PARKES SHIRE COUNCIL

INTEGRATED WATER CYCLE MANAGEMENT STRATEGY

UPDATE

ISSUES PAPER

Rev 0

2021

Advanced Water Recycling Facility under construction

Document Control

This is the Parkes Shire Council IWCM 2021 Update – Issues Paper

Version	Authors	Reviewer	Approved
			Date
Draft	R Butler	N Lai	17 August 2021

Contents

Table of Tables

Table of Figures

Abbreviations

Abbreviation	Description
ADWG	Australian Drinking Water Guidelines
BOD	Biochemical oxygen demand, a measure of 'strength' of organic pollutants in wastewater/ sewage.
CENJO	Central NSW Joint Organisation (formerly Centroc, see below) - consisting of Bathurst, Blayney, Cabonne, Cowra, Forbes, Lachlan, Oberon, Orange, Parkes, Weddin
Centroc	Central Regional Organisation of Councils – consisting of Bathurst, Blayney, Boorowa, Cabonne, Cowra, Forbes, Harden, Lachlan, Lithgow, Oberon, Orange, Parkes, Upper Lachlan, Weddin, Wellington, Young and Central Tablelands Water.
EPA	Environment Protection Authority
EIS	Environmental impact statement
EP	Equivalent population
DPIE	Department of Planning Industry and Environmenta
GIS	Geographical Information System
IDEA	Intermittently Decanted Extended Aeration
IPR	Integrated Planning and Reporting
IWCM	Integrated Water Cycle Management
LEP	Local Environment Plan
LGA	Local Government Area
LOS	Levels of Service
NPM	Northparkes Mine
NWI	National Water Initiative
SAP	Special Activation Precinct
SBP	Strategic Business Plan
STP	Sewage Treatment Plant
WELS	Water Efficiency Labelling and Standards
WHS	Work Health and Safety
WTP	Water Treatment plant
TAM	Total Asset Management
TRB	Typical Residential Bill

1 Executive Summary

Over the past five years Parkes Shire Council has delivered comprehensive upgrades of the town's urban water infrastructure. The $100m raft of capital works includes the refurbishment of raw water infrastructure and the construction new of state-of-the-art water and wastewater treatment facilities, including the establishment of new a recycled water scheme.

The infrastructure was designed to be 'right size' to service the existing population of 15,000 and accounted for predicted growth of 0.4% based on the 2015 IWCM modelling.

The new treatment plants and raw water infrastructure were officially opened in 2018, however, since their completion several significant developments have been announced for the region. This substantially increases projected growth, and the increased demand will exceed the current infrastructure capacity. Further investment in water infrastructure is required to accommodate this additional demand.

This *Issues Paper* focusses on capturing the key water and sewerage issues currently faced by Parkes Shire, the changes that have occurred since 2015 and documents other issues likely to emerge over the 30-year forecast period.

The Parkes IWCM 2021 Update builds on the IWCM Strategy 2015 and has been developed in accordance with the Checklist updated by the NSW Department of Planning, Infrastructure and the Environment in July 2019.

1.1 Adopted Scenario – IWCM 2015

The 2015 IWCM, along with the Strategic Business Plan for Water Supply and Sewerage Services (2014), were the key planning tools used to ensure Parkes Council could provide secure, reliable and sustainable urban water services into the future. Multiple solution sets were developed and tested by Council, consultants, key agencies and community stakeholders and after widespread public consultation Scenario 9 was adopted by Council.

The key elements of the adopted Scenario 9 were:

- New 16 ML/day Water Treatment Plant for the Parkes –Peak Hill Supply Scheme
- New 3 ML/day Sewage Treatment Plant for Parkes
- Advanced Water Recycling Facility and Ring Main and Solar PV
- Permanent Lachlan River Intake
- Connection to Bore 8
- Modification to the raw water transfer arrangements
- Continuing to plan for potential Centroc Water Grid Connections, commencing with the connection to Forbes Bore 3.
- Delivering the System Loss Management Plan
- Minor changes to the Permanent Water Conservation Measures.
- Substituting raw water for recycled water to the Golf Club, and
- Development of the agricultural Irrigation area near the future STP.

In addition, a flood safety upgrade to Lake Endeavour Dam was completed in 2018 to stabilise the spillway and also improved the level gauging and telemetry at the site.

1.2 Emerging Issues in 2021

Table 1.1: Issues identified in the IWCM 2021 update process

Issue	Description / Impact	Actions Underway or Proposed
Ability to access total allocation from River and Borefield in times of high demand	The secure yield from the river and borefield is constrained by the transfer pipe and pump capacity. The condition of the two 30km transfer pipes, as well as poor river water quality, reduces the time extraction is possible even when River flows are adequate.	River water pre-treatment plant Duplication of the pipeline Refurbishment of booster pumps
Increasing demand for raw water from Northparkes mine	Northparkes mine (NPM) production has increased from the 2015 projection to almost double raw water supply from 80L/sec to 120L/sec.	Agreement with NPM to supply
Special Activation Precinct	The planned Special Activation Precinct to the west of Parkes Township will bring a potential additional demand of 7.7GL/year, while PSC currently uses 2.2GL/year and commensurate growth in population in the town.	Planning of SAP assumes certain demand amounts which are included in this issues paper. These may change.
Council financial position poor after construction of new WTP and STP	Council's return on investment for the water business has been negative for the past three years.	Review TRB and capital works plan, access grant funding to finance required works.
B Section pipeline breakages and water quality impacts	Water supply provided by Lachlan Shire Council through long, aged pipeline	B Section pipeline refurbishment/replacement
Groundwater impacts from borefield extraction limiting yield	Sustainable capacity of the aquifer may not be able to provide the full amount of Council's Town Water allocation. Impacts and interactions with nearby bores also an issue.	Cenjo pipeline Borefield refurbishment and new Bore
Impacts associated with climate change such as	Water quality, demand and infrastructure can be impacted with both high and low river flow events increased rainfall, intense storms, drought and increased temperature	River water pre-treatment plant

These issues will be explored further in the Options Paper and the various scenarios to address the issues described and costed.

2 Introduction

2.1 The 2021 IWCM Update

This document is an update of the 2015 IWCM, prepared earlier than required due to the emerging issues of potentially increasing demand, climate change impacts exacerbating drought conditions (seen dramatically in 2019) and uncertainty about the sustainable limits of groundwater extraction.

Various projects are in planning to address the issues and this update aims to assist with ensuring the solutions are appropriate for the expected issues and changes.

The update process was completed collaboratively with Council and a range of specialist consultants, involved with the various other projects Parkes Shire Council are progressing at the time.

2.2 IWCM Planning Framework

The Integrated Water Cycle Management (IWCM) Strategy addresses three elements (IWCM, conservation and drought) of the Best-Practice Management of Water Supply and Sewerage Framework and is a local water utility's (LWU's) 30-year strategy for the provision of appropriate, affordable, cost-effective and sustainable urban water services that meet community needs and protect public health and the environment.

A LWU 's peak planning documents for its water supply and sewerage businesses are its current IWCM Strategy and its current SBP.

The IWCM Strategy:

- Identifies the water supply and sewerage needs of a LWU
- Right sizes' any infrastructure projects and determines their priority
- Identifies the lowest level of stable Typical Residential Bill (TRB) to meet the levels of service
- Includes a 30-year Total Asset Management Plan and Financial Plan

The process of preparing an IWCM Strategy follows the 2019 Department of Planning Industry and Environment (DPIE) Water IWCM Strategy Check List and broadly includes the following:

- Preparation of an IWCM Issues Paper
- Evaluation of feasible options
- Creation of IWCM Scenarios
- Triple bottom line assessment of the scenarios

The following are inputs to the IWCM Issues Paper:

- Water Service Objectives and Targets
- Growth strategy
- Existing systems
- Water cycle analysis
- Existing system performance assessment
- Assessment of unserviced areas
- Consultation

This Issues Paper updates the system descriptions and outlines the current compliance with Levels of Service and financial performance. The appendices are reports from specialist packages of

detailed analysis into demand analysis, demand management, groundwater, climate change and system modeling and capacity.

2.3 Study Area Context

Parkes Shire is located 300 km west of Sydney in the Central West of NSW and covers a total area of 5,919 km^2. The main urban centre of Parkes is located on the Newell Hwy (linking Melbourne and Brisbane), and also the transcontinental (Sydney to Perth) railway. The landscape is gently undulating, mostly cleared land, with an elevation of between 280 and 400 metres.

The Shire's four largest towns are Parkes, Peak Hill, Trundle and Tullamore. Tullamore and Peak Hill are situated in the Bogan River catchment, whilst Parkes and Trundle lie within the Lachlan River catchment.

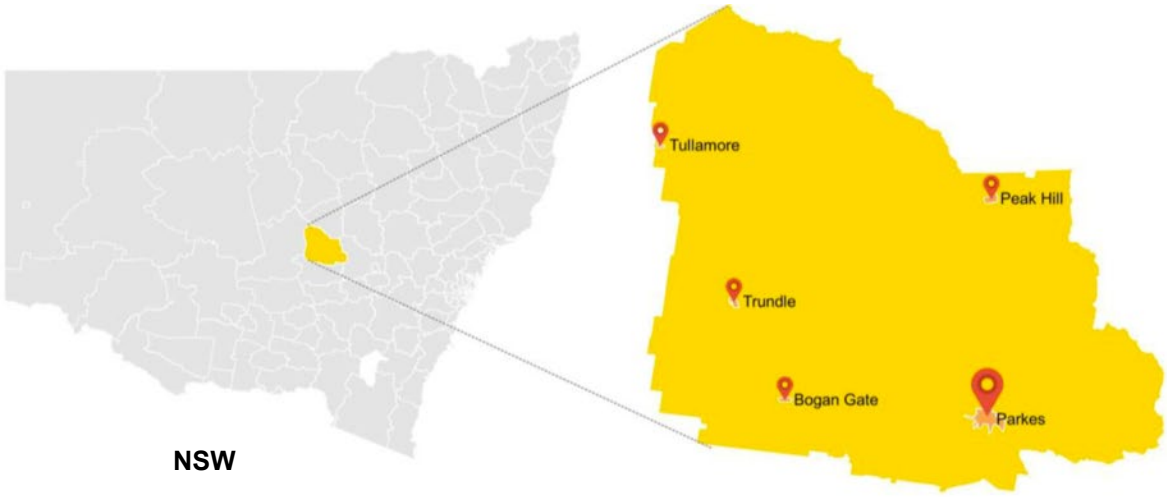

Figure 2-1: Regional Context of Parkes LGA

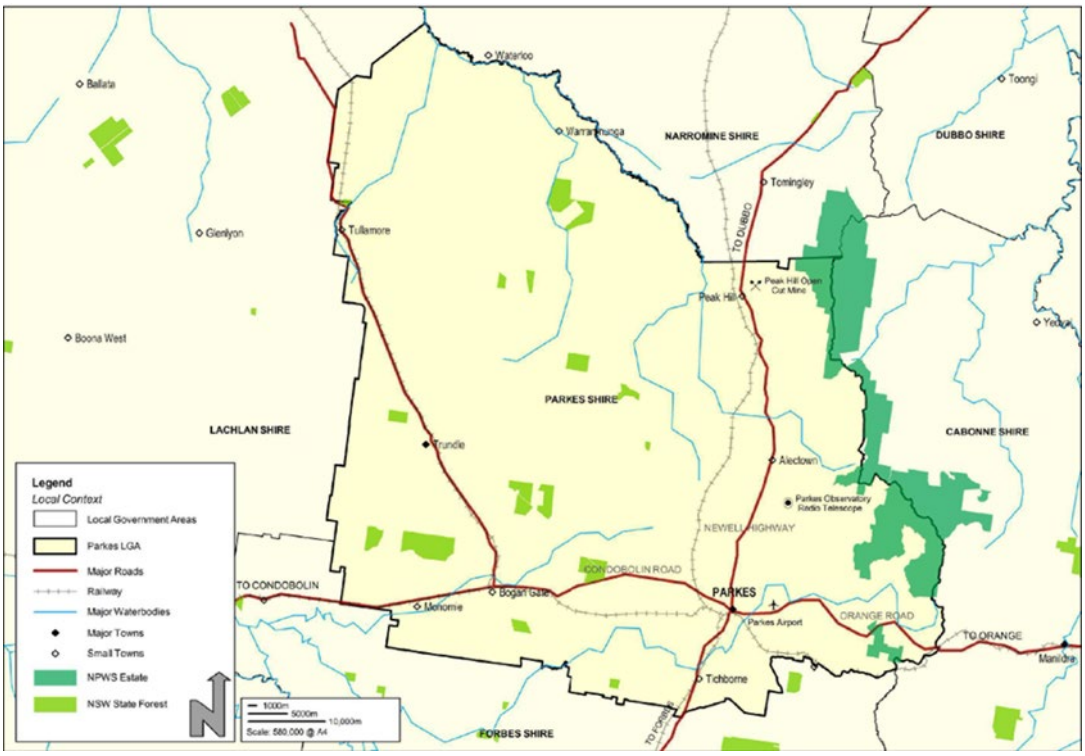

Figure 2-2: Map of Parkes LGA showing major towns

Parkes Shire is within the catchments of two main river systems, the Bogan River to the North and the Lachlan River to the South, both of which are major tributaries of the Murray-Darling System.

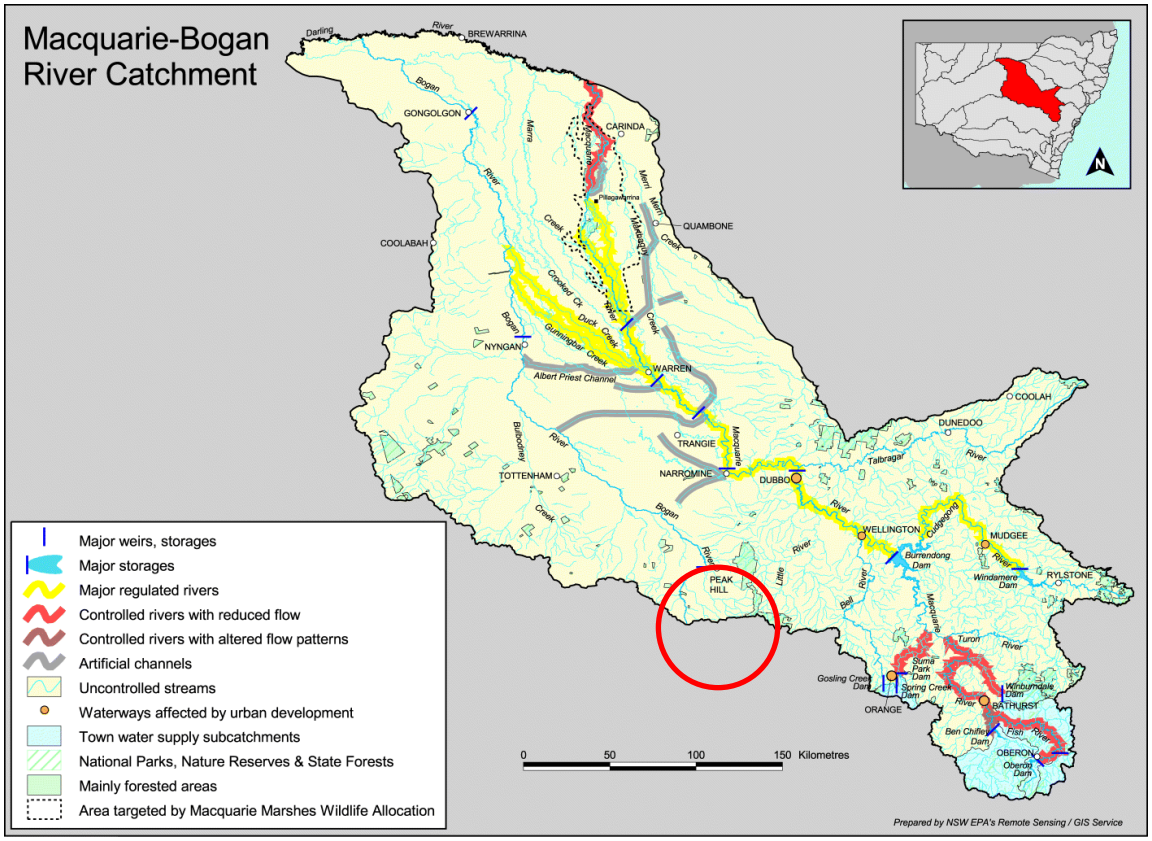

Figure 2-3: Parkes in context of the Bogan River catchment

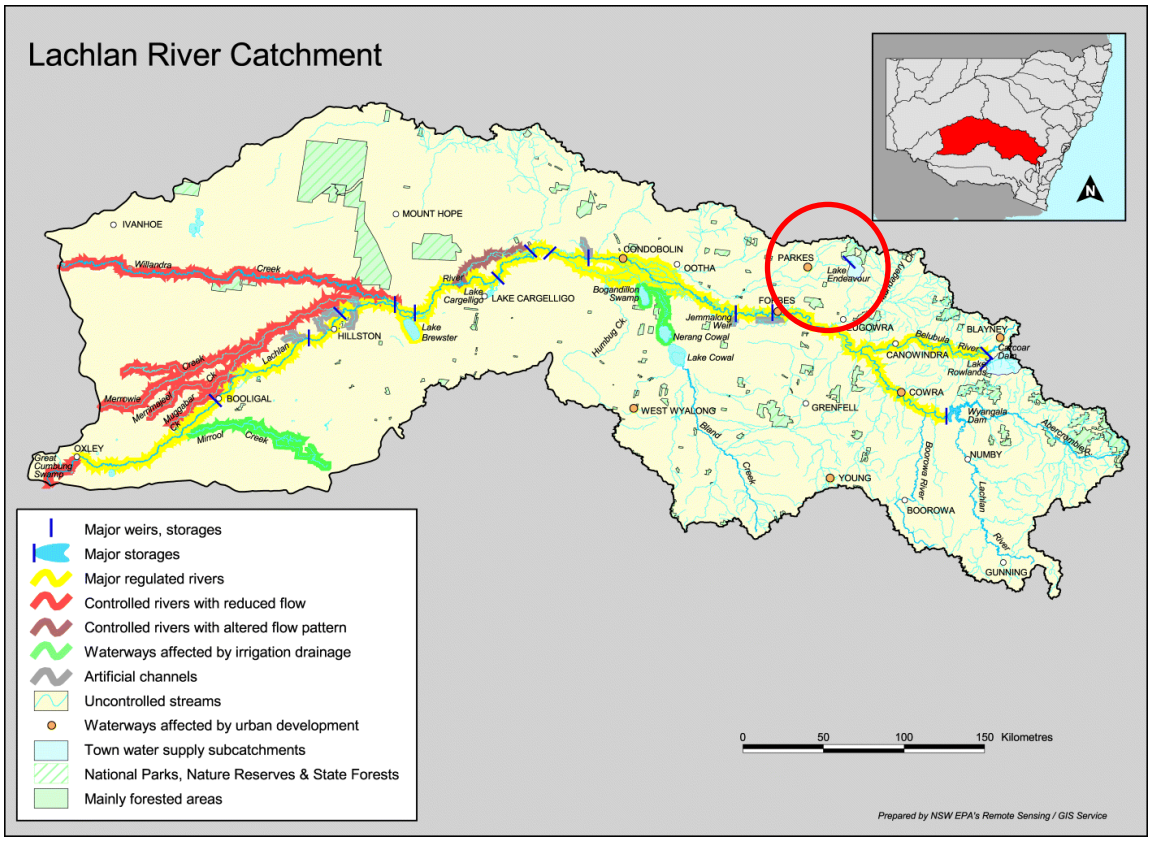

Figure 2-4: Parkes in context of the Lachlan River catchment

Parkes LGA is across four main sub-catchments: Gunningbland and Yarrabandai Creeks, Goobang-Billabong Creek and the Upper Lachlan River (all part of the Lachlan Catchment), as well as the Upper Bogan River catchment.

The town of Parkes is the main urban centre and is situated beside Goobang Creek which eventually flows into the Lachlan at Condobolin.

The Curumbenya Range forms the head of the Goobang Creek subcatchment. A series of low undulating hills of 300-370 metres in height extends west from this range north of Parkes. This ridgeline separates the catchments of the Lachlan and Bogan River systems.

2.4 Population

A detailed review of the serviced populations and areas has been undertaken using Census data (2016), Parkes Shire Council (PSC) billing data (to 2020) and GIS layers and is presented in Appendix A: Demand Analysis. Council provides services to the communities listed in the table below.

Table 2.1: Communities currently provided with water and sewerage services

Town/ Village/ Community	Connected Properties	Water	Sewer
Parkes (whole town)	9,563		Reticulated
Peak Hill	930	Reticulated Potable	Reticulated
Rural Properties adjacent to Peak Hill and Cookamidegera trunk mains	235	Potable Water from Trunk Main	Onsite management systems
Cookamidgera	60	Reticulated Potable	Onsite management systems
Parkes water supply system Total	**11,453**	**Reticulated Potable**	**Mainly Reticulated**
Trundle (including dwellings outside the village)	429	Reticulated Potable	Reticulated
Tullamore (including dwellings outside the village)	213	Reticulated Potable	Reticulated
Forbes Feed/Bogan Gate	329	Reticulated Potable	Onsite management systems
"B Scheme" Total	971		
Properties adjacent to the raw water mains	**39**	Partly treated or raw water from trunk main	Onsite management systems

Rural residents and industries outside of the communities listed above are responsible for their own water supply and generally source their water from rainwater tanks, groundwater bores and surface water allocations. These rural properties and industries use on-site sewage management systems. The inspection of these systems is the responsibility of Council's Public Health section.

In addition to the community water supplies listed in Table 2.1, Council has metered bulk potable water supply contracts with North Parkes Mine (from the Parkes scheme) and Lachlan Shire Council (supplied through the "B-section pipeline").

2.5 Previous IWCM Strategy and Outcomes

The 2015 IWCM Strategy, along with the *Strategic Business Plan for Water Supply and Sewerage Services* (2014), are the key business tools used to ensure Parkes Council can provide secure, reliable and sustainable urban water services into the future.

Multiple solution sets were developed and tested by Council, consultants, key agencies and community stakeholders and after widespread public consultation Scenario 9 was adopted by Council.

The key elements of the adopted Scenario 9 were:

- New 16 ML/day Water Treatment Plant for the Parkes – Peak Hill Supply Scheme
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- Minor changes to the Permanent Water Conservation Measures and
- Development of the agricultural irrigation area near the Webb St STP.

2.6 Lachlan Regional Water Strategy

In 2020 the NSW Government released the draft Lachlan regional Water Strategy for comment. The strategy aims to bring together policy, planning, regulatory, educational, technology and infrastructure solutions in an integrated package that is based on the best evidence, responds to the region's growth, balances different water needs and delivers the right amount of water for the right purpose at the right times.

The strategy covers the whole Lachlan River catchment region and all water types (regulated and unregulated river flows, creeks and groundwater).

The Strategy presents a long list of options for achieving sustainable water management in the region and these are consistent with the options presented in the Parkes IWCM 2021 Update.

The options cover actions, projects, reforms and investments that focus on:

- maintaining and diversifying water supplies, such as new pipelines, improving storages and reuse, recycle and stormwater projects
- protecting and enhancing natural systems, such as fish passages, better support for water quality management and improved management of wetlands on private land
- supporting water use efficiency and conservation, such as water efficiency measures, pricing and trade reviews
- strengthening community preparedness for climate extremes, such as reviewing drought operation rules, allocation processes and improving data collection and education programs

- improving the recognition of Aboriginal people's water rights, interests and access to water—such as reviewing cultural water access licences, ensuring greater involvement of Aboriginal people in water management and establishing Aboriginal regional water advisory committees.

Specific to Parkes, the Special Activation Precinct and Inland Rail are mentioned, as well as the B-Section pipeline, borefield management and the Cenjo Water grid pipeline.

The strategy also outlines existing commitments including:

- Wyangala Dam raising: a business case to raise the wall of Wyangala Dam.
  This will provide an additional 650 GL of storage capacity in the dam, improving water security and reliability for Parkes allocation from the Lachlan River, and may provide some flood management benefits.
- Lake Rowlands Dam to Carcoar Dam pipeline: a business case to construct a pipeline linking Lake Rowlands and Carcoar Dam to enable water transfers between both storages and improve water security and reliability for Parkes via River water flows.
- Parkes, groundwater projects and investigations:
- Funding provided for test bores, bore construction, pumping infrastructure and pipeline connections with existing bores to improve access to groundwater sources.
- Town Water Security Projects: Funding to increase water security in Parkes.
- Safe and Secure program funding for updating the IWCM.

The long list options relevant to Parkes are:

Option 4: Expansion to the piped town water supply system (Cenjo Pipeline)

Described as Option B: Gooloogong-Forbes-Parkes pipeline - this option has two components: transfer of potable water via a pipeline between Forbes' Water Filtration Plant and Parkes Reservoir (bi-directional) transfer of potable water via a pipeline between Parkes reservoir and Gooloogong Bores (bi-directional).

Option 5: Replacement and upgrade of existing pipelines (B Section Pipeline)

Described as Option A: Replacement and upgrade of B-section pipeline (Parkes Shire boundary to Tottenham, Bogan Gate and Tullamore). This option would replace 43 km of pipeline to reduce water losses and improve water security for the village of Albert and town of Tottenham. A strategic upgrade to a subsection of the pipeline would allow additional water delivery to Tottenham, Bogan Gate and Tullamore

The following note was added to this option: asset replacement is the responsibility of the asset owner; however, options may be eligible for co-funding through the Safe and Secure Water Program

Option 6: Inter-regional connections project investigation – this relates to Option 5 above.

Option 10: Reliable access to groundwater by towns – this relates to the Forbes borefield.

Option 20: Secure flows for water-dependent cultural sites – The Lachlan River generally and Goobang Creek are mentioned as culturally significant waterways.

This Option generally aims to:

- Improve recognition of cultural sites and their protection and management.
- Improve community wellbeing and connection to Country.
- Ensure cultural sites are appropriately considered and supported in the Lachlan water management planning framework.

3 Operating Environment Compliance

The delivery of water supply and sewerage services to the schemes' customers is subject to a large number of constraints, requirements, guidelines and other factors, which collectively are referred to as the operating environment. The five major elements of the operating environment (refer to the figure below) are reviewed in this section.

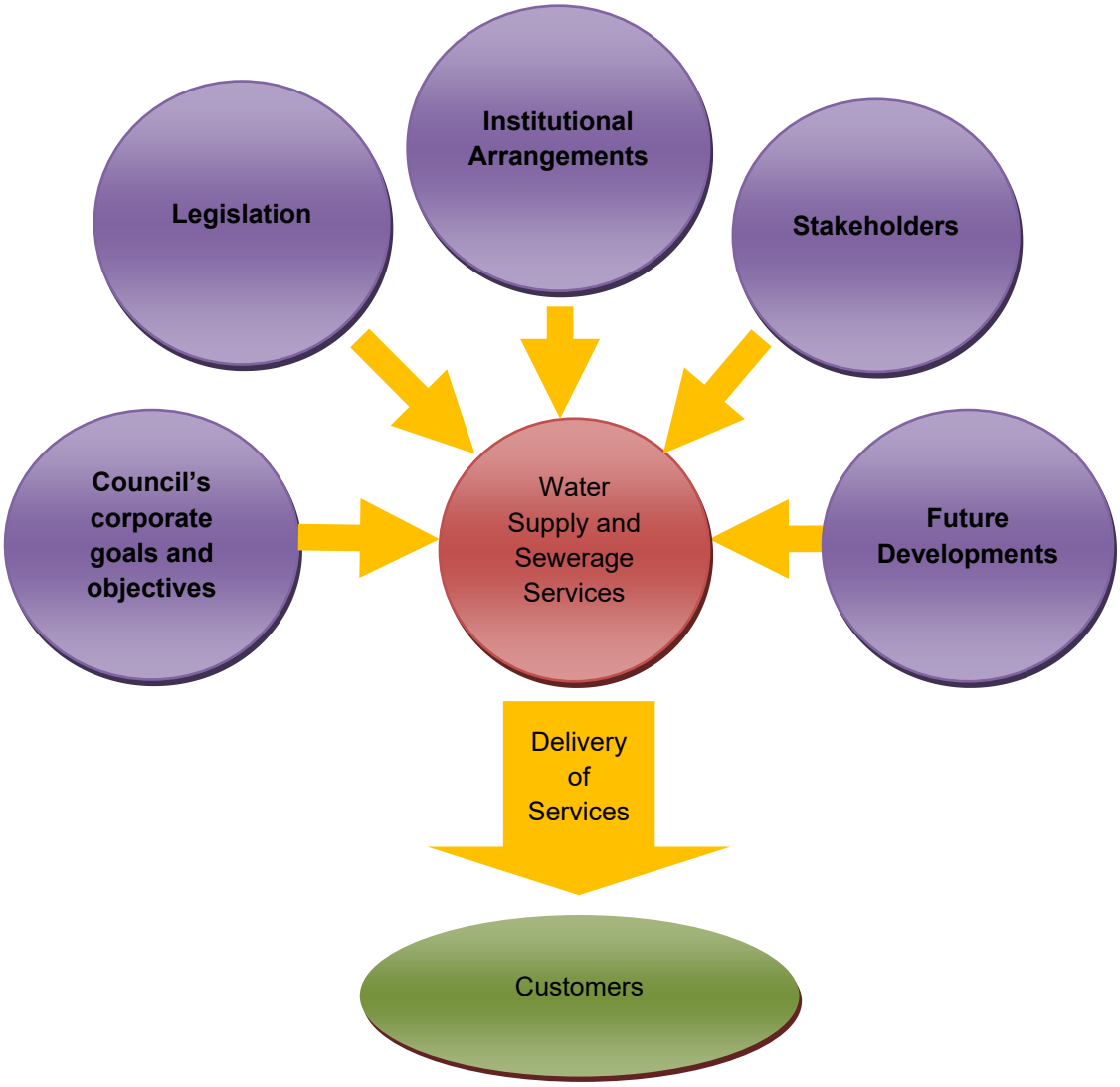


Figure 3-1: Council's strategic operating environment

3.1 Council's Corporate Goals and Objectives

Integrated Water Cycle Management (IWCM) planning aims to optimise service delivery and maximise long term cost effectiveness, whilst meeting community expectations and ensuring environmental sustainability.

Water utilities operated by local councils (like Parkes), must not only satisfy the Best Practice Requirements of the NSW Office of Water (discussed in detail below), but also the requirements of the NSW Office of Local Government (OLG).

The OLG requires all councils to implement a process known as Integrated Planning and Reporting (IP&R) which is summarised in the following figure:

Figure 3-2: Integrated Planning and Reporting Framework for NSW Councils

The Integrated Planning and Reporting Framework requires that extensive community consultation occur at various stages. The Community Strategic Plan (CSP) identifies the main priorities and aspirations for the future of the local government area for at least 10 years, and establishes strategic objectives and strategies for achieving them.

The Delivery Program details the principal activities to be undertaken by the council to perform its functions (including implementing the strategies set out in the CSP) within the resources available under the Resourcing Strategy (which includes long term financial, asset and workforce planning).

The current Delivery Program recognises all key projects and programs in the current IWCM Strategy. Following the local government elections (at the time of writing now postponed twice, but scheduled for December 2021) Council is required to adopt a new suite of IP&R documents.

The key points of integration between the Best Practice Management and IP&R frameworks are:

Since the IWCM Strategy contains the best available informaiton on urban water issues facing the local government area, it should inform the CSP (in relation to urban water issues)

The IWCM Strategy identifies the key activities, resources and timescales that Council needs to undertake to achieve its objectives, and so it should inform the asset and financial planning in the Resourcing Strategy as well as the activities and resource requirements in the Delivery Program.

Council's current Community Strategic Plan (adopted in 2017) has the following objectives which directly relate to water cycle management and the matters considered in this plan:

> 2.5 Improve health and wellbeing by widespread adoption of public health and safety initiatives
>
> 3.5 Grow and support our local communities by our communities having equitable access to services including education, health, technology and transport

4.1-4.5 Grow and diversify the economic base by:

- Having a strong local business sector
- The promotion and marketing of the Parkes Shire as a destination to visit, live, work and invest
- Attracting business investment into the Shire
- Lobbying Government for increased infrastructure and services funding
- Developing and implementing a range of Strategic Economic Development projects to drive economic diversification, investment, employment and population growth

5. Develop Parkes as a National Logistics Hub

7.1-7.4 Care for the environment in a changing climate by:

- Improved environmental outcomes of Council's operations
- having a high awareness of sustainable practices throughout the Community
- widespread adoption of recycling and waste reduction across the Shire
- high levels of compliance with environmental regulations and controls in Council's sphere of operations

8.1, 8.3 & 8.4 Maintain and improve the Shire's assets and infrastructure by Shire water, sewer and stormwater system management meeting industry best practice

Council has adopted the following corporate objectives for its water supply and sewerage services in its Strategic Business Plan for water supply and sewerage services (which align with and further clarifies the objectives in the Delivery Program) :

- To provide a high quality water and reliable supply service complying with recognised health standards at affordable prices.
- To provide a sewerage service to defined benefit centres which is economical, reliable and safe and that meets agreed community standards and license requirements.

Council has recognised five Key Result Areas that must be managed well to achieve success in the long-term provision of water supply and sewerage services to its customers. These are:

- Customer service
- Environmental protection and sustainable development
- Total asset management
- Work force
- Finance

Objectives and Performance Targets have been set in these Key Result Areas. These are fully described in the SBP.

This Integrated Water Cycle Management Strategy seeks to deliver these community and corporate objectives in the most cost-effective way possible.

Council's next Delivery Program will be developed with the aim of better integrating, and also expanding on, these objectives and targets.

The currency of Council's Strategic and Operational Plans are outlined in the Table below.

Table 3.1: Councils strategic planning documents and their latest review period

Planning Document	Latest review, period of currency
Community Strategic Plan 2030	Reviewed 2017
Parkes Shire Local Environmental Plan (LEP)	2012
Community Engagement Strategy	2017- 2021
Local Strategic Planning Statement	2020
Township Strategic Plans (Bogan Gate, Peak Hill, Trundle, Tullamore)	2016
12 Year Strategic Asset Management Plan	2017-18 To 2028-29
12 Year Long Term Financial Plan	2017-18 to 2028-29
Parkes Shire Council Workforce Plan	2017-18 to 2020-21
Delivery Program	2017-18 to 2020-21
Delivery Plan Financial Forecasts	2017-18 to 2020-21
Operational Plan	2021-22
Operational Budget	2019-20
Annual Report	2019-20
End Of Term Report	2012-2016

3.1.1 Corporate Policy

The Strategic Business Plan notes that the extent of legislation, and supporting regulation and policy is having a significant impact on council operations. Resources are stretched and diverted to compliance reporting rather than improved service provision, the State has transferred many responsibilities onto local councils without funding adjustment and there are fewer subsidies available for capital works.

Parkes Shire Council currently has the following corporate policies that are relevant to the operation of its water supply and sewerage schemes:

Table 3.2: Council Corporate Policies

Policy	Impacts
Complaints handling	This document sets out to define Parkes Shire Council's Complaints Handling Policy. The procedures required and organisational structure responsible for handling and managing complaints is also outlined.
Issuing and Processing of Stopped Water Meters and Inaccurate Water Meters Policy	Council is required to ensure that the processing of all water accounts affected by stopped water meters and inaccurate water meters are assessed and processed in a consistent manner and in accordance with presiding legislation. This policy sets out the procedures for processing.

Policy	Impacts
Property Owners with Concealed Water Leaks	The purpose of this policy is to ensure that all applications for allowances for water lost through concealed water leaks are processed in a consistent manner. The property owner is responsible for the maintenance and repair of their water service (from Council's water meter). Where concealed water leaks have been revealed, property owners may request that Council provide an allowance for lost water.
Purchase of Standpipe Water and Payment of Commissions to Agents	This purpose of this policy is to ensure that all agents allow the issue of standpipe water and receipt of payment for the water in a manner consistent with Council policy. Standpipe water is to be paid for at time of purchase, unless, a prior arrangement has been made and accepted by Council's Rates Revenue Officer, who will issue accounts.
Pensioner Rebate and Hardship Assistance Policy	This policy is to determine who is eligible for a pensioner concession and to ensure compliance under 'Section 575' of the Local Government Act, 1993. The policy also gives rise to hardship provisions and the granting of additional pensioner concessions.
Water Charges for Home Dialysis Policy	This policy establishers specific guidelines regarding the provision of a water usages concession for ratepayers and residents required to operate a home dialysis machine in their principal place of residence

In addition, Council is committed to the following operational objectives:

- Asset management,
- Work Health and Safety including asebsetos management,
- Business continuity,
- Enterprise risk management,
- Debt recovery,
- Considered investment,
- Sustainable procurement and disposal,
- section 603 and water certificates.

3.2 Legislative Framework

Parkes Shire Council delivers potable water supply and reticulated sewerage services to the community under the authority of the *Local Government Act 1993*. Council has embraced the principles underlying this Act in order to benefit the community it serves. Community consultation and involvement in decision-making has been increased in line with the Act in the last few years.

Several other Acts also affect Council's scheme. These generally fall into three main categories as follows (this is not intended to be an exhaustive list):

Table 3.3: Legislation Impacting on Water and Sewerage Services

Legislation	General Implications for Council
Pricing	

Local Government Act 1993
 	
Esp. Sections 64 (in applying Division 5 of Part 2 of Chapter 6 of the Water Management Act 2000 to a council), 428 and Chapter 15
	• Determining developer charges:
	  ○ provide a source of funding for infrastructure required for new urban development
	  ○ provide signals regarding costs of urban development and encourage less costly forms
	• Need to be more accountable.
	• Need for better asset management.

Environmental Planning and Assessment Act 1979	• Determining developer infrastructure contributions.
Water Management Act 2000	• Determining developer charges • Water rights, licences, allocations.
Local Government (General) Regulation 2005	• Determining developer charges. •
Independent Pricing and Regulatory Tribunal Act 1992	• Gives powers to the Independent Pricing and Regulatory Tribunal to inquire into and regulate prices. • IPART has developed a set of consistent pricing principles to be adopted by local government authorities. • Guidelines for 'user pays' charging system in the water and wastewater industry.
Water Industry Competition Act 2006	• Establishment of third-party access regime for water and sewerage infrastructure to encourage competition • Authorisation of IPART to regulate licensed private network operators to ensure services are delivered in a safe and reliable manner
Environmental Protection	
Protection of the Environment Operations Act 1997 (and Regulations under that Act)	• Regulating pollution activities and issue of licenses as well as the monitoring of and reporting on waste output. • Council is required to undertake the scheme operations in a proper and efficient manner
Soil Conservation Act 1938	• Conserves soil resources and farm water resources and the mitigation of erosion and land degradation.

Legislation	General Implications for Council
	• Preservation of watercourse environments
Environmental Planning and Assessment Act 1979	• Encourages the proper management of natural and man-made resources, the orderly use of land, the provision of services and protection of the environment.
Water Management Act 2000	• The Act provides for sustainable and integrated management of State's water sources. • Water rights, licences, allocations.
Health and Safety	
Public Health Act 2010	• Prevention of the spread of disease. • Effluent disposal methods. • Water quality risk management and delivery of quality water.
Fluoridation of Public Water Supplies Act 1957	• Addition of fluoride in public water supply by water utilities
Work Health and Safety Act 2011 (and *Work Health and Safety Regulation 2017*)	• Council's responsibility to ensure health, safety and welfare of employees and others at places of work. • Likely be cost implications • Impacts all operations. • Note public safety – insurance.
Dams Safety Act 2015	• Obligations and responsibility for the owners of declared dams

A detailed discussion of the impact of each of these Acts on the provision of water and sewerage services provided by Parkes Shire Council is contained in Appendix B of the Strategic Business Plan.

3.2.1 Health Based Targets

An emerging issue is the adoption of Health Based Targets to manage water quality and public health issues with drinking water. The manual developed by WSAA in 2015 outlines methods of assessing risk to water sources and water treatment. It proposes a target of one micro DALY (μDALY) per person per annum. DALY is Disability Adjusted Life Years and means the number of years lost to ill health due to (in this case) poor water quality. A μDALY is 1 millionth of a year life lost per person per year, which is very low. Calculating the average DALY in a system requires analysis of populations and clinical information for each reference pathogen tested for. Those pathogens include *E.coli* and *Cryptosporidium*, for example.

To achieve the targets, in most cases the addition of UV treatment at the end of the water treatment process will reduce pathogens by the required logarithmic factor [log $(1/10^{-6})$].

The current position of NSW Health is that the current guidelines are to be followed until the HBT guidelines are finalised.

3.3 Institutional Arrangements

Parkes is a member of the Central NSW Joint Organisation CENJO (formerly known as CENTROC) Water Utilities Alliance. The key relevant project of this group to the IWCM is the Water Grid options for connecting the borefield of Forbes, Parkes and Central Tablelands Water by a pipeline from Forbes to Goologong. This pipeline was described as a potential concept in the 2015 IWCM to be progressed. It has now developed with a pipe alignment plan, a draft operational strategy and agreement between the Councils. It is a project option in the Lachlan Regional Water Strategy and will be described further in the Options Report.

Council and Northparkes mine have a Working Group that meets regularly to discuss water supply for the mine. This group established that NPM will require 120L/sec average daily raw water supply from 2020 onwards. The group negotiates the pricing and operational aspects of the borefield and water transfer infrastructure.

The B-Section pipeline requires cooperation with Lachlan and Forbes Councils through another working group. These neighbouring Councils are also part of CENJO and participate in several collaborative projects.

3.4 Stakeholder Engagement

Stakeholders are defined as individuals and organisations, both internal and external, with an interest and/or equity in the water supply and sewerage services provided by the Council. They include:

- Property Owners/Ratepayers
- Councillors
- Management Staff
- Council Employees
- Government Agency Representatives
- Tourists
- Business Operators
- Special Interest Groups such as Environmental groups and Chambers of Commerce

These groups were approached as part of the Stakeholder and Community Input into the Integrated Water Cycle Management requirement of DPIE to form the Project Reference Group (PRG). Five PRG workshops were held over the course of the IWCM development. Agendas for these meetings are presented as an Appendix.

Table 3.4: PRG Workshops, topics and dates

Topic	Date
Introduction to the IWCM & purpose,	September 17 2020
Identified Issues	December 3 2020
Stormwater management	April 28 2021
Climate Change Risk Assessment	July 26 2021
Scenarios and Water Security Projects	August 25 2021

Council has developed a comprehensive Stakeholder Engagement Plan in 2021 which outlines many elements of engagement, specifically around Water Security Projects. These are shown at a glance in the figure below.

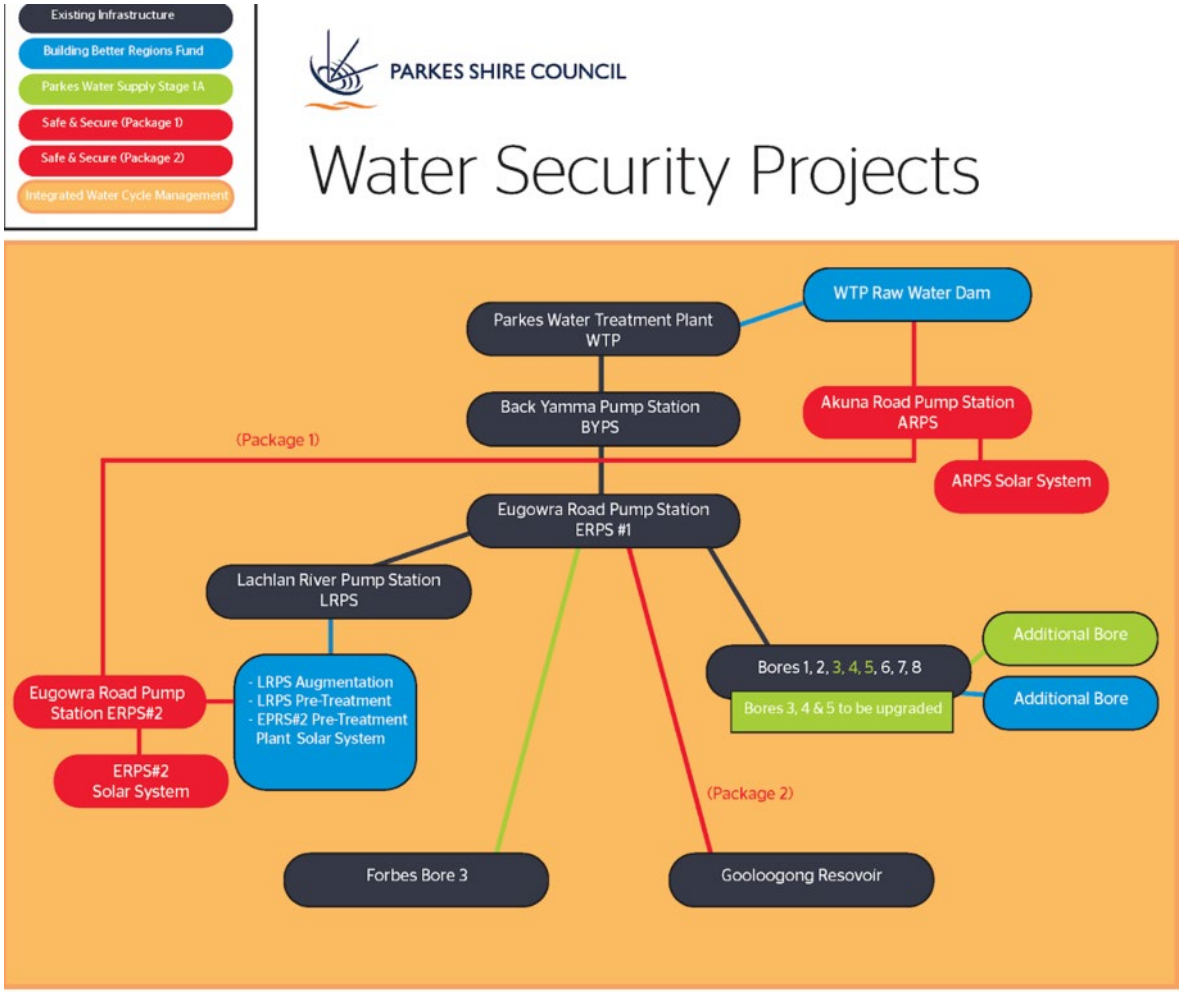


Figure 3-3: Diagram showing connection of Parkes Water Security Projects Underway

Public outreach and consultation are ongoing with the community, government and business stakeholders. The table below shows the current elements of Council's public outreach program

Table 3.5: Councils Public Outreach Program

Topic	Description		
Vox Pop - What does Water mean to me?	Short 3-minute videos with community members: Farmer Indigenous Elder Mother Tradesman Youth (12-18) Small business owner (main street of Parkes)	One video per subproject	3–5-minute video with scripted questions
Photo competition	Photo competition based on visual images of water – water as Art	Competition launched via social media Posters displayed during school holidays	Three winners per categories; Under 18, 18+

		Winning photos displayed at the local shows during August	
Council/Landcare water promotion	Water beads activities, answering focus questions: 'what does water mean to me' and 'how can I sustainably use water'	Students Yrs 4-5	Venue - Stock yards in Forbes, Forbes, Parkes and Eugowra
Shire Shows	Water activities at the Council stand: Water colouring book Water photo competition winner and artwork	Parkes, Trundle (August)	Showgrounds during August

There is also a monthly catch up between the Parkes Project Management Office and the DPIE Regional Managers to stay abreast of IWCM project progress and issues. This has been a valuable collaboration and resulted in clarity of decision making and sharing of information.

3.5 Future Developments

Council's strategic planning team along with the Infrastructure Division have been engaging closely with the Regional Growth Development Corporation (RGDC) a government project management group responsible for planning the Special Activation Precinct (SAP). This is the most significant development proposed for Parkes and will have an impact on the town and the water systems.

There is a also a Voluntary Planning Agreement with CleanTeq mining company for development of a battery minerals mine near Fifield in The Lachlan Shire, but with a major facility in Parkes. The Agreement allows for CleanTeq to fund community projects and contribute to road maintenance for the duration of the mine's life.

Developer contributions are determined under the Section 94 AND 94A Contributions Plans (2016) and the Developer Servicing Plan (2006). The developer charges have been updated annually but the plan has not been reviewed since 2006. These are outlined in Section 5.

3.6 Compliance with Best Practice Management

The NSW DPIE Water is responsible for the administration of the *Guidelines for Best-Practice Management of Water Supply and Sewerage,* developed in accordance with section 409(6) of the Local Government Act 1993. Water utilities are required to satisfy the Best-Practice requirements if they hope to receive funding for capital works under the Country Towns Water and Sewerage Program, Safe and Secure Funding and other programs.

A summary of Parkes Shire Council's current compliance status of the best-practice guidelines is listed in the Table below:

Table 3.5 - Best Practice Compliance

Best Practice Requirement	Status
Strategic Business Plan (including Financial Plan)	Requires Update

Best Practice Requirement	Status
Water Supply Service Pricing	
- Full cost recovery without significant cross subsidies	Compliant
- Complying residential charges with pay-for-use water pricing, independent of land value	Compliant
- Complying non-residential charges	Compliant
- Development servicing plan and adoption of developer charges	Compliant
- At least 75% of residential revenue from usage charges	Compliant (79% 2018-19)
Sewerage Service Pricing	
- Full cost recovery without significant cross subsidies	Compliant
- Complying residential charges, independent of land value	Compliant
- Complying non-residential charges	Compliant
- Development service plan including commercial developer charges	Compliant
- Complying liquid trade waste fees and charges	Compliant
- Complying liquid trade waste policy and approval for all discharges	Compliant
Demand Management	Being updated as part of the IWCM process
Drought Management	Compliant
Performance Reporting	Compliant
Integrated Water Cycle Management	This Document
TAMP, 30-year capital works plan System Operating Plans	Being updated as part of the IWCM process. Refers to Councils own asset management plan

3.7 Compliance with Levels of Service

The Levels of Service:

- define explicitly the water related standards to be met by Parkes Shire
- are an expansion of the community and corporate and regulatory objectives
- guide Council's detailed planning for water quality and flow improvements.

The Levels of Service define the deliverables and are drive the management and development of the water supply and sewerage schemes. Achieving the target Levels of Service is the **primary goal** (alongside compliance with statutory obligations).

Council uses its judgement in setting standards and while there are statutory service standards in some areas such as water quality, effluent quality, noise, and sludge management, in other areas, stakeholders may be consulted and may desire (and be willing to pay for) levels of service which are even more stringent than the regulatory requirements.

While Council endeavours to close any perceived gap between the stakeholder expectations and the levels of services provided, this is also subject to economic, social and environmental considerations.

It should be noted that while the current Levels of Service are the target they are not intended as a formal customer contract. It is Council's responsibility to strive for continual improvement and seek to achieve these levels in the most cost-effective way.

The Table below provided by DPIE shows the target LoS and performance against those targets.

Table 3.6: Water Supply LOS targets and Results for 2018-19

Objective	Service standard (design Std)	Performance Indicator	Parkes/Peak Hill Results 2018-19
Water supply security:			
Adequate potable water for current and future generations with moderate level of drought related restrictions	Surface Water - 5/10/10 rule based on 99th percentile dry year demands: •Water restrictions are in place for no more than 5% of the time •Water restrictions occur on average once every 10 years •During water restrictions, demand is reduced by 10%	•Frequency (avg number) of drought related Level 3 restrictions •Total percentage duration of drought related restrictions •Forecast water security index (FWSI)	Zero since 2015 0%
Projected town water supply extraction is within the upper limit of the water extraction licence	Not exceeding licensed entitlement	Annual volume of water extracted	4881 ML/year
Minimise water resource dependant environmental and third party impacts	100% compliance with the WSP requirements 100% compliance with the work approval conditions	Number of breaches Number of breaches	Nil breaches

Objective	Service standard (design Std)	Performance Indicator	Parkes/Peak Hill Results 2018-19
Drinking Water Quality:			
Protect public health	•100% compliance with the ADWG for health based parameters	•Number of boil water alerts	Nil
	•Adequate CT	•DWMS – annually reviewed & regularly audited	Yes
	•Compliance with the DWMS	•Number of operational control point (OCP) exceedance	?
	•100% compliance with Critical Control Points	•Number of Critical Control Point (CCP) exceedances	?
Protect dental	•100% compliance with the ADWG for fluoride concentration	•Fluoride plant – annually reviewed & regularly audited	Yes
	•Compliance with the NSW Fluoridation Act and Code	•Number of operational control point (OCP) exceedance	?
	•100% compliance with Critical Control Points	•Number of Critical Control Point (CCP) exceedances	?
Aesthetically fit for purpose	95% compliance with the ADWG for aesthetic parameters	•Discoloured water complaints •Complaints of taste (be specific, eg chlorine, palatability, hardness, staining of fitting/fixtures) •Complaints of odour (be specific, eg algae, others)	9 Total Water Quality complaints

Objective	Service standard (design Std)	Performance Indicator	Parkes/Peak Hill Results 2018-19
Reliability of supply infrastructure, through the sizing of components to:			
Limit supply interruptions	•Asset condition rating (default rating 2)	•Number of unplanned service interruptions due to asset failure: •Main breaks •Water service failure	6.06 per 100km
Maintain continuous service availability	•Adequate level of workforce resourcing with appropriate skills	•Response time to incidents •Major main burst •Minor main burst •Water service failure	All phone calls answered <30 seconds Staff on-site to commence work 60 minutes (during work hours) 120 minutes (out of work hours)
Maintain adequate pressure	•Treatment and distribution system capacity designed to supply 95th percentile Peak Day Demand •Minimum pressure at customer tap of 20m when delivering 0.1 L/s •Maximum static pressure of 150 m	•Number of incidents causing complaints about pressure	Zero complaints Minimum Pressure 12m Average pressure 44m
Provide adequate firefighting capability	•System is able to supply 10 L/s for 4 hours when supplying peak day demands while maintaining positive pressure	•Percentage of urban area with fire fighting facilities & capability appropriate to land zone	80%

Objective	Service standard (design Std)	Performance Indicator	Parkes/Peak Hill Results 2018-19
		•Percentage of systems/facilities capable of meeting fire engine requirements	

Table 3.7: Wastewater Levels of Service Targets and Results for Parkes LGA 2018-19

Objective	Service standard	Performance Indicator	Parkes LGA Results 2018-19
Maintain continuous service availability	•Asset condition rating (default rating 2)	Number of unplanned service interruptions due to asset failure: •Backup of sewage into properties •Overflow due to pump failure •Main blockage/collapse	55 breaks/chokes per 100km
	•Adequate level of workforce resourcing with appropriate skills	Response time to incidents •Moderate/major spill •Minor spill/blockage	All phone calls answered <30 seconds Staff on-site to commence work 60 minutes (during work hours) 90 minutes (out of work hours)

Objective	Service standard	Performance Indicator	Parkes LGA Results 2018-19
	•Asset register compliant with Accounting standard •Asset management system drives service delivery	•Extent of assets captured in the asset register •Accuracy of assets in the management system and what is in-ground •Percentage usage in work scheduling •Extent of data capture to assess future planning & drive efficiency	Yes
System performance	•Compliance with the EPL •Compliance RWMS •Contain 8 hours sewage load at ADWF within each SPS •Rainfall event with a 20% AEP (1-in-5 year) •Compliance with biosolids guidelines •Reduce effluent discharge from the STP •Minimise odours	•Non-compliances with the EPL •Wastewater quality performance index •Non-compliances with the RWMS •Number of overflows at ADWF •Number of overflows for the selected rainfall event •Non-compliances •% effluent reuse •Number of odour complaints	100% EPL compliance 19.05 overflows per 100km 33.63% Odour complaints 1

Objective	Service standard	Performance Indicator	Parkes LGA Results 2018-19
Sound regulation of sewerage & trade waste	•Compliant liquid trade waste (LTW) policy	• extent of implementation	100%
	•Compliant LTW classification, acceptance & approval processes	•extent of implementation	14.7ML collected
	•Full cost recovery pricing model or pricing model based on Appendix F of LTW guidelines	•Number of non-compliant systems/premises	Nil
		•pricing model based on Appendix F of LTW guidelines	

Table 3.8: General Levels of Service Targets and Results for Parkes LGA 2018-19

Objective	Service standard	Performance Indicator	Parkes
Community wellbeing:			
Public open spaces are maintained green with fit for purpose cost-effective water	•Greener parks, ovals and open spaces (POS)	•Percentage of all POS to be maintained green independent of weather patterns	
Environmental Sustainability:			
Minimise dependence on grid power	•On-site generation of renewable sources of electricity where economical	•Number of facilities with on-site generation system	100kW at both the WTP and STP

Objective	Service standard	Performance Indicator	Parkes
	•Optimise mix of energy sources and its reliability	•% per capita reduction in green gas emission since 2015 •% per capita reduction in grid power use •% per capita reduction in overall power use	
Financial Sustainability			
Revenue meets on-going commitments	•Common LGA wide **OR** individual town/system specific water & sewer service charges	•Extent of community acceptance	
	•Full cost recovery	•ERRR	ERRR Negative for both water and Sewer
	•Non-residential revenue reflects community benefits	•OMA/rates revenue	60%
	•Supports Council's hardship policy	•ROI	Negative
		•Accounting surplus/ deficit	
		•Residential & non-residential revenue split	79% / 18%
		•Level of pensioner rebate per property	
		•Number of service charge default/waiver	
		•Infrastructure renewals ratio	
		•Infrastructure backlog ratio	Compliant

Objective	Service standard	Performance Indicator	Parkes
Efficient operation delivering stable price paths	•Evidence based robust TAMP, financial plan & business continuity plan (eg DCERP)	•Asset maintenance ratio • TAMP, FP & DCERP – annually reviewed & regularly audited	No
Pricing signal for water & sewerage services is fair and strong to encourage efficient use of services	•Water & sewer tariff is compliant with best-practice guidelines •All users/customer properties to be metered & charged •Efficient price signals	•Percentage compliance with best-practice pricing guidelines •Percentage of users/customer properties metered & billed •Percentage users/customer properties not billed	100%
Developer charges that are competitive to attract economic growth	•Common LGA wide **OR** individual town/system specific water & sewer developer charges that is compliant with guideline •Full cost or cross-subsidised as per guideline •OR exemption from DC due to low annual growth as per guideline	•Extent of community acceptance •Percentage compliance with best-practice pricing guidelines •Extent of community support to cross subsidy OR full cost •Percentage variance with budget	100%

Objective	Service standard	Performance Indicator	Parkes
Asset Management Effectiveness:			
Asset register reflective of on-ground assets & their value	•Asset register compliant with Accounting standard	•Extent of assets captured in the asset register	95%
	•Asset management system drives service delivery	•Accuracy of assets in the management system and what is in-ground	95%
	•Asset value & condition derives investment and pricing is 'fair value' in both asset & financial systems	•Percentage usage in work scheduling	90%
		•Extent of data capture to assess future planning & drive efficiency	25%
		•Asset value is 'fair value' & is based on current condition in both asset & financial systems	95%
Adequate asset renewals & maintenance to maintain services & minimise price change shocks	•Prudent & efficient asset renewals & maintenance	•Building and infrastructure renewals ratio •Infrastructure backlog ratio •Asset maintenance ratio •Cost to bring assets to agreed service level	2020 AM maturity assessment done as part of central west JO. Parkes Council was assessed as satisfying all 'core' requirements for NAMAF

Objective	Service standard	Performance Indicator	Parkes
CRM System Effectiveness:			
Guides evidence based data driven decision making			Using Tech One ECM
General			
Population serviced			Water 12884 Sewer 12290
Typical Residential Bill			$1,144.09
Number of STPs			4 Parkes Treatment Capacity 3ML/day
Number of WTPs			1 Treatment capacity 16ML/day
Dams			2
Bores			7
Length of sewer			147
Sewer pumping stations			3
Length water headworks			219
Length of trunk and retic			462
Water pumping stations			12
NRW	Real Losses in Network and Headworks Losses	Less than 10% is desirable	12% 375ML/year (See Water Balance Dashboard)

4 Existing Water and Sewerage Services

The Parkes Water Supply System consists of a new (2018) 16 ML/day Water Treatment Plant which draws raw water from three different sources: Lake Endeavour Dam, located approximately 20 km East of Parkes, and the Lachlan River, and the Lachlan River borefield, both located approximately 30km South of Parkes.

The Lake Endeavour Dam Safety Upgrade was completed in 2016. The dam was strengthened for long-term stability and increased flood security. The upgrade included telemetry system upgrades to enable remote monitoring. Parts of the pipeline have been renewed.

The Lachlan River offtake was upgraded in 2017 with the installation of a permanent, purpose-built pump station to strengthen the raw water supply. The DICL pipeline was installed in 1994 and remains in good condition.

Bores 3A, 4 and 5 are being refurbished in 2021 to ensure their pump rates can be sustained.

The adjacent Bore 8 Upgrade was undertaken in 2017. Forbes Bore 3 was developed in 2019 but has not been connected to the Eugowra Road pump station. The new bores aim to spread the drawdown to minimise impact on adjacent users of the aquifer.

Two pipelines run 30km from the River and borefield to Parkes WTP. One DICL and one MSCL, both 375mm. The MSCL pipeline is experiencing a low number of joint failures and is subject to review.

Parkes Shire Council provides reticulated services to the communities listed in the table below, from 2019-20 water billing data:

Table 4.1: Communities Serviced

Town/ Village/ Community	Connected Properties (@2020)	Water	Sewer
Parkes	9,563	Reticulated Potable	Reticulated
Peak Hill	930	Reticulated Potable	Reticulated
Rural Properties adjacent to Peak Hill and Cookamidgera trunk mains	235	Potable Water from Trunk Main	Onsite management systems
Cookamidgera	60	Reticulated Potable	Onsite management systems
Parkes water supply system Total	11,453		
Trundle (including dwellings outside the village)	429	Reticulated Potable	Reticulated
Tullamore (including dwellings outside the village)	213	Reticulated Potable	Reticulated
Forbes Feed/Bogan Gate	329	Reticulated Potable	Onsite management systems
B-Section Total	971		

Town/ Village/ Community	Connected Properties (@2020)	Water	Sewer
Properties adjacent to the raw water mains	39	Partly treated or raw water from trunk main	Onsite management systems
Northparkes Mine	1	Raw water	NA
Recycled Water	11 Playing fields in Parkes plus Golf Course and Racecourse		

The rural properties not connected to the reticulated services generally source water from rainwater tanks, private groundwater bores and surface water allocations. They treat wastewater using onsite management systems, most commonly septic tanks.

Parkes Shire Council provides water supply services through two separate schemes, these are the:

1. Parkes / Peak Hill/ Northparkes Mine Water Supply Scheme, supplying potable water to the communities of Parkes, Peak Hill, Alectown and Cookamidgera and non-potable (raw) water to a small number of rural users and the Northparkes Mine, from here on referred to as the **Parkes Water Supply Scheme**.

2. Forbes to Tottenham Water Supply Scheme, also referred to as the **B Section** Pipeline, supplying potable water purchased from Forbes Shire Council to the communities of Trundle, Tullamore, Bogan Gate and Gunningbland, along with rural properties adjacent to the pipeline and bulk supply to Lachlan Shire for the community of Tottenham.

More information on number of connected properties, population and forecasting is provided in Appendix A.

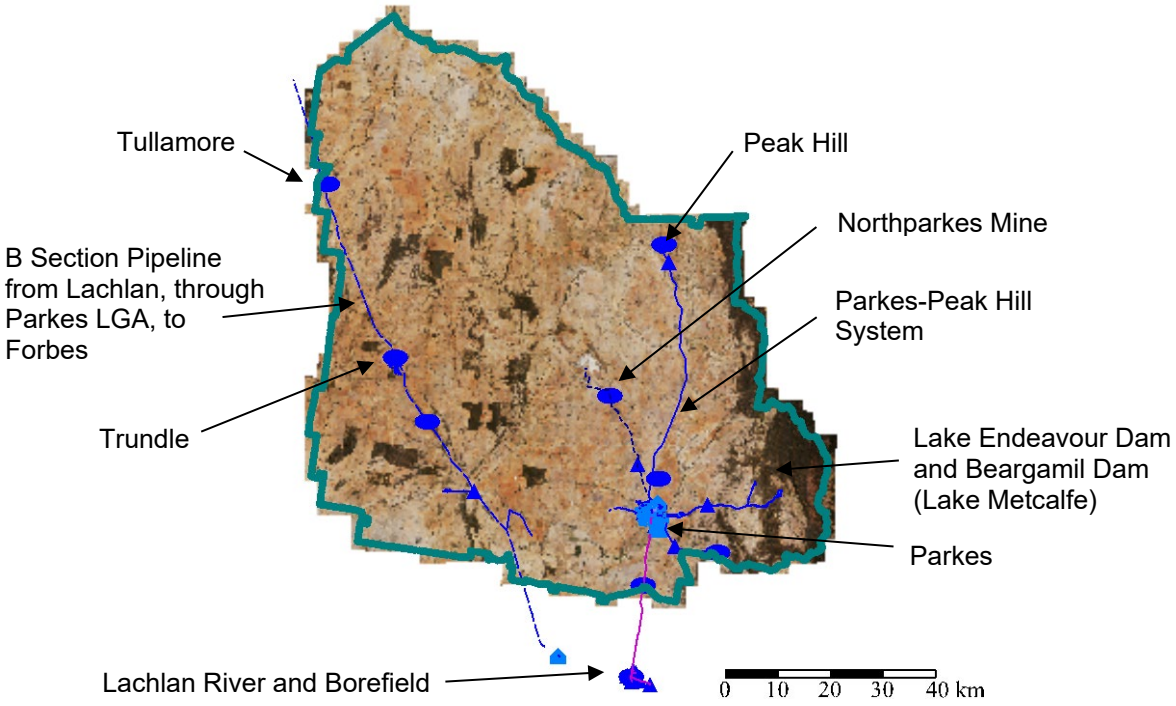


Figure 4-1: Showing the two main water supply systems (Council GIS**)**

4.1 Parkes Water Supply Scheme

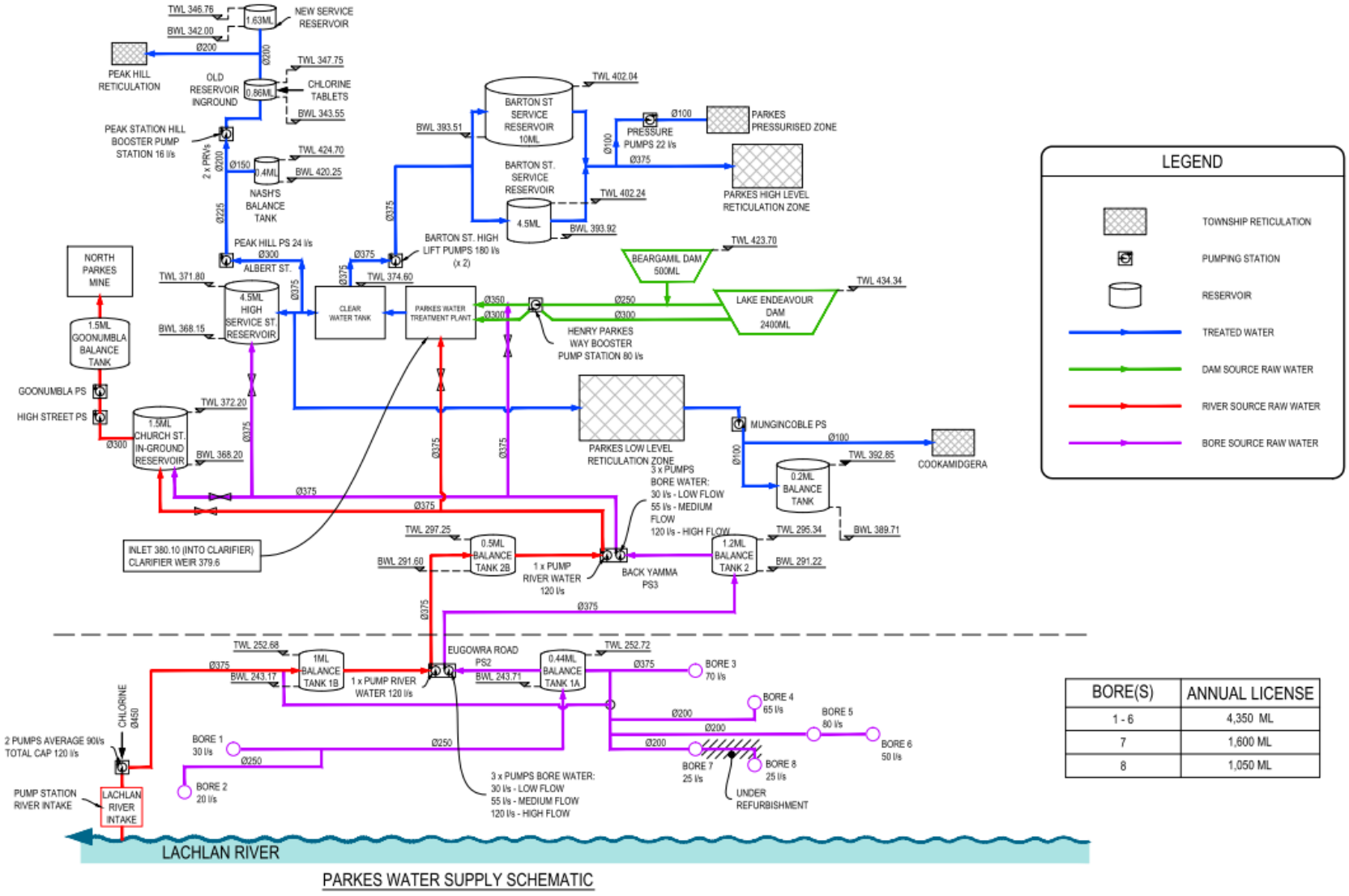
A schematic diagram of the Parkes Water Supply Scheme is shown in Figure 4-3.

This is the largest system in the Shire, supplying the two largest urban centres of Parkes and Peak Hill. The existing system includes the following major assets:

- Three water sources: groundwater from the Upper Lachlan Alluvium, surface water from Lake Endeavour Dam (capacity 2,400ML) and Beargamil Dam (550 ML) and the surface water off-take from the Lachlan River
- Eight production bores in the alluvial aquifers of the Lachlan Valley 30 km south of Parkes
- Transfer system from the borefield and river intake to Parkes through two 30km long, 375 mm diameter pipes and two pump stations (Eugowra Road and Back Yamma)
- 14 service reservoirs and balance tanks
- 9 other pump stations to deliver to Northparkes Mine, Peak Hill, Cookamidgera and raw water from the dams to Parkes
- 289 km of water mains, and
- One 16 ML/d water treatment plant (WTP) at Parkes commissioned in 2018.

There are also some users of raw water located along the trunk mains that supply the WTP and the Northparkes mine is provided with raw bore or river water.

Figure 4-2: Parkes Water Supply Scheme Schematic Diagram (as at 2020)



BORE(S)	ANNUAL LICENSE
1 - 6	4,350 ML
7	1,600 ML
8	1,050 ML

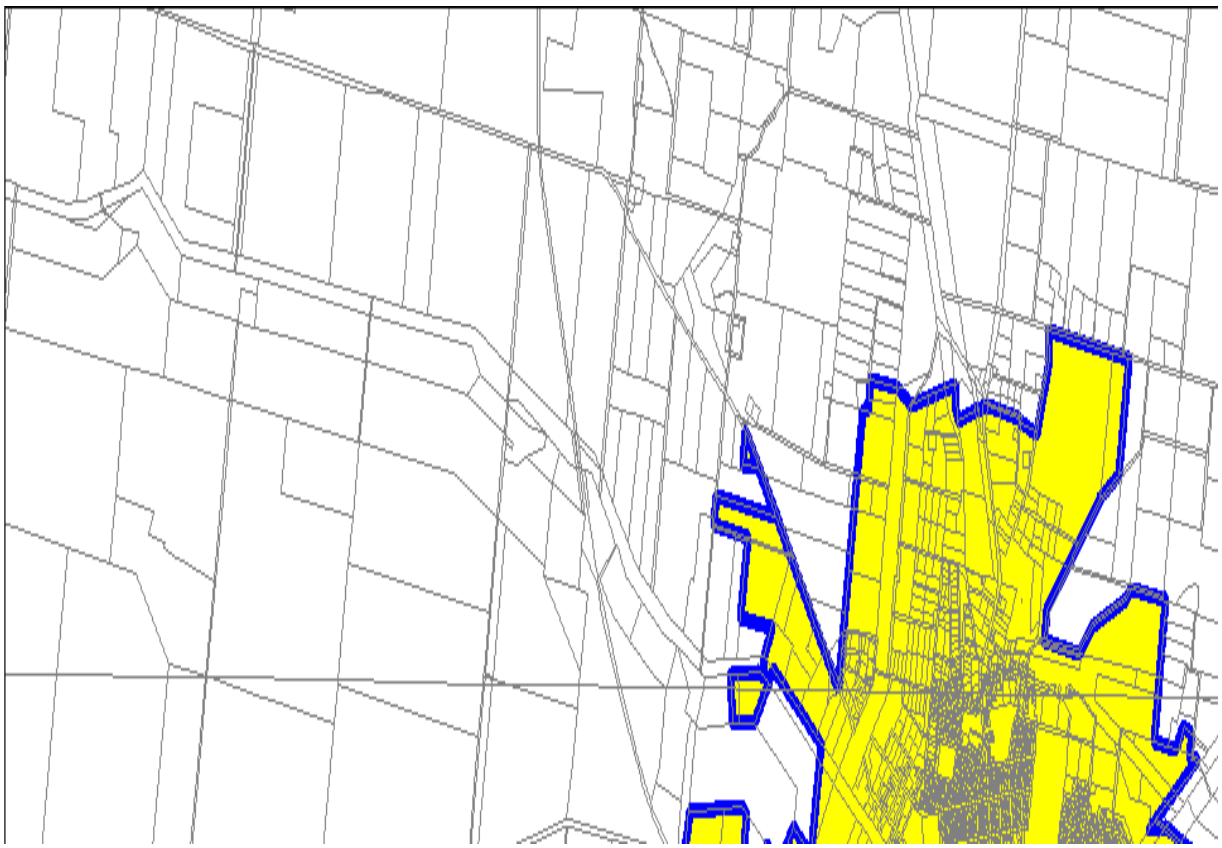


Figure 4-3: Map of Parkes Water Supply Service Area

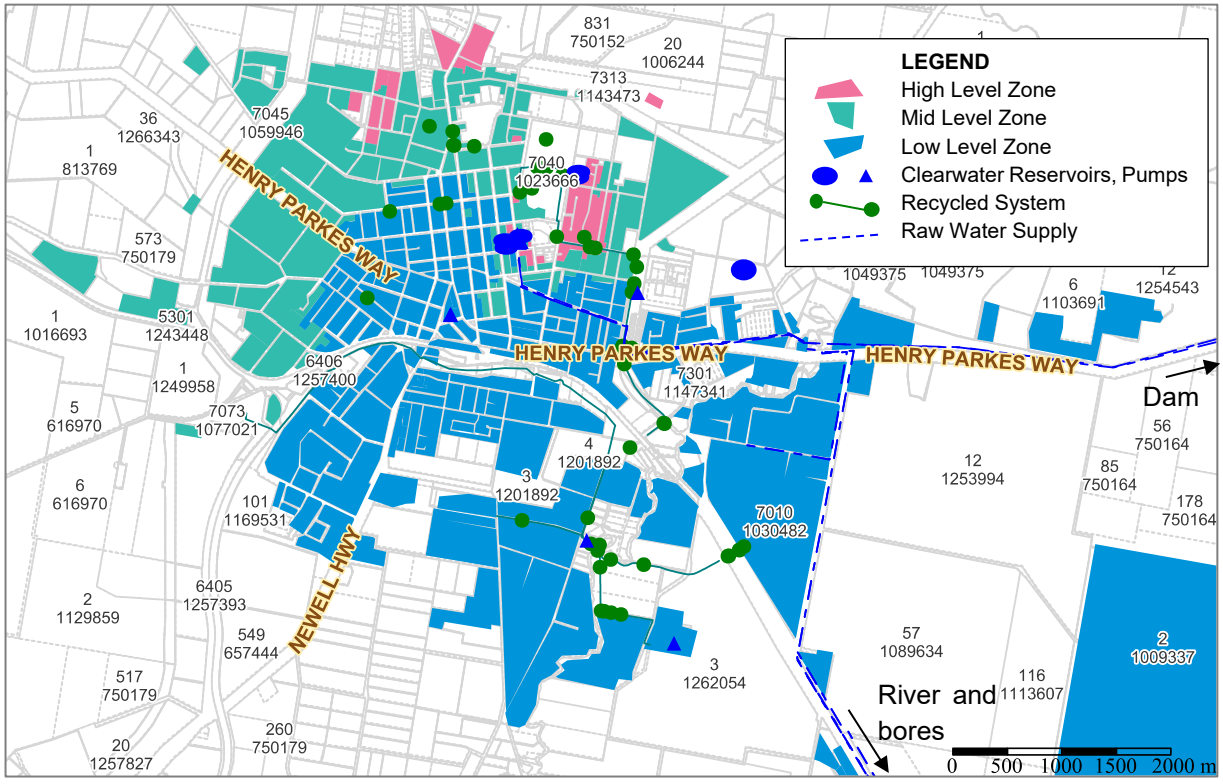


Figure 4-4: Reservoir zones in Parkes township

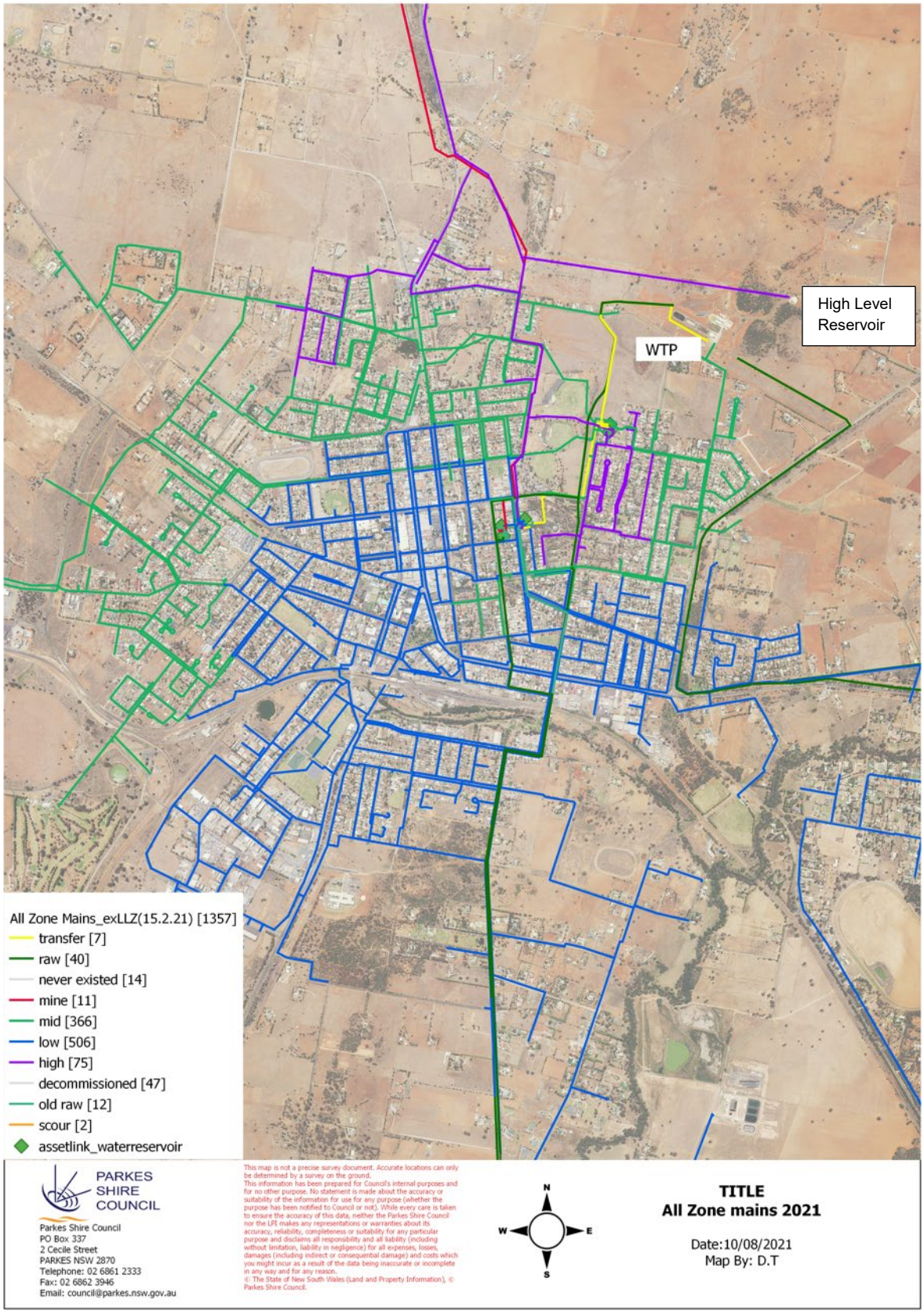


Figure 4-5: Water mains in Parkes Township

4.1.1 Water Service Reservoirs and Supply Areas

The Parkes Water Supply Scheme comprises five service reservoirs and their respective zones:

Reservoir	Capacity ML	Serviced Area	
Albert / High Street Reservoirs	5 and 4	Low Level Zone	3,600
- Cookamidgera Reservoir		Cookamidgera	214
Barton St Reservoirs	10 and 4.5	Mid Level Zone	4,800
High Level Reservoir	2.5	High Zone, Boosted Zone, some of the properties in Northern Parkes and all of Peak Hill	3,200
- Peak Hill Reservoirs (New reservoir and Old reservoir)	2 and 0.9	Peak Hill	1,150
			12,964

The Church Street reservoir in Parkes supplies Northparkes Mine with raw water as part of a discrete system.

4.1.2 Albert Street and High Street Reservoirs (Low Zone)

The Albert Street clear water tank (at the Parkes WTP) and the High Street reservoir are interconnected, with capacities of 5.0 ML and 4.5 ML respectively, and a Top Water Level of 374.5 m AHD.

This reservoir system supplies an area referred to as the “Low Zone” which comprises the Parkes CBD and southern parts of the Parkes urban area, shown below.

Figure 4-6: Low zone reticulation plan

The downstream Cookamidgera Reservoir is fed via a 100 mm pipe out of the Low Zone of Parkes. This trunk main has a number of connections between Parkes and Cookamidgera, and is boosted at Mungincoble.

This system serves and estimated population of 3,600 and the majority of tourist facilities in Parkes, including two of the three caravan parks. This comprises 17 accommodation premises, as well as the most of the restaurants and cafes by virtue of its coverage of the CBD.

As described above, the Parkes population peaks significantly that constitutes an approximately doubling of the population of Parkes for around a week. Much of the increase in demand each January from the Elvis Festival would be through the Albert Street and High Street reservoir due to concentration of activity in and around the CBD and Cooke Park, and the general dominance of this system in serving tourism and hospitality venues.

Table 4.2: Connections summary for the Albert Street and High Street reservoirs system

	2021
Household size	2.41
Residential population	5744
Residential connections	2385
Commercial connections	336
Institutional connections	42
Parks / open space connections	39
Rural connections	52
Total non-res connections	469

4.1.3 Barton Street Reservoirs (Mid Zone)

The Barton Street reservoirs comprise two interconnected tanks with a total capacity of 14.5 ML (10 ML and 4.5 ML) and a common Top Water Level of 403.7 m AHD.

This reservoir system supplies an area now referred to as the “Mid Zone” which comprises the northern and western parts of the Parkes urban area. The boosted zone previously fed by these reservoirs and a pump system have been transferred to the High Level Reservoir supply.

This reservoir system does not feed to any downstream service reservoirs but a 300mm main has been installed along Brolgan Road for the future supply of the SAP. The demand forecast for this is discussed in the Demand Analysis Appendix A.

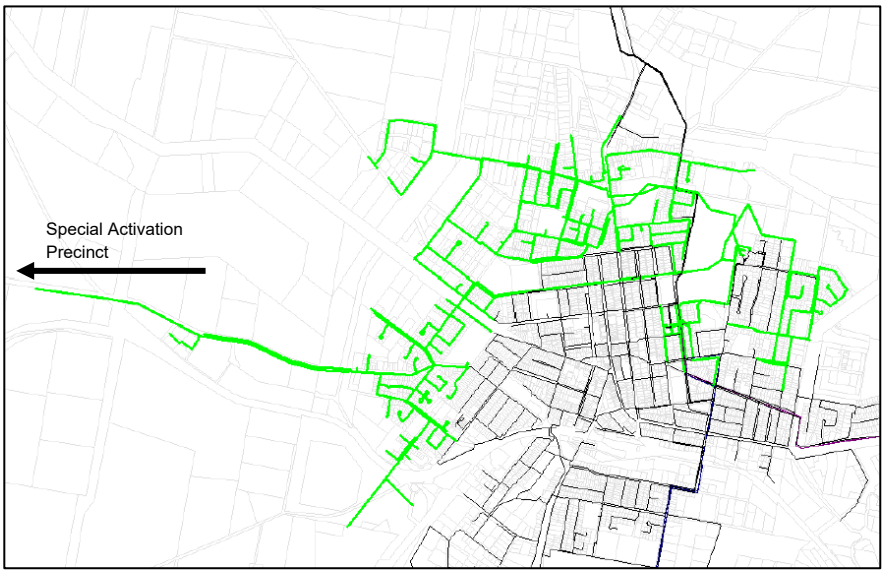


Figure 4-7: Barton St Reservoir reticulation plan

The current residential population associated with these residential connections is estimated to be 4,800.

The Barton Street reservoirs serve around 12% of the non-residential connections including seven accommodation premises and one caravan park.

Table 4.3: Connections summary for the Barton St reservoirs system

	2021
Household size	2.6
Residential population	4013
Residential connections	1542
Commercial connections	40
Institutional connections	14
Parks / open space connections	24
Rural connections	3
Total non-res connections	81

4.1.4 The High Level Reservoir (High Zone)

A 2.5 ML High Level Reservoir with a top water level 432 m was built in conjunction with the new Water Treatment Plant (WTP) in 2018. It supplies properties in the “boosted zone”, previously serviced by the

Barton Street reservoirs, and properties along the Peak Hill Feed Line, previously serviced by the Albert Street and High Street reservoirs.

New residential development is expected in the vicinity of the new reservoir as a result of the SAP and the pipe sizing of this part of the network was planned to accommodate up to 1,200 ET in this zone.

Table 4.4: Connections summary for the High Level reservoir system

	2021
Household size	2.36
Residential population	760
Residential connections	322
Commercial connections	0
Institutional connections	0
Parks / open space connections	0
Rural connections	0
Total non-res connections	0

4.1.5 Peak Hill Reservoirs

Water services in the township of Peak Hill are supplied by two reservoirs: The Old Service Reservoir (0.9 ML, TWL 349.4 m AHD) and the New Service Reservoir (2.0 ML, TWL 348.3 m AHD).

The Peak Hill Service Reservoirs are fed from a dedicated rising main (WRM) connected to the Albert Street Clear Water Tank in Parkes. This WRM is pressurised initially by the Peak Hill Pump Station and services a number of rural connections between Parkes and Peak Hill.

The Peak Hill WRM feeds Nash's Balance Tank near Alectown before being boosted at the Peak Hill Booster Station to feed into the Old Service Reservoir.

This reservoir system does not feed to any downstream service reservoirs.

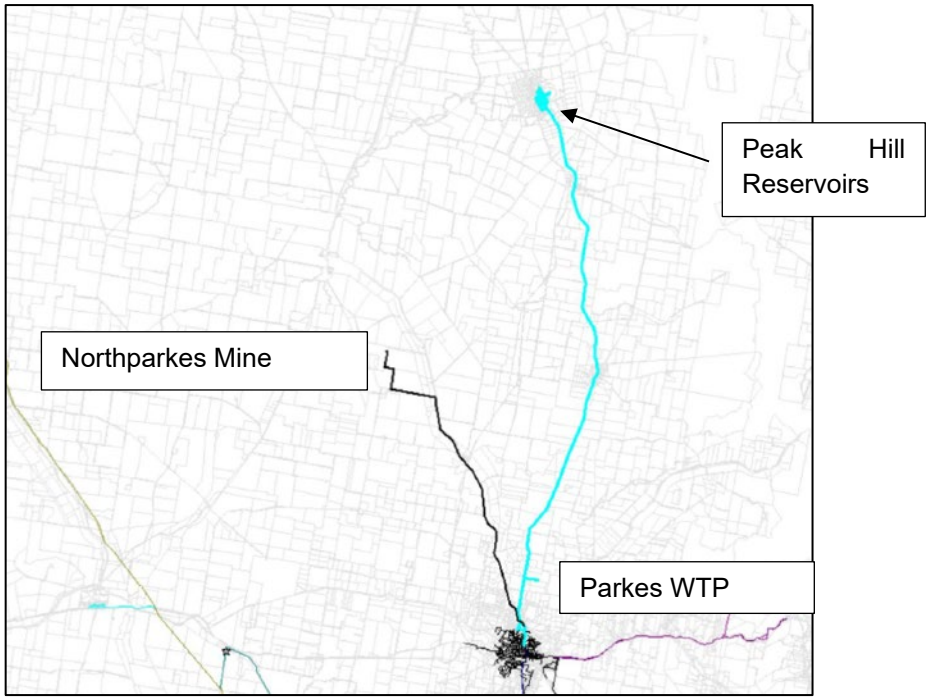


Figure 4-8: The Peak Hill Reservoir reticulation system

Table 4.5: Connections Summary for the Peak Hill reservoirs system

	2021
Household size	2.25
Residential population	915
Residential connections	411
Commercial connections	51
Institutional connections	20
Parks / open space connections	18
Rural connections	2
Total non-res connections	90

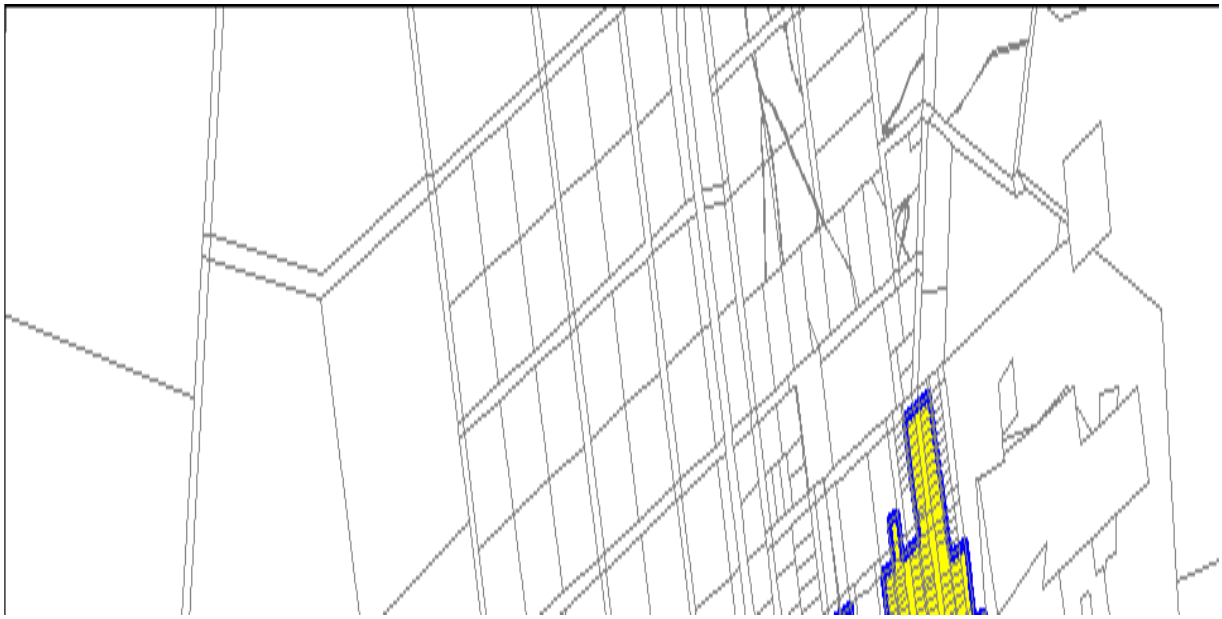


Figure 4-9: Map of Peak Hill Water Supply Service Area

4.1.6 Cookamidgera Reservoir

The village of Cookamidgera is serviced by the Cookamidgera reservoir which is fed via a 100 mm pipe out of the Low Zone of Parkes. This trunk main services a number of connections on the south-east outskirts of Parkes (included in the Albert Street and High Street reservoir system). It is boosted at Mungincoble. This reservoir system does not feed to any downstream service reservoirs.

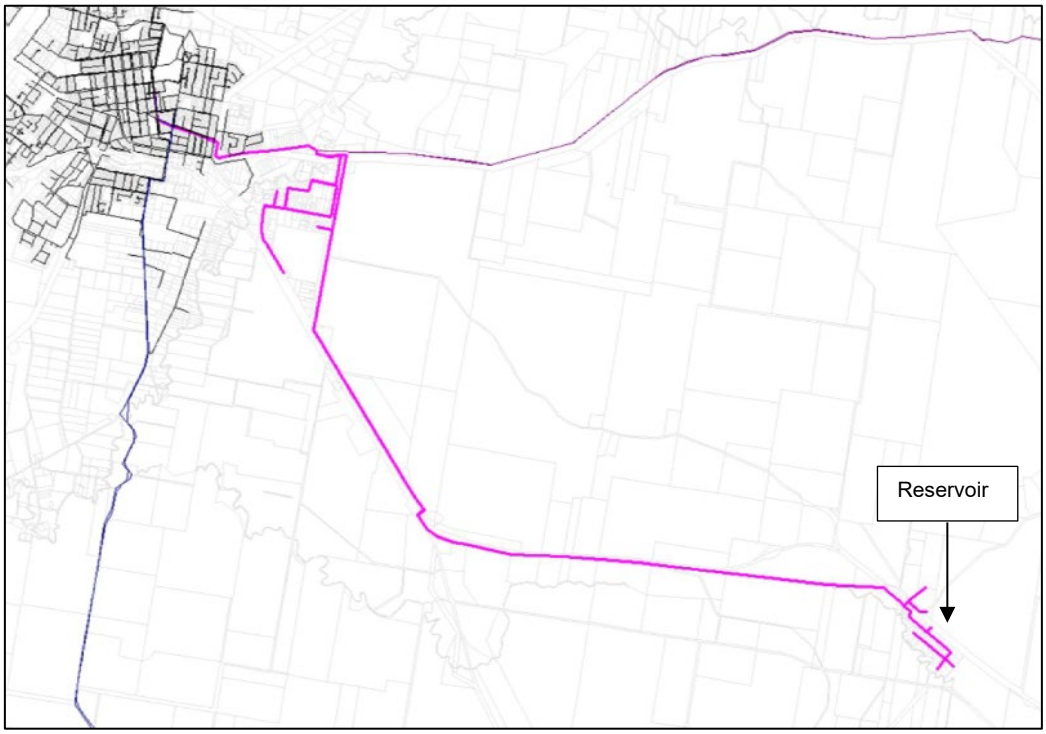


Figure 4-10: Cookamidgera Reservoir reticulation system

There are currently (2021 estimate) 24 active residential connections to mains fed directly by the Cookamidgera reservoir.

The Cookamidgera reservoir serves one rural connection, and no other non-residential connections. No major water users or tourist facilities are served by this system.

Table 4.6: Connections Summary for the Cookamidgera reservoirs system

	2021
Household size	2.34
Residential population	56
Residential connections	24
Commercial connections	0
Institutional connections	0
Parks / open space connections	0
Rural connections	1
Total non-res connections	1

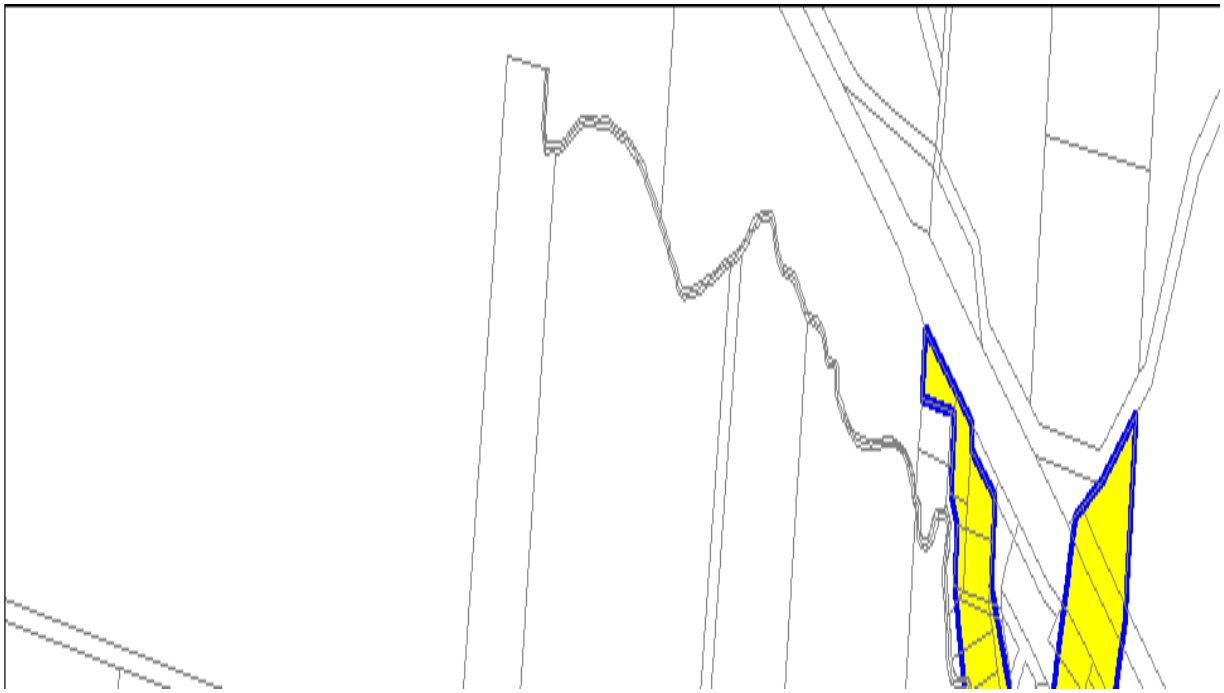


Figure 4-11: Map of Cookamidgera Water Supply Service Area

4.2 B-Section Water Supply Scheme

A schematic diagram of the B-Section Water Supply Scheme is shown below. This scheme supplies the communities of Bogan Gate, Trundle, and Tullamore with potable water purchased from Forbes Shire Council. The B-Section pipeline extends beyond the Parkes LGA and some potable water is on-sold to Lachlan Shire for the village of Tottenham.

There are 371 connected properties, with 255 in Trundle and 116 in Tullamore, mostly residential.

The system includes the following major assets:

- Extraction from the Lachlan River at Forbes (owned and operated by Forbes Shire Council)
- A pipeline extending from Turners Hill Reservoir to Tottenham (the pipeline sections in each shire are owned, operated and maintained by the respective councils)
- Turners Hill Reservoir (in Forbes Shire Council LGA)
- Trundle Reservoir (including the Botfield Reservoir balance tank)
- Tullamore Reservoir
- Bogan GateReservoir,
- Forbes water filtration plant (28 ML/d) (owned and operated by Forbes Shire Council).
- Forbes Shire Council sources water primarily from the Lachlan River (High Security - Town Water entitlement) with several bores available if required (drought and/or poor water quality conditions).

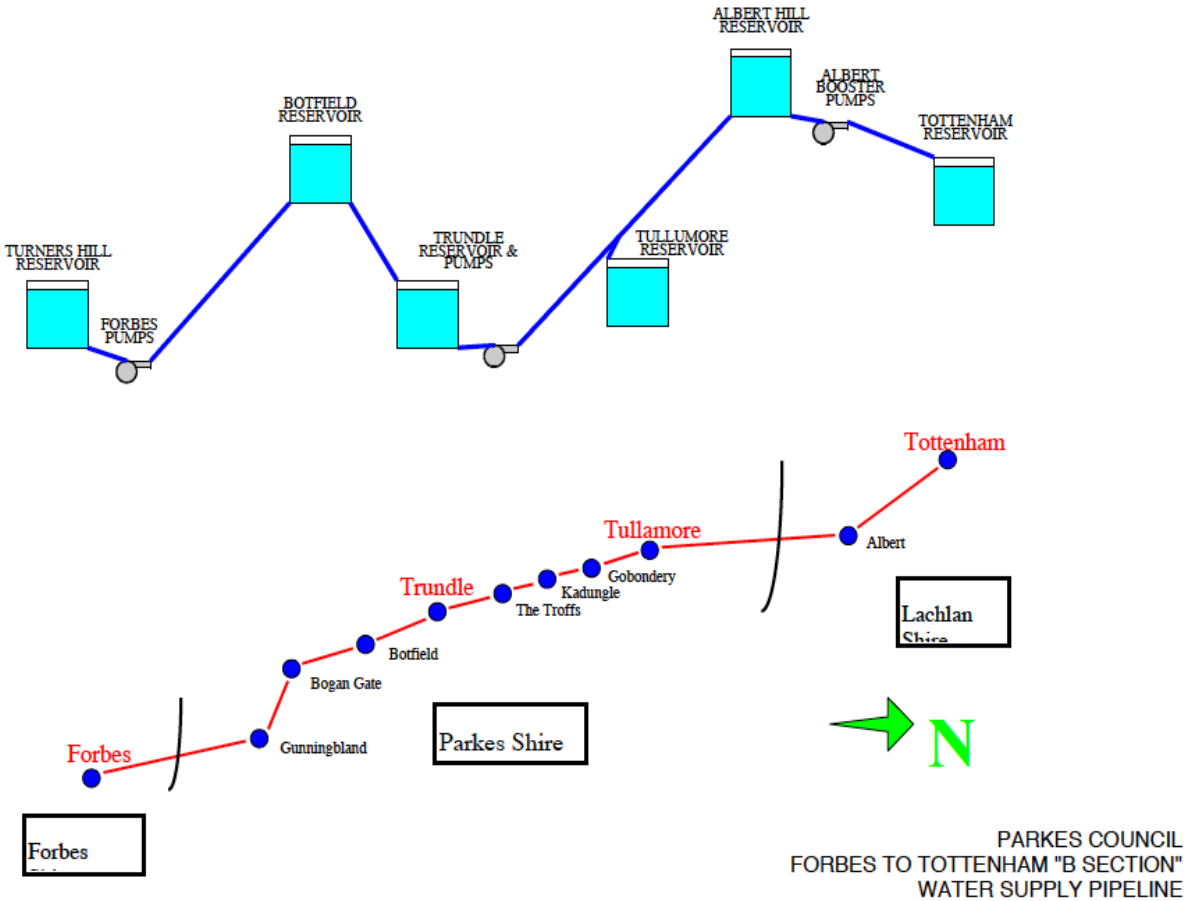


Figure 4-12: Schematic diagram of B-Section Water Supply Scheme

The service areas for Trundle and Tullamore are shown below.

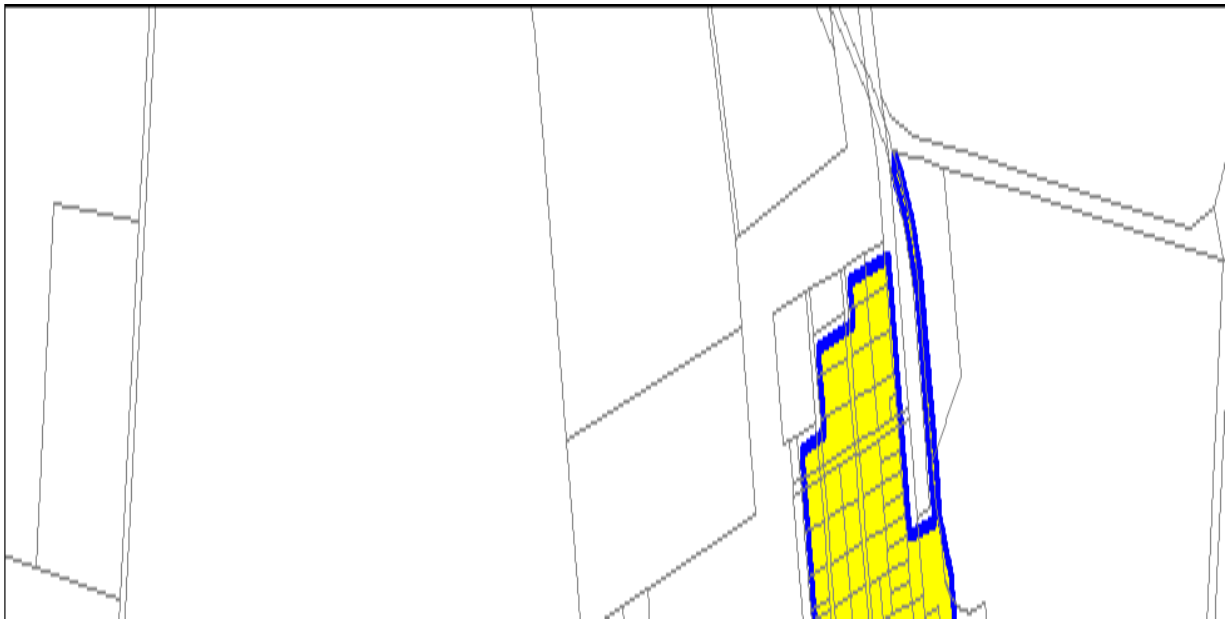


Figure 4-13: Map of Trundle Water Supply Service Area

Figure 4-14: Map of Trundle Water Supply Service Area

Beyond Tullamore, the scheme supplies bulk water to the community of Tottenham in Lachlan Shire, outside of the scope of this study.

4.3 Water Supplies

4.3.1 Lake Endeavour and Beargamil (Lake Metcalfe) Dams

Lake Endeavour Dam is located on Billabong Creek approximately 25 km east of Parkes. The dam was completed in 1940 by council and has a water storage capacity of 2,400 ML. The effective capacity of Lake Endeavour is currently estimated at 1,900ML due to siltation making the trunnion level the lowest operable intake.

Beargamil Dam was constructed in 1924 on the Beargamil Creek, thereby creating Lake Metcalfe. The dam is located west of Lake Endeavour and has a capacity of 480 ML.

The dominant land use in the catchment of both lakes is broad-acre agriculture, grazing and bushland. The average rainfall in the catchment area is 585 mm/annum, with a pan evaporation rate of 1900 mm/annum. Both dams can experience algal blooms during summer.

Council has a licence to draw 1,500 ML/a of raw water from Lake Endeavour and Beargamil Dams for the Parkes/Peak Hill water supply scheme. Up to 4 ML/day can be transferred under gravity from Lake Endeavour Dam to the existing WTP. During 2018-19, Council used only 4 ML/year from the dams.

The 2015 hydrological models for the Lake Endeavour catchment (area 140 km^2) and Lake Metcalfe catchment (32 km^2) calculated average annual inflow as 3.7 GL/annum for Lake Endeavour and 0.86 GL/annum for Lake Metcalfe. The median year flows are significantly lower than the average flow and combined capacity of the storages results in a sustainable yield of 1,100ML/annum although this yield has now been reduced to 950ML/annum due to the expected impacts of Climate Change by 2030 (Parkes IWCM 2016).

However, when there are drought conditions these two dams have been unable to supply any water for periods of up to 18 months. Also, the dams are more beneficial to the community as a water recreation space, so the full allocation will only ever be used in a dire emergency.

4.3.2 Lachlan River

Council has a high security allocation of 3,225ML/annum and a general security allocation of 1,650 ML/year under the Water Sharing Plan for the Lachlan Regulated River Water Source (2016)

Northparkes Mine also have a high security allocation of 755ML/annum and a general security allocation of 3,762ML/annum.

River water is sourced from the Lachlan River intake which was upgraded after the last IWCM with new pump, control and power infrastructure.

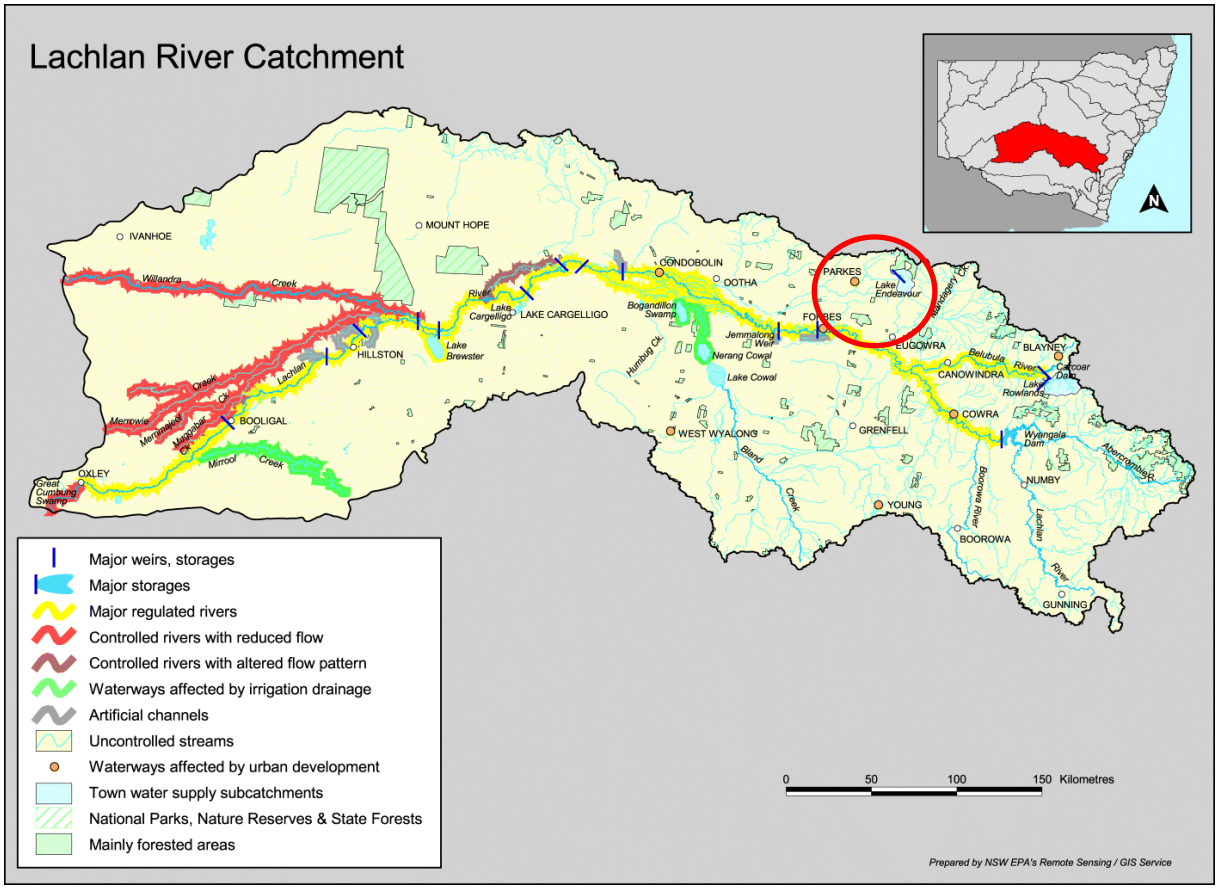


Figure 4-15: Lachlan River catchment and water supply features

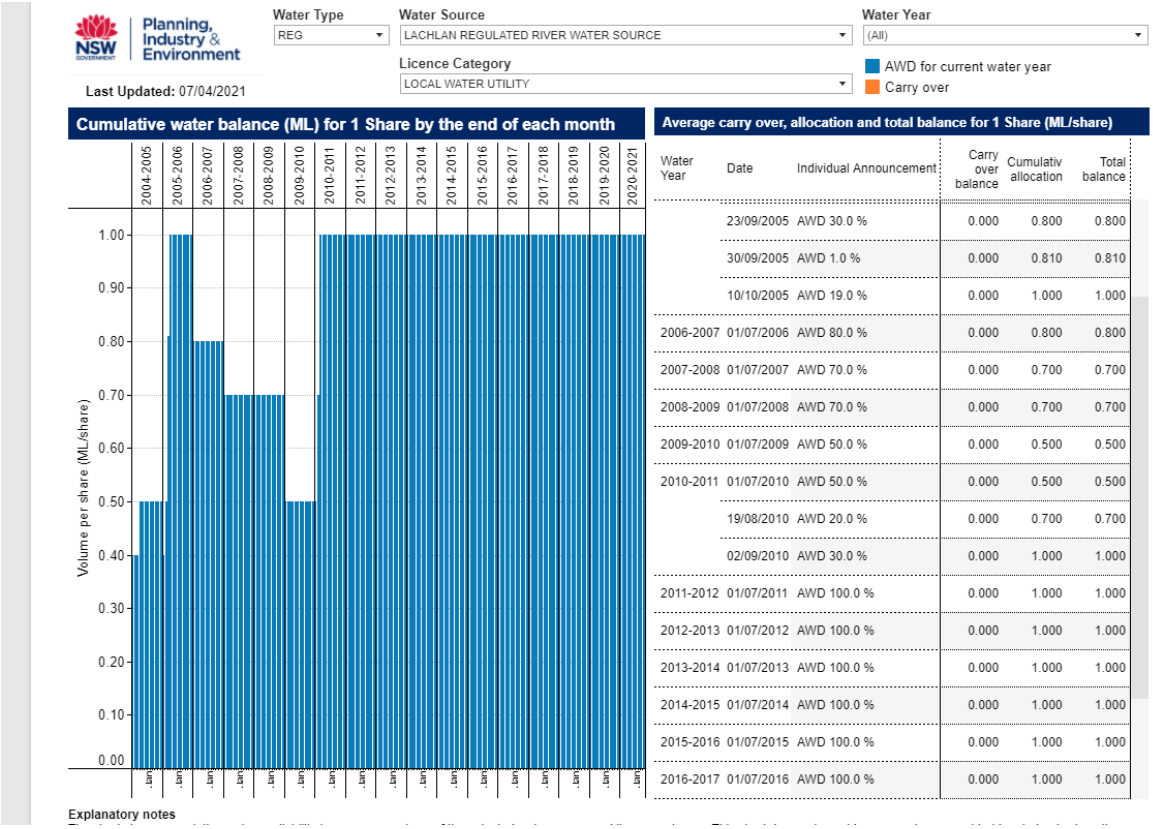
Source: https://www.environment.nsw.gov.au/ieo/Lachlan/maplg.htm

Figure 4-16: Lachlan River Intake

The allocation rate per licence unit (generally 1ML/unit) is determined by DPIE at the start of each year base on the long-term extraction limit for the Lachlan River.

The figure below shows the monthly allocation and total balance of Parkes Shire Council's local water utility licence category from 2004-05 to 2020-21. In the majority of years Parkes received a 100 per cent

allocation of its licence entitlement but that in 2004-05 to 2009-10 its allocation was constrained to as much as 40% of the normal amount.



Average carry over, allocation and total balance for 1 Share (ML/share)

Water Year	Date	Individual Announcement	Carry over balance	Cumulativ allocation	Total balance
	23/09/2005	AWD 30.0 %	0.000	0.800	0.800
	30/09/2005	AWD 1.0 %	0.000	0.810	0.810
	10/10/2005	AWD 19.0 %	0.000	1.000	1.000
2006-2007	01/07/2006	AWD 80.0 %	0.000	0.800	0.800
2007-2008	01/07/2007	AWD 70.0 %	0.000	0.700	0.700
2008-2009	01/07/2008	AWD 70.0 %	0.000	0.700	0.700
2009-2010	01/07/2009	AWD 50.0 %	0.000	0.500	0.500
2010-2011	01/07/2010	AWD 50.0 %	0.000	0.500	0.500
	19/08/2010	AWD 20.0 %	0.000	0.700	0.700
	02/09/2010	AWD 30.0 %	0.000	1.000	1.000
2011-2012	01/07/2011	AWD 100.0 %	0.000	1.000	1.000
2012-2013	01/07/2012	AWD 100.0 %	0.000	1.000	1.000
2013-2014	01/07/2013	AWD 100.0 %	0.000	1.000	1.000
2014-2015	01/07/2014	AWD 100.0 %	0.000	1.000	1.000
2015-2016	01/07/2015	AWD 100.0 %	0.000	1.000	1.000
2016-2017	01/07/2016	AWD 100.0 %	0.000	1.000	1.000

Lachlan Regulated River Water Source LWU Licence balance and allocation

Source: DPIE Water licensing trade dashboard

The Options Report will outline the pre-treatment system planned for construction at the river intake to enable extraction of water with higher NTU than 0.8.

4.3.3 Groundwater

Since 1967, groundwater has been used to supplement the water supply. There are currently seven bores located on the north side of the Lachlan River, approximately 15 km east of Forbes and 30 km south of Parkes, drawing from Zone 3 of the Upper Lachlan Alluvium.

Parkes Shire has a licence to abstract up to 4,700 ML/a from bores 1 to 5, and the North Parkes Mine (NPM) has a licence to abstract 1,050 ML/annum from bores 6, 7 and 8.

Parkes operates the bores for the town and NPM supply and typically draws between 2,000 and 3,000 ML/annum.

A full analysis of the borefield is presented in Appendix C.

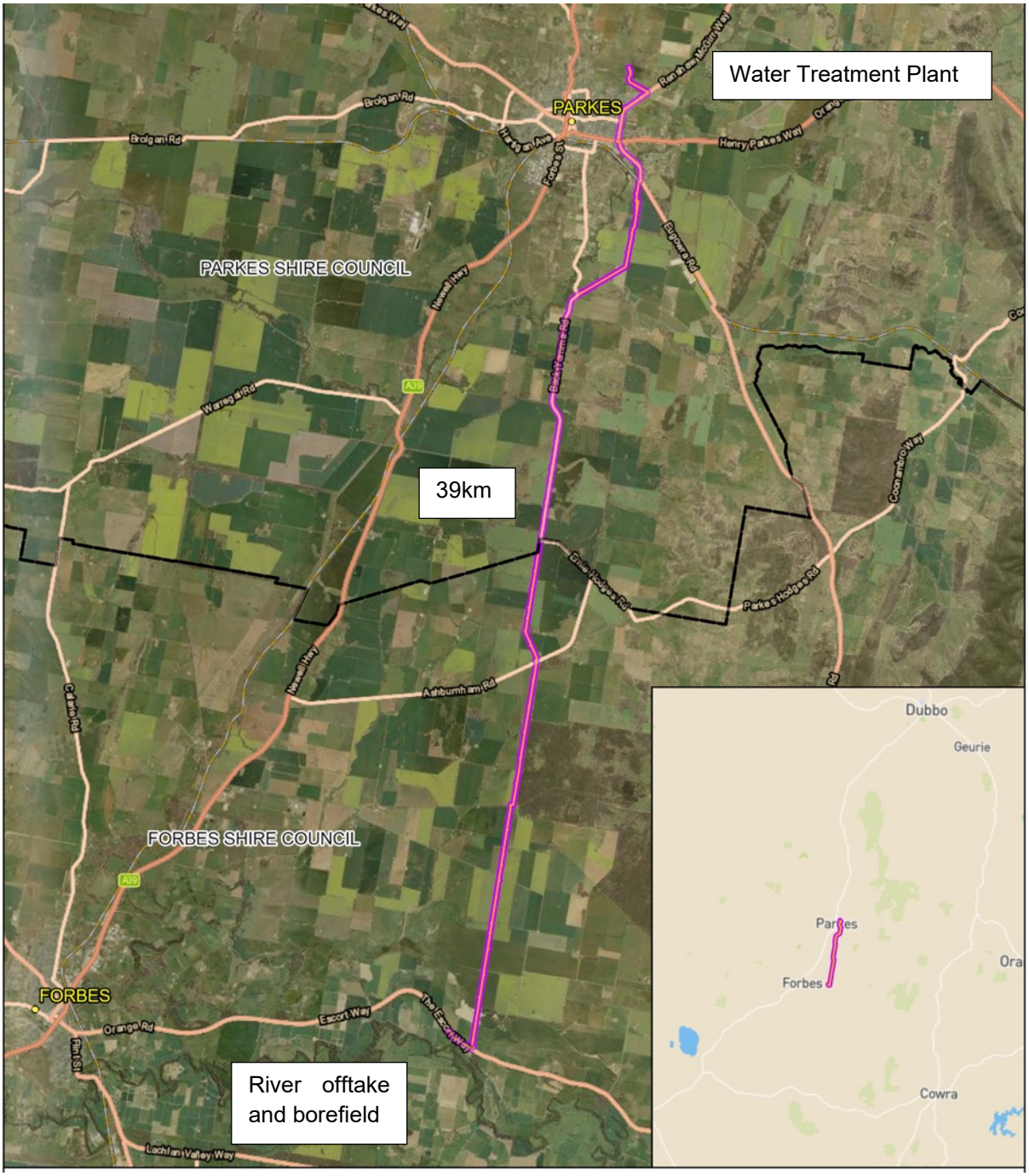


Figure 4-17: Water Sources General Arrangement Source: Ecological

A detailed review of Zone 3 and the total Lachlan alluvial groundwater source is provided in the document "Groundwater usage in Zone 3 of the upper Lachlan Alluvial Groundwater source" prepared for PSC in 2021.

The long-term average annual extraction limit for the whole of the Upper Lachlan Alluvial Groundwater Source is about 94,000 ML/year. In order to be sustainable, water extraction for the Upper Lachlan Alluvial has to be kept below this amount.

Between 2001 and 2019, maximum groundwater usage was of the order of 75,000 ML to 85,000 ML per annum. in the Upper Lachlan Alluvium. Groundwater extraction was less than 60,000 ML/year during 2012/13 to 2014/15.

Table 4.7: Maximum ground water extraction during peak years 2006-2009

	Upper Lachlan Alluvial Groundwater Source	Zone 3 alone
	ML/year	
2006/7	84,748	34,006
2007/8	76,416	
2008/9	80,197	35,783

The extent of the Upper Lachlan Alluvium, location of the Parkes borefield and other major abstractions, and the arrangement of the Parkes and Northparkes mine bore is shown in the figures below.

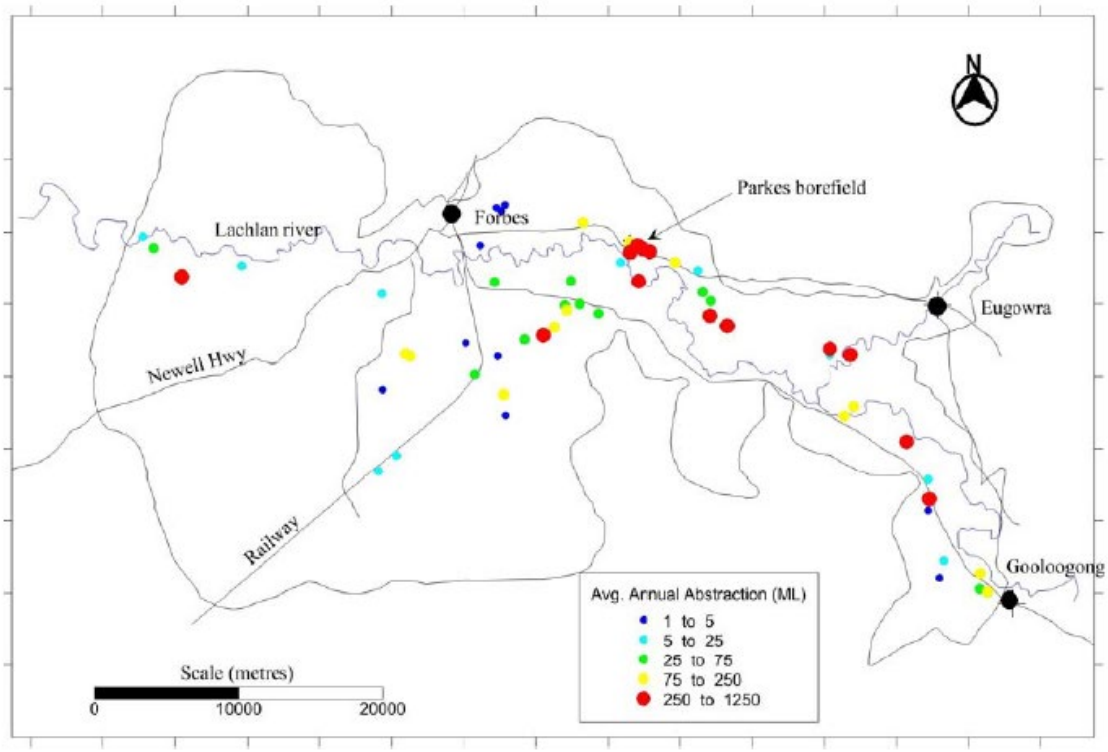


Figure 4-18: Location of Parkes Borefield and Major Aquifer Abstractions

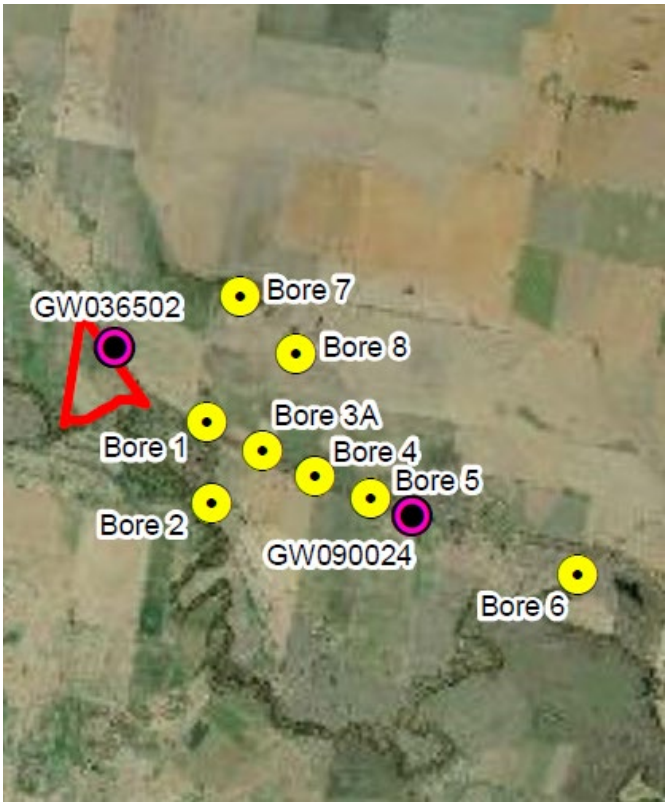


Figure 4-19: Bore Arrangement

Water from the bores and the nearby Lachlan River intake is transferred to Parkes via two pumping stations and 30km mains. Although they are designed to operate in parallel, currently one pipe is used for bore water and the other is used for river water.

In the past, concentrated abstraction from the borefield resulted in the development of an intense cone of depression (drawdown) around the borefield. The main causative factor for drawdown in the vicinity of Parkes Borefield was the expansion in Parkes Borefield abstraction from 1994 to 1995. However, continuing and increasing irrigation as well as limited recharge events, including two prolonged drought period, have led to an overall decline in water level as shown in the Figure below.

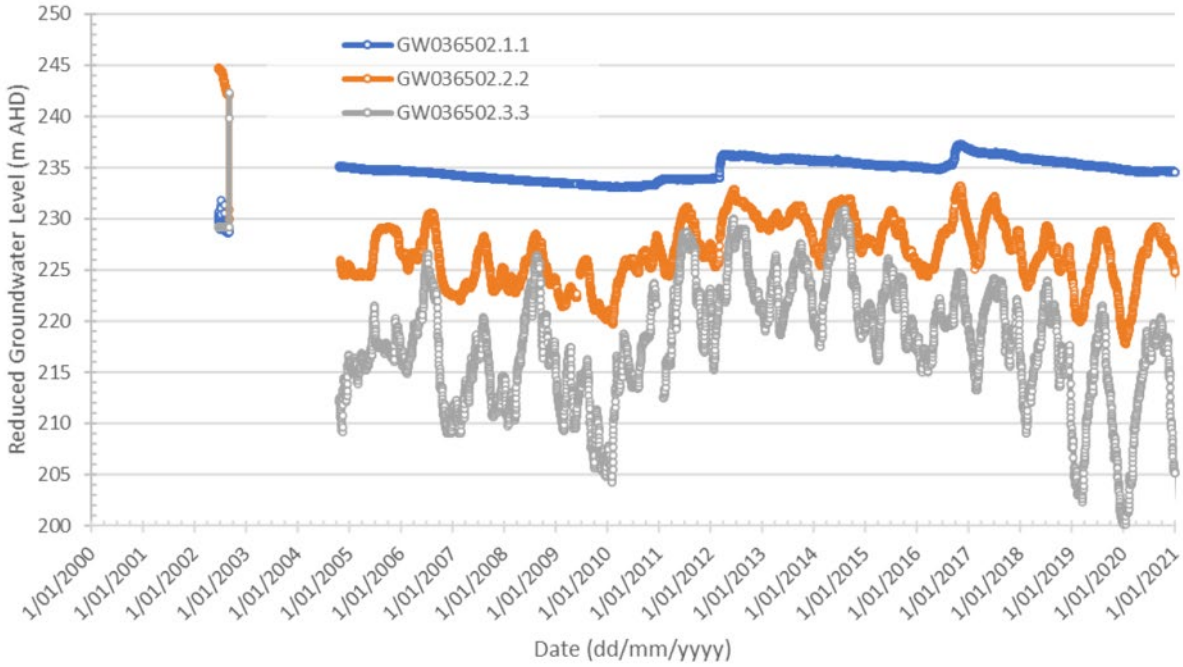


Figure 4-20: Hydrograph for Monitoring Bore GW036502

Parkes has implemented a number of measures to manage drawdown at the borefield. These include replacement of inefficient bores, acquisition of additional licences from neighbouring landholders, refurbishing bores 1, 3A, 4 and 5 and greater use of the surface water allocations.

Forbes Bore 3 was developed in 2019 but is yet to be connected to the Eugowra Rd Pump station as pipe alignment and access easements are still being detailed.

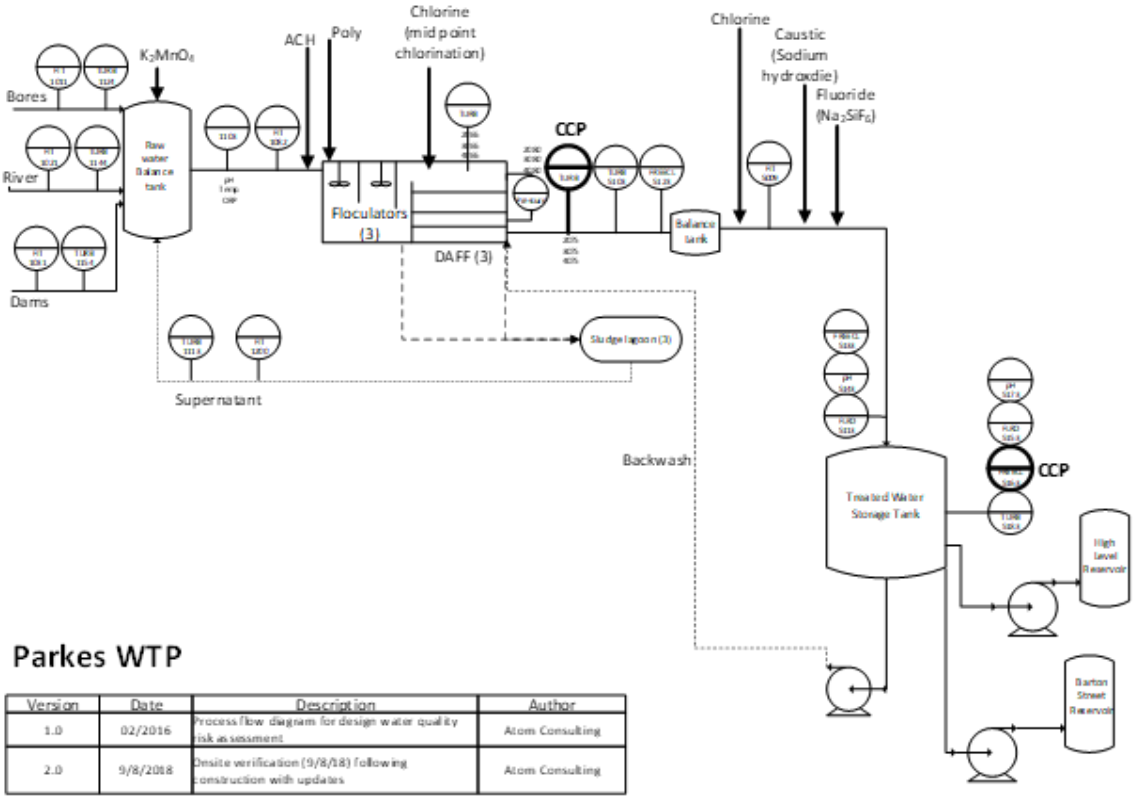
Parkes are also progressing investigation of an additional bore to the west of the borefield which would also connect into the Forbes Bore 3 pipeline

The Centroc group have be progressing the Centroc Water Grid Option, led by Parkes Council to spread the extraction of bore water across a broader area than the current Parkes Borefield, and to improve water security for all councils in the region. A significant investment by the Commonwealth or State will be required for the project to be viable. Parkes Shire will be responsible for planning a new transfer pipeline that, if staged appropriately, could draw groundwater from Gooloogong borefields across to Forbes. This will be further discussed in the Options Paper.

4.4 Water Assets

4.4.1 Water Treatment

The New Parkes WTP was commissioned over summer 2017-2018, it treats water through flocculation, dissolved air flotation filtration (DAFF), chlorination and fluoridation, diagram below.



Version	Date	Description	Author
1.0	02/2016	Process flow diagram for design water quality risk assessment	Atom Consulting
2.0	9/8/2018	Onsite verification (9/8/18) following construction with updates	Atom Consulting

Figure 4-21: Water Treatment Process Schematic – Existing Parkes WTP Source Atom Consulting

The plant was designed with a capacity of 16ML/day and also the capacity to be expanded to add an additional 16ML/day with capped connections in key locations.

Parkes Water Treatment Plant (WTP) and Associated Pipework Infrastructure

Not to scale. Pipe alignments are indicative only.

4.4.2 Eugowra Road Pump Station

Water from the River and borefield are pumped into two reservoirs at the Eugowra Road Pump Station and then via two pipes, boosted at Back Yamma and Akuna Road before arriving at the Water Treatment Plant raw water storage. The capacity of the pump and pipe system is 240L/sec (120L/sec in each pipe).

The Eugowra Road, Back Yamma and Akuna Road pumps are all powered by mains power.

Figure 4-22: Eugowra Road Reservoirs

Figure 4-23: Eugowra Rad Pump Station

4.5 Trade Waste

Council's Trade Waste Policy was updated in 2015 and outlines the approval requirements for non-domestic properties to discharge liquid to the sewerage system and comply with the Local Government Act and guidelines.

The 2018-19 Benchmarking report states 12.9ML of trade waste was collected in Parkes, 1.1ML in Peak Hill, 0.5ML in Trundle and 0.2ML in Tullamore. This represents 4% of the total sewage collected but this is expected to increase with the development of the SAP.

The trade waste usage charge for 2020-21 was $225 for Category 1 & 2 and $803 for Category 3.

There are currently 14 premises with trade waste agreements in Parkes and 7 in Peak Hill. These are generally commercial operators such as a clubs, restaurants and beauty salons. There are no heavy industries discharging to the sewerage system and consequently no Category 3 trade waste discharges.

Council currently does not have a trade waste officer to undertake on-going monitoring commercial premises and can therefore not provide any trade waste inspection results, however, if grease traps are being maintained in accordance with the agreements then there is little risk to the reticulation network or the STP.

4.6 Sewerage System Descriptions and Service Areas

4.6.1 Parkes Sewerage Scheme

Parkes is served by a conventional gravity sewage collection and transport system. Raw sewage gravitates to a balance tank and pump station on Nash St at the site of the old STP and is then pumped under Goobang Creek to the new plant on Webb St, further to the west.

The sewerage service area map for Parkes is shown below:

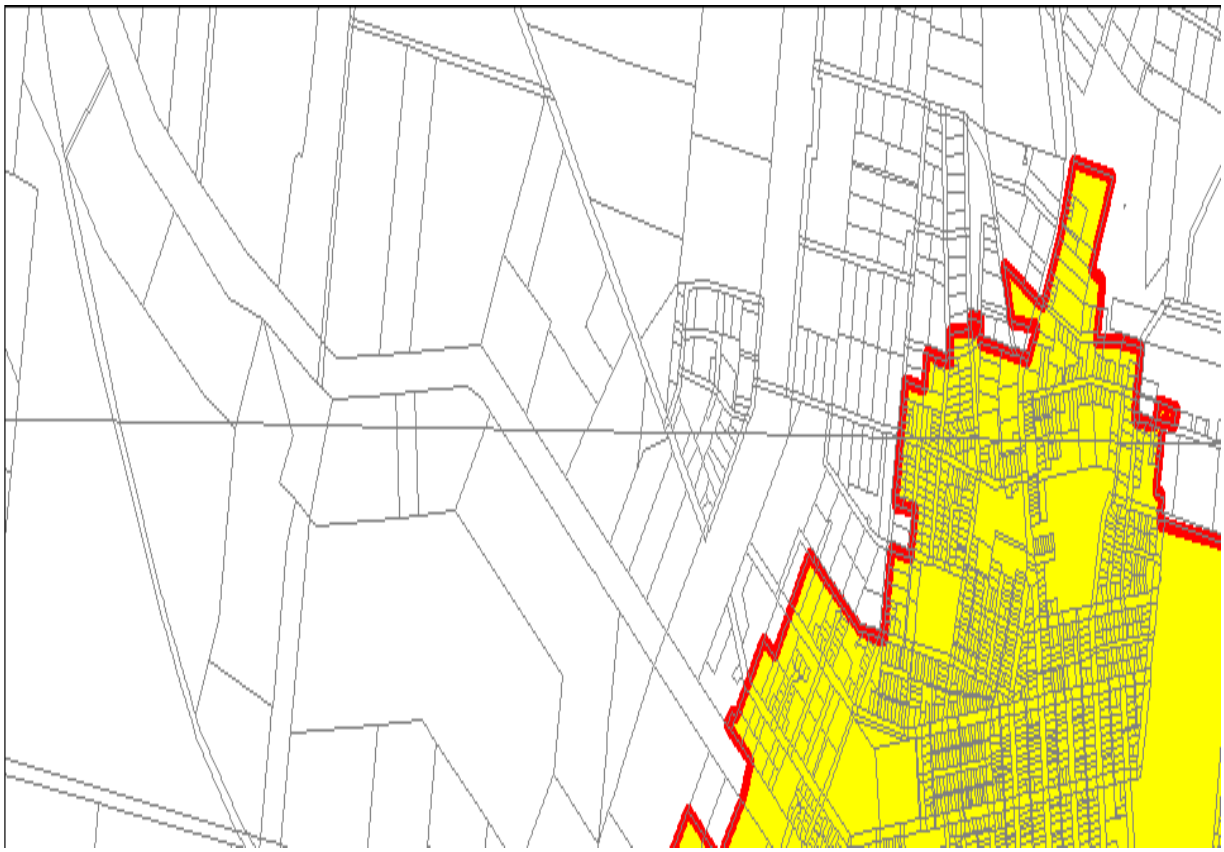


Figure 4-24: Sewerage Service Area Map for Parkes

The new Parkes Sewage Treatment Plant (STP) began processing the town's wastewater on Monday 7 July 2017 and was officially opened on 21 March 2018.

Figure 4-25: New Parkes STP

The new plant uses an aerobic biological process that removes nutrients, organic, and inorganic compounds from the wastewater. The treatment uses oxygen and specialised bacteria to breakdown the organic components from the wastewater, producing a high quality effluent that is suitable for a range of reuse applications and environmental discharge.

The new Sewage Treatment Plant provides a range of benefits to the community including; reduction of odours, improvements in effluent quality, and increased operational efficiency. The plant operates with a high level of automation which supports remote monitoring, substantially reduce day-to-day manual handling. The automation also optimises energy efficiency, and coupled with the site's 107 kWp PV (solar) panels, the plant's ongoing energy costs are sustainable.

The new plant is has 15,000 EP capacity, which can be upgraded to 20,000 EP to accommodate population growth.

The facility was constructed by contractor John Holland at a cost of $27.5 million. The NSW Government contributed just over $9.44 million through the Country Towns Water Supply and Sewerage Program, representing 38% of the cost.

The main components of the upgrade include:

- Transfer system for delivery of sewage from the existing STP to the new STP site;
- An inlet works and preliminary treatment consisting of band screening, grit removal, flow measurement and flow division facilities;
- Secondary treatment using the Intermittently Decanted Extended Aeration (IDEA) process;
- Tertiary treatment – nutrient control and disinfection facilities; and
- Biosolids and residuals management.

- The new plant is based on an aerobic biological process with much lower potential for odours.

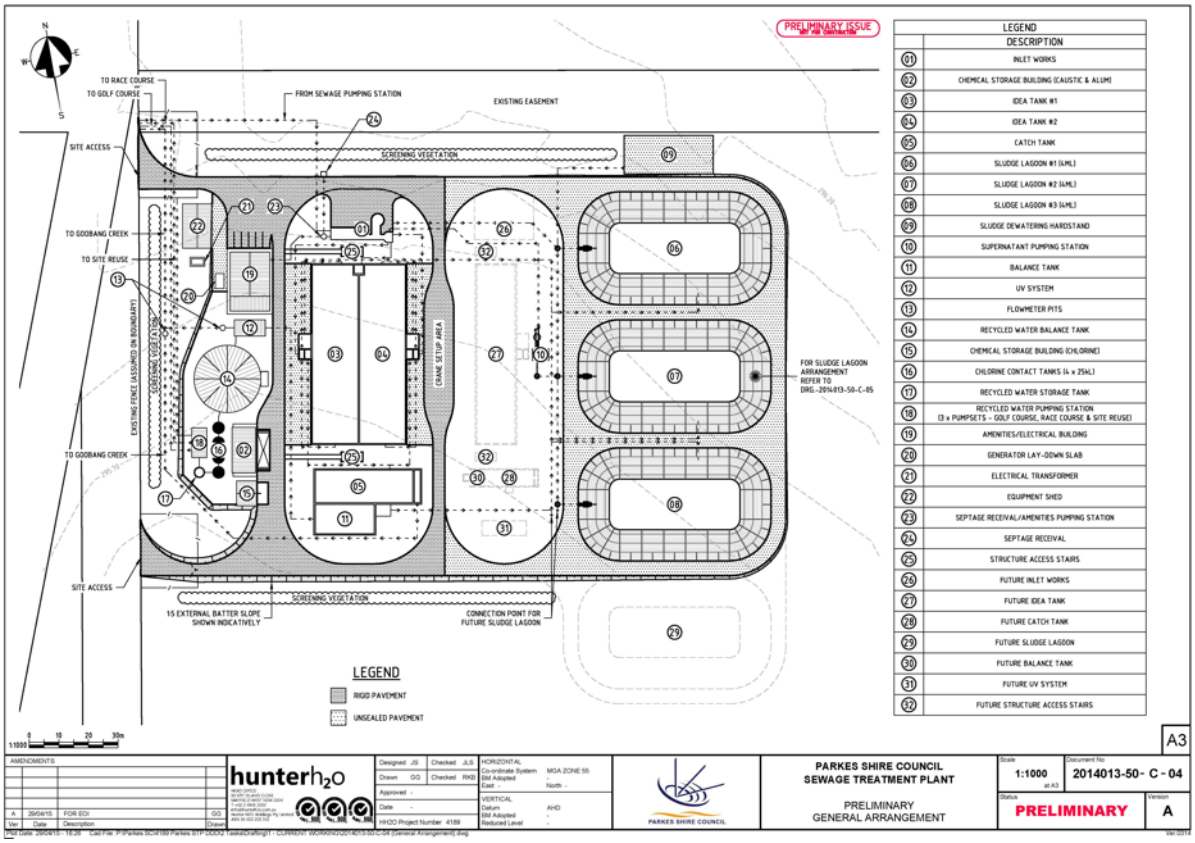


Figure 4-26: New Parkes STP General Arrangement Drawing

4.6.2 Peak Hill Sewerage Scheme

Peak Hill is served by a network of gravity sewers.

The Peak Hill STP is a trickling filter type works and was constructed in the late 1960s, with a safety upgrade completed in 2000. The plant comprises an inlet works, preliminary screening, two hopper bottomed primary sedimentation tanks, a primary pumping station, a flat topped sludge digester with an associated sludge pumping station, a bacteria bed (trickling filter), a humus tank and effluent ponds. The capacity of the STP is estimated at 1,800 EP. The hydraulic load is currently 1,100 EP with little change in loads forecast over the 30 year forecast period.

Up until the end of 1995, all the treated effluent from the sewage treatment works was discharged into a series of water retention basins for evaporation. The treated effluent was then pumped to the Peak Hill Gold Mining Project until 2005 to be used in the gold extraction process. Since 2005, the evaporation basins have been de-commissioned.

Peak Hill is a nil-release scheme, hence there is no EPA licence needed for approval for discharge from the EPA.

As there is limited growth expected in Peak Hill, no capacity upgrades will be required for the life of the plan. The service area for sewerage is the same as the water supply service area.

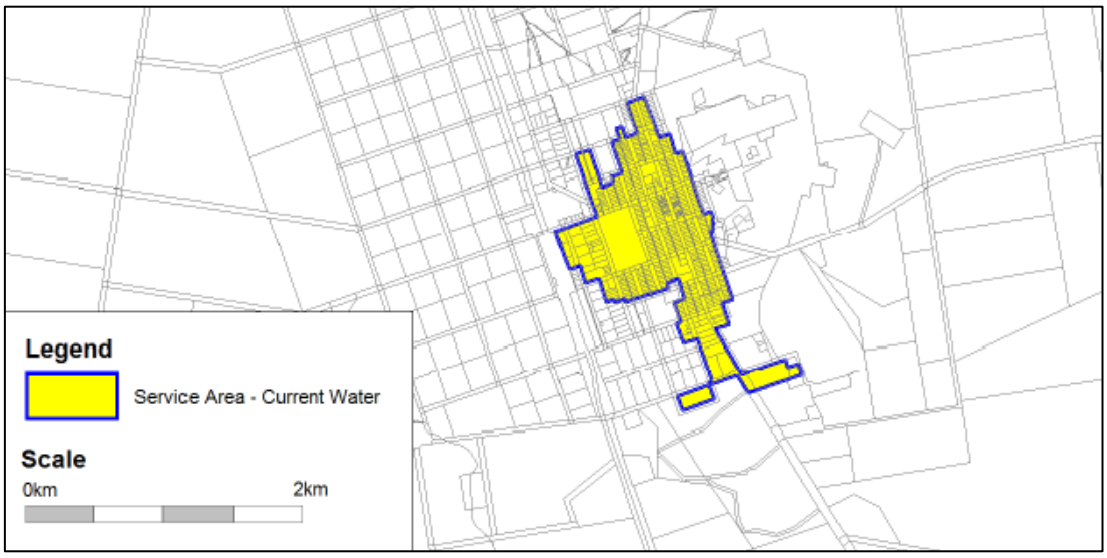


Figure 4-27: Sewerage Service Area Map for Peak Hill

4.6.3 Trundle and Tullamore Sewerage Scheme

Trundle and Tullamore are served by a network of low pressure sewers constructed in 2010 and 2008 respectively. Both have simple treatment works using passive oxidation ponds with no discharge to the environment.

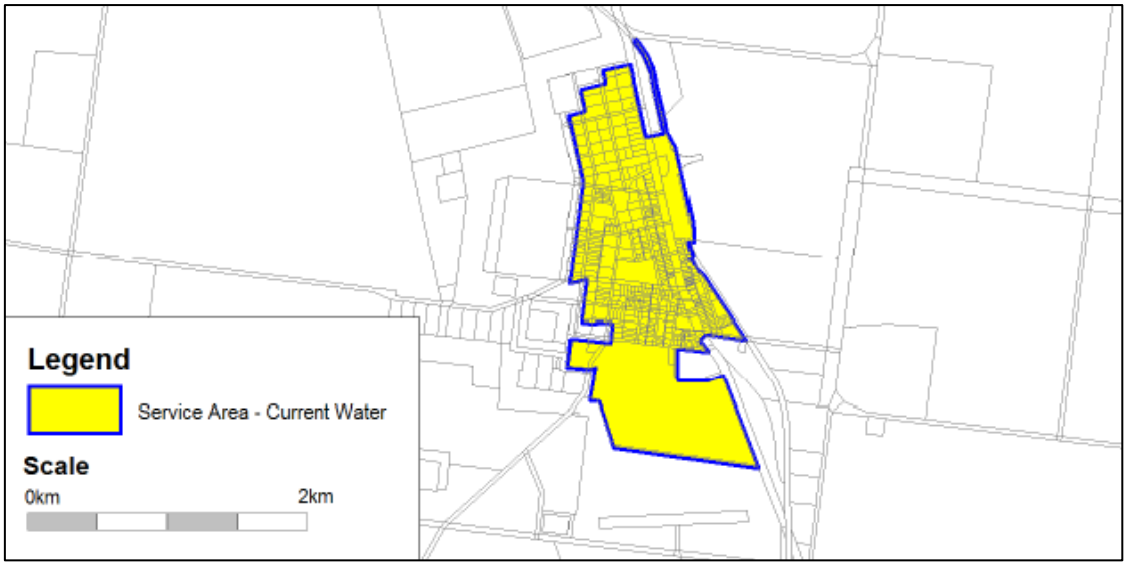


Figure 4-28: Sewerage Service Area Map for Trundle

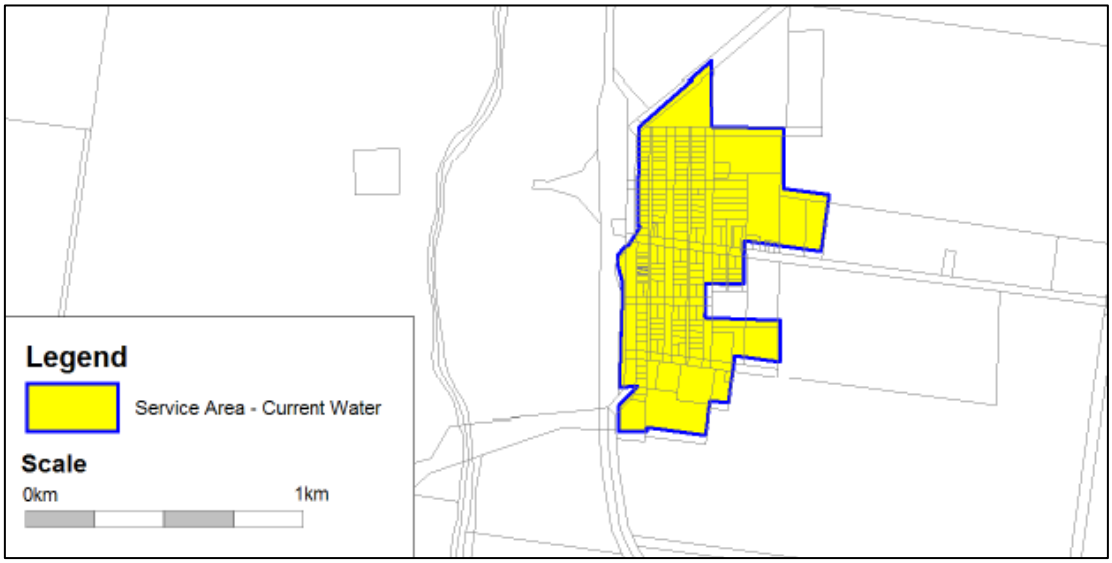


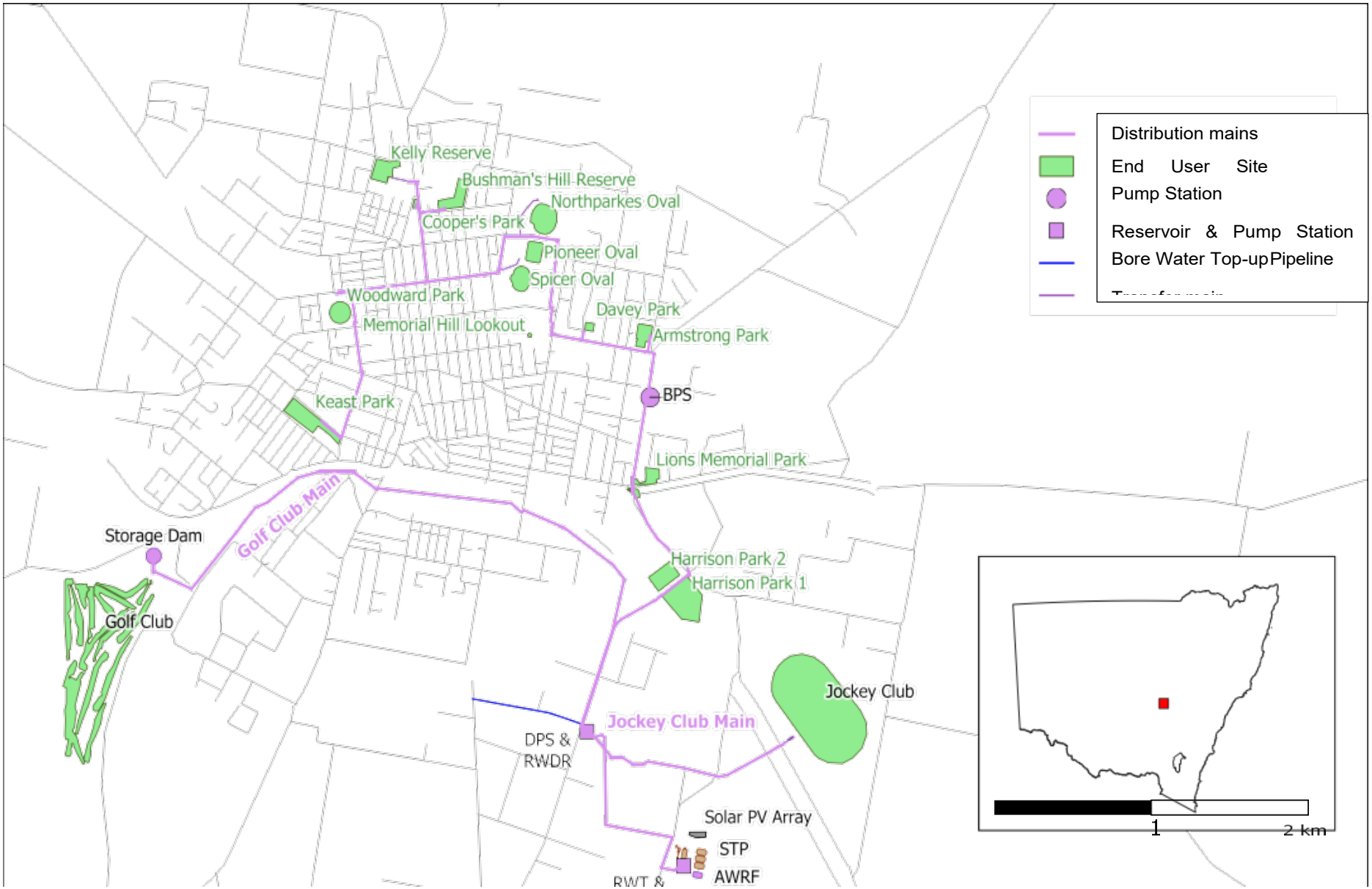
Figure 4-29: Sewerage Service Area Map for Tullamore

4.7 Water Recycling

An Advanced Water Recycling Facility (AWRF) was completed in 2018 to further treat the tertiary outflow from the new STP and deliver it through a rising main to existing recycled effluent users; the golf course and racecourse, as well as to 11 of Councils parks and ovals.

Figure 4-30: Advanced Water Recycling Facility - membrane filters

The system is designed to deliver 2ML/day of treated effluent from the 3ML/day inflows.


Distribution mains
End User Site
Pump Station
Reservoir & Pump Station
Bore Water Top-up Pipeline
Kelly Reserve
Bushman's Hill Reserve
Northparkes Oval
Cooper's Park
Pioneer Oval
Spicer Oval
Woodward Park
Memorial Hill Lookout
Davey Park
Armstrong Park
BPS
Keast Park
Lions Memorial Park
Golf Club Main
Storage Dam
Golf Club
Harrison Park 2
Harrison Park 1
Jockey Club
Jockey Club Main
DPS &
RWDR
Solar PV Array
STP
AWRF
RWT &
1
2 km

4.8 Stormwater

The town of Parkes is situated in the Goobang Creek sub-catchment, which flows into the Lachlan River at Condobolin.

The Curumbenya Range forms the head of the subcatchment for Goobang Creek. A series of low undulating hills of 300-370 metres in height extends west from this range through Goonumbla to Kadungle. This ridgeline separates the catchments of the Lachlan and Bogan River systems. Watercourses north of this line flow into the Bogan River, while those south of the line flow into Goobang Creek.

Stormwater in the urban areas of Parkes, Peak Hill, Trundle and Tullamore is drained through pits and pipes and generally discharged into shallow, often grassed swales. The central area of Parkes drains to a small waterway known as PAC Park Creek which joins Goobang Creek just upstream of the Parkes STP. Due to the low rainfall in the area, the water courses are ephemeral and no consistent monitoring of flow or quality is undertaken.

In early 2021 a large flood swept through the main street of Parkes, swamping businesses and disrupting the town for several weeks. This led to a Special Project Reference Group meeting to discuss more intensive implementation of WSUD measures and development controls in the future.

Figure 4-31: Flooding in Clarinda St January 2, 2021. Source https://www.youngwitness.com.au/

In April 1998 Parkes Shire Council received a direction under Section 12 of the *Protection of the Environment Administration Act* 1991 to prepare a Stormwater Management Plan. This was completed in 2001.

The plan details the condition of the stormwater drainage system in the Parkes township and includes an action plan for water quality improvements. The Plan identified two urban runoff issues at Bushmans Dam (Kelly Reserve) and PAC Park Creek.

Two major projects have been undertaken to address these issues, they are to reconstruct and rehabilitate Bushmans Dam and to install a gross pollutant trap at the discharge point into PAC Park with a complementing education program.

The plan also recommended setting water quality objectives for development and subsequently Council has prepared Stormwater Drainage Design Guidelines for developers to achieve catchment wide water quality management targets on private developments.

Further to this, the Parkes Local Strategic Planning Statement (2020) includes planning guidance for development across the shire and includes the provision to 'prepare a stormwater management strategy for Parkes Township' and to 'investigate the potential to develop Water Sensitive Urban Design policies for new development'.

Stormwater harvesting was investigated in 2012 but the recycled water scheme was chosen as the preferred model for providing an alternate water supply for parks irrigation. That investment now negates the potential for a cost effective return for stormwater harvesting.

4.9 Stormwater Sub-Catchments

The Parkes urban area is made up of three stormwater catchment areas, as shown in the aerial photo below:

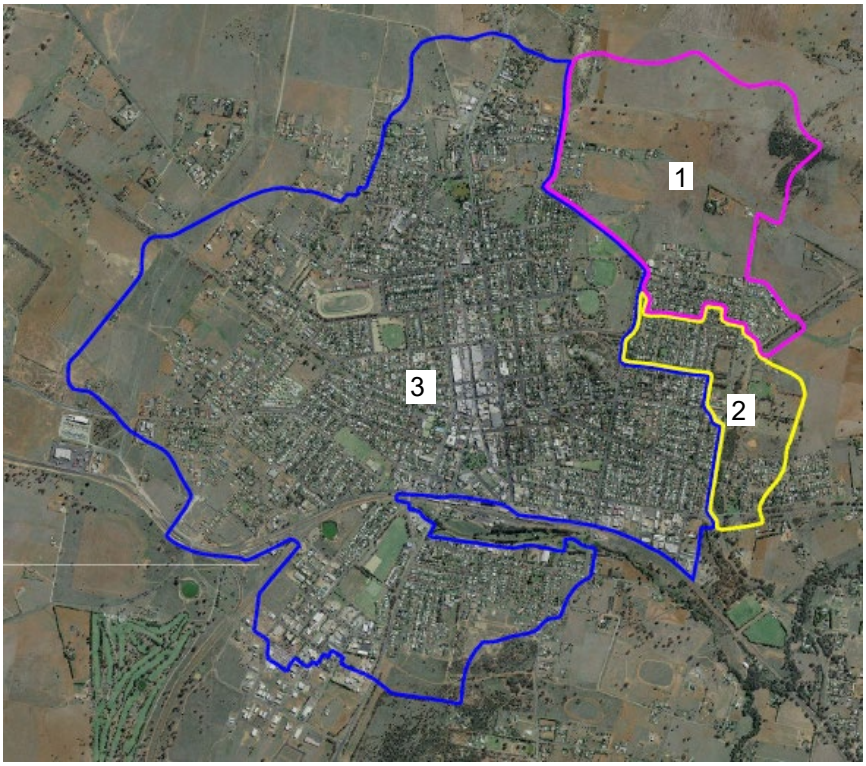


Figure 4-32: Stormwater sub-catchments

Catchment 1 is located to the northeast of the town has an area of 205 ha. It is a mixture of residential and rural land.

Catchment 2 is located to the east of the town and has an area of 65 ha.

Catchment 3 is the largest catchment and comprises the majority of the developed urban area. It has an area of 800ha it encompasses 75% of the town's area. This drains to PAC Park Creek, which also receives backwash water from the Parkes WTP.

All catchments ultimately flow in a South-Easterly direction towards Goobang Creek.

The runoff from these catchments is typical of urbanised catchment areas with nutrient loads consistent with MUSIC model assumptions.

No modelling or measurement of stormwater flows or quality have been undertaken to provide a time series graph. However, the assessment of the feasibility of harvesting stormwater for re-use by Geolyse and ISF (2014) determined the range of flows expected from modelling catchment size and rainfall over the past 25 years.

The low level of development proposed for Parkes over the planning horizon means that these volumes will not change significantly.

Table 4.8: Stormwater runoff flows

	Runoff Volume
Average Flow	1,315ML/year
Minimum Flow	380ML/year
Maximum Flow	3,640ML/day

5 Capacity and Performance Assessment

5.1 Financial Performance

The construction of the new water and wastewater treatment plants have created a financial burden on Parkes Council which is not yet being recovered through water and sewer use bills, nor developer contributions. The increase in expenditure is shown in the figure below.

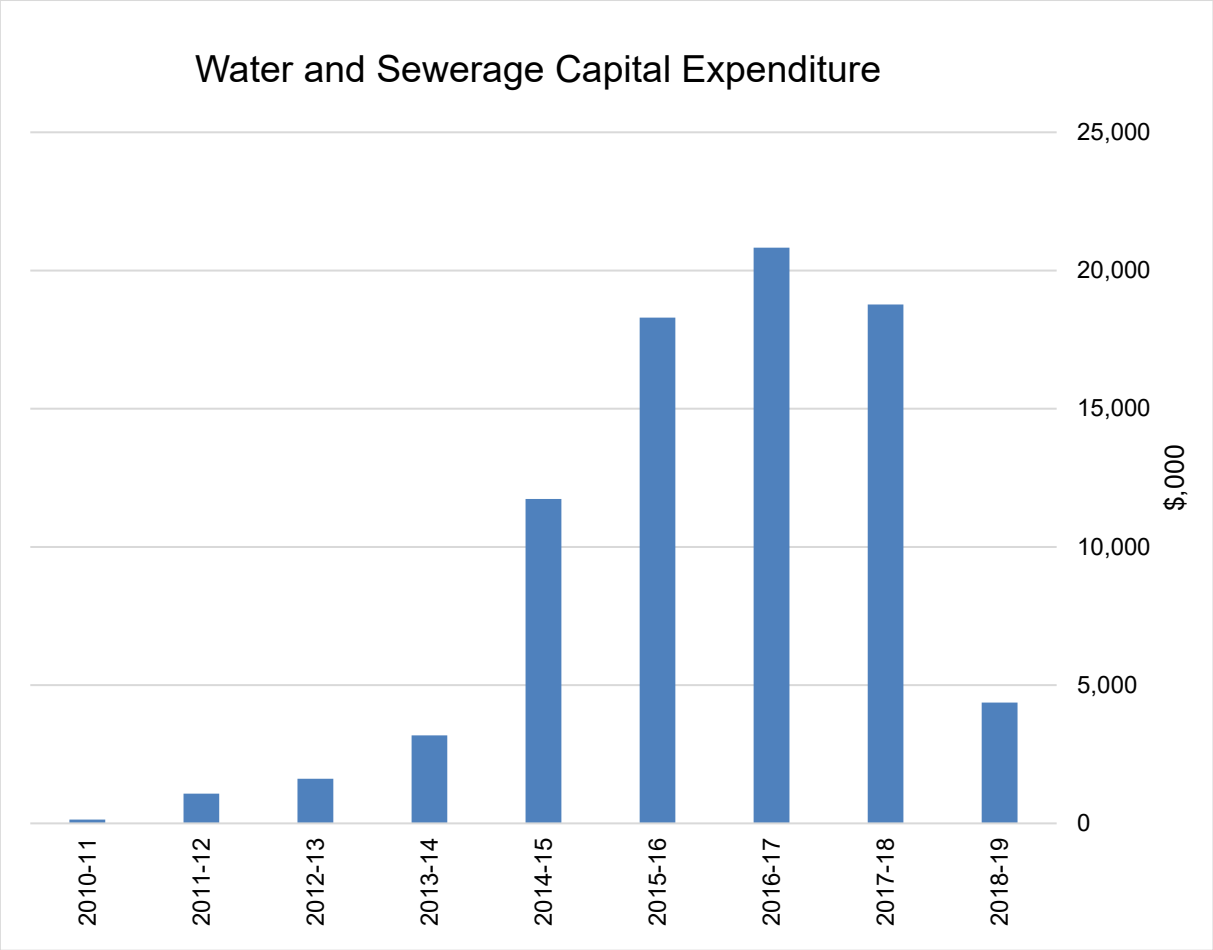


Figure 5-1: Combine water and sewer capital expenditure

This has led to an improvement and stability of delivering on levels of service to customers but there has been no increase in the number of customers, and in fact a decrease in water use.

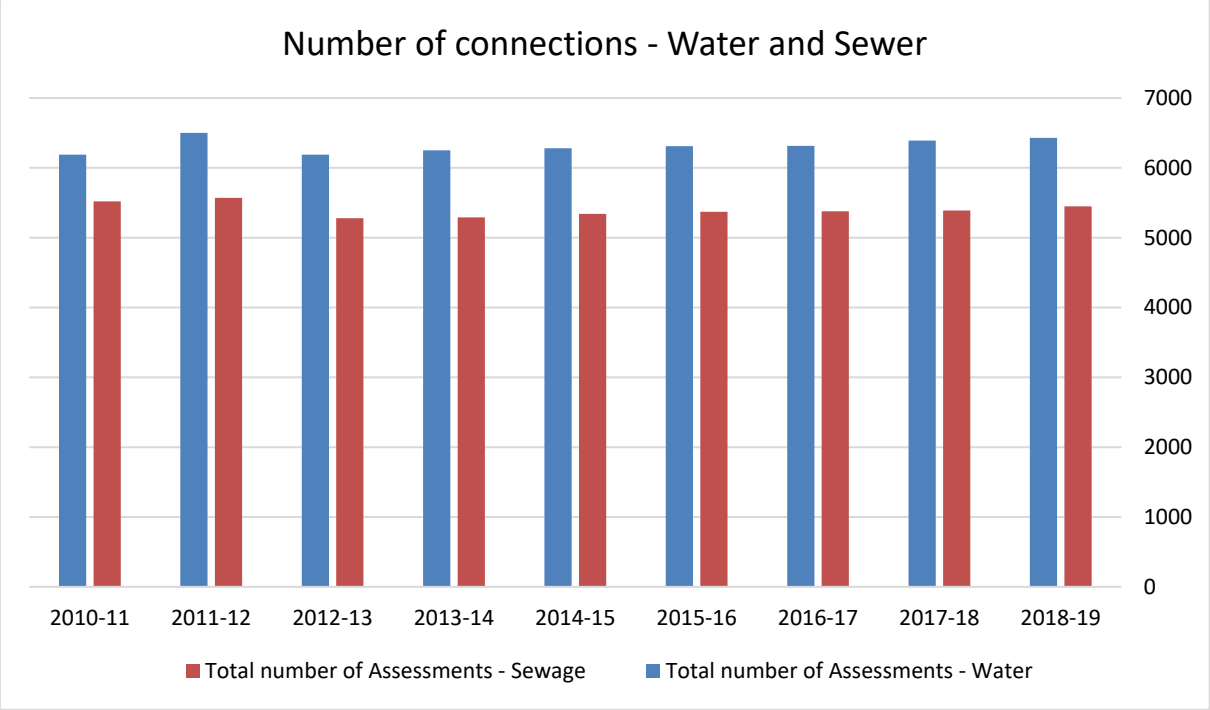


Figure 5-2: Number of assessments for water and sewer in recent history

The new plants are also more expensive to run…

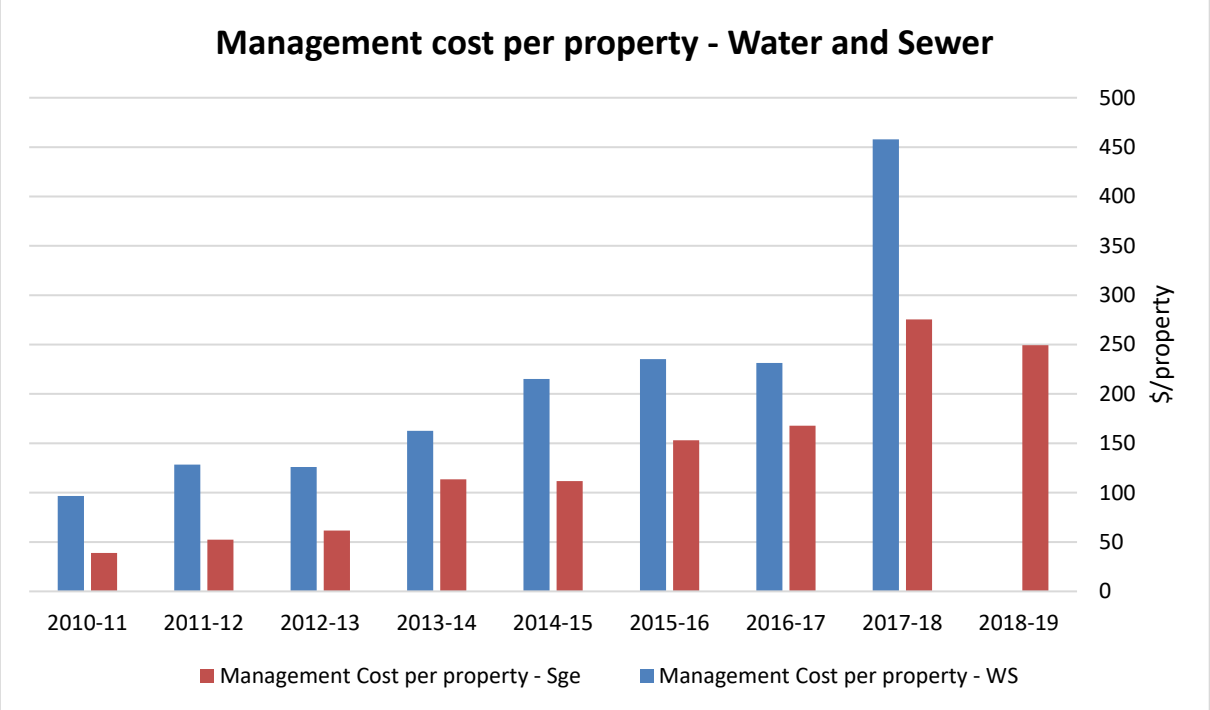


Figure 5-3: Management costs increasing

Leading to a negative return on investment.

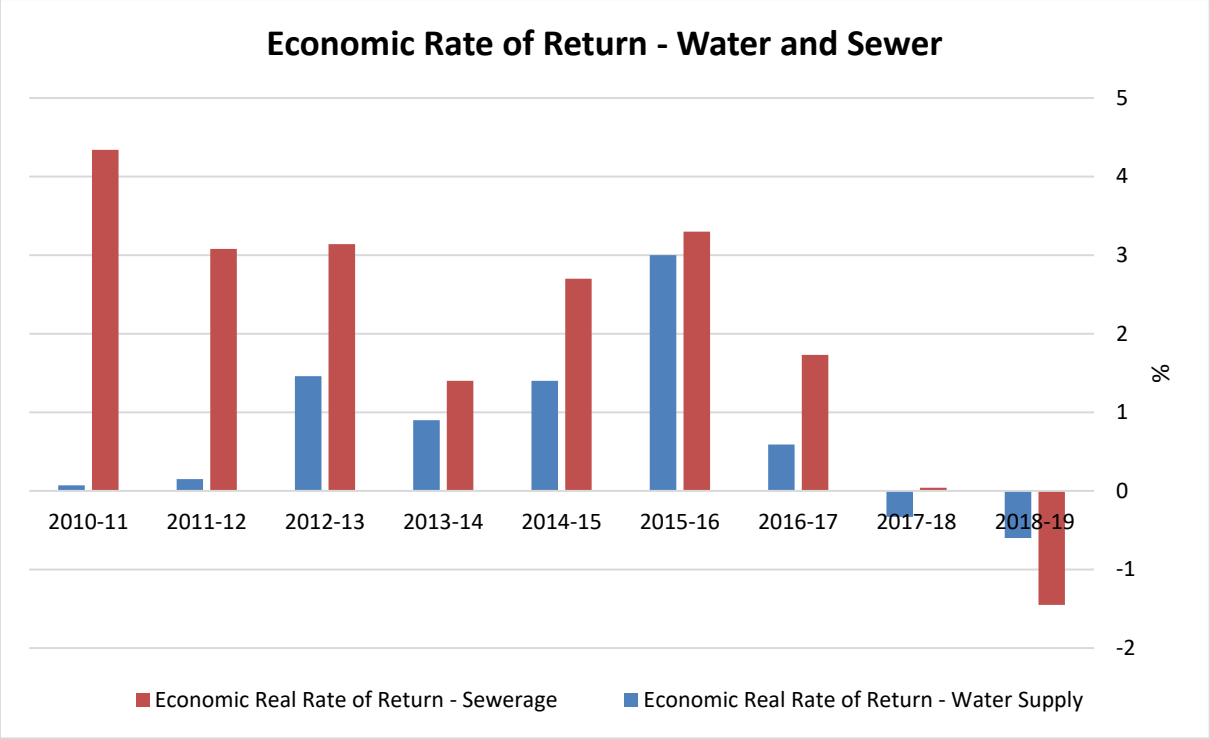


Figure 5-4: Economic Real Rate of Return for sewer and water

The combined TRB is $1,144.09 and the NSW State average is $1,468.34, putting Parkes as the fourth lowest in the state, which leaves room for an increase in bills to make up the deficit. However this is further investigated in the IWCM Options, to include the impact of the SAP on incoming revenue and developer contributions. The relevant data is summarised below.

5.1.1 Water Supply

Table 5.1: Summary of financial data for water

	2016-17	2017-18	2018-19
Operating Result per Property	$132.52	-$95.71	-$229.72
ERR	0.59	-0.33	-0.6
Net Debt to Equity (W&S)	-12.85	-6.67	-1.67
Revenue Split between residential and non-residential	Res 77.55%	Res 68.53%	Res 67%
OMA/Revenue (per property)	53%	69%	63%
Developer Charges / ET	$11,930	$12,670	$12,670
Typical Residential Bill	$579.52	$706.21	$679.09

5.1.2 Wastewater

Table 5.2: Summary of financial data for wastewater

	2016-17	2017-18	2018-19
Operating Result per Property	-	-	-
ERR	1.73	0.04	-1.45
Net Debt to Equity (W&S)	-12.85	-6.67	-1.67
Revenue Split between residential and non-residential	Res 77.55%	Res 68.53%	Res 67%
OMA/Revenue (per property)	55%	72%	76%
Developer Charges / ET	$3,530	$3,730	$4,370
Typical Residential Bill	$440	$450	$465

5.2 Water Supply Asset Condition

The condition of the water supply assets is documented in operational spreadsheets and regularly reported. A summary of the main assets and their condition is presented here.

Table 6.3: Condition of Water Supply Assets

Asset category	Location	Issues identified
Dams	Endeavour Lake - About 25 km to the east of Parkes	No Major issues
	Beargamil Lake - About 25 km to the east of Parkes	No major issues - minor crack on concrete spillway and spill /earthen dam interface requiring anchoring.
Bores	8 bores in Bore-fields within Forbes Shire Council area, about 30km South of Parkes.	Bore 3A, 4 and 5 require refurbishment which is under way in 2021
Water Treatment Works	Webb St Water Treatment Plant & appurtenants are situated in Parkes town.	Treatment plant capacity sufficient for peak day and anticipated growth but may require augmentation to supply full SAP demand
Pump Stations	**Parkes – 11 PS**	
	Back Yamma Pump Station	Good condition

Asset category	Location	Issues identified
	Barton Street Lift Pumps	Good Condition - Subject to overhaul or replacement
	Boosted Zone Pump Station	Good Condition
	Eugowra Pumping Station	Sound Condition
	Goonumbla Booster Pump Station	Good condition, subject to pump overhaul
	High Street Northparkes Mine PS	Good condition, subject to pump overhaul
	Orange Road Booster PS	Good condition, subject to pump overhaul
	Forbes Pump Station	Poor Electrical System
	Peak Hill Booster PS	Good condition, subject to pump overhaul
	Trundle Pump Station	Good condition, subject to pump overhaul
	Cookamidgera - Mugincoble PS	Aged electrical & mechanicals close to life expired
Reservoirs	**Parkes – 16 Reservoirs**	
	Balance Tank 1A	Structure requires re-caulking
	Balance Tank 1B	Good Condition
	Balance Tank 2	Good Condition
	Church Street Reservoir	Liner needs repair/replacement
	Goonumbla Hill Balance Tank	Good condition
	High Street in-ground Reservoir	Rubber lining requires replacing
	High Street Reservoir	Needs assessment of corrosion and leaks
	Albert St Reservoir	Planned for decommissioning after 2025
	High Level Reservoir	As new, excellent condition
	New Barton Street Reservoir	Sound Condition
	Old Barton Street Reservoir	Sound Condition
	Peak Hill – 3 Reservoirs	
	Nash Balance Tank	Sound Condition
	New Service Reservoir	Sound Condition
	Old Service Reservoir	Needs structural assessment and re-caulking
	Trundle - Trundle Reservoir	Good Condition

Asset category	Location	Issues identified
	Tullamore - Tullamore Reservoir Cookamidgera Reservoir	Good Condition Ladder Needs replacing
Pipes – Trunk Mains	Parkes – 219 km	Bulk supply pipelines from Dams and borefield are nearing end of life and frequently break.
	Peak Hill - 50.82 km	No major issues
	Trundle - 3.12 km	No major issues
Pipes - Reticulation	Parkes – 208.71 km	14.06 km with limited life span failure rates, of which about 12 km of pipes noted as life expired or in poor condition
	Peak Hill - 11.42 km	No major issues
	Trundle - 8.92 km	No major issues
	Tullamore - 4.59 km	No major issues
	Bogan Gate - 3.77 km	No major issues
	Cookamidgera - 5.59 km	No major issues

Table 4.4: Water Assets Summary

Asset	No./ Length/ Capacity	Average Condition 1 = Near Perfect 5 = Un-serviceable	Average Remaining Life (Years)	Current Replacement Cost ($'000) @2020
Water Mains **- Reticulation** **- Trunk**	172 km 343 km	3	40	**116,168**
Water Meters	5,840	2	5	**2,500**
Pumping Stations	22	3	12	**10,907**
Water Treatment Plants	1	4	5	**51,360**
Telemetry	1	3	11	**6.9**
Water Reservoirs	16	3	25	**18,879**
Bores	8	2	-	**3,245**
Dams	2		50	**25,000**
TOTAL	**-**	**-**	**-**	**243,959**

5.3 Sewerage Asset Condition

Unlike the water supply assets, the condition of the sewerage treatment and reticulation assets has not been fully documented in a specific Asset Management Plan. The sewerage assets' life is calculated as extremely long, indicating that the annual depreciation is too low, according to the 2018 -19 Financial Plan.

Parkes Shire Council has also carried out a valuation of the sewerage assets as required by the Division of Local Government, including the inspection of a representative sample of sewer pipes. Estimates of the timing for replacement needs in the medium and long term were determined based on the nominal lives of the assets combined with the results of the inspections and a general idea of the condition of the assets based on the day to day experience of the maintenance staff.

A review of costs from the asset database and Financial Statement was conducted in 2020 and is summarised below.

Table 6.5: Sewerage Assets and Condition Summary

Asset	No./ Length/ Capacity	Condition 1 = Near Perfect 5 = Un-serviceable	Average Remaining Life (Years)	Current Replacement Cost (MEERA) ($'000) @2020
Sewer Mains	153km	Average 2.5 12km Condition 5	94	**37,800**
Sewerage Manholes (nodes)	1,986	3	76	**5,811**
Sewerage Pumping Stations	7	2	40	**2,506**
Rising Mains	8.6km	2	60	**1,982**
Sewage Treatment Plants	4	2	13	**41,945**
Radio Telemetry	**1**	**3**	**9**	**6.75**
TOTAL				**90,050**

5.4 Replacement costs

From the 2020 Financial Statement, the total replacement cost of the water assets is $243M, sewerage assets is $90M and stormwater assets is $31M. A valuation is due to be carried out again by mid 2022.

5.5 Pricing

5.5.1 Water Charges

Council has already adopted a two-part water supply tariff structure comprising an access charge and a usage charge, including an inclining block usage charge structure for residential customers. Council's current water charges are shown in the table below.

Table 5.6: Water Supply Pricing Summary

	2017/18	2020/21
Average annual residential water supplied (kL/connected property/year)	279	249
Fixed charge (or minimum)		$1.84
Usage charge ($/KL): - Residential (up to 400KL) - Residential (above 400KL) - Non-Residential	 $1.80 $3.20 $1.90	 $1.90 $3.50 $2.50
Typical Residential Bill	$629	$679
Residential revenue from usage charges	66%	76% (modelled)

5.5.2 Sewerage Charges

The Best Practice Pricing Guidelines for sewerage services recommend adoption of a two-part tariff structure for non-residential customers that has features such as:

- Uniform annual charges for residential customers;
- A two-part, access and usage charges for non-residential customers;
- Trade waste charges for identified commercial and industrial customers; and
- Assessment and adoption of appropriate sewage discharge factors for commercial and industrial customers

Council's sewerage charges have been increasing over the past five years.

Table 5.7: Sewerage Pricing Summary

	2017/18	2020/21
Typical Residential Bill	$450	$465
- Connected Properties	5,202	4,455 (active)
- Sewage Collected	224kL/property	391kL/property
- Fixed Residential Charge	$412	$465
Non-residential	$235/year	

- Access charge (20mm water service) - Usage charge - Trade Waste Service Fee	$1.16/kL	$328/year $1.40/kL $225-$803/year

5.5.3 Developer charges

Developer Charges are up-front charges levied under Section 64 of the Local Government Act to recover part of the infrastructure costs incurred in servicing new developments or additions/changes to existing developments. Developer charges serve two related functions:

- They provide a source of funding for infrastructure required for new urban development.
- They impact on the costs of urban development and thus encourage less costly forms and areas of development.

Council's Development Servicing Plan (DSP) was updated in 2017.

Current developer charges for the Council are shown below.

Table 4.7 - Developer Charges ($/ ET)

Service Area	Developer Charges for 2019/20	
	Water	Sewerage
Urban/Village developments	$12,985/ ET	$4,848/ ET

6 Water Quality

6.1 Raw Water and Parkes Water Treatment Plant

PSC has a regular water quality monitoring program in place for all raw water sources, focusing primarily on pH, temperature and turbidity, and additionally flouride, colour and alkalinity for treated water. Table 6.1 shows the data for 2018 to 2020 from the monitoring systems and sampling conducted at Parkes/Peak Hill System including at the Eugowra Road Pump station. The diversity of supply options for PSC allows changing to a better water quality source when needed.

However, there are times when the raw water quality is poor, particularly from the Lachlan River but the new WTP effectively filters the issues before the outlet except for turbidity on 2 occasions.

Table 6.1: Water quality results from the Parkes WTP 2018 - 2020

Process	Parameter	Units	Min	Average	Max	Lower critical limit	Upper critical limit	Number of exceedances	No. of samples	% Exceedances
Bore	Turbidity	NTU	0.12	2.3	8.3		1.5	36	45	80%
River	Turbidity	NTU	8.96	28.2	42.0	0.0	0.5	17	17	100%
Dam	Turbidity	NTU	4.42	16.2	68.0	0.0	0.5	10	10	100%
Supernatant	Turbidity	NTU	0.09	3.4	16.7	0.0	0.5	30	31	97%
Combined raw	pH	0	6.93	7.3	8.1		0.8	0	431	
Combined raw	Turbidity	NTU	0.05	9.1	58.1	6.0	9.0	423	436	97%
Combined raw	Apparent Colour	PtCo	2.00	76.3	277.0			0	41	
Combined raw	Alkalinity	mg/L	126.00	172.5	275.0			0	15	
Combined raw	Temp	oC	13.50	20.3	28.4			0	701	
Combined raw	Fluoride	mg/L	0.31	0.9	1.3			0	411	

Process	Parameter	Units	Min	Average	Max	Lower critical limit	Upper critical limit	Number of exceedances	No. of samples	% Exceedances
FILTER 1	Turbidity	NTU	0.02	0.1	0.1		0.5	0	65	
FILTER 1	Online Turbidity	NTU	0.01	0.0	0.1		0.5	0	36	
FILTER 2	Turbidity	NTU	0.02	0.1	0.1		0.5	0	53	
FILTER 2	Online Turbidity	NTU	0.01	0.0	0.1		0.5	0	31	
FILTER 3	Turbidity	NTU	0.02	0.1	0.2		0.5	0	66	
FILTER 3	Online Turbidity	NTU	0.02	0.1	0.1		0.5	0	36	
Combined Filters	Turbidity	NTU	0.01	0.1	0.4		0.5	0	674	
Combined Filters	Apparent Colour	PtCo	0.00	0.6	2.0		15.0	0	38	
Combined Filters	True Colour	PtCo	0.00	0.4	2.0		15.0	0	38	
TWST Inlet	pH	0	6.91	7.3	7.7			0	661	
TWST Inlet	Online pH	0	1.28	7.3	8.2			0	669	
TWST Inlet	Free Chlorine	mg/L	0.03	1.5	3.2			0	655	
TWST Inlet	Online Free chlorine	mg/L	0.20	1.5	3.4			0	669	
TWST Inlet	Total Chlorine	mg/L	0.16	1.6	3.5			0	578	
TWST Inlet	Turbidity	NTU	0.01	0.1	20.2			0	639	
TWST Inlet	Fluoride	mg/L	0.03	0.9	1.2			0	399	

Process	Parameter	Units	Min	Average	Max	Lower critical limit	Upper critical limit	Number of exceedances	No. of samples	% Exceedances
TWST Inlet	Temp	oC	14.50	20.9	26.5			0	639	
TWST Outlet	pH	0	1.48	7.5	7.8			0	844	
TWST Outlet	Online pH	0	1.37	7.5	7.9		8.5	0	849	
TWST Outlet	Free Chlorine (grab)	mg/L	0.72	1.3	2.1	0.6	2.5	0	843	
TWST Outlet	Online Free chlorine	mg/L	0.75	1.4	2.1	0.6	2.5	0	850	
TWST Outlet	Total Chlorine	mg/L	0.80	1.4	2.3		2.5	0	741	
TWST Outlet	Turbidity	mg/L	0.01	0.1	0.9		0.5	2	825	0.2%
TWST Outlet	Online Turbidity	mg/L	0.01	0.0	0.2		0.5	0	837	
TWST Outlet	Fluoride	mg/L	0.31	0.9	1.3		1.5	0	675	
TWST Outlet	Temp	oC	0.95	20.1	26.1		20.0	429	816	53%
TWST Outlet	Alkalinity	mg/L	1.09	152.4	242.0			0	39	

The WTP design targets are as follows for reference.

Table 6.2: Treated Water Quality Targets for the Parkes WTP

Parameter	Units	Treated Water Quality Goal
Turbidity	NTU	Individual filter effluent (IFE) turbidity of <0.15 NTU for 95% of samples (excluding first 15 minutes after a backwash and taken at least every 15 minutes) IFE turbidity not to exceed 0.3 NTU for more than 15 minutes consecutively Combined filter effluent (CFE) turbidity of <0.15 NTU for 95% of samples, taken at least every 15 minutes CFE turbidity maximum of 1.0
True Colour	Hazen	<5
Total Iron	mg/L	<0.1
Total Manganese	mg/L	<0.02
Total Aluminium	mg/L	<0.1
TOC	mg/L	THMs formed, with at least 2 mg/L of free residual chlorine remaining after 48 hours in a controlled environment, not to exceed ADWG Guideline Value of 0.25 mg/L
DOCmg/L		
pH		THMs formed, with at least 2 mg/L of free residual chlorine remaining after 48 hours in a controlled environment, not to DOC mg/L exceed ADWG Guideline Value of 0.25 mg/L
Fluoride	mg/L	0.95 –1.05
Free Available Chlorine	mg/L	90th percentile within 0.2 mg/L of an Operator entered free available chlorine set-point at the entry to the Treated Water tank of between 1 and 4 mg/L
E Coli and Faecal Coliforms	CFU/ 100mL	<1

The following exceedances were recorded at the plant since 2019.

Table 6.3: Exceedances at the WTP recorded in the Drinking Water Management Strategy April 2019 – March 2020

Date	CCP1 Filtration	CCP2 Chlorination	Issue	Immediate correction	Corrective action
16/4/2019	Filter 1 above 0.5 NTU with peak of 1.28		Operators believe this was an analyser error	Combined filter grab was recorded as 0.09 NTU.	The filter was backwashed 6 hours earlier and the combined filter effluent was consistently below the critical limit and

Date	CCP1 Filtration	CCP2 Chlorination	Issue	Immediate correction	Corrective action
	NTU for 4.5 hours				the combined filter grab sample. Operators believed this reading was not representative of water quality. No shut down occurred and NSW Health was not notified
3/6/2019		0.99 mg/L	Free chlorine below the critical limit of 1 mg/L	Compared results to grab sample on same day which was 1.19 mg/L	Calibrated meter and made a note in the spreadsheet

6.2 B-Section Water Supply Quality

The B-Section delivers potable water treated by Forbes Shire Council to consumers in Forbes and Parkes. The water is then on-sold to Lachlan Shire Council.

In April 2019 Parkes Shire Council commissioned a rechlorinator at Forbes on the B-Section to improve free chlorine residual between the Forbes handover point and the Trundle rechlorinator. Chlorine variability is the main issue with B-Section water quality.

Table 6.4: B-Section water quality results 2019-200

Row Labels	pH			Free Chlorine			Turbidity			Temperature		
	Average	Min	Max	Average	Min	Max	Average	Min	Max	Average	Min	Max
Bogan Gate Retic.	7.26	6.69	7.8	0.09	0	0.58	0.46	0.08	1.51	20.35	11.6	30
Bogan Gate Retic.(#10)	7.61	7.1	8.13	0.79	0.07	2.04	0.47	0.04	1.21	17.59	12	26
Botfield Reservoir	7.38	7.02	8.07	0.39	0	1.56	0.71	0.11	1.77	19.82	3.6	32
Forbes Analyser (Post dose)	7.45	7.45	7.45	1.40	0.58	2.15	0.15	0.03	0.84	20.20	13	30
Forbes Bulk supply	7.26	6.64	7.79	0.92	0	2.21	0.89	0.07	10.02	18.95	11.7	30
Forbes Pump Shed (#16)	7.32	6.61	7.9	0.80	0	2.2	0.52	0.05	1.8	19.57	11.4	30
Gunningbland flow pit (#15)	7.37	6.76	8	0.79	0	2.02	0.49	0.05	1.53	19.42	11.6	32.1
Inlet to Trundle Reservoir 1	7.30	6.72	7.67	1.72	0.12	2.94	0.72	0.19	1.93	19.94	11.7	32
Inlet to Trundle Reservoir 2 (#5)	7.27	6.71	7.68	1.82	0	5	0.64	0.11	1.61	20.29	11.7	33
Inlet to Tullamore Reservoir (#1)	7.47	6.59	8.1	1.43	0.02	3.39	0.50	0.02	2	19.58	11.8	33
Outlet to Trundle Reservoir 2	7.35	6.68	8.04	1.04	0.09	4.1	0.48	0.03	1.31	19.55	11.7	31
Outlet Trundle Pump (OCP)	7.37	7.03	7.78	1.83	0.08	3.72	0.56	0.1	2.01	19.52	0.3	32
Parkes – Lachlan Meter (#17)	7.64	7.02	8.37	1.34	0.02	3.29	0.47	0.03	1.87	19.44	0.12	32
Trundle Police Station (#6)	7.65	6.98	8.58	0.60	0.05	1.97	0.51	0.04	1.52	20.55	12	33
Trundle pump analyser	7.81	7.45	7.95	2.28	1.52	3.08	0.77	0.03	1.63	14.80	12	22.2
Trundle Trunk	7.42	6.63	7.91	0.48	0	1.49	0.59	0.17	2.7	19.84	12	32
Tullamore Police Station (#2)	7.46	7.01	7.95	0.38	0	2.21	0.59	0.09	1.26	19.70	11.6	31
Total Average	**7.42**	**6.59**	**8.58**	**1.09**	**0**	**5**	**0.55**	**0.02**	**10.02**	**19.63**	**0.12**	**33**

6.3 Reticulated Water Quality

From 1 April 2019 to 31 March 2020, Parkes Shire Council received nine formal customer complaints about water quality and one complaint via Facebook. All complaints were investigated, seven were related to dirty water, two to chlorine taste and odour and one was about general aesthetics. All were investigated and flushed occurred where relevant.

Treated water is regularly tested in a range of end user locations for key health criteria by NSW Health and by PSC. The parameters tested include Free and Total Chlorine, pH, Turbidity, Total Coliforms and E-coli.

Table 6.5: Verification monitoring for the Parks-Peak Hill Scheme

Zone	Population served	Microbiological tests per year	Chemical tests per year	NSW Health sites codes
Parkes mid zone	4,800	26	5	13, 14, 22, 28, 31
Parkes low zone	3,600	26	3	1, 23, 24, 26, 29
Parkes high zone (including Alectown)	3,200	26	3	32, WTP
Cookamidgera reticulation	214	12		20
Peak Hill reticulation	1,150	26	1	10, 27, 30
Total	12,964	116	12	

Source: *Parkes verification monitoring program, March 2020*

In the Parkes Peak Hill scheme there was one exceedance of 2cfu/100mL total coliforms out of 119 samples.

Table 6.6: Verification monitoring for the B-section

Village	Population served	Microbiological tests per year	Chemical tests per year	NSW Health sites codes
Bogan Gate and Gunningbland	400	13	1	10, 15
Trundle	670	26	1	6
Tullamore	380	13		2,17
Total	1450	52	2	

Source: *Parkes verification monitoring program, March 2020*

In the B Section, there was one exceedance of pH (8.63), three exceedances of temperature (max 33%) and five exceedances of free chlorine (2.66).

Council has consistently complied with the Australian Drinking Guidelines for many years and submitted to NSW Health's Drinking Water Quality Database.

See the Drinking Water Management Strategy 2019-20 for more details including water quality graphs.

6.4 Effluent Quality and Discharge Limits

6.4.1 Parkes STP

The new STP has performed well during the first years since commissioning in 2018. The design standards are as follows.

Table 6.7: Design Standards for the New Parkes STP

Parameter	Design Value	Unit
Biochemical Oxygen Demand (BOD)	< 10	mg/L
Suspended Solids	< 15	mg/L
Total Nitrogen	< 10	mg/L
Ammonia Nitrogen	< 2	mg/L
Total Phosphorus	< 0.3	mg/L
pH	6.5 – 8.5	pH units
Faecal Coliforms	< 200	cfu / 100 mL
Oil & Grease	< 2	mg/L

There is limited data on flows at the STP but quality reporting for the EPA has been consistent. The results are as shown in the graphs below, highlighting the fine tuning of improved operation over time to ensure the effluent is within the defined limits.

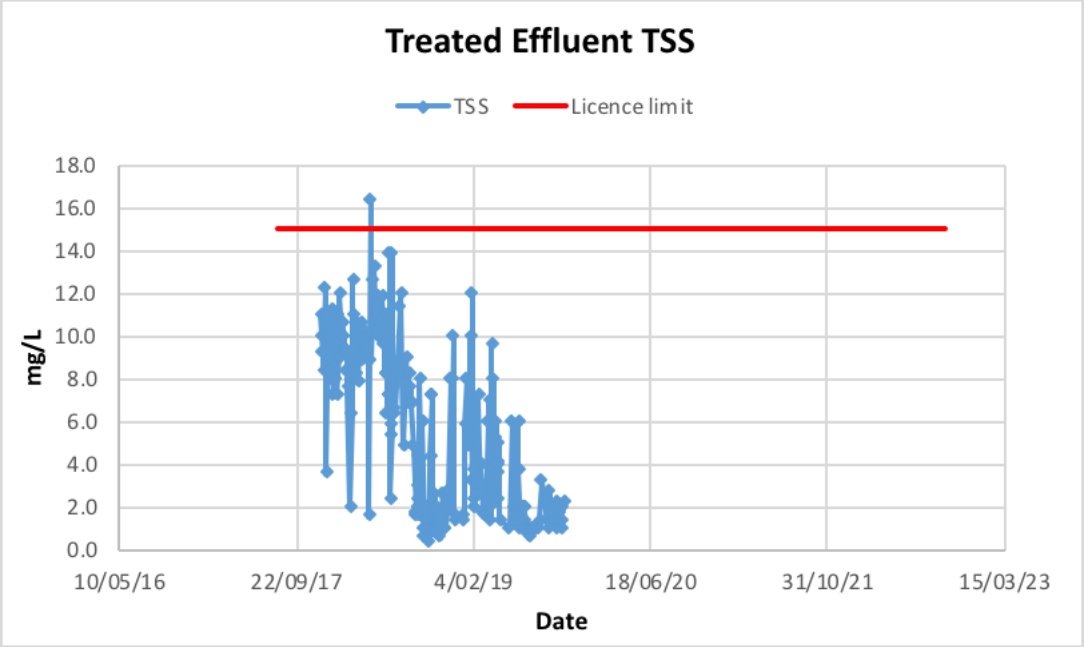


Figure 6-1: Total Suspended Solids in treated effluent discharge (limited data)

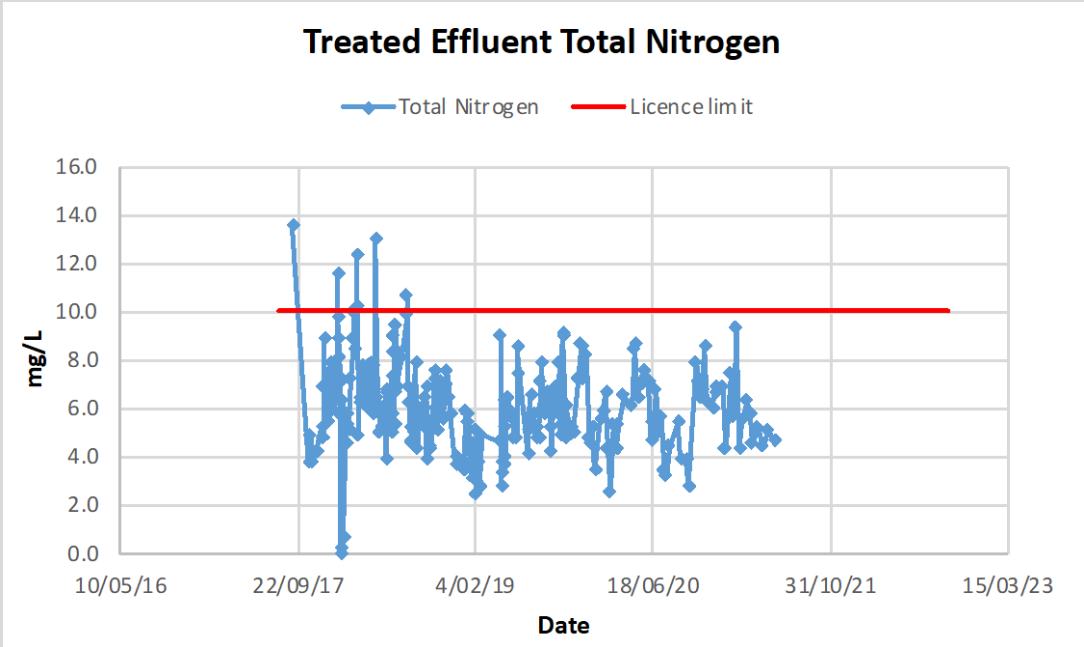


Figure 6-2: Total Nitrogen in treated effluent discharge

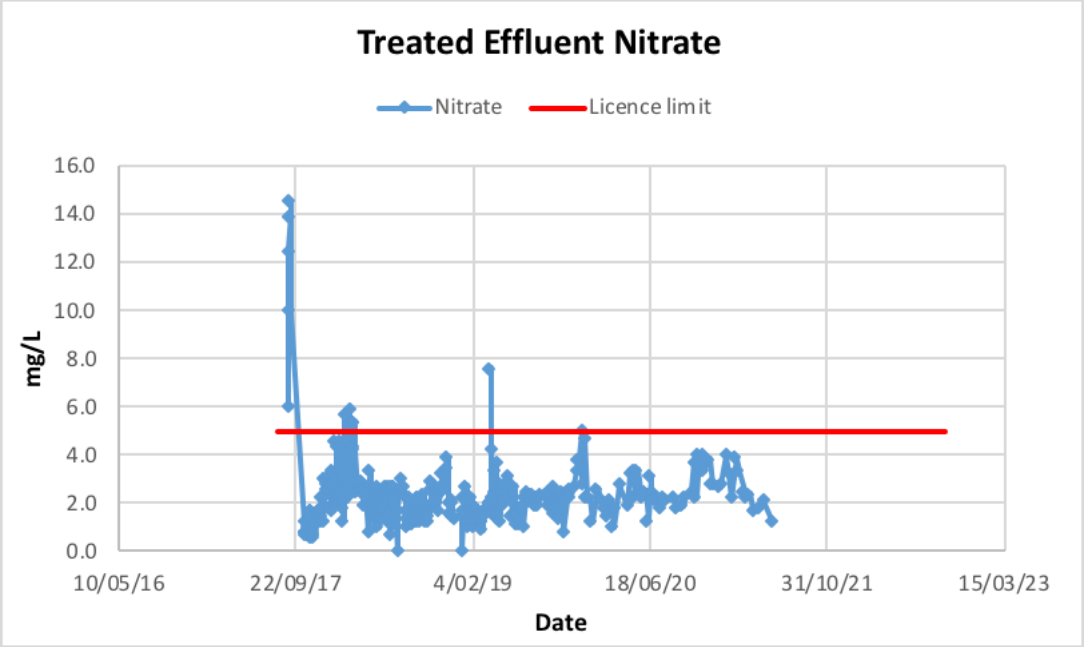


Figure 6-3: Nitrate in treated effluent discharge

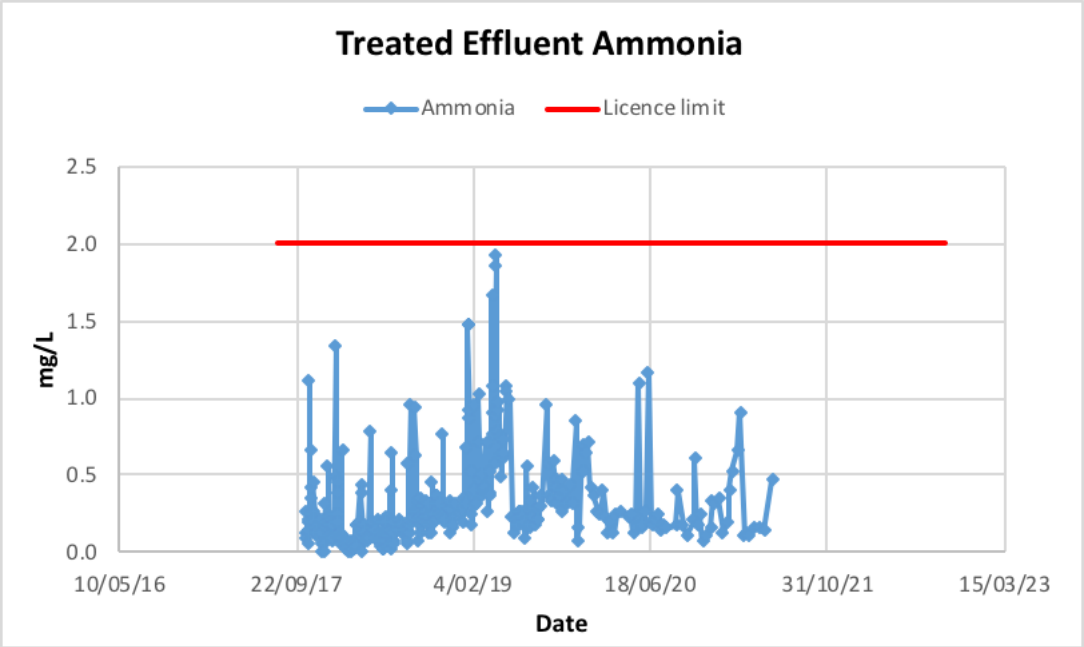


Figure 6-4: Ammonia in treated effluent discharge

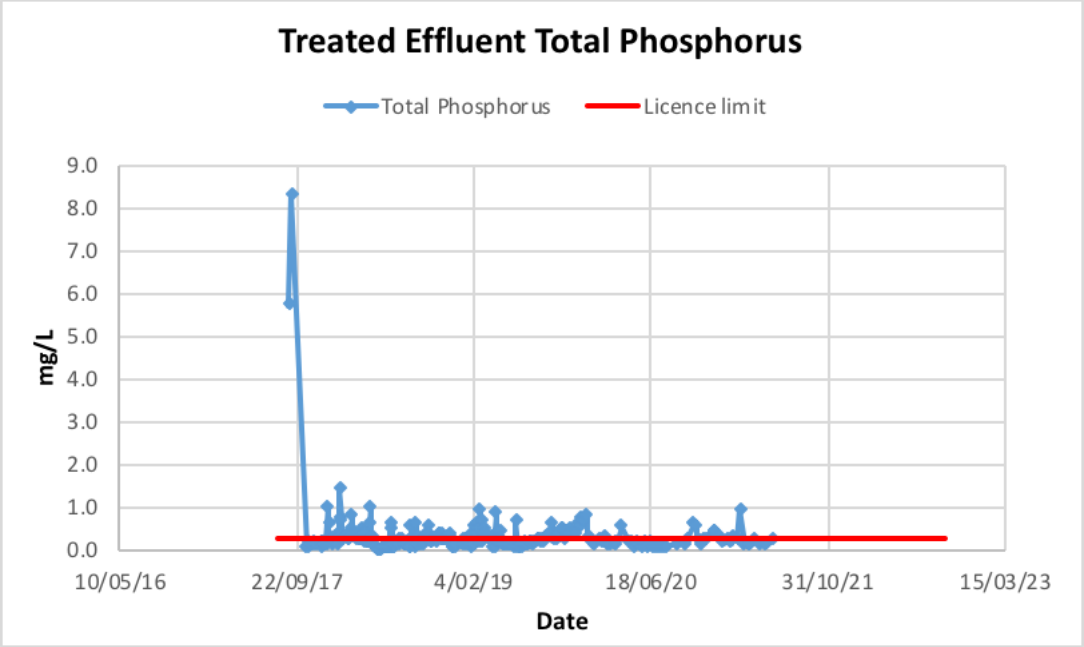


Figure 6-5: Phosphorus in treated effluent discharge

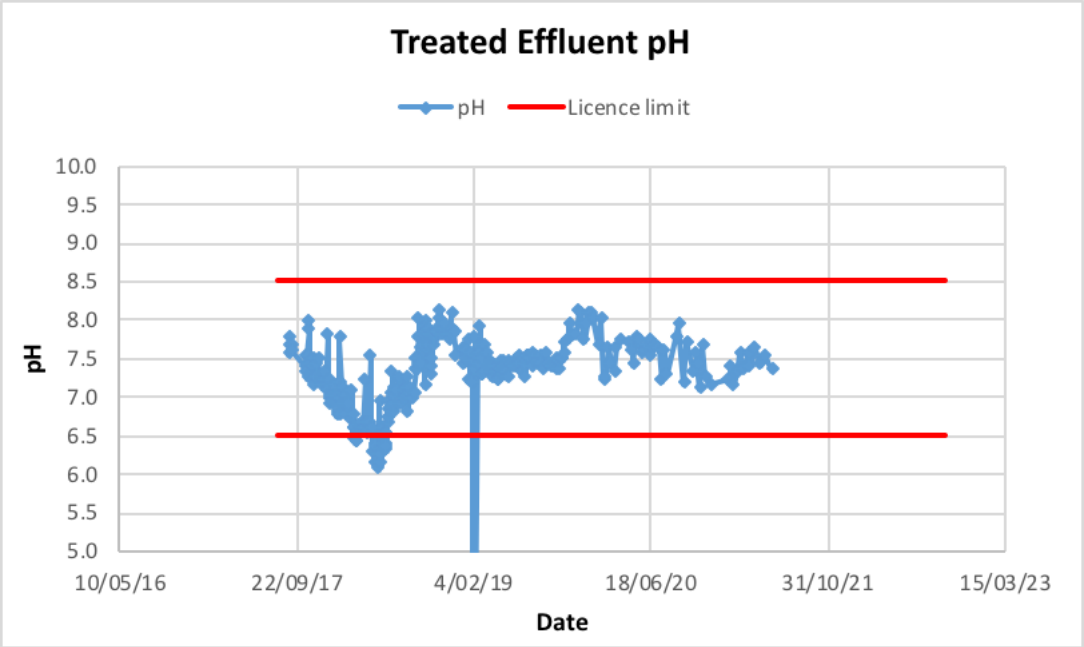


Figure 6-6: pH of treated effluent discharge

6.4.2 Peak Hill STP

The performance of the Peak Hill STP prior to the evaporation ponds was evaluated for the IWCM Strategy 2005. Although the scheme is nil-release and has no EPA discharge criteria, the following table is presented to inform future discussion about potential re-use options. The effluent quality indicates that

it cannot be used for irrigation of public open space without a substantial improvement in treatment standards, including disinfection.

6.4.3 Advance Water Recycling Facility

No data was provided for the recycled water system. This has been highlighted as a gap and will be progressed.

Appendix A: Demand Analysis

Appendix B: Demand Management

Appendix C: Groundwater Assessment

Appendix D: System Modelling

Appendix E: Climate Change Risk Assessment