Richmond Valley Council

ATTACHMENTS

Tuesday, 18 October 2022

UNDER SEPARATE COVER

Ordinary Council Meeting

Table of Contents

Richmond Valley Council

MINUTES

Ordinary Council Meeting
20 September 2022

ORDER OF BUSINESS

MINUTES OF RICHMOND VALLEY COUNCIL
ORDINARY COUNCIL MEETING
HELD AT THE COUNCIL CHAMBERS, 10 GRAHAM PLACE, CASINO
ON TUESDAY, 20 SEPTEMBER 2022 AT 6PM

Please note: these minutes are subject to confirmation at the next Council Meeting. Decisions recorded in the draft minutes are subject to the Council's Code of Meeting Practice in relation to rescinding decisions.

PRESENT: Cr Robert Mustow (Mayor), Cr Stephen Morrissey (Deputy Mayor), Cr Robert Hayes, Cr Sandra Humphrys, Cr Patrick Deegan, Cr Debra McGillan

IN ATTENDANCE: Vaughan Macdonald (General Manager), Angela Jones (Director Community Service Delivery), Ryan Gaiter (Director Organisational Services), Ben Zeller (Director Projects & Business Development), Jenna Hazelwood (Chief of Staff), Julie Clark (Personal Assistant to the General Manager and Mayor), Simon Breeze (IT Support Coordinator)

1 ACKNOWLEDGEMENT OF COUNTRY

The Mayor provided an Acknowledgement of Country by reading the following statement on behalf of Council:

"Richmond Valley Council recognises the people of the Bundjalung Nations as Custodians and Traditional Owners of this land and we value and appreciate the continuing cultural connection to lands, their living culture and their unique role in the life of this region in the past, present and future."

2 PRAYER

2.1 AMENDMENT TO PROCEEDINGS

RESOLUTION 200922/1

Moved: Cr Robert Mustow
Seconded: Cr Debra McGillan

That Item 2 Prayer, be included within Item 5.1 Community Condolences – Queen Elizabeth II.

CARRIED

3 PUBLIC ACCESS

Ms Rebecca Woods, Chief Executive Officer of Bogal Local Aboriginal Land Council (LALC), addressed Council in relation to Item 17.1 Box Ridge Road Compulsory Acquisition, supporting the report and the proposed subdivision at Box Ridge under the Road to Home program. Ms Woods pointed said the proposal would allow the Box Ridge community to enjoy the same standard of service as other Richmond Valley residents and supported the recommendation to compulsorily acquire Box Ridge Road as a public road to secure legal access to the site.

Ms Woods presented a letter from Uncle Warren Williams, Chair of the Bandjalang Aboriginal Corporation, providing in principle support for the compulsory acquisition.

The Mayor thanked Ms Woods for her presentation to the meeting.

Ms Jill Lyons addressed Council in relation to Item 20.1 Response to Questions; Cr Patrick Deegan, Regional Jobs Precinct and Expression of Interest for Regional Waste Solutions.

Ms Lyons expressed concerns in relation to energy from waste facilities and encouraged Council to consult further with the community and listen to other points of view regarding potential risks of these facilities.

The Mayor thanked Ms Lyons for her attendance and address to the meeting.

Ms Liz Stops addressed Council in relation to Item 20.1 Response to Questions; Cr Patrick Deegan, Regional Jobs Precinct and Expression of Interest for Regional Waste Solutions speaking against the item..

Ms Stops expressed concerns regarding energy from waste facilities and quoted from studies that were referenced in the Chief Scientist and Engineer's 2020 Report on Energy from Waste. Ms Stops believed that further research was required into the cost and potential impacts of these faciltiies and called for further community consultation.

Ms Stops also submitted three questions to Council regarding this matter. The response to these questions is provided at Appendix A.

The Mayor thanked Ms Stops for her attendance and address to the meeting.

A full recording of the public addresses to the meeting is available at:
https://richmondvalley.nsw.gov.au/council/council-meetings/council-meeting-videos/

4 APOLOGIES

RESOLUTION 200922/2

Moved: Cr Stephen Morrissey
Seconded: Cr Sandra Humphrys

That the apology received from Cr Sam Cornish be accepted and leave of absence granted.

CARRIED

5 MAYORAL MINUTES

5.1 COMMUNITY CONDOLENCES - QUEEN ELIZABETH II

RESOLUTION 200922/3

Moved: Cr Robert Mustow
Seconded: Cr Stephen Morrissey

The Lord's prayer was read by the General Manager.

A video presentation honouring the Queen's visit to the Richmond Valley in 1954 was provided.

A minute's silience in memory of Queen Elizabeth II was observed.

CARRIED

5.2 NSW INDEPENDENT FLOOD INQUIRY

RESOLUTION 200922/4

Moved: Cr Robert Mustow
Seconded: Cr Patrick Deegan

That Council:

1. Notes the release of the NSW 2022 Flood Inquiry recommendations and calls on the NSW government to respond in good faith to its findings and progress the recommendations as a matter of urgency.
2. Writes to the NSW Premier seeking urgent implementation of the initiatives to be delivered by the Northern Rivers Reconstruction Corporation.

CARRIED

6 CONFIRMATION OF MINUTES

6.1 MINUTES ORDINARY MEETING HELD 16 AUGUST 2022

RESOLUTION 200922/5

Moved: Cr Sandra Humphrys
Seconded: Cr Robert Hayes

That Council confirms the Minutes of the Ordinary Meeting held on 16 August 2022.

CARRIED

7 MATTERS ARISING OUT OF THE MINUTES

Nil

8 DECLARATION OF INTERESTS

The General Manager declared a pecuniary interest in relation to 16.2 Re-establishment of Alcohol Free Zones in Casino, Coraki and Evans Head, due to being a part-owner of a business located within a zone and advised he would leave the meeting if the item was debated.

9 PETITIONS

Nil

10 NOTICE OF MOTION

Nil

11 MAYOR'S REPORT

11.1 MAYORAL ATTENDANCE REPORT 11 AUGUST - 12 SEPTEMBER 2022

RESOLUTION 200922/6

Moved: Cr Robert Mustow
Seconded: Cr Stephen Morrissey

That Council receives and notes the Mayoral Attendance Report for the period 11 August – 12 September 2022.

CARRIED

12 DELEGATES' REPORTS

12.1 DELEGATES' REPORT SEPTEMBER 2022

RESOLUTION 200922/7

Moved: Cr Sandra Humphrys
Seconded: Cr Robert Mustow

That Council receives and notes the Delegates' Report for the month of September 2022.

CARRIED

13 MATTERS DETERMINED WITHOUT DEBATE

13.1 MATTERS TO BE DETERMINED WITHOUT DEBATE

RESOLUTION 200922/8

Moved: Cr Stephen Morrissey
Seconded: Cr Sandra Humphrys

That items 15.1, 15.2, 15.3, 16.2, and 17.2 identified be determined without debate.

CARRIED

14 GENERAL MANAGER

Nil

15 ORGANISATIONAL SERVICES

15.1 DISCLOSURE OF INTERESTS - UPDATE TO PROCEDURE AND ANNUAL DESIGNATED PERSON RETURNS

EXECUTIVE SUMMARY

In accordance with Council's Code of Conduct and Disclosure of Interest Procedure, Councillors and Designated Persons are required to lodge their completed disclosure of interest returns by 30 September 2022. All of the required disclosures have now been received from Councillors and Designated Persons.

A review of Council's Disclosure of Interest Procedure has been carried out, with minor amendments proposed to the list of designated persons, to accommodate changes in job titles.

RESOLUTION 200922/9

Moved: Cr Stephen Morrissey
Seconded: Cr Sandra Humphrys

That Council:

1. Notes that all required disclosure of interest returns have been received for the period ending 30 June 2022; and
2. Adopts the revised Disclosure of Interest Procedure.

CARRIED

15.2 COUNCILLOR EXPENSES AND FACILITIES POLICY

EXECUTIVE SUMMARY

Under Section 252 of the *Local Government Act 1993* (the Act), Councils must adopt a new policy on the payment of expenses and the provision of facilities to the Mayor and Councillors within 12 months of a local government election.

A review of the Payment of Expenses and Provision of Facilities to Councillors Policy, adopted in November 2016, was carried out and Council resolved at its August 2022 meeting to exhibit the revised policy for public comment.

Following a 28-day period of public exhibition, the policy is now presented for adoption.

RESOLUTION 200922/10

Moved: Cr Stephen Morrissey
Seconded: Cr Sandra Humphrys

That Council adopts the Councillor Expenses and Facilities Policy, noting that no submissions were received during the public exhibition period.

CARRIED

15.3 FINANCIAL ANALYSIS REPORT - AUGUST 2022

EXECUTIVE SUMMARY

The purpose of this report is to inform Council of the status and performance of its cash and investment portfolio in accordance with the *Local Government Act 1993* s.625, Local Government (General) Regulation 2021 cl.212, Australian Accounting Standard (AASB 9) and Council's Investment Policy.

The value of Council's cash and investments at 31 August 2022 is shown below:

Bank Accounts	Term Deposits	Floating Rate Notes	Fixed Rate Bonds	TCorp IM Funds	Total
$21,805,952	$41,000,000	$4,750,390	$2,000,000	$14,645,787	$84,202,128

The weighted average rate of return on Council's cash and investments as at 31 August 2022 was 0.44% which was above the Bloomberg AusBond Bank Bill Index for August of 0.15%, which is Council's benchmark.

RESOLUTION 200922/11

Moved: Cr Stephen Morrissey
Seconded: Cr Sandra Humphrys

That Council adopts the Financial Analysis Report detailing the performance of its cash and investments for the month of August 2022.

CARRIED

15.4 INTERNAL AUDIT AND RISK COMMITTEE COUNCILLOR NOMINATIONS

EXECUTIVE SUMMARY

Under Section 428A of the *Local Government Act*, Council is required to form an Internal Audit and Risk Committee which includes at least three positions held by officers external to the organisation. Council may also appoint a non-voting Councillor representative to the committee. At the August 2022 Ordinary Council Meeting, Council resolved to seek advice from the Office of Local Government regarding the option of appointing councillors on a rotating basis to the committee.

RESOLUTION 200922/12

Moved: Cr Robert Hayes
Seconded: Cr Patrick Deegan

That Council:

1. Determines not to appoint a Councillor representative as a member of the Internal Audit and Risk Committee; and
2. A report on the proceedings of each Committee meeting be presented to Council.

CARRIED

16 COMMUNITY SERVICE DELIVERY

16.1 DRAFT NORTH COAST REGIONAL PLAN - COUNCIL SUBMISSION

EXECUTIVE SUMMARY

The *Draft North Coast Regional Plan 2041* (Draft Plan) was publicly exhibited by the Department of Planning and Environment from 11 July 2022 to 24 August 2022. Council made a submission on the draft plan, expressing concern that it lacked a whole-of-government vision for renewal and growth in the Northern Rivers and failed to recognise the emerging role of the Richmond Valley as a regional employment centre. The Department of Planning and Environment is currently reviewing the submissions to the draft plan and has not yet set a date for release of the final document.

RESOLUTION 200922/13

Moved: Cr Robert Mustow
Seconded: Cr Sandra Humphrys

That Council:

1. Notes the release of the Draft North Coast Regional Plan 2041 and Richmond Valley Council's submission to the public consultation; and
2. Writes to the Member for Clarence and the Minister for Planning and Homes seeking the Richmond Valley's inclusion in Stage One of the North Coast Urban Development Program, in response to Casino's emerging role as a regional employment centre.

CARRIED

16.2 RE-ESTABLISHMENT OF ALCOHOL FREE ZONES IN CASINO, CORAKI AND EVANS HEAD

EXECUTIVE SUMMARY

Richmond Valley Council has operated Alcohol Free Zones in Casino, Coraki and Evans Head for a number of years and they have proved effective in managing street drinking. Under *the Local Government Act 1993*, the zones must be reviewed, re-advertised and re-established every four years. Council is required to undertake community and stakeholder consultation as part of the review process. This consultation has now been completed and it is recommended that Council re-establish the zones.

RESOLUTION 200922/14

Moved: Cr Stephen Morrissey
Seconded: Cr Sandra Humphrys

That Council:

1. Notes that the consultation requirements under the *Local Government Act 1993* for re-establishing the Alcohol Free Zones have been completed, with no objections received.
2. Re-establishes the Alcohol Free Zones in Casino, Coraki and Evans Head, as outlined in this report, for a period of four years.

CARRIED

17 PROJECTS & BUSINESS DEVELOPMENT

17.1 BOX RIDGE ROAD COMPULSORY ACQUISITION

EXECUTIVE SUMMARY

Council has been working with the Bogal Local Aboriginal Land Council and its planning consultants since 2021 to progress a development application for the Box Ridge community at Coraki, under the NSW Government's Roads to Home (R2H) program.

As part of the development application process, there is a necessity to formalise legal access through the creation of a dedicated public road servicing the Box Ridge discrete Aboriginal community.

The affected land is partially owned by NSW Crown Lands and subject to determined Native Title. NSW Crown Lands has advised that the most expedient way to acquire Crown land is through the compulsory acquisition process. As Council is the authorised roads authority it is the sole organisation with the means to undertake this task.

The Bogal Local Aboriginal Land Council has requested that Council initiates the process to declare Box Ridge Road a public road owned and managed by Council, enabling the subdivision of land to individual parcels which will bring important social and access benefits to the residents of the community.

It is recommended that Council supports the acquisition process, subject to successful negotiation with the relevant parties and removal of any encumbrances.

RESOLUTION 200922/15

Moved: Cr Robert Mustow
Seconded: Cr Robert Hayes

That

1. Subject to a successful negotiation with the relevant parties on the removal of associated encumbrances including Native Title, Council:
   (a) Will acquire the subject land by compulsory acquisition under Section 177 and 178 of the *Roads Act 1993 (NSW)* and in accordance with the requirements of the *Land Acquisition (Just terms Compensation) Act 1993 (NSW);*
   (b) Will approve the making of an application to the Minister for Local Government for the issue of a proposed Acquisition Notice under the *Land Acquisition (Just Terms Compensation) Act 1993 (NSW)* with respect to the subject land;
   (c) Dedicate the subject land as a public road.
2. All costs associated with the compulsory acquisition process are to be borne by the applicant.

CARRIED

17.2 STRATEGIC ASSET PLANNING AND ASSET MANAGEMENT STRATEGY

EXECUTIVE SUMMARY

Council is required, under the Integrated Planning and Reporting (IP&R) framework, to have an Asset Management Policy, Asset Management Strategy and Asset Management Plans outlining how it will manage its assets over the next 10 years.

Under the IP&R guidelines, each new council must review its asset policy, strategy and plans following the Local Government election, as part of the review of the Resourcing Strategy and development of the Delivery Program.

Accordingly, the revised policy and strategy are now presented for Council's consideration, with the revised asset management plans to be presented to a future Council meeting, following completion of the review.

RESOLUTION 200922/16

Moved: Cr Stephen Morrissey
Seconded: Cr Sandra Humphrys

That Council adopts the following asset planning documents:

1. Asset Management Policy [CPOL 11.01]
2. Asset Management Strategy 2022-2032

CARRIED

18 GENERAL BUSINESS

Nil

19 MATTERS FOR INFORMATION

RESOLUTION 200922/17

Moved: Cr Stephen Morrissey
Seconded: Cr Sandra Humphrys

Recommended that the following reports submitted for information be received and noted.

CARRIED

19.1 DISASTER RECOVERY WORKS UPDATE

RESOLUTION 200922/18

Moved: Cr Stephen Morrissey
Seconded: Cr Sandra Humphrys

That Council receives and notes the update provided on current status of natural disaster works.

CARRIED

19.2 AGENCY INFORMATION GUIDE (GIPA ACT)

RESOLUTION 200922/19

Moved: Cr Stephen Morrissey
Seconded: Cr Sandra Humphrys

That Council receives and notes the updated Agency Information Guide, as required under the *Government Information (Public Access) Act 2009*.

CARRIED

19.3 GRANT APPLICATION INFORMATION REPORT - AUGUST 2022

RESOLUTION 200922/20

Moved: Cr Stephen Morrissey
Seconded: Cr Sandra Humphrys

That Council receives and notes the Grant Application Information Report for the month of August 2022.

CARRIED

19.4 DEVELOPMENT APPLICATIONS DETERMINED UNDER THE ENVIRONMENTAL PLANNING AND ASSESSMENT ACT FOR THE PERIOD 1 AUGUST 2022 TO 31 AUGUST 2022

RESOLUTION 200922/21

Moved: Cr Stephen Morrissey
Seconded: Cr Sandra Humphrys

That Council receives and notes the Development Application report for the period 1 August 2022 to 31 August 2022.

CARRIED

20 QUESTIONS ON NOTICE

Nil

20.1 RESPONSE TO QUESTIONS; CR PATRICK DEEGAN, REGIONAL JOBS PRECINCT AND EXPRESSION OF INTEREST FOR REGIONAL WASTE SOLUTIONS

The following question on notice was received from Councillor Patrick Deegan.

Question

Cr Patrick Deegan asked the following question in writing.

"Noting references to the Regional Jobs Precinct and the Expression of Interest (EOI) for regional waste solutions during tonight's meeting, I note that on 8 July this year, new state legislation came into effect: Protection of the Environment Operations (General) Amendment (Thermal Energy from Waste) Regulation 2022.

This legislation bans new Energy to Waste (EtW) facilities in NSW, apart from four locations,

including the Richmond Valley Jobs Precinct (RJP), or in locations where it replaces a less environmentally sound fuel.

Understanding that the above EOI might or might not result in a proposal for EtW, can a report come to the September Ordinary Meeting addressing the following points:

- *The NSW Government's Chief Scientist and Engineer's Report on Energy from Waste (updated with additional advice), dated November 2020, quotes a paper that recommends the avoidance of proximity to food production. As the RJP is identified in the above legislation as one of the possible locations for EtW, do the businesses of Casino and the Richmond Valley and local agricultural industries meet the definition of food production, and how does this possible location fit with the abovementioned recommendation?*
- *The NSW Environment Protection Authority Energy from Waste Infrastructure Plan, dated September 2021, indicates EfW should be located away from high density residential areas due to risks from pollution. If EfW is unsuitable for high density residential areas due to pollution, what are the risks, if any, for areas with lower populations?*
- *Richmond Valley Council's current practice is to landfill 51% of its waste. What are the environmental impacts of this practice and how does it compare to alternative options?"*

Response

All forms of residual waste treatment including landfill, Energy from Waste facilities (EfW) and other technologies potentially pose risks to human health. That is why the Environment Protection Authority (EPA) applies stringent conditions to these activities. For EfW, this includes emissions standards to enable emissions to be managed and controlled. Emissions to air standards for energy recovery facilities in NSW are the most stringent in the world and are set out in the 'NSW Energy from Waste Policy Statement' (EPA, 2021). The NSW standards are more prescriptive than the European Union Industrial Emissions Directive 2010/75/EU (IED). The IED governs emissions from all industrial activities in the European Union. It is broadly regarded as the world standard for emissions control. This has now been surpassed by the NSW requirements. An energy recovery facility operating in NSW will be required to have lower emissions to air than any industrial facility operating in Europe.

The IED was used as the defacto standard for the two EfW facilities under construction in Western Australia. Emissions from modern EfW facilities are monitored in real time and available on public websites. They are generally lower than those required by the standards. EfW facilities need to be within an economically viable transport distance of waste sources, so are invariably sited close to developed areas where waste is generated. Proximity to food production and residential areas (of any density) are not a factor that determines the emissions standards to be met.

Proximity to Food Production

It is important to read the full detail and context of the Chief Scientist & Engineer's Report. The following paragraph is preceded by a paragraph which cites EnRisk (2018) as stating there is "*no causal evidence that health effects from incinerators emitting to EU IED standards occur*." The paragraph containing the reference to proximity to food production states:

"I note a more recent systematic review of health impacts (Tait et al, 2020) that concludes that older incinerator technology and infrequent maintenance are linked with adverse health effects, with fewer effects associated with more modern plants. As with the EnRisk review, the authors note study limitations preclude firmer conclusions, and recommend a precautionary approach. The authors make several recommendations, including design to world's best practice standards; adherence to upgrade and maintenance schedules and avoidance of proximity to food production. The first two can be addressed through the regulatory assessment and compliance process. The latter (exposure through food) should be addressed through the Human Health Risk Assessment (HHRA) that applicants are required to prepare."

Thus, the possible impact on food production is raised in one paper (Tait et al) cited by the Chief

Scientist. That paper also provides the mitigation strategy (HHRA), which is embedded in the NSW development assessment process. Any proposed facility would be required to satisfy this requirement to achieve an approval.

Risks to Areas of Lower Populations

The *NSW Energy from Waste Infrastructure Plan* (EPA 2021) states:

"All energy from waste facilities, regardless of their location, must comply with the Policy Statement, including demonstrated supply of feedstock in accordance with the resource recovery criteria. The Policy Statement was revised in June 2021 on the advice of the Chief Scientist and Engineer and sets out the most rigorous environmental controls in the world.

The Policy Statement also requires proponents of energy from waste facilities to provide effective information and public consultation about their proposals. Proponents need to engage in genuine dialogue with the community by providing accurate and reliable information. Operators of an energy from waste facility need to be 'good neighbours', particularly if they are near a residential setting and where there are workers in other nearby facilities."

Any proponent who lodges a development application will be required to meet these standards and all requirements under NSW legislation before an approval could be issued.

The decision by the NSW Government to allow Energy from Waste facilities in regional areas of NSW is based on the precautionary principle of avoiding areas with higher populations and future growth where existing higher levels of pollution are likely, such as Greater Sydney. The EfW Infrastructure Plan provides guidance on suitable locations for EfW facilities noting that:

"Regional precincts that are located on arterial transport routes have enormous potential to become circular economy precincts, where energy recovery sits at the centre of a network of complementary industries that can create jobs and drive innovation".

The Infrastructure Plan includes eight key considerations for selecting suitable locations including sites that:

- *Support existing waste, net zero and regional growth strategies*
- *Are close to existing or planned infrastructure*
- *Are away from high density residential areas*
- *Are compatible with environmental and climatic factors (air quality)*
- *Are connected to existing or planned road and rail infrastructure*
- *Create jobs*
- *Support secure and sustainable access to energy in locations that need it*
- *Attract investment and economic opportunities to communities who need it*

The NSW Government identified the Richmond Valley Jobs Precinct in the EfW Infrastructure Plan. This is due to an EfW facility being a potential solution to the waste challenges being investigated by Councils along the North Coast into Alternate Waste Treatment Solutions at that time. EfW facilities are recognised by the NSW Government as part of its Circular Economy as a potential solution for residual waste.

It should also be noted that EfW facilities are currently located in high density areas of major cities in Asia and Europe.

Environmental Impacts of Landfill

Council's current kerbside waste collection has 51% going to landfill. When Construction and Demolition and Commercial and Industrial wastes are added, total waste landfilled is estimated to be at least 60%.

The environmental impacts of landfill include:

- Polluting land in a controlled manner. Landfills are regulated by the EPA and the licence

allows pollution subject to certain controls and conditions.

- Generating leachate from deposited waste. This is a toxic liquid saturated with organic matter and metals which requires careful management and containment. Monitoring bores are put in place and regular analysis and assessment is continually carried out to ensure there is no migration of leachate into the ground water.
- Discharging hazardous gases into the atmosphere including methane which is more than 25 times as potent as carbon dioxide, which contributes to climate change.
- Landfilling requires cover materials which impact our natural resource supplies such as soils and clays as this material can never be recovered.

Modelling in the 'North Coast Waste Investment Review' (Arcadis) found that landfill disposal of residual waste is the worst performing option in terms of greenhouse gas emissions. The review investigated a number of scenarios and states:

"All alternative scenarios perform better than BAU (landfill) in terms of carbon abatement because they avoid GHG (greenhouse gas) emissions associated with both direct application of putrescible waste to landfill and the production of electricity from non-renewable energy sources. The most critical generator of GHG from the management of municipal waste streams is the landfilling of organic-rich putrescible waste (i.e. before additional source separation of organics or MBT processing), which is converted to high Global Warming Potential methane when decomposing in the landfill. Emissions associated with waste processing (energy and fuel consumption) make a moderate contribution to net emissions calculations. Transport's contribution to overall emissions is negligible."

RESOLUTION 200922/22

Moved: Cr Robert Hayes
Seconded: Cr Patrick Deegan

That the response to the question regarding the Regional Jobs Precinct and the Expression of Interest (EOI) for regional waste solutions raised by Councillor Patrick Deegan be received and noted.

CARRIED

21 QUESTIONS FOR NEXT MEETING (IN WRITING)

21.1 QUESTION ON NOTICE – CR ROBERT HAYES

Cr Robert Hayes asked the following question;

When Council receives and evaluates expressions of interest for regional waste solutions, can information be included in a future business paper based around the financial impacts that any solution would have on the ratepayers and industries, who will utilise any changes to the way that we will dispose of our waste into the future.

The General Manager advised a response would be provided once the information was available.

22 MATTERS REFERRED TO CLOSED COUNCIL

That Council considers the confidential report(s) listed below in a meeting closed to the public in accordance with Section 10A(2) of the Local Government Act 1993:

22.1 Tender VP311535 - Design and Construct Jackybulbin Bridge Replacement

This matter relates to (d)(i) commercial information of a confidential nature that would, if disclosed prejudice the commercial position of the person who supplied it.

This matter is considered to be confidential under Section 10A(2) - (d)(i) of the Local Government Act, and the Council is satisfied that discussion of this matter in an open meeting would, on balance, be contrary to the public interest as it deals with commercial information of a confidential nature that would, if disclosed prejudice the commercial position of the person who supplied it.

22.2 Tender VP314224 Upgrades to Richmond Valley Council's Four (4) Sewage Pump Station Switchboard Platforms

This matter relates to (d)(i) commercial information of a confidential nature that would, if disclosed prejudice the commercial position of the person who supplied it

This matter is considered to be confidential under Section 10A(2) - (a) of the Local Government Act, and the Council is satisfied that discussion of this matter in an open meeting would, on balance, be contrary to the public interest as it deals with personnel matters concerning particular individuals (other than councillors).

22.3 Replacement of Casino Indoor Sports Stadium Flooring

This matter relates to (d)(i) commercial information of a confidential nature that would, if disclosed prejudice the commercial position of the person who supplied it.

This matter is considered to be confidential under Section 10A(2) - (d)(i) of the Local Government Act, and the Council is satisfied that discussion of this matter in an open meeting would, on balance, be contrary to the public interest as it deals with commercial information of a confidential nature that would, if disclosed prejudice the commercial position of the person who supplied it.

The General Manager reported that no written representations had been received in respect of the items listed for consideration in Closed Council.

The Chair called for verbal representations from the gallery.

There were no representations from the gallery.

The Chair advised that under section 10A *Local Government Act 1993*, the media and public are to be excluded from the meeting on the basis that the business to be discussed is classified confidential under the provisions of section 10(2) as outlined above.

RESOLUTION 200922/23

Moved: Cr Stephen Morrissey
Seconded: Cr Robert Hayes

That:

1. Council resolves to enter Closed Council to consider the business identified in Item 22.1 and 22.2, together with any late reports tabled at the meeting.
2. Pursuant to section 10A(2) of the *Local Government Act 1993*, the media and public be excluded from the meeting on the basis that the business to be considered is classified confidential under the provisions of section 10(2) as outlined above.

3. The correspondence and reports relevant to the subject business be withheld from access to the media and public as required by 11(2) of the *Local Government Act 1993.*

CARRIED

Council closed its meeting at 7.32 pm.

The Open Council meeting resumed at 7.44 pm.

The resolutions of Closed Council were read by Council's Director Projects & Business Development and the Director Community Service Delivery.

23 RESOLUTIONS OF CLOSED COUNCIL

22.1 Tender VP311535 - Design and Construct Jackybulbin Bridge Replacement

That Council:

1. Declines the only submission received for Tender VP311535 Design and Construct Jackybulbin Bridge Replacement, due to the tendered price being in excess of the upper funding limit for the project.

2. Applies Clause 178 (3e) of the Local Government (General) Regulation 2021 to authorise the General Manager to enter direct negotiations with suitably qualified contractors with a view to obtaining works that provide council with the best outcome both from a financial and delivery perspective, and to finalise the terms of the contract or agreement and affixing the seal of Council where necessary.

3. Notes that the outcomes of the negotiations will be reported to Council for information at a future meeting.

22.2 Tender VP314224 Upgrades to Richmond Valley Council's Four (4) Sewage Pump Station Switchboard Platforms

That:

1. Council accepts the tender from AGS Commercial Pty Ltd for the upgrade to four sewage pump station switchboard platforms, which represents best value for money at $558,162.73 (ex GST) and;
2. The General Manager be authorised to negotiate and finalise the terms and conditions of any contract or agreement, in line with the content of this report and the available budget and affixing the seal of Council where necessary.

22.3 Replacement of Casino Indoor Sports Stadium Flooring

That:

1. Council applies the Extenuating Circumstances provisions of section 55(3)(i) of the *Local Government Act 1993* to determine not to call tenders for the replacement of the Casino Indoor Sports Stadium flooring and accepts the quoted price from AURA Sports Floors at $711,053 (exclusive of GST) which represents best value for Council; and
2. As per the requirements of Act, Council confirms:
   (a) The unique nature of the construction for this type of flooring system which provides a level of resilience to future rain events;

(b) The single compliant response from this locally accessible contractor when the quotation was advertised publicly;

(c) The ability to deliver the project as soon as possible to enable restoration of community access to this important recreational facility.

3. The General Manager be authorised to negotiate and finalise the terms and conditions of any contract or agreement, in line with the content of this report and the available budget and affixing the seal of Council where necessary.

The Meeting closed at 7.48 pm.

The minutes of this meeting were confirmed at the Ordinary Council Meeting held on 18 October 2022.

.....

CHAIRPERSON

APPENDIX A – RESPONSE TO PUBLIC ACCESS QUESTIONS

Ms Liz Stops asked the following questions during Council's Public Access session:-

1. Did the Richmond Valley Council make representations to the NSW Government, or did the NSW Government approach Council to be included in the Protection of the Environment Operations (General) Amendment (Thermal Energy from Waste) Regulation 2022?
2. What was the process for this inclusion and why wasn't there any community consultation?
3. As Richmond Valley Jobs Precinct has been designated as a potential site for a waste incinerator by the NSW government, at what stage in the process does council intend to consult with the community?

The General Manager provided the following response;

The inclusion of the Richmond Valley in the Thermal Energy from Waste Regulation was a NSW Government decision, and a natural progression from the Government's decision to include the Richmond Valley in the Energy from Waste Infrastructure Plan.

The Energy from Waste Policy Statement, which sets the most stringent emissions standards in the world, and the draft Regulation were all subject to extensive community consultation in 2021-2022.

The Energy from Waste Infrastructure plan and the Energy from Waste Policy Statement outlines a number of selection criteria for locating EfW facilities including:

- proximity to road and rail connections
- capacity to support regional communities who need more jobs, economic investment and access to energy, and
- capacity to complement existing waste management strategies where the community is already committed to resource recovery by providing separate waste collection for dry recyclables and food and organic wastes.

Casino meets these criteria, which is why the NSW Government has also selected the town as the centre of the Richmond Valley Regional Jobs Precinct. The Jobs Precinct was announced in February 2021 and it has always been clearly communicated that this precinct will create jobs in the agricultural, manufacturing and renewable energy sectors. The Regional Jobs Precinct Masterplan is being finalised by the NSW Government and will be placed on public exhibition once completed.

The NSW Waste and Sustainable Materials Strategy 2041 – which was also subject to widespread community consultation – identifies that the Northern Rivers region will require either additional landfill capacity to accept up to 100,000 tonnes of waste/per/annum or an equivalent medium-scale energy recovery facility by 2030. It also includes Energy from Waste as part of its Circular Economy.

Richmond Valley Council, together with other councils on the North Coast have been exploring alternative waste treatment solutions for many years, which culminated in the North Coast Regional Waste Investment Report. We are all searching for a better economic and environmental solution to our current practice of landfilling.

If there is a proposal, consultation with the community will be required.

The Child Safe Standards

NSW GOVERNMENT | Office of the Children's Guardian

ISBN: 978-0-6451877-6-2

Council Policy

Policy Title:	**Child Safety and Wellbeing**
Policy Number:	1.21
Focus Area:	Lead and advocate for our community
Responsibility:	Governance
Meeting Adopted:	Date of Council Meeting – Resolution Number

OBJECTIVE

This Policy has been developed in alignment with state and federal legislation and outlines Council's requirements to minimise risk to children and young people and to ensure their safety and wellbeing across all areas of Richmond Valley Council's operations.

It also informs Councillors, staff and volunteers of Richmond Valley Council about their obligations to act to protect the rights of children and young people and the important role they play in ensuring their safety and wellbeing.

SCOPE

This Policy applies to all Council Officials and all activities and facilities which involve contact with children and young people, including but not limited to:

- Community events;
- Community programs;
- Community engagement activities;
- Richmond-Upper Clarence Regional Library;
- Casino Indoor Sports Stadium;
- Visitor Information Centres;
- Public facilities, including parks and reserves;
- Community spaces hired out by Council;
- Attendance at external facilities, such as visits to schools;
- Attendance at private residences; and
- Traineeships, work experience, under-age employees and volunteer programs.

STATEMENT OF COMMITMENT

Richmond Valley Council is committed to be a child safe organisation and share the understanding that children's safety is a universal responsibility. The Child Safety and Wellbeing Policy demonstrates Council's commitment to the safety and wellbeing of children and young people in our local government area.

The Policy reflects a culture of shared responsibility for child safety and will help to ensure that every person who works for or with Council is aware of their responsibilities for upholding child safety principles. Council recognises its duty to ensure children and young person who access our services are safeguarded from harm, recognising that feeling safe can be as important as being safe.

DEFINITIONS

Child	A person aged under 18 years. Note that under child protection legislation a child is defined as aged under 16 years for mandatory reporting purposes, and as aged under 18 years for the reportable conduct scheme.
Child-related Position	Positions involving work with children and/or young people where the work normally involves being face to face or where contact is more than incidental.
Council Official	Councillors, employees, volunteers, consultants and contractors.
Mandatory Reporting	The legal requirement for any person delivering a service to children or young people, or in management of a service for children or young people, to report concerns for a child at risk of significant harm.
Reportable Conduct	Any offensive behaviour or misconduct committed against, with or in the presence of a child or young person, including but not limited to: - Ill treatment of a child; - Assault against a child; - Neglect or failure to protect a child from abuse or a harmful environment; - Inflicting psychological harm on a child; and - Sexual offence or misconduct, with or in the presence of a child.
Wellbeing	A sense of comfort, happiness and health.
Working with Children Check	An official clearance to work with children and young people provided by the NSW Office of the Children's Guardian in relation to anyone in a position classified as one involving child-related work.
Young Person	A person that is 16 or 17 years of age.

BACKGROUND

In 1990, Australia was one of 194 countries that committed to the United Nations Convention on the Rights of the Child. The outcome being that organisations and people working with children in NSW share responsibility for keeping children safe.

In 2017, the Royal Commission into Institutional Responses to Child Sexual Abuse highlighted the need for action to make organisations across Australia safe for children. Among the recommendations, was the development of standards to ensure a nationally consistent approach to embedding child safe cultures within organisations that engage with children and young people, and to act as a vehicle to give effect to the Royal Commission recommendations.

DEFINITION OF A CHILD-SAFE ORGANISATION

The Office of the Children's Guardian (OCG) was appointed to provide oversight of the provision of safety, welfare and wellbeing of children via implementation of the *Children's Guardian Act 2019*.

The OCG provides the following definition of a child-safe organisation:

> *Child-safe organisations create cultures, adopt strategies and act to prevent harm to children, including sexual abuse.*

The Australian and New Zealand Children's Commissioners and Guardians (ANZCCG) define a child-safe organisation as one that systematically:

- *Creates conditions to reduce the likelihood of children being harmed*
- *Creates conditions that increase the likelihood of identifying and reporting harm*
- *Responds appropriately to disclosures, allegations and suspicions of harm.*

CHILD SAFE STANDARDS

Richmond Valley Council is committed to implementing the Child Safe Standards

STANDARD 1:
Child safety is embedded in organisational leadership, governance and culture

STANDARD 2:
Children participate in decisions affecting them and are taken seriously

STANDARD 3:
Families and communities are informed and involved

STANDARD 4:
Equity is upheld and diverse needs are taken into account

STANDARD 5:
People working with children are suitable and supported

STANDARD 6:
Processes to respond to complaints of child abuse are child focused

STANDARD 7:
Staff are equipped with the knowledge, skills and awareness to keep children safe through continual education and training

STANDARD 8:
Physical and online environments minimise the opportunity for abuse to occur

STANDARD 9:
Implementation of the Child Safe Standards is continuously reviewed and improved

STANDARD 10:
Policies and procedures document how the organisation is child safe

IMPLEMENTATION OF THE CHILD SAFE STANDARDS

Richmond Valley Council aims to embed the 10 Child Safe Standards into organisational leadership, culture and practice through the actions outlined below.

STANDARD 1:
Child safety is embedded in organisational leadership, governance and culture

- Leaders and staff champion a set of adopted behaviours:
  - We lead by example
  - We take responsibility
  - We do what we say
  - We embrace change
  - We are community focused
  - We are in this together.
- Leaders incorporate risk management of child abuse into decision making and actively monitor risk to child safety.
- Leaders promote a culture of reporting.
- Provide professional development opportunities for Councillors and Council Officers.
- Build awareness of child protection through Council's communication channels.
- Promotion of Child Protection Week and associated initiatives.
- Requirement for staff working in child-related positions to have a current Working with Children Check (WWCC).
- Induction and ongoing children to address Child Safety and Wellbeing Policy.

STANDARD 2:
Children participate in decisions affecting them and are taken seriously

- Consult with children when Council is developing plans, strategies and events.
- Commitment to developing communication initiatives that use child-friendly language.
- Display child-friendly posters in key Council sites where children visit, for example, libraries, so that they know who to reach out to if they feel uncomfortable.

STANDARD 3:
Families and communities are informed and involved

- Council's Code of Conduct and Child Safety and Wellbeing Policy to be readily available on Council's website.
- Distribute child safety information through relevant communication channels.
- Use of child-friendly language where possible.

STANDARD 4:
Equity is upheld and diverse needs are taken into account

- Work to increase knowledge amongst staff with regard to elements that increase a child's vulnerability to harm.
- Leaders and staff adapt activities and services to ensure all children feel included.
- Information is presented in a variety of formats to support and enable improved accessibility.
- Review Disability Inclusion Action Plan (DIAP) to ensure children are included.
- Partner with relevant community and government organisations to ensure we have the most current knowledge and understanding of children's needs.
- Liaise with Council's Aboriginal Liaison Officer in the review of policies to ensure diversity in representation of views.
- Display a commitment (through communication and action) to the principles of equity creating opportunities for all community members regardless of age, race, gender, ethnicity or disability to participate in community and civic life.

STANDARD 5:
People working with children are suitable and supported

- Leaders expect that recruitment does not rely solely on the WWCC; with the provision of ongoing training opportunities for staff seen as critical.
- Recruitment processes involve a range of interview questions to establish staff suitability, with reference checks carried out on prospective employees.
- Promotion of Council's Statement of Commitment during recruitment.

STANDARD 6:
Processes to respond to complaints of child abuse are child focused

- Leaders create a culture where complaints are taken seriously, and all adults take responsibility for the safety of children.
- Leaders clearly explain that breaches of Council's Code of Conduct may result in disciplinary action.
- Accessible procedures are provided to enable children, staff and others to make complaints.
- Confidentiality in complaint-handling processes.
- Review of policies and procedures to enhance child safety processes where applicable.
- Regular review of Council's Complaints Management and Mandatory Reporting Policy, ensuring clarity of information regarding the appropriate reporting channels.
- Provide ongoing support to a child or young person during the complaint process.

STANDARD 7:
Staff are equipped with the knowledge, skills and awareness to keep children safe through continual education and training

- Leaders provide ongoing education and training opportunities for staff.
- Raise awareness of the Complaints Management and Mandatory Reporting Policy, together with the Child Protection and Wellbeing Policy.
- Leaders encourage young employees to participate in decisions that affect them.

STANDARD 8:
Physical and online environments minimise the opportunity for abuse to occur

- Leaders set clear expectations for behavioural standards for staff interacting with children and young people in physical and online settings.
- Risk assessments to be undertaken to identify areas where adults have opportunities to interact with children unsupervised.
- Add child protection as a risk to relevant business units within Council's Risk Management Framework.
- Regional libraries membership of eSafe Library program.

STANDARD 9:
Implementation of the Child Safe Standards is continuously reviewed and improved

- Leaders maintain and promote a culture of continuous improvement to ensure that policies and procedures are implemented.
- Children are supported to provide feedback and this information is acted upon.
- Council reviews Council Policies every four years, or sooner if legislative changes warrant it.

STANDARD 10:
Policies and procedures document how the organisation is child safe

- Child Safety and Wellbeing Policy, together with Council's Code of Conduct and complaint handling procedures are publicly accessible.
- Documents are maintained in accordance with NSW record keeping requirements.
- Identification of workplace 'champions' to take the lead in implementation of child safety initiatives and principles.

CHILD SAFE CODE OF CONDUCT

This Code of Conduct applies to:

- Councillors;
- Staff (including full-time, part-time, casual, temporary, term and agency staff);
- Volunteers; and
- Contractors engaged by Richmond Valley Council.

WE WILL

- ✓ Treat children and young people with respect and value their ideas and opinions
- ✓ Act as positive role models in our conduct with children and young people
- ✓ Avoid any unnecessary physical contact with children and young people
- ✓ Report any misconduct or inappropriate behaviour
- ✓ Contact police if a child is at immediate risk of abuse, by phoning 000
- ✓ Encourage young people to access resources for their overall health and wellbeing
- ✓ Report any suspicions based on reasonable grounds that a child or young person is at risk of significant harm to a supervisor or the Child Protection Helpline on 132 111.
- ✓ Report any cyberbullying of a young person to www.esafety.gov.au/

WE WILL NOT

- ✗ Shame, humiliate, oppress or degrade children or young people
- ✗ Unlawfully discriminate against any child
- ✗ Engage in an activity with a child or young person that is likely to harm them
- ✗ Initiate unnecessary contact with a child or young person
- ✗ Be alone with a child or young person unnecessarily
- ✗ Show favouritism through the provision of gifts or inappropriate attention
- ✗ Arrange contact, including online contact, outside of Richmond Valley Council's approved services, programs and activities
- ✗ Photograph or video a child or young person without the consent of the child and their parent or guardian
- ✗ Engage in discussions of a mature or adult nature in the presence of a child or young person
- ✗ Use inappropriate language in the presence of a child or young person.

REFERENCES

Relevant Council policies & plans

- Code of Conduct
- Complaints Management and Mandatory Reporting Policy
- Community Strategic Plan
- Community Engagement Policy
- Library Code of Conduct

Relevant legislation

- *Children's Guardian Act 2019*
- *Government Information (Public Access) Act 2009*
- *Local Government Act 1993*

Relevant resources

- NAPCAN www.napcan.org.au
- Australian Human Rights Commission https://childsafe.humanrights.gov.au
- SNAICC - National Voice for our Children www.snaicc.org.au/resources
- Office of the Children's Guardian www.kidsguardian.nsw.gov.au.au

REVIEW

This policy will be reviewed by Council at the time of any relevant legislative changes, compliance requirements or at least every four years.

Version Number	Date	Reason / Comments
1	Date	New policy

The Child Safe Standards

Richmond Valley Council

Concise Investment Report Pack

Richmond Valley Council

1 September 2022 to 30 September 2022

Contents

Richmond Valley Council

Concise Investment Report Pack
Richmond Valley Council
1 September 2022 to 30 September 2022

1. Portfolio Valuation As At 30 September 2022

	Fixed Interest Security	Security Rating	ISIN	Face Value Original	Face Value Current	Market Value	% Total Value	Running Yield	Weighted Running Yield
At Call Deposit									
	CBA Business Online Saver Acct RVC At Call	S&P ST A1+		7,635,000.00	7,635,000.00	**7,635,000.00**	9.86%	2.45%	0.24%
	CBA General Fund Bk Acct RVC At Call	S&P ST A1+		585,950.05	585,950.05	**585,950.05**	0.76%	1.45%	0.01%
	CBA Trust Acct RVC At Call	S&P ST A1+		87,050.17	87,050.17	**87,050.17**	0.11%	1.05%	0.00%
	MACQ 940323454 At Call	Moodys A2		10,018,493.20	10,018,493.20	**10,018,493.20**	12.94%	2.45%	0.32%
	NAB Business Cheque Acct RVC At Call	S&P ST A1+		24.70	24.70	**24.70**	0.00%	0.00%	0.00%
				18,326,518.12	18,326,518.12	**18,326,518.12**	23.68%		0.57%
Floating Rate Note									
	Auswide 0.9 06 Nov 2023 FRN	Moodys Baa2	AU3FN0057352	750,000.00	750,000.00	**750,000.00**	0.97%	3.16%	
	Auswide 0.6 22 Mar 2024 FRN	Moodys Baa2	AU3FN0059317	1,500,000.00	1,500,000.00	**1,500,000.00**	1.94%	2.38%	
	MACQ 0.48 09 Dec 2025 FRN	Moodys A2	AU3FN0057709	1,000,390.00	1,000,390.00	**1,000,390.00**	1.29%	1.96%	
	MYS 0.65 16 Jun 2025 FRN	Moodys Baa2	AU3FN0061024	1,500,000.00	1,500,000.00	**1,500,000.00**	1.94%	2.39%	
				4,750,390.00	4,750,390.00	**4,750,390.00**	6.14%		0.61%
Fixed Rate Bond									
	NTTC 1.1 15 Dec 2025 - Issued 10 September 2021 - Richmond Council Fixed	Moodys Aa3		2,000,000.00	2,000,000.00	**2,000,000.00**	2.58%	1.10%	
				2,000,000.00	2,000,000.00	**2,000,000.00**	2.58%		0.03%
Unit Trust									
	NSWTC Long Term Growth Fund UT			3,000,000.00	2,781,524.32	**2,781,524.32**	3.59%		-3.45%
	NSWTC Medium Term Growth Fund UT			11,005,029.35	11,546,232.90	**11,546,232.90**	14.92%		-1.37%
				14,005,029.35	14,327,757.22	**14,327,757.22**	18.51%		-4.82%

Richmond Valley Council

Concise Investment Report Pack
Richmond Valley Council
1 September 2022 to 30 September 2022

1. Portfolio Valuation As At 30 September 2022

Term Deposit

AMP 3.7 06 Feb 2023 181DAY TD	S&P ST A2	1,000,000.00	1,000,000.00	**1,000,000.00**	1.29%	3.70%	
AMP 3.65 20 Feb 2023 182DAY TD	S&P ST A2	2,000,000.00	2,000,000.00	**2,000,000.00**	2.58%	3.65%	
AMP 3.7 27 Feb 2023 182DAY TD	S&P ST A2	1,000,000.00	1,000,000.00	**1,000,000.00**	1.29%	3.70%	
AMP 3.7 01 Mar 2023 181DAY TD	S&P ST A2	1,000,000.00	1,000,000.00	**1,000,000.00**	1.29%	3.70%	
AMP 3.8 06 Mar 2023 180DAY TD	S&P ST A2	1,000,000.00	1,000,000.00	**1,000,000.00**	1.29%	3.80%	
AMP 4 14 Mar 2023 181DAY TD	S&P ST A2	1,000,000.00	1,000,000.00	**1,000,000.00**	1.29%	4.00%	
AUBANK 2.25 11 Nov 2022 184DAY TD	S&P ST A2	2,000,000.00	2,000,000.00	**2,000,000.00**	2.58%	2.25%	
Auswide 2.95 23 Nov 2022 90DAY TD	Moodys ST P-2	1,000,000.00	1,000,000.00	**1,000,000.00**	1.29%	2.95%	
Auswide 3.7 23 Feb 2023 182DAY TD	Moodys ST P-2	2,000,000.00	2,000,000.00	**2,000,000.00**	2.58%	3.70%	
Auswide 3.7 23 Feb 2023 182DAY TD	Moodys ST P-2	2,000,000.00	2,000,000.00	**2,000,000.00**	2.58%	3.70%	
Auswide 3.7 27 Feb 2023 181DAY TD	Moodys ST P-2	1,000,000.00	1,000,000.00	**1,000,000.00**	1.29%	3.70%	
GCU 3.4 06 Dec 2022 90DAY TD	Moodys ST P-2	1,000,000.00	1,000,000.00	**1,000,000.00**	1.29%	3.40%	
CACU 2.35 17 Nov 2022 184DAY TD	Unrated ST UR	1,000,000.00	1,000,000.00	**1,000,000.00**	1.29%	2.35%	
JUDO 2.7 24 Oct 2022 90DAY TD	S&P ST A3	1,000,000.00	1,000,000.00	**1,000,000.00**	1.29%	2.70%	
JUDO 2.35 08 Nov 2022 180DAY TD	S&P ST A3	2,000,000.00	2,000,000.00	**2,000,000.00**	2.58%	2.35%	
MACQ 3.2 30 Nov 2022 91DAY TD	Moodys ST P-1	2,000,000.00	2,000,000.00	**2,000,000.00**	2.58%	3.20%	
MACQ 3.43 12 Dec 2022 91DAY TD	Moodys ST P-1	1,000,000.00	1,000,000.00	**1,000,000.00**	1.29%	3.43%	
MACQ 3.43 13 Dec 2022 90DAY TD	Moodys ST P-1	1,000,000.00	1,000,000.00	**1,000,000.00**	1.29%	3.43%	
ME Bank 1.75 24 Oct 2022 180DAY TD	Moodys ST P-2	1,000,000.00	1,000,000.00	**1,000,000.00**	1.29%	1.75%	
ME Bank 2.45 05 Dec 2022 181DAY TD	Moodys ST P-2	1,000,000.00	1,000,000.00	**1,000,000.00**	1.29%	2.45%	
ME Bank 3.6 24 Jan 2023 181DAY TD	Moodys ST P-2	2,000,000.00	2,000,000.00	**2,000,000.00**	2.58%	3.60%	
MYS 2.5 28 Nov 2022 182DAY TD	Moodys ST P-2	1,000,000.00	1,000,000.00	**1,000,000.00**	1.29%	2.50%	
MYS 3 05 Dec 2022 91DAY TD	Moodys ST P-2	1,000,000.00	1,000,000.00	**1,000,000.00**	1.29%	3.00%	
MYS 3.7 06 Mar 2023 182DAY TD	Moodys ST P-2	2,000,000.00	2,000,000.00	**2,000,000.00**	2.58%	3.70%	
SCC 3 28 Nov 2022 90DAY TD	Unrated ST UR	1,000,000.00	1,000,000.00	**1,000,000.00**	1.29%	3.00%	
SCC 3 28 Nov 2022 91DAY TD	Unrated ST UR	1,000,000.00	1,000,000.00	**1,000,000.00**	1.29%	3.00%	
SCC 3 28 Nov 2022 91DAY TD	Unrated ST UR	1,000,000.00	1,000,000.00	**1,000,000.00**	1.29%	3.00%	
SCC 3.25 30 Nov 2022 90DAY TD	Unrated ST UR	2,000,000.00	2,000,000.00	**2,000,000.00**	2.58%	3.25%	
SCC 3.5 19 Dec 2022 91DAY TD	Unrated ST UR	1,000,000.00	1,000,000.00	**1,000,000.00**	1.29%	3.50%	
		38,000,000.00	38,000,000.00	**38,000,000.00**	49.09%		1.56%
Portfolio Total		**77,081,937.47**	**77,404,665.34**	**77,404,665.34**	**100%**		**-2.05%**

Richmond Valley Council

Concise Investment Report Pack
Richmond Valley Council
1 September 2022 to 30 September 2022

2. Portfolio Valuation By Categories As At 30 September 2022

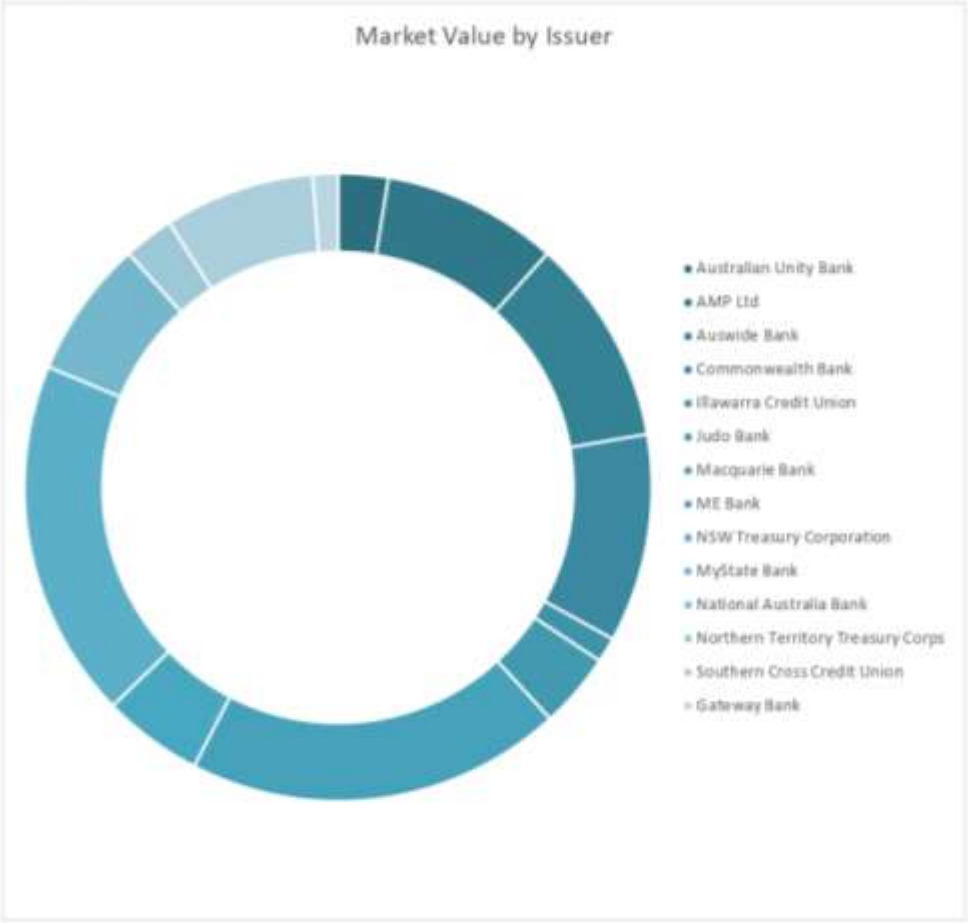
Security Type	Market Value	% Total Value
Fixed Rate Bond	2,000,000.00	2.58%
At Call Deposit	18,326,518.12	23.68%
Term Deposit	38,000,000.00	49.09%
Floating Rate Note	4,750,390.00	6.14%
Unit Trust	14,327,757.22	18.51%
Portfolio Total	77,404,665.34	100.00%

Richmond Valley Council

Concise Investment Report Pack
Richmond Valley Council
1 September 2022 to 30 September 2022

2. Portfolio Valuation By Categories As At 30 September 2022

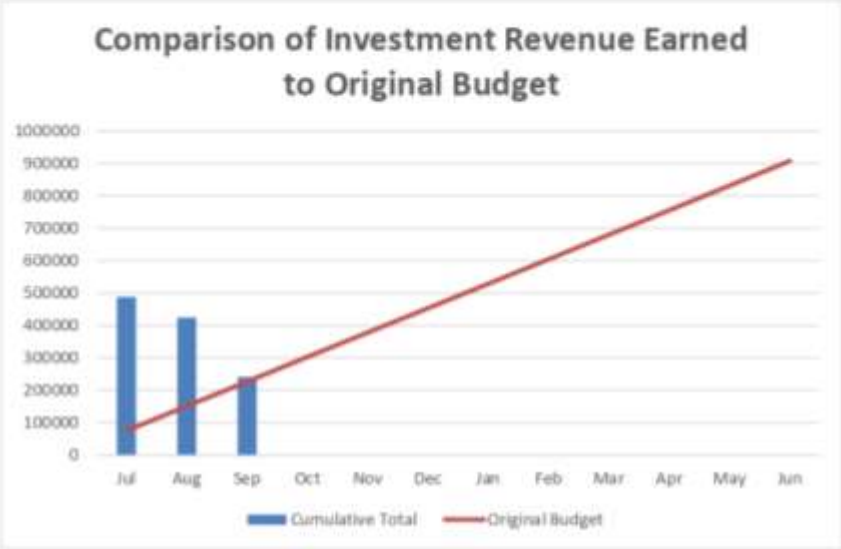
Issuer	Market Value	% Total Value
AMP Bank Ltd	7,000,000.00	9.04%
Australian Unity Bank	2,000,000.00	2.58%
Auswide Bank Limited	8,250,000.00	10.66%
Commonwealth Bank of Australia Ltd	8,308,000.22	10.73%
Gateway Bank Ltd	1,000,000.00	1.29%
Illawarra Credit Union Ltd	1,000,000.00	1.29%
Judo Bank	3,000,000.00	3.88%
Macquarie Bank	15,018,883.20	19.40%
Members Equity Bank Ltd	4,000,000.00	5.17%
MyState Bank Ltd	5,500,000.00	7.11%
National Australia Bank Ltd	24.70	0.00%
Northern Territory Treasury Corporation	2,000,000.00	2.58%
NSW Treasury Corporation	14,327,757.22	18.51%
Southern Cross CU	6,000,000.00	7.75%
Portfolio Total	77,404,665.34	100.00%



3. Investment Revenue Received For 1 September 2022 to 30 September 2022

Security	Issuer	Settlement Date	Face Value (Basis of Interest Calculation)	Consideration Notional	Income Type
JUDO 0.8 01 Sep 2022 365DAY TD	Judo Bank	1 Sep 2022	1,000,000.00	**8,000.00**	Security Coupon Interest
SCC 1.9 01 Sep 2022 90DAY TD	Southern Cross CU	1 Sep 2022	2,000,000.00	**9,369.86**	Security Coupon Interest
CCU 2.05 Sep 2022 90DAY TD	Coastline Credit Union Ltd	5 Sep 2022	2,000,000.00	**9,863.01**	Security Coupon Interest
JUDO 0.85 05 Sep 2022 181DAY TD	Judo Bank	5 Sep 2022	1,000,000.00	**4,215.07**	Security Coupon Interest
CACU 2.15 07 Sep 2022 90DAY TD	Illawarra Credit Union Ltd	7 Sep 2022	1,000,000.00	**5,301.37**	Security Coupon Interest
MACQ 0.48 09 Dec 2025 FRN	Macquarie Bank	9 Sep 2022	1,000,000.00	**4,948.08**	Security Coupon Interest
ME Bank 0.75 12 Sep 2022 182DAY TD	Members Equity Bank Ltd	12 Sep 2022	1,000,000.00	**3,739.73**	Security Coupon Interest
CCU 2.45 14 Sep 2022 90DAY TD	Coastline Credit Union Ltd	14 Sep 2022	2,000,000.00	**12,082.19**	Security Coupon Interest
MYS 0.65 16 Jun 2025 FRN	MyState Bank Ltd	16 Sep 2022	1,500,000.00	**9,045.99**	Security Coupon Interest
AUBANK 2.4 19 Sep 2022 61DAY TD	Australian Unity Bank	19 Sep 2022	2,000,000.00	**8,021.92**	Security Coupon Interest
SCC 2.6 19 Sep 2022 90DAY TD	Southern Cross CU	19 Sep 2022	1,000,000.00	**6,410.96**	Security Coupon Interest
Auswide 0.6 22 Mar 2024 FRN	Auswide Bank Limited	23 Sep 2022	1,500,000.00	**8,991.93**	Security Coupon Interest
Westpac 0.99 26 Sep 2022 182DAY TD	Westpac Banking Corporation Ltd	26 Sep 2022	1,000,000.00	**4,936.44**	Security Coupon Interest
TMC 3.27 Sep 2022 91DAY TD	Transport Mutual Credit Union Limited	27 Sep 2022	1,000,000.00	**7,479.45**	Security Coupon Interest
Other		30 Sep 2022		**18,493.20**	Bank Interest
Other		30 Sep 2022		**1,338.54**	Bank Interest
Other		30 Sep 2022		**67.97**	Bank Interest
Other		30 Sep 2022		**14,311.22**	Bank Interest
				136,616.93	
Medium Term Growth Fund	NSW Treasury Corporation			**(227,010.77)**	Fair Value Gain/(Loss)
Long Term Growth Fund	NSW Treasury Corporation			**(91,018.55)**	Fair Value Gain/(Loss)
				(318,029.32)	
TOTAL				**-181,412.39**	

4. Comparison of Investment Revenue Earned to Original Budget and Investment Portfolio by Month 2022 - 2023 YTD



Richmond Valley Council

Concise Investment Report Pack
Richmond Valley Council
1 September 2022 to 30 September 2022

5. Environmentally Sustainable Investment Performance Report for the Period Ending 30 September 2022 Relative To 31 August

Portfolio Summary by Fossil Fuel Lending ADIs

ADI Lending Status	% Total	Current Period	% Total	Prior Period
Fossil Fuel Lending ADIs				
AMP Bank Ltd	9.0%	7,000,000.00	4.8%	4,000,000.00
Commonwealth Bank of Australia Ltd	10.7%	8,308,000.22	14.0%	11,790,159.42
Macquarie Bank	19.4%	15,018,883.20	15.5%	13,016,157.62
National Australia Bank Ltd	0.0%	24.70	0.0%	24.70
Westpac Banking Corporation Ltd	0.0%	0.00	1.2%	1,000,000.00
	39.2%	**30,326,908.12**	**34.2%**	**29,806,341.74**
Non Fossil Fuel Lending ADIs				
Australian Unity Bank	2.6%	2,000,000.00	4.8%	4,000,000.00
Auswide Bank Limited	10.7%	8,250,000.00	9.8%	8,250,000.00
Coastline Credit Union Ltd	0.0%	0.00	4.8%	4,000,000.00
Gateway Bank Ltd	1.3%	1,000,000.00	0.0%	0.00
Illawarra Credit Union Ltd	1.3%	1,000,000.00	2.4%	2,000,000.00
Judo Bank	3.9%	3,000,000.00	5.9%	5,000,000.00
Members Equity Bank Ltd	5.2%	4,000,000.00	5.9%	5,000,000.00
MyState Bank Ltd	7.1%	5,500,000.00	3.0%	2,500,000.00
Northern Territory Treasury Corporation	2.6%	2,000,000.00	2.4%	2,000,000.00
NSW Treasury Corporation	18.5%	14,327,757.22	17.4%	14,645,786.54
Southern Cross CU	7.8%	6,000,000.00	7.1%	6,000,000.00
Transport Mutual Credit Union Limited	0.0%	0.00	1.2%	1,000,000.00
	60.8%	**47,077,757.22**	**63.4%**	**54,395,786.54**
Total Portfolio		**77,404,665.34**		**84,202,128.28**

All amounts shown in the table and charts are Current Face Values.
The above percentages are relative to the portfolio total and may be affected by rounding.
A fossil fuel lending ADI appearing in the non-fossil fuel related table will indicate that the portfolio contains a "green bond" issued by that ADI.

Disclaimer:

Laminar Capital Pty Ltd ABN 33 134 784 740 (AFSL 476686), its officers, employees, agents and associates ("Associates") from time to time hold interests in securities of, or earn brokerage, fees and other benefits from, corporations or investment vehicles referred to in documents provided to clients. All information contained herein is confidential and proprietary to Laminar Capital and, accordingly, this material is not to be reproduced in whole or in part or used for any purpose except as authorised by Laminar Capital. It is to be treated as strictly confidential and not disclosed directly or indirectly to any other person, firm or entity.

Distribution of this information to anyone other than the original recipient and that party's advisers is unauthorised. Any reproduction of these materials, in whole or in part, or the divulgence of any of its contents, without the prior consent of Laminar Capital is prohibited. Any securities recommendation or comments (including an opinion) contained in this document is general advice only and does not take into account your personal objectives, financial situation or needs. Laminar Capital is not acting in a fiduciary capacity. Recommendations or statements of opinion expressed may change without notice. You should not act on a recommendation or statement of opinion without first considering the appropriateness of the general advice to your personal circumstances or consulting your investment advisor to determine whether the recommendation or statement of opinion is appropriate for your investment objectives, financial situation or needs.

Laminar Capital believes that the information contained in this document is accurate when issued. Laminar Capital does not warrant that the information contained herein is accurate, reliable, complete or up-to-date, and, to the fullest extent permitted by law, disclaims all liability of Laminar Capital and its Associates for any loss or damage suffered by any person by reason of the use by that person of, or their reliance on, any information contained in this document or any error or defect in this document, whether arising from the negligence of Laminar Capital or its Associates or otherwise. No action should be taken on the basis of or in reliance on the information, opinions or conclusions contained in this document.

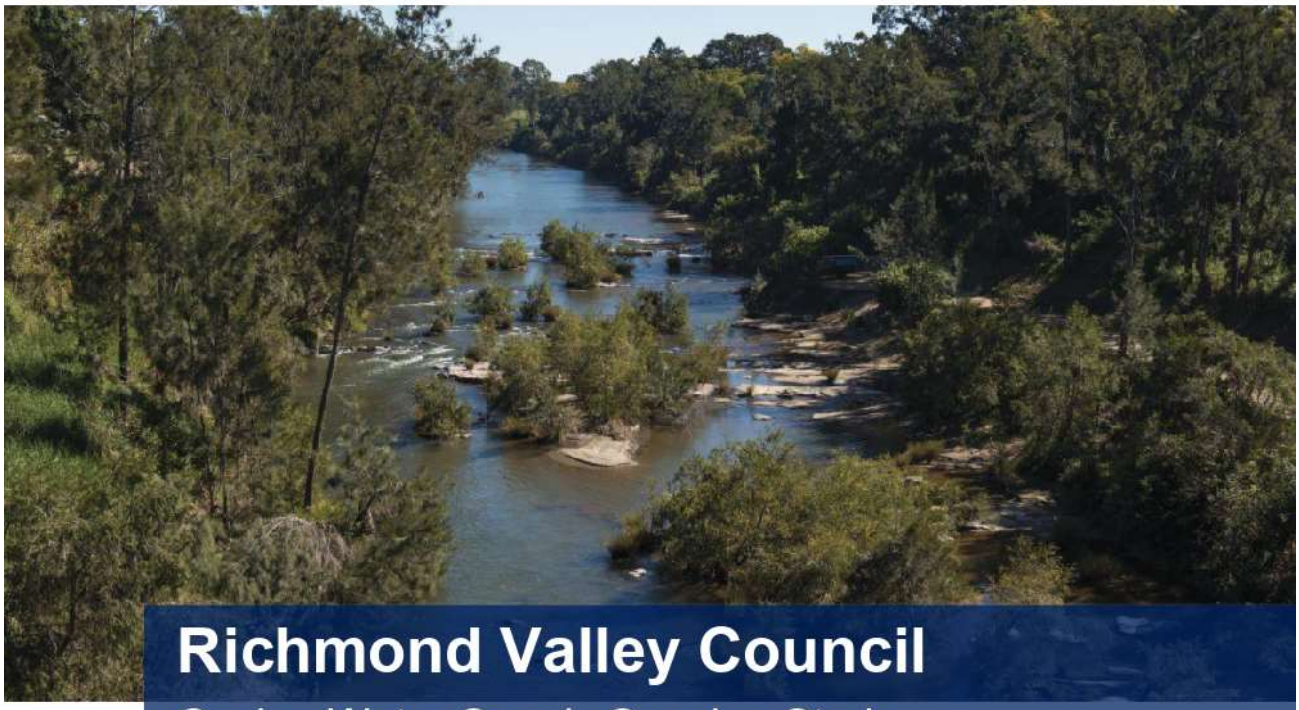
Laminar Capital acts as principal when we buy and sell fixed interest securities in the secondary markets. The yield that we quote to you incorporates any margin that we may receive. The margin is the difference between the price at which we, as principal, buy the security and the price at which we sell the security to you. Laminar Capital may also receive placement fees from Issuers for distributing securities on their behalf.

This document is not, and is not intended to be, an offer or invitation for subscription or sale, or a recommendation, with respect to any securities, nor is it to form the basis of any contract or commitment. This document does not purport to identify the nature of the specific market or other risks associated with these products. Before entering into any transaction in relation to the products, the investor should ensure that it fully understands the terms of the products and the transaction, relevant risk factors, the nature and extent of the investor's risk of loss and the nature of the contractual relationship into which the investor is entering. Prior to investing in these products, an investor should determine, based on its own independent review and such professional advice as it deems appropriate, the economic risks and merits, the legal, tax accounting characteristics and risk, and the consequences of an investment in them. This is not a substantive commentary or analysis by Laminar Capital and has not been prepared as a research product or comments by a research analyst.

LAMINAR CAPITAL PTY LTD
ACN 134 784 740
WWW.LAMINARCAPITAL.COM.AU

MELBOURNE OFFICE: LEVEL 5 RIALTO NORTH, 525 COLLINS STREET, MELBOURNE, VIC 3000 T 61 3 9001 6990 F 61 3 9001 6933
SYDNEY OFFICE: LEVEL 18 ANGEL PLACE, 123 PITT STREET, SYDNEY NSW, 2000 T 61 2 8094 1230
BRISBANE OFFICE: LEVEL 15 CENTRAL PLAZA 1, 345 QUEEN STREET, BRISBANE QLD, 4000 T 61 7 3123 5370

NSW GOVERNMENT Public Works Advisory



Richmond Valley Council

Casino Water Supply Scoping Study

Report Number: ISR22003

September 2022

Prepared for:

Richmond Valley Council

Report Number: ISR22003

Document control

Version	Author(s)	Reviewer	Approved for issue	
			Name	Date
First Draft	Eugene Yap	Gareth Clemens	Glenn Fernandes	23/02/2022
Final	Glenn Fernandes		Glenn Fernandes	06/09/2022

Glenn Fernandes
Principal Engineer – Planning (Water Utilities)
Public Works | Department of Regional NSW
T 02 9769 9735 | **M** 0421 487 408
4 Parramatta Square, 12 Darcy Street, Parramatta 2150
e glenn.fernandes@pwa.nsw.gov.au | **w** www.publicworksadvisory.nsw.gov.au

Cover photo: The Richmond River flowing through the North Coast town of Casino (Source: https://www.visitnsw.com)

Executive Summary

Richmond Valley Council (RVC) identified the need for a review of the Casino water supply security and has secured funding through the NSW Safe and Secure Water Program for a Scoping Study.

RVC is located in the far North Coast of NSW which is a sub-tropical region. Casino's water supply is currently sourced from a single source, the Jabour Weir on the Richmond River and is treated at the Casino water treatment plant (WTP).

RVC have engaged PWA to prepare a Scoping Study which will review the viable options and provide Council with a strategy that will ensures Casino's long-term water security and a preferred option that can meet the forecast future demand and the expected impacts of climate change.

Growth Strategy

Based on the review of the historical population growth, Council has nominated **0.5% per annum** as the population growth rate for Casino over the 30-year planning period.

The future population and dwellings in the Casino WSS are shown in Table S-1.

Table S-1: Population and dwelling projection for Casino WSS

	2020	2025	2030	2035	2040	2045	2050
Population	9,920	10,170	10,430	10,690	10,960	11,240	11,520
New Population	-	250	510	770	1,040	1,320	1,600
Occupied Dwellings	3,591	3,691	3,792	3,897	4,004	4,113	4,226
New Occupied Dwellings	-	99	201	305	412	522	634

Water Demand Projections

The Casino WS forecast 30-year demands, for a growth rate of 0.5%, are summarized in Table S-2.

Table S-2: Scheme level water supply projections

	2020	2025	2030	2035	2040	2045	2050
Average Year Customer Demand (ML/year)	2,010	2,030	2,060	2,080	2,100	2,130	2,150
Unrestricted future annual Extraction from Jabour Weir – 1°C warming (ML/year)	2,680	2,710	2,740	2,770	2,800	2,830	2,870
Peak Day Production (ML/day)	12.86	13.01	13.16	13.32	13.48	13.64	13.81

Water security is achieved if the secure yield of a water supply headworks is at least equal to the 30-year forecast unrestricted annual extraction presented in Table S2. The average year demands are used for revenue planning.

Water Security Assessment

The drawdown of the Jabour Weir storage when supplying the 2020 annual unrestricted extraction for the historical climate is shown in Figure S-1.

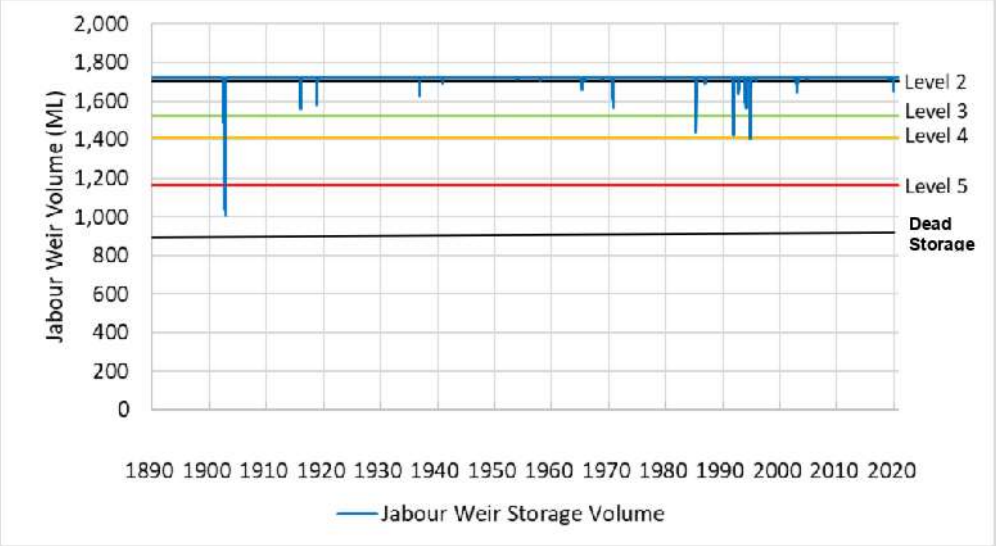


Figure S-1: Storage behaviour of Jabour Weir hindcast when supplying 2020 demand

Figure S-1 shows how often and what restriction level would be imposed when supplying the 2020, with the Federation Drought being a critical drought for the system. The Level 5 restrictions that would be required in a repeat of a Federation drought (Figure S1) would be further exacerbated for the forecast 30-year demand and future climate change which is expected to further reduce the yield of the Jabour weir.

The 2020 annual demand of 2,010 ML/year exceeds the secure yield estimated to satisfy the 5/10/10 rule set out in DPE Water's draft guidelines for "*Assuring future urban water security – Assessment and adaption guidelines for NSW local water utilities*". Over the 30-year horizon the shortfall is estimated to be **514 ML/year**.

Approach

A two-pronged approach of demand reduction and supply increase was used to address the shortfall in secure yield.

1. **Demand reduction options** – these look to reduce the future demands of Casino WSS
2. **Supply side options** – these augment the Casino WSS to improve water security

A reduction in demand can defer a source/supply augmentation and also reduces the extent of the augmentation, in some instances providing significant cost savings.

Summary of Options and Recommendation

Demand reduction options and supply augmentation options were considered to address the water security issues. The supply augmentation options also included regional solutions. The options which were investigated are summarized in Table S-3.

Table S-3: Summary of demand reduction and supply side options

Option	Size	Cost	Uncertainties
Practical Demand Reduction Options	Reduce ILI to 2.0, 20% uptake of whole residential retrofit program, effluent reuse scheme	**$4.5M+** Cost of leakage reduction cannot be estimated.	Estimation of water savings due to uptake of programs and identification of leakage Cost of leakage reduction cannot be estimated.

Option	Size	Cost	Uncertainties
Releases from Toonumbar Dam	514 ML/year High Security License Entitlement fee	**$120,000** (30-year NPV @ 7%)	Outcomes of Regional Water Strategy i.e. selected options
	514 ML water usage fee during drought	$12,700/year of access	
Connection to Rous County Council's bulk supply system at Lismore	27 km long pipeline, RCC bulk headworks connection fee	**$22M** (includes operating cost for a drought year)	Requires agreement with RCC. Transmission loses.
	514 ML water usage fee during drought	$1M	
Accessing Jabour Weir Pool Dead Storage	Cost to access and transfer portion of dead storage volume (around 25% of current volume)	Cost unknown	Volume of dead storage available - requires new bathymetric survey of weir pool storage Engineering and environmental challenges
Raising Jabour Weir	Raise Jabour Weir by 1.8m (additional storage of 1,511 ML)	**$5.5M** (capex)	The size of weir raising will depend on the E flow rules required by NRAR
Off-river storage (ORS)	430 ML ORS	**$9.8M** (capex)	The size of ORS will depend on the E flow rules required by NRAR Requires suitable land to be identified

Recommendation

Based on the survey of the weir pool done by in 2010, there is approximately 700 ML of dead storage in the Jabour Weir pool. Modelling showed that accessing 50% of the dead storage would provide water security for Casino. It is unknown what percentage of the dead storage could be accessed. On this basis, the following two Scenarios are recommended to provide water security to Casino.

Scenario 1 – Staged solution			
	Stage 1	Stage 2 (after 10-15 years)	30-year present value cost
Scenario 1A	Access Jabour Weir dead storage (Further investigations needed to estimate the cost)	Releases from Toonumbar Dam	$55,000
Scenario 2A		Raise Jabour Weir	$2.8M
Scenario 2 – Up-front supply augmentation			
Raise Jabour Weir by 1.8 m for additional storage of 1,511 ML)			$5.5M

Contents

Tables

Figures

1. Introduction

1.1 Purpose

Richmond Valley Council (RVC) identified the need for a review of the Casino water supply security and has secured funding through the NSW Safe and Secure Water Program for a Scoping Study.

RVC is located in the far North Coast of NSW which is a sub-tropical region. Casino's water supply is currently sourced from a single source, the Jabour Weir on the Richmond River and is treated at the Casino water treatment plant (WTP).

RVC have engaged PWA to prepare a Scoping Study which will review the viable options and provide Council with a strategy that will ensures Casino's long-term water security and a preferred option that can meet the forecast future demand and the expected impacts of climate change.

1.2 Process

The objective of the engagement is to provide Council with a strategy that will ensure Casino's long-term water security:

The key tasks undertaken to achieve the objective are summarised below:

- Review the growth and forecast the population and long-term water demands for Casino
- Assess the capacity of the system headworks to understand when the demand will exceed supply and determine the shortfall
- evaluate, develop and assess supply and demand side options
- identify the recommended strategy that will ensure Casino's long-term water security

2. Growth strategy and development

2.1 Historical population

The historical population growth in Casino assessed by analysis of ABS Census data and using Council's water billing data records are provided in Appendix A.

The historical population for residential and strata users calculated from water billing data is given in Table 2-1.

Table 2-1: Historical serviced population in Casino

User Class	'10/11	'11/12	'12/13	'13/14	'14/15	'15/16	'16/17	'17/18	'18/19	'19/20
Residential	8,810	8,860	8,900	8,920	8,940	8,930	8,990	9,070	9,090	9,060
Strata	840	840	850	860	870	870	880	880	870	860
Total	**9,650**	**9,710**	**9,760**	**9,780**	**9,820**	**9,800**	**9,860**	**9,950**	**9,960**	**9,920**

Based on the above estimate of serviced population, the average population growth rate over the last ten years for the Casino Water Supply Scheme has been **0.31% per annum**.

2.1.1 Review of previous forecasts

The population and/or demand for the town of Casino was previously forecasted in the following studies:

- *RVC Water Supply and Sewerage Strategy Plan (2018)* – projections from 2018 had an average annual growth rate of **0.54% per annum**
- *RVC Development Servicing Plan (2010)* – projections from 2010 had an average annual growth rate of **1.0% per annum**

See Appendix A.3 for DPE's projected population growth rates. DPE growth rates are not included in this Section as DPE projects population based on the LGA, which includes Casino and all other towns within Richmond Valley Council.

2.2 Growth strategy

2.2.1 Residential growth

Based on the review of the historical population growth, Council has nominated **0.5% per annum** as the population growth rate for Casino over the 30-year planning period.

Out of total future growth, 10% will occur as infill development, with one quarter of infill occurring south of the river and the remaining three quarters occurring north of the river. This split is based on the same proportion of existing dwellings north and south of the river.

The remaining 90% of total future growth will occur in residential development areas, shown in Figure 2-1.

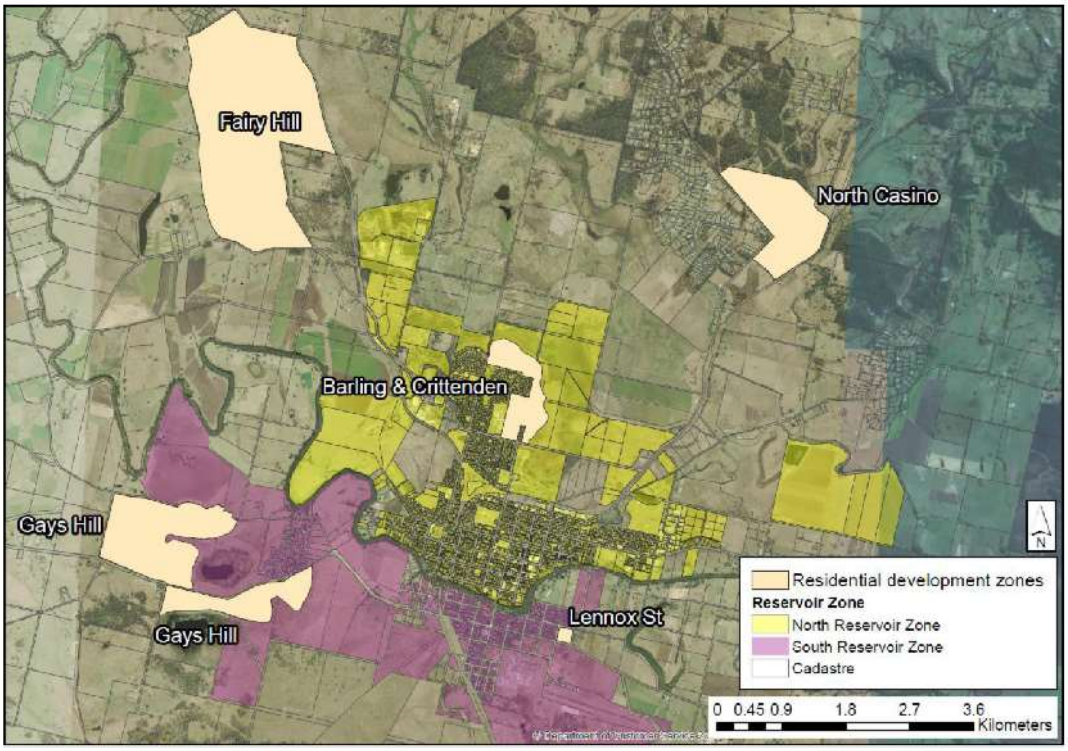


Figure 2-1: Casino residential development zones

As advised by Council, residential development areas will proceed as follows:

- **Stage 1:** Growth will first occur in the *Lennox Street* development area, which can accommodate an estimated **64 dwellings**
- **Stage 2:** When Lennox Street is fully developed, growth will then occur in the *Barling & Crittenden* development area, which can accommodate an estimated **300 dwellings**
- **Stage 3:** When Barling/Crittenden is fully developed, growth will then occur in either the *Gays Hill*, *Fairy Hill* or *North Casino* development areas. Council does not currently know which of these areas will end up being developed first, therefore it has been nominated to split this stage of development into two alternative options:
    1. Stage 3 growth will be north of the river (if Fairy Hill or North Casino are developed)
    2. Stage 3 growth will be south of the river (if Gays Hill is developed)

These assumptions, including the two options for the Stage 3 growth, will be used to forecast the future peak day demand on a reservoir zone level.

It is possible that some future development areas will not be connected to the Casino water supply scheme (WSS), however during a drought, these properties may tanker in water from Casino water supply system, and therefore they have been included in the town water supply demand.

2.2.2 Industrial and Non-residential growth

The Northern Co-operative Meat Company Ltd (NCMC) abattoir (now rebranded as 'The Casino Food Co-op') is the largest user in the water supply system. For the 'Meat Works' Council has advised that there are no plans for augmentation or any increase in the number of shifts.

NCMC has indicated that they plan to expand processing with increased packaging for direct sales to supermarkets, however they have indicated that this is not expected to increase water demand.

The NSW Government is currently working with Richmond Valley Council to develop the **Richmond Valley Regional Job Precinct (RJP)**. Growth and demands associated with the RJP are currently unknown, and are out of scope for this study.

Council is liaising with local non-residential users to get a sense of future water usages. For the purpose of demand projections, Council has nominated a growth rate of 0.5% for non-residential demands (based on total residential and non-residential growth) which includes the Casino Gateway Lifestyle Village (Retirement village and Holiday Park).

2.3 Visitor Contribution

Richmond Valley Events Centre is an 80 acre site, located in Casino adjacent to the STP. It holds the yearly PRIMEX Field Days, around May each year. It hosts 1,000 suppliers and 30,000 visitors for the three-day event. The visitors do not stay at ste with the event open between 9 am and 4 pm. Other events held there are the CMCA Rally, independent machinery demonstration days, producer workshop and forums etc [1]. The water usage for this Events Centre varies largely, as most of the water usage is recorded either in Q3 (autumn) or Q4 (winter) of each year. Often, there is no water usage in Spring or Summer, and water usages from Autumn to Winter ranges from 200 to 350 kL per quarter.

Casino Holiday Park (Gateway Lifestyle Village) is a combination of permanent sites and tourist sites. It is one of the major water users in Casino WSS, with average consumption of 21.6 ML/year and max consumption of 26.7 ML/year. Gateway Lifestyle Village is expected to experience some growth as there are approvals for more long-term sites and manufactured home estates.

2.4 Population and Dwelling Projections

Council's nominated growth rate of 0.5% per annum is used to project the future serviced population. It was assumed that all the residential growth will occur in stand alone dwellings, therefore the number of future dwellings is estimated using the household size of 2.5 people per dwelling (see Appendix Table A-2). The future population and dwellings in the Casino WSS are shown Table 2-2 and Table 2-3.

Table 2-2: Population and dwelling projection for Casino WSS

	2020	2025	2030	2035	2040	2045	2050
Population	9,920	10,170	10,430	10,690	10,960	11,240	11,520
New Population	-	250	510	770	1,040	1,320	1,600
Occupied Dwellings	3,591	3,691	3,792	3,897	4,004	4,113	4,226
New Occupied Dwellings	-	99	201	305	412	522	634

Table 2-3: Staging and location of new occupied dwellings Casino WSS

	2020	2025	2030	2035	2040	2045	2050
Infill – North of river	0	7	15	23	31	39	48
Infill – South of river	0	2	5	8	10	13	16
Stage 1 – Lennox St	0	64	64	64	64	64	64
Stage 2 – Barling & Critt	0	25	117	211	300	300	300
Stage 3 – North Casino and/or Fairy Hill and/or Gays Hill	0	0	0	0	7	106	207
Total new occupied dwellings	**0**	**99**	**201**	**305**	**412**	**522**	**634**

As previously mentioned, Council does not currently know which of the *Gays Hill*, *Fairy Hill* or *North Casino* development areas will be developed first. A projection for the Stage 3 growth occurring North of the river or South of the river is provided in Appendix A.4.

3. Casino water supply scheme

Council supplies potable water to approximately 11,000 people in Casino [2] through the Casino Water Supply Scheme (WSS). An overview of the system is shown in Figure 3-1.

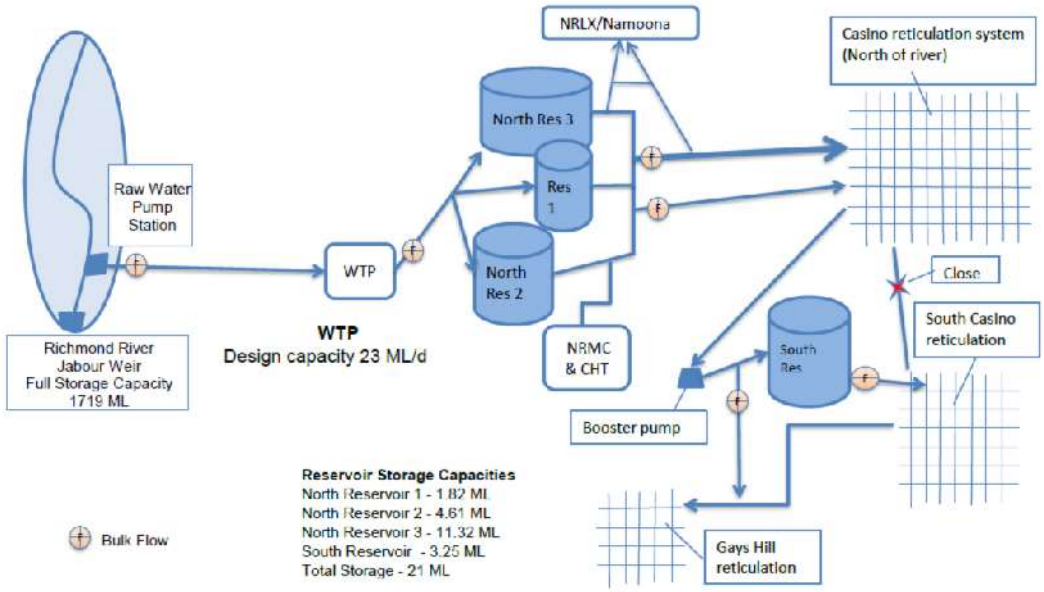


Figure 3-1: Casino WSS distribution flow diagram [2]

3.1 Raw Water source

3.1.1 Jabour Weir

Water is sourced from Jabour Weir pool on the Richmond River, located just upstream of the Casino township. The weir has been raised twice since its original construction, with the current configuration completed in 1976. The location of the Jabour Weir and the extraction point are shown in Figure 3-2.

Based on a survey of the weir pool done by Hydrosphere in 2010, the storage volume of the weir pool is estimated to be around 1,720 ML at the current weir crest height. Of this 1,720 ML, approximately 700 ML is dead storage which cannot currently be accessed by the raw water pump station [3].

Figure 3-2: Casino WSS – location of Jabour Weir

3.1.2 Richmond River Catchment

The region receives 1,097 mm of rainfall in an average year [4]. The Richmond River Catchment is shown in Figure 3-3.

Figure 3-3: Richmond River Catchment

3.1.3 Water Access License and Works Approval

Water Access License

Council holds one Water Access License (WAL27156) to extract from the Richmond River at the Jabour Weir, issued under the *Water Management Act 2000*. The following apply to the WAL:

WAL license number	WAL 27156
Water Source	Kyogle Area Water Source
Category [Subcategory]	Domestic and Stock [Town Water Supply]
Entitlement	3,427 ML/year
Water Sharing Plan (WSP)	Richmond River Area Unregulated, Regulated and Alluvial Water Sources
WSP Management Zone	Lower Kyogle Management Zone

There are no cease to pump conditions that apply to the WAL. There are also no environmental flow requirements in the WSP or the WAL rules that apply.

Works Approval

Council holds one Works Approval issued under the *Water Management Act 2000*, for taking of water. The following apply to the Works Approval:

Works Approval	30CA307398
Water Source	Kyogle Area Water Source
Kind of Approval	Water Supply Works and Water Use
Use Purpose(s)	Town Water Supply
Work Type	Diversion Works – 363mm Turbine Pump x 2 Storages – Overshot Dam
Water Sharing Plan (WSP)	Richmond River Area Unregulated, Regulated and Alluvial Water Sources
WAL nominating these works	WAL27156

The Works Approval has the following rule relating to requirements to pass flows downstream:

DK0180-00001 – *"The pipe must be operated to maintain a flow in the watercourse downstream of the dam. The flow must be equal to the flow entering the storage of the dam or the capacity of the pipe, whichever is the lesser discharge."*

After discussion with DPE and Council it was determined that there has never been a pipe in the wall to ensure compliance with the above rule. NRAR has advised Council of its intention to change this rule.

3.1.4 Fishway and Environmental Flows

There is a fishway at the left abutment of the Jabour Weir to allow fish passage.

The original orifice fishway (constructed as part of the 1976 weir raising) was modified in 1992 to a Denil fishway. The only other works on the fishway since then was reinstating a section of the diversion wall above the fishway that was broken off during a flood. No works was done to the fishway when the Weir strengthening work was done.

Council operates the fishway as specified by DPI Fisheries permit PN19/425. An excerpt from the permit regarding fishway closure is shown below.

TIMING OF FISHWAY REOPENING

4. This permit authorises the above mentioned fishway to be closed temporarily upon the receipt of the acceptance of conditions form and fishway closure notification form (attached), however the fishway must be reopened (meaning the immediate complete removal of drop boards) and fish passage restored subject to any of the following triggers:

- The fishway is requested to be re-opened by DPI Fisheries.
- If flows measured at Richmond River, Casino gauging station 203004 are:
  - 100 ML/day or greater (averaged over a 24 hour period); or
  - Greater than (>) 40 ML/day for a period of 5 consecutive days or more.

Reason – Timing the works for appropriate conditions can reduce delays and minimise impacts on the aquatic environment and fish passage outcomes

OPERATION

5. This permit authorises the temporary closure of the Jabour Weir fishway. DPI Fisheries request the following operation protocol be adopted as a trigger for fishway operation, with flows measured at Richmond River, Casino gauging station 203004:

- If flows are less than (<) 15 ML/day Jabour Weir fishway may be fully closed.
- If flows are greater than (>) 40 ML/day for a period of 5 consecutive days or more, Jabour Weir fishway should be fully opened and drop boards removed.

- If flows are 100 ML/day or greater (averaged over a 24 hour period), Jabour Weir fishway should be fully open and drop boards removed.

Reason – To ensure fish passage opportunities are optimised

The above fishway permit conditions show that the fishway may be fully closed when flows downstream are low (<15 ML/day). Based on Council's experience in the recent drought, the flow trigger for closing the fishway (<15ML/day) occurs **before** the weir pool water level has fallen below the weir crest level. If the fishway were not there, the flows passing through it would instead pass over the weir crest. And if no flows were passing over the weir crest because the level was too low, the fishway could be closed as per the permit. Therefore, flows through the fishway will not impact on the capacity or the secure yield of the weir pool.

The fishway access is approximately 400 mm lower than the weir crest and during very low flows (<15 ML/day) the weir pool drains at a higher rate through the fishway, lowering the weir pool capacity by 400 mm. DPI Fisheries therefore allowed Council to close the fishway during these low flows to keep the storage in the weir pool as high as possible. During the last drought the fishway was closed once it drained down to the bottom of the fishway. However once closed the weir pool filled and started overflowing the crest.

3.1.5 Health-Based Treatment Targets (HBT) – catchment inherent risk

The introduction of a microbial Health-Based Target (HBT) in the Australian Drinking Water Guidelines is being considered to determine the tolerably low level of microbial risk for drinking water.

PWA has developed an HBT Assessment tool which categorised catchments into vulnerability categories. The tool was used to assess the inherent microbial risk from each water source catchment, the findings are provided in Appendix D.

Based on the assessment, Casino catchment has an **inherent risk of 'High**' for chlorine sensitive and chlorine resistant pathogens. The highest risk comes from livestock. This is consistent with the findings of NSW Health's preliminary cryptosporidium risk assessment. Based on NSW Health (letter sent to Council in March 2020), there is a **'High risk'** of cryptosporidium in the raw water source for Casino. NSW Health considered that cryptosporidium may be present from the stock and onsite sewage management systems in the catchment.

3.2 Water Treatment

3.2.1 Treatment process

Casino WTP is a conventional filtration system consisting of flocculation, sedimentation, filtration, fluoridation, and chlorination processes. The plant capacity is 23 ML/day. The process flow diagram for Casino WTP is shown in Figure 3-4.

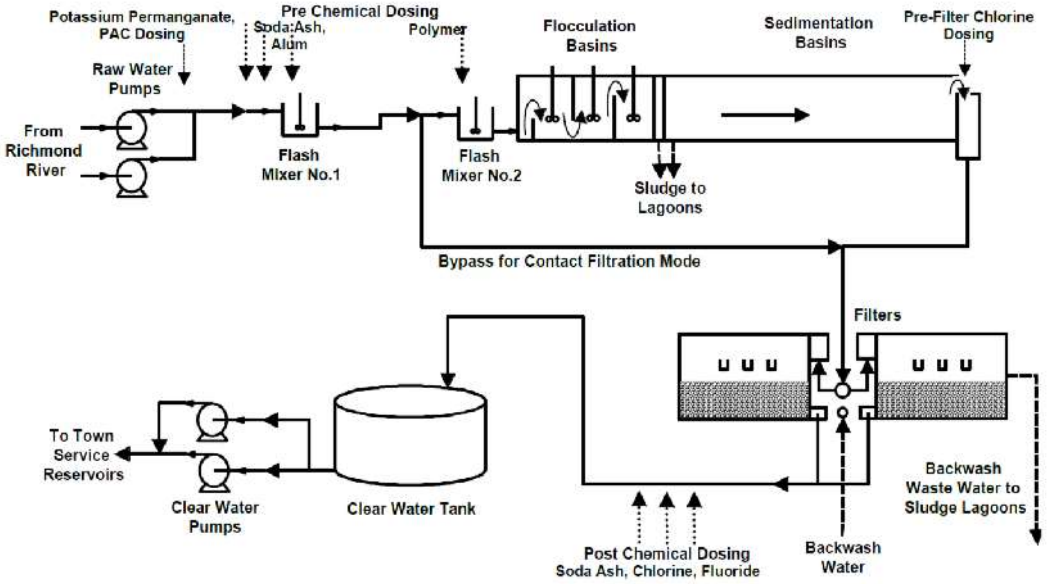


Figure 3-4: Casino WTP – process flow diagram [5]

3.2.2 Historical WTP production

Daily WTP production data from the Casino WTP was available from October 2008 to July 2020. Water restrictions were implemented a few times during this period. The historical daily production and the implemented water restriction is presented in Figure 3-5.

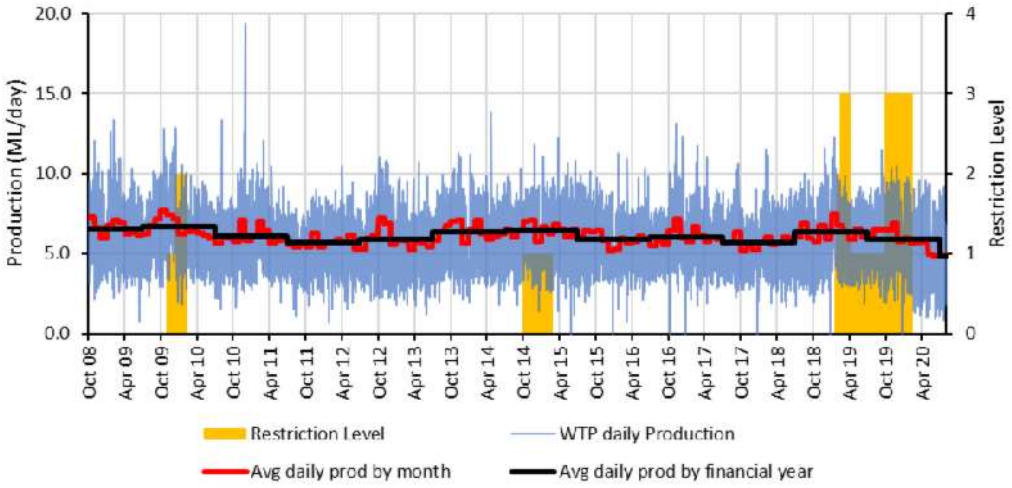


Figure 3-5: Historical daily production data - Casino WTP

According to the Council, little water savings are achieved during Level 1 and 2 restrictions due to the offset by the increase of rural residential and industrial demand [2]. This is evident from the data as the average daily production for the unrestricted period is 6.06 ML/day, and for the restricted period is 6.47 ML/day. NCMC's highest demand year occurred in 2014/15, where there was a Level 1 restriction for five months.

The annual production totals for 2010 to 2020 are shown in Table 3-1.

Table 3-1: Historical annual production - Casino WTP (ML/year)

2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
2,228	2,076	2,151	2,329	2,355	2,161	2,207	2,079	2,321	2,167

The historical average year, max year and peak day production (from 2008 to 2020) is summarised in Table 3-2.

Table 3-2: Historical average year, max year and peak day production (from 2008 to 2020)

Average production year	Maximum production year	Peak production day
2,220 ML/year	2,432 ML (2009/10)	12.9 ML

3.3 Distribution

The CWSS supplies water to approximately 11,000 people in the urban area of Casino [2]. Figure 3-6 shows an overview of the distribution system in the Casino water supply scheme.

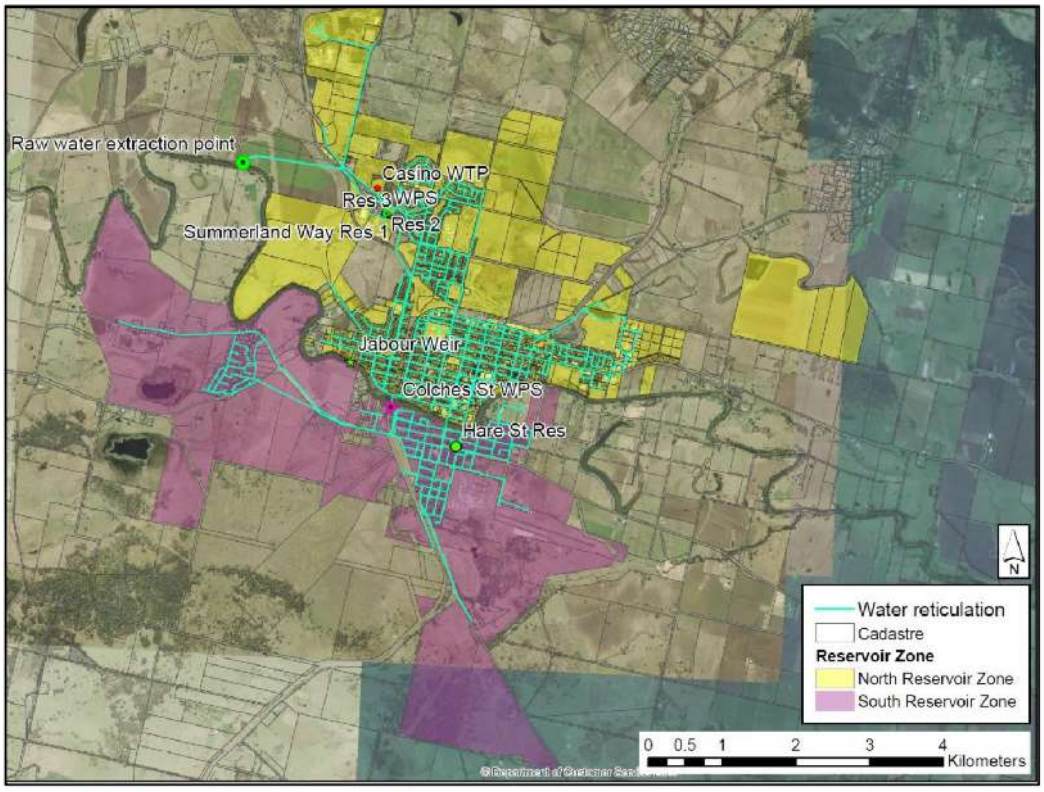


Figure 3-6: Casino water supply scheme

3.3.1 Metered Customer Demand

Council supplied customer billing data from 2010 to 2020, with meters being read four times a year. User classes were separated into residential, non-residential, strata, fire service, vacant and Northern Co-operative Meat Company (NCMC).

The historical number of assessments and the historical metered customer demand for the Casino WSS is given in Table 3-3 and Table 3-4 respectively.

Table 3-3: Historical number of assessments

Financial Year	'11/12	'12/13	'13/14	'14/15	'15/16	'16/17	'17/18	'18/19	'19/20
Residential	3,617	3,629	3,639	3,650	3,652	3,663	3,705	3,717	3,719
Non-residential	375	374	370	372	372	377	380	383	380
Vacant / Council	13	16	16	13	14	14	13	16	16
Strata	192	195	195	195	196	197	196	197	196
NCMC	4	4	4	4	4	4	4	4	4
Fire Service	2	2	2	2	2	2	2	2	2
Total	4,203	4,219	4,225	4,235	4,240	4,256	4,300	4,317	4,317

Table 3-4: Historical customer demand (ML/year) - Casino WSS

Financial Year	'11/12	'12/13	'13/14	'14/15	'15/16	'16/17	'17/18	'18/19	'19/20
Residential	632	627	631	656	614	659	637	632	569
Non-residential	384	320	335	356	342	392	413	402	405
Vacant / Council	5	5	5	3	1	2	1	4	3
Strata	73	74	74	81	74	82	77	75	73
NCMC	851	905	1,085	1,177	885	879	862	989	966
Fire Service	5	10	6	6	6	6	6	6	6
Total	1,949	1,941	2,136	2,277	1,923	2,020	1,997	2,109	2,021

The historical usage for all available billing periods for Casino WSS is given in Figure 3-7.

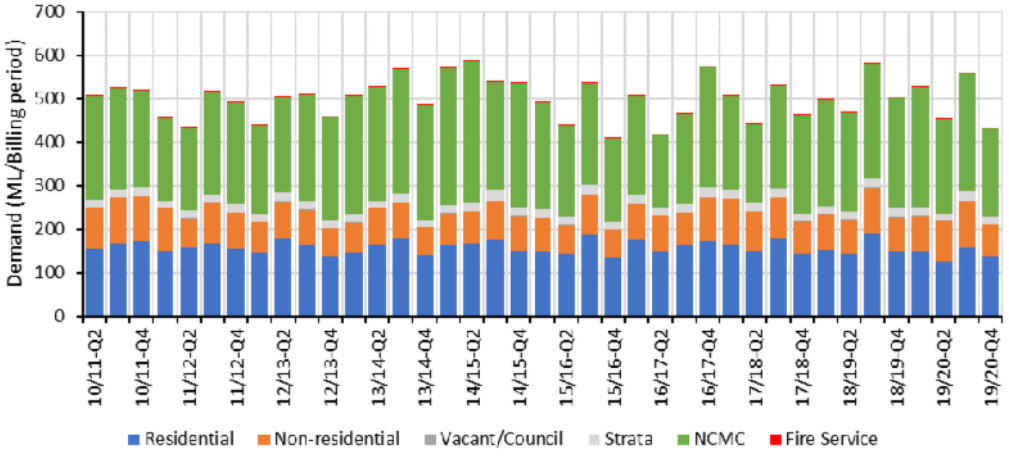


Figure 3-7: Historical customer demand by user category - Casino WSS

On average NCMC used 47% of the total customer water demand. The next highest user class, residential, used 31%.

3.3.2 Major water users

The criteria used to identify major non-residential water users was any customers that used more than 1% of the total customer usage for Casino WSS. Four users met the criteria for a major non-residential user; their average and maximum annual use from 2011/12 to 2019/20 is given in Table 3-5.

Table 3-5: Casino WSS - major water users

Major User	Average Yearly Usage (ML/year)	Maximum Yearly Usage (ML/year)
Northern Co-operative Meat Company (NCMC)	955	1,177
Richmond Dairies	72	112
Casino Holiday Park (Gateway Lifestyle Village)	22	27
Riverina Australia (feedlot)	19	37

NCMC is a meat processing cooperative; its large water use comes from an abattoir and a tannery process facility. According to the NCMC website, it is Australia's largest meat processing Co-operative. NCMC currently distributes its products to more than 20 countries outside of Australia.

3.3.3 Water balance

Table 3-6 shows the historical average yearly (2010-2020) demand for each user class, and the estimation of water losses. Water losses can be classified as apparent losses (such as unauthorised consumption – theft/illegal use and customer meter under-registration) and real losses (such as leakages).

The assumptions used to estimate apparent losses and unbilled authorised consumption and unavoidable water loses are explained in Appendix B.1.

The apparent and real water losses need to be targeted in order to reduce water losses.

Table 3-6: Casino water supply scheme water losses estimation

Category	Subcategory	User classes and losses	Consumption (ML/year)
Authorised consumption (ML/year)	Billed metered consumption by registered (retail) customers	Residential	704
		Commercial	308
		NCMC	955
		Municipal - excl parks [a]	10
		Municipal – parks [b]	20
	Unbilled authorised consumption (e.g. system flushing)		11
Water losses	Apparent losses (e.g. theft, customer meter under-registration)		42
	Current Annual Real Losses	Avoidable real losses	107
		Unavoidable real losses from mains	26
		Unavoidable real losses from service connections	44
		Total (average year production at Casino WTP)	**2,228**

[a] Municipal includes Vacant/Council user classes
[b] Parks – large parks in Casino were identified from satellite images. The parks identified were Crawford Square, Queen Elizabeth Park, Albert Park and Casino Racecourse

Figure 3-8 shows the Casino WSS water consumption and losses for the historical average year (2010-2020).

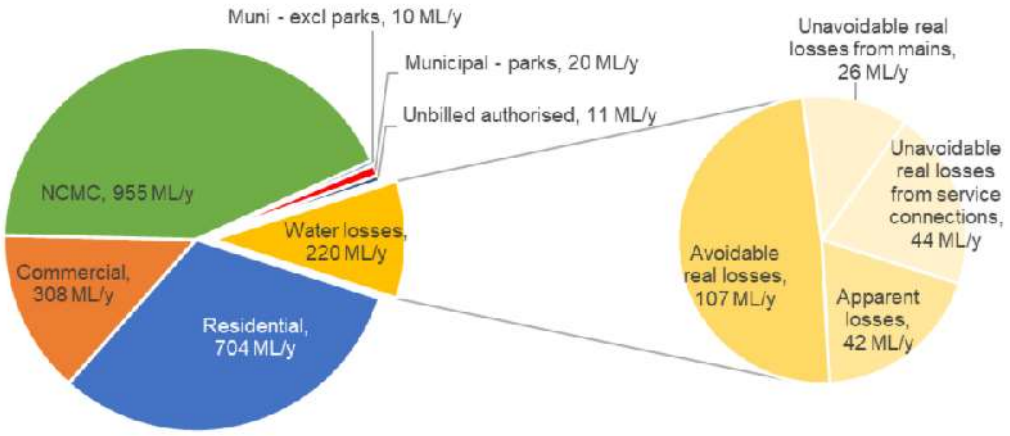


Figure 3-8: Casino WSS consumption and losses (average year)

Based on the above water balance, Casino WSS has an infrastructure leakage index (ILI: current annual real losses / unavoidable real losses) of 2.5 in an average year. This puts Casino WSS in the second highest (best) Leakage Performance Category according to IWA.

On average, around 10% of the water produced in Casino WSS is not accounted for in the billing data, therefore the water loss of the Casino WSS is estimated to be 10%. The unit water loss per assessment in 2019/20 was 132 L/assessment/day. The estimated water losses (total and unit) for each year for the Casino WSS is given in Appendix B.1.

. The outcome of the water balance is that the performance of the water supply system is good and the water savings from performance improvement would not be significant.

3.3.4 Residential unit demands

Existing dwellings

The residential unit demands for each scheme were assessed. The results are given in Table 3-7.

Table 3-7: Unit demand per active residential assessment

Average Year Demand (kL/year)	99th percentile unrestricted annual Demand (kL/year)	Average Day Demand (kL/day)	Peak Day Demand (kL/day)	Climate Independent (Internal) Demand (kL/day)
176.9	187.1	0.48	1.03	0.44

Using the WELS rating water efficiency values for shower, tap, toilet, washing machine and dish washers, it has been estimated that on average, residents in Casino are using around 2-star WELS rating (or equivalent) appliances.

3.4 Water Supply Projections

A water demand analysis is undertaken to calculate the unit demands, estimate the non-revenue water and forecast the following demands:

- Average (rainfall) year demands – for revenue planning
- Dry year demands – to assess drought security

- Peak day demands – to assess system reliability.

The method and analysis for estimating the above demands is provided in Appendix B.2.

The impact of 1°C climate warming on water demands was assessed. The methodology and results are provided in Appendix B.4. The assessment found that 1°C climate warming would only cause a small increase in demands of around 1%.

The demands were projected using the following assumptions:

- The residential demand is projected by multiplying the estimated increase in occupied residential dwellings (see **Error! Reference source not found.**) by the residential unit demand calculated for new dwellings (see Section 3.3.4).
- The non-residential demand is projected at 0.5% a year. No growth was projected for NCMC and other classes.
- The NRW is projected by assuming that it stays constant at 10% of production.

The Casino WS forecast 30-year demands, for a growth rate of 0.5%, are summarized in Table 3-8.

Table 3-8: Scheme level water supply projections

	2020	2025	2030	2035	2040	2045	2050
Average Year Customer Demand (ML/year)	2,010	2,030	2,060	2,080	2,100	2,130	2,150
Unrestricted Future Year Extraction from Jabour Weir – 1°C warming (ML/year)	2,680	2,710	2,740	2,770	2,800	2,830	2,870
Peak Day Production (ML/day)	12.86	13.01	13.16	13.32	13.48	13.64	13.81

Average and peak day demand projections on a reservoir zone level are provided in Appendix B.5.

4. Water Security Assessment

4.1 Identifying the issue - secure yield of Jabour Weir

The unrestricted 2020 annual extraction with 1°C climate warming was estimated to be 2,680 ML/year, increasing to 2,870 ML/year by 2050 due to growth

NSW Urban Water Services (NUWS) were engaged to develop a model to understand the behaviour of the existing Jabour Weir storage when supplying the current and 30-year forecast demand. A rainfall runoff model was developed using historic climate data, and this was used to develop a system behaviour model for the Casino water supply headworks incorporating the Jabour Weir. The system behaviour model was calibrated using historic stream flow data recorded by river gauge stations.

To understand the behaviour of the existing Jabour weir storage when supplying the current and 30-year forecast demand, a simple water balance was undertaken between the daily inflow to and outflow from the storage. The analysis was then hindcast to 1890 to simulate the behaviour of the weir storage for the historical droughts on record. The drawdown of the storage when supplying the 2020 annual unrestricted extraction for the historical climate, is shown in Figure 4-1.

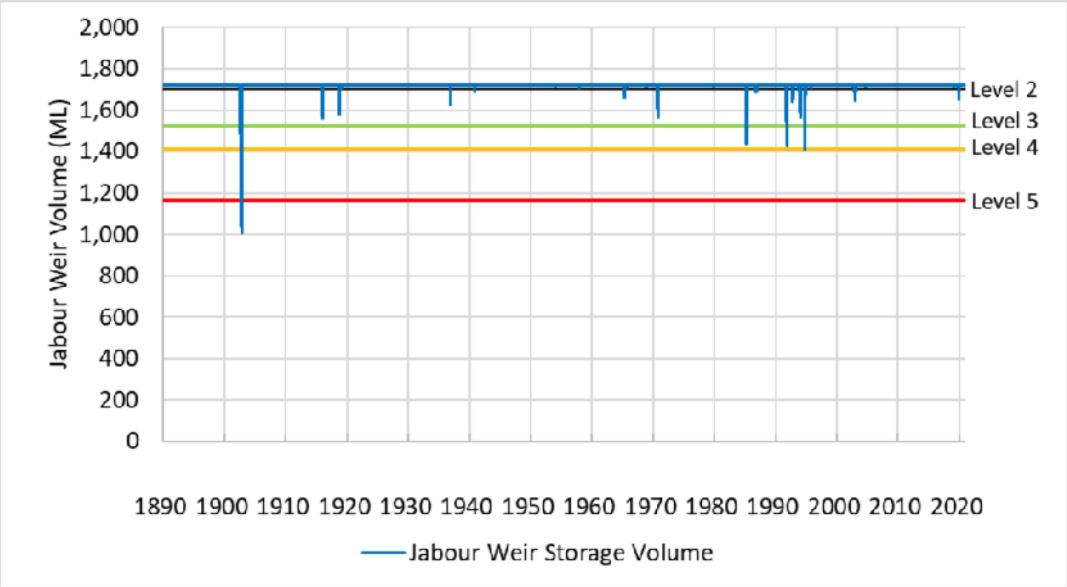


Figure 4-1: Storage behaviour of Jabour Weir hindcast when supplying 2020 demand

Figure 4-1 shows how often and what restriction level would be imposed when supplying the 2020, with the Federation Drought being a critical drought for the system. This situation would be further exacerbated for the forecast 30-year demand and future climate change which is expected to further reduce the yield of the Jabour weir.

4.2 Quantifying the issue

In order to quantify the water security issue, the capacity of the existing system needs to be defined. The capacity of the existing headworks is defined as the annual demand that can be supplied on a secure yield basis. Water security is then achieved if the secure yield of a water supply headworks is at least equal to the forecast unrestricted annual demand estimated in Table 3-8.

The secure yield was estimated to satisfy the 5/10/10 rule set out in DPE Water's draft guidelines for "*Assuring future urban water security – Assessment and adaption guidelines for NSW local water utilities*".

Secure yield is defined as the highest annual water demand that can be supplied while meeting the **'5/10/10 design rule'**.

1. Duration of restrictions does not exceed 5% of the time; and
2. Frequency of restrictions does not exceed 10% of years
3. Severity of restrictions does not exceed 10%.

Council can adopt a different design rule as a level of service

The Jabour Weir storage volume is 1,719 ML, of which 700 ML is dead storage.

The secure yield results for the Jabour Weir storage, are provided below.

- **Historic Climate 1890 – 2020** **3,074 ML/year**
- **1°C climate warming** **2,356 ML/year (23% reduction)**

The operating rule used reflected the Works Approval DK0180-00001:

"The pipe must be operated to maintain a flow in the watercourse downstream of the dam. The flow must be equal to the flow entering the storage of the dam or the capacity of the pipe, whichever is the lesser discharge."

Figure 4-2 shows the secure yield of Jabour Weir dropping over time due to climate warming (1°C increase by 2030 considered).

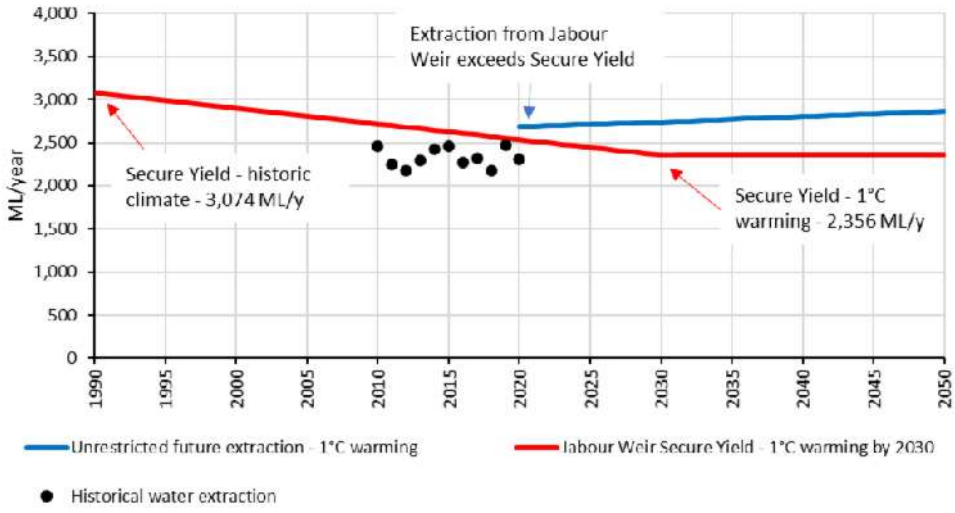


Figure 4-2: Casino water supply - projected dry year extraction compared to Secure Yield

The figure shows that the current unrestricted annual extraction exceeds the secure yield, and over the 30-year horizon the shortfall is estimated to be **514 ML/year**. It should be noted that the drop in historic secure yield may not be linear as shown. Options to address this shortfall are discussed in Sections 5 and 6.

Council owns WAL number 27156 which entitles them to extract 3,427 ML/year from the Jabour Weir Pool. This entitlement is sufficient to meet the estimate 2050 unrestricted future extraction.

4.3 Approach

A two-pronged approach of demand reduction and supply increase was used to address the shortfall in secure yield.

1. **Demand reduction options** – these look to reduce the future demands of Casino WSS
2. **Supply side options** – these augment the Casino WSS to improve water security

This approach is illustrated in Figure 4-3.

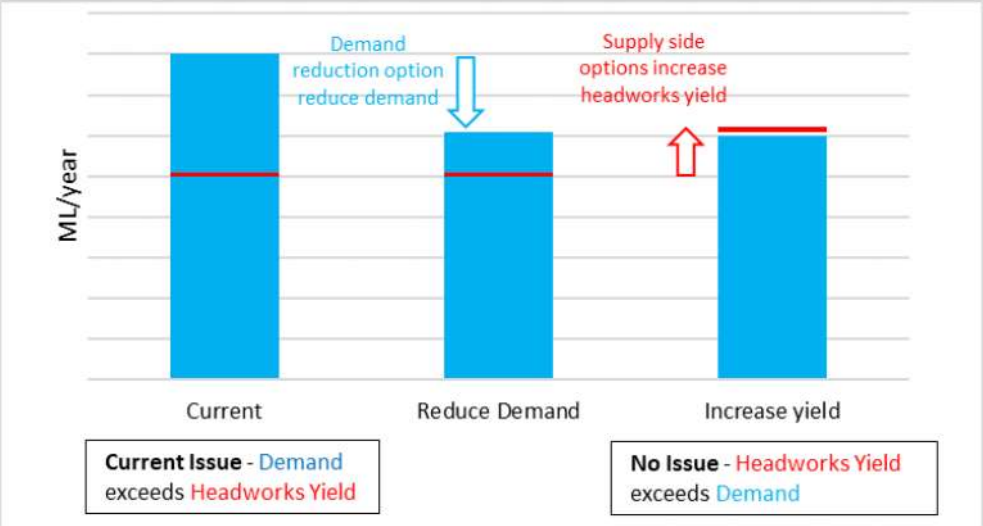


Figure 4-3: Representation of approach to improve water security

A reduction in demand can defer a source/supply augmentation and also reduces the extent of the augmentation, in some instances providing significant cost savings.

5. Demand reduction options

This section looks at ways to reduce the current and future water demands in Casino.

LWU water demand reduction options can be categorised into four 'themes':

1. **Utility** – reducing demand on a utility level, such as reducing system water losses, reducing water use at Council properties, raising price signals
2. **Residential** – reducing both internal and external residential demand by improving efficiency of water fixtures and reducing external water use (such as garden watering)
3. **Non-residential** – perform audits on major users to improve water efficiency, also encouraging all non-residential users to be water efficient
4. **Source substitution** – using recycled water for the irrigation of public open spaces (POS)

The effectiveness of each theme in reducing water demand depends on a Council's current situation and the potential for water savings. See below for the analysis of water demand reduction for each theme.

5.1 Utility

Options for demand reduction for utility assets are:

- Leakage management – installing pressure reducing valves to reduce the stress on pipes and lower the number of leaks and breaks in pipes
- Leak detection programs – monitoring rainfall and soil moisture to predict where leaks are likely to occur and using acoustic devices to pick up the noise water makes as it leaks. This ensures a fast response time to pipe breakages
- General education program
- Smart metering, with feedback and leak alerts.

The options of leakage management/detection are in line with the RCC Regional Demand Management Plan (RDMP) [6] Action 2, and based on the reported current status, RVC has installed data loggers, flow meters and SCADA which tracked and repaired several major leaks.

Leakage reduction

Casino WSS has been assessed as having around 140 ML of avoidable water losses.

Leakage can be reduced by:

- pipeline and asset management
- pressure management (which may increase or decrease the pressure)
- improved response time for repairs
- active leakage control – using methods such as ultrasonic leakage detection survey

The outcome of the water balance indicated that the performance of the water supply system is good and the water savings from performance improvement would not be significant. The cost associated with reducing leakage to a low level may not provide value for money

5.2 Residential

5.2.1 Internal residential demand

Options for reducing internal water demand for residential properties are:

- whole house retrofit (fixing leakages, replacing fixtures with 4-star rated fixtures),
- showerhead exchange program
- washing machines rebate/swap for low socio-economic residents
- evaporative cooler maintenance (bleed rates, collection trays etc)

From Section 3.3.4, the internal usage (excluding evaporative cooler use) of Casino's residential users was estimated to be about 180 L/person/day, which is equivalent to around **2-star WELS**

rating (or equivalent) appliances. It is noted that RCC is campaigning for unknit internal residential demand of 160 L/person/day and although Casino is not supplied by RCC, the RDMP extends across the RVC LGA and could reduce consumption in Casino.

If Council were able to achieve a 50% participation in a program to retrofit houses with all 5-star WELS rated appliances, the estimated forecast 30-year **savings will be around 120 ML/year**. Based off a typical rebate, this is estimated to cost Council around **$1.25 Million**. The assumptions for cost estimates, as well as the water savings estimated for other water efficient appliance/fittings programs are provided in Appendix D.1.

Water efficient appliances/fittings program

Evaporative cooler maintenance

Due to the low evaporative cooler usage in Casino, any target water demand reduction for evaporative coolers would not achieve significant water savings.

5.2.2 External residential demand

Options for reducing external water demand for residential properties are:

- Lawn buyback programs – rebates to replace lawn/gardens with less water intensive landscapes (e.g. using native plants or rock gardens)
- Rainwater tank rebates – an existing program under the RDMP
- 3rd pipe supply (using recycled water) – this is only cost effective for new developments

Lawn buy-back program

For residential irrigation, water savings may be achieved through a lawn buy-back program. This program provides an incentive (rebates) to convert turf to less water and fertilizer intensive landscapes. Options include planting a mix of native trees, shrubs, perennials, bunch grasses, ground covers, mulch, rocks and stones. The Australian Arid Lands Botanic Garden have created a collection of six 'AridSmart Display Gardens' which feature simple landscaping and use of native species to produce a garden that can be maintained with little to no water compared to a typical garden and lawn [7].

If Council were able to achieve a 20% participation in a lawn buy-back program, the estimated savings will be around 16 ML/year in 2050. Based off a rebate for program offered in California, this is estimated to cost Council around **$460,000**. The assumptions for cost estimates are provided in Appendix D.2.

Rainwater tank rebates

Rainwater tanks reduce water demand for residents, as captured rainwater can be used for garden watering and can also be connected to toilets and washing machines. The RCC Rainwater Tank Rebate Program is currently available to residents of Casino, to encourage rainwater tank uptake. The current uptake s about five houses a year.

As there is already a program in place, this option is not considered to achieve any additional reduction in demand. It is also noted that the yield from rain water tanks would reduce during dry periods and therefore have a minimum contribution towards water security during drought.

5.3 Non-residential

For major non-residentials users, water audits were selected as viable options to reduce water usage, however it requires ongoing liaison and funding to encourage implementation.

From the RDMP [6], in 'Action 3: Sustainable Water Partner Program', up to $25,000 rebates are available for major non-residential users (>5 ML/a) joining the program.

Council needs to discuss options with major water users such as NCMC, for the possibility of joining the Sustainable Water Partner Program. From the billing data, NCMC has used more water during droughts, and the reason may be:

- Increase of supply as farmers are quickly selling off their livestock during droughts (or to prepare for droughts), leading to drop of prices
- Abattoirs take advantage of the drop of prices, increasing output hence using more water in the process

Therefore, an investigation may be required to determine if NCMC will be able to reduce water use in dry years.

5.4 Source substitution

This option considers substituting potable water for irrigation of public open spaces with recycled effluent. According to the RVC Water and Sewer Strategic Plan 2018, currently, Blue Dog Agriculture and Casino Golf Course use effluent for irrigation.

Effluent as substitution for environmental flows and Basic Landholder Rights downstream of the weir will also be considered (refer to Section 6.2.2).

5.4.1 Recycled water for irrigation of public open spaces

Effluent reuse on public open spaces, instead of using potable water, is one way Council could reduce the water demand of the Casino WSS.

An effluent reuse scheme was investigated which would supply effluent to the public open spaces Albert Park, Queen Elizabeth Park, Crawford Square (Casino skate park) and the Casino Racecourse/Showground. A preliminary route for the distribution system is shown in Figure 5-1. The length of effluent distribution main required is 6km.

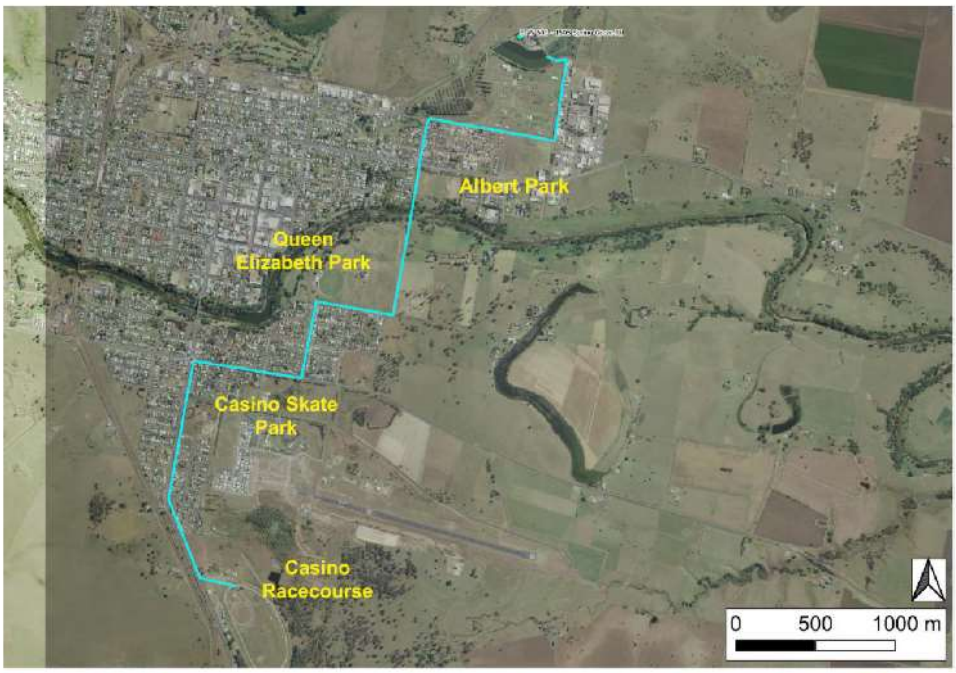


Figure 5-1: Preliminary route for the distribution system for irrigation of POS

An assessment of the treatment barriers at the STP found that the current treatment may not achieve the pathogen reduction targets for irrigation of POS from the NSW Guideline for Recycled

Water Management Systems [8]. To guarantee that the targets for all pathogens are met, Council may have to install chlorination and/or UV disinfection at the STP. See Appendix E.1 for more detail on the effluent treatment requirements.

The estimated total capital cost for upgrading the effluent reuse system is around **$4 million.** See Appendix E.3 for more detail on the cost estimate.

5.5 Review of Regional Demand Management Plan (RDMP) Actions

A review of the seven proposed actions from Council's Regional Demand Management Plan (RDMP) is provided in Appendix F. A summary of the seven actions and how the options discussed above are consistent with the objectives of these actions is provided below.

Action 1: Monitoring, evaluation and reporting – this will provide a better understanding of water use in the Casino WSS and allow Council to better target demand reduction actions

Action 2: Water loss management – the objectives are consistent with the Utility options in Section 5.1

Action 3: Sustainable water partner program – the objectives are consistent with the Non-residential options in Section 5.3

Action 4: Smart metering – this will achieve many of the same benefits of Action 1. It will also allow for customers to better monitor their own water use, potentially leading to detection of leaks on customer side, and driving individual water efficiency. This action will determine the business case for scope and extent of a smart metering program

Action 5: Recycled water – consistent with the source substitution option in Section 5.4

Action 6: Rainwater tank rebates – the objectives are consistent with the rainwater tank option in Section 5.2.2

Action 7: Community engagement and education – this action could drive down residential demands, both internal and external. This action could supplement the residential options in Section 5.2

5.6 Demand reduction scenarios

Table 5-1 presents different combinations of demand reduction options and the water savings that can be achieved in 2050. Lawn buyback program has been excluded from the options as the estimated savings are low.

Table 5-1: Combination of options and the total dry year savings for 2050

Combination	1 – baseline	2	3	4 - aspirational
Leakage reduction	✗	✓ (ILI of 2.0) 66 ML/year	✓ (ILI of 2.0) 66 ML/year	✓ (ILI of **1.0**) 137 ML/year
Residential – Whole house retrofit program	✗	✗	✓ (20% uptake) 49 ML/year	✓ (50% uptake) 123 ML/year
Rainwater tanks	✗	✗	✗	✗
Lawn buy backs	✗	✗	✗	✓ (20% uptake) 16 ML/year
Non-residential programs	✗	✗	✗	✗
Effluent reuse	✗	✓ 33 ML/year	✓ 33 ML/year	✓ 33 ML/year

2050 Savings (ML/year)	**0**	**99** (20% of shortfall)	**148** (30% of shortfall)	**309** (60% of shortfall)

*Internal demand reduction option – assuming whole house retrofit rebate since that has biggest savings

Combination 1 assumes Council does not adopt any of the demand reduction options, hence no water savings. Combination 4 assumes Council adopts all options, and 309 ML of savings may be achieved.

Combination 2 and 3 are considered practical options which could reduce the water demand by 100-150 ML/year. This will reduce the secure yield shortfall by 20-30%. The cost to reduce the demand may not achieve value for money when compared to the cost saved by reducing the size of the supply augmentation.

6. Supply side options for improving water security

The supply side options aim to address the shortfall between the secure yield of Jabour Weir and the estimated 30-year unrestricted future extraction to supply Casino WSS.

6.1 Regional Options

6.1.1 Toonumbar dam options

DPE Water is in the process of developing a Regional Water Strategy to guide how the NSW Government can best manage the challenges that are facing the Far North Coast region. The draft Far North Coast Regional Water Strategy (FNC RWS) was on public exhibition from 30 October until 13 December 2020. The final strategy is still in development.

RVC, RCC and Kyogle Council have had discussions with Water NSW regarding the potential to access additional releases from Toonumbar Dam.

A long list of 39 Options have been developed as part of the Draft FNC RWS. Two of these options, Option 3 and 19, consider increasing the utilisation of Toonumbar Dam. These are:

Option 3. Use Toonumbar Dam to augment town water supplies	
Source: Rous County Council, WaterNSW and Department of Planning, Industry and Environment—Water	
Description	Connect Toonumbar Dam to a town water supply to provide additional town water security for the region. A number of connection opportunities exist: • pipe from the dam wall to Casino water treatment plant • pipe from the dam wall to Rocky Creek Dam • pipe from the end of Eden Creek to Casino water treatment plant • pipe from the end of Eden Creek to Rocky Creek Dam • deliver along existing river to Jabour Weir at Casino (non-build option).
Intent	• Increase utilisation of Toonumbar Dam water. • Improve resilience of town water supplies in the Far North Coast region.
Challenges addressed	• Region is unprepared for extended dry periods. • Town water demand is expected to exceed supply in the short-to-medium term. • Underutilisation of Toonumbar Dam.
Potential combinations	This option could be combined with: • Option 1. Interconnection of independent water supplies in the region to the Rous County Council network • Option 19. Raise Toonumbar Dam level.
Considerations	The current water sharing plan does not allow for extraction from the Richmond regulated system for town water supply. This option would require modification of the water sharing plan to allow such extractions. Introducing regular extraction for town water supply may impact on water reliability for existing rural regulated system users. This option would need to assess the impact of increased extraction on the water security of existing regulated licence holders.

Option 19. Raise Toonumbar Dam level	
Source: Northern Rivers Regional Bulk Water Supply Strategy	
Description	Raise Toonumbar Dam to increase storage capacity and encourage additional usage uptake. By increasing the size of the dam and associated water security, dam usage becomes more attractive to business and facilitates the introduction of new users to the regulated system (e.g. town water suppliers). WaterNSW investigations indicate the optimum level increase to be 6 m. Several other dam levels have been considered, including a 10 m and 20 m lift.
Intent	• Increase drought security for existing regulated water users. • Improve resilience of town water supplies in the Far North Coast region.
Challenges addressed	• Region is unprepared for extended dry periods. • Town water demand is expected to exceed supply in the short-to-medium term. • Underutilisation of Toonumbar Dam.
Potential combinations	This option could be combined with: • Option 1. Interconnection of independent water supplies in the region to the Rous County Council network • Option 3. Use Toonumbar Dam to augment town water supplies • Option 20. Establish sustainable extraction limits for Far North Coast surface water and groundwater sources • Option 21. Establish and/or increase environmental water releases from major storages in the Far North Coast • Option 22. Convert low flow water access licences to high flow water access licences • Option 27. Addressing cold water pollution • Option 33. Active and effective water markets • Option 34. Regional Demand Management Program.
Considerations	This option requires: • consideration of sustainable extraction limits and assessment of potential impacts on the reliability of water access licences in the Richmond River Extraction Management Unit • assessment of potential impacts on cultural heritage sites • assessment of inundation impacts on landholders • assessment of changes to existing river flow patterns and planned environmental water • assessment of cold water pollution impacts • assessment of potential impacts on floodplain industries • consideration of the distribution of benefits amongst consumptive water users and the environment • assessment of flow modifications or changed operational regime on connectivity including fish passage, native fish (including threatened species), ecological communities and ecosystems • review and amendments to the *Water Sharing Plan for the Richmond River Area Unregulated, Regulated, and Alluvial Water Sources 2010.* This option would require assessment under the *Fisheries Management Act 1994.* Environmental assessment processes require sufficient scope to consider the cumulative impact of combined infrastructure options.

Based on the secure yield modelling, the secure yield shortfall could be met by supplying around 9.4 ML/day for two months during the critical drought.

The 2021/22 WaterNSW Regulated River prices for the North Coast valley, which includes Toonumbar Dam, is $24.83/ML for usage and $17.42/ML for high security entitlement [9]. If Council were to obtain a high security license entitlement of 514 ML/year (equal to the secure yield shortfall) the cost will be around $9,000/year for the entitlement. The 30-year present value cost (at a rate of 7% p.a.) of this entitlement charge is $120,000. Council will also have to pay about $10,000 to

$15,000 for usage (including transmission losses) during a drought where they need 514 ML to meet the shortfall.

6.1.2 Connection to Rous County Council's WSS

The Northern Rivers Regional Organisation of Councils (NOROC) has resolved to develop 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 2013 Northern Rivers *Regional Bulk Water Supply Study* [10] investigated numerous interconnection and supply scenarios to identify options that warrant further development in future stages of the strategy development.

The NOROC study identified five potentially feasible water supply scenarios. The study found that connecting Casino to the RCC bulk supply scheme would address local supply issues without significantly altering the demand or yield of the regional scheme, but it would introduce additional costs as well as cost sharing opportunities.

RCC have advised that connection could be made to RCC's Cityview Reservoir in south Lismore. The NOROC study did not assess a particular alignment, but a potential route is shown in Figure 6-1. The distance of this pipeline is around 27 km.

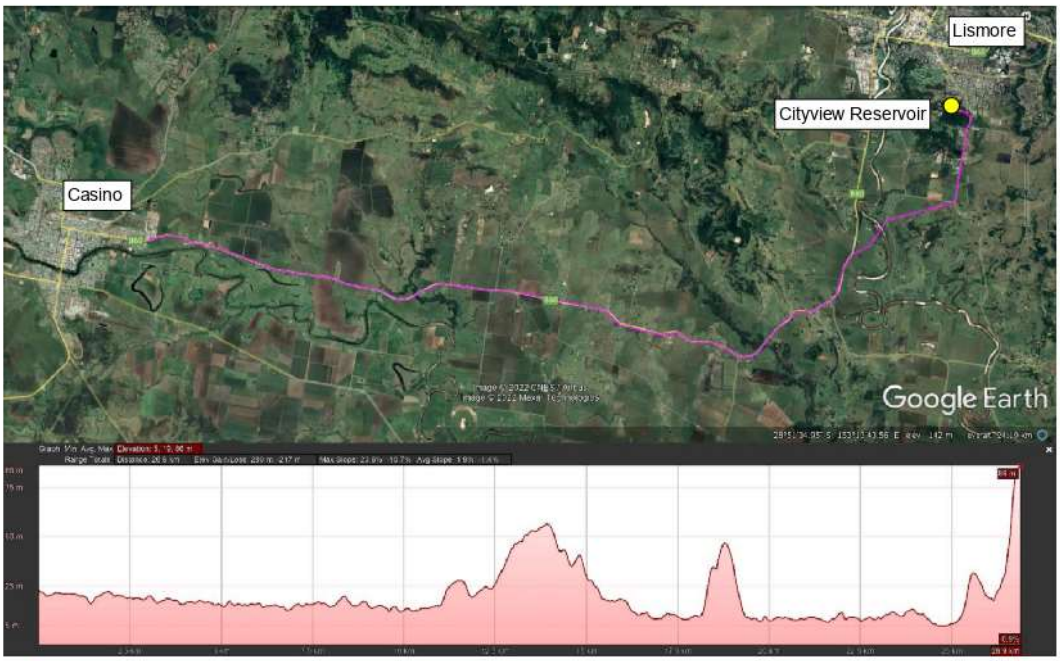


Figure 6-1: Potential route to connect Casino WSS to RCC's network at Lismore

Based on the secure yield modelling, the secure yield shortfall could be met by supplying around 9.4 ML/day for two months during the critical drought.

A 375mm diameter pipeline will be able to supply 9.4 ML/day. It is assumed no pumping is required as Cityview Reservoir is already about 60m above the elevation of Casino. A 375mm DICL trunk main is estimated to cost around **$11 Million**, based of costs in DPE Water's Reference Rates Manual. This cost could be reduced by constructing a smaller diameter pipeline and supplying less than 9.4 ML/day but over a longer period during drought. The scheme can be refined further if this is the preferred option.

RCC's bulk headworks connection fee is $8,943/ET in their 2021/22 fees and charges. The Casino WSS has a demand of approximately 1,250 ET, which would equate to a connection fee of around **$11 Million**. The 2021/22 notional price of water to member Councils is $2.00/kL. To meet the secure yield shortfall of 514 ML in the critical drought, this would cost Council around **$1 Million**. The total cost of this option would be around **$23 Million**.

6.2 Headworks Augmentation Options

6.2.1 Accessing Jabour Weir Pool Dead Storage

Based on the survey of the weir pool done by Hydrosphere in 2010, there is approximately 700 ML of dead storage in the Jabour Weir pool. If some of this dead storage could be accessed, the secure yield of the water source could be improved.

The secure yield was estimated for a scenario where the dead storage was reduced by half, from 700 ML to 350 ML. The estimated secure yield is shown in Table 6-1.

Table 6-1: Secure Yield (5/10/10 rule) for Jabour Weir with reduced dead storage

Dead storage volume	Secure Yield (5/10/10) for 1°C climate warming	Shortfall in meeting 2050 unrestricted future extraction of 2,870 ML/a
700 ML (current)	2,356 ML/a	514 ML/a
350 ML	3,395 ML/a (44% increase)	No shortfall

If the dead storage is reduced by 50% there would be **no shortfall and water security for Casino would be achieved**. Updating the system behaviour model with a new bathymetric survey of the Jabour Weir storage would be required to accurately determine how much of the dead storage needs to be accessed to achieve water security. It is understood from Council that the dead storage is a pump access issue. Further investigations are needed to provide a cost estimate to access the dead storage.

As the survey of the Jabour Weir pool was undertaken in 2010, it is recommended that another bathymetric survey be undertaken to update the estimate of the dead storage volume.

6.2.2 Raising Jabour Weir

The secure yield of the Jabour Weir could be increased by raising the weir.

Changes to the weir would trigger a review of the environmental flow conditions. It is currently not certain what the changes to the environmental flow conditions would be. This would require advise form NRAR and would likely involve engaging an ecohydrologist to assess the downstream impacts of a weir raising.

To proceed with sizing the weir raising, DPE Water have advised PWA of two potential environmental flow rules that could result from the weir raising. These rules are:

1. E Flow Rule 1 (current) - No release requirements other than fishway flows, but fishway closed before water drops below weir crest height
2. E Flow Rule 2 - Maintain a flow at the existing gauge station of 15 ML/d or lesser equal to the inflow

A third option is considered, where the effluent from the Casino STP is discharged into the Richmond River downstream of the weir for E-flows, banking the water in the weir. This gives the following rule:

3. E Flow Rule 3 - Maintain a flow at the existing gauge station of 15 ML/d or lesser equal to the inflow with 2.6 ML/d STP effluent just above gauge station.

The secure yield model was run to determine the weir raising required to meet 2050 unrestricted secure yield of 2,870 ML/year under the three E Flow rules. The results are provided in Table 6-2.

Table 6-2: Weir raising required to meet 2050 unrestricted secure yield of 2,870 ML/year

E flow rule	Additional storage required in weir pool	Weir raising required
Rule 1 (current)	543 ML	0.4 m
Rule 2	1,511 ML	1.8 m
Rule 3	1,419 ML	1.7 m

Results show that the required weir raising is sensitive to the application of the E flow rule, however using STP effluent as an E Flow substitute does not provide a significant benefit.

Design and cost estimate

Raising the 2.9m high structure by 1.8m requires major changes to the weir configuration. Two feasible options for raising are by using extended anchors or using a concrete buttress.

The cost to raise the weir by 1.8m is estimated by around **$1.5M** for either option. Provision of a modern (vertical slot type) fishway structure is estimated to cost an additional **$4M**. Details and cost estimates of this augmentation are provided in Appendix G.

6.2.3 Off-river Storage

The secure yield of the Jabour Weir could be increased by constructing an off-river storage (ORS). Water would be pumped to this storage from the Richmond River for use during drought.

As for the weir raising, construction and operation of an ORS would trigger a review of the environmental flow conditions. It is currently not certain what the changes to the environmental flow conditions would be.

To proceed with sizing the off-river storage, DPE Water have advised PWA of three potential environmental flow rules which would govern when Council could pump from the Richmond River to the storage. These rules are:

4. E Flow Rule 4 - Pump from river to fill ORS when flows at gauge station are above 584 ML/d . Max TDEL 30% of flow
5. E Flow Rule 5 - Pump from river to fill ORS when flows at the gauge station are above 80 %ile (78.4 ML/d) during the months January to September inclusive and when greater than 90% ile (42.4 ML/d) during the months of October to December
6. E Flow Rule 6 - Pump from river to fill ORS when flows at the gauge station are above 90%ile (42.4ML/d) during the months January to September inclusive and when greater than 95%ile (25.6 ML/d) during the months of October to December.

The secure yield model was run to determine the Off-river storage volume required to meet 2050 unrestricted secure yield of 2,870 ML/year under the three E Flow rules. The results are provided in Table 6-2.

Table 6-3: Off-river storage required to meet 2050 unrestricted secure yield of 2,870 ML/year

E flow rule	Off-river storage volume required
Rule 4	424 ML
Rule 5	390 ML
Rule 6	390 ML

The size of the off-river storage is not significantly different for the three E flow rules, 390 - 424 ML.

Design and cost estimate

The design considers a 430 ML off-river storage.

Council has nominated two possible storage sites, shown in Figure 6-2.

Figure 6-2: Potential locations for off-river storage

Cost estimate for the provision of a 430ML storage facility is **$9.8M**. Note the cost estimate does not include cost of pipelines to and from the storage as the actual location of the storage is unknown. Details and cost estimates of this augmentation are provided in Appendix G.

6.3 Alternate water source - groundwater

PWA engaged Golder to undertake a third-party review of the 2012 groundwater feasibility study by Hydrosphere [11]. The review included review of the WSP and rules associated with groundwater sources, review of log data, water level monitoring data, and extraction rates, and review of impacts to surrounding users, ecosystems and culturally significant sites.

Based on Golder's review, four locations were identified as potential borefields for an emergency water supply scheme for Casino – Fairy Hill, Sheppard Street, East Casino and South Casino. These four borefield locations are shown in Figure 6-3.

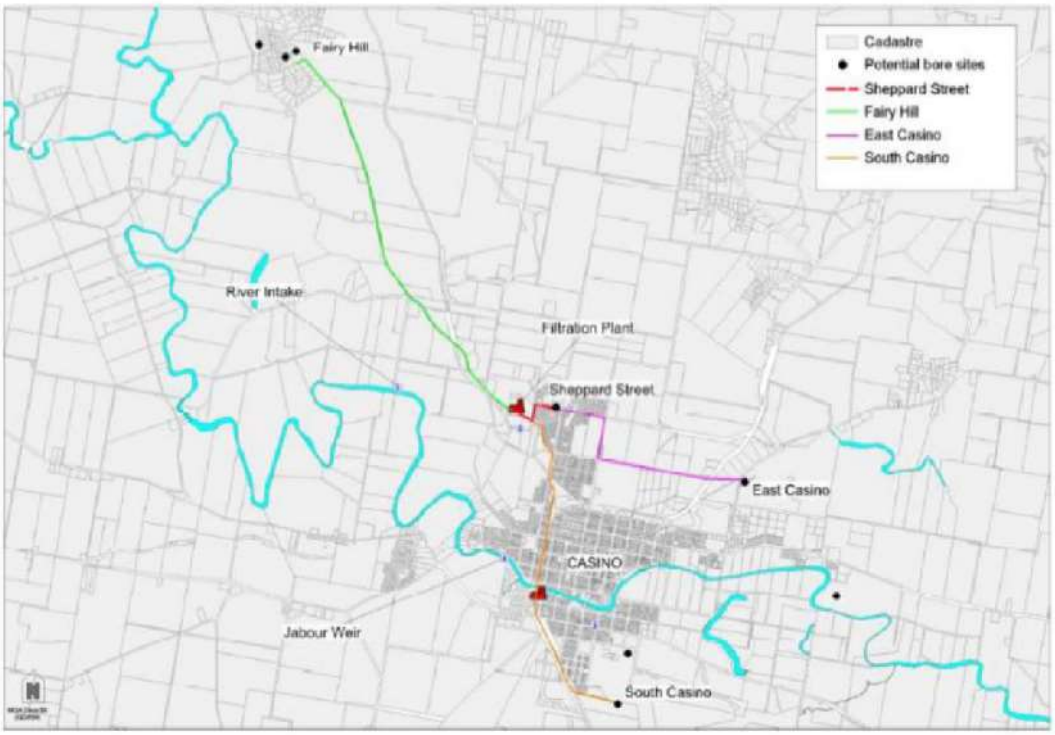


Figure 6-3: Potential borefield locations

Hydrosphere short-listed about a dozen bores that could be potential water sources for Casino. Of these, only three had salinity that was considered potable or good. The combined yield of these three bores was estimated to be 10.3 L/s, or around 0.9 ML/day. This is significantly lower than the current average day demand for Casino of around 5.5 ML/day.

The yield of the bores as reported by Hydrosphere is either unknown, or Golder have advised that the yields should be considered indicative only. A more detailed assessment would require reviewing local geological information at the potential bore field location.

Groundwater sources that have so far been identified around Casino are not suitable to provide a potable water source of the quality or quantity required to solve the water security issues. They should be considered as an emergency supply at this stage.

7. Summary of Options and Recommendations

The demand reduction options and supply side options which were investigated to address the water security issues are summarized in Table 7-1.

Table 7-1: Summary of demand reduction and supply side options

Option	Size	Cost	Uncertainties
Practical Demand Reduction Options	Reduce ILI to 2.0, 20% uptake of whole whose retrofit program, effluent reuse scheme	**$4.5M+**	Estimation of water savings due to uptake of programs and identification of leakage Cost of leakage reduction cannot be estimated.
Releases from Toonumbar Dam	514 ML/year High Security License Entitlement fee	**$120,000** (30-year NPV @ 7%)	Outcomes of Regional Water Strategy i.e. selected options
	514 ML water usage fee during drought	$12,700	
Connection to RCC's bulk supply system at Lismore	27 km long pipeline, RCC bulk headworks connection fee	**$22M**	Requires agreement with RCC
	514 ML water usage fee during drought	$1M	
Accessing Jabour Weir Pool Dead Storage	Cost to access and transfer portion of dead storage volume (around 25% of current volume)	Cost cannot be estimated	Volume of dead storage available - requires new bathymetric survey of weir pool storage Engineering and environmental challenges
Raising Jabour Weir	Raise Jabour Weir by 1.8m	**$5.5M**	The size of weir raising will depend on the E flow rules required by NRAR
Off-river storage (ORS)	430 ML ORS	**$9.8M**	The size of ORS will depend on the E flow rules required by NRAR Requires suitable land to be identified

Recommendation

The following two Scenarios are recommended to provide water security to Casino:

Scenario 1 – Staged solution

Stage 1 – Access dead storage

Modelling showed that accessing 50% of the dead storage would provide water security for Casino. It is unknown what percentage of the dead storage could be accessed. Council should investigate options to access the dead storage either through temporary or permanent pumping arrangements. Depending on the volume of dead storage that can be accessed, the current headworks could provide water security for Casino for the next 10 to 15 years.

Stage 2 – Supply augmentation

Based off Table 7-1, the preferred option is releases from Toonumbar Dam. It is understood that the Regional Water Strategy is currently being finalised. Deferring the need for a supply augmentation allows time for Council to work with the state government on the Toonumbar Dam options in the RWS. The 30-year present value cost of this option is **$55,000**.

If the use of Toonumbar Dam is not a preferred option in the RWS then the next preferred option from Table 7-1 is the raising of Jabour Weir. By delaying works by 10 years, present value cost is reduced from $5.5M to **$2.8M**.

Scenario 2 – Up-front supply augmentation

If an up-front solution is to be considered, the preferred option from Table 7-1 is the raising of Jabour Weir. The present value cost is $5.5M.

8. References

[1] Primex Field Days PTY LTD, "Richmond Valley Events Centre," [Online]. Available: https://www.primex.net.au/richmond-valley-events-centre/. [Accessed 21 September 2020].

[2] Richmond Valley Council, "Consultant Brief - Casino Water Supply Scoping Study," 2020.

[3] Hydrosphere Consulting, "Analysis of Jabour Weir Raising Options: Stage 1 Investigations," 2010.

[4] Bureau of Meteorology, "Climate statistics for Australian locations," 2020. [Online]. Available: http://www.bom.gov.au/climate/averages/tables/cw_058063.shtml. [Accessed 21 September 2020].

[5] City Water Technology Pty Ltd, "Richmond Valley Casino WTP Process Assessment and Optimisation," 2021.

[6] Hydrosphere Consulting, "Rous County Council Regional Demand Management Plan: 2019-2022," 2018.

[7] Australian Arid Lands Botanic Garden, "AridSmart Display Gardens," [Online]. Available: https://www.aalbg.org/aridsmart-display-gardens.html. [Accessed 7 October 2020].

[8] "NSW Guidance for Recycled Water Management Systems," Department of Primary Industries.

[9] IPART, "Review of Water NSW's rural bulk water prices - From 1 October 2021 to 30 June 2025," 2021.

[10] Hydrosphere, "Northern Rivers Regional Bulk Water Supply Study," 2013.

[11] Hydrosphere Consulting, "Preliminary Feasibility Assessment: Groundwater Source for Casino Emergency Water Supply," 2012.

[12] T. B. M. T. D. W. A.O Lambert, "A Review of Performance Indicators for Real Losses from Water Supply Systems," 1999.

[13] MWH, "Casino Water Model Build," 2013.

[14] D. Fitzgerald, "An investigation into factors influencing participation in water-conservativ programs: Participation in Victoria's Showerhead Exchange Program," 2019.

[15] be water wise, "Turf Replacement Program," [Online]. Available: https://www.bewaterwise.com/turf-replacement-program.html. [Accessed 20 04 2021].

[16] DPIE Water, "NSW Reference Rates Manual - Valuation of water supply, sewerage and stormwater assets," 2014.

[17] Water Services Association of Australia, "Health-Based Targets for Drinking Water Safety," 2015.

[18] Water Services Association of Australia (WSAA), "Manual for the application of Health-Based Targets for Drinking Water Safety," 2015.

[19] NSW Department of Planning, Industry and Environment, "AdaptNSW NSW Climate projections map," [Online]. Available:

https://climatechange.environment.nsw.gov.au/Climate-projections-for-NSW/Interactive-map. [Accessed 2020 September 22].

[20] Richmond Valley Council, "Water and Sewer Strategic Plan," 2018.

[21] UTS Institute for Sustainable Futures, "LWU Options: System Water Efficiency Estimation Tool "SWEET"," 2020.

[22] The LEAKSSuite Library, "Unavoidable Annual Real Losses & Infrastructure Leakage Index," 16 July 2020. [Online]. Available: https://www.leakssuitelibrary.com/uarl-and-ili/. [Accessed 16 April 2021].

[23] The LEAKSuite Library, "ILIs in Australia 2014/15," [Online]. Available: https://www.leakssuitelibrary.com/australian-ilis/. [Accessed 20 04 2021].

Appendix A Historical population growth in Casino

A.1 Calculated from ABS Data

The Australian Bureau of Statistics (ABS) calculates an Estimated Residential Population (ERP) each year for each LGA in Australia. It uses census data as the basis (which is based on place of usual residence), then adjusts for many factors such as interstate and overseas migration, births and deaths. The historical ERP for Richmond Valley Council LGA is given in Appendix Table A-1.

Appendix Table A-1: Historical estimated residential population (ERP) for Richmond Valley Council

	1996	2001	2006	2011	2016	2019
Richmond Valley Council LGA	20,861	21,014	21,728	22,717	23,164	23,465
Average annual growth		0.15%	0.67%	0.89%	0.39%	0.43%

The ERP shows that population within RVC LGA has been increasing slightly, however it does not contain information regarding intra-LGA migration.

The number of occupied and unoccupied dwellings in Casino was obtained using 2016 Census data. The results are shown in Appendix Table A-2.

Appendix Table A-2: Household size and occupancy ratio for Casino (2016 Census)

	Dwellings			Persons	House hold size	% private dwellings occupied
	Occupied	Unoccupied	Total			
Separate house	3,428	220	**3,648**	8,650	2.5	94%
Semi-detached row or terrace house townhouse etc	78	13	**91**	98	1.3	86%
Flat or apartment	490	66	**556**	774	1.6	88%
Total for standard private dwellings	3,996	299	**4,295**	9,522	2.4	93%

* Standard private dwellings exclude population in other dwellings such as caravans, cabins, houseboats, or dwellings attached to shops

The statistical areas used to calculate the values in Appendix Table A-2 are shown in Appendix Figure A-1.

The 3,650 residential assessments for 2016 in the billing data correlate well with the 3,648 total separate houses recorded in the 2016 Census data, which indicates that all residential properties are metered. However, the number of strata assessments in the billing data is less than the ABS total number of semi-detached row and flat or apartment dwellings. This is because one strata assessment usually contains more than one dwelling.

The serviced area population was estimated by multiplying the number of "active" residential assessments by the estimated household size of 2.5 people per separate house – see Appendix Table A-2. To estimate the population in assessments classified as Strata in the billing data, an approximate household size of 4.5 people per Strata assessment was calculated so that the population matched the 2016 census.

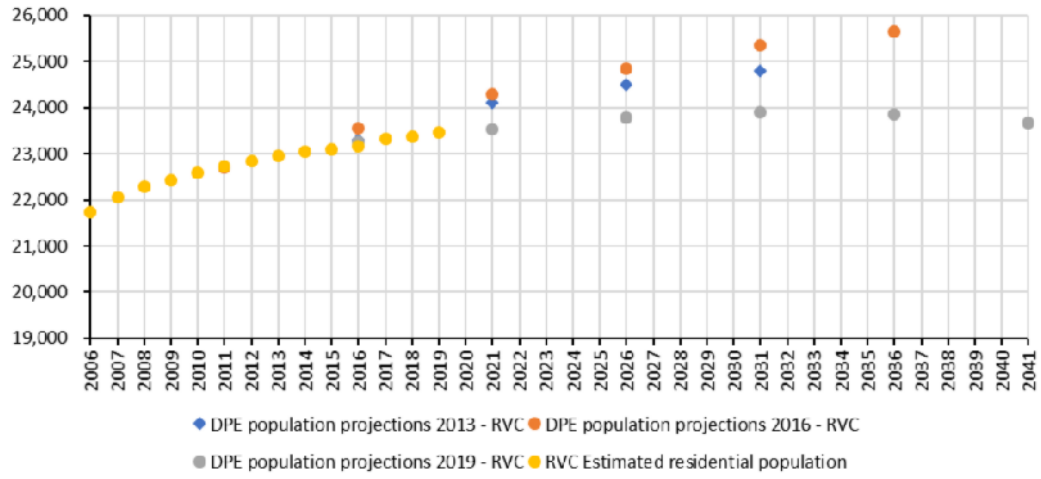
The historical population for residential and strata user classes is given in Appendix Table A-4.

Appendix Table A-4: Historical serviced population in Casino, calculated from water billing data

User Class	'10/11	'11/12	'12/13	'13/14	'14/15	'15/16	'16/17	'17/18	'18/19	'19/20
Residential	8,810	8,860	8,900	8,920	8,940	8,930	8,990	9,070	9,090	9,060
Strata	840	840	850	860	870	870	880	880	870	860
Total	**9,650**	**9,710**	**9,760**	**9,780**	**9,820**	**9,800**	**9,860**	**9,950**	**9,960**	**9,920**

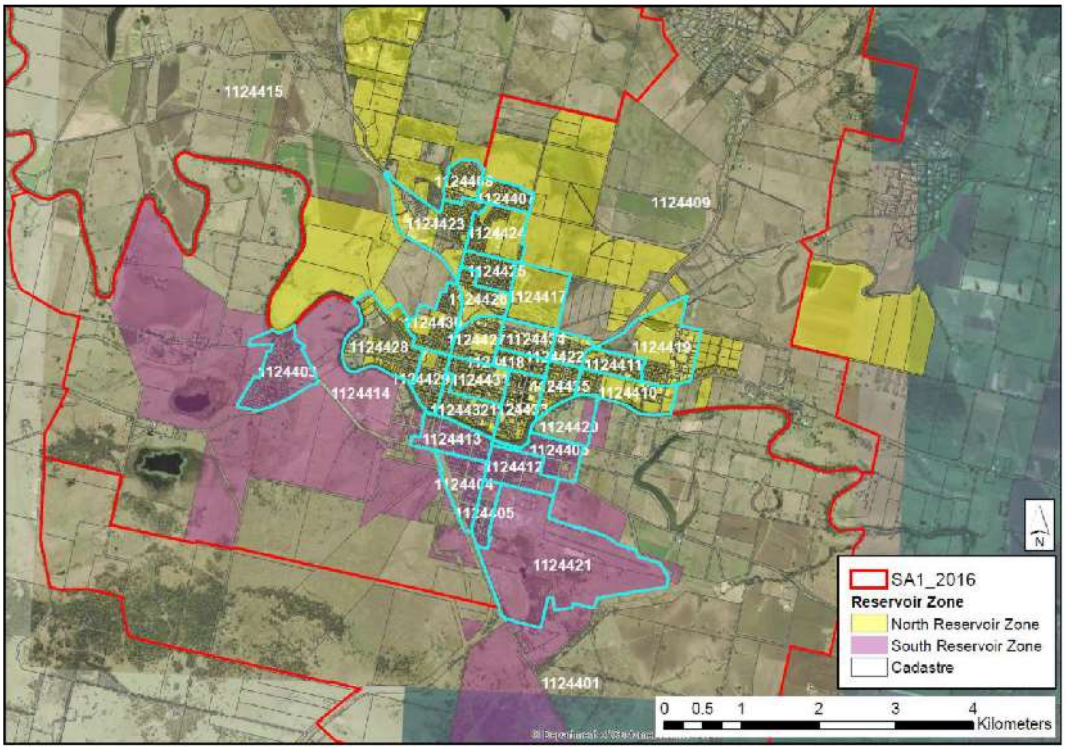
A.3 DPE Projections for Richmond Valley LGA

See Appendix A.3 for DPE's projected population growth rates. DPE growth rates are not included in this Section as DPE projects population based on the LGA, which includes Casino and all other towns within Richmond Valley Council.



Appendix Figure A-2: Richmond Valley LGA ERP vs DPE population projections

Based on the 2019 projections, the population of RVC is expected to grow, up until 2031 to 24,000 before decreasing for the following ten years. This does not show the rate of growth for the town of Casino.



Appendix Figure A-1: ABS 2016 SA1 boundaries

The SA1 areas used to calculate the dwellings and population in Table are outlined in teal.

A.2 Calculated from Water Billing Data

The water billing data was used to estimate the number of dwellings and population for Casino water supply service area.

The number of occupied separate house dwellings connected to water was estimated to be approximately the same as the number of "active" residential assessments, i.e. those that had an average usage of at least 60 L/day in a billing period. The number of occupied semi-detached row or terrace house, townhouses, flats or apartments cannot be estimated from the billing data because multiple dwellings may be counted under a single 'strata' assessment.

The historical number of active and inactive assessments with the user classes "residential" or "strata" in Council's water billing data is given in Appendix Table A-3.

Appendix Table A-3: Historical residential and strata assessments in Casino

	2010/11	'11/12	'12/13	'13/14	'14/15	'15/16	'16/17	'17/18	'18/19	'19/20
Residential assessments										
Active	3,490	3,510	3,530	3,530	3,540	3,540	3,560	3,600	3,600	3,590
Inactive	120	100	100	100	110	110	100	110	110	130
Total	**3,610**	**3,620**	**3,630**	**3,640**	**3,650**	**3,650**	**3,660**	**3,710**	**3,720**	**3,720**
Strata assessments										
Active	186	187	189	190	194	194	194	194	193	190
Inactive	2	5	6	5	1	3	3	2	4	6
Total	**188**	**192**	**195**	**195**	**195**	**196**	**197**	**196**	**197**	**196**

A.4 Projections for Stage 3 growth

As previously mentioned, Council does not currently know which of the *Gays Hill*, *Fairy Hill* or *North Casino* development areas will be developed first. The location of the development will impact on the demand on either the north or south reservoir zone. Therefore, two options are considered – one where Fairy Hill and/or North Casino develop first, and another where Gays Hill is developed first. This only impacts the projection after around 2040. The projections are shown in Appendix Table A-5

Appendix Table A-5: Occupied dwelling projections for Casino WSS in north or south of Casino, depending on location of Stage 3 development

	2020	2025	2030	2035	2040	2045	2050
Projection based on Stage 3 Option 1 – Fairy Hill / North Casino Development							
North of river	2,606	2,639	2,738	2,839	2,944	3,051	3,160
South of river	986	1,052	1,055	1,057	1,060	1,063	1,065
Total	**3,591**	**3,691**	**3,792**	**3,897**	**4,004**	**4,113**	**4,226**
Projection based on Stage 3 Option 2 – Gays Hill Development							
North of river	2,606	2,639	2,738	2,839	2,937	2,945	2,953
South of river	986	1,052	1,055	1,057	1,067	1,168	1,272
Total	**3,591**	**3,691**	**3,792**	**3,897**	**4,004**	**4,113**	**4,226**

* Note that this table does not include strata assessments. Assumed no growth in strata user class.

Appendix B Water Demand Analysis

B.1 Water losses

Annual water losses in Casino WSS

Yearly summary	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
Total production (ML)	1727	2102	2127	2251	2453	2110	2203	2110	2340	2180
Total demand (ML)	1551	1902	1919	2093	2239	1883	1968	1947	2052	1972
NRW (ML)	176	199	209	158	214	227	236	163	288	207
NRW (% production)	10.2%	9.5%	9.8%	7.0%	8.7%	10.7%	10.7%	7.7%	12.3%	9.5%
No. of connections	3609	3617	3629	3639	3650	3652	3663	3705	3717	3719
NRW (L/conn/day)	173.9	149.4	159.7	122.7	154.2	174.3	176.7	118.5	210.4	152.8
Total Connection		4202	4218	4224	4234	4239	4255	4299	4316	4316
NRW (L/conn/day) Including non-res		128.6	137.4	105.7	132.9	150.2	152.1	102.1	181.2	131.7

Apparent losses and Unbilled authorised consumption

Unbilled authorised consumption was estimated as 0.5% of water supplied. Apparent losses are estimated as customer meter under-registration (2% of metered consumption) plus theft (0.1% of water supplied). As recommended by IWA.

Estimation of unavoidable real losses

The unavoidable real losses from mains and service connections were estimated using equations from the International Water Association (IWA) paper titled 'A Review of Performance Indicators for Real Losses from Water Supply Systems' [12], re-published in 2020. The equation considers length of mains, number of connections and average system pressure. The approximation is:

$$UARL = (18 * Lm + 0.8 * Ns) * P$$

Where:

UARL = Unavoidable annual real losses (L/d)

Lm = Length of mains

Ns = No. of service connections

P = Average operating pressure at average zone point (meters)

The length of mains and number of service connections were obtained from GIS data and the Billing data respectively. Average operating pressure was assumed to be 30m.

The UARL for Casino is calculated to be around 113 ML/year.

Infrastructure leakage index (ILI)

The infrastructure leakage index (ILI) is an indicator of how effectively real losses in the distribution system are being managed at the current operating pressures. It is the preferred indicator for state and national comparisons (metric benchmarking), and has been adopted by the International Water Association as the preferred indicator for international comparisons (National Water Commission, 2014)

Based on the water balance in Section 3.3.3, Casino WSS has an infrastructure leakage index (ILI: current annual real losses / unavoidable real losses) of 2.5 in an average year. This puts Casino WSS in the second highest (best) Leakage Performance Category according to IWA.

B.2 Water demand analysis

A water demand analysis is undertaken to calculate the unit demands, estimate the non-revenue water and forecast the following demands:

- Average (rainfall) year demands – for revenue planning

- Dry year demands – to assess drought security
- Peak day demands – to assess system reliability.

The analysis uses the water production data (that is the water delivered into the system), and the customer billing data (metered consumption by users in the system).

Peak usage analysis is first undertaken to understand water usage patterns during periods of peak usage.

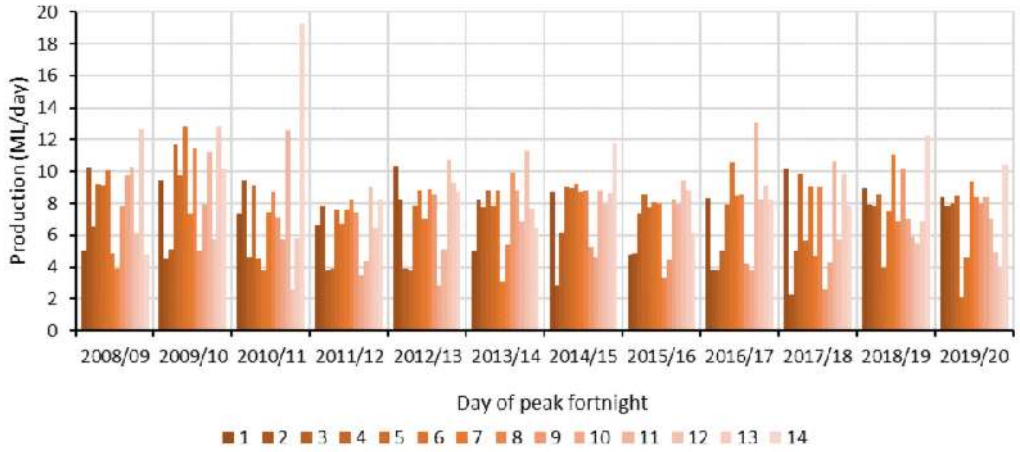
Trend correction of historical WTP production and customer usage patterns is then undertaken to understand the impact of various factors/trends (demographic, climatic, economic etc.) on the variability of town water demand. The results are then used to estimate the above demands, which are used as a starting point for projections. The 30-year forecasts based on the nominated growth, are used to identify the issues in meeting the adopted water supply security, and reliability objectives of the urban water supply system.

B.2.1 Peak usage analysis

Weather patterns in summer that result in prolonged periods of high demand can stress systems more than a large but isolated peak day demand. Historical daily production data is analysed to understand water usage patterns during these periods of peak usage.

The first aim of the analysis is to obtain a ratio of the peak day to the average day in the peak week, which is used to estimate peak day demands from the production model hindcast. The second aim is to obtain a demand "persistence pattern" during the peak period, which can be used to estimate whether the existing reservoirs and WTP capacity can supply demand during the peak period. The persistence pattern can also be used in simulating a peak demand period in a hydraulic model simulation.

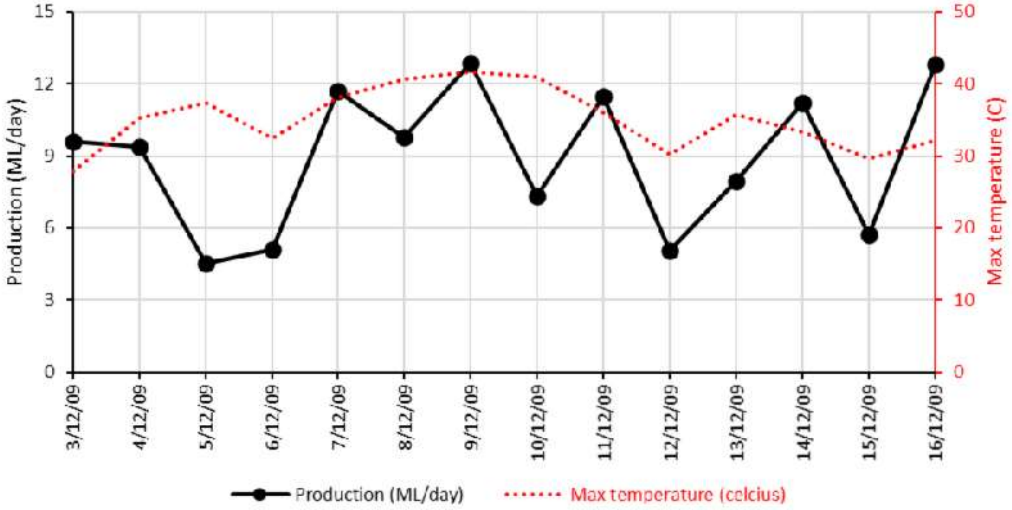
Daily WTP production data was used for peak usage analysis. The historical peak fortnight pattern for 2008 to 2020 are shown in Appendix Figure B-1.



Appendix Figure B-1: Peak fortnight production patterns - Casino WSS (2008/09-2019/20)

From the available data, the highest production was 19.3 ML/day, which occurred on 29 November 2010. However, this high production day has been ruled as an operational reason, as it occurred on a Monday to compensate for the drop in reservoir level over the weekend. The surrounding days also have low production (3 to 5 ML) and low temperatures.

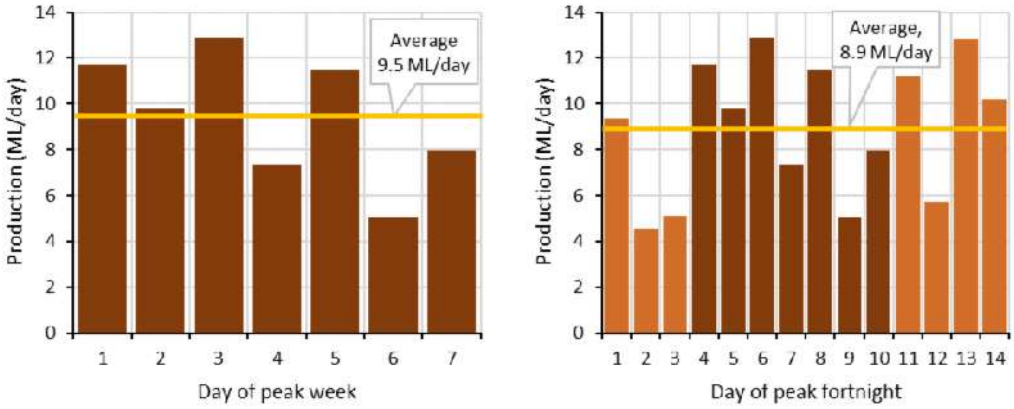
The peak day that appears to be unaffected by operational reasons is likely on Wednesday 9 December 2009, where the production was 12.86 ML. The production values surrounding this date are consistently high, with very little rain (total 1.4 mm) and maximum temperatures ranging from 30 to 41°C. See Appendix Figure B-2 for the water production patterns surrounding the peak day.



Appendix Figure B-2: Production and max temperature around the peak day production

The week and fortnight with the highest recorded production also occurred around the same date as the peak day. The week starting 7 December 2009 recorded 66 ML of water produced, and the fortnight starting on 4 December 2009 recorded 125 ML.

The daily production during the peak week, and the peak fortnight is shown in Appendix Figure B-3. The peak fortnight includes the peak week, shown in a darker shade.



Appendix Figure B-3: Peak fortnight and peak week production - Casino WSS

The average daily production for the peak week (ADPW) was 9.5 ML, and the average daily production for the peak fortnight was 8.9 ML

B.2.2 Trend correction

Modelling of water production data (that is the water delivered into the system), and the customer billing data (metered consumption by users in the system) is undertaken to understand the impact of various factors/trends (demographic, climatic, economic etc.) on the variability of town water demand.

The factors that were considered were:

- Historical water requirement for grass irrigation (lawns and public open spaces) obtained from PWA's simulated water use model. The model uses location-specific historical rainfall and evaporation data, soil type and grass type
- Historical water requirement for use of evaporative coolers. The model uses location-specific historical maximum temperature data, and a range of trigger temperatures
- Change in number of connections (reflecting population growth)
- Water restrictions
- Demand reduction in response to increase in price (based on the DPE Water Local Water Utility Circular 11 - LWU11)

The aim is to develop a model which, when input with historical factors/trends, will output a production that co-relates well with the actual historic production or customer usage.

The model is then hind-cast over a period of available climatic data of temperature and rainfall to estimate the annual demands if the current conditions of lot size, household size, number of connections, pricing and usage patterns were to prevail. The average year and dry year demand over the 50-year period are then determined and these demands are used as the starting point for the forecasts

Climate correction methodology

For both production and metered consumption, the demand analysis was undertaken by first assessing the climate dependence of the usage pattern for each user category/system.

The accuracy of the model is assessed using a statistical measure called the "coefficient of determination" (R^2). The coefficient of determination indicates the proportion of the variance that is explained by the model, so when R^2 is equal to one, all of the variance is explained, when R^2 is equal to zero, none of the variance is explained, generally for water production models an R^2:

- greater than 0.9 is extremely good
- between 0.7 and 0.9 is good
- between 0.5 and 0.7 is acceptable
- less than 0.5 is poor.

As a model becomes more complex the fit generally becomes better, in order to ensure that the additional factors are statistically significant, the "adjusted coefficient of determination" (R^2_{adj}) is calculated. If after the addition of a new parameter to the model, the R^2_{adj} increases then the new factor is statistically significant.

Results of climate correction of WTP production data

The water production model was developed using WTP production records from 2008/09 to 2019/20. Periods of water restrictions were excluded to estimate the unrestricted production. It was determined that the small increase in assessments in Casino over this period did not significantly impact water usage. The annual increase in price of water was also not significant to have any impact on the demand for water in Casino.

The model shows little correlation between the water production and outdoor lawn irrigation. The "R-squared" (R^2) value (which quantifies the degree of correlation) between the modelled and actual production data is 0.21. Potentially two things can explain this. Firstly, Casino is situated in a sub-tropical region where it receives plenty of rain even in summer, meaning that irrigation of lawn is not as significant a portion of customer demand compared to drier areas of NSW. Secondly, NCMC, a meat process industry uses almost half of the water in Casino, and its water use is dependent on market factors, not the weather. As a result, the overall water production in Casino is **not** significantly climate dependent.

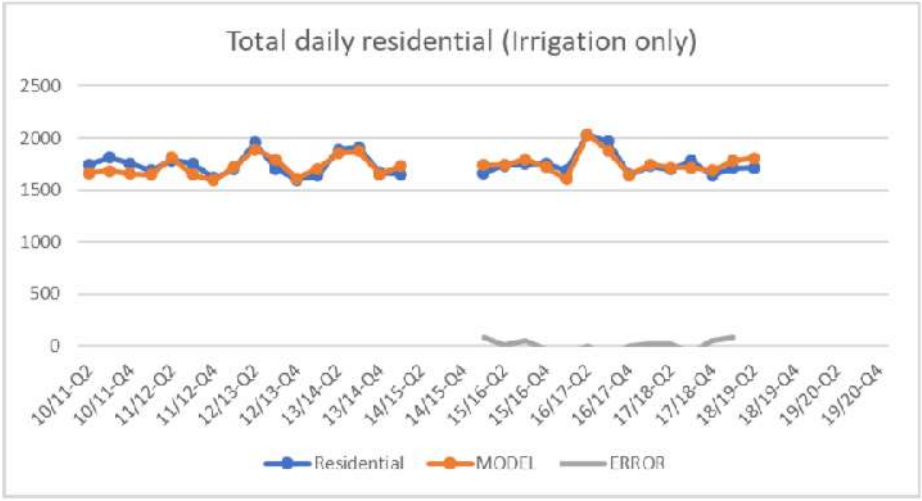
Results of climate correction of customer usage data

All customers excluding NCMC

The model was trained over a period of no water restrictions – June 2015 to September 2018. This model included the historical usage peak which occurred in the second quarter of 2016/17

The modelling showed that the outdoor lawn irrigation was the most significant contributors to the water consumption patterns for the 'Residential' user class, and for 'total Casino consumption excluding NCMC'. The small increase in number of assessments in Casino and the water price increase over the period were determined to not have a significant effect on water consumption patterns. Evaporative coolers were not considered as they are not commonly used in Casino.

Residential users had consumption patterns that were significantly climate dependent, with an R^2 of 0.78 fitted to the modelled historical irrigation demand. The following figure shows the historical residential consumption fitted to the irrigation demand model.



Appendix Figure B-4: Casino 'Residential' class modelled with irrigation model - R^2 = 0.78

Training the model over the post-restriction period provides a more updated model, as customer behaviour may have changed after the water restrictions (e.g. customers may be more aware about reducing consumption). Comparing the two periods, the model suggests that consumption pattern has decreased slightly after restriction was enforced in 2014/15.

As the starting points for the forecasts:

a) the average year demand was calculated using the average modelled historical yearly irrigation demand

b) the unrestricted future year demand was calculated using the 99th percentile (1 in 100 year) modelled historical yearly irrigation demand

c) the peak day demand was calculated using the average day irrigation demand from the highest modelled historical weekly irrigation demand and a peak day to average day peak week (ADPW) ratio of 1.52 (derived from the PD/AD ratio of 2.19 taken from the 'Casino Water Model Build', by MWH [13])

NCMC customer

NCMC did not have significantly climate dependent demand. The average and maximum year from the billing data was selected as the starting points for the forecasts.

NCMC peak day consumption is calculated by subtracting the peak day usage of all other customers from and 10% NRW (see Section 3.3.3) from the peak day production of 12.9 ML. Council has confirmed that a peak day consumption of around 5 ML/day for NCMC is a reasonable estimate.

Combined customer usage results

The combined results which are used as the starting point for the forecasts are given in Appendix Table B-1.

Appendix Table B-1: Estimated customer usage for starting point of forecasts

	Average year demand (ML/year)	Unrestricted future year demand (ML/year)	Average day demand (kL/day)	Peak Day Demand (kL/day)
North of Richmond River reservoir zone				
Residential	454	480	1,243	2,624
Non-residential	280	299	766	1728
Vacant/Council	3	5	9	13
Strata	62	66	170	385
NCMC	955	1,177	2,616	5,249
Fire Service	1	1	1	3
North Res Total consumption	**1,755**	**2,027**	**4,805**	**10,002**
South of Richmond River reservoir zone				
Residential	181	192	496	1,080
Non-residential	52	54	141	362
Vacant/Council	0	0	0	0
Strata	16	17	43	90
NCMC	0	0	0	0
Fire Service	6	9	17	37
South Res Total consumption	**255**	**272**	**697**	**1,569**
Total Casino WSS (both North and South of Richmond River)				
Residential	635	672	1,739	3,704
Non-residential	331	353	908	2091
Vacant/Council	3	5	9	13
Strata	78	82	213	475
NCMC	955	1,177	2,616	5,249
Fire Service	7	9	18	40
Total Casino consumption	**2,010**	**2,298**	**5,503**	**11,572**

B.3 Production and Extraction estimate

Appendix Table B-2 shows the estimated WTP production and Jabour Weir extraction for starting point of forecasts. The estimated average year and unrestricted future year demands are from Appendix Table B-1, the WTP production is calculated assuming 10% water losses as calculated in the water balance in Section 3.3.3, and the extraction is calculated assuming 4% of water extracted is lost across the WTP process (such as for filter backwashing).

Appendix Table B-2: Estimated WTP production and Jabour Weir extraction for starting point of forecasts

	Average year (ML/year)	Unrestricted future year (ML/year)	Average day (kL/day)
Residential	635	672	1,739
Non-residential	331	353	908
Vacant/Council	3	5	9
Strata	78	82	213
NCMC	955	1,177	2,616
Fire Service	7	9	18
Total Casino consumption	**2,010**	**2,298**	**5,503**
Water Losses (10%)	223	255	611
WTP Production	**2,233**	**2,554**	**6,114**
Jabour Weir Extraction	**2,322**	**2,656**	**6,357**

B.4 Effect of Climate Change

To assess likely future water demands that result from climate change, 15 different Global Climate Models (GCMs) based on 1°C climate warming were used in PWA's simulated water use model. DPE Water provided the dataset which is from the NSW and ACT Regional Climate (NARClim) Model.

The historical water requirements for grass irrigation were calculated using PWA's simulated water use model for each of the GCMs as well as the historical data set. The results were then input to the 'Total excluding NCMC' group as that was climate dependent. As NCMC's water consumption pattern is climate independent, it has been assumed that its average and dry year consumption is unaffected under the 1°C warming scenario.

The model estimates the following changes in production for the Casino WSS Production for 1°C climate warming:

- Average year production will increase by 1.2% to **2,260 ML/year**
- 99th percentile unrestricted future year production will increase by 1.1% to **2,581 ML/year**

The impact of climate change on peak day production is an increase in the frequency of peak weeks by up to 2.4 times.

The Casino WSS water demand 30-year projections with 1°C climate warming are summarized in Appendix Table B-3.

Appendix Table B-3: Scheme level water supply projections with 1°C climate warming

	2020	2025	2030	2035	2040	2045	2050
Unrestricted Future Year Extraction from Jabour Weir – historic climate (ML/year)	2,660	2,680	2,710	2,740	2,770	2,800	2,840

	2020	2025	2030	2035	2040	2045	2050
Unrestricted Future Year Extraction from Jabour Weir – 1°C warming (ML/year)	2,680	2,710	2,740	2,770	2,800	2,830	2,870

B.5 Reservoir zone level water demand projection

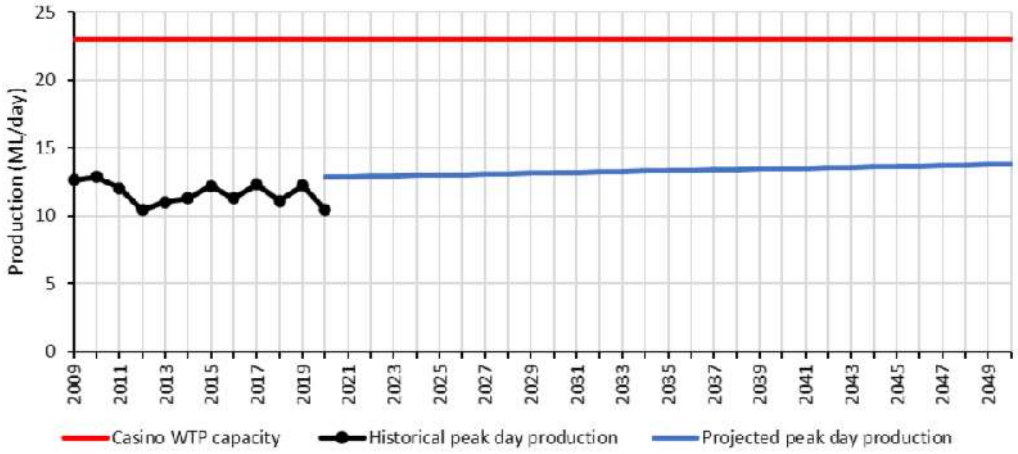
The water demand projection was also completed for reservoir zone level, based on the development zones options discussed in Section 2.2. The average day and peak day demand for each zone are shown in Appendix Table B-4.

Appendix Table B-4: Reservoir zone level projection

		2020	2025	2030	2035	2040	2045	2050
Projection based on Option 1 - Fairy Hill / North Casino Development								
Average day demand (kL/day)	North Reservoir	4,805	4,837	4,895	4,955	5,016	5,078	5,142
	South Reservoir	697	726	731	736	741	746	751
	Total	**5,503**	**5,564**	**5,626**	**5,691**	**5,757**	**5,824**	**5,894**
Peak day demand (kL/day)	North Reservoir	10,002	10,072	10,198	10,326	10,458	10,593	10,731
	South Reservoir	1,569	1,634	1,646	1,658	1,670	1,683	1,696
	Total	**11,571**	**11,707**	**11,844**	**11,984**	**12,128**	**12,276**	**12,427**
Projection based on Option 2 - Gays Hill Development								
Average day demand (kL/day)	North Reservoir	4,805	4,837	4,895	4,955	5,013	5,037	5,063
	South Reservoir	697	726	731	736	744	787	831
	Total	**5,503**	**5,564**	**5,626**	**5,691**	**5,757**	**5,824**	**5,894**
Peak day demand (kL/day)	North Reservoir	10,002	10,072	10,198	10,326	10,452	10,507	10,563
	South Reservoir	1,569	1,634	1,646	1,658	1,676	1,772	1,870
	Total	**11,571**	**11,707**	**11,844**	**11,984**	**12,128**	**12,278**	**12,432**

B.6 System capacity assessment

The Casino WTP has a capacity of 23 ML/day. The projected peak day production from the Casino scheme compared to the headworks capacity is shown in Appendix Figure B-5. All peak production days caused by operational issues were removed.



Appendix Figure B-5: Forecast peak day production – Casino Water Supply Scheme

The capacity of the Casino WTP is not expected to be exceeded in the 30-year planning horizon.

Appendix C Operational Performance of Casino WTP

In 2021 Council and NSW Health engaged City Water Technologies (CWT) to conduct a process assessment of the Casino WTP to identify process issues and opportunities for improvement.

The operational issues that were flagged at the outset of this project (April 2020) included:

WTP performance concerns:

- Ongoing customer complaints about water quality appearance and taste/ smell;
- Periodic challenges in achieving stable chlorine residuals at the town reservoir;
- Filter media loss from filters, raising the risk of potential particle/ pathogen breakthrough

Contaminants of particular interest:

- Manganese and iron;
- Organics, including blue-green algal toxins and taste and odour compounds;
- Pathogens, particularly chlorine resistant pathogens (i.e. Cryptosporidium);

Operational issues:

- PAC dosing system issues (blockages and overflows);
- Interaction between PAC and potassium permanganate due to insufficient lag time between dosing points;
- Manual handling requirements for existing chemical systems, particularly for the soda ash system;
- Limitations of automation of the raw water pump station and WTP systems.

The report is currently not finalised. The latest version [5] identified many issues, and Council have advised that they have been working to rectify most of these issues. Council has advised that the filters have been completely refurbished and four filter actuator valves have been removed which were no longer operating efficiently.

The issues and recommendations from the July 2021 report can be found in Appendix XX. The high priority recommendations are given below:

General recommendations:

- Check that bypass valves for contact filtration mode and plant bypass are not leaking and cannot be opened inadvertently
- Limit WTP flow rate to 230 L/s as a maximum plant rate where possible to ensure reasonable sedimentation and filtration loading rates
- Where water is used by consumers off the rising main, prior to full disinfection contact time in the North Reservoir, use notification and manage the risks until a new pipeline from the reservoirs is completed in August 2022.

Monitoring recommendations

- Undertake monthly sampling and analysis for THMs in the North Reservoir and points within the reticulation (as well as current sampling in the finished water) to provide confirmation that THM levels remain low within the reticulation

Process operation recommendations

- Carry out backwashing while the plant is off where this is practical to minimise filtration rates and flow changes seen in the filters

- Replace/repair problematic filter valves as soon as possible to assist with stable filter operation
- Investigate filter headloss trends and use other information to determine whether even and stable flow distribution between the four filters is being achieved
- Correct issues leading to filter turbidity spikes and breakthrough as soon as possible, with the following approaches:
  - Detailed investigation into the individual filter online trends to analyse breakthrough spikes and ripening times and confirm the required improvements to flow distribution/ control through individual filters;
  - Check whether the post-filtration soda ash dosing affects the turbidity measurements;
  - Depending on further findings, consider measures such as lower filtration rates and/or filter aid polymer dosing.
  - Monitor the condition of the filter media every 6 months, using the detailed filter inspection SOP developed as part of the filter upgrades.

Chemical systems recommendations

- Continue with PAC chemical system improvements:
  - New system of larger capacity and better design
  - Upgraded unloading system to improve the system's operability

Potential WTP upgrade recommendations

- Investigate additional process barriers such as UV disinfection to achieve HBT target protozoa removal

Appendix D Assumptions for cost estimates of options

D.1 Water efficient appliances/fittings program

If all residential water fixtures in Casino were upgraded to 4-Star WELS water fixtures, the estimated water savings is 63 L/person/day, which totals 209 ML. However, a 100% participation rate is unlikely. Fitzgerald (2019) [14] conducted a survey to determine the participation rate of the Victorian Showerhead Exchange Program. In the survey, out of the 1,693 respondents, 46.8% participated in the program.

Based on the survey, a participation rate of 50% was assumed for the showerhead exchange option, and 20% participation rate for washing machine rebate and whole house retrofit. The water savings are summarised in Appendix Table D-1. The potential savings are calculated using the estimated internal residential demand of 583 ML/year for Casino WSS, which was estimated by the water demand analysis of customer usage data.

Appendix Table D-1: Potential water use reduction from water efficient appliances/fittings program

	% participation	Potential yearly savings (ML/year)	
		2020	2050
Showerhead exchange program	50%	41	48
Washing machine rebate	20%	17	20
Whole house retrofit	20%	42	49
	50%	105	123

If 50% of houses take up the whole house retrofit the demand reduction of 123 ML/year. This is only one quarter of the 514 ML/year secure yield shortfall volume.

Cost estimate

As this is a rebate, the cost of the lawn water efficient appliances/fittings program is entirely up to Council, with a higher rebate naturally expected to lead to greater uptake.

To estimate the cost, the following costs are nominated:

- $100 rebate on shower heads, assuming Council provides a 50% rebate. The median price of 4.5 Star WELS showerhead is around $200.
- $150 rebate for upgrading to water efficient washing machines (4 stars or more) based on Eurobodalla Shire Council's 'Water saving incentive scheme'
- $650 rebate for a whole house retrofit - $200 for upgrade to dual flush toilet based on Eurobodalla Shire Council's 'Water saving incentive scheme', $150 for washing machine rebate, $200 for showerhead exchange, and $100 for taps.

The cost estimate for water efficient appliances/fittings program is provided in Appendix Table D-2.

Appendix Table D-2: Cost estimate for water efficient appliances/fittings program

	% participation	Cost to Council ($'000)	
		2020	2050 *
Showerhead exchange program	50%	$180	$190
Washing machine rebate	20%	$110	$115
Whole house retrofit	20%	$465	$500
	50%	$1,170	$1,250

* Assuming Council continues to provide rebates to new dwellings that use 4 Star Wels fixtures. Future costs of rebates were discounted back to 2020 at a discount rate of 7%.

D.2 Lawn buy-back program

Assuming a 20% participation rate for the lawn buyback program, and 75% reduction in external water demand for lawn buyback participants, 13.5 ML of water can be saved which would extend to 15.9 ML in 2051. Higher participation rate could be encouraged by offering higher rebates.

The water savings of 13.5 ML/year is only around 3% of the 514 ML/year secure yield shortfall volume.

Cost estimate

As this is a rebate, the cost of the lawn buy-back is entirely up to Council, with a higher rebate naturally expected to lead to greater uptake.

A lawn buy-back by the Metropolitan Water District of Southern California offered a rebate of $1 USD per square foot [15], which is equivalent to around $28 AUD per square meter. Using a rate of $20 per square meter of lawn removed, the lawn buyback program would cost Council $430,000. If Council continues to provide this program for future new dwellings, then the 30-year discounted cost to Council would be $462,000 (also assuming 20% of new dwellings will participate in this program).

Appendix E Recycled water scheme

Public open spaces considered for effluent reuse in RVC Water and Sewer Strategic Plan 2018 are Albert Park, Queen Elizabeth Park and Crawford Square (Casino skate park). The Casino Racecourse/Showground was also considered for effluent reuse as there is significant potable water use there.

The highest year for irrigation of these POS was in 2018/19, when they used a combined 33 ML of potable water. In an average year these POS use around 20 ML of potable water. This could be saved by implementing an effluent reuse scheme.

E.1 Effluent treatment requirements

To obtain Section 60 approval for the extended effluent reuse scheme, the treatment and non-treatment barriers of the effluent reuse scheme will have to achieve the minimum log reduction value (LRV) targets for irrigation of POS from the NSW Guideline for Recycled Water Management Systems [8].

PWA nominated an LRV for each process based on the LRV range from the Guideline. The achieved LRVs with and without non-treatment barriers are shown in Appendix Table E-1. Non-treatment barriers can be difficult to enforce for POS, as access by the public cannot always be prevented.

Appendix Table E-1: Casino STP log reduction values from current treatment process and targets for irrigation of public open spaces

	Protozoa		Virus		Bacteria	
Barrier	LRV range	Nominated LRV	LRV range	Nominated LRV	LRV range	Nominated LRV
Indicative LRV for current treatment processes						
Primary treatment	0.0 – 0.5	**0.0**	0.0 – 0.1	**0.0**	0.0 – 0.5	**0.0**
Well-aerated secondary treatment	0.5 – 2.0	**1.0**	0.5 – 2.0	**1.0**	1.0 – 3.0	**1.5**
Lagoon storage	1.0 – 5.0	**2.0**	1.0 – 4.0	**2.0**	1.0 – 3.5	**2.0**
Wetlands – subsurface flow	1.0 – 3.0	**1.0**	n/a	**0.0**	0.5 – 1.0	**0.5**
Total LRV (treatment)		**4.0**		**3.0**		**4.0**
Non-treatment barriers						
No public access during irrigation		2.0		2.0		2.0

	Protozoa		Virus		Bacteria	
End use	Target LRV	Achieved LRV	Target LRV	Achieved LRV	Target LRV	Achieved LRV
LRV Target - Irrigation of public open spaces	3.7		5.2		4.0	
Total LRVs achieved from treatment processes + non-treatment barriers		✔ **6.0**		✗ **5.0**		✔ **6.0**
Total LRVs achieved from treatment processes only		✔ **4.0**		✗ **3.0**		✔ **4.0**

Based on the LRV assessment of the current treatment processes at Casino STP, the minimum LRV target for Virus may not be met, even with non-treatment barriers. To guarantee that the LRV targets for all pathogens are met, Council may have to install chlorination and/or UV disinfection at the STP. Both Chlorination and UV can provide up to 4.0 LRVs for virus and bacteria.

E.2 Effluent distribution system

Peak day demand of the proposed POS for effluent reuse

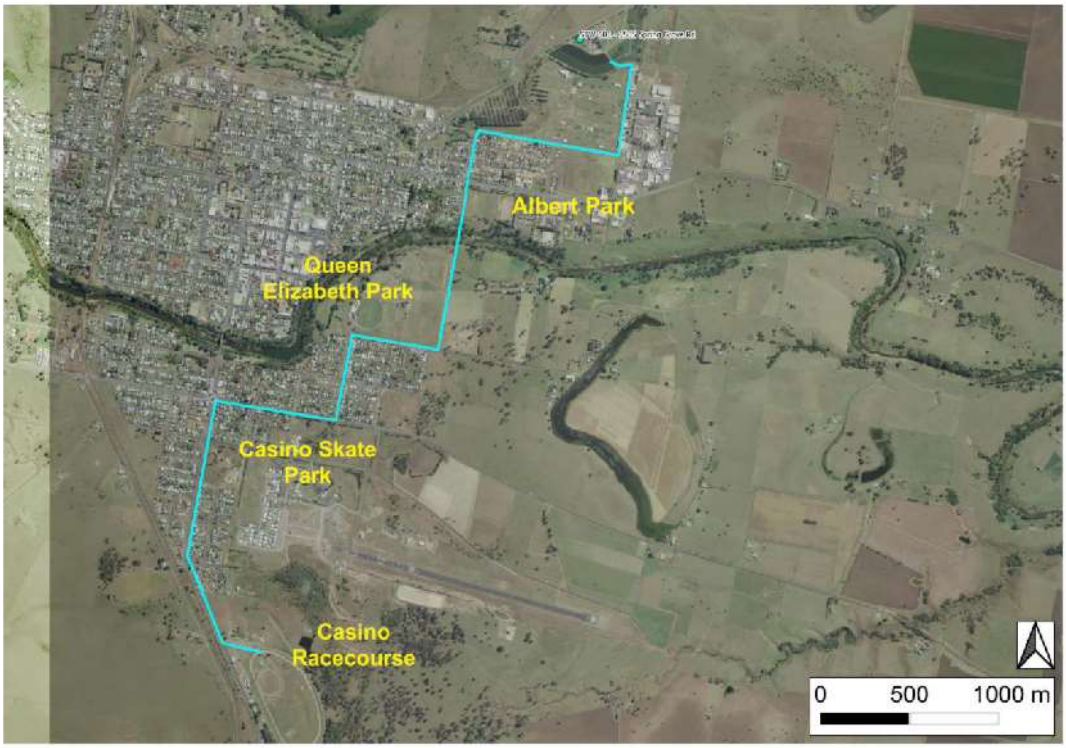
The combined irrigation spaces of the four parks are 21.6 ha. Through the Simulated Water Use Model, it was estimated that the peak day demand (PDD) for the parks are 2.6 ML.

The pipe diameter, pump capacity and reservoir sizing are based on the PDD of 2.6 ML/day.

Preliminary distribution system

A chlorination system can be installed to achieve the LRV target. The treated effluent will be stored in a reservoir to prevent recontamination. The pumps will then deliver treated effluent from the reservoir to the four parks.

A preliminary route for the distribution system to deliver effluent to the listed POS is shown in Appendix Figure E-1.



Appendix Figure E-1: Preliminary route for the distribution system for irrigation of POS

The total length of effluent distribution main required is 6km. The main crosses the Richmond River.

E.3 Cost estimate for reuse system

The cost of implementing the proposed effluent reuse scheme is estimated using the NSW Reference Rates Manual 2014 [16]. The costs were converted to 2020/21 values by the 'Producer

Price Index: Non-residential building construction – NSW', retrieved from Australian Bureau of Statistics website.

Appendix Table E-2: Estimated costing for effluent reuse scheme

Cost component	Units	Estimated cost 2021 ($'000)
Chlorinator	1 unit	$60
Distribution [1]	5650 meters	$1,150
River crossing	350 meters drilling	$240
Difficulty of construction [2]	3500 meters	$310
Pump	2 units: duty/backup	$190
Effluent storage [3]	5ML Steel reservoir	$1,360
	Total	$3,300
	20% Contingency	$660
	Estimated total capital cost	$3,960

[1] – Pipe was sized based on a flow velocity of 1 m/s. Pipe diameter of 200mm was selected
[2] – additional cost was added for some segments along the reuse main, as these segments are along suburban sites (including residential roads).
[3] – The reservoir was selected to accommodate two days' worth of peak day demand

The estimated total capital cost for upgrading the effluent reuse system is around **$4 million**

Appendix F Review of Regional Demand Management Plan (RDMP) Actions

The seven proposed actions in Appendix Table F-1 are from Council's Regional Demand Management Plan (RDMP).

Appendix Table F-1: Proposed actions from Regional Demand Management Plan

Action	RDMP Objectives	RDMP Approach	PWA Comment
Action 1: Monitoring, evaluation and reporting	• Ensure timely, accurate and consistent reporting to assist with ongoing RDMP development and evaluation. • Ensure consistency with existing reporting requirements and avoid duplication or additional reporting. • Ongoing information on consumption reported to consumers.	Further development of monitoring and evaluation programs is required to develop greater understanding of the outcomes of demand management programs. There is a need to understand the number of real multi-residential properties in order to better understand the demand of these properties.	Improving quality and quantity of water consumption data will be very beneficial in identifying opportunities for reducing water demand – e.g. identifying major water users, improving water balance to better quantify water loss.
Action 2: Water loss management	• Accurately quantify amount of losses on a quarterly basis. • Detect and repair leaks. • Reduce losses to sustainable levels	Each LWU will develop a water loss management plan (WLMP) including data collection improvements, identification of monitoring zones, flow metering, pressure management, data capture, active leak detection, repairs, operating requirements and capital budget.	This Action is consistent with the Utility demand side options (Section 5.1). This action will act towards lowering Casino's ILI from 2.8 to closer to 1.0.
Action 3: Sustainable water partner program	• Assist businesses and community groups to improve water efficiency and reduce water/sewer bills	This program focuses on the highest water user in the region (non-residential customers with consumption greater than 5 ML/a). This action includes development of water efficiency plan funded by RVC as appropriate for customers using >5 ML/a.	14 of the top 50 customers listed in the RDMP Appendix F are in Casino, with the NCMC Abattoir being the highest water user. This Action is consistent with the non-residential demand side options (Section 5.3).
Action 4: Smart metering	• Investigate implementation of new technology for identifying leaks and monitoring consumption	With developments in smart water metering technology, new opportunities have arisen to achieve water savings through better understanding of real-time water consumption. It is necessary to consider the approach that will best suit the individual needs of the councils and the overall requirements of the region to deliver business value and effective demand management.	The Action will achieve many of the same benefits of Action 1. It will also allow for customers to better monitor their own water use, potentially leading to detection of leaks on customer side, and driving individual water efficiency. This action will determine the business case for

Action	RDMP Objectives	RDMP Approach	PWA Comment
			scope and extent of a smart metering program.
Action 5: Recycled water	• Develop cost-effective opportunities for replacement of potable water use with treated sewage effluent. • Encourage the use of recycled water to supplement potable water supplies	There is a need to consider opportunities for existing customers to connect to the existing schemes and for expansion of the schemes to target additional customers. The approach impacts Ballina and Byron Shire Councils.	There is not an existing recycled water scheme in Casino, so the approach of this Action is not targeted at Casino. The Source substitution demand side options (Section 5.4) are consistent with the objectives of this action.
Action 6: Rainwater tank rebates	• Encourage the use of rainwater to supplement potable water supplies. • Increase take up of rainwater tank rebates through training and cost-effective, tailored marketing activities.	A communication and engagement program will be developed with the aim of increasing uptake of the rebate based on the recommendations of the tactical marketing plan. A training and information session, open to all tank suppliers, plumbers and councils in the region will also be implemented to provide training to suppliers and administrators of the rebate.	As rainwater tank rebates have been offered since 2003, it is not considered that much more benefit in reducing water demand in Casino can be obtained from this Action. That is not to say this Action does not have a benefit
Action 7: Community engagement and education	• Provide information to assist households to use water more efficiently. • Improve understanding of household consumption compared to benchmarks and targets. • Provide practical tools that allow consumers to take specific action relevant to their water use activities. • Provide resources to deliver water efficiency messages. • Improved promotion of voluntary permanent water saving measures.	Regional targets for residential consumption per connection and demand per capita are included in this RDMP (refer Section 3.3). Each LWU will adopt local targets that will contribute to the overall regional target. There is a need for consistent marketing and information provided to residential customers across the region. This will include: • Increased used of social media; • Investigation of a centralised webpage for all demand management information; • Development of a regional water supply bill format to increase awareness of household consumption and allow comparison with regional or local benchmarks and targets; and • Regular information/kits to be prepared by RCC and posted by all councils including promotion of Voluntary Water Saving Measures.	This action could drive down residential demands, both internal and external. This action could supplement the residential demand side options (Section 5.2)

Appendix G Jabour Weir Raising and Off-river storage augmentation options

Appendix H Application of Health-Based Targets (HBTS)

The introduction of a microbial Health-Based Target (HBT) in the Australian Drinking Water Guidelines is being considered to determine the tolerably low level of microbial risk for drinking water. The HBT will provide the basis for determining the treatment requirements and will help define the performance standards that apply to treatment processes.

The application of HBTs requires that the source risk to a drinking water supply be assessed and quantified, and depending on the risk, a log-reduction in pathogens by treatment is required. If a system were not to meet the recommended Log Reduction Values (LRVs) then a potential issue would arise.

PWA has developed an HBT Assessment tool which categorised catchments into vulnerability categories. The tool was used to assess the inherent microbial risk from each water source catchment, the performance of the treatment barriers, and the residual microbial risk after treatment.

HBT assessment of threats

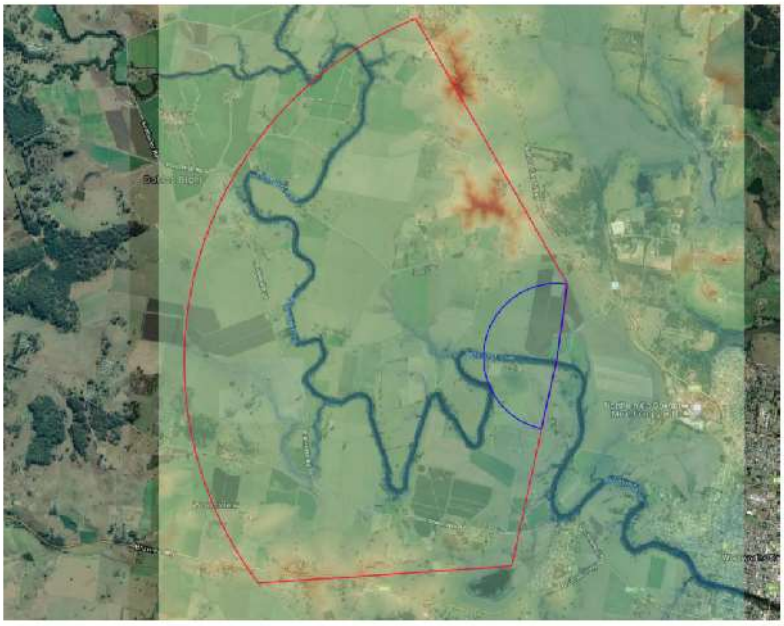
Casino WTP sources its water from only one source, Jabour Weir. Since this water source is a river source, a catchment vulnerability assessment is required.

The assessed is undertaken for an inner catchment and outer catchment:

- Inner catchment – 1 km radius from the extraction point in Casino
- Outer catchment – 5 km radius from the extraction point in Casino

The likelihood of the threat occurring in the outer catchment is considered to be lower than the inner catchment, therefore risk ratings within the outer catchment is reduced.

The aerial view of the catchment of Casino water supply source is shown in Appendix Figure H-1.



Appendix Figure H-1: Inner and outer catchment of Casino raw water source

The threats within the catchment are as follows:

- Contamination by stock – a large proportion (80-90%) of the catchment is grazing land, with moderate slope (around 4%), and high annual rain fall. There is a high risk of animal wastes being introduced into the raw water source.

Based on the assessment, Casino catchment has an **inherent risk of 'High**' for chlorine sensitive and chlorine resistant pathogens. The highest risk comes from livestock.

NSW Health preliminary cryptosporidium risk assessment

Based on NSW Health (letter sent to Council in March 2020), there is a **'High risk'** of cryptosporidium in the raw water source for Casino. NSW Health considered that cryptosporidium may be present from the stock and onsite systems in the catchment. This is consistent with PWA's findings.

NSW Public Works Advisory

Richmond Valley Council

Casino Water Supply Scoping Study

HBT Assessment

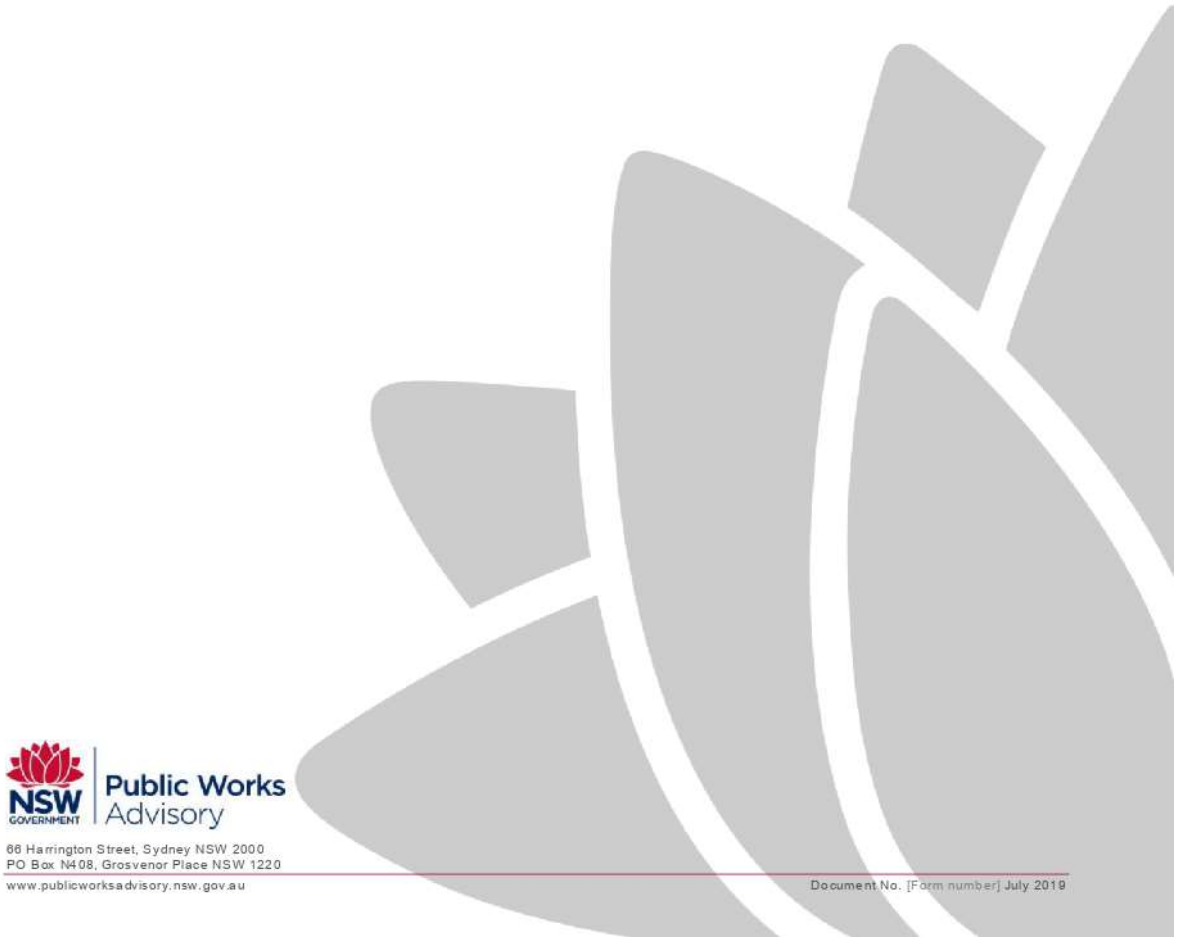
HBT Assessment Tool — Reset Form

Question	Answer		Catchment characteristics	
Catchment Assessment				
Name of water supply	Casino Water Supply Scheme		1.1 Average slope	3.7%
Name of water source	Jabour Weir		1.2 Average annual rainfall (mm)	1091.7
Is this a primary or secondary source	Primary Source		1.3 Area NSW	North Coast
Is the water source groundwater or surface water	Surface Water		1.4 Soil drainage	Imperfectly drained
			1.5 Land use grazing (%)	50%
Surface Water Assessment				
Is extraction from a storage or dam?	No			
Vulnerability Assessment Required?	Yes			

Vulnerability Assessment

Question	Answer - Inner Catchment	Answer - Outer Catchment	Inherent Risk Rating - Inner Catchment	Inherent Risk Rating - Outer Catchment
Definition:	(Area within approximately [illegible] from surface intake [illegible] land that slopes towards water body)	(Area within approximately [illegible] from surface intake [illegible] land that slopes towards water body)		
Urban Areas				
No of properties with septics in catchment	5	25	Low	Low
Sewage				
Are there STPs in catchment	Yes	Yes	Low	Low
[illegible]	No	No	Low	Low
[illegible]	No	No	Low	Low
Are there industrial WWTS in catchment	No	No	Low	Low
Are there landfill type facilities in catchment	No	No	Low	Low
Are there urban stormwater discharges in catchment	No	No	Low	Low
Effluent Reuse				
Any effluent reuse in catchment	No	No		
Stock animals				
Are dairies, feedlots or other intensive farming operations in catchment	No	No	Low	Low
Are there free roaming livestock within catchment	Yes	Yes		
Is number of calves and lambs in catchment known?	No	No	Average [illegible] for North Coast will be used	Average [illegible] for North Coast will be used
% of perennial watercourses fenced off	50% to 90%	50% to 90%		
% of perennial waterways with riparian vegetation	<50%	<50%		
Weighted risk from livestock			High	High
Highest subcatchment rating	High			
Inherent Risk	High			

Note: Extractions from a surface water intake - requires catchment vulnerability assessment



66 Harrington Street, Sydney NSW 2000
PO Box N408, Grosvenor Place NSW 1220
www.publicworksadvisory.nsw.gov.au

Document No. [Form number] July 2019