schedule submitted.

2.4 Assessment of qualifications and departures

Qualifications and departures

There were no qualifications or departures from Clover Pipelines Pty Ltd or Pipe Lining and Coating Pty Ltd.

There were several qualifications and departures with the Tender submitted by Steel Mains Pty Ltd. The majority of these were based on changes to the general conditions of contract.

All outstanding departures have now been resolved following clarifications from Steel Mains Pty Ltd.

Normalised price scores

The Tenders were compared based on the Assessed Tender Amounts, calculated by adding the assessed values of qualifications and departures to the original Tender Amounts.

The Assessed Tender Amounts were used to calculate the weighted and normalised price scores using the method set out in the Tender Evaluation Plan. The price scores are summarised below.

Tenderer	Weighted price score	Ranking
Clover Pipelines Pty Ltd	54	2
Steel Mains Pty Ltd	60	1
Pipe Lining and Coating Pty Ltd	50	3

2.5 Selection of the most advantageous tender

Total scores were obtained for each of the tenders by adding the normalised total non-price score and weighted price score. The total overall scores are summarised below.

Tenderer	Total normalised non-price score	Weighted price score	Total score	Ranking
Clover Pipelines Pty Ltd	20	54	74	2
Steel Mains Pty Ltd	20	60	80	1
Pipe Lining and Coating Pty Ltd	19	50	69	3

Tenderers have confirmed their understanding of scope, contractual obligations and that the Tender Amount reflects all contractual obligations.

The Tender Evaluation Committee agrees that the Tenderer with the highest total score, therefore representing the best value for money, was Steel Mains Pty Ltd – determined as the most advantageous.

The Recommended Tender Amount is \$834,691.00 (including GST), being \$758,810.00 (excluding GST).

2.6 Commentary on the Tenderer's capability

Steel Mains Pty Ltd submission indicates a thorough understanding of scope.

Performance

The TEC considers Steel Mains Pty Ltd capable of completing the contract satisfactorily.

3. Governance

3.1 Finance

The St. Helena trunk main upgrade is a significant multi-year project with a remaining budget of \$22.1M.

Therefore, the current total allocated budget is sufficient to allow awarding of the contract.

This Finance comment needs to be read in conjunction with the St Helena 600 Augmentation Stage 2 tender report contained in this business paper.

3.2 Legal

The tender was undertaken in accordance with the requirements of the *Local Government Act 1993*, associated *Regulation*, and Council Policy.

A Tender Evaluation Plan was used outlining the tender process, evaluation methodology and Code of Conduct requirements (including disclosure of interests/conflicts). The tender evaluation panel consisted of three representatives from Council.

4. Conclusion

Open tenders for the proposed contract 'Supply and Delivery of Pipe and Materials for St. Helena Trunk Main Augmentation' – Supply Contract, were called through a Request for Tender process.

At the conclusion of the evaluation process, the preferred Tenderer is Steel Mains Pty Ltd.

Adam Nesbitt

Group Manager Operations

Audit, Risk and Improvement Committee – meeting update October and November 2020

(D20/7645)

Business activity priority	Strategy and planning
Goal 2	Align strategic direction to core functions and sustainability

Recommendation

That Council:

1. Receive and note the attached minutes from the Audit, Risk and Improvement Committee meeting of 19 October 2020 and 23 November 2020.
2. Approve the revised Audit, Risk and Improvement Committee Charter at Attachment 3.

Background

The Audit, Risk and Improvement Committee met on 19 October 2020 and 23 November 2020. A copy of the minutes of the meetings are attached ([Attachment 1 and 2](#)).

Key messages

1. Financial matters reported to Council's October 2020 meeting

An update on and copies of the reports in relation to the following matters were furnished to the Audit, Risk and Improvement Committee at its meeting on 19 October 2020 and subsequently reported to Council at its October 2020 meeting:

- NSW Audit Office 'Management Letter on the final phase of the audit for the year ended 30 June 2020',
- Annual Financial Report for year ending 30 June 2020, and
- Audit Report for year ending 30 June 2020.

2. Work Health Safety – COVID19 and working from home

The Audit, Risk and Improvement Committee requested and were provided with an update in relation to the wellbeing of Council staff and the status of working from home arrangements implemented by Council in response to the COVID19 pandemic.

Workstation assessments for staff working from home continue to be undertaken/updated by the WHS Officer. Regular communication between staff and their supervisors ensures staff wellbeing is monitored. There have been no reportable WHS incidents in relation to working from home arrangements to date.

3. ICT business plan update

The Audit, Risk and Improvement Committee requested and were provided with a further report in relation to progress against action items identified in Council's ICT business plan.

The progress report included updates in relation to the implementation of the Content Manager platform and the effects COVID19 on progress against action items.

The Committee noted their preference that sufficient time be taken to thoroughly complete and close out each pre-requisite action item prior to moving onto the next action.

4. Audit, Risk and Improvement Committee Charter and Internal Audit Charter

The Audit, Risk and Improvement Committee were presented with and have endorsed a revised Audit, Risk and Improvement Committee Charter ([Attachment 3](#)). The amended Charter has been referred to Council for consideration and adoption, if approved.

The Committee were also presented with and have approved a revised Internal Audit Charter ([Attachment 4](#)). The Committee has delegated authority to approve amendments to the Internal Audit Charter.

The revised Charters were developed in consultation with Audit, Risk and Improvement Committee members, TNR in their capacity as the NSW Audit Office appointed external auditor (contractor), Grant Thornton in their capacity as Council's internal auditor (consultant) and Council staff. The revised Charters have incorporated key themes from the Office of Local Government's 'A New Risk Management and Internal Audit Framework for Local Councils in NSW' released in September 2019.

Consultation

This report was prepared in consultation with the Audit, Risk and Improvement Committee Chairperson.

Conclusion

This report provides a summary of the key messages from the Audit, Risk and Improvement Committee meetings held on 19 October 2020 and 23 November 2020. It also includes a recommendation to adopt an amended Audit, Risk and Improvement Committee Charter.

Phillip Rudd
General Manager

Attachment:

1. Minutes from Audit, Risk and Improvement Committee meeting 19 October 2020
2. Minutes from Audit, Risk and Improvement Committee meeting 23 November 2020
3. Proposed revised Audit Risk and Improvement Committee Charter – for approval
4. Revised Internal Audit Charter

Rous County Council

Audit, Risk and Improvement Committee Minutes

Monday, 19 October 2020

The Chair opened the meeting at 10.00am.

In attendance:

Voting Committee:

- Brian Wilkinson (Independent member - Chair) – via Zoom link
- David Yarnall (Independent member) – present at Council offices
- Cr Darlene Cook (Council member) – present at Council offices

Rous County Council:

- Phillip Rudd (General Manager) – present at Council offices
- Helen McNeil (Group Manager People and Performance) – present at Council offices
- Guy Bezrouchko (Group Manager Corporate and Commercial) – present at Council offices
- Andrew Logan (Planning Manager) – via Zoom link
- Phil Courtney (Group Manager Operations) – via Zoom link
- Natalie Woodhead-Tiernan (Finance Manager) – via Zoom link
- Lauren Edwards (Governance Advisor) – present at Council offices
- Tim Allen (ICT Manager) – via Zoom link

Other attendees:

- Geoff Dwyer (Thomas Noble & Russell) – via Zoom link
- Jodie Carter (Thomas Noble & Russell) – via Zoom link
- Gearoid Fitzgerald (Delegate of the Auditor-General for New South Wales) – via Zoom link

1. APOLOGIES

Nil.

2. ACKNOWLEDGEMENT OF COUNTRY

Council showed its respect and acknowledged the Traditional Custodians of the Land, of all Elders, on which this meeting took place.

3. MINUTES OF PREVIOUS MEETING

Minutes of the meeting held 27 July 2020 were noted as presented.

4. DISCLOSURE OF INTEREST

Nil.

5. PRESENTATION

Geoff Dwyer, Thomas Noble and Russell (on behalf of the Audit Office of NSW via video link) presented the Annual Financial Reports and Audit Report for the year ending 30 June 2020.

6. GROUP MANAGER CORPORATE AND COMMERCIAL REPORTS

i). Annual financial reports and Audit Report for the year ending 30 June 2020

RECOMMENDATION [21/20] (Wilkinson/Cook) that the Committee:

1. Receive and endorse the draft 'Annual Financial Statements for the year ended 30 June 2020' and the NSW Audit Office draft 'Report on the Conduct of the Audit for the year ended 30 June 2020' to Rous County Council for adoption.
2. Receive and note the NSW Audit Office 'Engagement Closing Report for the year ended 30 June 2020'.
3. Receive and note the NSW Audit Office 'Management Letter on the final phase of the audit for the year ended 30 June 2020' as tabled at the meeting.
4. Note and acknowledge the work undertaken by the Finance staff and the liaison with the Auditors in relation to the 2019/20 audit.

CARRIED

7. OTHER MATTERS

i). Performance Audit – Credit Card Management in Local Government – September 2020

RECOMMENDATION [22/20] (Yarnall/Cook) that the Committee receive and note the release of the Audit Office of NSW performance report – Credit Card Management in Local Government.

CARRIED

8. CONFIRMATION OF MINUTES

i). Audit, Risk and Improvement Committee meeting minutes 19 October 2020

RECOMMENDATION [23/20] (Cook/Yarnall) that the minutes of the Audit, Risk and Improvement Committee meeting held 19 October 2020 be confirmed.

CARRIED

9. NEXT MEETING

Monday, 23 November 2020.

10. CLOSE OF BUSINESS

There being no further business the meeting closed at 10.50am.

Rous County Council

Audit, Risk and Improvement Committee Minutes

Monday, 23 November 2020

The Chair opened the meeting at 10.30am.

In attendance:

Voting Committee:

- Brian Wilkinson (Independent member - Chair) – via Zoom link
- David Yarnall (Independent member) – present at Council offices
- Cr Darlene Cook (Council member) – present at Council offices

Rous County Council:

- Phillip Rudd (General Manager) – present at Council offices
- Helen McNeil (Group Manager People and Performance) – present at Council offices
- Guy Bezrouchko (Group Manager Corporate and Commercial) – present at Council offices
- Andrew Logan (Planning Manager) – present at Council offices
- Natalie Woodhead-Tiernan (Finance Manager) – via Zoom link
- Lauren Edwards (Governance Advisor) – present at Council offices
- Tim Allen (ICT Manager) – via Zoom link
- Paul Coore (Risk and Assurance Coordinator) - present at Council offices

Other attendees:

- Geoff Dwyer (Thomas Noble & Russell) – via Zoom link

1. APOLOGIES

An apology was noted from Gearoid Fitzgerald (NSW Audit Office).

2. ACKNOWLEDGEMENT OF COUNTRY

Council showed its respect and acknowledged the Traditional Custodians of the Land, of all Elders, on which this meeting took place.

3. MINUTES OF PREVIOUS MEETING

Minutes of the meeting held 19 October 2020 were noted as presented.

4. DISCLOSURE OF INTEREST

Nil.

5. STANDARD REPORTS

i). Risk management

RECOMMENDATION [23/20] (Yarnall/Cook) that the Audit, Risk and Improvement Committee receive and note the information presented in this report regarding enterprise risk management and progress against completion of actions rated 'high' or above in Council's risk register.

CARRIED

ii). Work Health and Safety (WHS)

RECOMMENDATION [24/20] (Cook/Wilkinson) that the Audit, Risk, and Improvement Committee receive and note the information presented in this report regarding Work Health Safety systems, compliance and reviews.

CARRIED

iii). Governance

RECOMMENDATION [25/20] (Cook/Yarnall) that the Audit, Risk, and Improvement Committee receive and note the information presented in the report on:

1. Progress against actions arising from internal audits.
2. Policy and delegations review status.
3. The results in the attached 'Model Code of Conduct Complaints Statistics' report.
4. Update on the governance of section 355 Committees, specifically Council's decision at its August 2020 meeting to re-endorse the activities of the landowner volunteer floodgate operator program as a committee of Council.
5. ICT Business Plan 2019/21 progress report as at 31 October 2020 and note that a further report will be submitted to the July 2021 Committee meeting.

CARRIED

iv). Implementation of Integrated Planning and Reporting – period 1 January 2020 – 30 June 2020

RECOMMENDATION [26/20] (Yarnall/Wilkinson) that the Audit, Risk and Improvement Committee receive and note the report and attachment regarding performance against delivery of the actions for Year 3 of the combined Delivery program/Operational plan for the period 1 January 2020 to 30 June 2020.

CARRIED

v). Committee review

RECOMMENDATION [27/20] (Yarnall/Wilkinson) that the Audit, Risk, and Improvement Committee:

1. Endorse the proposed amended Audit Risk and Improvement Committee Charter and refer it to Council recommending it be adopted.
2. Approve the proposed amended Internal Audit Charter.

6. GROUP MANAGER CORPORATE AND COMMERCIAL REPORTS

i). Financial management

RECOMMENDATION [28/20] (Cook/Wilkinson) that the Audit, Risk, and Improvement Committee receive and note the information presented in the Financial management report – November 2020 regarding:

1. Annual Financial Statements for year ending 30 June 2020 issued to the Office of Local Government.
2. Audit Office of NSW Management letter issues, summary of actions.
3. The quarterly budget review report furnished to Council's October 2020 meeting applicable for the quarter ending 30 September 2020.
4. The investment report furnished to Council's October 2020 meeting applicable for the month of 30 September 2020.
5. Instance of minor data breach and actions in response thereto.

CARRIED

7. GENERAL MANAGER REPORTS

i). Other matters

RECOMMENDATION [29/20] (Yarnall/Wilkinson) that the Committee receive and note this report and endorse the Committee meeting reporting calendar.

CARRIED

ii). Meeting schedule for 2021

RECOMMENDATION [30/20] (Yarnall/Cook) that the Committee confirm meeting dates for 2021 as: 22 March; 24 March; 26 July; 25 October (financial statements) and 22 November commencing at 10.00am.

CARRIED

8. CONFIRMATION OF MINUTES

i). Audit, Risk and Improvement Committee meeting minutes 23 November 2020

RECOMMENDATION [31/20] (Yarnall/Cook) that the minutes of the Audit, Risk and Improvement Committee of 23 November 2020 be accepted.

CARRIED

9. NEXT MEETING

Monday, 22 March 2021.

10. CLOSE OF BUSINESS

There being no further business the meeting closed at 11:32am



Audit, Risk and Improvement Committee Charter

A document governing Committee
composition, operation and conduct

Version	Purpose and description	Date adopted by Council	Resolution no.
0.1	Draft – Green Paper	DRAFT (24/01/2013)	DRAFT
0.2	Draft – Update of Insurance details + Other Miscellaneous changes	DRAFT (18/02/2013)	DRAFT
1.0	Adoption at Council meeting 20 March 2013	20 March 2013	19/13
0.1	Risk and Audit Committee – minor amendments	4 May 2016	Item 6. i)
2.0	Adoption at Council meeting 18 May 2016, subject to the following changes: <ul style="list-style-type: none"> - The term of appointment of the Internal Auditor (consultant) from two years to four years. - Secretariat title change from Manager Governance to Manager Governance and Human Services. - Removal of references to Richmond River County Council and Far North Coast County Council 	18 May 2016	49/16 Refer page 13 Refer page 11
2.1	Review as a result of the <i>Local Government Amendment (Governance and Planning) Act 2016</i> (Audit, Risk and Improvement Committee) and organisation restructure	DRAFT for 15 October 2018 RAC Committee meeting	Adopted 15/10/18
2.2	Incorporating proposed amendments from Risk and Audit Committee meeting of 15 October 2018	21 November 2018 Council meeting	104/18
3.0	Scheduled review and update incl. changes in anticipation of amendments to s428A of the <i>Local Government Act 1993</i> .	DRAFT	DRAFT

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Part 1: Background

1.1 Interpretation

This document is the 'Audit, Risk and Improvement Committee Charter' and should be read in conjunction with the Internal Audit Charter. Both documents are made in accordance with the Office of Local Government Guidelines under section 23A of the *Local Government Act 1993*, Office of Local Government Model Code of Conduct.

In this Charter a reference to 'Council' means Rous County Council.

NOTE: Local Government elections were scheduled to be held in September 2020. The amendments to the *Local Government Act 1993* relating to Audit, Risk and Improvement Committees were due to commence within 6 months of the election. In response to the COVID-19 pandemic local government elections have been deferred to 2021. This means that the new provisions of the *Local Government Act 1993* governing Audit, Risk and Improvement Committees will not commence until 6 months after the 2021 election.

1.2 Purpose

The Audit, Risk and Improvement Committee is a committee of Rous County Council under section 355 of the *Local Government Act 1993*. On commencement of the amendments to section 428A of the *Local Government Act 1993* (refer to Schedule 1 of the *Local Government Amendment (Governance and Planning) Act 2016* the Committee will no longer be a section 355 Committee but instead be a Committee formed under section 428A.

The role of the Committee is to report to Rous County Council and provide appropriate advice and recommendations on matters identified in this Charter. The Committee is independent and therefore operates independently of Council management.

Primary responsibility for financial and other reporting, for internal controls, for compliance with laws, for ethical behaviour, for the management of Council, for risk management and for organisational improvements, resides with the elected Council and the General Manager in accordance with the *Local Government Act 1993*.

The Committee has a legislated duty to keep under review the following aspects of Council operations:

1. Compliance
2. Risk management
3. Fraud control
4. Financial management
5. Governance
6. Implementation of the strategic plan, delivery program and strategies
7. Service reviews
8. Collection of performance measurement by Council
9. Any other matters prescribed by regulations made under the *Local Government Act 1993*.

Through its activities the Committee will proactively facilitate and promote continuous improvement across Council. An overarching objective is to encourage innovative thinking and problem solving across the spectrum of Council function and activities.

1.3 Rous County Council Code of Conduct applies

Consistent with the general conduct obligations in Rous County Council's Code of Conduct, Committee members are expected to demonstrate integrity, leadership, selflessness, impartiality, accountability, openness, honesty and respect during Committee meetings. This extends to equal opportunity through respect for differing views.

1.4 Scope of authority

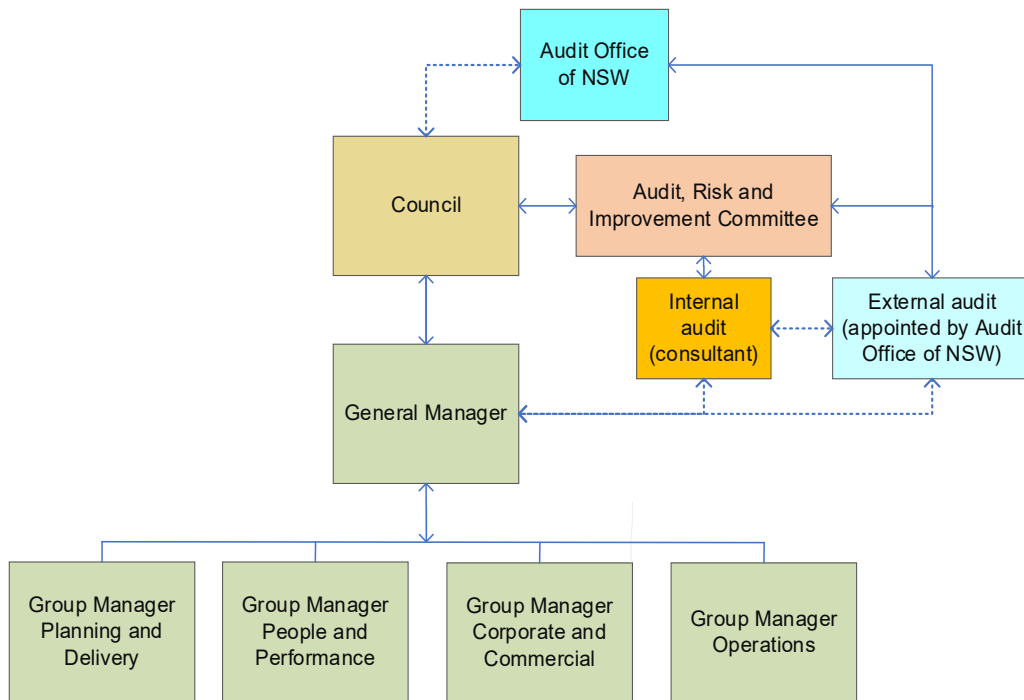
The Committee has no executive powers, except those expressly provided by Rous County Council or as prescribed under the *Local Government Act 1993*.

The Committee has no financial delegation.

The Committee is authorised within the scope of its roles and responsibilities to:

1. Seek, through the General Manager, any information it needs from any employee or external party (subject to their legal obligations to protect information).
2. Discuss any matters with the external auditor or other external parties (subject to confidentiality considerations).
3. Seek, through the General Manager, the attendance of any employee or councillor at committee meetings.
4. Seek, through the General Manager, external legal or other professional advice considered necessary to meet its responsibilities.

1.5 Structure



Part 2: Committee composition, tenure, fees and insurance

2.1 Composition and tenure

The Committee consists of:

1. Members (voting members):

- One Rous County Council Councillor (excluding Council's chairperson):

Term of 2 years aligning with the commencement of the term of Council.

In addition to the Rous County Council councillor appointed to the committee, Council will also appoint an alternate councillor committee member. The alternate councillor committee member will be a substitute for the primary councillor committee member when and if that committee member is absent or unable to attend committee meetings.

- One independent external member (not a member of the Council):

Term of 4 years commencing from Year 2 of the term of Council to Year 2 of the next term of Council.

The position holder is the alternate chairperson in the event that the chairperson is absent.

- One independent external member (not a member of the Council to be chairperson):

Term of 4 years commencing from Year 2 of the term of Council to Year 2 of the next term of Council.

The independent external members will be eligible for extension or re-appointment following a formal review of their performance by Council.

The members of the Committee, taken collectively, will have a broad range of skills and experience relevant to the operations of Council. At least one independent member must have accounting or related financial management experience, with understanding of accounting and auditing standards in a public sector environment.

The General Manager is authorised to determine an appropriate method of recruitment and selection of independent external members including if and when a vacancy occurs.

Appointment of voting members is by Council resolution.

2. Ex-officio members (non-voting members):

- General Manager.
- Other employees of Council at the Committee's invitation.

The following persons are non-members (non-voting invitees) of the committee:

- Audit Office of NSW (as appointed auditor of NSW local councils).
- Audit Office of NSW contracted external auditor.

- Council's internal auditor (consultant).
- Other persons at the chairperson's invitation.

The Audit Office of NSW, Audit Office of NSW contracted external auditor and Council's internal auditor (consultant) have a 'standing' invitation to meetings. This includes receiving all business papers and meeting minutes.

Casual vacancy

Where a casual vacancy arises, the General Manager will advise Council and take steps to identify a suitable replacement member.

2.2 Transitional arrangements - COVID19 and the deferral of the 2020 local government elections

The term of appointment of the independent external members which is due to expire in 2021 is extended to 2023, being Year 2 of the new term of Council, unless the member decides not to take up the extension. Independent members must advise the General Manager of their decision at least 6 months prior to the scheduled expiry of the term. The independent external members will be eligible for extension or re-appointment following a formal review of their performance by Council.

The term of appointment of Councillor members was extended by a further 12 months by resolution of Council at its meeting on 19 August 2020 ([45/20]).

2.3 Fees and reimbursement of expenses for Committee members

Councillor member

A sitting fee/rate is not payable to the councillor Committee member in addition to the annual fee received by the councillor as a member of the governing body of Rous County Council.

Reasonable travel and other Committee-related expenses are reimbursable subject to production of valid tax invoices or other evidence, as required.

Independent external members

The General Manager is authorised to negotiate a sitting fee/rate for independent external Committee members. The sitting fee/rate is to be commensurate with the committee member's skills, experience and qualifications and is payable subject to attendance and participation at meetings.

Reasonable travel and other Committee-related expenses are reimbursable subject to production of valid tax invoices or other evidence, as required.

2.4 Insurance for Committee members

Committee members are covered by the following insurances held by Council:

- Public Liability and Professional Indemnity subject to the terms and conditions provided by the insurance policy held, as amended from time to time.

- Voluntary Workers' Insurance (including members of committees established by Council).

It is recommended that Committee members have private medical insurance in place appropriate for their individual circumstances as Council's 'Voluntary Workers' Insurance' policy does not cover medical expenses.

Part 3: Mission statement and responsibilities

3.1 Mission statement

To keep under review the following aspects of Council's operations:

- (a) compliance,
- (b) risk management,
- (c) fraud control,
- (d) financial management,
- (e) governance,
- (f) implementation of the strategic plan, delivery program and strategies,
- (g) service reviews,
- (h) collection of performance measurement data by the council,
- (i) provide information to Council for the purpose of improving the Council's performance of its functions.

Committee members are expected to:

1. Undertake their roles and responsibilities in Council's best interests.
2. Exercise due diligence including declaring conflicts of interest.
3. Understand the relevant legislative and regulatory requirements appropriate to each Council.
4. Contribute the time needed to study and understand the papers provided.
5. Apply good analytical skills, objectivity and good judgement including ensuring confidentiality.
6. Express opinions frankly, ask questions that go to the fundamental core of the issues, and pursue independent lines of enquiry.
7. Respect and comply with Council's Code of Conduct.

The Committee also has the following responsibilities:

Risk management

1. Review whether management has in place a current and comprehensive risk management framework, and associated procedures for effective identification and management of business and financial risks, including fraud.
2. Review whether a sound and effective approach has been followed in developing strategic risk management plans for major projects or undertakings.

3. Review the impact of the risk management framework on its control environment and insurance arrangements.
4. Review whether a sound and effective approach has been followed in establishing business continuity planning arrangements, including whether plans have been tested periodically.

Control framework

1. Review whether management has adequate internal controls in place, including over external parties such as contractors and advisors.
2. Review whether management has in place relevant policies and procedures, and these are periodically reviewed and updated.
3. Progressively review whether appropriate processes are in place to assess whether policies and procedures are complied with.
4. Review whether appropriate policies and procedures are in place for the management and exercise of delegations.
5. Review whether management has taken steps to embed a culture which is committed to ethical and lawful behaviour.

External accountability

1. Satisfy itself the annual financial reports comply with applicable Australian Accounting Standards and supported by appropriate management sign-off on the statement and the adequacy of internal controls.
2. Review the external audit opinion, including whether appropriate action has been taken in response to audit recommendations and adjustments.
3. To consider contentious financial reporting matters in conjunction with Council's management and external auditors.
4. Satisfy itself there are appropriate mechanisms in place to review and implement, where appropriate, relevant state government reports and recommendations.
5. Satisfy itself there is a performance management framework linked to organisational objectives and outcomes.

Statutory compliance

1. Determine whether management has appropriately considered legal and compliance risks as part of risk assessment and management arrangements.
2. Review the effectiveness of the system for monitoring compliance with relevant laws, regulation and associated government policies.

Internal audit

1. Act as a forum for communication between the Council, General Manager, management, internal audit and external audit.

2. Review the internal audit coverage and internal audit plans (long term strategic, mid-term operational and annual work plans), ensure the plans have considered the Risk Management Plan, and approve the plans.
3. Consider the adequacy of internal audit resources to carry out its responsibilities, including completion of the approved internal audit plans.
4. Review all audit reports and consider significant issues identified in audit reports and action taken on issues raised including identification and dissemination of better practices.
5. Monitor the implementation of internal audit recommendations by management.
6. Periodically review the internal audit charter to ensure appropriate organisational structures, authority, access and reporting arrangements are in place.
7. Periodically review the performance of the internal audit function and the internal auditor (consultant).
8. Consider significant issues raised in external audit reports and better practice guides, and ensure appropriate action is taken.

Part 4: Meetings and meeting procedure

4.1 Meeting frequency and extraordinary meetings

The Audit, Risk and Improvement Committee will meet at least quarterly at a time as agreed by the Committee. One of these meetings will include the review of Council's annual financial statements, external audit opinion and any qualifications prior to being referred to Council. This meeting is generally scheduled annually in October.

The need for any additional meetings will be decided by the chairperson of the Committee, although other Committee members, Council or the General Manager may make requests to the chairperson for additional meetings.

4.2 Meetings closed to the public

Committee meetings are not open to the public.

4.3 Notice of ordinary Committee meetings, agenda and business papers

The General Manager must send to Committee members, at least 5 days before each meeting of the Committee, an agenda and business papers proposed to be considered at the meeting. This may be in electronic form or hard copy.

The agenda and business paper will include a copy of the annual calendar / schedule of reporting to the Committee, for information only.

4.4 Notice of extraordinary Committee meetings

Notice of less than 5 days may be given to Committee members of an extraordinary meeting in cases of an emergency.

4.5 Conduct of Committee meetings

While meetings will generally be conducted in person, telephone or video conference or other methods including by email communication, may be used.

4.6 Quorum

A quorum will consist of a majority of voting Committee members i.e. two voting Committee members.

The voting Committee members can request, through the chairperson, that non-voting members and invitees absent themselves from all or part of the meetings where it is considered inappropriate for them to be present for the discussion of matters on the agenda.

4.7 Motions to be seconded

A recommendation or an amendment to a recommendation cannot be debated unless or until it has been seconded.

4.8 Voting

Voting is to be by open means (such as by voice or by show of hands or other means of indicating a vote).

A Committee member who is present at a meeting of the Committee but who fails to vote on a recommendation put to the Committee is taken to have voted against the recommendation.

All voting at Committee meetings must be recorded in the minutes of the meeting with the name of the Committee members who voted for and against each recommendation or amendment.

The person presiding at a Committee meeting has, in the event of an equality of votes, a second or casting vote. Where that person declines to exercise, or fails to exercise, their second or casting vote, in the event of an equality of votes, the motion being voted on is lost.

4.9 Dealing with items by exception

The Committee may, at any time, resolve to adopt multiple items of business on the agenda together by way of a single resolution. A recommendation to adopted multiple items of business together must identify each of the items of business to be adopted and state that they are to be adopted as recommended in the business paper.

4.10 Secretariat

The General Manager will ensure the provision of appropriate secretariat support. The secretariat will ensure the agenda for each meeting and supporting papers are circulated, at least one week before the meeting and will take minutes at each meeting. Where possible, meeting minutes will be reviewed and confirmed at the end of each meeting.

4.11 Conflict of interest and annual disclosure of interest

Rous County Council's Code of Conduct applies to the Committee. It is the personal responsibility of Council officials, including committee members, to comply with the standards in the Code of Conduct and regularly review their personal circumstances with this in mind. Independent and councillor members must be free from any management, business or other relationships that could be perceived to interfere with their ability to act in the best interests of Council.

Committee members, invitees, observers and Council officials must declare any conflict of interest at the start of each meeting or before discussion of a relevant agenda item or topic. Details of any conflict of interest should be appropriately noted in the meeting minutes.

Where a real or perceived conflict of interest is deemed by the Chair to exist (or in the case of the Chair by the majority of the Committee) the relevant person will be excused from Committee deliberations and leave the meeting on the issue from which the conflict arises.

Voting members, ex-officio members (non-voting members) and non-members (non-voting invitees) are required to complete an annual disclosure of interest.

4.12 Confidentiality

Committee members, invitees, observers and Council officials are bound by Council's confidentiality requirements including the provisions of the Code of Conduct.

Independent committee members are required to sign a confidentiality agreement as a condition of appointment.

Part 5: Internal auditor

5.1 Mission statement for internal audit program

- To deliver an independent, objective assurance and consulting activity designed to add value and improve Council's operations.
- To help Council accomplish its objectives by bringing a systematic, disciplined approach to evaluate and improve the effectiveness of risk management, control, and governance processes.

(The Institute of Internal Auditors Australia).

5.2 Internal audit charter

The Committee is responsible for developing and adopting an internal audit charter. The charter will outline, among other things, the expected professional standards to be adhered to and the applicable reporting relationships between the internal auditor (consultant), the Audit, Risk and Improvement Committee, the General Manager and external auditor.

5.3 Appointment

The selection and appointment of the internal auditor (consultant) will be undertaken by the General Manager having regard to the recommendation of the Committee.

The internal auditor (consultant) must not be the Audit Office of NSW contracted external auditor for Council.

5.4 Term

The term of appointment of the internal auditor (consultant) is four (4) years.

5.5 Insurance

As a non-member 'non-voting invitee' the internal auditor (consultant) will be required to have in place for at least the duration of their engagement valid insurances (with an insurer authorised by the Australian Prudential Regulation Authority) for:

- Public Liability (minimum indemnity limit of \$10M).
- Professional Indemnity (minimum indemnity limit of \$10M).
- Workers' Compensation insurance coverage,

or such other insurances and insurance limits as determined by management.

Part 6: Other

6.1 Committee member induction

New members will receive relevant information and briefings at the time of their appointment to assist them to meet their responsibilities as a Committee member.

Committee members are required to undertake Code of Conduct training equivalent to that completed by Rous Councillors.

6.2 Reporting to Council on Committee activity

The Committee will report to Council as soon as practicable following each Committee meeting with an update on the key points of business transacted at the meeting and a copy of the meeting minutes.

6.3 Assessment of Committee performance

The chairperson of the Committee and General Manager will initiate a review of the performance of the Committee at least once every two years. The review will be conducted on a self-assessment basis (unless otherwise determined by the chairperson of the Committee or Council), with appropriate input from management and any other relevant stakeholders, as determined by the chairperson of the Committee.

6.4 Review of Charter

The Committee (or the internal auditor (consultant) on its behalf) will review the Committee's Charter at least once every two years.

Changes to the Charter require Rous County Council resolution.



Rous County Council Internal Audit Charter

A Charter governing the
conduct of internal audit

Version	Purpose and description	Approved by ARIC
1.0	<p>Following adoption of Rous County Council's Risk and Audit Committee Charter at Council's meeting 18 May 2016, the following changes have been made to the Rous County Council's Internal Audit Charter:</p> <ul style="list-style-type: none"> - The term of appointment of the Internal Auditor (consultant) from two years to four years. - Manager Governance titles changed to Manager Governance and Human Services. - Finance and Corporate Services Director title change to Manager Corporate and Commercial. - Removal of references to Richmond River County Council and Far North Coast County Council. 	
2.0	<p>Review following update of the Audit, Risk and Improvement Committee Charter and to incorporate the following amendments:</p> <ul style="list-style-type: none"> - Name of Risk and Audit Committee amended to Audit, Risk and Improvement Committee. - Manager Governance and Human Services titles changed to Group Manager People and Performance. - Manager Corporate and Commercial title changed to Group Manager Corporate and Commercial. 	15/10/2018
3.0	Routine review and update (minor).	DRAFT

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Part 1: Background

1.1 Interpretation

This Charter is the 'Internal Audit Charter' and should be read in conjunction with the Audit, Risk and Improvement Committee Charter. It is made having regard to the sample Internal Audit Charter contained in the Department of Local Government Guidelines under section 23A of the *Local Government Act 1993*.

In this Charter a reference to 'Council' means Rous County Council.

1.2 Purpose

The Audit, Risk and Improvement Committee is a committee of Rous County Council under section 355 of the *Local Government Act 1993*. The Committee does not have financial delegation.

The Audit, Risk and Improvement Committee Charter requires that the Committee adopt an Internal Audit Charter which outlines, among other things, the expected professional standards to be adhered to and the applicable reporting relationships between the Internal Auditor (consultant), the Audit, Risk and Improvement Committee, the General Manager and Audit Office of NSW contracted external auditor.

This Internal Audit Charter is a formal statement of purpose, authority and responsibility for internal audit. It outlines the legal and operational framework under which Council's internal audit function will operate and it authorises Council staff to facilitate the delivery of the Committee's Internal Audit Plan Services as approved by the Audit, Risk and Improvement Committee.

The mission of internal audit is to provide independent assessment and validation of the effectiveness of internal control frameworks from both a risk mitigation and efficiency viewpoint. It is primarily designed to add value through the continuous improvement of Council's risk management, control and governance processes.

1.3 Role and authority

As provided in the Audit, Risk and Improvement Committee Charter, Rous County Council will engage an internal auditor (consultant) to perform internal audit work for and on behalf of Council. While the internal audit (consultant) reports directly to the Audit, Risk and Improvement Committee, it is coordinated by the Governance Advisor whom is authorised to direct the implementation of the Internal Audit Plan approved by the Audit, Risk and Improvement Committee. For this purpose, the internal audit (consultant) is authorised to have full and unrestricted access to all functions, property, personnel, records, information, accounts, files, monies and other documentation, as necessary for the conduct of their work. Their terms of engagement must include a specific element regarding confidentiality.

1.4 Objectivity, independence, conflict of interest and organisational status

The internal audit (consultant):

- Will perform internal audit activities in such a manner that they have an honest belief in their work product and that no significant quality compromises are made. Further, the internal audit (consultant) undertakes that they will not subordinate their judgment on internal audit matters to that of others. The internal audit (consultant) is not responsible for operational activities on a daily basis, or in the detailed development or implementation of new or changed systems, or for internal checking processes.
- Has independent status within Council and for this purpose is accountable to the Audit, Risk and Improvement Committee and administratively responsible to the General Manager.
- Must remain independent of the activities being audited whereby they must not audit work areas or work which they have previously undertaken or delivered for Council. Whilst the International Standards for the Professional Practice of Internal Auditing ('Standards') provide guidance on this point and allow this to occur after 12 months, each instance should be carefully assessed.

When engaging the internal audit (consultant) Council will take steps to identify, evaluate the significance, and manage any perceived or actual conflicts of interest that may impinge upon internal audit work. The Internal Audit (consultant) has a duty to report to the Governance Advisor any situation where they feel their objectivity may be impaired or where a conflict of interest (perceived or actual) may exist. The Audit, Risk and Improvement Committee must be advised of any such report.

The work of the internal audit (consultant) does not relieve Council staff from their accountability to discharge their responsibilities. All staff are responsible for risk management and the operation and enhancement of internal control. This includes responsibility for implementing remedial action or recommendations endorsed by management following an internal audit.

1.5 Skills and conduct

The internal audit (consultant) must:

1. Possess the knowledge, skills and technical proficiency essential to the performance of internal audits.
2. Be skilled in dealing with people and in communicating audit issues effectively.
3. Maintain their technical competence through a program of continuing education.
4. Exercise due professional care in performing internal audit engagements.
5. Conduct themselves in a professional manner.

6. Conduct their activities in a manner consistent with the Standards and Code of Ethics issued by the Institute of Internal Auditors, Australia and International Professional Practices Framework, Institute of Internal Auditors.

Part 2: Scope of work and methodology

The scope of services provided by the internal audit (consultant) may include but is not limited to:

1. The examination and evaluation of the adequacy and effectiveness of systems of internal control, risk management, governance, and the status of ethical behaviour.
2. Ascertaining conformity with the goals and objectives of the Council.
3. Assessment of the economic and efficient use of resources.
4. The examination of compliance with policies, procedures, plans and legislation.
5. Assessment of the reliability and integrity of information.
6. Assessment of the safeguarding of assets.
7. Any special investigations as directed by the Audit, Risk and Improvement Committee.
8. All activities of the Council, whether financial or non-financial, manual or computerised.

2.1 Internal audit methodology

The internal audit (consultant) will use the most appropriate methodology for each internal audit engagement, depending on the nature of the activity and the pre-determined parameters for the engagement. Generally, internal audits will have regard to the International Professional Practices Framework, Institute of Internal Auditors, and include:

1. Planning.
2. Reviewing and assessing risks in the context of the audit objectives.
3. Examination and evaluation of information.
4. Communicating results.
5. Following up on implementation of audit recommendations.

2.2 Operating principles

Internal audit will conform with industry standards in relation to audit, for example:

1. The Standards and Code of Ethics issued by the Institute of Internal Auditors.
2. Where relevant, the Statement on Information Systems Auditing Standards issued by the Information Systems and Control Association.
3. Relevant auditing standards issued by the Auditing and Assurance Standards Board.

Part 3: Other

3.1 Reporting

The Governance Advisor will submit to the Audit, Risk and Improvement Committee a report summarising all audit activities undertaken during the period preceding a meeting, indicating:

1. Internal audit engagements completed or in progress.
2. Outcomes of each internal audit engagement undertaken.
3. Remedial action taken or in progress.

On completion of each internal audit the internal audit (consultant) will issue a report detailing the objective and scope of the audit, and resulting issues based on the outcome of the audit.

The internal audit (consultant) will seek from the General Manager an agreed and endorsed action plan outlining remedial action to be taken, along with an implementation timetable and person responsible. Responsible officers must, as and when required, provide written responses to management and action plans regarding issues and recommendations contained in internal audit reports.

The work of the internal audit (consultant) is solely for the benefit of Council and is not to be relied on or provided to any other person or organisation, except where this is formally authorised by the Audit, Risk and Improvement Committee.

3.2 Internal audit planning requirements

The internal audit (consultant) is to use a risk-based rolling program of internal audits to establish an annual Internal Audit Plan to reflect a program of audits over a three year period. This approach provides Council with some continuity across the four year appointment term for the internal audit (consultant). It also means that Council can be flexible, dynamic and responsive in order to meet changing needs and priorities.

The internal audit (consultant) must prepare an annual Internal Audit Plan for review and approval by the Audit, Risk and Improvement Committee. The annual Internal Audit Plan will be based on an assessment of the goals, objectives and business risks of Council and take into consideration any special requirements of the Audit, Risk and Improvement Committee and General Manager.

The Governance Advisor, in consultation with the Chairperson of the Audit, Risk and Improvement Committee, has authority to adjust the Internal Audit Plan as a result of receiving special requests from management to conduct reviews that are not on the Plan, for example where an incident has occurred. Any such adjustment is to be reported to the next meeting of the Audit, Risk and Improvement Committee. Such adjustments are subject to budget availability.

3.3 Co-ordination with external audit

The Governance Advisor in cooperation with the Finance Manager will, as necessary, facilitate consultation between the internal audit (consultant) and the Audit Office of NSW contracted external auditor to discuss matters of mutual interest, to co-ordinate audit activity, and to reduce duplication of audit effort.

3.4 Review of the Internal Audit Charter

The Governance Advisor will periodically review the Internal Audit Charter to ensure it remains up-to-date and reflects the current scope of internal audit work.

3.5 Evaluation of internal audit

Performance measures (key performance indicators) against which to evaluate the performance of the internal audit (consultant) will be established and where appropriate incorporated into Council's Integrated Planning and Reporting Framework.

3.6 Review

Changes to this Internal Audit Charter are to be referred to the Audit, Risk and Improvement Committee for approval.

Information reports

(D20/7940)

Business activity priority	Process management, improvement and innovation
Goal 6	Continuous improvement through process management and innovative thinking

Recommendation

That the following information reports be received and noted:

- i). Investments – November 2020
- ii). Water production and usage – October 2020 and November 2020
- iii). Reports/Actions pending
- iv). Annual ‘Model Code of Conduct Complaints Statistics’ report
- v). Debt write-off information summary

Background

Copies of the following reports are attached for information:

- i). Investments – November 2020
- ii). Water production and usage – October 2020 and November 2020
- iii). Reports/actions pending
- iv). Annual ‘Model Code of Conduct Complaints Statistics’ report
- v). Debt write-off information summary

Consultation

Consultation has been undertaken with the General Manager, Group Managers and staff.

Conclusion

Copies of the reports listed are attached for information.

Phillip Rudd
General Manager

Investments – November 2020

(D20/8694)

Business activity priority Results and sustainable performance

Goal 7 Sustainable performance

Recommendation

That Council receive and note the investments for November 2020.

Background

Clause 212 of the *Local Government (General) Regulation 2005* and Council's 'Investment' policy require that a report detailing Council's investments be provided. This report has been for 30 November 2020.

Governance

Finance

RBA cash rate

At the RBA's November meeting, it was decided to leave the cash rate at 0.25%. The 90-day average bank bill swap rate (BBSW) remains steady at 0.09%. The low rate will continue to put pressure on interest yields in the foreseeable future.

Total funds invested for November was \$32,144,887

This is a decrease of \$2,325,695 compared to the September 2020 figure. This is primarily due to three semi-annual loan repayments.

Return for November was 1.30%

The weighted average return on funds invested for the month of November was 1.30%. This represents a decrease of 24 basis point compared to the September result (1.54%) and is 120 basis points above Council's benchmark (the average 90-day BBSW rate of 0.09%) (Refer: Graph D2).

Interest earned for November was \$33,141

Interest earned compared to the original budget is \$17,256 below the pro-rata budget (Refer: Attachment A).

Summary of indebtedness as at 30 November 2020

Information	Loan #1	Loan #2	Loan #3	Loan #4	Loan #5	Loan #6	Total
Institution	CBA	CBA	CBA	Dexia	NAB	NAB	
Principal Borrowed	\$ 2,000,000	\$ 3,000,000	\$ 10,000,000	\$ 10,000,000	\$ 10,000,000	\$ 10,000,000	\$ 45,000,000
Date Obtained	9-Jun-04	31-May-05	31-May-06	21-Feb-07	31-May-07	25-Sep-07	
Term (Years)	20	20	20	20	20	20	
Interest Rate	6.82%	6.25%	6.37%	6.40%	6.74%	6.85%	
Date Due	10-Jun-24	31-May-25	31-May-26	21-Feb-27	31-May-27	25-Sep-27	
Annual Commitment	\$ 184,785	\$ 264,921	\$ 891,595	\$ 893,507	\$ 917,390	\$ 925,933	\$ 4,078,130
Principal Repaid LTD	\$ 1,362,587	\$ 1,974,605	\$ 5,916,913	\$ 5,308,806	\$ 5,221,587	\$ 4,911,919	\$ 24,696,418
Interest Incurred LTD	\$ 1,593,975	\$ 2,131,665	\$ 7,011,216	\$ 6,755,577	\$ 7,163,172	\$ 7,125,205	\$ 31,780,811
Principal Outstanding	\$ 637,413	\$ 1,025,395	\$ 4,083,087	\$ 4,691,194	\$ 4,778,413	\$ 5,088,082	\$ 20,303,582
Interest Outstanding	\$ 101,727	\$ 166,749	\$ 820,686	\$ 1,117,583	\$ 1,205,318	\$ 1,405,337	\$ 4,817,399

Cheque account balance as at 30 November 2020 was \$162,901

Ethical holdings represent 59.11% of the total portfolio

Current holdings in Ethical Financial Institutions equals \$19,000,000. The assessment of Ethical Financial Institutions is undertaken using www.marketforces.org.au which is an affiliate project of the Friends of the Earth Australia (Refer: Graph D4).

Implications of borrowing from New South Wales Corporation (Tcorp)

Council staff have commenced aligning the existing maturing term deposit investments with Tcorp investment guidelines. The below table shows the movement between rating categories:

Investment category rating	September 2020 term deposit %	November 2020 term deposit %	Increase/ (decrease)
All A –	23.08%	34.67%	50.22%
BBB+, BBB, BBB-	50.00%	49.77%	(0.45%)
Unrated	26.92%	15.55%	(42.22%)

Legal

All investments are in accordance with section 625 of the *Local Government Act 1993*, clause 212 of the *Local Government (General) Regulation 2005* and Council's 'Investment' policy.

Consultation

Nil.

Conclusion

A report on investments is required to be submitted to Council. As at 30 November 2020, investments total \$32,144,887 and the average rate of return is estimated at 1.30%.

Guy Bezrouchko
Group Manager Corporate and Commercial

Attachments:

- A. Investment analysis
- B. Investment by type
- C. Investment by Institution
- D. Total funds invested - comparisons

Rous County Council – Investment Analysis Report – 30 November 2020

Attachment A

Funds Invested With	S & P Local Long Term Rating	Product Name	Ethical ADIs	Lodgement Date	Maturity Date	% of Portfolio	30 Nov 20 Balance	Rate of Return	Monthly Interest	Year-to-Date Interest
CBA Business Online Saver	AA-	CBA-BOS	No	At call		11.34	3,644,887.51	1.20	1,120.18	9,978.18
Newcastle Permanent Bldg Soc	BBB	TD	Yes	29/1/2019	19/1/2021	1.56	500,000.00	2.95	1,212.33	6,182.88
Newcastle Permanent Bldg Soc	BBB	TD	Yes	19/2/2019	16/2/2021	1.56	500,000.00	2.95	1,212.33	6,182.88
Newcastle Permanent Bldg Soc	BBB	TD	Yes	8/3/2019	2/3/2021	3.11	1,000,000.00	2.85	2,342.47	11,946.58
Auswide Bank Ltd	BBB+	TD	Yes	3/5/2019	4/5/2021	3.11	1,000,000.00	2.55	2,095.89	10,689.04
Firstmac Ltd	UNRATED	TD	Yes	3/5/2019	11/5/2021	1.56	500,000.00	2.75	1,130.14	5,763.70
Auswide Bank Ltd	BBB+	TD	Yes	8/10/2019	12/10/2021	1.56	500,000.00	1.65	678.08	3,458.22
Auswide Bank Ltd	BBB+	TD	Yes	22/10/2019	19/10/2021	1.56	500,000.00	1.65	678.08	3,458.22
Auswide Bank Ltd	BBB+	TD	Yes	29/10/2019	26/10/2021	1.56	500,000.00	1.65	678.08	3,458.22
Defence Bank	BBB	TD	Yes	3/12/2019	1/12/2020	1.56	500,000.00	1.75	719.18	3,667.81
BankVic (Police Financial Services Ltd T/as)	BBB+	TD	Yes	10/12/2019	8/12/2020	1.56	500,000.00	1.75	719.18	3,667.81
Police Credit Union SA	UNRATED	TD	Yes	14/1/2020	12/1/2021	1.56	500,000.00	1.70	698.63	3,563.01
Police Credit Union SA	UNRATED	TD	Yes	20/1/2020	2/2/2021	1.56	500,000.00	1.70	698.63	3,563.01
The Capricornian Ltd	UNRATED	TD	Yes	21/1/2020	5/1/2021	1.56	500,000.00	1.75	719.18	3,667.81
Goldfields Money Ltd	UNRATED	TD	Yes	28/1/2020	19/1/2021	1.56	500,000.00	1.65	678.08	3,458.22
ING Bank Aust Ltd	A	TD	No	3/2/2020	9/2/2021	1.56	500,000.00	1.65	678.08	3,458.22
ING Bank Aust Ltd	A	TD	No	11/2/2020	16/2/2021	3.11	1,000,000.00	1.65	1,356.16	6,916.44
ING Bank Aust Ltd	A	TD	No	18/2/2020	23/2/2021	1.56	500,000.00	1.60	657.53	3,353.42
MyState Bank Limited	BBB+	TD	Yes	3/3/2020	9/3/2021	3.11	1,000,000.00	1.65	1,356.16	6,916.44
MyState Bank Limited	BBB+	TD	Yes	16/3/2020	15/12/2020	1.56	500,000.00	1.75	719.18	3,667.81
MyState Bank Limited	BBB+	TD	Yes	17/3/2020	15/12/2020	1.56	500,000.00	1.75	719.18	3,667.81
Auswide Bank Ltd	BBB+	TD	Yes	28/4/2020	23/3/2021	1.56	500,000.00	1.55	636.99	3,248.63
Auswide Bank Ltd	BBB+	TD	Yes	28/4/2020	13/4/2021	1.56	500,000.00	1.55	636.99	3,248.63
AMP Bank	BBB	TD	No	9/6/2020	7/12/2020	1.56	500,000.00	1.55	636.99	3,248.63
Bank of Queensland	BBB+	TD	Yes	30/6/2020	22/6/2021	3.11	1,000,000.00	1.05	863.01	4,401.37
Bank of Queensland	BBB+	TD	Yes	21/7/2020	20/7/2021	1.56	500,000.00	0.90	369.86	1,639.73
National Australia Bank Limited	AA-	TD	No	28/7/2020	27/7/2021	1.56	500,000.00	0.80	328.77	1,380.82
National Australia Bank Limited	AA-	TD	No	11/8/2020	10/8/2021	1.56	500,000.00	0.80	328.77	1,227.40
National Australia Bank Limited	AA-	TD	No	11/8/2020	17/8/2021	1.56	500,000.00	0.80	328.77	1,227.40
Bank of Queensland	BBB+	TD	Yes	18/8/2020	24/8/2021	1.56	500,000.00	0.80	328.77	1,150.68
National Australia Bank Limited	AA-	TD	No	25/8/2020	31/8/2021	1.56	500,000.00	0.78	320.55	1,047.12
National Australia Bank Limited	AA-	TD	No	25/8/2020	7/9/2021	1.56	500,000.00	0.78	320.55	1,047.12
Commonwealth Bank of Australia	AA-	TD	N/A	25/8/2020	25/5/2021	1.56	500,000.00	0.67	275.34	899.45
Westpac Banking Corporation	AA-	TD	No	8/9/2020	14/9/2021	1.56	500,000.00	0.74	304.11	851.51
Judo Bank	UNRATED	TD	Yes	15/9/2020	15/12/2020	1.56	500,000.00	0.95	390.41	1,002.05

Funds Invested With	S & P Local Long Term Rating	Product Name	Ethical ADIs	Lodgement Date	Maturity Date	% of Portfolio	30 Nov 20 Balance	Rate of Return	Monthly Interest	Year-to-Date Interest
Auswide Bank Ltd	BBB+	TD	Yes	22/9/2020	23/3/2021	1.56	500,000.00	0.75	308.22	719.18
National Australia Bank Limited	AA-	TD	No	22/9/2020	21/9/2021	3.11	1,000,000.00	0.70	575.34	1,342.47
Auswide Bank Ltd	BBB+	TD	Yes	29/9/2020	30/3/2021	1.56	500,000.00	0.75	308.22	647.26
MyState Bank Limited	BBB+	TD	Yes	29/9/2020	28/9/2021	1.56	500,000.00	0.80	328.77	690.41
Commonwealth Bank of Australia	AA-	TD	N/A	6/10/2020	5/10/2021	3.11	1,000,000.00	0.67	550.68	1,027.95
MyState Bank Limited	BBB+	TD	Yes	20/10/2020	19/10/2021	1.56	500,000.00	0.60	246.58	345.21
The Mutual Bank (Maitland Mutual)	UNRATED	TD	Yes	27/10/2020	2/2/2021	1.56	500,000.00	0.47	193.15	225.34
Warwick Credit Union	UNRATED	TD	Yes	27/10/2020	2/2/2021	1.56	500,000.00	0.47	193.15	225.34
Bendigo & Adelaide Bank Ltd (Rural Bank Div)	BBB+	TD	Yes	3/11/2020	16/3/2021	3.11	1,000,000.00	0.55	421.92	421.92
AMP Bank	BBB	TD	No	3/11/2020	2/11/2021	1.56	500,000.00	0.60	230.14	230.14
Summerland Credit Union	UNRATED	TD	Yes	10/11/2020	9/11/2021	1.56	500,000.00	0.70	201.37	201.37
AMP Bank	BBB	TD	No	13/11/2020	16/11/2021	1.56	500,000.00	0.75	184.93	184.93
Bank of Sydney Ltd	UNRATED	TD	Yes	17/11/2020	15/6/2021	1.56	500,000.00	0.70	134.25	134.25
AMP Bank	BBB	TD	No	17/11/2020	16/11/2021	1.56	500,000.00	0.75	143.84	143.84
Bank of Queensland	BBB+	TD	Yes	20/10/2020	18/10/2022	1.56	500,000.00	0.80	328.77	460.27
MATURED TDs									1,855.07	68,167.95
						100.00	32,144,887.51	1.3	33,141.00	211,474.07

Total Investment Holdings

100.00	32,144,887.51	33,141.00	211,474.07
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Total YTD Interest	211,474.07
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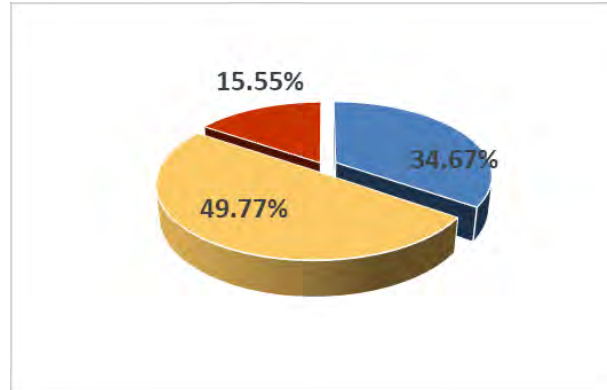
Deposits with Australian Deposit-taking institutions (ADI) are Government.

Budget Interest @ 30 Nov 20	228,750.00
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Guaranteed for balances totalling up to \$250,000 per customer, per institution.

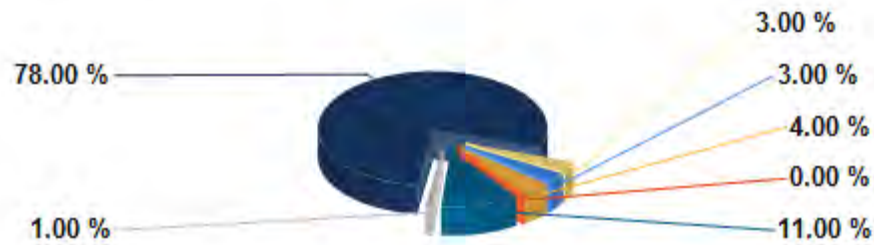
Budget variance	(17,275.93)
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Investment by Type



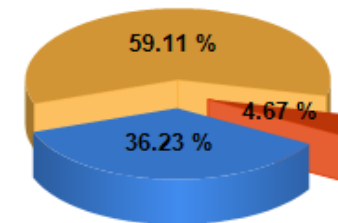
■ All A category term deposits
 ■ BBB+, BBB, BBB- category term deposits
 ■ Unrated Term Deposits

Investment by Fund



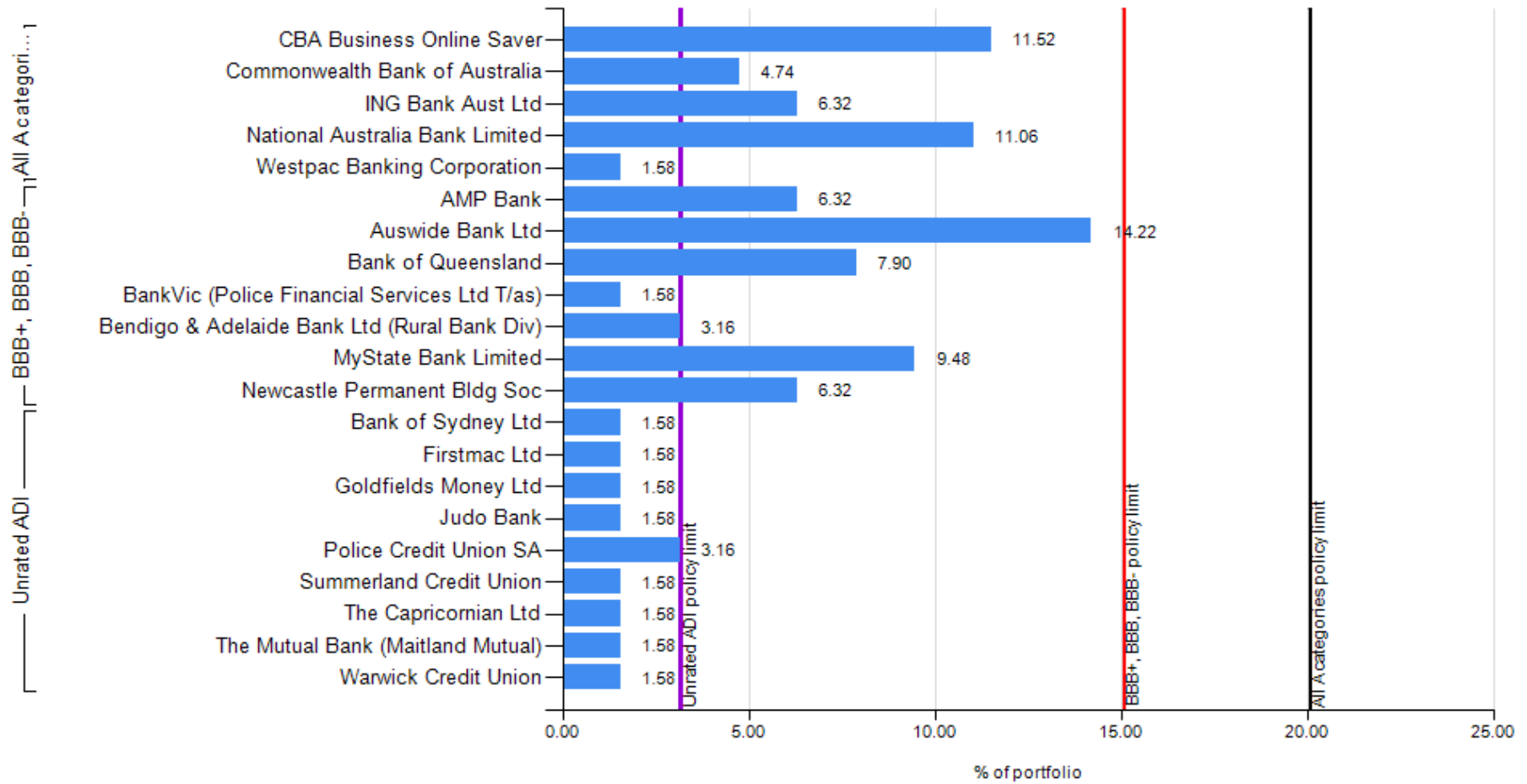
■ Fleet ■ Property ■ Retail ■ RWL ■ Water ■ Weeds
■ Flood

Ethical Investment as a % of Portfolio

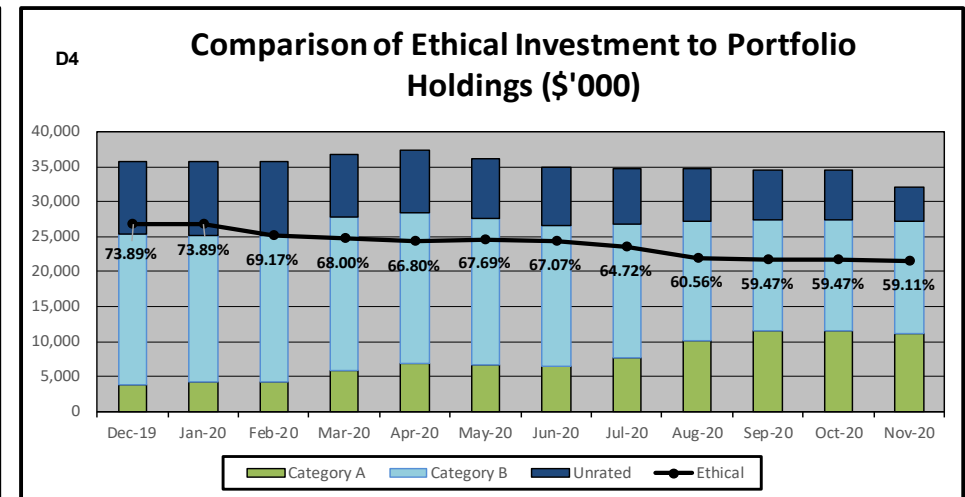
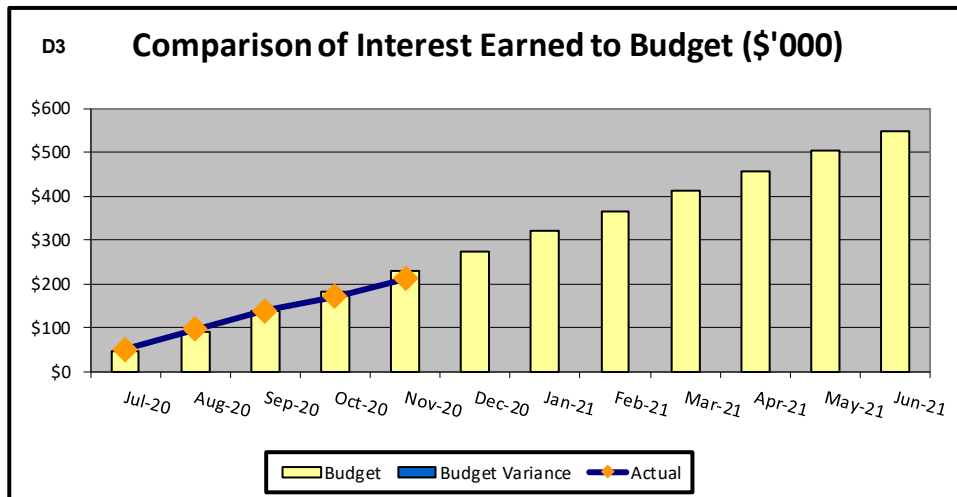
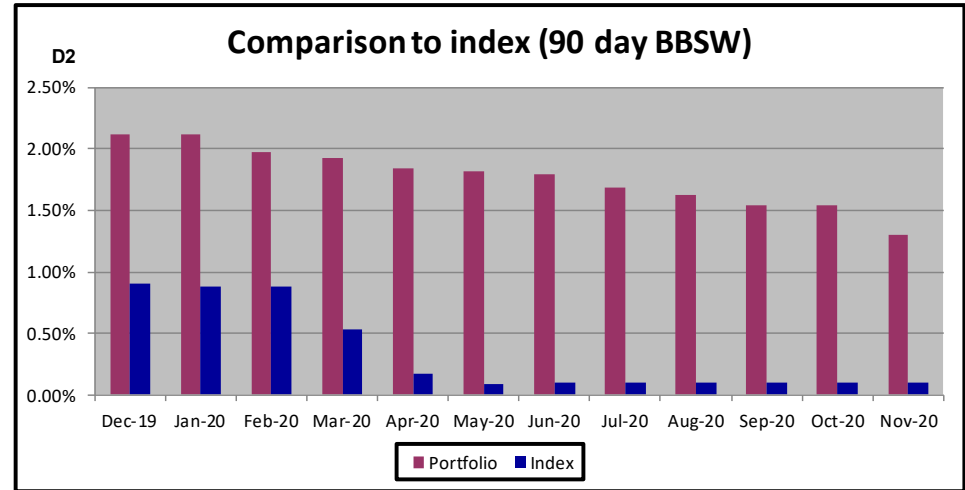
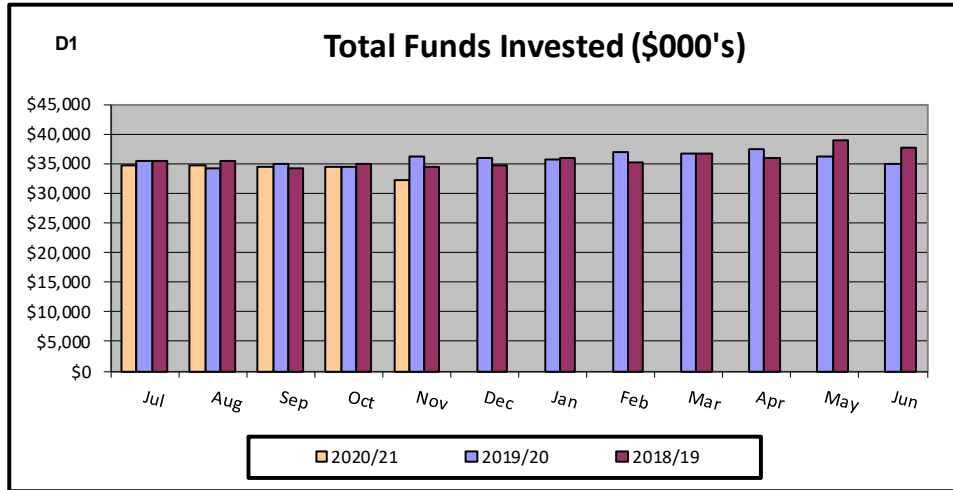


■ Investment in fossil fuels ■ Unknown status
■ No investment in fossil fuels

Investment by Institution



Note: Institutions shown with "***" and in red are in breach of council policy.



Water production and usage – October 2020 and November 2020

(D20/8233)

Business activity priority

Strategy and planning

Goal 2

Align strategic direction to core functions and sustainability

Background

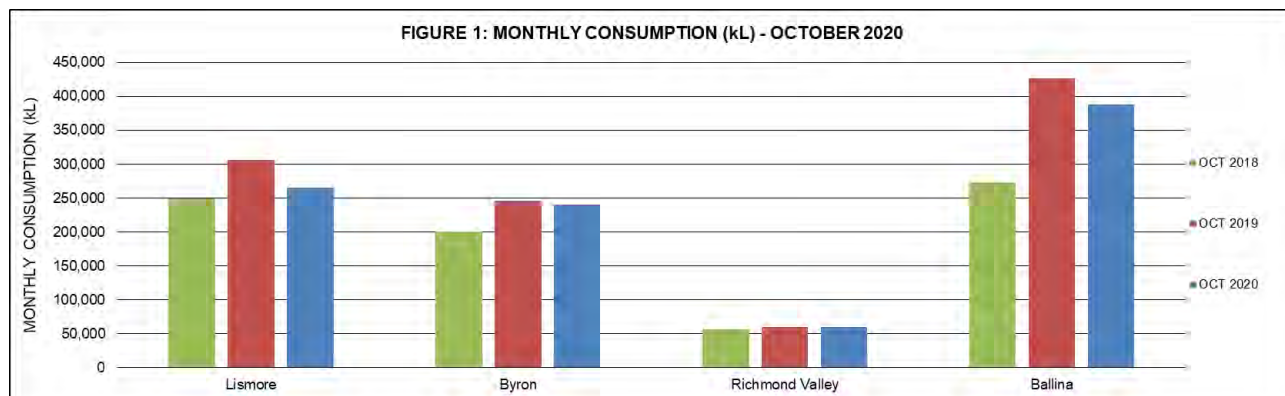
- Summary for October 2020**

The table below is the October 2020 bulk water sales to the constituent councils in kilolitres compared to September 2020 and the corresponding October for 2018 and 2019.

Council	Council area	Oct 2018	Oct 2019	Sept 2020	Oct 2020	Change on previous year %	% of Total
Lismore City Council	Dunoon/The Channon	10,808	14,362	10,670	12,813		
	Clunes	3,345	6,120	4,522	5,022		
	Pineapple Road	362	768	406	594		
	Holland Street	33,144	48,463	37,429	41,244		
	Ross Street	70,317	87,559	65,928	71,367		
	Tullera	1,285	1,850	1,398	1,455		
	No. 4 Reservoir	38,324	54,605	38,307	43,996		
	No. 9 Reservoir	86,632	86,530	80,666	83,210		
	Tanelawn	4,507	5,705	4,629	5,075		
	North Woodburn	633	809	813	901		
	TOTAL		249,357	306,771	244,768	265,677	↓ 13.40
Byron Shire Council	Bangalow	12,179	17,570	15,246	17,884		
	Byron Bay	49,847	57,103	43,374	54,530		
	Coopers Shoot	78,276	88,220	76,706	91,031		
	Wategos Beach	3,455	4,530	4,740	6,032		
	Brunswick Heads	14,342	20,422	14,589	20,623		
	Ocean Shores	42,950	57,830	43,048	50,423		
	TOTAL		201,049	245,675	197,703	240,523	↓ 2.10
Richmond Valley Council	Coraki	10,260	11,838	10,043	11,190		
	Woodburn	4,348	5,570	4,702	4,980		
	Broadwater	17,353	14,184	9,842	12,667		
	Evans Head	24,994	28,493	25,540	30,916		
	TOTAL		56,955	60,085	50,127	59,753	↓ 0.55
Ballina Shire Council	Ballina 375mm main	89,683	81,350	74,515	117,886		
	Lennox Head 200mm main	2,632	2,561	1,956	2,405		
	Basalt Crt 450mm main	118,679	207,501	151,399	185,138		
	Ballina Heights	6,643	50,684	7,144	8,007		
	Sub-Total	217,637	342,096	235,014	313,436		
	Wollongbar 375mm main	55,418	84,835	69,112	74,809		
	Lumley Park Bore	0	0	0	0		
	Converys Lane Bore	0	0	0	0		
	Sub-Total	55,418	84,835	69,112	74,809		
	TOTAL		273,055	426,931	304,126	388,245	↓ 9.06
TOTAL MONTHLY CONSUMPTION BY CONSTITUENT COUNCILS		780,416	1,039,462	796,724	954,198	↓ 8.20	100.00

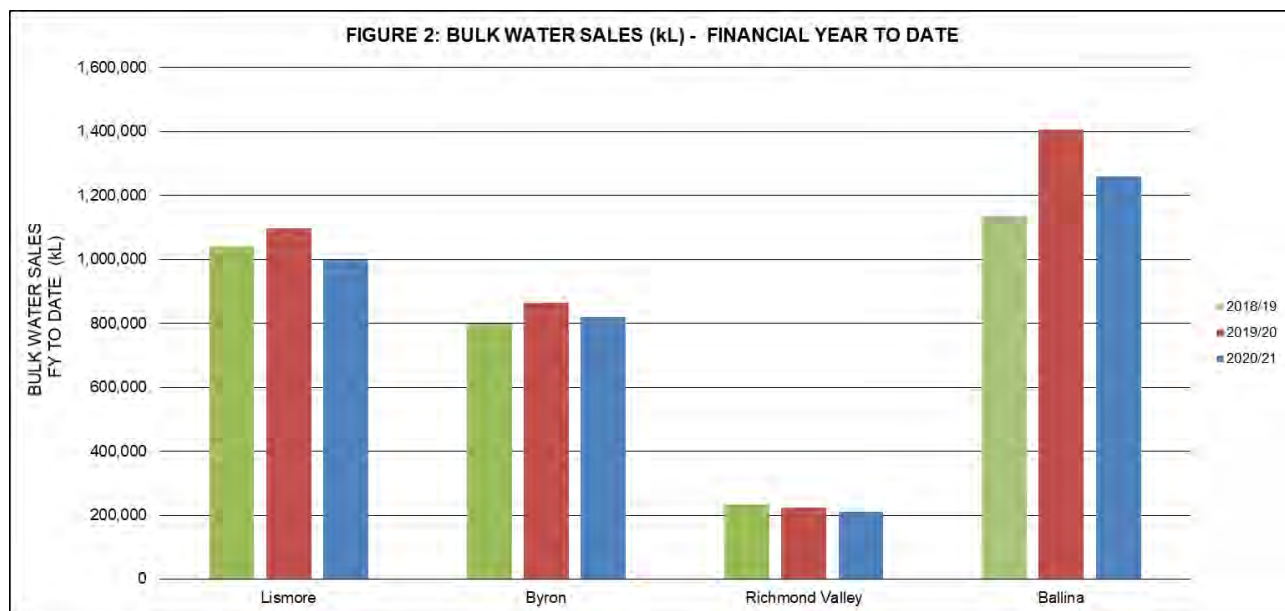
Monthly consumption by constituents

Figure 1 is the monthly consumption for each council area compared to the previous two years.



Sales to constituents – financial year to date

Figure 2 is the bulk water sales in kilolitres to the constituent councils for the financial year to date compared to previous financial years.



Source contribution

The table below is the source contributions in kilolitres for the month compared to the corresponding month of the previous two years.

Daily source usage for October 2020 averaged 33.957ML. This is an increase from the September 2020 daily average of 30.050ML. Rocky Creek Dam as of 31 October 2020 was at 92.9% of full capacity.

Source	Oct 2018	Oct 2019	Sept 2020	Oct 2020	Change on previous year %	% of Total
Rocky Creek Dam	851,368	821,751	891,138	515,054		48.93
Wilson River	0	159,102	2,609	396,851		37.70
Emigrant Creek Dam	12,313	146,245	7,754	140,751		13.37
Alstonville Plateau Bores	0	0	0	0		
Coastal Sands Bores	0	0	0	0		
MONTHLY TOTAL	863,681	1,127,098	901,501	1,052,656	↓ 6.60	100.00
CALENDAR YEAR TO DATE TOTAL	7,497,020	9,873,117	7,423,984	8,476,640	↓ 14.14	

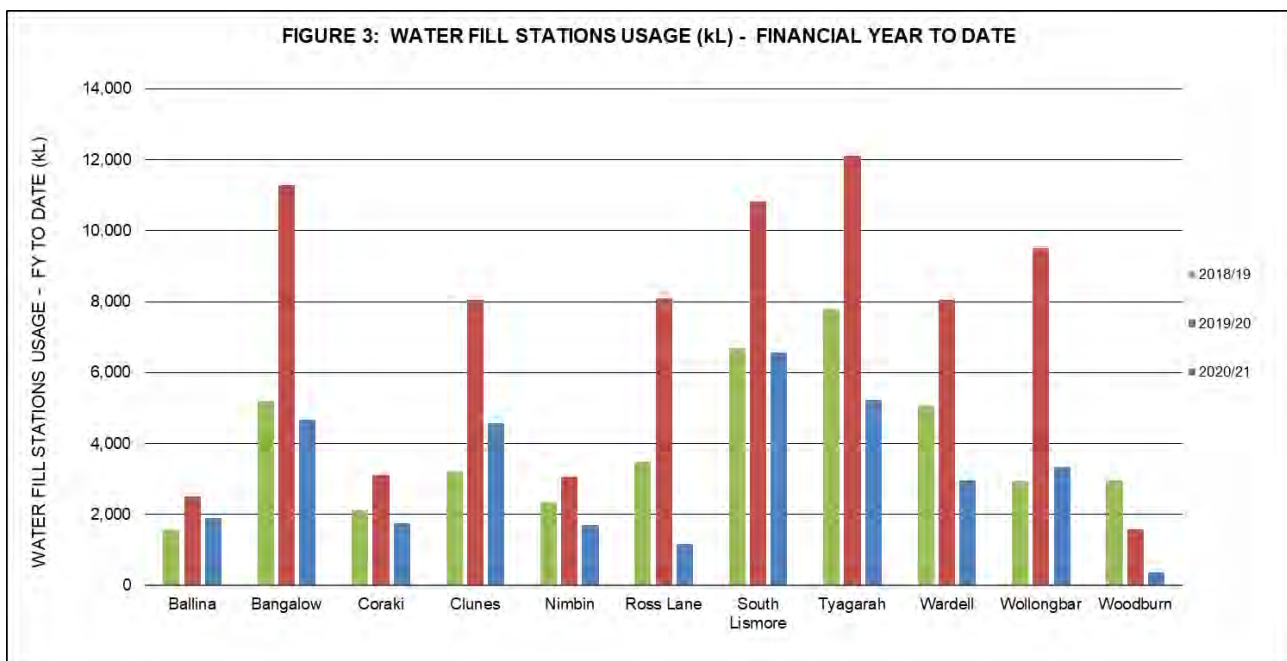
New connections

The table below is a summary of the new water connections for each council for the month. The kL/connection/day provides a comparison of the monthly consumption per connection per day.

Supply authority	New connections for month	Calendar year to date total	Total connections	kL/Connection/Day
Lismore City Council	N/A	84	14,106	0.61
Byron Shire Council	18	139	10,246	0.76
Richmond Valley Council	12	26	2,734	0.71
Ballina Shire Council	N/A	90	15,470	0.81
Rous County Council	0	5	2,127	0.91
TOTAL	30	344	44,683	

Water fill stations

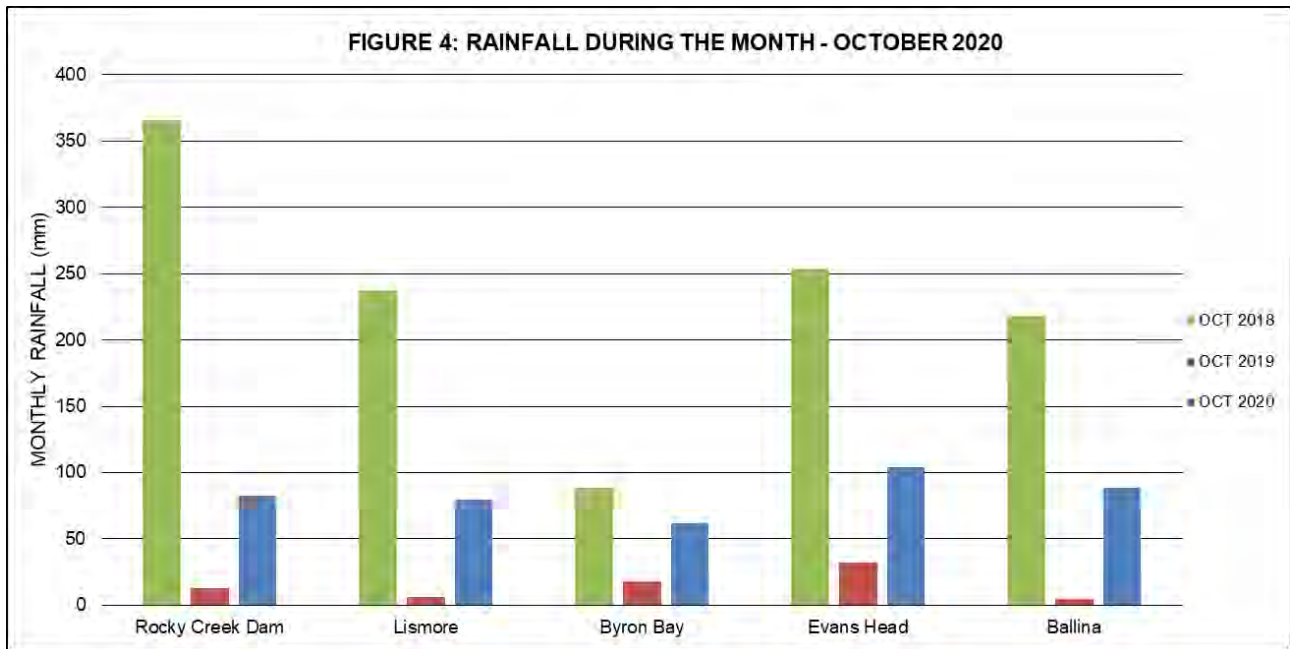
Figure 3 is the usage from the public water fill stations for the financial year to date in kilolitres for each water fill station compared to previous financial years.



Total water usage for the public water fill station network for October 2020 was 15,280kL, an increase from 8,340kL in September 2020.

Rainfall by area

Figure 4 is the monthly rainfall for Rocky Creek Dam and council areas compared to the previous two years.



Note: The Rocky Creek Dam rainfall reading is from the rain gauge at Nightcap Water Treatment Plant. Other rainfall data is from the Bureau of Meteorology.

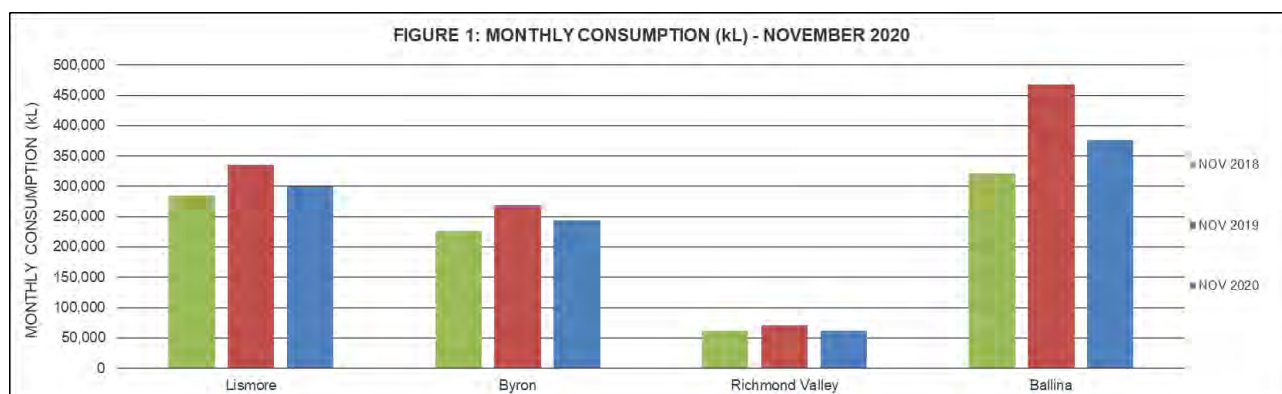
• Summary for November 2020

The table below is the November 2020 bulk water sales to the constituent councils in kilolitres compared to October 2020 and the corresponding November for 2018 and 2019.

Council	Council area	Nov 2018	Nov 2019	Oct 2020	Nov 2020	Change on previous year %	% of Total	
Lismore City Council	Dunoon/The Channon	12,420	20,861	12,813	14,271			
	Clunes	4,393	7,901	5,022	5,322			
	Pineapple Road	444	1,011	594	297			
	Holland Street	41,399	52,507	41,244	48,404			
	Ross Street	78,896	91,858	71,367	83,888			
	Tullera	1,541	2,602	1,455	1,852			
	No. 4 Reservoir	53,635	60,944	43,996	54,371			
	No. 9 Reservoir	85,533	90,448	83,210	85,029			
	Tanelawn	5,160	6,019	5,075	5,556			
	North Woodburn	710	1,090	901	933			
	TOTAL	284,131	335,241	265,677	299,923	↓ 10.54	30.56	
Byron Shire Council	Bangalow	14,876	21,218	17,884	19,278			
	Byron Bay	54,334	60,580	54,530	53,623			
	Coopers Shoot	89,372	97,873	91,031	91,419			
	Wategos Beach	3,821	4,913	6,032	5,672			
	Brunswick Heads	17,811	21,623	20,623	19,889			
	Ocean Shores	46,146	62,879	50,423	53,929			
		TOTAL	226,360	269,086	240,523	243,810	↓ 9.39	24.84
Richmond Valley Council	Coraki	10,726	12,978	11,190	11,551			
	Woodburn	4,848	7,579	4,980	5,739			
	Broadwater	18,123	17,514	12,667	12,424			
	Evans Head	28,003	32,987	30,916	31,856			
		TOTAL	61,700	71,058	59,753	61,570	↓ 13.35	6.27
Ballina Shire Council	Ballina 375mm main	85,438	78,988	117,886	75,589			
	Lennox Head 200mm main	2,740	7,283	2,405	2,469			
	Basalt Crt 450mm main	159,285	274,922	185,138	203,702			
	Ballina Heights	9,555	9,802	8,007	10,195			
		Sub-Total	257,018	370,995	313,436	291,955		
	Wollongbar 375mm main	64,547	96,676	74,809	84,299			
	Lumley Park Bore	0	0	0	0			
	Converys Lane Bore	0	0	0	0			
		Sub-Total	64,547	96,676	74,809	84,299		
		TOTAL	321,565	467,671	388,245	376,254	↓ 19.55	38.33
TOTAL MONTHLY CONSUMPTION BY CONSTITUENT COUNCILS		893,756	1,143,056	954,198	981,557	↓ 14.13	100.00	

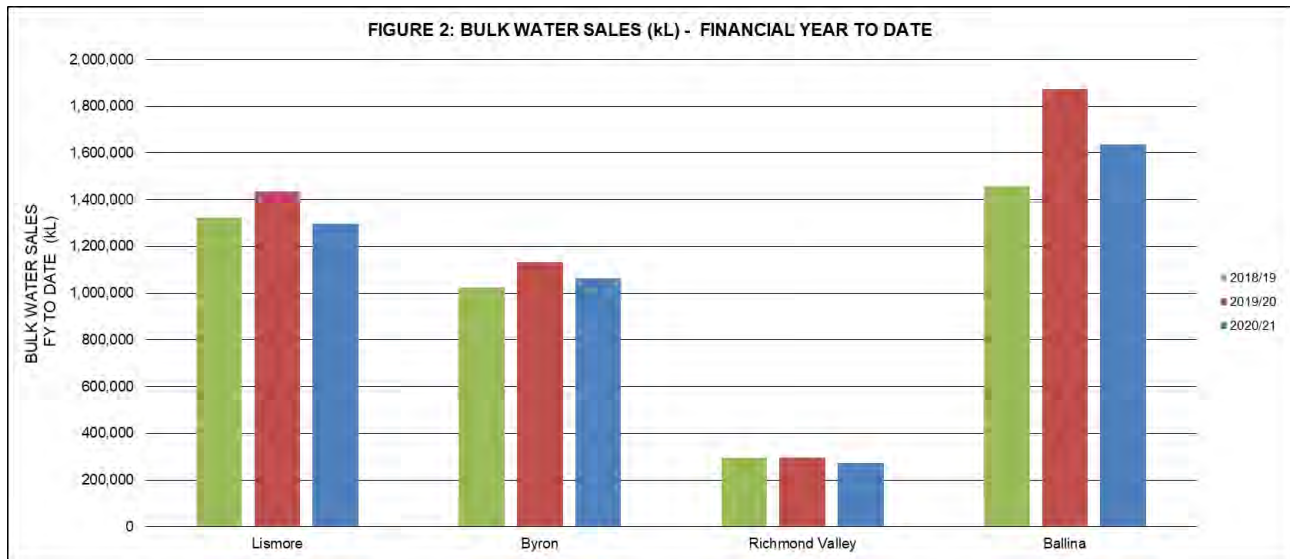
Monthly consumption by constituents

Figure 1 is the monthly consumption for each council area compared to the previous two years.



Sales to constituents – financial year to date

Figure 2 is the bulk water sales in kilolitres to the constituent councils for the financial year to date compared to previous financial years.



Source contribution

The table below are the source contributions in kilolitres for the month compared to the corresponding month of the previous two years.

Daily source usage for November 2020 averaged 36.254ML. This is an increase from the October 2020 daily average of 33.957ML. Rocky Creek Dam as of 30 November 2020 was at 89.6% full capacity.

Source	Nov 2018	Nov 2019	Oct 2020	Nov 2020	Change on previous year %	% of Total
Rocky Creek Dam	946,254	1,146,269	515,054	588,116		54.07
Wilson River	7,461	1,214	396,851	354,101		32.56
Emigrant Creek Dam	47,622	100,017	140,751	145,409		13.37
Alstonville Plateau Bores	0	0	0	0		
Coastal Sands Bores	0	0	0	0		
MONTHLY TOTAL	1,001,337	1,247,500	1,052,656	1,087,626	↓ 12.82	100.00
CALENDAR YEAR TO DATE TOTAL	8,498,357	11,120,617	8,476,640	9,564,266	↓ 14.00	

New connections

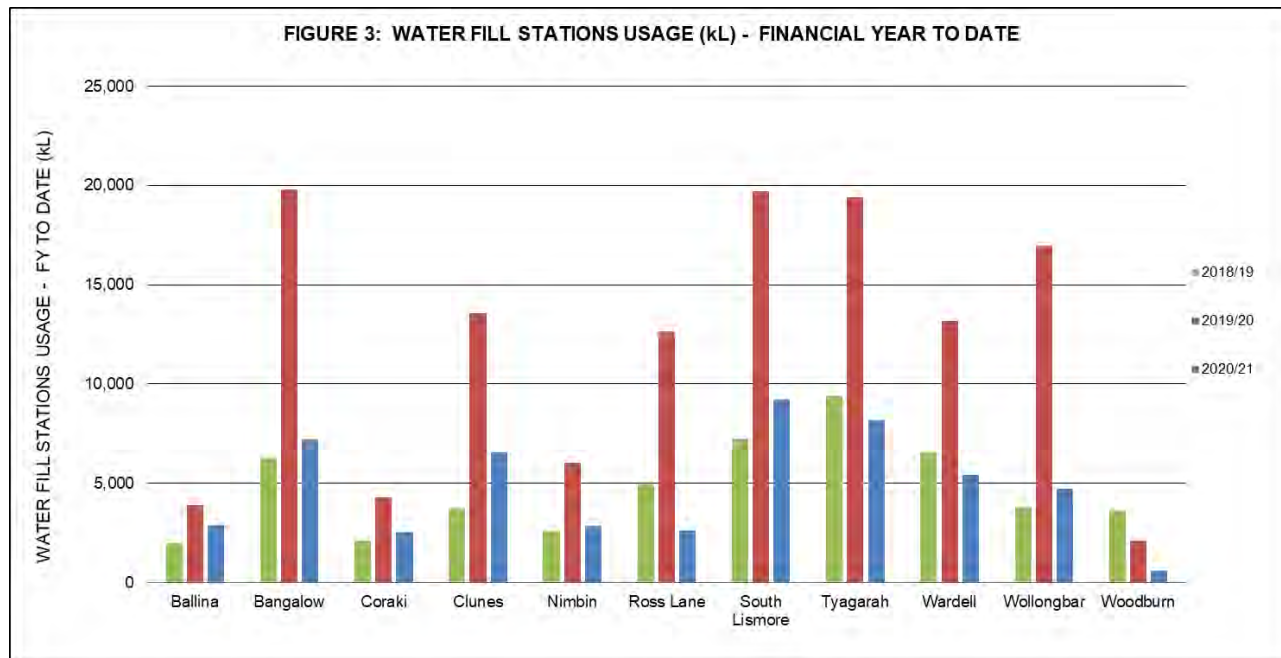
The table below is a summary of the new water connections for each council for the month. The kL/connection/day provides a comparison of the monthly consumption per connection per day.

Supply authority	New connections for month	Calendar year to date total	Total connections	kL/Connection/Day
Lismore City Council	36	120	14,142	0.71
Byron Shire Council	N/A	139	10,246	0.79
Richmond Valley Council	N/A	26	2,734	0.75
Ballina Shire Council	N/A	90	15,470	0.81
Rous County Council	0	5	2,127	0.94
TOTAL	36	380	44,719	

Water fill stations

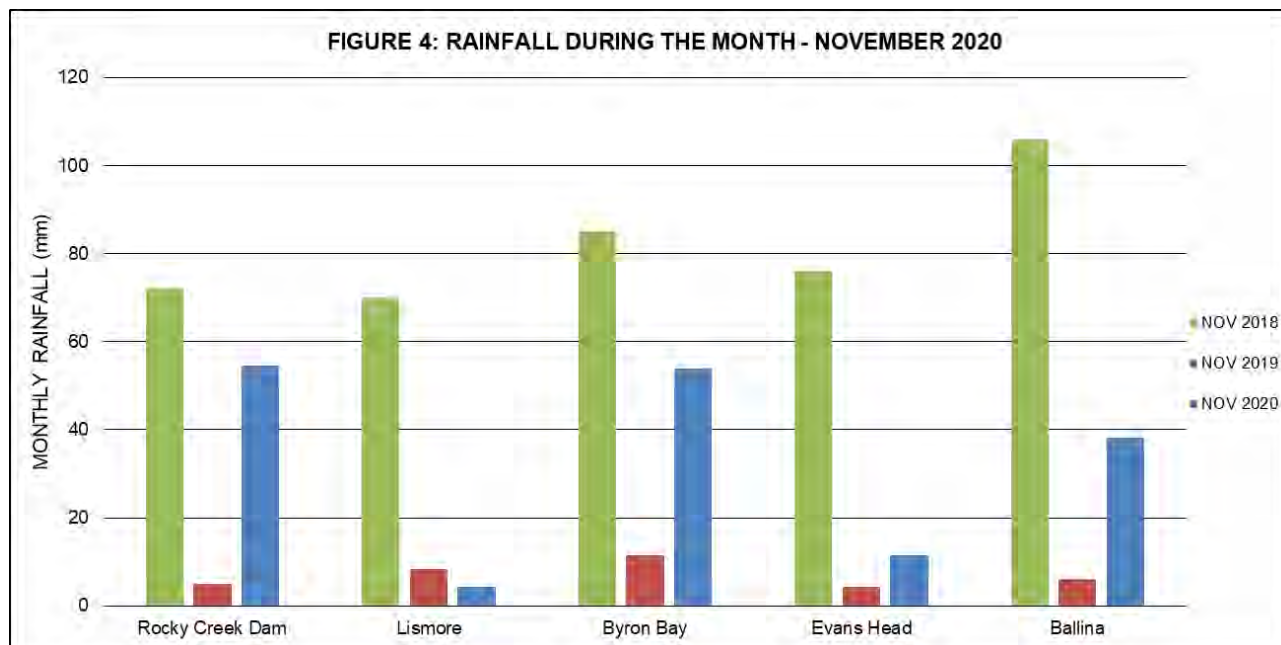
Figure 3 is the usage from the public water fill stations for the financial year to date in kilolitres for each water fill station compared to previous financial years.

Total water usage for the public water fill station network for November 2020 was 18,580kL, an increase from 15,280kL in October 2020.



Rainfall by area

Figure 4 is the monthly rainfall for Rocky Creek Dam and council areas compared to the previous two years.

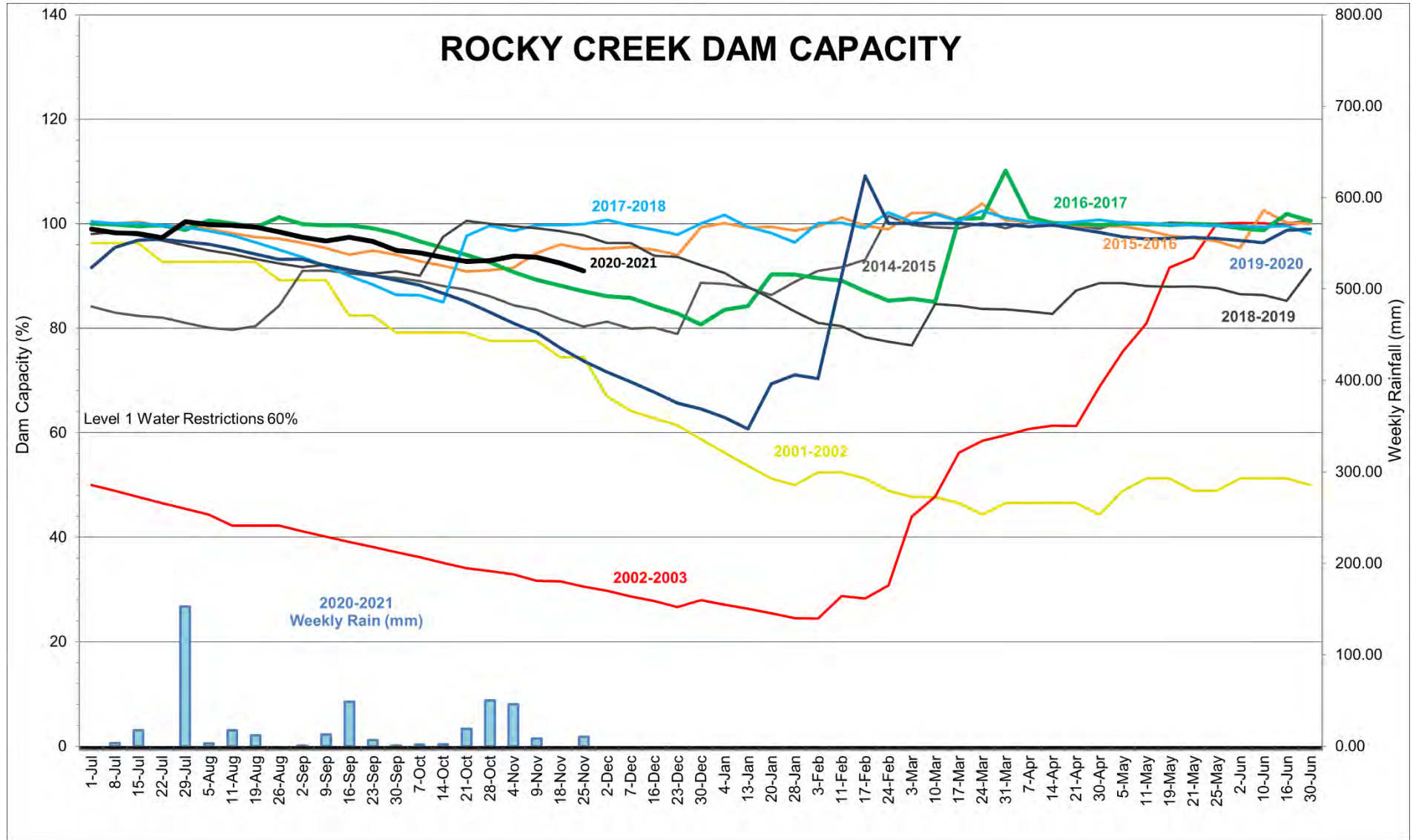


Note: The Rocky Creek Dam rainfall reading is from the rain gauge at Nightcap Water Treatment Plant. Other rainfall data is from the Bureau of Meteorology.

Andrew Logan
 Group Manager Planning and Delivery

Attachment: Rocky Creek Dam Capacity.

Rous County Council meeting 16 December 2020



Reports / actions pending

(D20/7939)

Business activity priority

Process management, improvement and innovation

Goal 6

Continuous improvement through process management and innovative thinking

Background

Following is a list of pending resolutions with individual comments provided on current position and expected completion date.

Meeting	Resolution	Status
20/02/19	Confidential report: Development Servicing Plan for Bulk Water Supply 2016 – request for deferred payment arrangement	
	<p>RESOLVED [13/19] (Mustow/Cadwallader) that Council:</p> <ol style="list-style-type: none"> 1. Receive and note this report; 2. Approve the request for deferred payment arrangements as set out in the report; 3. Receive a subsequent report on policy options for deferred payment arrangements having regard to the Development Servicing Plan for Bulk Water Supply and the policy positions of the constituent councils; and 4. Reject any further consideration of similar requests until point 3. is complete and a policy position is determined. 	Scheduled for review before the expiry of the current Development Servicing Plan in 2021.
21/08/19	Delivery program progress update: 1 January to 30 June 2019	
	<p>RESOLVED [55/19] (Cameron/Ekins) that Council:</p> <ol style="list-style-type: none"> 1. Receive and note the report and attachment. 2. Acknowledge that sound and effective governance requires that staff and councillors are able to participate fully in work tasks and decision making and that equitable access measures for all are essential for this and that consequently all Delivery Plan Actions be reviewed to determine that equitable access measures reflect this principle. 3. In relation to Action 2.4.3.1, that customers, staff and councillors with a disability be invited to discuss their perspectives in the development of access awareness training. 	COMPLETE (3 and 4). General Manager emailed Councillors 27/09/19 regarding Disability Awareness training, seeking feedback by 31/10/2019. The trialled training package has been rolled out to staff for completion. The release of the training coincided with the 'International Day of People with a Disability', which was on 3 December 2019.

Meeting	Resolution	Status
	<p>4. In relation to Action 2.4.3.2, customers, staff and councillors with a disability be invited to participate in the access training provided to staff.</p> <p>5. In relation to Actions 2.4.3.7/8, a review is initiated to determine the effectiveness of access measures and standards based on the feedback of staff, customers and councillors who use foyers 2 and 4.</p>	<p>A review via way of survey to staff, customers and councillors, regarding the effectiveness of access measures and standards for Levels 2 and 4, will occur by 30 June 2021.</p>
11/12/19	Information reports	
	<p>A future report be provided to Council on Perradenya cycleway.</p>	<p>IN PROGRESS: Workshop presented at September 2020 workshop. Report to Council scheduled for April 2021.</p>
	<p>Richmond River Cane Growers' Association submission: <i>Review of Tuckombil Canal fixed weir (Letters 118585 / 53238)</i></p>	<p>IN PROGRESS: Staff engaged with Richmond Valley Council staff around their grant application for a Study to update their Richmond River Flood Model (2010). Their grant was successful, and they have commenced procurement of a modelling consultant. Rous has contributed \$10,000 towards the project. One of the secondary goals for their Study is to consolidate these models along the mid to lower Richmond, including the Evans River Model, the W2B Pacific Highway Upgrades and collect high resolution flood modelling information around the Tuckombil Canal and upstream.</p> <p>The updated model information will contribute to a future Rous led options study for the Tuckombil Canal. The Cane Growers Association was advised in April 2020 of the intentions with regards to Richmond Valley Council, and will be updated during December 2020 with the latest information.</p>

Phillip Rudd
General Manager

Annual 'Model Code of Conduct Complaints Statistics' report

(D20/7200)

Business activity priority

Leadership

Goal 1

Values based leadership and culture

Recommendation

That Council note the results in the attached 'Model Code of Conduct Complaints Statistics' report and the requirement to provide the report to the Office of Local Government.

Background

In accordance with the Code of Conduct Procedures, Council is required to provide Code of Conduct complaints statistics to the Office of Local Government annually. The report must also be furnished to Council.

Governance

The report is required to be provided to the Office of Local Government within three months of the end of September (being 31 December 2020).

Consultation

This report has been prepared in consultation with staff responsible for the handling of Code of Conduct complaints and was reported to, received and noted by the Audit Risk and Improvement Committee at its November meeting.

Conclusion

In accordance with Council's reporting requirements, the 'Model Code of Conduct Complaints Statistics' report has been prepared and is submitted to Council for information.

Phillip Rudd
General Manager

Attachment:

1. Model Code of Conduct Complaints Statistics report for reporting period 1 September 2019 – 31 August 2020 – Rous County Council.

Office of Local Government

Model Code of Conduct Complaints Statistics

Reporting Period: 1 September 2019 - 31 August 2020

Date Due: *31 December 2020*

To assist with the compilation of the Time Series Data Publication it would be appreciated if councils could return this survey by 30 November 2020.

Survey return email address: codeofconduct@olg.nsw.gov.au

Council Name:	Rous County Council
----------------------	-------------------------------------

Contact Name:	Lauren Edwards
Contact Phone:	(02) 6623 3800
Contact Position:	Governance Advisor
Contact Email:	lauren.edwards@rous.nsw.gov.au

All responses to be numeric.

Where there is a zero value, please enter 0.

Enquiries: Performance Team
Office of Local Government
Phone: (02) 4428 4100
Enquiry email: olg@olg.nsw.gov.au

Debt write-off information summary

(D20/7215)

Business activity priority

Strategy and planning

Goal 2

Align strategic direction to core functions and sustainability

Recommendation

That Council receive and note the debt write-off information summary with debts written-off totalling \$4,242.97 for the period 1 July 2019 to 30 June 2020.

Background

Council's *'Debt Management and Financial Hardship'* policy requires an information summary report be submitted to Council on a bi-annual basis. This is the first such report since the policy was approved by Council on 15 April 2020.

• Delegations

All debts above \$1,000.00 (ex-GST) may be written off only by Resolution of Council.

Council has delegated to the General Manager the power to write-off debts equal to or below the \$1,000.00 threshold.

The General Manager has provided delegated authority to write-off debts equal to or below:

- \$500.00 to the Group Manager Corporate and Commercial
- \$250.00 to the Finance Manager

Debts which have been approved for write-off by Council staff under delegation and in accordance with clauses 131 or 213 of the *Local Government (General) Regulation 2005* for the period 1 July 2019 to 30 June 2020 are tabled below:

Table 1

Customer Type	Ref. Number	Write-off amount	Background	Reason	Approved by
Retail water account	10856	\$400.53	Transposition error occurred when the water meter numbers were recorded on the paperwork used to setup the water meters in our billing system. Write off charges incorrectly billed	Debt raised in error	GM
Retail water account	10857	\$306.65	Transposition error occurred when the water meter numbers were recorded on the paperwork used to setup the water meters in our billing system. Write off charges incorrectly billed	Debt raised in error	GM
Retail water account	11280	\$296.25	Meter union failure on property owner's side of the water meter resulting in leak registering as usage	Debt not lawfully recoverable	GM
Retail water account	10449	\$4.86	Rural fire service used water to fight fire on neighbouring property	Attempt to recover debt not cost effective	GM

Customer Type	Ref. Number	Write-off amount	Background	Reason	Approved by
Retail water account	10343	\$990.66	Meter fitting failure	Debt not lawfully recoverable	GM
Retail water account	11163	\$357.21	Mains break occurred on private property during the quarter of unexplained high usage through the property owner's water meter	Debt not lawfully recoverable	GMCC
Retail water account	10455	\$283.10	Property owner reported leak on Rous' side of water meter. Water Operator attended and noticed tap not turning off fully. Water Operator returned at later time and replaced tap – property owner not advised. Property owner was incorrectly using tap as sudo pressure reducing valve (PRV). Tap replacement resulted in leaks for the owner who had not been advised of high pressure at property and that PRV required.	Debt not lawfully recoverable	GMCC
Retail water account	10212	\$38.79	Property owner repaired leak in private lines and reported meter tap would not turn of when he went to repair leak. Property owner disputed RCC findings particularly since tap was replaced and only paid 50% of the usage plus facility charge.	Attempt to recover debt not cost effective	FM
	Total	\$2,678.05			

Debts which have been approved for write-off by Council resolution and in accordance with clauses 131 or 213 of the *Local Government (General) Regulation 2005* for the period 1 July 2019 to 30 June 2020 are tabled below:

Table 2

Customer Type	Ref. Number	Write-off amount	Background	Reason	Resolution
Retail water account	11390	\$1,564.92	Meter union failure on property owners side of the water meter resulting in leak registering as usage	Debt not lawfully recoverable	26/20
	Total	\$1,564.92			

Governance

Finance

Charges written off during the period 1 July 2019 and 30 June 2020 total \$4,242.97 and this amount will be included in Council's Annual Report.

Legal

Clause 131(6) of the *Local Government (General) Regulation 2005* requires the General Manager to inform Council of any amounts written-off under delegated authority.

Conclusion

The charges totalling \$4,242.97 were written-off under Council resolution and delegated authority pursuant to clauses 131 or 213 of the *Local Government (General) Regulation 2005*. The next debt write-off information summary report will be included in the February 2021 business paper.

Guy Bezrouchko
Group Manager Corporate and Commercial

Confidential matters

(D20/8675)

Recommendation

That Council move into Closed Council to consider the following matters and the meeting be closed to members of the public and press based on the grounds detailed below:

1. Report	St Helena trunk main augmentation – Stage 2 construction contract
Grounds for closure	Section 10A(2)(c) information that would, if disclosed, confer a commercial advantage on a person with whom the Council is conducting (or proposes to conduct) business.

Section 10A, Local Government Act, 1993:

A Council may close to the public only so much of its meeting as comprises the receipt or discussion of any of the following:

Section 10A(2):

- (a). personnel matters concerning particular individuals (other than councillors),
- (b). the personal hardship of any resident or ratepayer,
- (c). information that would, if disclosed, confer a commercial advantage on a person with whom the Council is conducting (or proposes to conduct) business,
- (d). commercial information of a confidential nature that would, if disclosed:
 - (i). prejudice the commercial position of the person who supplied it, or
 - (ii). confer a commercial advantage on a competitor of the Council, or
 - (iii). reveal a trade secret,
- (e). information that would, if disclosed, prejudice the maintenance of law,
- (f). matters affecting the security of the council, councillors, council staff or council property,
- (g). advice concerning litigation, or advice that would otherwise be privileged from production in legal proceedings on the ground of legal professional privilege,
- (h). information concerning the nature and location of a place or an item of Aboriginal significance on community land.

Section 10A(4):

Council may allow members of the public to make representations to or at a meeting before any part of the meeting is closed to the public, as to whether that part of the meeting should be closed.