

Drought Management Plan 2020 (Town Water)



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# ARMIDALE REGIONAL COUNCIL

## DROUGHT MANAGEMENT PLAN 2020

	Position	Name	Date
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Approved	Director Businesses & Services	Scot MacDonald	30 November 2020

This plan was prepared in accordance with NSW Water Directorate Drought Management Planning Guidelines 2016 and DPIE Water's Drought Management Checklist, August 2007.

This plan was adopted by Council on **24 February 2021**.

## Amendment List

<b>No.</b>	<b>Amendment Details</b>	<b>Name</b>	<b>Date</b>
1.	Last paragraph in page 30 of the DMP paraphrased - the Malpas dam level recorded in January 2020 was the lowest on record, not the one recorded in 1981.	Arun Gautam	24 February 2021
2.	Figure 9, 10 and 15 amended to include data until 2020.	Arun Gautam	24 February 2021

# Executive Summary

## This Plan

This Drought Management Plan (DMP) , guides the Armidale Regional Council (ARC) as a Local Water Utility. Council supplies treated water to residents and businesses in Guyra and Armidale.

The aim of the DMP is to:

- ❑ Provide guidance to staff when managing drought events
- ❑ Inform the community of the issues associated with drought management and the community's role during drought
- ❑ Extend water security to Council's customers as long as operationally possible while maintaining water standards to Australian Drinking Water Guidelines.
- ❑ Optimise water security for residents and businesses.

Having a sound Drought Management Plan in place is part of the NSW Government best-practice management requirements for water supply.

This Drought Management Plan has the following uses with relation to drought management:

- ❑ Operational plan
- ❑ Resourcing strategy
- ❑ Authorised approach, that is, staff have the confidence that the actions in this plan have been authorised in advance
- ❑ Basis for government grant applications
- ❑ Basis of a public awareness and community communication program

This plan gives authority to Council's General Manager, in consultation with Council, to declare drought and implement the actions herein described.

This Drought Management Plan has been prepared with a view to providing Council with a comprehensive drought management strategy. The NSW Local Government PPRR (prevention, preparation, response and recovery) emergency management approach has been applied. This approach provides a strategic and systematic drought management process to reduce risk to the community and the environment. It involves effectively integrating implementation strategies before (i.e. prevent and prepare), during and after drought events.

## Drought Prevention Strategy

Drought prevention actions are proactive measures that Armidale Regional Council (ARC) can undertake in anticipation of declining water storage levels and changing customer water use. Prevention actions may be activated prior to drought or during drought declared stages. Preventative actions are provided in section 2.

## Drought Preparedness Strategy

Being prepared for drought is essential to reduce the impact of water limitations and to enhance the capacity of ARC and the community to respond to drought conditions. This drought management plan is part of the necessary preparedness. Further discussion is provided in section 3.

## Drought Response Strategy

### Drought Triggers and Water Level Restrictions

Drought triggers are situations that activate staged response strategies according to the severity of the drought. The triggers are described in Section 4.1.2 and summarised in the table below.

It is important to note, Water Triggers and Restrictions are an important feature of Council's strategies, however every drought event is different, and Council and staff must be adaptive to prevailing conditions. In practice this means Council officers may recommend and Council may approve variations to triggers and restrictions as condition warrant.

**Table 1: Proposed Water Restrictions Triggers**

Level	Triggers	Target Total Demand (ML/day) / Residential Demand (Litres/person/day)
P Permanent	Applicable all Times	8.2*/200*  (90% of the average – new norm)
<b>1</b> Low	Total storage level below 80% and adverse three month climate outlook by the Bureau of Meteorology. Authoritative advice on an adverse climatic forecast (e.g. drought declared by the government in the area). Operational Issues affecting the ability to supply.	7.4/180  (80% average)
<b>2</b> Moderate	Total storage level below 70%. Operational Issues affecting the ability to supply. Consumption target of previous level not achieved for 2 weeks.	7.0/170  (75% average)
<b>3</b> High	Total storage level fell below 60%. Serious Operational Issues affecting the ability to supply. Consumption target of previous level not achieved for 2 weeks	6.6/160  (70% average)

Level	Triggers	Target Total Demand (ML/day )/ Residential Demand (Litres/person/day)
<b>4</b> <b>Very High</b>	Total storage level fell below 55%. Serious Operational Issues affecting the ability to supply. Consumption target of previous level not achieved for 2 weeks.	6.4/155  (65% average)
<b>5</b> <b>Emergency</b>	Total storage level below 50%. Serious Operational Issues affecting the ability to supply. Consumption target of previous level not achieved for 2 weeks.	6.2/150  (60% average)

*\*Ninety percent of average annual water production by Armidale and Guyra WTPs over 2014 to 2018. This is daily annual average demand and need to be adjusted for seasonal variations.*

### Demand-Side Actions

Demand-side actions are intended to reduce the water consumption, matching the demand to the diminishing water resources. Restrictions on the use of water are the main actions. Details are provided in Section 4.3.

### Supply-Side Actions

Supply-side actions aim to supplement the existing water resources with additional water sources. Details of these actions are provided in Section 4.4.

### Drought Management Team

A Drought Management Team will be formed as part of the drought response, and will be responsible for managing Council’s response during drought. Table 33 in section 4.2.2 lists the roles and the responsibilities of the team.

### Monitoring

A continuous monitoring program will be implemented during drought to track the availability and quality of water, the demand, and the effectiveness of the response plan. Details are provided in Section 4.5.

### Drought Recovery Strategy

The recovery process is set out to support affected communities in the reconstruction of the physical infrastructure and the restoration of emotional, social, economic and physical wellbeing. The recovery actions are described in section 5.

### Background Information

Background information on the water supply scheme, the climate, and the regulatory framework is provided in Sections 6, 7 and 8.

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# 1 Introduction

## 1.1 Context

This Drought Management Plan (DMP) has been developed in order to:

- ❑ Provide guidance to staff when managing drought events
- ❑ Inform the community of the issues associated with drought management and the community's role during drought
- ❑ Extend water security to Council's customers as long as operationally possible while maintaining water standards to Australian Drinking Water Guidelines.
- ❑ Optimise water security for residents and businesses.

The NSW Government Best-Practice Management of Water Supply and Sewerage Guidelines (2007) require Local Water Utilities to have a Drought Management Plan in place and be ready to implement their plan when drought conditions arise. This plan satisfies the guidelines requirement. A copy of the Best-Practice Guidelines Drought Management checklist is included in Appendix A.

## 1.2 This Plan

This DMP provides a combination of long-term and short-term management actions to respond to drought incidents and nominates who is responsible for leading and carrying out the required actions.. The aims of this plan are to:

- ❑ Ensure that timely warning is provided to the appropriate authorities and other stakeholders (including customers) in a drought event
- ❑ Provide relevant information for use in response to a situation when water availability is at risk
- ❑ Identify customer groups who have different requirements during droughts, for example hospitals and schools.
- ❑ Outline procedures to Council staff so as to respond to and mitigate drought related issues
- ❑ Enable timely warning to appropriate personnel to implement appropriate actions
- ❑ Document how ARC will manage the water supply scheme during water shortages due to drought

The functions of the DMP are:

- ❑ As an operational plan for water supply management during drought
- ❑ As a resourcing strategy and staff allocation to manage drought
- ❑ As an authorised approach to drought management enabling staff to act knowing that necessary actions have been endorsed
- ❑ As the basis for government grant applications to address the needs identified in this plan

- ❑ As the basis of a public awareness and community engagement tool for use by Council to demonstrate transparent and responsible drought management

The plan includes strategies specific to the ARC town water supply in Armidale and Guyra network.

## 1.3 Drought Planning

### 1.3.1 Objectives of Drought Planning

Drought planning is an emergency response plan that aims to reduce the impact of water scarcity on the community, business, economy and environment.

### 1.3.2 The PPRR Approach

This plan has a four-step approach referred to as PPRR (prevention, preparation, response and recovery) approach. The PPRR is a continuous process that involves effectively integrating implementation strategies before (i.e. prevent and prepare), during and after drought events with particular emphasis on response and recovery.

An overview of the four phases is provided below:

- ❑ **Prevention.** Actions to reduce or eliminate the likelihood or effects of drought related issues. These include understanding the climate patterns and their impact on water availability, understanding water sharing plans rules and analysing past drought events. They also may include upgrading the water resources, typically through capital investment.
- ❑ **Preparedness.** Developing strategies for drought situations before an incident occurs, to ensure effective response and recovery. This DMP is a key component of this phase.
- ❑ **Response.** Actions to control contain and/or minimise the impacts of the drought. Typically this would involve implementation of demand-side and supply-side actions listed in this DMP.
- ❑ **Recovery.** Restoration of 'normal' water supply conditions, including actions to assist the community and businesses to recover from the impacts of drought.

This plan describes the actions that ARC will implement in the prevention, preparedness, response and recovery stages of a drought incident.

## 2 Drought Prevention Strategy

### 2.1 Overview

Drought prevention actions are proactive measures that LWUs can undertake in order to increase coping capacity. Prevention actions may be activated / implemented prior to drought or during drought-declared periods. This will be determined at Council's discretion.

During drought, existing water resources are expected to decrease at a rate dependent on the respective water demand rate at a particular water restriction level. While current water resources are diminishing, other supply options may be considered as potential alternatives for supplementary or emergency water sources.

Some prevention actions are described below.

### 2.2 Short-term Actions

#### 2.2.1 Permanent Water Conservation

ARC will implement permanent water conservation measures by encouraging water efficient practices.

#### 2.2.2 Voluntary Water Restrictions

When the water source's availability is approaching the level that would trigger the implementation of water restrictions, ARC will start a pre-activation of voluntary water restrictions (i.e., implementation of water conservation measures).

Council will communicate the importance of using water saving measures, especially in times developing drought.

#### 2.2.3 Drought Water Pricing

Demand is affected by price.

ARC will consider the introduction of scarcity pricing before and/or during drought to reduce discretionary water use (possibly a two-step usage charge). The price signal also communicates to customers the seriousness of the event.

ARC will monitor the impact of the pricing on the demand and assess the effectiveness of this action. Higher pricing may be necessary to meet higher costs of responding to drought and reduced revenue that will impact the efficacy of the Water Fund to maintain and renew assets.

### 2.3 Long-term Actions

Hydrological studies show that the ARC water supply dams do not have sufficient storage to provide secure supply in drought emergencies. The 'secure yield' of the dams are adequate to meet the

current demand under historic climate but are not adequate for current demand under climate change condition and future demands under both historic and climate change conditions.

### **2.3.1 Renewing Puddledock Transfer Main**

ARC has secured 50% funding to renew the Puddledock transfer main under NSW Government's Safe and Secure Funding programme. Renewing existing Puddledock transfer main along with the pump station will help boost the capacity of Armidale's town water supply and it also provide supplementary source in case of failure of Malpas Dam transfer line.

### **2.3.2 Increase in Surface Storage**

The capacity of Malpas Dam is 12,266 ML. The capacity could be more than doubled by increasing the Full Supply Level (FSL) by 5.5m to meet future demand and to deal with potential adverse climate effect on secure yield. Alternative surface storage options may also need to be considered. ARC will be seeking state and federal funding for the project.

### **2.3.3 Groundwater**

ARC engaged a hydrogeologist during drought in 2019 to report on potential Groundwater supplies. There were 26 sites identified for test drilling. The work is still in progress but it is likely that there are a number of bores in Guyra could be used as a town water source subject to NRAR approval. Test drilling had less success in Armidale but has potential to reduce demand on potable supply by using bore water for the irrigation of parks and sports fields.

## 3 Preparedness

### 3.1 Overview

Being prepared for drought is essential to reduce the effect of and to enhance the capacity of ARC and the community to cope with the consequences of drought. This means that ARC should have action plans in place ready to be implemented and have ongoing activities to prepare Council staff and the community for those situations, such as training exercises, monitoring and consultation.

The benefits of being prepared for incidents and having a drought management plan are:

- ❑ Having a pre-determined and agreed list of actions to be taken in drought, allowing for an effective implementation of those actions
- ❑ Allows ARC to promptly seek drought relief support and funding from relevant authorities
- ❑ Have well defined protocols of drought restriction activation and escalation

This DMP documents ARC's preparedness in regards to incidents affecting town water supply. The actions described in this plan have been endorsed by Council, therefore in case of emergencies, the appointed staff can quickly activate relevant personnel required to take actions to respond to the problem; to acquire other resources required for drought management and to quickly implement the pre-determined drought response actions outlined in section 4. The following sections describe some of the ongoing activities that ARC should undertake in order to be prepared for drought situations.

### 3.2 Exercising Drought Management

In order to ensure the effectiveness of this plan and to prepare staff for emergency situations, a periodic program for exercising drought management will be developed and implemented in conjunction with other emergency training programs. These exercises will be a simulation of drought starting and intensifying, requiring actions.

### 3.3 Data Availability

The DMP may include, as attachments, technical information (i.e. design, operational, maintenance plans) relevant to the water supply system. This is to ensure that in case of emergencies all relevant information is in one document facilitating an effective and prompt response to the problem.

These attachments should be updated regularly, as the plans are modified.

### 3.4 Monitoring

Continuous monitoring of the water sources and water supply schemes is essential to understand the performance of the water sources and their capability of supplying demand. Monitoring of these parameters assists ARC in preparing for unconventional situations. In order to ensure a safe and sustainable water supply, the following monitoring is required.

- ❑ Drinking water daily demand

- ❑ Daily monitoring of water supply source
  - River flows and depth
  - Water level at dams / reservoirs
  
- ❑ Daily temperature and rainfall
- ❑ BoM forecasts

## 3.5 Consultation

### 3.5.1 Community Engagement

Engagement with the community is a critical element of an effective drought management program, as it ensures customer acceptance and behavioural changes, required to reduce water demand.

ARC will inform the community about the DMP and the drought action plans in place. This will assist the community to understand the critical importance of drought management actions and the need to conserve water. ARC may also involve the community in the development and review of this plan.

ARC Communication and Engagement Plan 2019 (TRIM AI/2020/27191) prepared by GHD broadly outline the approach to the communications and engagement for the leadership, communication and long-term water planning and management during Level 5 water restrictions.

### 3.5.2 Government Consultation

Consultation on the implementation of the Drought Management Plan would be expected to be with:

- ❑ Department of Planning, Industry and Environment (DPIE)/ Water Group
- ❑ Natural Resource Access Regulator (NRAR)
- ❑ NSW Health (especially in relation to water quality)
- ❑ Neighbouring LWUs

## 4 Drought Response Strategy

The response strategy consists of implementing appropriate actions to control, contain or minimise the impacts of droughts. The implementation of the DMP includes identifying and reviewing situations, overseeing the implementation of supply and demand actions, approving media releases and reviewing operations. These actions will be the responsibility of the Drought Management Team.

The following sections describe the response strategy during drought incidents.

### 4.1 Drought Strategy Activation Plan

#### 4.1.1 Overview

The drought response strategy will be activated in an event when the water supply is affected due to natural climate conditions.

The main scenario that would activate a drought management response, including the introduction of supply restrictions, is water scarcity.

#### 4.1.2 Drought Triggers

Triggers are the conditions that will activate the response strategy plan. The triggers are based on progressive reductions in water availability. The triggers for implementing drought restrictions are provided in the Table 1.

These triggers initiate demand-side actions which are expected to reduce the demand to a target daily demand (refer Table 2). If the demand reduction is not achieved by the introduction of the restrictions for each level, the next level should be applied.

Table 2 lists water supply system drought triggers levels. The Relax column indicates the mark where the level can be relaxed, and the status changed to a lower level.

**Table 2: Proposed Water Restrictions/Relaxation Triggers**

Level	Triggers	Target Total Demand (ML/day) / Residential Demand (Litres/person/day)	Relax
P Permanent	Applicable all Times	8.2*/200*  (90% of the average – new norm)	N/A

Level	Triggers	Target Total Demand (ML/day) / Residential Demand (Litres/person/day)	Relax
<b>1 Low</b>	Total storage level below 80% and adverse three month climate outlook by the Bureau of Meteorology. Authoritative advice on an adverse climatic forecast (e.g. drought declared by the government in the area). Operational Issues affecting the ability to supply.	7.4/180  (80% average)	Total Storage rises to 90% and climate outlook by the BoM. Go to Water Conservation
<b>2 Moderate</b>	Total storage level below 70%. Operational Issues affecting the ability to supply. Consumption target of previous level not achieved for 2 weeks.	7.0/170  (75% average)	Total Storage rises to 90% and climate outlook by the BoM. Go to Water Conservation
<b>3 High</b>	Total storage level fell below 60%. Serious Operational Issues affecting the ability to supply. Consumption target of previous level not achieved for 2 weeks	6.6/160  (70% average)	Total Storage rises to 80% and climate outlook by the BoM. Go to Level 1
<b>4 Very High</b>	Total storage level fell below 55%. Serious Operational Issues affecting the ability to supply. Consumption target of previous level not achieved for 2 weeks.	6.4/155  (65% average)	Total Storage rises to 70% and climate outlook by the BoM. Go to Level 2
<b>5 Emergency</b>	Total storage level below 50%. Serious Operational Issues affecting the ability to supply. Consumption target of previous level not achieved for 2 weeks.	6.2/150  (60% average)	Total Storage rises to 60% and climate outlook by the BoM. Go to Level 3

\*Ninety percent of average annual water production by Armidale and Guyra WTPs over 2014 to 2018. This is daily annual average demand and need to be adjusted for seasonal variations.

## 4.2 Drought Management Team Roles and Responsibilities

### 4.2.1 Activation and Setting Restriction Level

ARC General Manager can proclaim this drought management plan to be in force once General Manger determines that Trigger 1 has been reached. This decision should be ratified by Council.



The General Manger has the authority to change the restriction levels on the advice of the Chair of the Drought Management Team (DMT). Changes to Water Level Restrictions should seek adoption at a Council meeting.

#### 4.2.2 Drought Management Team

The General Manager will appoint the drought management team (DMT) and will activate/deactivate DMT as required. Roles and responsibilities of DMT are in the Table 3.

**Table 3: DMT Roles and Preliminary Responsibilities**

<b>Chair</b>	Levels 1, 2, 3 and 4 : Manager of Utilities Levels 5: Director Businesses and Services
<b>Responsibilities</b>	Coordinate the activities of the team Communicate with Council Communicate with government agencies – high level Communicate with senior management
<b>Incident Manager</b>	Levels 1,2,3 and 4 : Operations Engineer Level 5: Manager of Utilities
<b>Responsibilities</b>	Monitor and assess data Provide an assessment of the situation Brief the DMT Chair and Council Allocate roles to team members, including stand-ins Prioritise tasks and develop response actions Ensure adequate facilities and resources – both specialist and support Communicate with stakeholders, neighbouring LWUs, government agencies and major customers – action level Hold regular team meetings, and chair if the Chair is not available Monitor the use of actions and their effectiveness Monitor team member performance and take action if required Determine completion of the response phase, and commence recovery Post incident, coordinate review of incident and update of the Drought Management Plan
<b>Communication Manager</b>	Nominated officer from Media, Communications and Engagement
<b>Responsibilities</b>	Support the DMT Chair and Incident Manager with communication Prepare communication material as appropriate Issue media statements and interviews if appropriate (and approved by the Director or GM) Maintain media database including social networks Monitor and manage social networks communication
<b>Administrative Support</b>	General Manger to nominate or redeploy one of the staff for administration support
<b>Responsibilities</b>	Record keeping Prepare progress reports as required for distribution to DMT members

	Provide administrative support, telephone answering, email first review and general office duties Attend and minute meetings
Water Efficiency Officer	General Manger to redeploy one of the staff as Water Efficiency Officer
Responsibilities	Promote Water Conservation Work with commercial and institutional customers high water users to help achieve water efficiency Support the Incident Manager and Chair
Support Team	Chair to nominate as required depending on the severity of the incidence
Responsibilities	Support the Incident Manager and Chair

### 4.3 Demand-Side Action Plan

#### 4.3.1 Water Restrictions

Water restrictions aim to reduce water demand by customers through regulating the type and duration of water-using activities. If not specifically mentioned, the restrictions of each level apply to the all higher levels. For example, if fixed hoses are prohibited for Level 2, fixed hoses are also prohibited for the higher levels.

A schedule of the water restrictions levels, their definitions and comprehensive list of proposed rules in each category of restriction are provided in **Appendix B**.

### 4.4 Supply-Side Action Plan

When drought occurs, actions must be taken to mitigate the effects of water shortage and to ensure that a reliable water supply is available to meet the health and safety needs of the community while supporting the economy. Supply-side actions are actions taken by Council aimed at supporting the restrictions as well as preparing for worsening situations.

#### 4.4.1 Staged Action-Plan

Drought management supply-side actions should be implemented while the community, guided by Council, takes action to reduce water demand using water restrictions as one of its strategies. The supply actions are proposed to be implemented within a time frame so that water supply is sufficient to sustain the estimated water demand at the particular water restriction level. The supply-side actions are actions that the Council will undertake to continually supply water to its customers during drought. Alternative water supply options are described in Section 6.3.2.

In 2015 Armidale Dumaresq Council engaged WREMA Pty Ltd to undertake the secure yield study of the Armidale water supply in accordance with NOW (2013) guideline 'Assuring future urban water security – Assessment and adaptation guidelines for NSW local water utilities – DRAFT – December 2013'. The study found that the Malpas dam can meet the demand of Armidale for many years to come for stationary climate while satisfying NOW (2013) 5/10/10 rule. However, in response to the drought (2019) and in consultation with Department of Planning Industry and Environment (DPIE)

officers, Council engaged NSW Public Works to update the secure yield of its water supply dams by extending the climate data to include the recent drought. The study found that the secure yield of the water supply dams were severely impacted by the drought (2019) and the secure yield of water supply dams can meet the current unrestricted demand under stationary climate but can not meet the future demand under stationary climate or the current restricted demand under climate changed scenarios. ARC is working with DPIE Water and NSW Public Works to develop a strategy to secure water for the region.

Table 4 lays out how supply actions are implemented as restriction levels are increased.

**Table 4: Staged Drought Supply-Side Actions**

Level	Supply Side Activity	Potential Daily Supply, ML/day
1 Low	Consider to stop the operation of Scour Valves at the dams.	7.4  (80% average)
2 Moderate	Stop the operation of Scour Valves at the dams.  Stop flushing of Council mains and reservoir cleaning.	7.0  (75% average)
3 High	Consider to operate Puddledock dam for regular supply while keeping Malpas for more serious drought to come.  Consider to operate ground water bores if available.  Stop environmental flows at Malpas dam when the dam level reaches 55% and below.  Investigate re-use of the backwash water.  Investigate the re-use of STP effluent at the sewer treatment plant or other water sources for watering of Council’s parks in the city area.	6.6  (70% average)
4 Very High	Operate Puddledock dam for regular supply while keeping Malpas for more serious drought to come.  Commence work on the re-use scheme if found feasible.  Investigate the options to reduce evaporation losses from the dam.	6.4  (65% average)

Level	Supply Side Activity	Potential Daily Supply, ML/day
5 Extreme	<p>Operate Puddledock dam in Armidale and ground water bores if available in Guyra for regular supply while keeping Malpas for more serious drought to come.</p> <p>Use alternative sources of water wherever possible</p> <p>Use groundwater from all available ground water bores.</p> <p>Commence work to reduce evaporation losses if they are cost effective.</p> <p>Plan to undertake water quality testing as dam level drops which in turn will help modify the treatment processes when required to handle the change in incoming raw water quality</p> <p>Prepare for Water carting to Guyra.</p>	6.2  (60% average)

#### 4.4.2 Water Carting

Water cartage to Armidale City is impractical and expensive. However the water carting from Armidale to Guyra may be feasible. It is anticipated that water carting to Guyra would require 6 large trucks or semi-trailers carting water for 10 hours per day (20 kl per load x 5 loads per day x 6 trucks = 0.6ML / day). It was learned in 2019 drought it is beneficial to cart water earlier than when dam is empty so that the supply is maintained half by dam water and half by carted water resulting in less trucks on the local roads per day. Additionally, it will avoid the risk that Guyra town not getting water if highways are blocked..

Technical and financial assistance towards the cost of water cartage is available from the NSW Government but is subject to quantities and cartage arrangements being agreed with DPIE Water. Further details regarding water carting are provided in the DPIE Water document titled "Drought Relief for Country Towns".

#### 4.5 Monitoring During Drought

The following monitoring will be carried out during drought. Some of the items listed below are recorded on a regular basis as part of the water business requirements:

- Daily water demand
- Daily supply from each source (including non-drinking water)
- Daily monitoring of water sources (river flows, dam levels, groundwater table level)
- Daily temperature and rainfall
- Impact of restrictions on water consumptions
- Comprehensive testing of water quality from any emergency supply such as new bores before commencing supply. Assistance is available from NSW Health
- Ongoing water source quality:

- Electrical conductivity (monthly)
- Total Dissolved Solids (monthly)
- pH (daily)
- Alkalinity (monthly)
- Algae levels (daily)
- Taste and odour (on complaint)
- Chemical analysis (monthly)
- Microbial analysis (weekly)

A chart showing the daily demand, restriction level, temperature and rainfall is to be prepared and updated at least weekly.

Deep water samples are also need to be tested for chemical and physical analysis to adjust the treatment processes if required as the dam level goes down.

Monitoring is intended to provide effective management of the incident. Some or all of the data may be used as part of the communication campaign.

## 4.6 Communication Strategy

### 4.6.1 Community

#### Purpose

The purpose of the communication strategy is to:

- ❑ Communicate the restriction levels and expected behaviour in a timely and effective manner
- ❑ Provide general information to the community and businesses and enlist its support and understanding to the actions taken by ARC

#### Channels

Some of the communication channels that may be used:

- ❑ Advertisements on radio, television and newspapers
- ❑ Press releases
- ❑ Social media
- ❑ Interviews / media conferences / presentation to community group meetings
- ❑ Signs in key locations and major roadways
- ❑ Place copies of the restrictions notice on common noticeboards around the town
- ❑ Have the restrictions explained in schools so that the message gets taken home
- ❑ Letterbox drop of the notice and Brochure or mail out to all residents and business. Include these with water bills
- ❑ Rangers carrying additional brochures to be passed out where they initially warn residents
- ❑ Announcement by high profile persons (e.g. Mayor)
- ❑ Develop a program to make hotel and motel guests aware of the restrictions in place

## Messages

Typically, the messages include:

- Restriction levels and what they mean
- Background / need
- Effort by Council and stakeholders (e.g. supply side projects)
- Contact for special cases / exemptions / additional information
- This is not a failure, but an event that occurs due to circumstances, and it is managed appropriately.

## Contact List

**Table 5: Contact Details of the Local Media**

Organisation	Address	Phone
Armidale Express	115 Faulkner Street ARMIDALE 2350	02 6776 0500
The Guyra Argus		02 6776 0500
Radio 2AD	123 Rusden St Armidale 2350	02 6772 1144
FM 100.3		02 6772 1333
2TM (gives their news to the above)	Radio Centre, Goonoo Goonoo Road, South Tamworth	02 6765 7055 02 6765 9585
2ARM- FM 92.1 Armidale Community Radio	PO Box 707 ARMIDALE 2350	02 6772 1486
Tune! FM UNE 106.9 FM	University of New England ARMIDALE 2350	02 6773 2399
ABC New England North West	470 Peel Street Tamworth 2340	02 6760 2411 Fax: 02 6760 2499
Prime Television Tamworth	PO Box 634 Calala 2340	02 6761 9777
NBN Television	226 Bridge St TAMWORTH 2340	02 6762 1990 Fax: (02) 6762 1995
TEN Television (Northern NSW)	Shop 4 Tamworth Lifestyle centre 31-41 The Ringers Rd. Tamworth 2340	02 6763 2700
SBS Television		1800 500 727

## 4.6.2 Agencies

### Purpose

The separate communication strategy is required for regulators, other government agencies, Water Managers and neighbouring utilities in order to:

- ❑ Share resources for managing the drought
- ❑ Apply for regulatory and financial support as required
- ❑ Obtain access to alternative water sources.

### Contact List

**Table 6: Contact Details of Government Agencies**

Organisation	Name	Phone	Email
DPIE Water	Glenn George, Regional Manager North	02 6653 0127	<a href="mailto:glenn.george@dpie.nsw.gov.au">glenn.george@dpie.nsw.gov.au</a>
EPA	Michael Lewis, Regional Operations Office - Armidale	2 6773 7000 0418 208 635	<a href="mailto:Michael.Lewis@epa.nsw.gov.au">Michael.Lewis@epa.nsw.gov.au</a>
NSW Health	Glenn Pearce, Senior Environmental Health Officer	02 6764 8000	<a href="mailto:glenn.pearce@hnehealth.nsw.gov.au">glenn.pearce@hnehealth.nsw.gov.au</a> ,
NSW Fire Brigade	66 Barney St ARMIDALE 2350	02 6771 5076	
Rural Fire Services	Fire Control Centre Mann St ARMIDALE 2350	02 6771 2400	

## 5 Recovery Strategy

The recovery process will commence at the end of the response operations. The end of the drought should start with Council revoking drought conditions. The DMT will cease operation, but members will still be available to assist the Recovery Coordinator, mainly in debriefing and assessing the response.

A Recovery Coordinator will be appointed by the DMT to oversee the recovery process. The Recovery Coordinator will be responsible for:

- ❑ Preparing a response report and recommending actions based on the experience. The report will be submitted to the General Manager within 4 weeks of revoking the drought condition and to Council within 8 weeks. Once endorsed by Council the report will become the main component of the preparedness stage
- ❑ Assessing the remaining drought impacts and determining the appropriate personnel to co-ordinate the recovery activities. This will be based on the drought recovery survey described below.

A drought recovery survey will be developed to evaluate the recovery process needed to restore the physical infrastructure and the restoration of emotional, social, economic and physical wellbeing. The drought recovery survey will assess the following criteria in order to determine the recovery actions required:

- ❑ **Ownership:** Determine the ownership of private or public asset and the source of assistance that may be available
- ❑ **Severity of impact:** Develop a scale to determine the severity of social, economic and financial impact to be based upon
- ❑ **Time to recover:** Evaluate a timeframe required to recover from the drought impact
- ❑ **Cost of impacts:** The financial loss due to the drought impact
- ❑ **Resources required:** Resources (financial and others) required to complete the recovery process

With the outcomes of the drought recovery survey, ARC will be able to seek the appropriate resources to address the recovery needs. The recovery process will involve restoring the community to the point where normal social and economic activities may resume.

ARC will not compensate private customers for costs or financial losses caused by the drought. ARC, however, will assist customers and co-ordinate activities associated with seeking compensation from other sources such as government and insurance companies.

When the drought period is considered over and the conditions return to normal, the following actions are to be considered:

- ❑ Reviewing the Drought Management Plan and actions in the light of experience
- ❑ Insurance compensation



- ❑ Government assistance
- ❑ Liaise with tax office to provide tax relief (reduction or delay of payment deadline)
- ❑ Develop rehabilitation/recovery programs based on the drought recovery survey
- ❑ Ensure fire control programs are in place
- ❑ Assist the community in resolving conflicts.

# 6 Water Supply Scheme

## 6.1 Location

Armidale Regional Council (ARC) located in the New England Region of New South Wales, is half-way between Brisbane and Sydney, and was formed from amalgamation in 2016 of the former Armidale Dumaresq Council and adjoining Guyra Shire Council. ARC is also the Local Water Utility (LWU). Armidale city, as the region’s centre, has a population of about 22,000 and a further 2000 live in Guyra 35km north of Armidale and 6000 in rural areas and other villages.

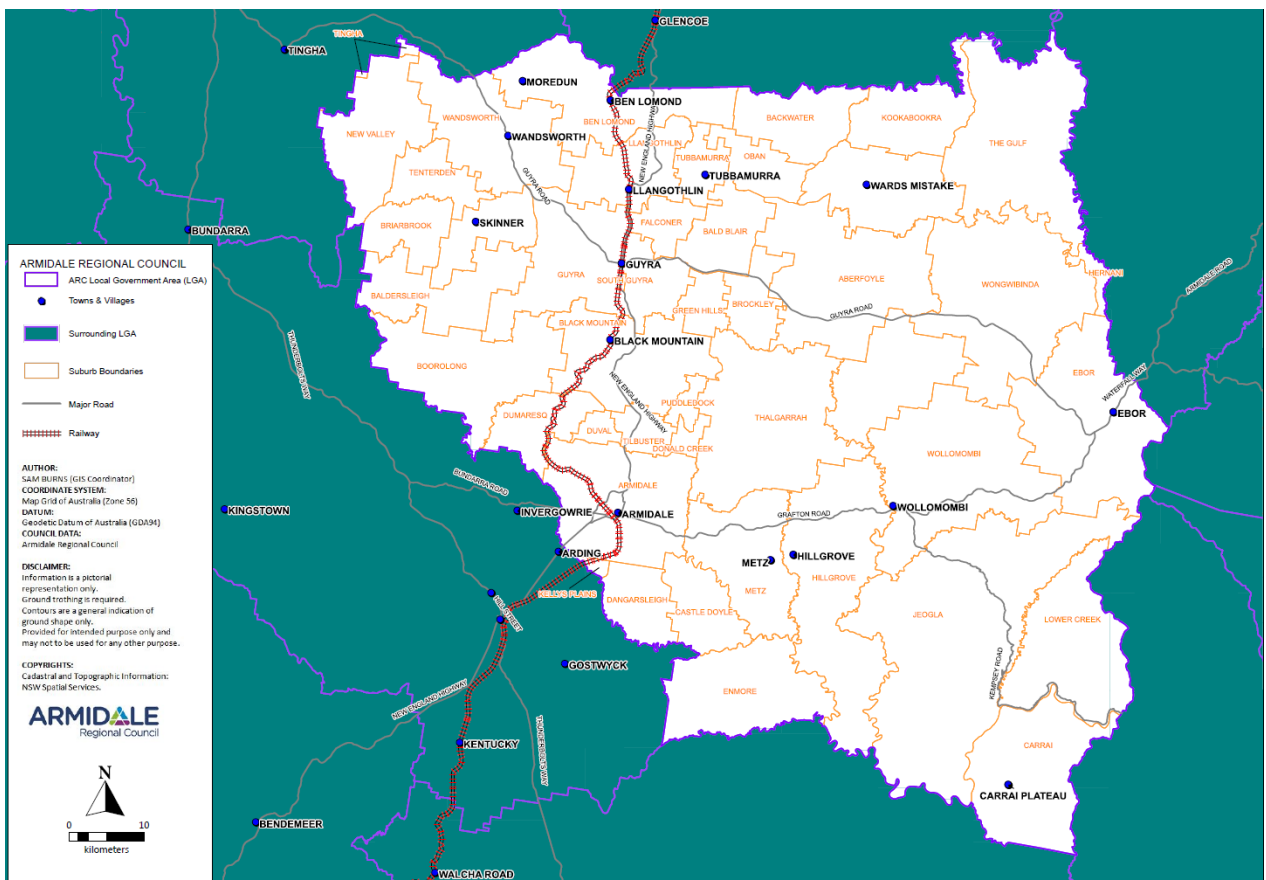


Figure 1: Location Map

## 6.2 Existing Water Supply Schemes

ARC has two water supply schemes for Armidale and Guyra as shown in Figure 2.

Armidale’s main water source is Malpas Dam holding 12,260ML and was built in 1968. The dam provides a high level of drought security to Armidale, confirmed in a recent review of the dam’s secure yield. Puddledock and Gara Dams have been retained as backups in case the supply from Malpas Dam needs to be interrupted for operational reasons. Pipes from all three dams manifold to a

common DN450 steel inlet to the single Water Treatment Plant on north side of town. Water Treatment Plant consists of Coagulation and flocculation, Horizontal sedimentation tank, Ozonation Plant, Biological activated carbon filtration and Soda ash, Chlorine gas and Fluoride dosing units. Ozonation plant was installed in 2008 and has design capacity of 22.5 ML/d. Finished water gravitates or pumped to various clear water reservoirs and then to the customers.

Guyra's town water is sourced from two small dams located on the Gara River, 7km north of the town. Hydrologic studies show that the dams are too small to guarantee supply during an extended drought. The 'secure yield' of the dams is 390 million litres a year compared to an average annual usage of 435 million litres.

Two 70L/s duplicate pumps transfer raw water from Guyra #1 Dam via parallel rising mains to a 0.4 ML balancing tank and then water gravitates to the water treatment plant. The plant has a nominal capacity of 6.05 ML per day and is located approx. 2.5km north of Guyra on Falconer Road. After treatment, water is pumped to two clear water reservoirs, 0.9 ML and 2.5 ML capacity. From the reservoirs, water is distributed by a gravity reticulation network to consumers including a large scale glasshouse farm to grow tomatoes. One exception is the supply by a dedicated line from the treatment plant to the old Abattoir site on the northern side of Guyra which now operates as a rabbit farm.

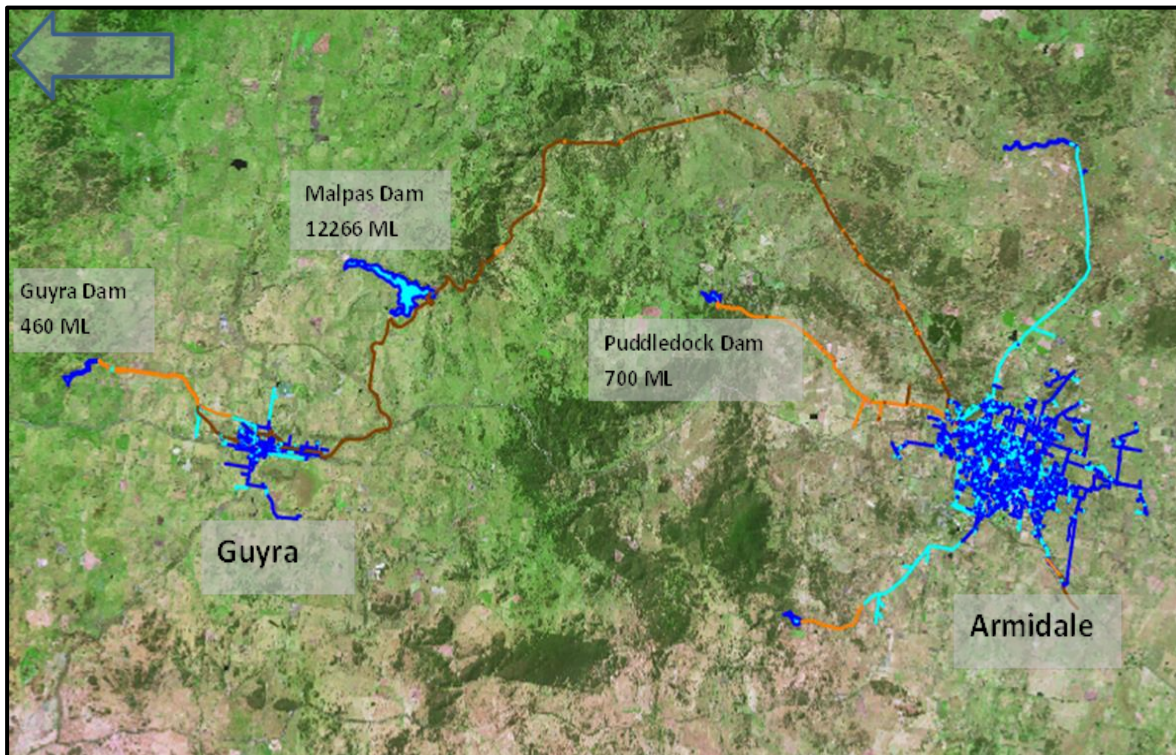


Figure 2: ARC Water Supply Schemes

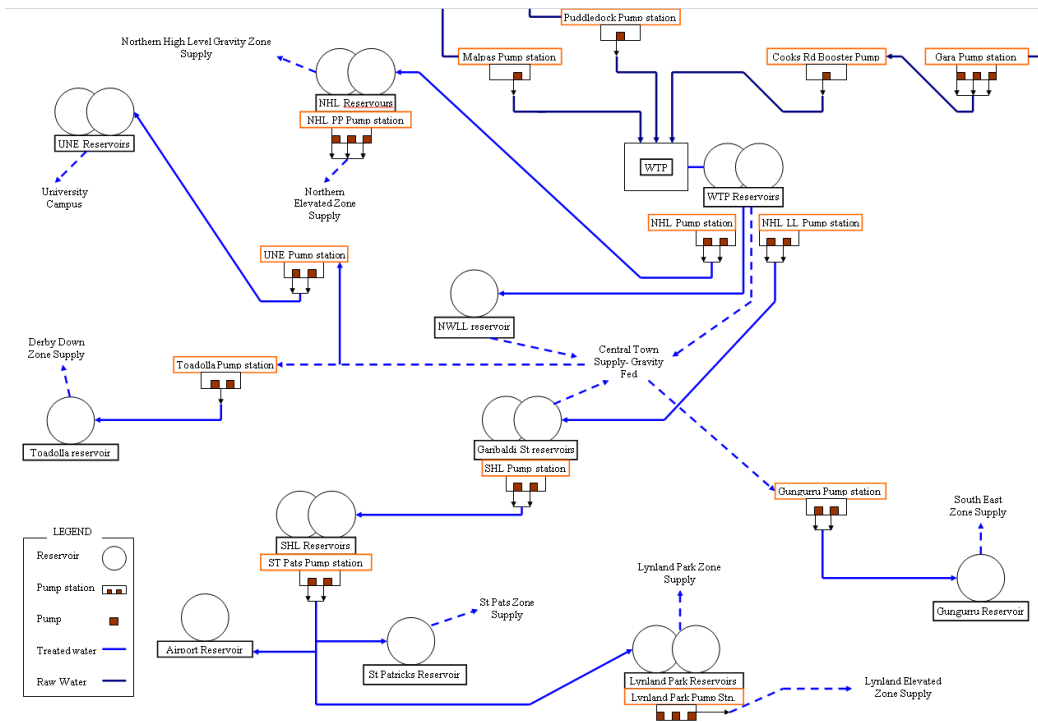


Figure 3A: Water Supply Scheme – Armidale

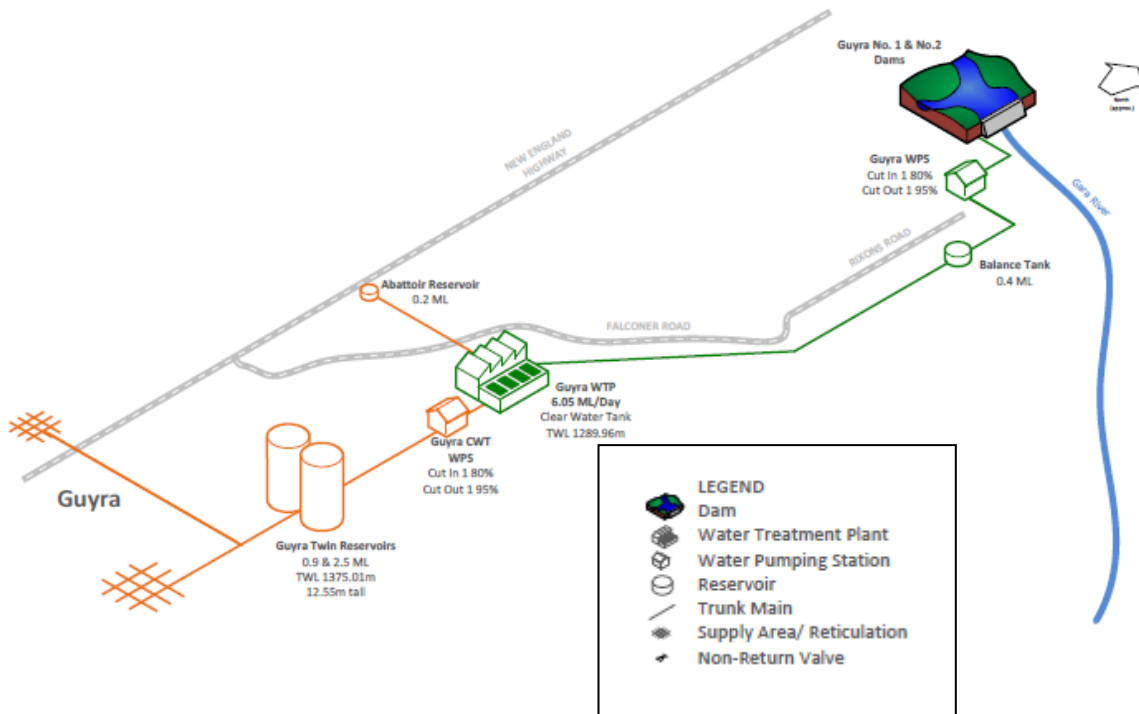


Figure 3G: Water Supply Scheme – Guyra

### 6.3 Water Sources

#### 6.3.1 Existing Sources

Armidale water supply scheme has 3 water supply storage dams; Malpas, Puddledock and Gara Dam and Guyra water supply has two small dams as shown in Fig 4. Malpas can also supply to the Guyra. There is 1 additional Dumaresq Dam in Armidale but is used only for recreational purpose.

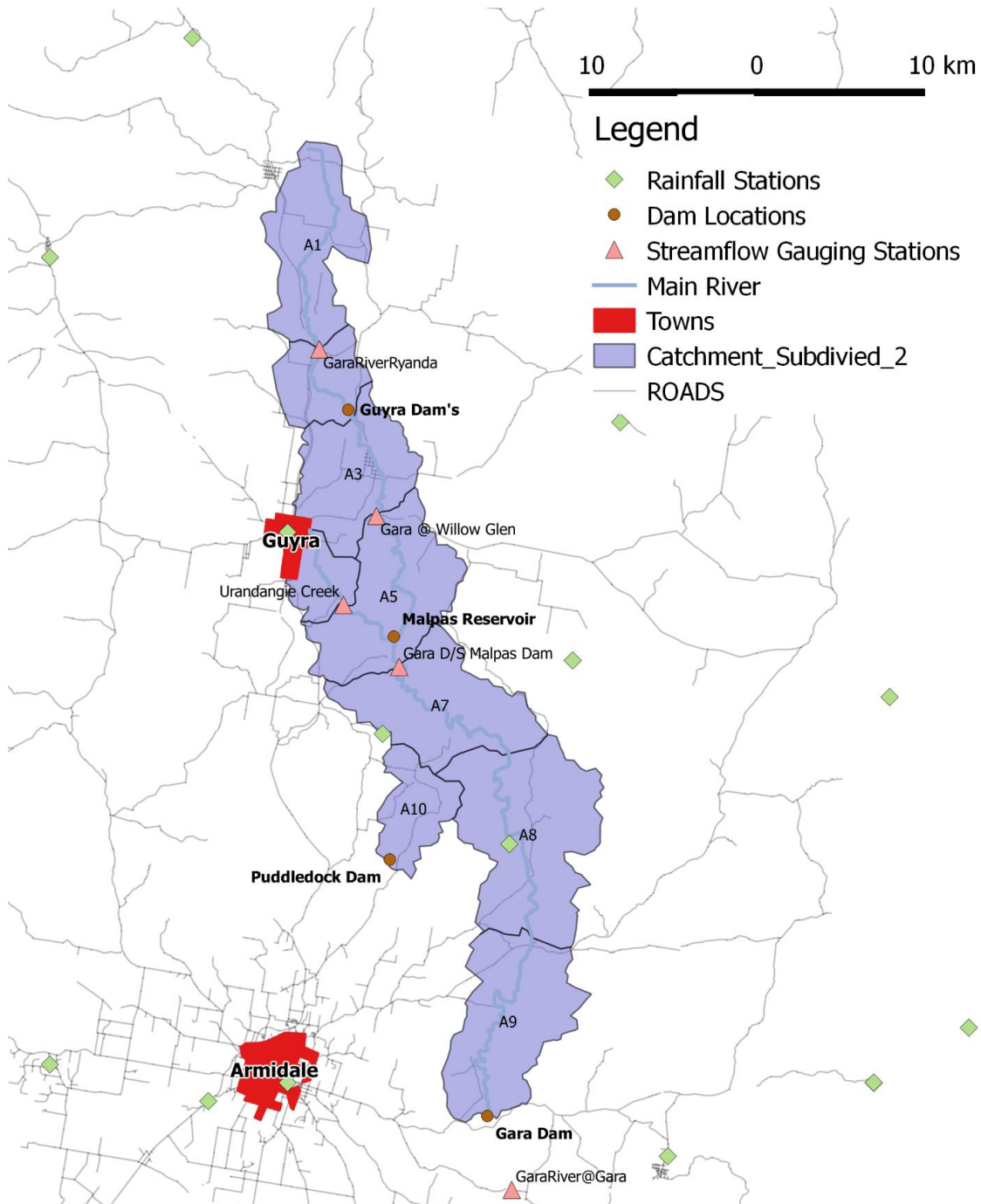


Fig 4: Gara River Catchment



Brief details of all water source dams are provided in the Table 7.

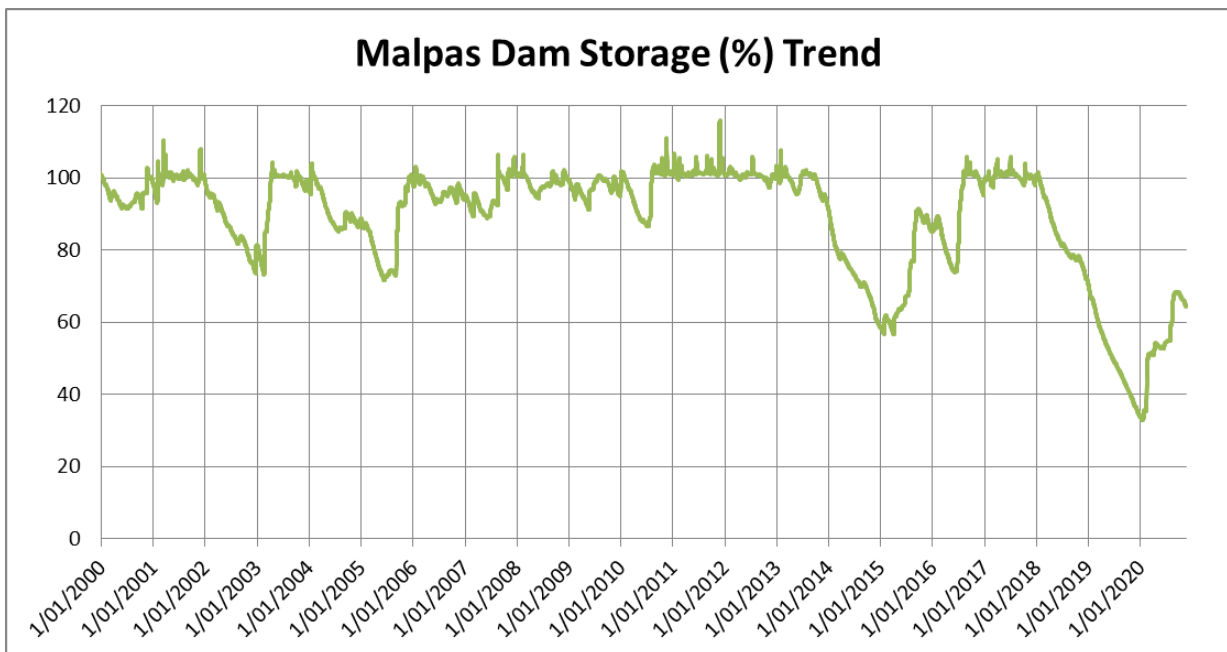
**Table 7: Brief details Water Supply Sources**

Dam	Catchment Area (km <sup>2</sup> )	Total Capacity (ML)	Dead Storage (ML)	Inundated area at FSL (ha)	Licenced annual extraction volume (ML)*	Enviro release (ML/day)	Headworks Transfer Capacities (ML/day)		Spillway Elevation (m)
							Gravity	With Pump	
<b>Armidale Water Supply Scheme</b>									
Malpas Dam	196	12,266	105	179.67	6772	1-3 <sup>#</sup>	19.0	25.9	1175.70
Puddledock Dam	24	696	-	14.10	-	unknown	1.0	6.0	1063.71
Gara Dam	397	219	-	9.40	130	0.2	n/a	4.8	943.03
<b>Guyra Water Supply Scheme</b>									
South Guyra Dam	74	112	2	4.78	729	-	n/a	6.0	1262.8
North Guyra Dam	73	352	52	13.58	-	-	n/a	n/a	1267.3

*#If inflows measured at Willow Glenn are less than 1ML/day then release is inflows plus 1ML/day, if inflows are >1ML/day but < 6ML/day then outflows ≥ 2 ML/day, if inflows are >6ML/day then outflows ≥ 3 ML/day. The release will cease when dam levels reaches to 55% of its total capacity.*

*\*Based On Bathymetric Survey – CEH 2015 for Guyra Dams and Michel 1999 in case of Malpas/Puddledock and Gara.*

Malpas has a catchment of about 195km<sup>2</sup> which includes the catchment for Guyra's two water supply dams. The dam was designed with the potential to add gates to the spillway to double storage capacity. Design drawings show a future Full Supply Level about 5.5m (18 feet) higher than the current spillway level. The 35km long delivery pipeline from Malpas Dam to Armidale is mostly DN450 MSCL pipe. Under gravity the main can deliver 220L/s from Malpas to Armidale. A water pumping station was built in 1987 just downstream of the Dam which can boost flow to 300 L/s. Water restriction was imposed in Armidale water supply scheme in 2019 for the first time since Malpas dam was built. Record shows the dam storage went down to 5000ML (38.5% of then capacity 13000ML) in May 1981. The dam recorded 32.8 in January 2020 which is the lowest level recorded as shown in Fig 5 .



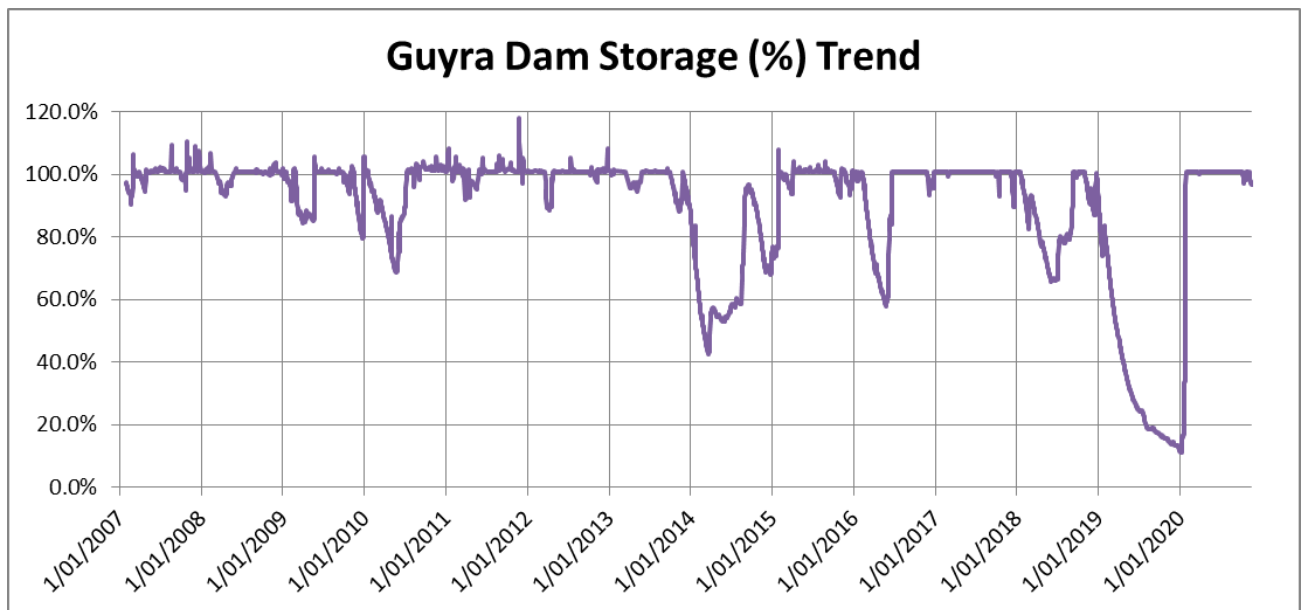
**Fig 5: Malpas Dam Historical Storage**

Puddledock dam is on Puddledock Creek about 14km northeast of Armidale and was built in 1928. Gravity supply from the dam to Armidale Water Treatment is very limited, about 1ML/day through a DN300 pipeline. The small Puddledock water pumping station can boost the supply to 6ML/day if Malpas Dam is offline. Council has secured NSW Government Safe and Secure funding to replace much of the pipeline and relocate the booster station to enable 10ML/d to be drawn from Puddledock Dam. This work is expected to commence in the first half of 2021.

Gara Dam is a small concrete gravity dam on the Gara River about 13km east of Armidale. The dam was built in the 1950s. Supply from the dam must be pumped to get it to the Water Treatment Plant. There are two booster pumping stations on the DN250 delivery main, both in poor condition. Council is considering for decommissioning of the dam.

Two Guyra dams North and South (also known as Top and Bottom or Dam 2 and Dam 1 respectively) are located on the Gara River about 7km north of Guyra town. South or Dam 1 was built in 1957 and the North or Dam 2 was built in 1967 in such a way that the Dam 2 flows directly into Dam 1. The Dam 2 was designed with the provision to raise the height of dam wall by a further 3.3m. A pump station fitted with duty/standby pumps rated at 70 l/s pumps water from South dam (Dam 1) to 0.4 ML balancing tank and then water gravitates to the water treatment plant. Frequent restrictions have been applied in Guyra in last three years but there is no record of restrictions prior to that.

All of ARC dams had a history of cyanobacterial (blue green algae) events and ARC undertakes regular algae monitoring of all of its dams. Cyanobacteria when in excessive number can cause odours, taints and tastes. They can also produce harmful toxins.



**Fig 6: Guyra Dams Historical Storage**

### 6.3.2 Potential Sources

Alternate sources of water in Armidale Regional Council area are limited. Few of them are discussed below and will also require further investigation if they can be used in drought.

#### Dead Storage

Dead storage is the lowest portion of dam storage that is usually not accessible under normal operations. Water quality is generally quite poor when water levels drop to such low levels. There may be opportunities to use dead storage water for non potable use.

#### Ground Water

Council is seeking approval from NRAR for Water Access Licences to extract groundwater from four bores in Guyra. Council has sought a maximum extraction of 512 MLs per annum from the bore network to be piped to Guyra's water treatment plant.

#### Water Cartage

Water carting to Armidale may be very difficult and expensive. Any potential water source in case of severe drought in Armidale is from Tamworth, Bellingen or Inverell which all are 100 to 200Km away from Armidale. Using \$0.56/Km/KL (the figure sourced from Coffs Harbour Drought Management Plan 2012 which in turn was based on carting event from Berridale to Cooma to relieve a blue-green algae incident and the cost was slightly less in case of carting water from Armidale to Guyra in 2019) for transport, it will cost about \$267 K daily or \$8M for a month to supply 50 % of average demand of 6.35ML per day. It will require 2 trips for 45 water trucks each with 35KL capacity. The exercise is going to be difficult to manage logistically and is also very expensive.

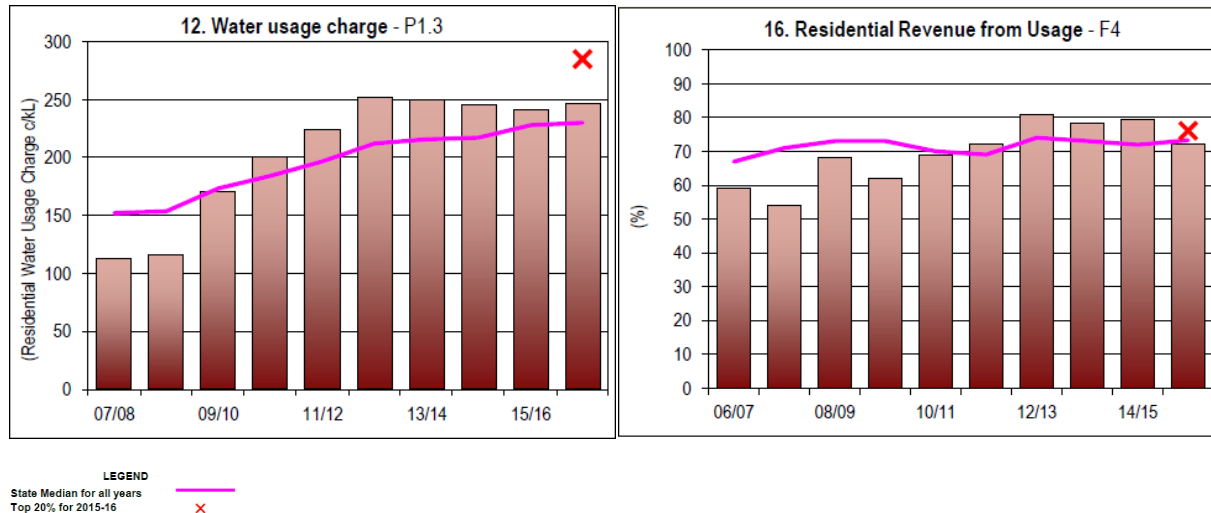
However, water carting may be possible in case of Guyra scheme. It is anticipated that water carting from Armidale to Guyra would require 6 water trucks each with 20KL capacity for 10 hours per day (20 kl per load x 5 loads per day x 6 trucks = 0.6MI / day) to supply 50 % of average demand of 1.22ML per day. It will approximately cost \$12K per day to maintain the supply of 50% of average demand.



Technical and financial assistance towards the cost of water cartage is available from the NSW Government but is subject to quantities and cartage arrangements being agreed with DPIE Water.

## 6.4 Water Demand

### 6.4.1 Water Pricing



**Fig 7: Water Usage Charge and Residential Revenue from Usage** (Source: ARC TBL Water Supply Performance 2015-16)

NSW Best-Practice Pricing states that at least 75 % of residential revenue is from water usage charges for utilities with 4,000 or more connected properties and is at least 50% for smaller utilities. Armidale Regional Council’s water usage charge is slightly above state median and its residential revenue from usage charge is around 75% for a few years, which should provide a strong pricing signal as anticipated in NSW Best-Practice Management Framework.

### 6.4.2 Water Users

Population of Armidale Regional Council is 30,311 (ABS ERP 2016). It is estimated that 22,000 people in Armidale, 2000 people in Guyra is covered by reticulated water supply system. The remaining population of about 6,000 are currently obtaining water from rainwater tanks and private bores.

As the drought becomes more severe there will be an increasing number of rural properties with rainwater tanks requiring refill from the town water supply system. This may create an additional demand of about 1ML per day (6000 x 150 Lpcd) in Council’s water supply system. These are generally accessed from standpipes in Armidale (2) and Guyra. The standpipes are metered and charged using a credit card. The standpipes have been restricted to residents of ARC Local Government Area, but this was difficult to monitor and there was evidence of residents and water carters transporting water outside of the LGA.

ARC’s water supply dams were designed and constructed solely to provide for the long-term security of town water supply during any drought. Environmental release from Malpas dam will cease when it gets to 55% of its storage and the other dams do not have requirements for environment release. However farmers living along the Gara River downstream of the dams may demand water release which may not be possible to meet.

### 6.4.3 Historical and Current Water Usage

User pay pricing was introduced in the 1990’s, which resulted in a 35% reduction in consumption. Nevertheless, household water consumption is higher than NSW State average and national median as shown in the Fig 8. There has been significant increase in water usage price from 2020/21 and its impact is still to be seen.

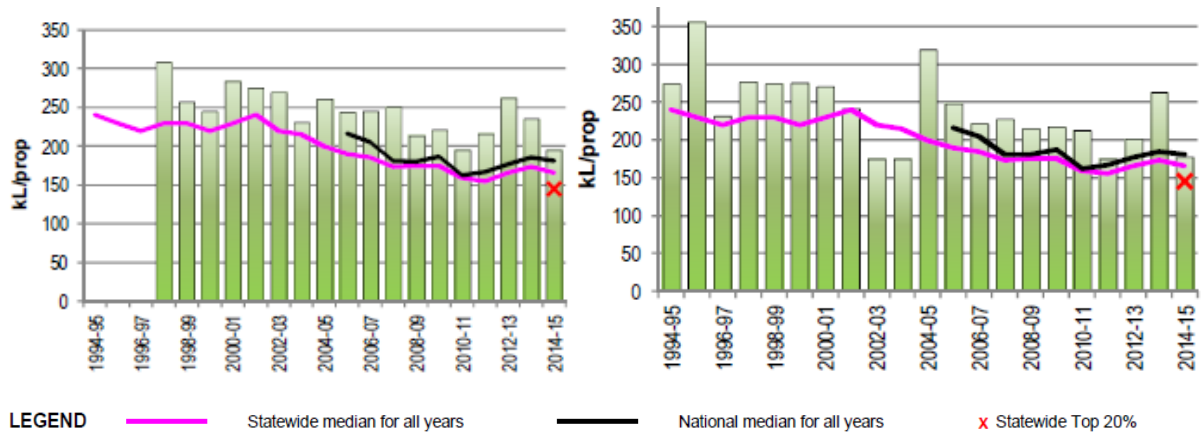


Fig 8: Armidale (left) and Guyra (right) Average Annual Residential Water Usage (kL/property)

In the last 10 years, Armidale average daily water production is 7.65ML with peak daily demand of 18.72ML as shown in the Fig 9.

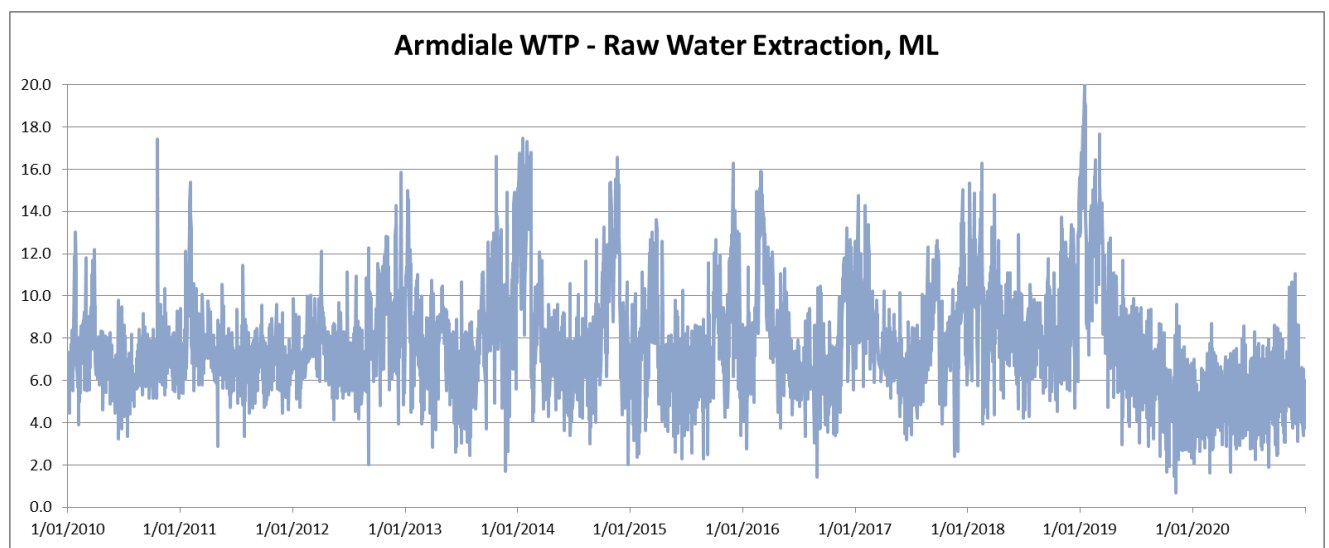


Fig 9: Armidale Historical Daily Water Production, ML

In the last 10 years, Guyra average daily water production is 1.22ML with peak daily demand of 4.71ML as shown in the Fig 9.

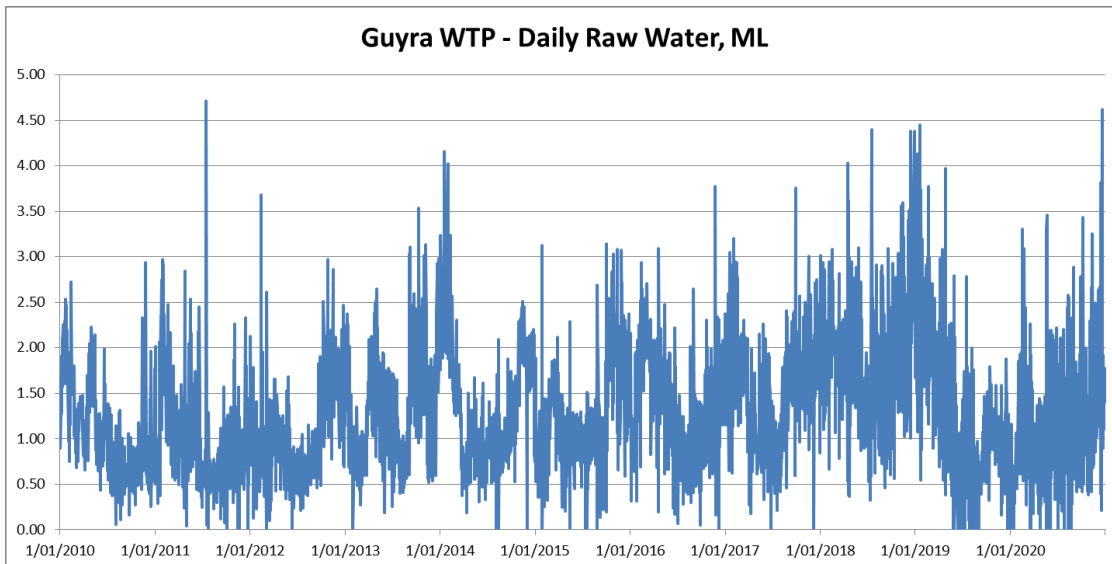


Fig 10: Guyra Historical Daily Water Production, ML

Breakdown of water consumption by customer category is as shown in the Fig 11 and 12. 70% of Armidale water use is from residential customers whereas it is only 32% in case of Guyra. Glass house tomato uses more than 40% of water in Guyra. Target restriction in case of Armidale can be achieved with the focus on residential customers but it may not be possible in case of Guyra without the help from the tomato farm.

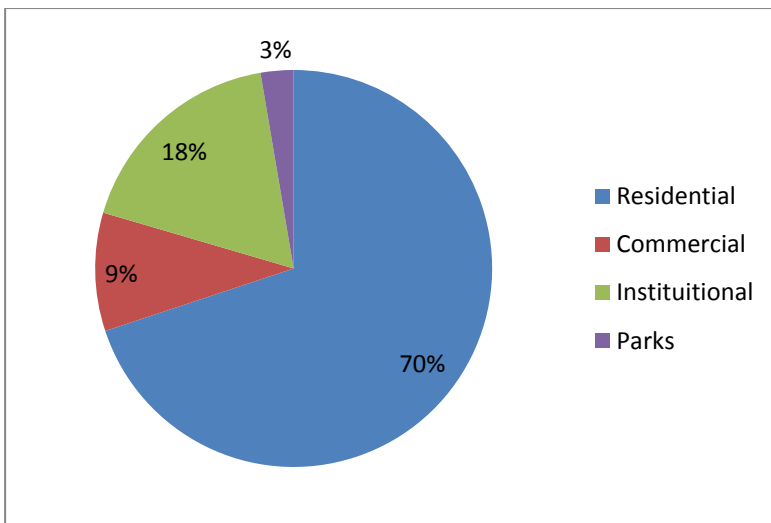
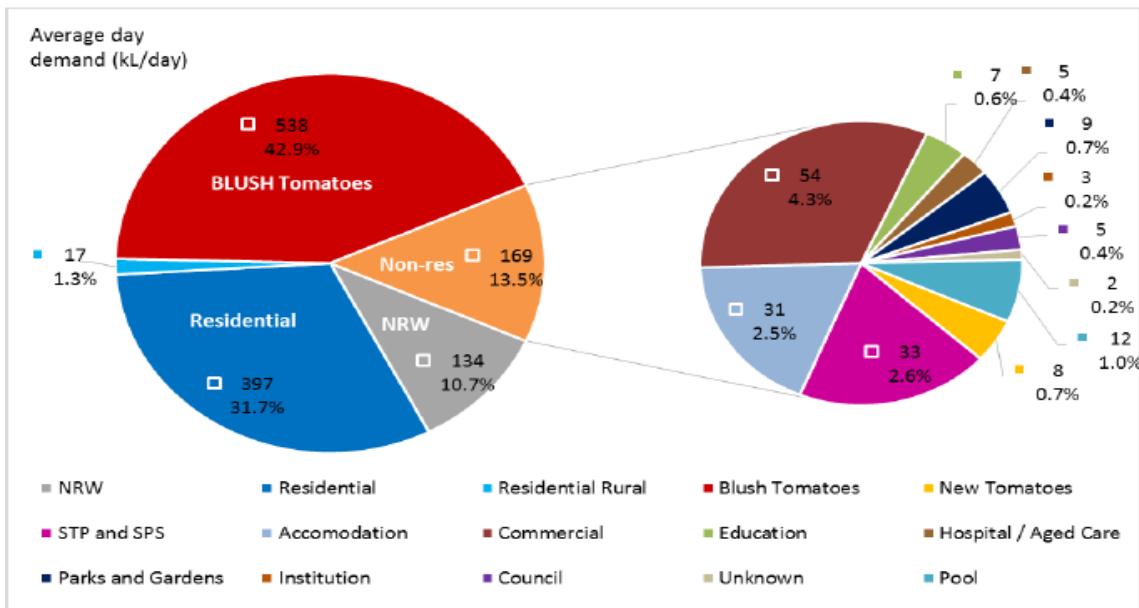


Fig 11: Armidale Average Water Consumption by Customer Category



NRW stands for Non Revenue Water.

Fig 12: Guyra Water Consumption by Customer Category

### 6.4.4 Top Water Consumers

It is recommended that ARC approaches major water users in advance of drought to make special arrangements for water restrictions during droughts. Whilst it may be the case that significant savings can be made during droughts, many of the large potable water users may not be able to cut back their consumption without affecting their services, production and/or staffing levels. Council should take this into consideration when preparing special arrangements with each customer. The customers with higher non-essential water use should be targeted first.

### 6.4.5 Dry Year Annual Demand Analyses

Extract of draft IWCM Issues paper have been reproduced below for current and forecasted demand in Armidale and Guyra.

Table 8: Armidale Water Forecast

	2016	2018	2023	2028	2033	2038	2043	2048
Average year metered demand (ML/year)	2,421	2,476	2,617	2,762	2,909	3,064	3,235	3,414
Peak day production (ML/day)	18	18	20	21	22	23	24	26
Dry year extraction (ML/year)	3,675	3,764	3,994	4,230	4,470	4,722	4,999	5,289

Table 9: Guyra Water Forecast

	2016	2022	2027	2032	2037	2042	2046
Average year demand production (ML/year)	425	433	444	456	469	485	504
Peak day production (ML/day)	4.4	4.5	4.6	4.7	4.8	4.8	5.0
Dry year extraction (ML/year)	589	607	625	644	666	690	712

# 7 Climate

## 7.1 Rainfall, Evaporation and Temperature

The New England Region experiences a dry sub-humid temperate climate with the majority of rain falling in the summer months. Average annual rainfall is just less than 800mm in Armidale which goes up to about 900mm in Guyra as shown in Fig: 13 Isohyetal Map for Gara River Catchment. Mean monthly maximum temperatures vary from 26.8 degrees Celsius in January to 10.1 degrees Celsius in July and mean monthly minimum temperatures vary from 13.9 degrees Celsius in January to -1.1 degrees in July. The mean annual evaporation is approximately 1600mm, with monthly values varying from 60mm in June to 210mm in January.

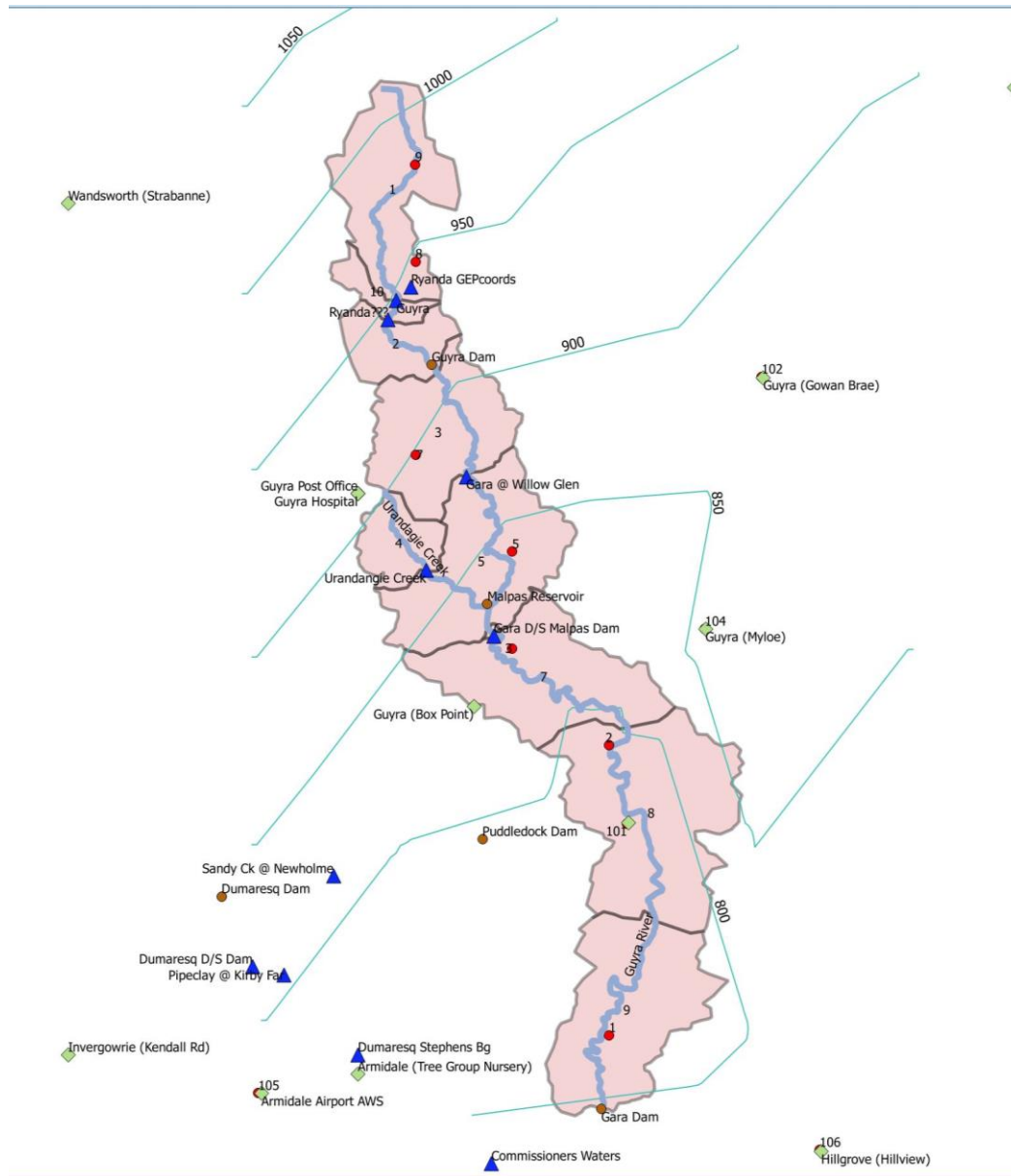
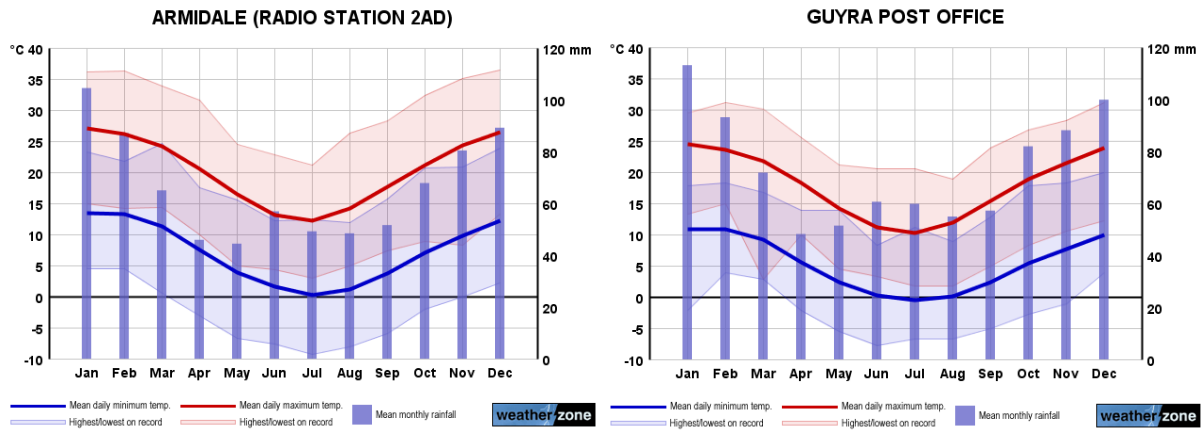


Figure 13: Isohyetal Map



Note: Armidale Radio (BOM station 56002) commenced in 1857 and closed in 1997 and Guyra Post Office (BOM Station 56016) commenced in 1886 and is current.

Fig 14: Armidale (left) and Guyra (right) Climate Data

## 7.2 Climate Change

NSW Climate Impact Profile 2010 predicts some changes to climate. Daily maximum temperatures in the New England/North West region are projected to increase over all seasons by 1–3°C. Rainfall is projected to increase in all seasons except winter, when it is expected to decrease by 10–20%. Evaporation is likely to increase throughout the year Overall water balance is likely to remain similar to what it is at present, but with some redistribution of runoff likely to produce substantial increases in summer and a substantial decrease during spring and winter.

The NSW Office of Water engaged NSW Public Works to conduct a pilot study to determine the potential impact of variable climatic patterns on 11 local water utility water supply systems in regional NSW. The pilot study found that future secure yield under the methodology proposed by NOW(2013) also known as “5/10/10” rule, is reduced by up to 9% for coastal and table land utilities and by approximately 30% for inland water utilities in mid and southern NSW. The pilot study used 0.9°C global warming by ~ 2030 and the 15 global climate models.

Secure yield of ARC water supply dams were found to be reduced by about 32% with the consideration of climate change (NUWS 2020). The study utilised climate data provided by DPIE Water for a future climate change scenario corresponding to a 1 degree rise in global temperature by year 2030.

## 7.3 Drought Restrictions History

Council introduced water restriction in late February 2019 in Guyra and early March 2019 in Armidale. It was the first water restriction imposed in Armidale since Malpas Dam was built in 1968. However, water restrictions have been applied in the past in Guyra.

Some of the actions Council took during the restrictions are listed below

- Demand management through education, rebates and imposed restrictions;
- Finding and fixing leaks in ageing infrastructure;

- Water carting from Armidale to Guyra;
- Commissioning of Malpas Dam to Guyra pipeline.
- Additional testing – deep water samples
- Targeting high water users to constrain consumption
- Offering rebates on residential water tanks, front loading dish washers and shower heads.

As the drought worsens, higher level of water restrictions was progressively introduced with Level 5 Emergency water restrictions on 24 June 2019 in Guyra and 1 October in Armidale. Residential water consumption was below the target level of 160 litres per capita per day since the introduction of level 5 restriction as shown in the graph below.

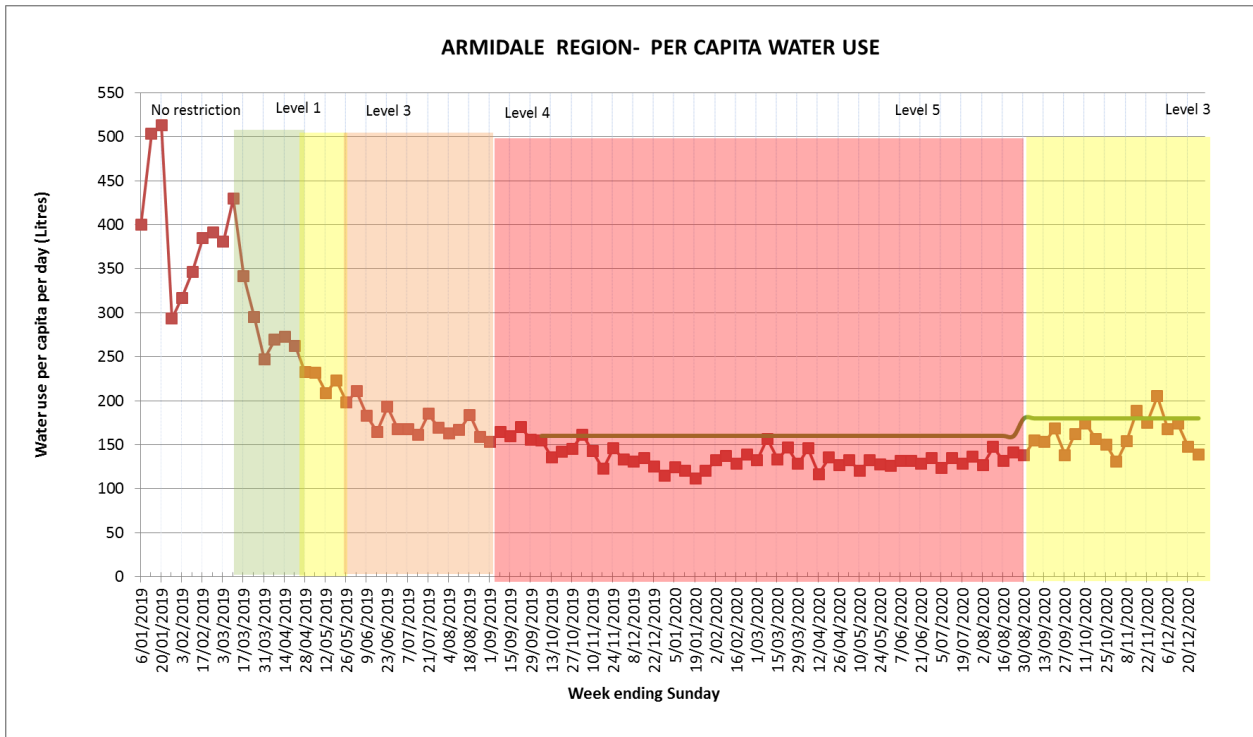


Fig 15: Residential Water Use in Armidale and Guyra combined during the drought

Some of the highlights of 2019 drought were

- Malpas and Guyra dam catchment, as measured by Guyra Post Office weather station (the Bureau’s Station No. 056016), observed 330.8mm of rainfall in 2019 which is NOT only the lowest in 130 years but 40% less than the second lowest (553.9mm) recorded in 1919, exactly a century ago.
- Guyra dam hit the level that it couldn’t supply Guyra town forcing water carting from Armidale.
- Malpas dam level fell to 32.8% on 15th Jan 2020. The lowest since it was built in 1970.
- Poor water quality, as dam level drops to unprecedented level, provided extra challenges to treat water.

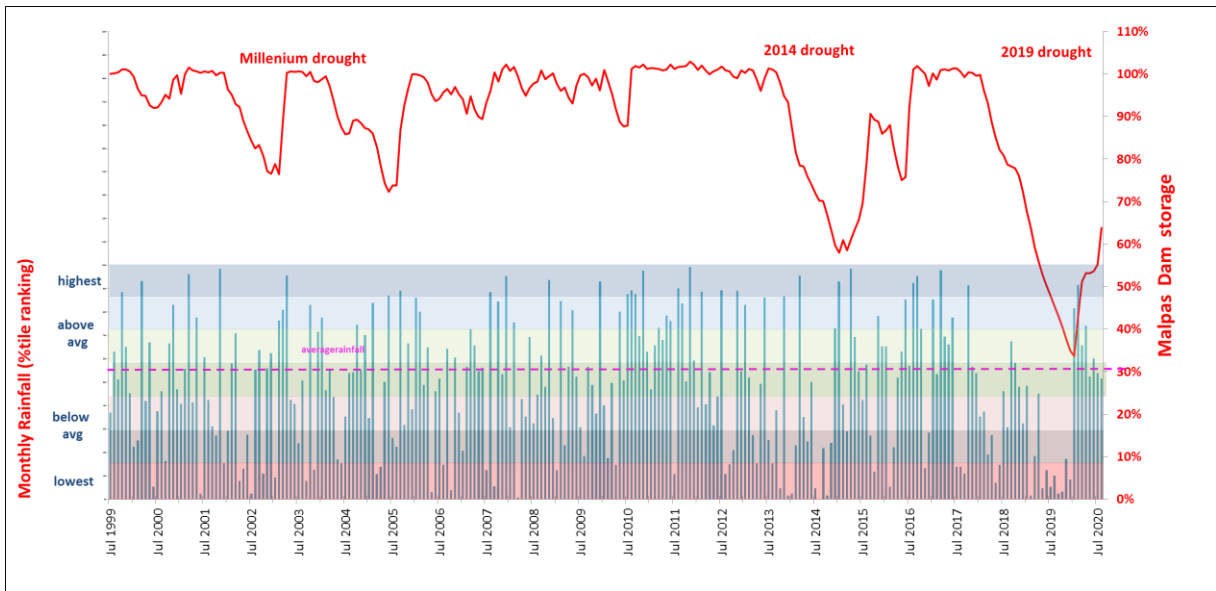


Fig 16: Malpas Dam Storage Trend and the Rainfall in the last 20 years



## 8 Regulatory Framework

### 8.1 Armidale Regional Council

ARC delivers water under the provisions of the NSW *Local Government Act 1993*. Some aspects of the water business are carried out under the provisions of the NSW *Water Management Act 2000*. ARC is empowered to restrict water supply (e.g. by public notice published in a newspaper circulating within Armidale Regional Council area) under the *Local Government (General) Regulation 2005*.

The *Local Government Act 1993* Section 637 reads: “a person who wilfully or negligently wastes or misuses water from a public water supply, or causes any such water to be wasted, is guilty of an offence”. The maximum penalty which can apply is:

- ❑ Maximum penalty: 20 penalty units
- ❑ Current (s17 of Crimes (Sentencing Procedure) Act 1999) penalty unit: \$110

Consumers who are identified breaching water restrictions in place may have their supply cut off or restricted by Council in accordance with Clause 144 of the *Local Government (General) Regulation 2005*.

This plan is administered by the Council. During drought, this plan will be overseen by the Drought Management Team. The implementation of this Drought Management Plan will be the responsibility of the Drought Incident Manager.

### 8.2 DPIE Water

#### 8.2.1 General

DPIE Water works with partner agencies and with the community to provide a reliable, sustainable supply of water for households, irrigators, farmers, industry and the environment.

Available water determinations are made for each water source generally at the start of a water year (on 1 July). The licensed volume or the percentage of the share component is defined by DPI Water. Since the introduction of the *Water Management Act 2000*, DPI Water is preparing water sharing plans for rivers and groundwater systems across New South Wales.

### 8.2.2 Water Sharing Plans

By setting the rules for how water is allocated for the next 10 years, a water sharing plan provides a decade of certainty for the environment and water users. This not only ensures that water is specifically provided for the environment through a legally binding plan, but also allows licence holders, such as irrigators, who require large volumes of water to plan their business activities.

No water supply dams except Malpas dam are not subject to any water sharing plans. Malpas dam is subject to Water Sharing Plan for the Macleay Unregulated and Alluvial Water Sources 2016 (<https://legislation.nsw.gov.au/#/view/subordleg/2016/385>). The plan was made under section 50 of the Water Management Act 2000 and commenced on 1 July 2016. Section 28 of the plan sets the following rules for Malpas Dam releases (current as January 2017):

#### **“28 Releases in the Malpas Dam Water Source**

*(1) In the Malpas Dam Water Source, releases of water must be made from Malpas Dam in accordance with this clause.*

*(2) Subject to subclause (3), when inflows to Malpas Dam, as measured at the Gara River at Willow Glen gauge (206035), are:*

*(a) less than 1 ML/day, a release equal to or greater than the inflows plus 1 ML/day, as measured at the Gara River downstream Malpas Dam gauge (206039), must be made from Malpas Dam, or*

*(b) equal to or greater than 1 ML/day and less than or equal to 6 ML/day, a release of 2 ML/day or greater, as measured at the Gara River downstream Malpas Dam gauge (206039), must be made from Malpas Dam, or*

*(c) greater than 6 ML/day, a release of 3 ML/day or greater, as measured at the Gara River downstream Malpas Dam gauge (206039), must be made from Malpas Dam.*

*(3) Subclause (2) does not apply when the Malpas Dam is less than or equal to 55% of the dam’s storage capacity.”*

### 8.3 Fire Fighting Requirements

In spite of the water restriction actions, preference will be provided to accommodating firefighting requirements.

Minimum of 150KL of water is reserved for firefighting purpose in each reservoir, which is able to provide water for 4 hours with a flow rate of 10l/s. In the event that the emergency conditions last for more than 3 days, fire services will be directed to arrange alternate water source (e.g. water tankers) if appropriate.

Council anticipates making available to the NSW RFS all of its tank storages holding groundwater.

## References

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## Appendix A DPI Water Drought Management Plan Checklist

Extract of DPI Water Best – Practice Management Guidelines – Strategic Business Plan – Drought Management Plan Checklist

### Strategic Business Plan – Check List

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#### 6.6 Drought Management<sup>4,8</sup>

- A. Are all water supply sources suitably monitored (eg. level, flow, relevant water quality) and recorded? If not, implement suitable monitoring and recording.
  - B. Includes a graph of the water demand over time with super-imposed restriction periods, storage/ground water level and relevant climatic data since the last SBP Update.
  - C. Includes a summary of water supply system performance since the last SBP Update and any management/emergency response actions undertaken.
  - D. Review the adopted drought management plan, especially the schedule of trigger points for drought water restrictions and the level of water restrictions, and the associated measures. Update where warranted and include as an Appendix.
- 

<sup>4</sup> All items under this element must be reviewed when preparing the Strategic Business Plan.

<sup>8</sup> A separate Drought Management Plan with NOW Concurrence will not be necessary in the future if these items are addressed in your SBP.

## Appendix B Detailed Restriction Rules

### Details of Restriction Levels and Proposed Rules

In addition to Permanent Water Conservation Measures, there are five levels of water conservation measures/ restrictions that correlate to the five drought response levels. A general description of each level of restrictions is included below. The measures also include special provisions for the elderly, infirmed and disabled.

**Permanent Water Conservation Measures:** As part of Councils overall Demand Management strategy in conserving water at all times (during drought and non-drought periods) the following permanent water conservation measures apply;

- Sprinklers / fixed hoses are not to be used for watering of gardens and lawns between; 8.00am to 6.00pm during Eastern Daylight Saving Time; and between 9.00am and 4.00pm Eastern Standard Time.
- Hand held hoses fitted with a trigger nozzle may be used at any time for general watering of gardens and vehicle washing.
- No hosing down of hard surfaces (pressurised hose to be used).
- New turf may be watered at any time with an approved Water Management Plan for up to six weeks from installation of turf.

Permanent water conservation is voluntary only; the Local Government Act and regulation do not currently provide a mechanism to enforce these measures except s637 of the Act which prohibits waste of water.

**Level 1 Low:** This is the first temporary level of restriction and would involve a restriction on the use of hoses and drip irrigation systems during the heat of the day, as well as limiting the use of sprinklers to 2 hours per day. The introduction of this level of restrictions would raise community awareness of drought conditions, however only minor reductions in water consumptions would be achieved.

New turf may be watered at any time with an approved Water Management Plan for up to six weeks from installation of turf.

**Level 2 Moderate:** This level of restriction would involve a ban on sprinklers, as well as limiting the use of hoses and drip irrigation systems to 2 hours per day in order to reduce water consumption to just below average consumption levels. Implementation of this level of restrictions would create some level of inconvenience for the community; however most lawns and gardens would not be significantly impacted.

**Level 3 High:** This level of restriction would further limit the use of hoses and drip irrigation to 2 hours twice a week in order to further reduce water consumption below average consumption levels. Implementation of this level of restrictions would create inconvenience for the community. Some losses of lawns and gardens would be expected at this stage.

**Level 4 Very High:** This severe level of restriction would involve a ban on all outdoor and non-essential usage in order to reduce water consumption to around winter consumption levels. Due to the major impacts of this level of restrictions, implementation of level 4 restrictions would only occur in very rare circumstances. Impacts would include the severe stress, and in many cases dying off, of lawns and gardens. Non-residential customers would be urged to reduce their demand.

**Level 5 Emergency:** This extreme level of restriction would involve an all-out campaign to reduce water consumption to absolute minimum levels (<150 L/person/day). This level of restrictions would involve a major disruption to normal lifestyles, including reduced shower times, reduced number of washing machine loads and a ban on the use of residential evaporative coolers (except where exemptions apply). Non-residential customers would be requested to restrict the use of water for only essential services. Aggressive water conservation measures are at Level 5 to extend Armidale's water supply for as long as possible, with the possible temporary shutting down of non-essential, water dependent services.

Level 5 Emergency restrictions will have further three 'trigger points', based on the number of days before the town water supply runs out. Level 5 Trigger 1 will commence when total storage level get to about 40 % (or 365 days of water is left in the dam) and progress to Trigger 2 with 250 days and Trigger 3 with 60 days. Each trigger point has specific messaging and actions and is outlined in the ARC Drought Management Water Restrictions Communication and Engagement Strategy 2019.

Armidale Regional Council Drought Management Plan - Water Restriction Guide																			
Category	Activity	Permanent		Level 1		Level 2		Level 3		Level 4		Level 5		Level 5 Trigger 1		Level 5 Trigger 2		Level 5 Trigger 3	
				Low		Moderate		High		Very High		Emergency		Emergency		Emergency		Emergency	
	Total storage (%)			80%		70%		60%		55%		50%		The Day Zero – 365 days		The Day Zero – 250 days		The Day Zero – 60 days	
	Target demand	200 L/P/D		180 L/P/D		170 L/P/D		160 L/P/D		155 L/P/D		145 L/P/D		120 L/P/D		100 L/P/D		80 L/P/D	
General watering lawns and gardens	Buckets/cans	✓		✓		✓		R	2 hours Note D	X	Recycled water only	X	Recycled water only	X	Recycled water only	X	Recycled water only	X	Recycled water only
	Hand held hoses (with trigger nozzle)	✓		R	Not during heat of the day Note E	R	2 hours Note D	R	2 Hours On Sunday and Wednesday Note D	X		X		X		X		X	
	Water efficient drip irrigation	✓		R	Not during heat of the day Note E	R	2 hours Note D	X		X		X		X		X		X	
	Sprinklers and fixed hoses	R	Not during heat of the day	R	2 hours only Note D	X		X		X		X		X		X		X	
	Watering of new turf for upto 6 weeks	R	Not during heat of the day	R	Not during heat of the day Note E	R	2 hours Note D	R	2 Hours On Sunday and Wednesday Note D	X		X		X		X		X	
Public parks, gardens and facilities	Watering vegetation	✓		R	Not during heat of the day Note E	R	Selected parks and sports field and all garden beds. Note E & H	R	Selected parks and sports field and all garden beds. Note G&H	X		X		X		X		X	
Vehicle washing	Buckets	✓		✓		✓		R	Not during heat of the day Note E	R	Windscreen /Licence plate cleaning only	R	Windscreen /Licence plate cleaning only	R	Windscreen /Licence plate cleaning only	R	Windscreen /Licence plate cleaning only	R	Windscreen /Licence plate cleaning only
	Hand held hoses	✓		R	Not during heat of the day Note E	R	2 hours Note D	X		X		X		X		X		X	
Washing down hard surfaces	High pressure cleaner	✓		✓		✓		X		X		X		X		X		X	
	Hand held hoses	X		X		X		X		X		X		X		X		X	
Private swimming pools	Filling	✓		R	Permit required for filling pools >5kL	R	Permit required for filling pools >5kL	X		X		X		X		X		X	
	Topping up	✓		✓		✓		R	Buckets only - no fixed hoses.	X		X		X		X		X	
Council swimming pool	Lawns and surrounds	✓		R	Lawn areas watered in accordance with Level 1 restrictions	R	Lawn areas watered in accordance with Level 2 restrictions	R	Lawn areas watered in accordance with Level 3 restrictions	X		X		X		X		X	
	Topping up	✓		✓		✓		✓		✓		✓		✓		✓		X	
Hydrotherapy Pool		✓	No restrictions to health facilities	✓	No restrictions to health facilities	✓	No restrictions to health facilities	✓	No restrictions to health facilities	✓	No restrictions to health facilities	✓	No restrictions to health facilities	✓	No restrictions to health facilities	✓	No restrictions to health facilities	✓	No restrictions to health facilities
Evaporative coolers	Use of water for cooling	✓		✓		✓		✓		✓		R	Business, commercial and domestic aged and disabled only.	R	Business, commercial and domestic aged and disabled only.	R	Business, commercial and domestic aged and disabled only.	R	Business, commercial and domestic aged and disabled only.
Water cartage	Treated water for stock and domestic	✓		✓		✓		R	Internal domestic use only	R	Internal domestic use only	R	Internal domestic use only	R	Internal domestic use only	R	Internal domestic use only	R	Internal domestic use only

Armidale Regional Council Drought Management Plan - Water Restriction Guide																				
Category	Activity	Permanent		Level 1		Level 2		Level 3		Level 4		Level 5		Level 5 Trigger 1		Level 5 Trigger 2		Level 5 Trigger 3		
				Low		Moderate		High		Very High		Emergency		Emergency		Emergency		Emergency		
	Total storage (%)			80%		70%		60%		55%		50%		The Day Zero – 365 days		The Day Zero – 250 days		The Day Zero – 60 days		
	Target demand	200 L/P/D		180 L/P/D		170 L/P/D		160 L/P/D		155 L/P/D		145 L/P/D		120 L/P/D		100 L/P/D		80 L/P/D		
	Treated water for all other uses	✓		✓		✓		X		X		X		X		X		X		
Commercial and industrial	General use (excl lawns and garden)	✓		✓		✓		R	Target 15% reduction in usage.	R	Target 20% reduction in usage.	R	Target 25% reduction in usage.	R	Target 30% reduction in usage.	R	Target upto 50% reduction in usage. Consider temporary closure of non-essential/ high water customers.			
	Landscaping (incl lawns and garden)	✓		R	Not during heat of the day Note E	R	Hand held hoses only for 2 hours Note D	R	Hand held hoses 2 Hours On Monday and Thursday Note D	X		X		X		X		X		
	Irrigation of sports areas	✓		R	Not during heat of the day Note E Water Management Plan encouraged	R	2 hours with approved Water Management Plan Note D	R	2 Hours with approved Water Management Plan On Monday and Thursday Note D	X		X		X		X		X		
Elm St Guyra Tomato Farm	Irrigation of Hydroponic Tomatoes	✓		✓		✓		R	Target 15% reduction in usage.	R	Target 20% reduction in usage.	R	Target 25% reduction in usage.	Target 30% reduction in usage with approved Water Management Plan – supply may be limited to the amenities when Malpas dam gets to 35%.						
<b>Key:</b>		<b>Notes:</b>																		
✓ = Allowed at all times		A. Restrictions apply to the use of Armidale and Guyra town water.																		
X = Banned at all times		B. Greywater and rainwater can be used at any time provided that rainwater tanks are not topped up from town supplies.																		
R = Restricted use only		C. A Water Management Plan may be approved to allow the use of fixed sprinklers outside the nominated hours during Permanent and Level 1 restriction periods.																		
		D. Any reference to 2 hours of restricted watering means between the hours of 6 pm and 8 pm OR 6am and 8am (not both) during daylight saving and 5 pm and 7 pm OR 5am and 7am (not both) at all other times.																		
		E. Not during the heat of the day means not between 9.00 am and 5.00 pm during daylight saving and 10.00 am and 3.00 pm at other times.																		
		F. Periods of water restrictions Level 1 to Level 5 will be policed by Council Officers. The maximum penalty under the Local Government Act for a breach of restrictions is \$2,200 for corporations and \$220 for individuals.																		
		G. Selected parks and sports fields may be watered for 1 watering cycle on Mondays & Thursdays outside the daytime.																		
		H. Armidale Central Park, Armidale Sportsground, Rologas Field, Harris Park, Guyra Lions Park Sporting Complex.																		
		I. The target reduction will be relative to the pre-drought average consumption.																		