

## 6.7. WATER SECURITY STRATEGY AND IMPLEMENTATION PLAN

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### RECOMMENDATION

**That Council adopts the Water Security Strategy and Implementation Plan as presented.**

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### EXECUTIVE SUMMARY

The Water Security Strategy and Implementation Plan will be presented for consideration and adoption by Council.

### BACKGROUND

Douglas Shire Council is forecast to exceed its current water extraction licence by 2025-2026.

Currently, extraction is limited by the ability to access sufficient water during the dry season (typically at the height of the tourist season) when demand is greatest. This can result in severe restrictions on water usage.

The Council has been investing in water security in the previous years and has been in planning stages for Mossman River intake.

The Water Security Strategy and Implementation Plan is a strategic document, which can be used to support the Operational Plan.

Water Security Strategy and Implementation Plan identifies:

- Strategic priorities, timeframes and estimated costs for upgrading the region's water supply networks to deliver improved water supply security in the short, medium and long-term; and
- Other options considered a priority from either a compliance and/or an asset maintenance and replacement perspective.

Development of the Water Security Strategy and Implementation Plan is based on providing an appropriate 'Level of Service' for the community in terms of raw water supply source availability and reliability.

Other aspects also considered in developing the Strategy included the cost, likely stakeholder buy-in, operational implications (including water quality), compliance, and asset maintenance, age and replacement.

## COMMENTS

Once adopted by Council, the Water Security and Implementation Plan will be provided as the main supporting documentation with an application to the Department of Regional Development, Manufacturing and Water for a licence to extract additional 2,000 ML per annum of water from the Mossman River, which is a requirement for the Mossman River Intake.

## PROPOSAL

That Council adopts the Water Security Strategy and Implementation Plan as presented.

## FINANCIAL/RESOURCE IMPLICATIONS

The Water Security Strategy and Implementation Plan will show a defined direction that Douglas Shire Council is taking to ensure the community has sufficient drinking water year-round. The document will be used to support business cases and funding requests for future projects.

## RISK MANAGEMENT IMPLICATIONS

As a developed strategy, the implementation of the Water Security Strategy and Implementation Plan clearly defines the actions that this Council must take to ensure the security of drinking water for the community, which will work to reduce the risk of severe water restrictions or no supply of water during the dry season.

## SUSTAINABILITY IMPLICATIONS

- Economic:** Ensuring drinking water availability provides opportunity for sustainable economic growth in the Shire.
- Environmental:** Strategy considers environmental benefits.
- Social:** Strategy ensures the community will have access to sustainable water supply which is essential for the sustainable growth of community.

## CORPORATE/OPERATIONAL PLAN, POLICY REFERENCE

This report has been prepared in accordance with the following:

### Corporate Plan 2019-2024 Initiatives:

#### Theme 3 - Leading Environmental Stewardship

Our visitors and residents deeply value the unparalleled environment in which we live. We recognise our responsibility in protecting and preserving our natural world for generations to come. We understand the strong link between the environment and the economy: they are interdependent. Douglas Shire will be at the forefront of environmental protection by developing strategies, setting policies, and working with all stakeholders to become the envy of and to inspire locations across Australia and the World.

**Goal 3 - We will continue to build water infrastructure so that the Douglas Shire may enjoy water security and water quality.**

### Operational Plan 2023-2024 Actions:

Mossman River intake - Part of the Douglas Shire water security strategy. Progress the intake as a matter of urgency to avoid Rex Creek water licence exceedance by 2025-2026.

### COUNCIL'S ROLE

Council will play a major role implementing the priorities under the Water Security Strategy and Implementation Plan.

The following areas outline where Council has a clear responsibility to act:

**Advocate** Council makes representation on behalf of the community on important issues, funding opportunities, projects and programs. Council will use its influence to seek the best outcomes for the community.

### CONSULTATION

**Internal:** Water and Wastewater Department.  
Project Management Department.  
Council Workshops, this document was workshopped, and changes requested have been incorporated.

**External:** Badu Advisory Pty Ltd.

### COMMUNITY ENGAGEMENT

Nil.

### ATTACHMENTS

1. 2023 09 14 DSC Water Security Strategy and Implementation Plan [6.7.1 - 21 pages]



# WATER SUPPLY SECURITY STRATEGY & IMPLEMENTATION PLAN

13 September 2023



*Engaging, Planning, Partnering*  
*Muruku Kirraji – Eastern Kuku Yalanji*  
*Nganyji pina ngunda-lum ... Ma:lnyjirri-yngku – Yirrganydji*

Image - Mossman River

# Water Supply Security Strategy & Implementation Plan

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## Executive Summary

This Water Supply Security Strategy ('Strategy') set outs the most efficient and effective solutions for meeting the community's basic water needs in the future taking into account population growth and the potential adverse impacts of climate change.

The development of the Strategy has been informed by a Regional Water Supply Security Assessment undertaken in 2018 (by the Queensland Government in partnership with Council) as well as an updated identification and assessment of potential options in early 2023.

This Strategy identifies:

- strategic priorities, timeframes and estimated costs for upgrading the region's water supply networks to deliver improved water supply security in the short, medium and long-term and
- other options considered a priority from either a compliance and/or an asset maintenance and replacement perspective.

Development of the Strategy is based on providing an appropriate 'Level of Service' for the community in terms of raw water supply source availability and reliability. Other aspects also considered in developing the Strategy included the cost, likely stakeholder buy-in, operational implications (including water quality), compliance, and asset maintenance, age and replacement.

The approach undertaken for the Strategy was to:

- Understand the existing raw water supply and associated level of service for each system
- Examine the potential future raw water supply and associated level of service for each system under increased levels of demand under both historical and a dry climate scenarios
- Derive options to address potential shortfalls in current and future water supplies and level of service
- Evaluate options using a multi-criteria analysis and determine the preferred options
- Examine appropriate demand management measures that may provide benefit to the supply system
- Identify an overall water strategy and associated implementation plan.

Hydrologic modelling suggests that, with current demands and water supplies, and under historical climate conditions, water restrictions (i.e. other than Level 0 - Permanent Water Conservation Measures) could be expected to be in place, on average, around 20.6% of the time over the long-term. A dry climate change scenario would potentially increase this to around 42.1% of the time due to reduced creek flows.

In developing the Strategy, Councillors were asked to consider what might be an appropriate desired Level of Service for water supplies in terms of their appetite for implementing water restrictions. It was considered that if the kind of dry climatic conditions experienced in 2019 were to reoccur in the future, then the community would expect steps to have been taken to avoid the need for imposing severe restrictions and harming the region's economy and tourism industry. Eliminating the need for imposing severe (i.e. Level 3 or Level 4) water restrictions in the future was therefore considered to be essential in order to underpin the region's economic growth and ongoing investment by the tourism industry. Occasionally implementing less

severe (Level 2) restrictions was considered acceptable but only providing there was a valid reason for doing so (such as after an extended dry period with no rainfall).

The development of a strategy for ensuring water supplies are sufficient to meet the community's current and future water needs involved:

- a range of demand management initiatives for reducing potable water demands and
- initiatives for increasing water supplies by building new – or augmenting existing – water supply infrastructure such as the second raw water extraction intake in Mossman River.

The report sets out the strategic priorities, timeframes and estimated costs of options for upgrading the region's water supply networks to deliver improved water supply security in the short, medium and long-term (see Table 2). It also presents other options considered a priority primarily from either a compliance and/or an asset maintenance and replacement perspective (see Table 3).

The assessment found the risk of there being insufficient daily flows to supply daily demands (rather than the limitation of the existing Rex Creek licence's annual volumetric limit) is really the key issue imposing an immediate threat to being able to meet the current level of water demands of communities supplied by the Mossman-Port Douglas water reticulation network.

The assessment therefore confirmed the importance of urgently constructing a second raw water extraction site in the Mossman River. This option would achieve the desired Level of Service and eliminate the need for implementing level 3 and level 4 restrictions in response to shortfalls in daily water availability in Rex Creek.

Not augmenting existing water supplies in this way would mean the ongoing growth in future water demands would significantly increase the percentage of time people could expect water restrictions to be in place compared to now. However, augmenting water supplies coupled with ongoing demand management and water saving initiatives would effectively remove the need to impose water restrictions due to water availability constraints in Rex Creek up to at least 2050.

After augmentation of the Mossman River intake, the development of a new simplified water restriction regime would be warranted. This might involve implementing Level 1 and/or Level 2 style water restrictions whenever water supplies need to be pumped from the Mossman River in order to promote heightened community awareness of the need to conserve water and use it efficiently and help reduce operational pumping costs.

Continuing to invest in water savings and demand management initiatives will assist in reducing the daily demand for raw water from Rex Creek and thereby lessen the probability of daily water supply shortfall events occurring. However, these initiatives would not reduce the probability of needing to impose level 3 or level 4 water restrictions during extended dry periods. This is because water restrictions are dependent solely on the daily water levels in Rex Creek which would not be improved by water savings initiatives.

Although not a contributor to delivering the desired level of service per se, investing in water savings initiatives plus demand management education and engagement campaigns are nevertheless considered important in order to:

- in the short-term – help offset the ongoing increase in water usage arising from with the projected population growth during the construction period and
- in the medium to longer-term – maximise the utilisation of water already within the network and minimise the need to extract water from the river.

For the Whyanbeel network, doubling the existing Mossman – Whyanbeel pipeline’s estimated 1 ML/d capacity to 2 ML/day would provide a source that would be well in excess of the projected total 2050 annual demand and be sufficient to respond to even dry periods of very long duration in Little Falls Creek.

In addition, reducing potable demands in the Whyanbeel reticulation network (through either investing in water savings/recycling initiatives and/or more effective demand management in the Whyanbeel network) would enable the current Little Falls Creek water licence to remain sufficient to meet the future water demands of the communities supplied by the Whyanbeel reticulation network out to 2050 and beyond.

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# 1 Introduction

## 1.1 Background

Douglas Shire Council ('Council') is a registered water service provider providing drinking water services to about 15,000 customers.

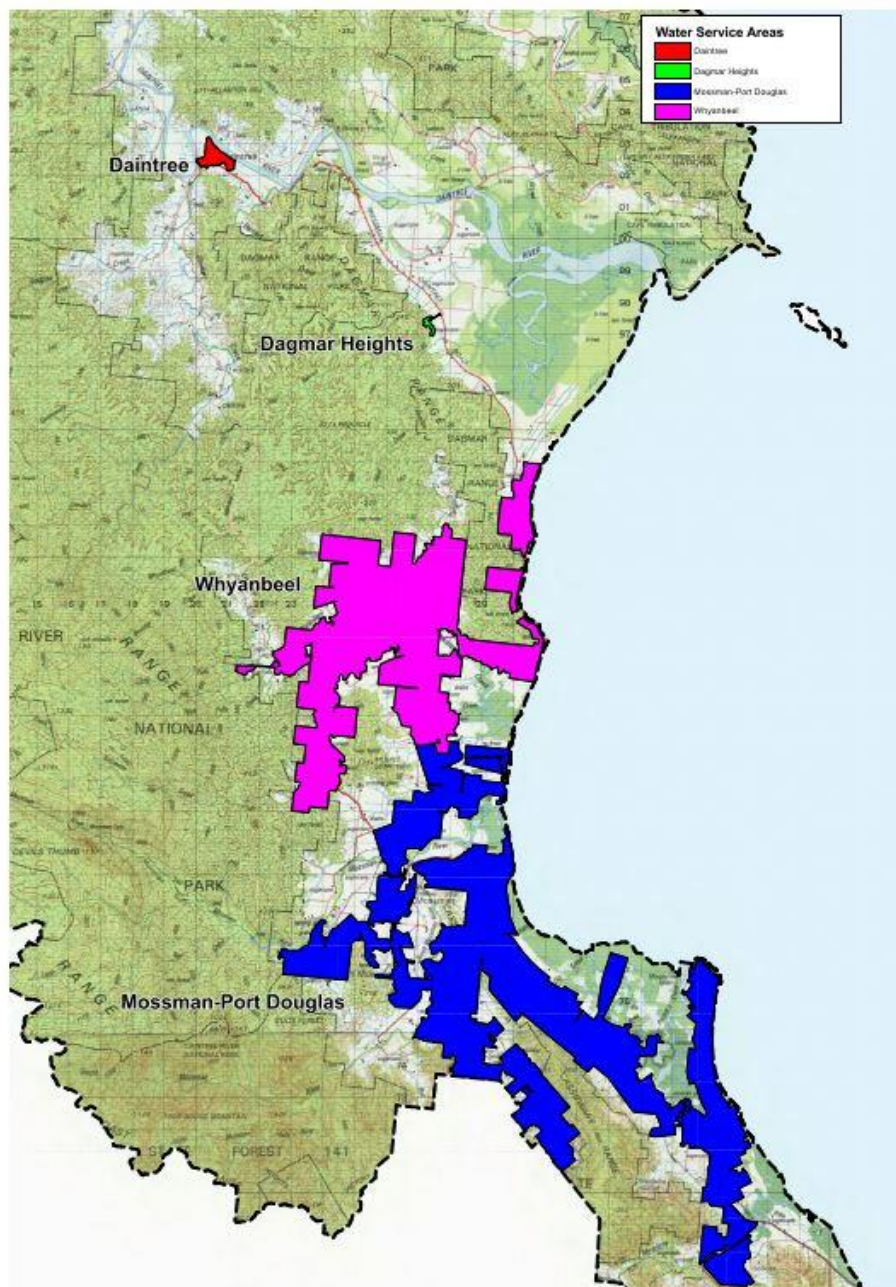
Council operates the following three drinking water supply schemes (as shown in Figure 1):

- Whyanbeel reticulation network
- Mossman-Port Douglas reticulation network and
- Daintree scheme.

Additionally, Council operates one non-potable water scheme:

- Dagmar Heights.

**Figure 1 – Douglas Shire Council water supply schemes**



The drinking water schemes source water from highly protected catchments and then treat it to Australian Drinking Water Guideline standards for supply to the following communities:

- Whyanbeel
- Miallo
- Bamboo
- Rocky Point
- Wonga Beach
- Mossman
- Port Douglas
- Mossman Gorge
- Mowbray
- Newell Beach
- Cooya Beach
- Cassowary
- Craiglie and
- Daintree Village and surrounds.

Council plays an essential role in providing and advocating for infrastructure that contributes to a healthy economic base from which the community and businesses can grow and prosper. Securing long-term water security for the Douglas Shire is considered critical to attract private sector investment and social infrastructure which are directly linked to new jobs and economic growth in the region.

## **1.2 Purpose of this Strategy**

This Water Supply Security Strategy ('Strategy') set outs the most efficient and effective solutions for meeting the community's basic water needs in the future taking into account population growth and the potential adverse impacts of climate change.

The development of the Strategy has been informed by a Regional Water Supply Security Assessment undertaken in 2018 (by the Queensland Government in partnership with Council) as well as an updated identification and assessment of potential options in early 2023.

## **1.3 Scope**

### **1.3.1 In-scope**

This Strategy identifies:

- strategic priorities, timeframes and estimated costs for upgrading the region's water supply networks to deliver improved water supply security in the short, medium and long-term and
- other options considered a priority primarily from either a compliance and/or an asset maintenance and replacement perspective.

### **1.3.2 Out of scope**

Consideration of Council's financial and/or funding strategy is out of scope of this Strategy.

## 2 Approach

### 2.1.1 Timeframe

The Strategy has been developed considering supply needs from now (2023) out to 2050.

### 2.1.2 Level of Service Framework

Development of the Strategy is based on providing an appropriate 'Level of Service' for the community in terms of raw water supply source availability and reliability. Level of service (LOS) objectives are targets for providing long-term water supply security for the community and to ensure there is sufficient reliable water to meet the needs of the community, businesses and industry. LOS objectives take into account expected water demands and the frequency, severity and duration of water restrictions<sup>1</sup>.

### 2.1.3 Other Aspects Considered in Strategy Development

The development of the Strategy also considers other aspects including the cost, likely stakeholder buy-in, operational implications (including water quality), compliance, and asset maintenance, age and replacement.

These are described in Table 1.

**Table 1 – Aspects considered in the development of the Strategy**

Aspect	Remarks
Water availability	Considers the annual and daily volume of water supplies available to the system including from both raw water and recycled water supply sources.
Cost	Considers the estimated capital cost per additional estimated annual and daily volumes of potable water supply that would be made available to the system by each option.
Stakeholder buy-in	Considers the likely stakeholder acceptance of each option.
Operational implications and best practice	Considers the extent to which each option represents operational best practice for water supply schemes of the scale managed by Council. Also considers potential impediments to ensuring water quality within the system continues to meet latest health based water quality standards.
Compliance	Considers the extent to which each option is driven by, and addresses, current or potential compliance issues including, for example, adequacy of water supply for fire-fighting purposes, occupational health and safety hazards etc.
Asset condition	Considers the extent to which each option is driven by, and addresses, asset maintenance, life and replacement requirements

<sup>1</sup> Water security level of service objectives: Guidelines for development, Department of Natural Resources, Mines and Energy, State of Queensland, April 2018.

### 2.1.4 Methodology

The approach undertaken for the Strategy was to:

- Understand the existing raw water supply and associated level of service for each system
- Examine the potential future raw water supply and associated level of service for each system under increased levels of demand under both historical and a dry climate scenarios
- Derive options to address potential shortfalls in current and future water supplies and level of service
- Evaluate options using a multi-criteria analysis and determine the preferred options
- Examine appropriate demand management measures that may provide benefit to the supply system
- Identify an overall water strategy and associated implementation plan.

### 2.1.5 Population and Demand Projections

Total population receiving water services in Douglas Shire is estimated 15,874 with most residents (14,055) living within the Mossman/Port Douglas water supply network. Port Douglas is the tourist gateway to the region and supports a majority of the estimated 426,000 overnight visitors each year, along with an estimated 262,000 day visitors who come to experience the World Heritage Listed Daintree Rainforest and Great Barrier Reef.

In 2018, the Queensland Government partnered with Council to investigate and establish a shared understanding of the existing security of the communities' water supplies and the capacity of the supplies to support future growth. This partnership produced a Regional Water Supply Security Assessment (RWSSA) report which provided valuable information about the water supply security and a foundation for future water supply planning for these communities.

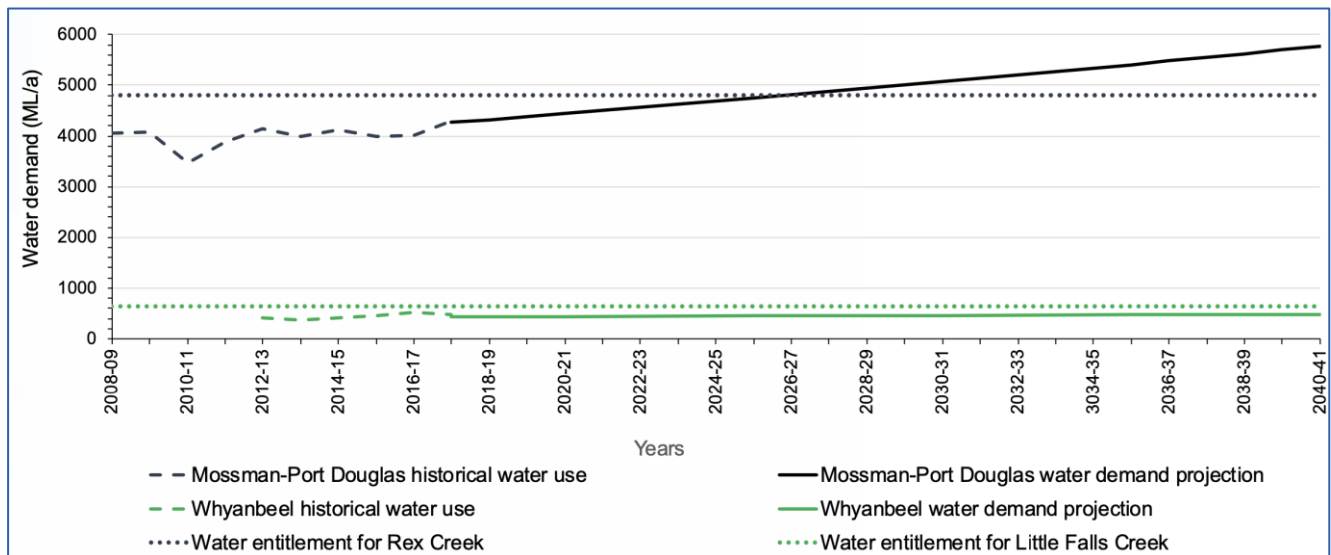
At the time, the RWSSA:

- indicated that "Based on projections provided by the Queensland Government Statistician's Office (QGSO), it is estimated the population in the council area will grow from approximately 11 000 people in 2016 to about 14 500 people in 2041"<sup>2</sup>.
- factored in the higher numbers of transient population staying in Port Douglas (due to tourism) noting that "The average daily total water use comprises all urban uses, including residential, non-residential (which relates to the water used by the commercial, municipal and industrial sectors including water use associated with the transient population within the council's area), and water losses associated with treatment and distribution."
- concluded that, based on water use and population growth projections, the demand for water by the Mossman-Port Douglas communities would reach the annual volumetric limit of existing council's water licence from Rex Creek by 2025–26.
- also concluded that the demand for water for the Whyanbeel communities was not likely to reach the full council annual entitlement from Little Falls Creek in the next 25 years.

Figure 2 shows the historical water use and water demand projections as presented in the 2018 RWSSA.

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<sup>2</sup> Mossman and Port Douglas regional water supply security assessment, Department of Natural Resources, Mines and Energy, State of Queensland, 2018.

**Figure 2 – Historical water use and water demand projections**

*Reproduced from Figure 5 RWWSA (under Creative Commons Licence)*

These projections have been updated to take into account recent trends in water demands. Based on the Mossman Port-Douglas RWWSA, the projected long-term growth:

- Mossman-Port Douglas annual demand is estimated to increase 1,000 ML over 15 years during 2026 to 2041. Assuming this growth rate, and based on the demand of 4,273 ML/a in 2021-22, the 2049-50 total level of demand was estimated to be approximately 6,800 ML/a (See also Figure 5 in section 9.2.3 which presents the updated projected growth in Mossman-Port Douglas demand)
- Whyanbeel demand was estimated to be 130 ML over 15 years, i.e. 2026 to 2041. Assuming this growth rate, and based on the demand of 428 ML/a in 2021-22, the 2049-50 total level of demand was estimated to be approximately 671 ML/y.

### 3 Douglas Shire Council's Raw Water Sources

#### 3.1 Rex Creek Intake

Mossman, North Mossman, Port Douglas, Craiglie, Newell Beach, Cooya Beach, Cassowary and Mowbray communities are supplied with water from Rex Creek. This water is treated at the Mossman Water Treatment Plant (WTP) and reticulated under gravity through 195 km of pipes.

Council holds a water licence for the Rex Creek Intake with an annual entitlement of 4,800 ML as well as maximum daily extraction limit of 32 ML and flow related extraction limits based on the stream flows measured in Rex Creek.

There have been occasions in October/November when water supply from Rex Creek has been less reliable. Water restrictions are therefore regularly imposed during September, October and November.

#### 3.2 Little Falls Intake

Whyanbeel, Miallo, Bamboo, Rocky Point, Port Douglas Views and Wonga Beach communities are supplied with water from Little Falls Creek. This water is treated at the Whyanbeel WTP.



Council holds a water licence for the Little Falls Creek Intake with an annual entitlement of 630 ML as well as maximum daily extraction limit of 5.2 ML and flow related extraction limits based on the stream flows measured in Rex Creek.

Whyanbeel water scheme and Mossman-Port Douglas water scheme are interconnected to provide supply security to either system.

### **3.3 Intake Creek**

Water for Daintree Village has historically been drawn through an intake structure above Cassowary Falls<sup>3</sup>, and since 2019, occasionally supplemented from a bore installed adjacent to the community oval. Since late 2022, when the intake structure at Cassowary Falls was damaged, water for Daintree has been sourced solely from the bore.

Council has completed an assessment of various long-term solutions for a water supply to the area. Options looked at included reinstating the existing intake and access, installing pumps at the bottom of the falls and continuing to source water from the bore. The conclusion at this point is that water will continue to be sourced from the bore.

## **4 Water Restrictions**

### **4.1 Overview**

As part of its demand management, Council imposes short-term water restrictions seeking to reduce daily water demands from the reticulation system to less than the daily water supplies allowed to be taken from the flows in Rex Creek.

There are four increasing levels of water restrictions (Level 1 to Level 4) typically applied throughout the region in the dry season. Permanent (Level 0) water conservation measures apply in all other times.

The water extraction rate from Rex Creek is regulated by the Queensland Government in order to maintain environmental flows in the creek and Mossman Gorge downstream of the intake. However, these reduced allowable extraction rates generally align with when water restrictions are triggered. This generally occurs in the dry season which also tends to coincide with the peak tourism season when water demands are typically higher.

In recent years, the effectiveness of water restrictions during dry periods has been variable, with daily water use sometimes increasing in the short-term when the commencement of water restrictions is announced. However, with targeted and sustained community education and engagement campaigns, it is considered that the effectiveness of demand management might be improved and reduce overall demand per capita by 10% in the medium term to long-term.

### **4.2 Current probability of experiencing restrictions**

The decision criteria for implementing water restrictions in the Mossman-Port Douglas communities are effectively based on the allowable volumes that may be pumped from Rex Creek at various daily flow levels measured in the watercourse. This means that analysis of water restrictions is really an analysis of the likelihood of daily creek flows dropping to levels that would trigger Level 1 through to Level 4 water restrictions.

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<sup>3</sup> Council holds a water licence for the Daintree Intake with an annual entitlement of 80 ML.

Hydrologic modelling suggests that, with current demands and water supplies, and under historical climate conditions, water restrictions (i.e. other than Level 0 - Permanent Water Conservation Measures) could be expected to be in place, on average, around 20.6% of the time over the long-term comprised of:

- Level 1 restrictions – 9.2% of the time
- Level 2 restrictions – 7.8% of the time
- Level 3 restrictions – 2.4% of the time
- Level 4 restrictions – 1.2% of the time.

Climate change would potentially reduce creek flows and increase the extent to which the current regime of water restrictions would be triggered in the future. For example, modelling found that, with current demands and water supplies but under a dry climate scenario, water restrictions (i.e. other than Level 0 - Permanent Water Conservation Measures) could be expected to be in place, on average, around 42.1% of the time over the long-term comprised of:

- Level 1 restrictions – 11.1% of the time
- Level 2 restrictions – 16.7% of the time
- Level 3 restrictions – 9.3% of the time
- Level 4 restrictions – 5.0% of the time.

## **5 Existing Level of Service**

### **5.1 Overview**

Recent assessments have highlighted the limitations of Council's existing raw water extraction works at Rex Creek in being able to meet the growing community's daily water usage needs particularly during the dry season.

Historically, the daily volume of water that can be taken from Rex Creek reduces during the dry season as water levels in the creek drop. The dry season typically extends from May to October which also happens to coincide with the peak tourism season and increased water demands. In recent years, hot seasonal weather has commenced earlier than this and extended later into December.

Analysis of potential climate change scenarios was found to further exacerbate the likelihood of experiencing shortfalls in daily water supplies under current levels of demand.

### **5.2 Mossman-Port Douglas**

#### **5.2.1 Daily water supply shortfalls**

Modelling suggests that relying solely on the existing 4,800 ML water licence and works at Rex Creek to supply current water demands from the Mossman–Port Douglas reticulation network would mean that:

- Daily water supply shortfall events (i.e. periods when the available daily water supplies are insufficient to meet the community's daily water demands) could be expected to occur on:
  - 1.6% of days.
  - Average, in 73% of years.
- The average duration of these shortfall events would be 8 days but the maximum duration could extend up to 74 days in a very dry period.

### 5.2.2 Emergency supply from Whyanbeel utilising the existing pipeline

Utilising the existing 1 ML/day pipe from Whyanbeel as an emergency supply source to supplement water supplies from Rex Creek during dry periods would mean that under current water demands:

- One or more daily water supply shortfall events could still be expected to occur on:
  - 1.1% of days
  - Average in 48% of years
- The maximum duration could be up to 41 days
- There would be no change to the likelihood of implementing water restrictions (because they are based on flows in Rex Creek irrespective of the water supply / demand balance).

## 5.3 Whyanbeel

### 5.3.1 Daily water supply shortfalls

Modelling suggests that the existing 630 ML water licence and works at Little Falls Creek to supply current water demands from the Whyanbeel Reticulation network would mean that:

- Daily water supply shortfall events (i.e. periods when the available daily water supplies are insufficient to meet the community's daily water demands) could be expected to occur:
  - on 0.4% of days
  - on average, in 26% of years
- The average duration of these shortfall events would be 5.5 days but the maximum duration could extend up to 32 days in a very dry period.

### 5.3.2 Emergency supply from Mossman utilising the existing pipeline

Utilising the existing 1 ML/day pipe from Mossman subcatchment as an emergency supply source to supplement water supplies from Little Falls Creek during dry periods would mean that under current water demands:

- The likelihood of daily water supply shortfall events would be effectively eliminated (noting that water quality related events impacting water supplies could still occur)
- There would be no change to the likelihood of implementing water restrictions (because they are based on flows in Rex Creek irrespective of the water supply / demand balance).

## 6 Desired Level of Service

A workshop was held on 6 December 2022 at which Councillors considered what might be an appropriate desired Level of Service for water supplies in terms of their appetite for implementing water restrictions.

If the kind of dry climatic conditions experienced in 2019 were to reoccur in the future, Councillors considered the community would expect steps to have been taken to avoid the need for imposing severe restrictions and harming the region's economy and lifestyle.

Councillors therefore considered that eliminating the need for imposing severe (i.e. Level 3 or Level 4) water restrictions in the future will be essential in order to underpin the region's economic growth and lifestyle. Councillors considered that occasionally implementing less severe (Level 2) restrictions would be acceptable but only providing there was a valid reason for doing so (such as after an extended dry period with no rainfall).

The basis for this view is also consistent with the Douglas Shire's Economic Development Strategy (2021-2024) which states there are 6,727 jobs located in the Douglas Shire, the largest employing industry being in the accommodation and food services sector with tourism supporting 2,546 jobs and generating more than \$611M per year.

## 7 Strategy Development

### 7.1 Overview

As illustrated in Figure 3, the development of a strategy for ensuring water supplies are sufficient to meet the community's current and future water needs involved:

- Demand management initiatives for reducing potable water demands which included:
  - Smart water meters – replacing the aging retail meter fleet with smart meters to reduce water losses, improve accuracy of water rates billing and increase participation in water saving practices with an ability to provide real-time water usage data to the community.
  - Recycled water and re-use – expand Port Douglas recycled water scheme to reduce demand for potable water supplies.
  - Education and awareness – community education and understanding of water security issues to increase efficient water use and the uptake of water conservation behaviours.
  - Leak detection and pipe upgrades – a program of leak detection and replace aging reticulation mains to reduce water losses and improve network resilience. This includes the implementation of district metering and pressure management in the network.
- Initiatives for increasing water supplies by building new – or augmenting existing – water supply infrastructure such as the second raw water extraction intake in Mossman River.

Figure 3 – Achieving water security through complementary demand management and water supply augmentation initiatives



### 7.2 Existing Demand Management Initiatives

Council is continuing to invest in other water saving initiatives to reduce system water losses and recycle wastewater to reduce daily potable water usage.

#### 7.2.1 Loss reduction and recycling water

Reductions in potable water demands that are being pursued by DSC include:

- 0.5 ML/day from water savings associated with water treatment plan membrane upgrades.
- 0.5 ML/day from investing in Mossman – Port Douglas pressure reduction / zonal metering.

- 1.0 ML/day from water savings relating to contributions from the Port Douglas WWTP recycled water scheme.

Collectively, successfully implementing all the above initiatives could add up to around 2.0 ML/day of potable water savings<sup>4</sup>.

### **7.2.2 Water restrictions**

To help manage water demand during periods of low water availability, Council also imposes water restrictions to encourage people to reduce their water use and conserve water supplies.

However, as discussed in section 6, Councillors consider level 3 and level 4 water restrictions have a detrimental and unacceptable impact on the community and the hundreds of tourism-dependant hotels, resorts and short-term accommodation providers in the Shire, along with the landscaping and horticultural-based businesses servicing them.

## **7.3 Options Identification**

A workshop was held with Council officers on 15 November 2022 to identify a comprehensive list of options for improving the water supply security of the region. This included infrastructure options for upgrading the region's water supply system as well as initiatives for reducing water losses, increasing water savings, and reducing potable water use.

## **7.4 Options Evaluation**

Each option was assessed in terms of the aspects described in Table 1 in section 2.1.3. This evaluation utilised a multi-criteria analysis.

A multi-criteria analysis ranked the options:

- short (0-3 years), medium (4-10 years) and long-term (10+ years) water supply security priorities and
- priorities based on other non-water supply security considerations.

The results of this ranking and triage step are discussed further in section 8 below.

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<sup>4</sup> Estimated savings based on estimates provided by DSC in the 15 November 2022 workshop and in subsequent follow up advice.

## 8 Implementation Plan

### 8.1 Priorities for improving water supply security

Table 2 sets out the strategic priorities, timeframes and estimated costs of options for upgrading the region's water supply networks to deliver improved water supply security in the short, medium and long-term.

**Table 2 – Strategic priorities, timeframes and estimated costs of options for delivering improved water supply security**

	Timeframe	Strategic Priorities	Estimated Capital Cost (\$)⁵
Short-term	Short-term 0 to 3 years (by end 2026)	Mossman River intake pump station and pipeline (up to 13 ML/d) including power supply and UV upgrade	13,000,000
		Mossman – Port Douglas pressure management / zonal metering	800,000
		UF Membrane Replacement (Phases 2, 3 & 4)	3,800,000
		Port Douglas WWTP Recycled Water Scheme	4,000,000
		Education and awareness program (ongoing opex only)	-
Medium-term	Medium-term 4-10 years (2027-2033)	Review water restriction regime (after commissioning of Mossman River intake) supported by updated education and awareness program	75,000
		Duplication of emergency water supply pipeline from Mossman to Whyanbeel	600,000
Long-term	Long-term 10+ years (2034-2050)	Increase capacity of Mossman River intake pump station and pipeline (additional 6 ML/d), and power supply	9,000,000
		Additional contingency bore for Daintree	330,000

### 8.2 Priorities for addressing compliance and/or asset related issues

Table 3 presents other options that are considered a priority primarily from either a compliance and/or an asset maintenance and replacement perspective.

⁵ Estimated costs – 2023 base date



**Table 3 – Other ongoing priorities required for compliance and/or an asset maintenance and replacement reasons**

Option	Estimated Capital Cost (\$) <sup>6</sup>	Compliance	Asset maintenance / renewal
Leak detection and mains renewal program	9,000,000 (over 10 years)	✓	✓
Smart water meter program	1,900,000		✓
Whyanbeel trunk water main	6,000,000		✓
Whyanbeel & Daintree WTPs – UV unit renewal	650,000	✓	✓
Cooya Beach reservoir connection	1,833,000	✓	
Mossman WTP clearwater reservoir relining	1,000,000		✓
Daintree raw WTP reservoir refurbishment	350,000	✓	
Wonga Beach reservoir recommissioning	500,000	✓	

## 9 Implications for Level of Service

### 9.1 Overview

The updated 2023 water supply security assessment examined the potential effects of growth in future water demands and proposed water supply and demand management strategies on achieving the desired level of service.

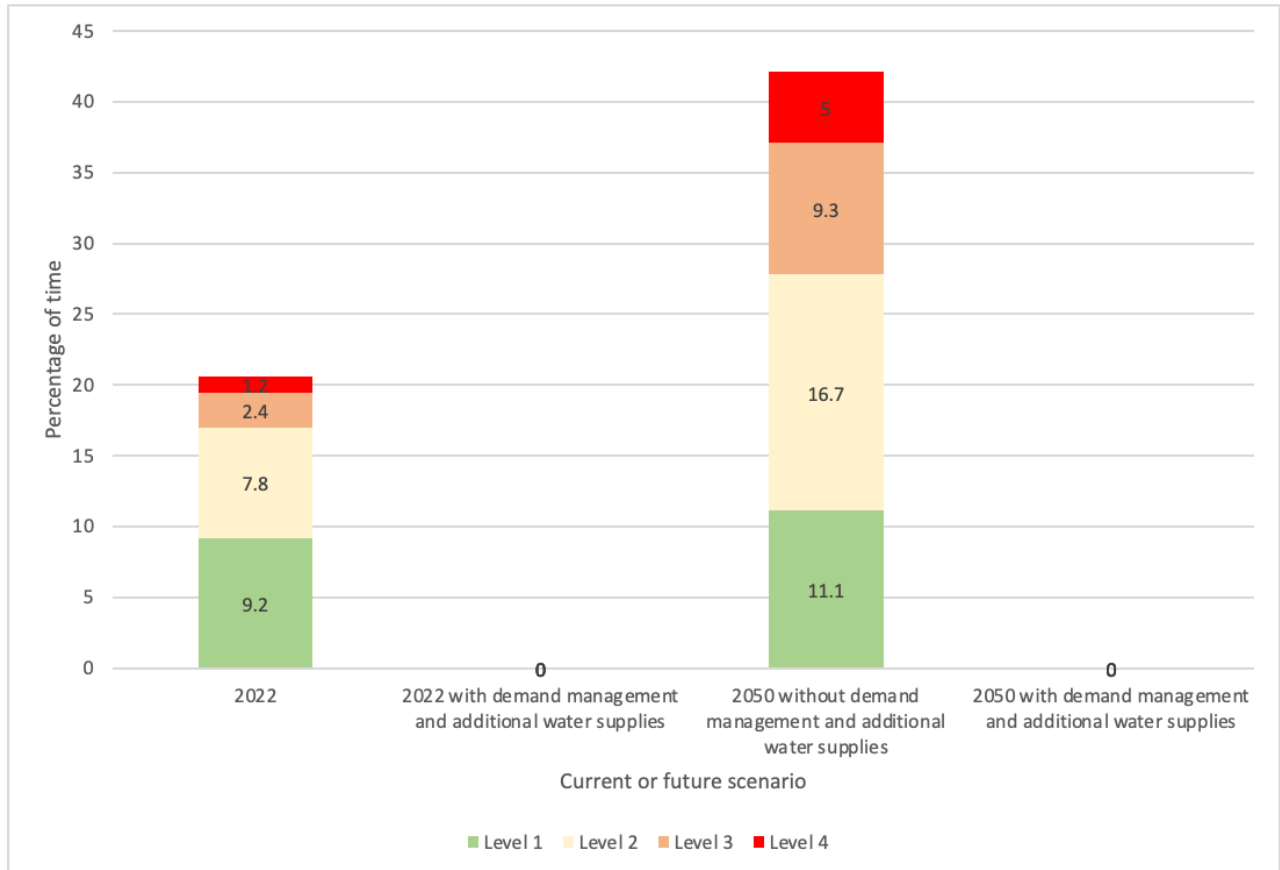
Figure 4 presents the key outcomes of this assessment. It shows that augmenting the region's water supply by building new water intake infrastructure at Mossman would achieve the desired Level of Service and eliminate the need for implementing level 3 and level 4 restrictions in response to shortfalls in daily water availability in Rex Creek.

Figure 4 illustrates that, without augmenting existing water supplies, the ongoing growth in future water demands would significantly increase the percentage of time that people could expect water restrictions to be in place compared to now. However, augmenting water supplies coupled with

<sup>6</sup> Estimated costs – 2023 base date

ongoing demand management and water saving initiatives would effectively remove the need to impose water restrictions due to water availability constraints in Rex Creek up to at least 2050.

**Figure 4 – Implications of the Strategy on current and future Levels of Service**



## 9.2 Mossman-Port Douglas reticulation network

### 9.2.1 Level of Service

The updated 2023 water supply security assessment found the above strategies are likely to ensure the desired level of service objectives will continue to be met over the next thirty years, even allowing for future population growth coupled with the potential adverse effects of climate change.

The assessment found the risk of there being insufficient daily flows to supply daily demands (rather than the limitation of the existing Rex Creek licence's annual volumetric limit) is really the key issue posing an immediate threat to being able to meet the current level of water demands of communities supplied by the Mossman-Port Douglas water reticulation network. The assessment confirmed the importance of urgently constructing a second raw water extraction site in the Mossman River.

### 9.2.2 Implications for water restriction regime

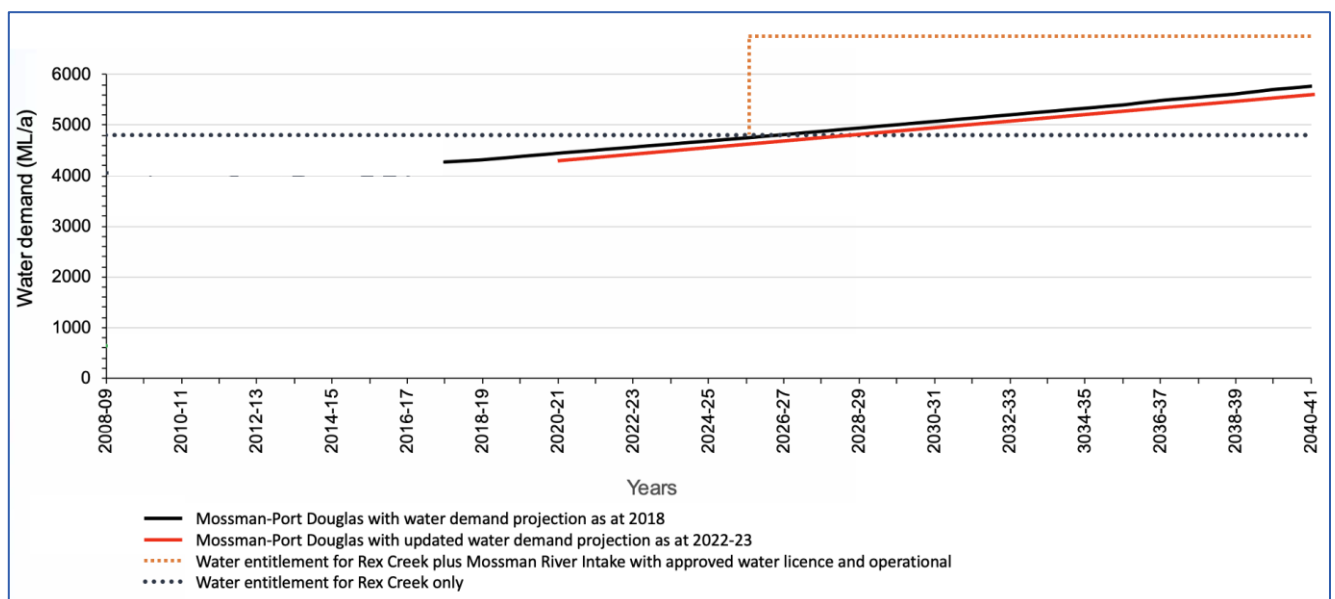
After augmentation of the Mossman River intake, the development of a new simplified water restriction regime would be warranted. This might involve implementing Level 1 and/or Level 2 style water restrictions whenever water supplies need to be pumped from the Mossman River in order to promote heightened community awareness of the need to conserve water and use it efficiently and help reduce operational pumping costs.

### 9.2.3 Implications for annual water balance

Figure 5 shows the projected annual water demand and available water supplies for the Mossman-Port Douglas reticulation network before and after the Mossman River Intake becomes available and operational.

It illustrates how the Mossman River water licence and intake works will eliminate the risk of reaching the annual volumetric limit in 2026.

Figure 5 – Projected annual water demand and available water supplies



### 9.2.4 Effect of demand management

Section 7.2 outlined the water savings initiatives being pursued by DSC to reduce potable water demands which might collectively add up to around 2.0 ML/day. Continuing to invest in these and other demand management initiatives will assist in reducing the daily demand for raw water from Rex Creek and thereby lessen the probability of daily water supply shortfall events occurring.

However, these initiatives would not reduce the probability of needing to impose level 3 or level 4 water restrictions during extended dry periods. This is because water restrictions are dependent solely on the daily water levels in Rex Creek which would not be improved by water savings initiatives.

Although not a contributor to delivering the desired level of service per se, investing in water savings initiatives plus demand management education and engagement campaigns are nevertheless considered important in order to:

- in the short-term – help offset the ongoing increase in water usage arising from with the projected population growth during the construction period and
- in the medium to longer-term – maximise the utilisation of water already within the network and minimise the need to extract water from the river.

### **9.3 Whyanbeel reticulation network**

The updated 2023 water supply security assessment concluded that maintaining access to emergency water supplies from the Mossman River via the existing pipeline will be important in order to address water supply shortfalls in Whyanbeel that might arise should extended dry periods occur in Little Falls Creek in the future.

The assessment also suggested that, in the longer term:

- doubling the pipeline's existing estimated 1 ML/d capacity to 2 ML/day would provide a source that would be well in excess of the projected total 2050 annual demand and be sufficient to respond to even dry periods of very long duration in Little Falls Creek.
- reducing potable demands in the Whyanbeel reticulation network (through either investing in water savings/recycling initiatives and/or more effective demand management in the Whyanbeel network) would enable the current Little Falls Creek water licence to remain sufficient to meet the future water demands of the communities supplied by the Whyanbeel reticulation network out to 2050 and beyond.

### **9.4 Daintree scheme**

After recently completing an assessment of various long-term water supply options for Daintree Village, Council has concluded that water will continue to be sourced from the existing bore.