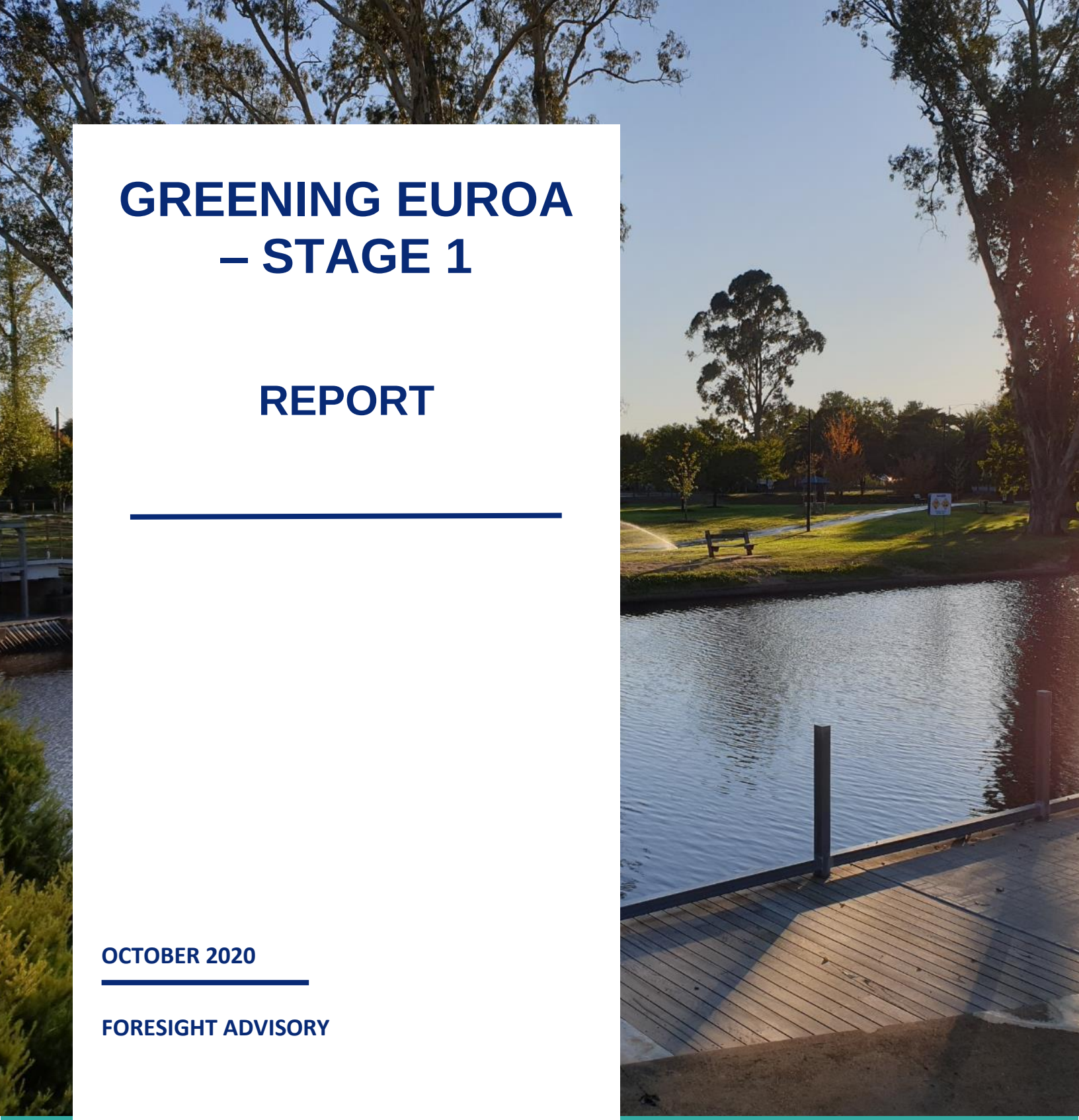

GREENING EUROA – STAGE 1

REPORT

OCTOBER 2020

FORESIGHT ADVISORY

Strathbogie shire

ACKNOWLEDGEMENTS

The Euroa Greening – Stage 1 Report has been developed by Foresight Advisory for Strathbogie Shire Council, Goulburn Valley Water (GVW), Goulburn Broken Catchment Management Authority and the Alliance for Water Stewardship.

As the lead consultant for this project, Foresight Advisory thanks the following organisation's for their time in assisting to provide the key information to support the development of the Background Report:

- Friendlies Society Oval Committee of Management
- Memorial Oval Committee of Management
- Euroa Lawn Bowls Club
- Euroa Lawn Tennis Club
- Euroa Croquet Club
- Euroa Arboretum
- Euroa Primary School
- Euroa Secondary College
- St Johns Primary

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Version Control

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FINAL 3	20.10.2020	D. D'Aspromonte	Project Steering Committee

Table of Contents

INTRODUCTION

Euroa is currently facing a water shortage for the irrigation of key community spaces within the township. This water shortage is due to Stage 2 water restrictions (which have been lifted in March 2020) and a lack of sustainable long term fit for purpose water supply for open space irrigation. These recent experiences have highlighted the volatility of Euroa's water supply system which is heavy reliance on rainfall. In the current variable climate, the town is at high risk of having restrictions imposed again in the next dry year.

Therefore in 2019, the Euroa Greening project was established by Strathbogie Shire Council, Goulburn Valley Water (GVW) and the Alliance for Water Stewardship as a key initiative to work with the local community to increase the use of recycled water within the township for the greening of key community recreational assets.

The priority sites included in this project are:

- The Friendlies Society Oval
- Memorial Oval
- Euroa Lawn Tennis Club
- Euroa Lawn Bowls Club
- Euroa Croquet Club
- Euroa Arboretum
- Euroa Secondary College
- Euroa Primary School
- St Johns Primary School

The location of each of these sites is also defined in Figure 1.

Other potential (secondary) sites identified by stakeholders that are not included in this report are:

- A number of Council public open spaces within Euroa
- Euroa Showgrounds
- Butter Factory (private use)
- Euroa Golf Course (second alternative water connection)

The location of each of these sites is also defined in Figure 1.

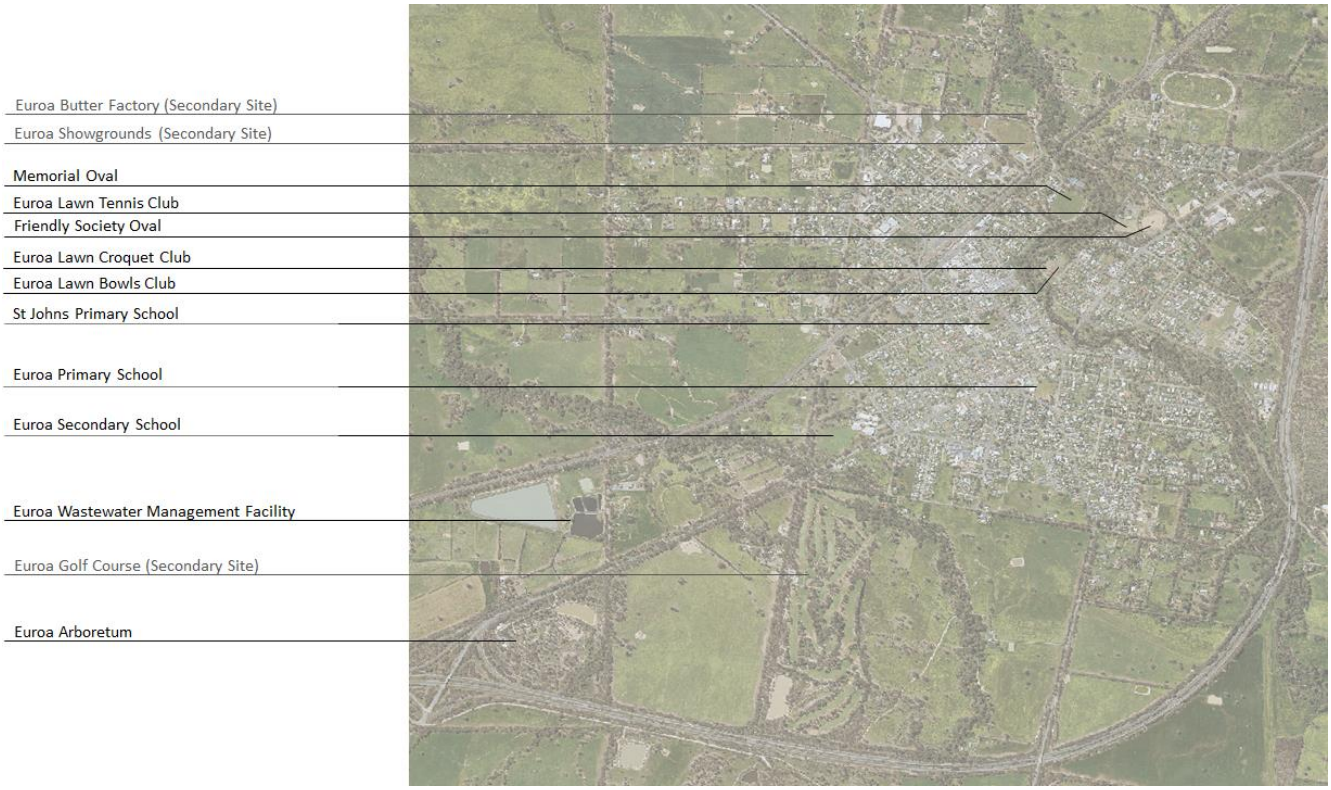


Figure 1 - Euroa Greening Priority Sites

The following report provides a summary of findings from the three phases of the project which includes:

- Phase 1 – A background investigation assessing the site conditions, existing infrastructure, historical and current water supplies, and risk assessment to support an alternative water supply
- Phase 2 – Evaluate and mitigate water risks and water security issues
- Phase 3 – Infrastructure design for precinct and town based alternative water supplies as well as each site.

BACKGROUND INVESTIGATIONS

Three background investigations were completed to understand the broader context for Euroa. These investigations included an assessment of:

- Climatic information – rainfall and evaporation statistics
- Climate change data
- Groundwater information – groundwater depths and beneficial reuse

The findings from each of these investigations are detailed below.

Climatic Information

The following rainfall and evaporation statistics (shown in Table 1 and Table 2respectively) are provided from the Bureau of Meteorology for Euroa. The rainfall data is based on data from 1883 to 2020, whilst evaporation data is based on data from 1975 to 2005.

Table 1 - Average Annual Rainfall (649.1mm)

Month	**Jan**	**Feb**	**March**	**April**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
Mean Rainfall (mm)	38.7	33.4	43.7	45.8	62.1	74.1	69.8	70.8	59.9	60.0	45.8	43.2
Percentage of total (%)	6	5	7	7	10	11	11	11	9	9	7	7

Table 2 - Average Annual Evaporation (1300mm)

Month	**Jan**	**Feb**	**March**	**April**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
Mean Evaporation (mm)	200	175	150	80	50	40	40	50	80	125	150	175
Percentage of total (%)	15	13	11	6	4	3	3	4	6	10	11	13

Climate Change

The climate change forecasts for Euroa are best represented in the Goulburn Climate Projections (CSIRO and DELWP, 2019) report. The key findings from this report are summarised in Figure 2 and further detailed below.

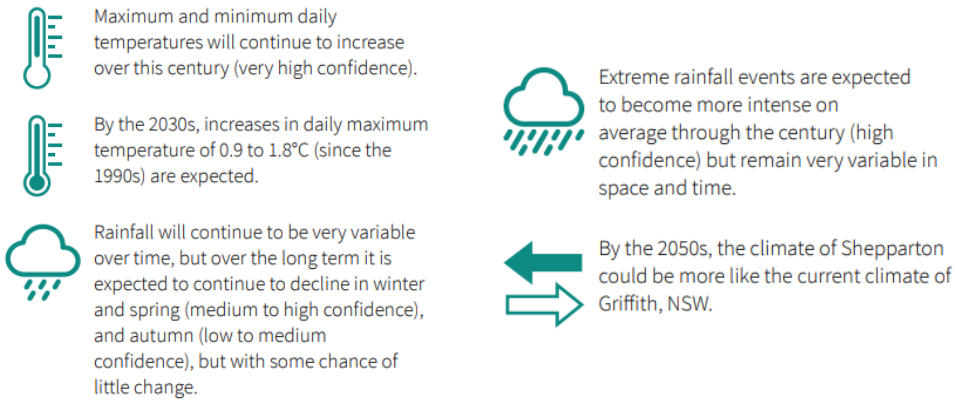


Figure 2 - Climate Change Summary, Goulburn Region

Rainfall

In the last decade Victoria has experienced a decrease in rainfall, mostly in the cooler seasons. It is anticipated that in the future rainfall will decrease in the region, with the greatest reduction in rainfall likely to occur in spring. It is anticipated by later this century (under a high emissions scenario) there is likely to be a 23% decrease in annual rainfall with up to 35% reduction occurring in spring (CSIRO and DELWP, 2019).

Extreme Temperature

Extreme temperature days in the Goulburn region are set to increase in the future. It is estimated that in Shepparton, by 2050, under high emission projections that the average days with temperatures over 35°C will increase from 14.8 days (based on 1981-2010 figures) to between 23 and 40 days.

Daily minimums will also be affected by climate change. It is anticipated that under a high emissions scenario, by 2050, the average daily minimum temperature will exceed 22°C 7.2 to 14.6 days per year on average, compared to 2.6 days per year based on 1981-2010 figures.

Extreme Rainfall

With a warmer climate, rainfall intensities are likely to increase. It is anticipated that in 2050 under a high emissions scenario, a 1 in 20-year rainfall event will change in intensity by -5% to +13%. This will result in more severe flood events.

Groundwater

Anecdotal information provided from key stakeholders in Euroa indicates that most sites are unable to access a sufficient quantity of groundwater from private bores or the Strathbogie Shire Council Turnbull Street Public Groundwater system. In early 2020 Strathbogie Shire Council shut off groundwater supplies to all sites from the Turnbull Street system due to drought conditions.

Groundwater Depth

Figure 3 below provides a visual assessment of depth to the groundwater table in Euroa. Most sites within the township are located over a groundwater table which is 5-20m deep.

Beneficial Reuse of Groundwater

Figure 4 below provides a visual assessment of the beneficial reuse of water Euroa's groundwater system. Beneficial reuse is based on salinity levels within the groundwater and are separated into the following bands:

A1 – Total Dissolved Solids <600 mg/L (which is suitable for irrigation)

A2 – Total Dissolved Solids 601-1,200 mg/L (which has limited suitability for irrigation)

B – Total Dissolved Solids 1,201-3,100 mg/L (which cannot be used for irrigation)

C – Total Dissolved Solids 3,101-5,400 mg/L (which cannot be used for irrigation)

Based on this map, there are no sites within this investigation that are located within an A1 or A2 beneficial reuse banding within Euroa.

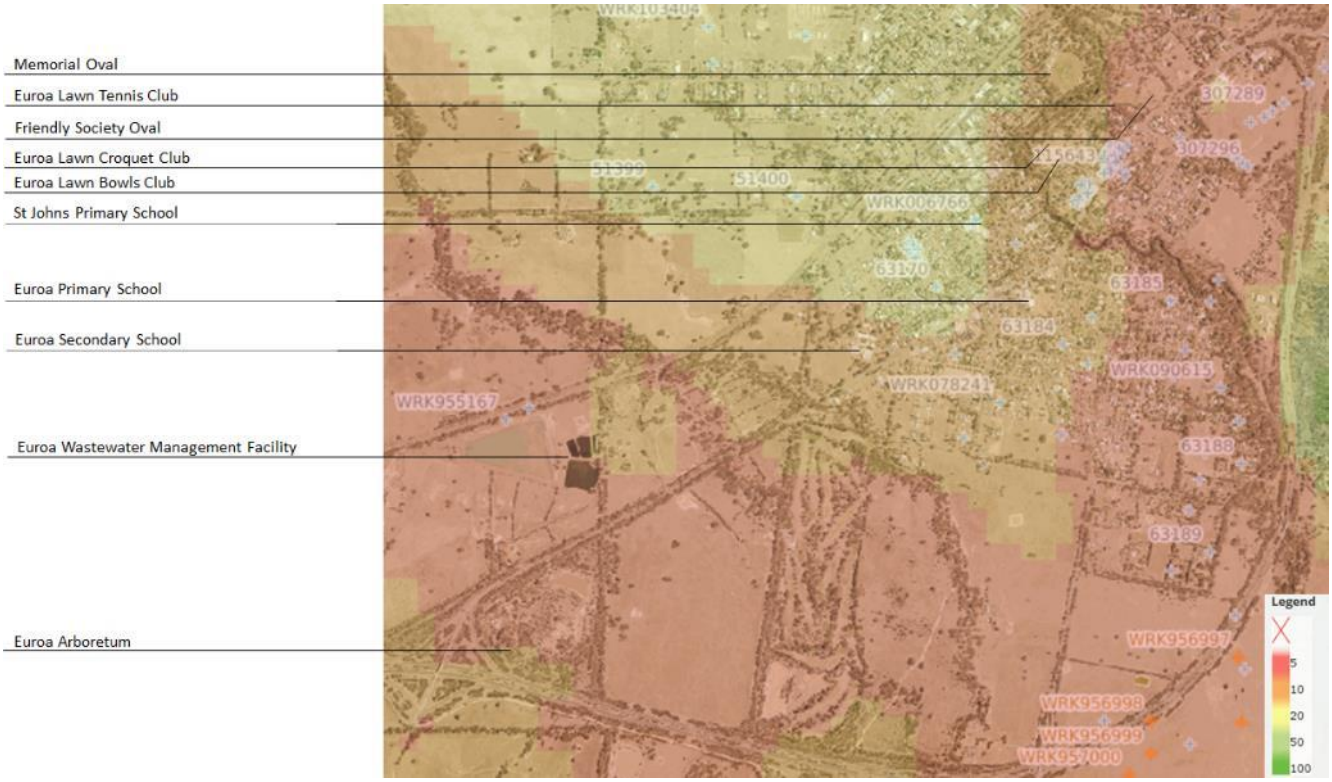


Figure 3 – Depth to Water Table (Source: Visualising Victoria's Groundwater)

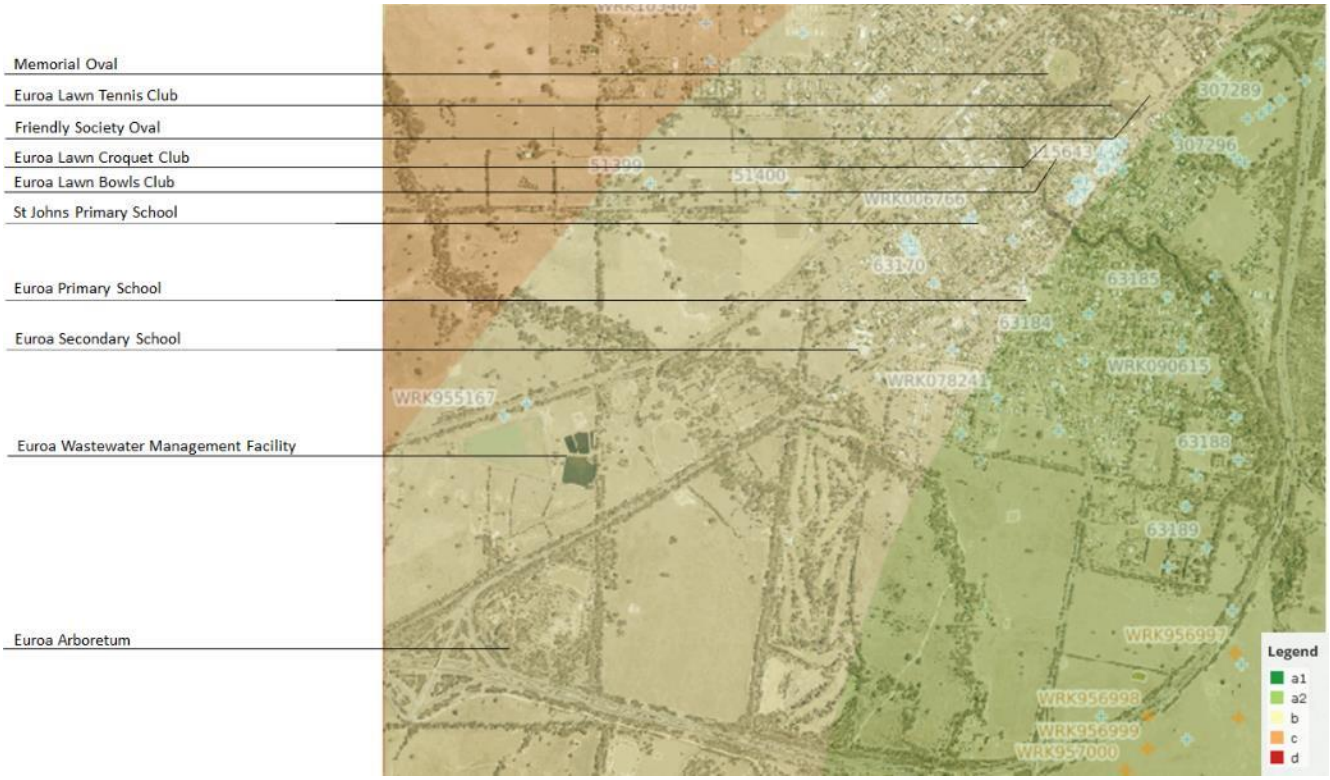


Figure 4 – Beneficial Reuse Map (Source: Visualising Victoria's Groundwater)

Water Quality Sampling

The following section of the report summarises the water quality sampling completed for the three water supplies currently used on the key sites within Euroa which include:

Water Sample 1
Supplied via: On site infrastructure within the Euroa Arboretum
Source: On site stormwater harvesting and reuse system at the Euroa Arboretum
Testing Location: Stormwater Harvesting Pond at the Euroa Arboretum
Water Supplied to: Euroa Arboretum

Water Supply 2
Supplied via: Private water tanker
Source: Euroa Wastewater Management Facility (WMF) Class C recycled water
Testing Location: Supplied directly from water tanker
Water Supplied to: Friendlies Society Oval

Water Supply 3
Supplied via: Private water tanker
Source: Private Farm Dam
Testing Location: Supplied directly from water tanker
Water Supplied to: Memorial Oval, Euroa Lawn Bowls, Euroa Croquet, Euroa Lawn Tennis

It should be noted that GVW are assisting water users in Euroa by coordinating water supplied from Water Supplies 1 and 2 noted above. Water Supply is water sourced from GVW's WMF.

Table 3 summarises the water quality sampling results from the three sources defined above. The results should be reviewed, taking the following into account, noting that the detailed water quality tests for each water supply is provided in Appendix A:

- Only one water quality sample was taken on 26th March 2020, from each Water Supply during a dry period with no prior rainfall
- Human health, environmental health or operational factors have been considered as the critical driver for each parameter
- Acceptable limits of parameter in water supply for irrigation only
- Acceptable limits have been taken from Australian Guidelines for Water Recycling: Managing Health and Environmental Risks (Phase 2) Stormwater Harvesting and Reuse, July 2009 and the Department of Environment and Resource Management: Irrigation water quality—salinity and soil structure stability.

Table 3 - Water Sample Analysis

Parameter	Health, Enviro or Operational Factor	Unit	Guideline	Sample 1 Euroa Arboretum	Sample 2 Euroa WMF	Sample 3 Farm Dam
pH	O	-	6.0 – 9.0	7.4	8.5	7.5
E. coli	H	cfu/100mL[1]	<10	20	3,400	17,000
Turbidity	O	NTU	<25	120	18	720
Conductivity	O	µS/cm	<1,000	250	890	200
SAR [2]	O & E	-	<10	2.5	6.6	1.7
Bacteria & Virus	H	LRV[3]	>1.5	0	0	0
Protozoa	H	LRV	>0.8	0	0	0
Suspended Solids	O	mg/L	<50 [4]	41	33	79
Iron	O	mg/L	<10 [4]	15,000	930	60,000
Phosphorus	O	mg/L	<0.8 [4]	0.22	3.3	1.3
Hardness ($CaCO_3$)	O	mg/L	<350 [4]	39	72	56

[1] Colony Forming Unit (CFU), which is a count of bacterial colonies on an agar plate

[2] The guideline Sodium Absorption Ration (SAR) value is dependent upon conductivity, refer to document: Department of Environment and Resource Management: Irrigation water quality—salinity and soil structure stability

[3] Log Removal Value (LRV) means log reduction for pathogens in untreated water. To convert to percentage reduction the formula is: $100x(1- 10^{-LRV})$. An LRV of 1.5 = 97% reduction, LRV of 0.8 = 84% reduction in pathogens

[4] Are guideline limits from the Australian Guidelines for Water Recycling: Managing Health and Environmental Risks (Phase 2) Stormwater Harvesting and Reuse, July 2009, assuming a design life for irrigation infrastructure of 20 years

Water Quality Sampling – Results Summary

The following points should be noted about the results obtained from the water quality testing completed on the three water sources:

- Water sampling results for iron and aluminium were considered very high and may be a result of the approach to water quality testing and the presents of colloidal clays in samples 1 and 3. High iron and aluminium levels are generally only an issue in groundwater
- Water Sample 2 (from the Euroa WMF) is a good quality water with low turbidity, but will be biologically active, so should not be stored for lengthy periods as algae and/or bacteria will start growing
- Water Sample 1 summary - E. Coli meets the Class B standard and could be considered Class B provided suspended solids are <30 mg/L and Biochemical Oxygen Demand (BOD) is <20 mg/L
- Water Sample 2 summary – Does not meet Class C quality, it fails on E. Coli >1,000 org/100mL, however it meets Class D provided suspended solids and BOD values are in acceptable limits. It should be noted that this sample was not taken from the end of the WMF treatment process. GVW have confirmed that the water quality at the end of the WMF treatment train is a Class C recycled water
- Water Sample 3 summary - Does not meet Class C quality, it fails on E. Coli >1,000 org/100mL, however it meets Class D provided suspended solids and BOD values are in acceptable limits

- Heavy metals, pesticides and herbicides are all below the limit of reporting (LOR), i.e., the analysis detection limit. These contaminants are all impacted by runoff. There was no recorded rainfall in the period leading up to the testing.

SITE ANALYSIS

The following section of the report provides an analysis for the nine sites included in the project scope. For each site the following is summarised:

- Site Overview
- Site Infrastructure
- Irrigation and Water Source
- Geotechnical Analysis
- Site Map
- Site Photos

Friendlies Society Oval

Site Overview

The Friendlies Society Oval is located within the north of the Euroa township adjacent to the Euroa Lawn Tennis Club. The entire site (including the Lawn Tennis Club) is located on Crown land and is bounded by Turnbull and Parker Street to the north and Gobur and Tarcombe Streets to the south.

Strathbogie Shire Council and the Friendlies Society Oval Committee of Management have recently completed an upgrade to the oval which included:

- Removal of a concrete wicket and old boundary fence
- New surface and grass
- Turf pitch
- Irrigation system, controls and tanks
- Picket fence

The oval is predominantly used for local cricket and is a key open space for local residents. The oval is also used for large Lawn Tennis events.

The site is zoned Public Park and Recreation Zone (PPRZ) with the northern corner of the site impacted by flooding from Sevens Creek, which includes an Urban Flood Zone (UFZ) overlay. Flooding from the Sevens Creek does not impact the Friendlies Society Oval or associated infrastructure.

Site Infrastructure

The Friendlies Society Oval infrastructure is less than one year old and has sufficient capacity for the irrigation of the oval only. It should be noted that there is currently no infrastructure in place to irrigate the oval surrounds which are predominantly mature native trees which require limited irrigation. The infrastructure on site includes:

- 100,000L Rhino Galvanised Steel Tank (Dark Green) – Holding capacity approximately 80,000L (Figure 5)
- Pop-up sprinkler irrigation system (Figure 6)
- Pump shed housing:
    - Pumps Lowara (Hydrovar system) – Variable Speed Drive (Figure 7)
    - Lowara High Pressure Tank (Figure 7)
    - Automated Irrigation System (Hunter Irrigation Controller) (Figure 8)
    - Irrigation Filter (Dix Engineering) (Figure 9)
- The oval has a 1.5m high picket fence around its perimeter which can be locked
- Grass used on the oval is not a drought tolerant species.

The following temporary infrastructure is in place to ensure sufficient water is available during the establishment phase of the grass on site:

- 2 x No. 20,000L Plastic Tanks (Black) (Figure 10)
- Pipeline connecting the Strathbogie Shire Council Turnbull Street Public Groundwater system to the 100,000L Rhino Tank.

Irrigation and Water Source

Up until March 2020 the Friendlies Society Oval was using water from the Strathbogie Shire Council Turnbull Street Public Groundwater system as well as potable water (supplied by GVW).

Class C recycled water is currently used to irrigate the oval. This water is delivered to site with a water tanker. Estimated water use for irrigation on the site is 5ML/year.

Given the oval has been recently grassed and a new pitch installed, irrigation of the ground is occurring during the daytime on a daily basis. The user of water on this site has entered into a Reclaimed Water Use agreement with GVW to ensure all safety procedures are followed, including the installation of signs to inform the public that recycled water is being used on the site.

Geotechnical Analysis

The geotechnical analysis completed included a simple infiltration test at one location on the Friendlies Oval as well as a visual assessment of a soil sample taken at the surface. These tests were completed in accordance with the Australian Standards AS1726 – Geotechnical Site Investigations.

The soil sampled was classified as a Medium CLAY, Dark Brown with an infiltration rate of approximated at 50mm/hour.

This assessment determined that given the low permeability of the soil there is a higher risk that alternative water supply used on the site will runoff and pose risks to downstream receiving waters. This is a key consideration when developing a management plan for the use of alternative water on the site.

Site Map

Site Photos

Figure 5 – 100,000L Steel Tank

Figure 6– Pop-up Sprinkler System

Figure 7– Pumps, Filter and Pressure Tank

Figure 8 – Irrigation Controller

Figure 9 –Irrigation Filter

Figure 10 – 2No. 20,000L Plastic Tanks

Euroa Lawn Tennis Club

Site Overview

The Euroa Lawn Tennis Club is located within the north of the Euroa township adjacent to the Friendlies Society Oval. The entire site (including the Friendlies Society Oval) is located on Crown land and is bounded by Turnbull and Parker Street to the north and Gobur and Tarcombe Streets to the south.

The lawn tennis courts are predominantly used by local residents during the week, with larger gatherings during weekends and major events.

The site is zoned Public Park and Recreation Zone (PPRZ) with the northern corner of the site impacted by flooding from Sevens Creek, which includes an Urban Flood Zone (UFZ) overlay. Flooding from the Sevens Creek does not impact the Lawn Tennis Club or associated infrastructure.

Site Infrastructure

The Lawn Tennis club infrastructure is functional with some elements nearing 10 years of age. The infrastructure to support irrigation of the lawn tennis courts only is:

- 2 x No. 30,000L Plastic Tanks (Green) (Figure 11)
- Pump Shed housing:
    - Irrigation Pump (Details unknown)
- Automated Irrigation System (Irritrol – Total Control Unit) (Figure 12)
- Connection to the Strathbogie Shire Council Turnbull Street Public Groundwater system
- The tennis courts have a 3m high chain link fence around its perimeter that can be locked
- Grass used on the tennis courts is not a drought tolerant species.

The current infrastructure on site is sufficient to meet current irrigation demands.

Irrigation and Water Source

Up until March 2020 the Lawn Tennis Club was using water from the Strathbogie Shire Council Turnbull Street Public Groundwater system as well as potable water (supplied by GVW).

Water is now catered to the Lawn Tennis Club by a local water carting business, which is coordinated by Goulburn Valley Water. The water supplied to the Lawn Tennis Club has been noted as dam water.

Irrigation on the courts is manual and the typical regime for watering the lawn tennis courts is:

- September to March
- The courts are irrigated on a weekly basis using 60kL per cycle
- Increased irrigation during court preparation period in September and in hotter months
- In total approximately 2ML/year of irrigation water is used by the Lawn Tennis Club

The Tennis Club have developed a policy to ensure irrigation only occurs when the club is closed.

Geotechnical Analysis

The geotechnical analysis completed included a simple infiltration test at one location on the Euroa Lawn Tennis Club as well as a visual assessment of a soil sample taken at the surface. These tests were completed in accordance with the Australian Standards AS1726 – Geotechnical Site Investigations.

The soil sampled was classified as a Medium CLAY, Dark Brown with an infiltration rate of approximated at 10mm/hour.

This assessment determined that given the low permeability of the soil there is a higher risk that alternative water supply used on the site will runoff and pose risks to downstream receiving waters. This is a key consideration when developing a management plan for the use of alternative water on the site.

Site Map

Site Photos

Figure 11 – 2No. 30,000L Plastic Tanks

Figure 12 – Irrigation Controller

Memorial Oval

Site Overview

The Memorial Oval is located within the north of the Euroa township to the west of the Euroa Lawn Tennis Club. The site is located on Crown land and is bounded by the Sevens Creek to the east, Dunn Street to the west and Slee Street to the south.

The oval is predominantly used by local football club and is a key open space for local residents. Adjacent to the oval is the Euroa Netball Club, which have recently upgraded their two courts.

The site is zoned Public Park and Recreation Zone (PPRZ) with a large extent of the site encumbered by an Urban Flood Zone (UFZ) due to flooding from the Sevens Creek. Flooding from the Sevens Creek impacts all the irrigation infrastructure on the site.

Site Infrastructure

The Memorial Oval infrastructure is over 20 years old and has limited capacity to adequately irrigate the oval. It should be noted that there is currently no infrastructure in place to irrigate the oval surrounds which are predominantly mature native trees which require limited irrigation. The infrastructure on site includes:

- 1No 15,000L Plastic Tank (Black) (Figure 13)
- 1No. 19,000L Galvanised Steel Tank (Figure 13)
- Pop-up sprinkler irrigation system (Figure 14)
- Pump shed housing:
    - Grunfos Vertical Multistage pump (Figure 15)
    - Irrigation Filter (Dix Engineering) (Figure 16)
- Automated Irrigation System (Hunter XCore Irrigation Controller) (Figure 17)
- Pump connection to the Sevens Creek – this is under a current Water Right owned by Council
- 4No. potable water connection points for watering the wicket area
- The oval has a 1.5m high chain link fence around its perimeter that can be locked (Figure 18)
- The grass on the oval is not a drought tolerant species

The storages on site are insufficient to meet the current irrigation demands. It is also noted that given the age of the irrigation system it is currently in need of an upgrade.

Irrigation and Water Source

In recent years the memorial oval has had limited use of their water allocation from the Sevens Creek (given lack of water within the waterway) and the Turnbull Street groundwater system. Potable water has been used for the irrigation of the wicket area only with manual watering.

Water is now catered to the Memorial Oval by a local water carting business, which is coordinated by Goulburn Valley Water. The water supplied to the Memorial Oval has been noted as dam water.

Irrigation on the oval is through an automated sprinkler system and the typical watering regime is:

- Between 9pm and 4am which enables a full irrigation cycle to run
- Each irrigation cycle is limited by the current available storage
- September to March
- Approximately 100kL is used per week during this period
- Increased irrigation of the oval occurs in hotter months
- In total approximately 5ML/year of irrigation water is used by the Memorial Oval
- The Memorial Oval has a 1.5m high chain link fence around the playing area which can be locked during irrigation cycles. The site boundary also has a 2m high chain link fence.

Geotechnical Analysis

The geotechnical analysis completed included a simple infiltration test at one location on the Memorial Oval as well as a visual assessment of a soil sample taken at the surface. These tests were completed in accordance with the Australian Standards AS1726 – Geotechnical Site Investigations.

The soil sampled was classified as a Silty CLAY, Dark Brown with an infiltration rate of approximated at 700mm/hour.

This assessment determined that given the medium to high permeability of the soil there is a lower risk that alternative water supply used on the site will runoff and pose risks to downstream receiving waters. This is a key consideration when developing a management plan for the use of alternative water on the site.

Site Map

Site Photos

Figure 13 – Above Ground Tanks

Figure 14– Pop-up Sprinkler System

Figure 15– Irrigation Pump

Figure 16 – Irrigation Filter

Figure 17 –Irrigation Controller

Figure 18 – Fence surrounding Oval

Euroa Lawn Bowls Club

Site Overview

The Euroa Lawn Bowls Club was founded in 1895 and is located within the north of the Euroa township to the south of the Memorial Oval. The site is located on Crown land adjacent to the Euroa Croquet Club and the entire site is bounded by the Sevens Creek to the west, Templeton Street to the south and Turnbull Street to the east.

The site is zoned Public Park and Recreation Zone (PPRZ) with a large extent of the site encumbered by an Urban Flood Zone (UFZ) due to flooding from the Sevens Creek. Flooding from the Sevens Creek impacts all the irrigation infrastructure on the site.

Site Infrastructure

The Lawn Bowls infrastructure is over 10 years old and has capacity to adequately irrigate the greens. The infrastructure on site includes:

- 2No 22,000L Plastic Tank (Black) (Figure 19)
- 1No. 22,000L Concrete Tank (Figure 20)
- Overhead sprinkler irrigation system (Figure 21)
- Pump shed housing:
    - Irrigation pump (Figure 22). This pump is very old and has been refurbished a number of times.
- Manual Irrigation System (Figure 23)
- Connection to the Strathbogie Shire Council Turnbull Street Public Groundwater system (Figure 24)
- Connection to the Euroa township potable supply (Figure 24)
- The bowls club has a 1.8m high colourbond fence on the eastern side of the property with a 1.5m high chain link fence along the northern and southern boundary. There is no fence defining the western boundary of the property as it transitions to the Euroa Croquet Club
- The grass on the bowling green is not a drought tolerant species.

The storages on site insufficient to meet the current irrigation demands, however the concrete tank is nearing its end of useful life.

Irrigation and Water Source

The Euroa Lawn Bowls Club was using the Strathbogie Shire Council Turnbull Street Public Groundwater system and potable water, however as this bore system became more unreliable in recent years and Stage 2 water restrictions have been put in place in Euroa, the club is now provided water by local water carting business, which is coordinated by Goulburn Valley Water. The water supplied to the Euroa Lawn Bowls Club has been noted as dam water.

Irrigation on the bowling green is through a manual overhead sprinkler system and the typical watering regime is:

- Once a week, for 1 hour per green for a full irrigation cycle. Given current water restrictions and limitations on the storage infrastructure, irrigation of the greens has been reduced to 45mins per green.
- Irrigation is typically completed in the evening and when there is no wind, to increase irrigation efficiency
- The weekly irrigation cycle is 80kL - September/October to March
- For approximately 6 weeks during the year, during hotter months, irrigation increases to 100kL per week
- Increased irrigation of the green occurs in hotter months and during the green fertilisation and upkeep periods
- In total approximately 4ML/year of irrigation water is used by the Bowls Club

The gardens surrounding the greens are currently irrigated with potable water.

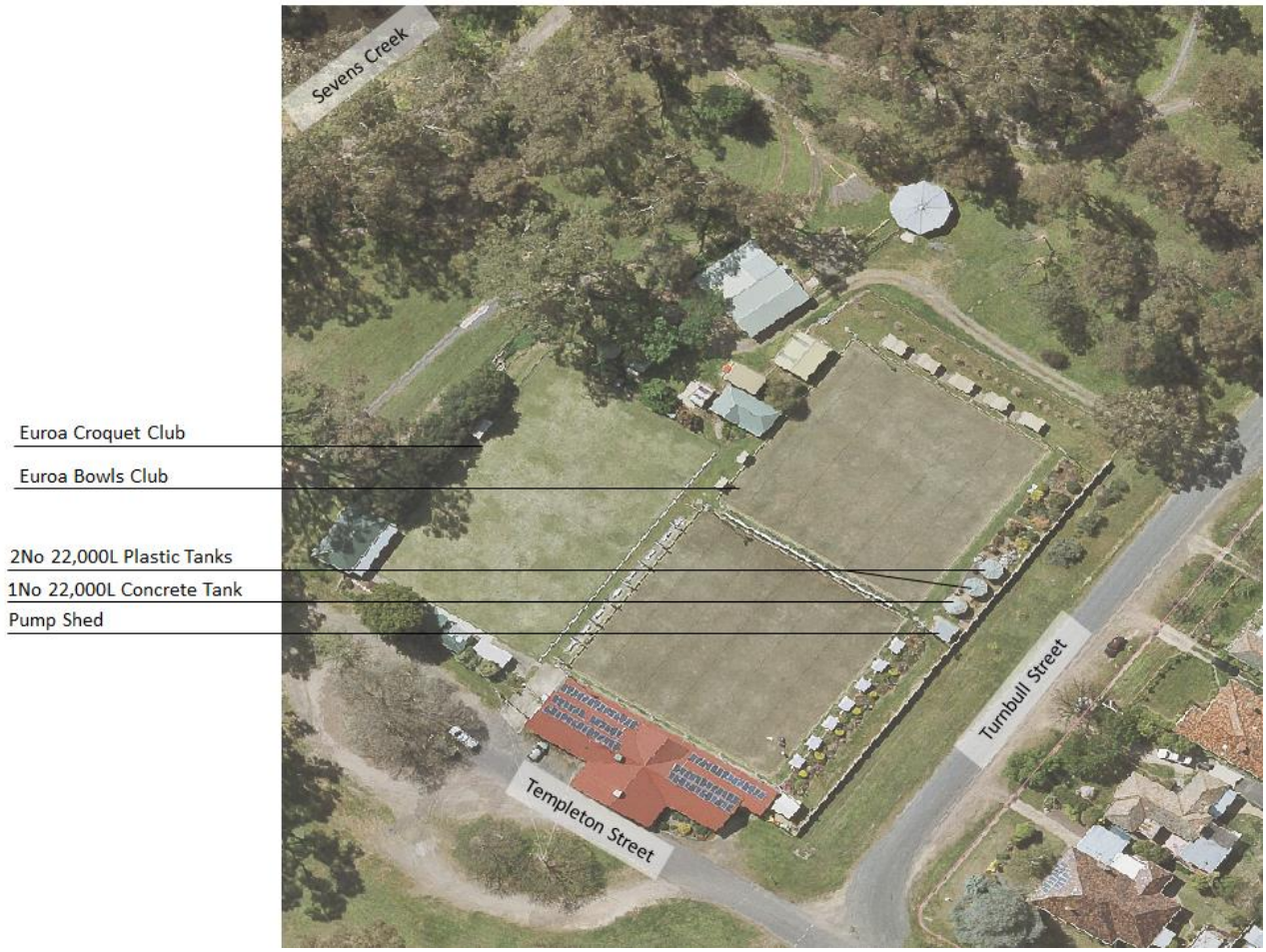
Geotechnical Analysis

The geotechnical analysis completed included a simple infiltration test at one location on the Euroa Lawn Bowls green as well as a visual assessment of a soil sample taken at the surface. These tests were completed in accordance with the Australian Standards AS1726 – Geotechnical Site Investigations.

The soil sampled was classified as a Silty SAND, Light Brown with an infiltration rate of approximated at 700mm/hour.

This assessment determined that given the medium to high permeability of the soil there is a lower risk that alternative water supply used on the site will runoff and pose risks to downstream receiving waters. This is a key consideration when developing a management plan for the use of alternative water on the site.

Site Map



Site Photos

Figure 19 – Above Ground Tanks - Plastic

Figure 20– Above Ground Tank - Concrete

Figure 21– Overhead Sprinkler Irrigation

Figure 22 – Irrigation Pump

Figure 23 –Manual Irrigation System

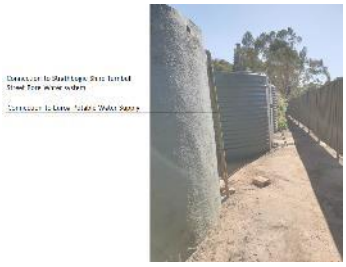


Figure 24 – Bore Water and Potable Water Connections into tanks

Euroa Croquet Club

Site Overview

The Euroa Croquet Club is over 100 years old and is located within the north of the Euroa township to the south of the Memorial Oval. The site is located on Crown land adjacent to the Euroa Lawn Bowls Club and the entire site is bounded by the Sevens Creek to the west, Templeton Street to the south and Turnbull Street to the east.

The site is zoned Public Park and Recreation Zone (PPRZ) with a large extent of the site encumbered by an Urban Flood Zone (UFZ) due to flooding from the Sevens Creek. Flooding from the Sevens Creek impacts all the irrigation infrastructure on the site.

Site Infrastructure

The Lawn Bowls infrastructure has capacity to adequately irrigate the court. The infrastructure on site includes:

- 1No 26,000L Plastic Tank (Green) (Figure 25)
- Automatic Irrigation System (Hunter XCore Irrigation Controller) Figure 26
- The Croquet club has a 1.5m high wire mesh fence along the northern, western and southern boundaries. There is no fence defining the eastern boundary of the property as it transitions to the Euroa Lawn Bowls Club (Figure 27)
- Irrigation pump located in a housing adjacent to the storage tank (Figure 28)
- The grass on the croquet court is not a drought tolerant species.

Irrigation and Water Source

The Euroa Croquet Club was using the Strathbogie Shire Council Turnbull Street Public Groundwater system and potable water, however as this bore system became more unreliable in recent years and Stage 2 water restrictions have been put in place in Euroa, the club is now provided water by local water carting business, which is coordinated by Goulburn Valley Water. The water supplied to the Euroa Croquet Club has been noted as dam water.

Irrigation on the croquet court is through an automated popup sprinkler system and the typical watering regime is:

- Every second day using approximately 4-5kL per irrigation cycle
- Irrigation is reduced during the winter months to twice weekly (if there is limited rainfall)
- In total approximately 1ML/year of irrigation water is used by the Croquet Club.

Geotechnical Analysis

The geotechnical analysis completed included a simple infiltration test at one location on the Euroa Croquet court as well as a visual assessment of a soil sample taken at the surface. These tests were completed in accordance with the Australian Standards AS1726 – Geotechnical Site Investigations.

The soil sampled was classified as a Silty CLAY, Dark Brown with an infiltration rate of approximated at 300mm/hour.

This assessment determined that given the low to medium permeability of the soil there is a medium to high risk that alternative water supply used on the site will runoff and pose risks to downstream receiving waters. This is a key consideration when developing a management plan for the use of alternative water on the site.

Site Map

Site Photos

Figure 25 – Above Ground Tank

Figure 26– Irrigation Controller

Figure 27– Perimeter Fence

Figure 28– Pump Housing

Euroa Arboretum

Site Overview

The Euroa Arboretum was established in 1990. The site cover more than 27 hectares and includes:

- Recreational spaces
- Restoration zones
- Bush walks
- Seed Production Areas
- Native Plant Nursey

The site is located to the south of the Euroa township on Crown land and is bounded by the Hume Freeway to the south, Euroa Main Road to the north and farming/low density residential zoning to the east. The site is zoned Public Conservation and Resource Zone (PCRZ).

Site Infrastructure

The irrigation infrastructure at the Euroa Arboretum is in primarily to support watering at the Native Plant Nursery.
The infrastructure on the site has varied age and includes:

- A stormwater harvesting basin which is located in the north east corner of the site. This basin has a maximum volume of 26ML when full, which equates to approximately 2 years of irrigation supply for the site (including losses from evaporation and infiltration) (Figure 29)
- 2No. Stormwater treatment wetlands which direct stormwater from the external catchments to the harvesting basin
- 2No. 26,000L Plastic Tank (Green) (Figure 30)
- Overhead sprinkler irrigation system (Figure 31)
- Handheld irrigation
- Pump shed housing:
    - Irrigation pump (Figure 32) Franklin Electric Subdrive Inline 1100
    - Sand filter (Figure 33) – type unknown
    - High pressure tank – Franklin Electric
    - Automated irrigation system (Hunter Irrigation Controller) (Figure 34)
- The Native Plant Nursey has a 2.0m high chain link fence around its boundary. There is also a gate limiting vehicle access around the site, which is located at the carpark.

Irrigation and Water Source

The Euroa Arboretum has always been reliant on stormwater harvesting and reuse for irrigation and other non-potable uses on site (including toilet flushing). The volume supplied through this source provides sufficient water for the site's demands.
Irrigation at the plant nursery is the largest demand on site. Irrigation occurs through an automated overhead sprinkler system, with some manual watering. The irrigation regime is:

- Two days a week using 52kL, all year round
- There is limited access to the plant nursery during times of irrigation, given it is limited from 4pm to 9am
- Increased irrigation occurs in hotter months
- In total approximately 9ML/year of irrigation water is used by the Euroa Arboretum in an average year. This can increase to 11ML/year in a dry year.

Geotechnical Analysis

No analysis completed on this site given the controlled nature of irrigation on the site.

Site Map


Stormwater Harvesting Pond 26ML
Stormwater Treatment Wetlands
Seed Production Area
Plant Nursery
Stormwater Treatment Wetlands
Seed Production Area
Euroa Main Road
Hume Freeway


2No. 26,000L Plastic Tanks
Sand Filter
Pump Shed
Greenhouses – Plant Irrigation

Site Photos

Figure 29 – Stormwater Harvesting Pond

Figure 30– Above Ground Tanks

Figure 31– Overhead Sprinkler Irrigation

Figure 32 – Irrigation Pump

Figure 33 – Sand Filter

Figure 34 – Irrigation Controller

St Johns Primary School

Site Overview

St Johns Primary School in Euroa is located to the south of the Euroa township on private land and is bounded by Anderson Street to the west, Binney Street to the east and residential properties along its north and south boundary. The site is zoned General Residential Zone (GRZ).

Site Infrastructure

The irrigation infrastructure at St Johns Primary School supports the grassed play area on the eastern side of the property. The infrastructure on the site has varied ages and includes:

- Underground pump housing (Figure 35):
    - A groundwater pump (Davey)
    - Pressure Tank (Global Water Solutions)
- 3No. 22,500L Plastic Tanks (Maroon) (Figure 36)
- 1No. 8,000L Plastic Tank (Maroon)
- Pop up sprinkler irrigation system (Figure 37)
- Automated Irrigation System (Orbit Controller) – located in the Merci Centre (Figure 38)
- 2.0-3.0m high colourbond and chain wire mesh fencing surrounds the property
- The grass on the play area is not a drought tolerant species.

Irrigation and Water Source

The current groundwater system at the school is currently not functional, given lack of supply from the existing bore. The 3No. 22,500L plastic tanks are currently connected to an existing building adjacent to the tanks. Therefore, the grassed play area within the school is not irrigated.

When the area was irrigated it typically occurred outside of school hours.

The irrigation demand for St Johns Primary School for the existing grass play area and garden irrigation has been estimated as 3ML/year.

Geotechnical Analysis

The geotechnical analysis completed included a simple infiltration test at one location on the St Johns grassed play area as well as a visual assessment of a soil sample taken at the surface. These tests were completed in accordance with the Australian Standards AS1726 – Geotechnical Site Investigations.

The soil sampled was classified as a Clayey SILT, Brown with an infiltration rate of approximated at 1300mm/hour.

This assessment determined that given the high permeability of the soil there is a low risk that alternative water supply used on the site will runoff and pose risks to downstream receiving waters. This is a key consideration when developing a management plan for the use of alternative water on the site.

Site Map

Site Photos

Figure 35 – Groundwater Pump and Pressure Tank

Figure 36 – Above Ground Tanks

Figure 37 – Sprinkler Irrigation

Figure 38 – Irrigation Controller

Euroa Primary School

Site Overview

Euroa Primary School in Euroa is located to the south of the township on Crown land and is bounded by Clifton Street to the north, Anderson Street to the south and Scobie Street to the east. The site is zoned Public Use Zone (PUZ).

Site Infrastructure

The irrigation infrastructure at Euroa Primary School supports the grassed play area on the eastern side of the property.
The infrastructure on the site supports irrigation from potable supply only. The only infrastructure on the site is:

- Taps located throughout the school to support irrigation of garden beds
- A 1.5m chain wire mesh fencing surrounds the property
- Couplings located around the grassed playing area for manual watering connections (Figure 39)
- The grass on the play area is not a drought tolerant species.

Irrigation and Water Source

Euroa Primary School currently do not irrigate the grassed play area.
The irrigation demand for Euroa Primary School for the existing grassed play area and garden irrigation has been estimated as 4ML/year.

Geotechnical Analysis

The geotechnical analysis completed included a simple infiltration test at one location on the Euroa Primary School grassed play area as well as a visual assessment of a soil sample taken at the surface. These tests were completed in accordance with the Australian Standards AS1726 – Geotechnical Site Investigations.
The soil sampled was classified as a Clayey SILT, Brown with an infiltration rate of approximated at 350mm/hour.
This assessment determined that given the low to medium permeability of the soil there is a medium to high risk that alternative water supply used on the site will runoff and pose risks to downstream receiving waters. This is a key consideration when developing a management plan for the use of alternative water on the site.

Site Map

Site Photos

Figure 39 – Irrigation Couplings

Euroa Secondary College

Site Overview

Euroa Secondary College in Euroa is located to the south of the township on public land and is bounded by Bury Street to the north, Clifton Street to the south and Campbell Street to the east. The site is zoned Public Use Zone (PUZ).

Site Infrastructure

Currently there is no irrigation infrastructure at Euroa Secondary College to support irrigation of their green play space on the western side of the property.

However, there is a rainwater tank (31,700L) located on one building within the school (Figure 40). Unfortunately, there are no pumps to support local irrigation of garden beds. Potable water is currently used to irrigate garden beds and the schools agricultural garden (Figure 41).

The grass used on the school oval is not a drought tolerant species.

Irrigation and Water Source

Euroa Secondary College currently do not irrigate the grassed play area.

The irrigation demand for Euroa Secondary College for the existing grass play area and garden irrigation has been estimated as 5ML/year.

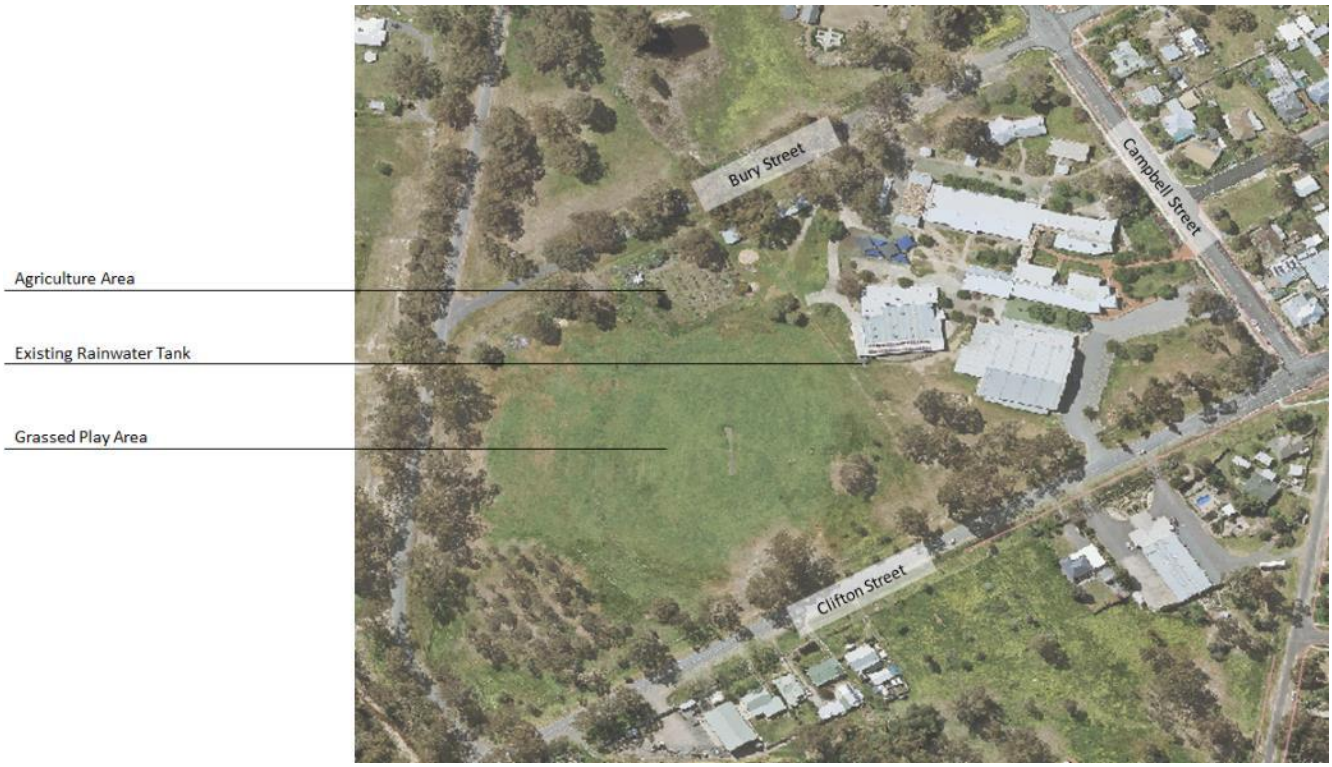
Geotechnical Analysis

The geotechnical analysis completed included a simple infiltration test at one location on the Euroa Secondary College oval as well as a visual assessment of a soil sample taken at the surface. These tests were completed in accordance with the Australian Standards AS1726 – Geotechnical Site Investigations.

The soil sampled was classified as a Sandy LOAM, Brown with an infiltration rate of approximated at 2500mm/hour.

This assessment determined that given the high permeability of the soil there is a low risk that alternative water supply used on the site will runoff and pose risks to downstream receiving waters. This is a key consideration when developing a management plan for the use of alternative water on the site.

Site Map



Site Photos

Figure 40 – Existing Rainwater Tank

Figure 41 – Agricultural Area

WATER SECURITY ASSESSMENT

The following section of the report assesses the current and future water sources available to each site including:

- Drought resilience assessment – which includes a review of the total water balance for each site including water supply, demand and shortfall. Where shortfalls are defined potential alternative water sources solutions are provided
- Water risk assessment – which includes a risk assessment associated with current water use practices on each site. The risk assessment includes reviewing human, environmental and soil health
- Improvement to water management practices – solutions to improve water quality and supply at each site
- Facility design – which includes concept designs for onsite improvements to water management practices as well as potential local, regional and township based alternative water supply solutions.

The findings of this assessment for each site is provided below.

Friendlies Society Oval

As defined earlier in the report the Friendlies Society Oval currently receives recycled Class C water, which is delivered by a water tanker to site. The maximum water demand for the site is 5ML/year.

Drought Resilience Assessment

The findings of drought resilience assessment for the Friendlies Society Oval is summarised in Table 4. It reviews the available water sources to meet the irrigation demands for the site which includes:

- Class C recycled water tankered to site, which is the current water supply used for irrigation
- Groundwater, which was previously supplied to the site from the Turnbull Street Groundwater system
- Stormwater harvested from the Gobur Street Drain
- Rainwater harvested from the Tennis Clubrooms
- Recycled water provided from the Euroa WMF as part of a whole of township recycled water system.

The current water balance for the site is presented in Figure 42.

Figure 42 - Friendlies Oval Water Balance Summary

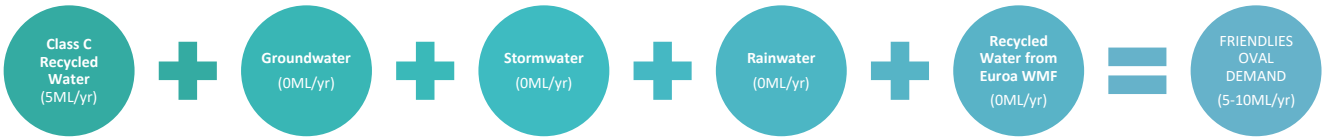


Table 4 - Friendlies Society Oval drought resilience & water risk assessment summary

Alternative Water Supplies Assessments	Water Tanker* (Class C Recycled Water)	Groundwater	Stormwater	Rainwater	Recycled Water (Class B)
Harvestable volume (est.) – ML/year	5-10	0	>10	<2	>10
Long term viability	✗	✗	✓	✗	✓
Environmental risks	LOW-MED		LOW-MED		LOW-MED
Human health risks	HIGH		MED		MED
Soil risks	LOW		LOW		LOW
Infrastructure risks	LOW		MED		LOW

* defines current water supply for the site

Key findings from the drought resilience and water risk assessment are provided below:

Water Supply Options

- The current water source of recycled water tankered to site from the Euroa WMF is not a long-term sustainable option given:
  - The financial and environmental costs (through increased emissions) incurred to cart the water to site, which includes multiple deliveries a day during peak irrigation period
  - The community perception of this practice continuing for an extended period
- Rainwater cannot provide sufficient water to meet current water demands, therefore the risks associated with this water source has not been assessed

- Based on the findings of the groundwater assessment detailed earlier in the report (see Figure 4), groundwater does not meet beneficial reuse requirements. Through anecdotal information provided by stakeholders, this supply is also not able to meet current water demands
- The Gobur Street Stormwater Harvesting Scheme could supply treated stormwater for irrigation purposes to several sites including the Friendlies Society Oval. Further details on this scheme are provided in later sections of the report
- The Euroa Recycled Water Scheme could supply treated wastewater from the WMF for irrigation purposes to several sites including the Friendlies Society Oval. Further details on this scheme are provided in later sections of the report.

Existing Infrastructure

- The existing infrastructure on the site was installed less than 12 months ago and is adequate to cater for the current irrigation demands and future connection to an alternative water supply. Given the age of the system it is also free from water losses associated with leakages and evaporation from open storages
- The existing 100,000L storage tank provides sufficient water storage for one irrigation cycle during peak demand periods
- An automated irrigation system on the site allows for controlled irrigation of the oval, using preprogrammed stations
- Based on a simple visual assessment during the grass establishment phase, there may be potential to slightly reduce the water applied to the oval to reduce over irrigation
- The recycled water currently used on the site poses a very low risk to the condition of the existing irrigation infrastructure.
- The oval has a 1.5m high picket fence around its perimeter which can be locked.

Water Risk Assessment

There are two water sources available to the site which include a minimum of Class C recycled water from the Euroa WMF and stormwater. The risks associated with these two water sources are defined below.

Human Health

- Users of recycled water in Euroa must enter into a Reclaimed Water Use Agreement with GVW which outlines key application requirements that include (but are not limited to):
  - Requirements for signage
  - Buffer zones to sensitive areas
  - Application considerations
  - Withholding period post irrigation.
- If harvested stormwater is proposed to be used on site a scheme management plan must be prepared through the design development phase to manage relevant health, environmental and operational risks

Soil Health

- Using the water quality sample taken from the Euroa WMF key factors for soil health including pH, conductivity, sodium adsorption ration and hardness are all within guideline limits
- Using the water quality sample taken at the Euroa Arboretum as a representative sample for the Gobur Street drain, key factors for soils health including pH, conductivity, sodium adsorption ration and hardness are all within guidelines limits.

Improvement to Water Management Practices

Alternative water supplies available for the site include:

- Class C minimum recycled water from the Euroa WMF, supplied through a holistic township recycled water scheme

- A precinct-based stormwater harvesting and reuse scheme that could divert water from the Gobur Street drain before it discharges into the Sevens Creek.

Both of these schemes are deemed viable options that would require further investigation to confirm technical viability, required environmental approvals and costs. These schemes are further defined in the township and precinct alternative water solutions section of the report.

Facility Design

The following section of the reports provides the prioritised actions recommended for implementation at the Friendlies Society Oval to improve the drought resilience, safety and water management practices.

The actions relevant to the facility design have been prioritised using the following numbering system:

- 1.1 – The first digit denotes the priority of the action – 1 is a first order priority action
- 1.1 – The second digit denotes the action number – 1 is the first action within priority 1

The key actions associated with the facility design for the Friendlies Society Oval are presented in Figure 43 and include:

Priority 1 Projects:

- 1.1 Educational programs to ensure the operators of the irrigation system on site are aware of the relevant procedures as well as safety and sustainability considerations regarding the reuse of recycled water
- 1.2 The irrigation controller should be set to ensure irrigation is occurring on the irrigated area at a time that limits exposure to the public as well as provides a 4-hour withholding period
- 1.3 Access to the irrigated area during watering must be restricted. This will require the use of lockable gates
- 1.4 Signage is required to inform the public that an alternative water supply is being used on site
- 1.5 Metering should be installed to monitor the use of alternative water on the site
- 1.6 Treatment at the site, or prior to supply to site (at the Euroa WMF) must be provided to ensure a Class C standard recycled water is maintained
- 1.7 A Reclaimed Water Users agreement should be in place with the Friendlies Society Oval Committee of Management to ensure all the key safety considerations are adhered to on site or the use of recycled water.

Priority 2 Projects:

- 2.1 A remote monitoring system should be put in place to provide a simple means to monitor the performance of the irrigation system and recycled water supply on site
- 2.2 The connection of an alternative water supply to site is a priority action, however it is unlikely to be implemented in less than 3 months.

Priority 3 Projects:

- 3.1 When replanted, the Friendlies Society Oval did not use warm season grasses which would reduce water consumption on the site by up to 10%. This action is an optional consideration for the site; however, it is not a priority action.

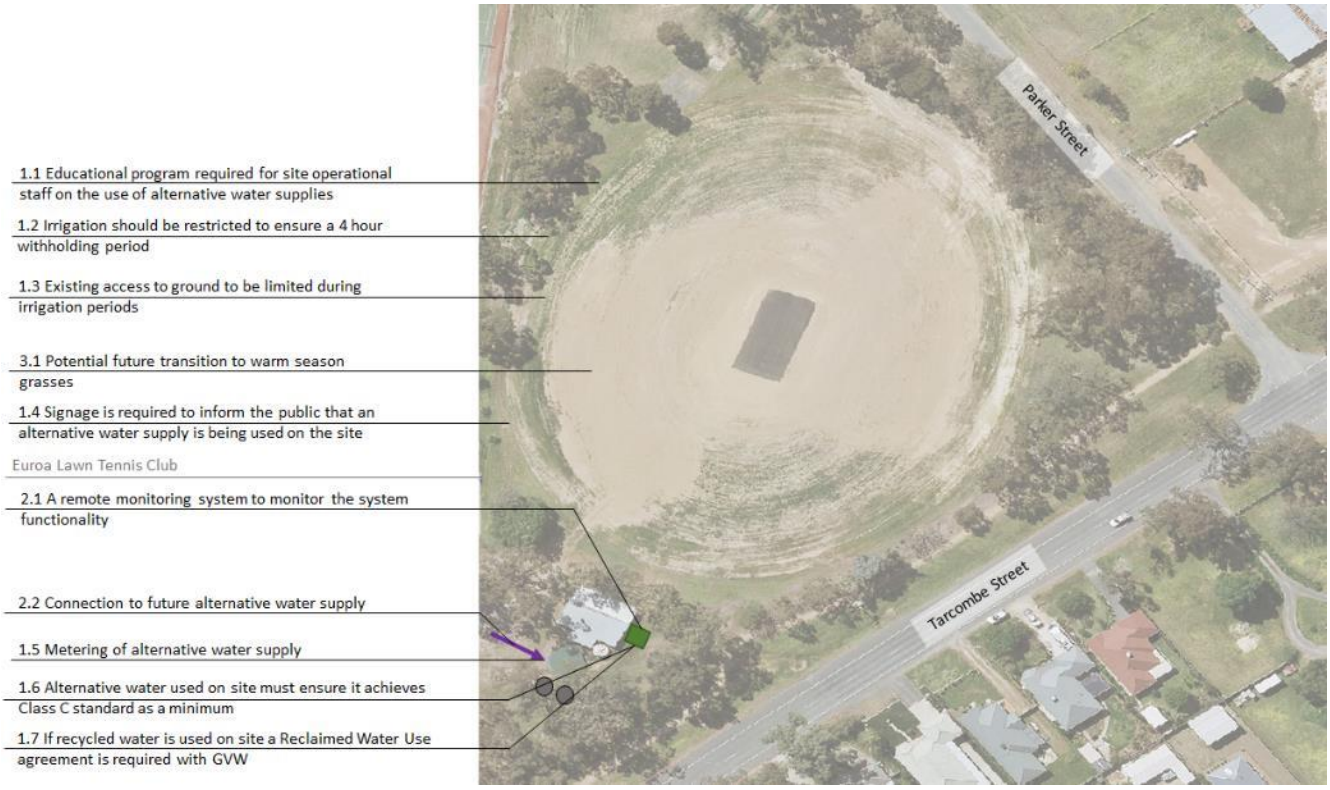


Figure 43 – Friendlies Society Oval Facility Design

Euroa Lawn Tennis Club

As defined earlier in the report the Euroa Lawn Tennis Club currently receives water from a private dam in Euroa, which is delivered by a water tanker to site. The maximum water demand for the site is 2ML/year.

Drought Resilience Assessment

The findings of drought resilience assessment for the Euroa Lawn Tennis Club is summarised in Table 5. It reviews the available water sources to meet the irrigation demands for the site which includes:

- Dam water tankered to site, which is the current water supply used for irrigation
- Groundwater, which was previously supplied to the site from the Turnbull Street Groundwater system
- Stormwater harvested from the Gobur Street Drain
- Rainwater harvested from the Tennis Clubrooms
- Recycled water provided from the Euroa WMF as part of a whole of township recycled water system.

The current water balance for the site is presented in Figure 44.

Figure 44 – Euroa Lawn Tennis Club Water Balance Summary

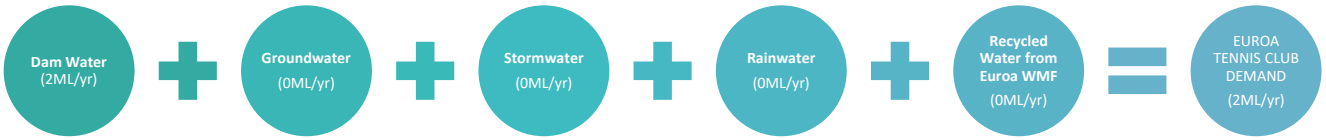


Table 5 – Euroa Lawn Tennis Club drought resilience & water risk assessment summary

Alternative Water Supplies Assessments	Water Tanker* (Dam Water)	Groundwater	Stormwater	Rainwater	Recycled Water (Class B)
Harvestable volume (est.) – ML/year	2	0	2	<0.2	>2
Long term viability	✗	✗	✓	✗	✓
Environmental risks	LOW-MED		LOW-MED		LOW-MED
Human health risks	HIGH		MED		MED
Soil risks	LOW		LOW		LOW
Infrastructure risks	LOW		MED		LOW

* defines current water supply for the site

Key findings from the drought resilience and water risk assessment are provided below:

Water Supply Options

- The current water source dam water tankered to site from is not a long-term sustainable option given:
  - The financial and environmental costs (through increased emissions) incurred to cart the water to site, which includes multiple deliveries a day during peak irrigation period
  - The community perception of this practice continuing for an extended period
  - Based on water quality sampling of this raw water source, it does not meet Class D recycled water standards. This risk should be noted given a recycled water of this quality is not suitable for irrigation of municipal public open space (EPA, 2003)

- Rainwater cannot provide sufficient water to meet current water demands, therefore the risks associated with this water source has not been assessed
- Based on the findings of the groundwater assessment detailed earlier in the report (see Figure 4), groundwater does not meet beneficial reuse requirements. Through anecdotal information provided by stakeholders, this supply is also not able to meet current water demands
- The Gobur Street Stormwater Harvesting Scheme could supply treated stormwater for irrigation purposes to several sites including the Euroa Lawn Tennis Club. Further details on this scheme are provided in later sections of the report
- The Euroa Recycled Water Scheme could supply treated wastewater from the WMF for irrigation purposes to several sites including the Euroa Lawn Tennis Club. Further details on this scheme are provided in later sections of the report.

Existing Infrastructure

- The existing infrastructure on the site is functional with some elements nearing 10 years of age. Given the age of the system it is subject to water losses associated with leakages
- There are no evaporative losses from the storages on site which are all above ground tanks
- The existing 60,000L storage tank (2 x No. 30,000L Plastic Tanks) provides sufficient water storage for one irrigation cycle during peak demand periods. This storage size is adequate to cater for the current irrigation demands and a future connection to an alternative water supply
- An automated irrigation system on the site allows for controlled irrigation of the courts, using preprogrammed stations
- The tennis courts have a 3m high chain link fence around its perimeter that can be locked.

Water Risk Assessment

There are two water sources available to the site which include a minimum of Class C recycled water from the Euroa WMF and stormwater. The risks associated with these two water sources are as defined above for the Friendlies Society Oval.

Improvement to Water Management Practices

Alternative water supplies available for the site include:

- Class C minimum recycled water from the Euroa WMF, supplied through a holistic township recycled water scheme
- A precinct-based stormwater harvesting and reuse scheme that could divert water from the Gobur Street drain before it discharges into the Sevens Creek.

Both of these schemes are deemed viable options that would require further investigation to confirm technical viability, required environmental approvals and costs. These schemes are further defined in the township and precinct alternative water solutions section of the report.

Facility Design

The following section of the reports provides the prioritised actions recommended for implementation at the Euroa Lawn Tennis Club to improve the drought resilience, safety and water management practices.

The key actions associated with the facility design for the Euroa Lawn Tennis Club are presented in Figure 45 and include:

Priority 1 Projects:

- 1.1 The irrigation controller should be set to ensure irrigation is occurring on the irrigated area at a time that limits exposure to the public as well as provides a 4-hour withholding period
- 1.2 The current water supplied to the site is a Class D standard recycled water. Treatment at the site should be considered to ensure a Class C standard
- 1.3 Metering should be installed to monitor the use of alternative water on the site

- 1.4 Access to the irrigated area during watering must be restricted. This will require the use of lockable gates
- 1.5 Educational programs to ensure the operators of the irrigation system on site are aware of the relevant procedures as well as safety and sustainability considerations regarding the reuse of alternative water
- 1.6 Signage is required to inform the public that an alternative water supply is being used on site
- 1.7 An alternative water use management plan should be in place to ensure the Euroa Lawn Tennis Club adhere to all the key safety considerations for the use of an alternative water supply.

Priority 2 Projects:

- 2.1 A remote monitoring system should be put in place to provide a simple means to monitor the performance of the irrigation system and recycled water supply on site
- 2.2 A Reclaimed Water Users Agreement should be in place with the Friendlies Society Oval Committee of Management to ensure all the key safety considerations are adhered to on site or the use of recycled water
- 2.3 The connection of an alternative water supply to site is a priority action, however it is unlikely to be implemented in less than 3 months.

Priority 3 Projects:

- 3.1 The introduction of warm season grasses on the Euroa Lawn Tennis Courts could reduce water consumption by greater than 10%.

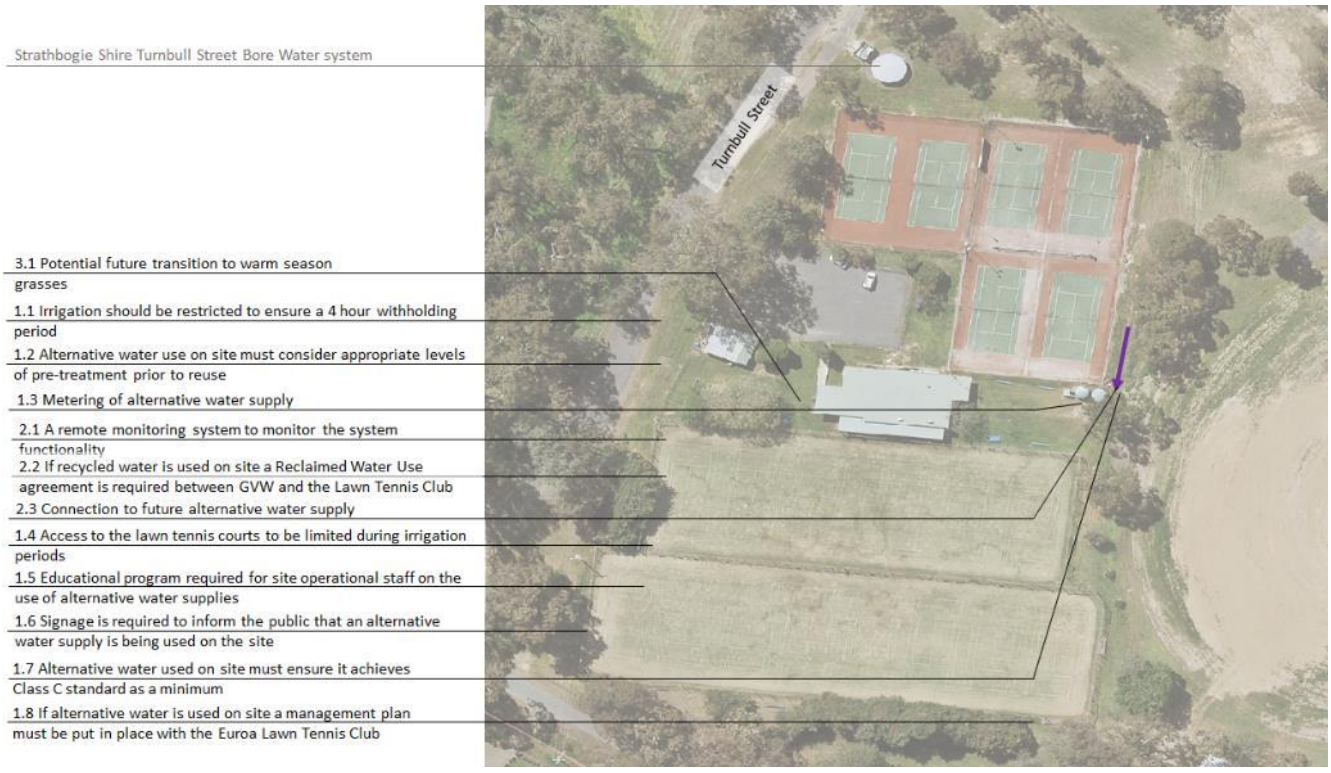


Figure 45 – Euroa Lawn Tennis Club Facility Design

Memorial Oval

As defined earlier in the report the Memorial Oval currently receives water from a private dam in Euroa, which is delivered by a water tanker to site. The maximum water demand for the site is 5ML/year.

Drought Resilience Assessment

The findings of drought resilience assessment for the Memorial Oval is summarised in Table 6. It reviews the available water sources to meet the irrigation demands for the site which includes:

The drought resilience assessment for the Memorial Oval, reviewed the available water sources to meet the irrigation demands for the site. Through this assessment the following water sources were investigated:

- Dam water tankered to site, which is the current water supply used for irrigation
- Groundwater, which was previously supplied to the site from the Turnbull Street Groundwater System
- Stormwater harvested from the Blackwood Lane Drain
- Rainwater harvested from the Memorial Oval Pavilion and Clubrooms
- Recycled water provided from the Euroa WMF as part of a whole of township recycled water system.

The current water balance for the site is presented in Figure 46.

Figure 46 – Memorial Oval Water Balance Summary

Table 6 - Memorial Oval drought resilience & water risk assessment summary

Alternative Water Supplies Assessments	Water Tanker* (Dam Water)	Groundwater	Stormwater	Rainwater	Recycled Water (Class B)
Harvestable volume (est.) – ML/year	5	0	>5	0	>5
Long term viability	✗	✗	✓	✗	✓
Environmental risks	LOW-MED		LOW-MED		LOW-MED
Human health risks	HIGH		MED		MED
Soil risks	LOW		LOW		LOW
Infrastructure risks	LOW		MED		LOW

* defines current water supply for the site

Key findings from the drought resilience and water risk assessment are provided below:

Water Supply Options

- Memorial Oval has historically relied on a water allocation from the Sevens Creek. However, in recent years this water supply has not been used due to insufficient flows within the waterway
- The current water source dam water tankered to site from is not a long-term sustainable option given:
  - The financial and environmental costs (through increased emissions) incurred to cart the water to site, which includes multiple deliveries a day during peak irrigation period
  - The community perception of this practice continuing for an extended period

- Based on water quality sampling of this raw water source, it does not meet Class D recycled water standards. This risk should be noted given a recycled water of this quality is not suitable for irrigation of municipal public open space (EPA, 2003)
- Rainwater cannot provide sufficient water to meet current water demands, therefore the risks associated with this water source has not been assessed
- Based on the findings of the groundwater assessment detailed earlier in the report (see Figure 4), groundwater does not meet beneficial reuse requirements. Through anecdotal information provided by stakeholders, this supply is also not able to meet current water demands
- The Blackwood Lane Stormwater Harvesting Scheme could supply treated stormwater for irrigation purposes to several sites including the Euroa Lawn Tennis Club. Further details on this scheme are provided in later sections of the report
- The Euroa Recycled Water Scheme could supply treated wastewater from the WMF for irrigation purposes to several sites including the Memorial Oval. Further details on this scheme are provided in later sections of the report.

Existing Infrastructure

- The storages on site are insufficient to meet the current irrigation demands and can not cater for a future connection to an alternative water supply
- Given the age of the irrigation infrastructure it is currently in need of an upgrade due to leaks and lack of effective coverage from the Oval's sprinklers
- An automated irrigation system on the site allows for controlled irrigation of the courts, using preprogrammed stations
- Memorial Oval has a 1.5m high chain link fence around the playing area which can be locked during irrigation cycles.

Water Risk Assessment

There are two water sources available to the site which include a minimum of Class C recycled water from the Euroa WMF and stormwater. The risks associated with these two water sources are as defined above for the Friendlies Society Oval.

Improvement to Water Management Practices

Alternative water supplies available for the site include:

- Class C minimum recycled water from the Euroa WMF, supplied through a holistic township recycled water scheme
- A precinct-based stormwater harvesting and reuse scheme that could divert water from the Blackwood Lane drain before it discharges into the Sevens Creek.

Both of these schemes are deemed viable options that would require further investigation to confirm technical viability, required environmental approvals and costs. These schemes are further defined in the township and precinct alternative water solutions section of the report.

Facility Design

The following section of the report provides the prioritised actions recommended for implementation at the Memorial Oval to improve the drought resilience, safety and water management practices.

The key actions associated with the facility design for the Memorial Oval are presented in Figure 47 and include:

Priority 1 Projects:

- 1.1 Educational programs to ensure the operators of the irrigation system on site are aware of the relevant procedures as well as safety and sustainability considerations regarding the reuse of alternative water

- 1.2 The irrigation controller should be set to ensure irrigation is occurring on the irrigated area at a time that limits exposure to the public as well as provides a 4-hour withholding period
- 1.3 Access to the irrigated area during watering must be restricted. This will require the use of lockable gates
- 1.4 Signage is required to inform the public that an alternative water supply is being used on site
- 1.5 Metering should be installed to monitor the use of alternative water on the site
- 1.6 The current water supplied to the site is a Class D standard recycled water. Treatment at the site should be considered to ensure a Class C standard
- 1.7 Upgrade existing irrigation system on Memorial Oval
- 1.8 Install new above ground plastic tank with a total storage of 46,000L
- 1.9 An alternative water use management plan should be in place to ensure the Memorial Oval Committee of Management adhere to all the key safety considerations for the use of an alternative water supply.

Priority 2 Projects:

- 2.1 A remote monitoring system should be put in place to provide a simple means to monitor the performance of the irrigation system and recycled water supply on site
- 2.2 The connection of an alternative water supply to site is a priority action, however it is unlikely to be implemented in less than 3 months
- 2.3 A Reclaimed Water Users Agreement should be in place with the sites Committee of Management to ensure all the key safety considerations are adhered to on site

Priority 3 Projects:

- 3.1 The introduction of warm season grasses on Memorial Oval could reduce water consumption by greater than 10%.

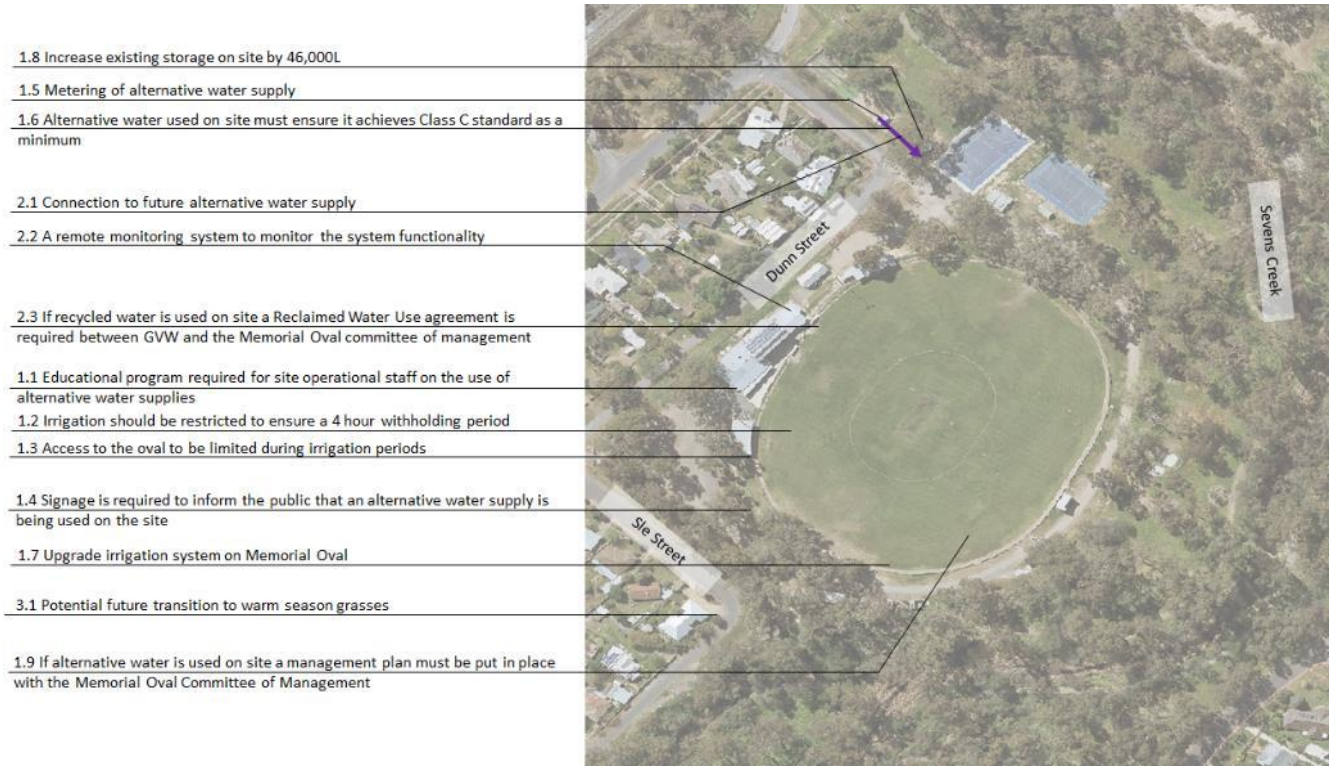


Figure 47 – Memorial Oval Facility Design

Euroa Lawn Bowls Club

As defined earlier in the report the Euroa Lawn Bowls Club currently receives water from a private dam in Euroa, which is delivered by a water tanker to site. The maximum water demand for the site is 4ML/year.

Drought Resilience Assessment

The findings of drought resilience assessment for the Euroa Lawn Bowls is summarised in Table 7. It reviews the available water sources to meet the irrigation demands for the site which includes:

The drought resilience assessment for the Euroa Lawn Bowls Club, reviewed the available water sources to meet the irrigation demands for the site. Through this assessment the following water sources were investigated:

- Dam water tankered to site, which is the current water supply used for irrigation
- Groundwater, which was previously supplied to the site from the Turnbull Street Groundwater system
- Stormwater harvested from the Gobur Street Drain
- Rainwater harvested from the Lawn Bowls Clubrooms
- Recycled Water provided from the Euroa WMF as part of a whole of township recycled water system.

The current water balance for the site is presented in Figure 48

Figure 48 – Euroa Lawn Bowls Club Water Balance Summary

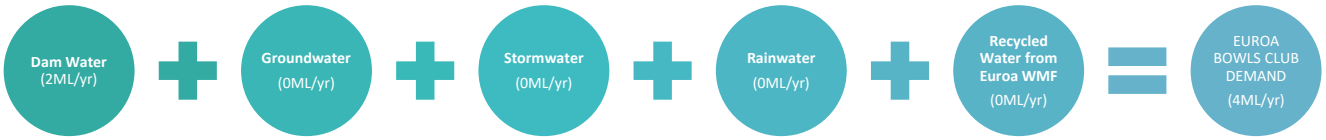


Table 7 – Euroa Lawn Bowls Club drought resilience & water risk assessment summary

Alternative Water Supplies Assessments	Water Tanker* (Dam Water)	Groundwater	Stormwater	Rainwater	Recycled Water (Class B)
Harvestable volume (est.) – ML/year	4	0	>4	0	>4
Long term viability	✗	✗	✓	✗	✓
Environmental risks	LOW-MED		LOW-MED		LOW-MED
Human health risks	HIGH		MED		MED
Soil risks	LOW		LOW		LOW
Infrastructure risks	LOW		MED		LOW

* defines current water supply for the site

Key findings from the drought resilience and water risk assessment are provided below:

Water Supply Options

- Euroa Lawn Bowls Club has historically relied on a water supplied from the Strathbogie Shire Council Groundwater system, however in recent months this supply has been disconnected
- The current water source (dam water tankered to site) is not a long-term sustainable option given:
  - The financial and environmental costs (through increased emissions) incurred to cart the water to site, which includes multiple deliveries a day during peak irrigation period
  - The community perception of this practice continuing for an extended period

- Based on water quality sampling of this raw water source, it does not meet Class D recycled water standards. This risk should be noted given a recycled water of this quality is not suitable for irrigation of municipal public open space (EPA, 2003)
- Rainwater cannot provide sufficient water to meet current water demands, therefore the risks associated with this water source has not been assessed
- Based on the findings of the groundwater assessment detailed earlier in the report (see Figure 4), groundwater does not meet beneficial reuse requirements. Through anecdotal information provided by stakeholders, this supply is also not able to meet current water demands
- The Gobur Street Stormwater Harvesting Scheme could supply treated stormwater for irrigation purposes to several sites including the Euroa Lawn Tennis Club. Further details on this scheme are provided in later sections of the report
- The Euroa Recycled Water Scheme could supply treated wastewater from the WMF for irrigation purposes to several sites including the Euroa Lawn Bowls Club. Further details on this scheme are provided in later sections of the report.

Existing Infrastructure

- The storages on site are sufficient to meet the current irrigation demands and a future connection to an alternative water supply. However, the existing concrete tank on site is nearing its end of useful life
- The current irrigation system is an overhead system which is controlled manually
- The Bowls Club has a 1.8m high colourbond fence on the eastern side of the property with a 1.5m high chain link fence along the northern and southern boundary, which can be locked. There is no fence defining the western boundary of the property as it transitions to the Euroa Croquet Club.

Water Risk Assessment

There are two water sources available to the site include a minimum of Class C recycled water from the Euroa WMF and stormwater. The risks associated with these two water sources are as defined above for the Friendlies Society Oval.

Improvement to Water Management Practices

Alternative water supplies available for the site include:

- Class C minimum recycled water from the Euroa WMF, supplied through a holistic township recycled water scheme
- A precinct-based stormwater harvesting and reuse scheme that could divert water from the Gobur Street drain before it discharges into the Sevens Creek.

Both of these schemes are deemed viable options that would require further investigation to confirm technical viability, required environmental approvals and costs. These schemes are further defined in the township and precinct alternative water solutions section of the report.

Facility Design

The following section of the reports provides the prioritised actions recommended for implementation at the Euroa Lawn Bowls to improve the drought resilience, safety and water management practices.

The key actions associated with the facility design for the Euroa Lawn Bowls Club are presented in Figure 49 and include:

Priority 1 Projects:

- 1.1 Educational programs to ensure the operators of the irrigation system on site are aware of the relevant procedures as well as safety and sustainability considerations regarding the reuse of alternative water
- 1.2 The existing irrigation system will require an upgrade to enable automation and reduce exposure to system operators

- 1.3 The irrigation controller should be set to ensure irrigation is occurring on the irrigated area at a time that limits exposure to the public as well as provides a 4-hour withholding period
- 1.4 Access to the irrigated area during watering must be restricted. This will require the use of lockable gates and potential separation / coordination of irrigation with the Croquet Club
- 1.5 Signage is required to inform the public that an alternative water supply is being used on site
- 1.6 Metering should be installed to monitor the use of alternative water on the site
- 1.7 The current water supplied to the site is a Class D standard recycled water. Treatment at the site should be considered to ensure a Class B standard (or potentially higher). Given the increased risks associated with recycled water use at the bowls club, this treatment process may also be required if a future scheme is implemented
- 1.8 Replace concrete tank
- 1.9 An alternative water use management plan should be in place to ensure the Euroa Lawn Bowls Club adhere to all the key safety considerations for the use of an alternative water supply.

Priority 2 Projects:

- 2.1 A remote monitoring system should be put in place to provide a simple means to monitor the performance of the irrigation system and recycled water supply on site
- 2.2 The connection of an alternative water supply to site is a priority action, however it is unlikely to be implemented in less than 3 months
- 2.3 A Reclaimed Water Users Agreement should be in place with the club to ensure all the key safety considerations are adhered to on site

Priority 3 Projects:

- 3.1 The introduction of warm season grasses at the Euroa Lawn Bowls Club could reduce water consumption by greater than 10%.

Figure 49 – Euroa Lawn Bowls Facility Design

Euroa Croquet Club

As defined earlier in the report the Euroa Croquet Club currently receives water from a private dam in Euroa, which is delivered by a water tanker to site. The maximum water demand for the site is 1ML/year.

Drought Resilience Assessment

The findings of drought resilience assessment for the Euroa Croquet Club is summarised in Table 8. It reviews the available water sources to meet the irrigation demands for the site which includes:

The drought resilience assessment for the Euroa Croquet Club, reviewed the available water sources to meet the irrigation demands for the site. Through this assessment the following water sources were investigated:

- Dam water tankered to site, which is the current water supply used for irrigation
- Groundwater, which was previously supplied to the site from the Turnbull Street Groundwater system
- Stormwater harvested from the Gobur Street Drain
- Rainwater harvested from the Croquet Clubrooms
- Recycled Water provided from the Euroa WMF as part of a whole of township recycled water system.

The current water balance for the site is presented in Figure 50.

Figure 50 – Euroa Croquet Club Water Balance Summary

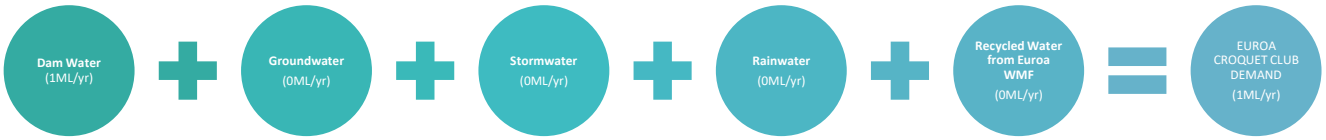


Table 8 – Euroa Croquet Club drought resilience & water risk assessment summary

Alternative Water Supplies Assessments	Water Tanker* (Dam Water)	Groundwater	Stormwater	Rainwater	Recycled Water (Class B)
Harvestable volume (est.) – ML/year	1	0	>1	0	>1
Long term viability	✗	✗	✓	✗	✓
Environmental risks	LOW-MED		LOW-MED		LOW-MED
Human health risks	HIGH		MED		MED
Soil risks	LOW		LOW		LOW
Infrastructure risks	LOW		MED		LOW

* defines current water supply for the site

Key findings from the drought resilience and water risk assessment are provided below:

Water Supply Options

- Euroa Croquet Club has historically relied on water supplied from the Strathbogie Shire Council Groundwater system, however in recent months this supply has been disconnected
- The current water source (dam water tankered to site) is not a long-term sustainable option given:
  - The financial and environmental costs (through increased emissions) incurred to cart the water to site, which includes multiple deliveries a day during peak irrigation period
  - The community perception of this practice continuing for an extended period

- Based on water quality sampling of this raw water source, it does not meet Class D recycled water standards. This risk should be noted given a recycled water of this quality is not suitable for irrigation of municipal public open space (EPA, 2003)
- Rainwater cannot provide sufficient water to meet current water demands, therefore the risks associated with these water source has not been assessed
- Based on the findings of the groundwater assessment detailed earlier in the report (see Figure 4), groundwater does not meet beneficial reuse requirements. Through anecdotal information provided by stakeholders, this supply is also not able to meet current water demands
- The Gobur Street Stormwater Harvesting Scheme could supply treated stormwater for irrigation purposes to several sites including the Euroa Croquet Club. Further details on this scheme are provided in later sections of the report
- The Euroa Recycled Water Scheme could supply treated wastewater from the WMF for irrigation purposes to several sites including the Euroa Croquet Club. Further details on this scheme are provided in later sections of the report.

Existing Infrastructure

- The storages on site are sufficient to meet the current irrigation demands and a future connection to an alternative water supply
- The Croquet Club has an automatic irrigation system
- There is a 1.5m high wire mesh fence along the northern, western and southern boundaries of the club. There is no fence defining the eastern boundary of the property as it transitions to the Euroa Bowls Club.

Water Risk Assessment

There are two water sources available to the site which include a minimum of Class C recycled water from the Euroa WMF and stormwater. The risks associated with these two water sources are as defined above for the Friendlies Society Oval.

Improvement to Water Management Practices

Alternative water supplies available for the site include:

- Class C minimum recycled water from the Euroa WMF, supplied through a holistic township recycled water scheme
- A precinct-based stormwater harvesting and reuse scheme that could divert water from the Gobur Street drain before it discharges into the Sevens Creek.

Both of these schemes are deemed viable options that would require further investigation to confirm technical viability, required environmental approvals and costs. These schemes are further defined in the township and precinct alternative water solutions section of the report.

Facility Design

The following section of the reports provides the prioritised actions recommended for implementation at the Euroa Croquet Club to improve the drought resilience, safety and water management practices.

The key actions associated with the facility design for the Euroa Croquet Club are presented in Figure 51 and include:

Priority 1 Projects:

- 1.1 Educational programs to ensure the operators of the irrigation system on site are aware of the relevant procedures as well as safety and sustainability considerations regarding the reuse of alternative water
- 1.2 The irrigation controller should be set to ensure irrigation is occurring on the irrigated area at a time that limits exposure to the public as well as provides a 4-hour withholding period
- 1.3 Access to the irrigated area during watering must be restricted. This will require the use of lockable gates and potential separation / coordination of irrigation with the Lawn Bowls Club

- 1.4 Signage is required to inform the public that an alternative water supply is being used on site
- 1.5 Metering should be installed to monitor the use of alternative water on the site
- 1.6 The current water supplied to the site is a Class D standard recycled water. Treatment at the site should be considered to ensure a Class C standard
- 1.7 An alternative water use management plan should be in place to ensure the Euroa Croquet Club adhere to all the key safety considerations for the use of an alternative water supply.

Priority 2 Projects:

- 2.1 A remote monitoring system should be put in place to provide a simple means to monitor the performance of the irrigation system and recycled water supply on site
- 2.2 The connection of an alternative water supply to site is a priority action, however it is unlikely to be implemented in less than 3 months
- 2.3 A Reclaimed Water Users Agreement should be in place with the club to ensure all the key safety considerations are adhered to on site.

Priority 3 Projects:

- 3.1 The introduction of warm season grasses at the Euroa Bowls Club could reduce water consumption by greater than 10%.

Figure 51 - Euroa Croquet Club Facility Design

Euroa Arboretum

As defined earlier in the report the Euroa Arboretum currently harvests stormwater from an onsite dam. The maximum water demand for the site is 11ML/year.

Drought Resilience Assessment

The findings of drought resilience assessment for the Euroa Arboretum is summarised in Table 9. It reviews the available water sources to meet the irrigation demands for the site which includes:

The drought resilience assessment for the Euroa Arboretum, reviewed the available water sources to meet the irrigation demands for the site. Through this assessment the following water sources were investigated:

- Groundwater from sources local to the Euroa Arboretum
- Stormwater harvested from the onsite pond
- Rainwater harvested from the buildings within the plant nursery
- Recycled water provided from the Euroa WMF as part of a whole of township recycled water system.

The current water balance for the site is presented in Figure 52.

Figure 52 – Euroa Arboretum Water Balance Summary

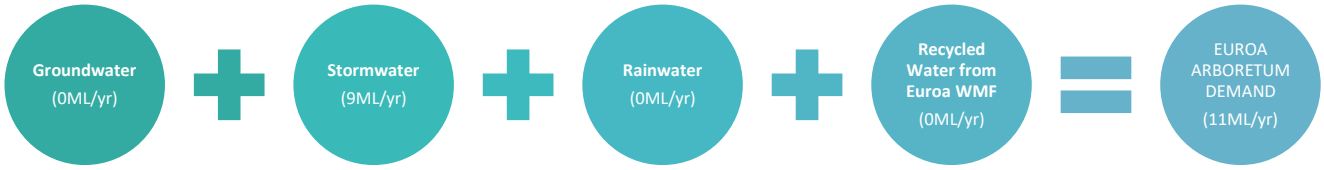


Table 9 – Euroa Arboretum drought resilience & water risk assessment summary

Alternative Water Supplies Assessments	Groundwater	Stormwater	Rainwater	Recycled Water (Class B)
Harvestable volume (est.) – ML/year	0	>11	0	>11
Long term viability	✗	✓	✗	✓
Environmental risks		LOW-MED		LOW-MED
Human health risks		MED		MED
Soil risks		LOW		LOW
Infrastructure risks		MED		LOW

* defines current water supply for the site

Key findings from the drought resilience and water risk assessment are provided below:

Water Supply Options

- The Euroa Arboretum relies on stormwater harvesting from a storage dam on their site to meet their current water demands including irrigation and toilet flushing. Currently this water supply is sufficient to meeting current demands
- Rainwater cannot provide sufficient water to meet current water demands, therefore the risks associated with this water source has not been assessed

- Based on the findings of the groundwater assessment detailed earlier in the report (see Figure 4), groundwater does not meet beneficial reuse requirements. Through anecdotal information provided by stakeholders, this supply is also not able to meet current water demands
- The Euroa Recycled Water Scheme could supply treated wastewater from the WMF for irrigation purposes to several sites including the Euroa Arboretum. Further details on this scheme are provided in later sections of the report.

Existing Infrastructure

- The above ground storages within the plant nursery are sufficient to meet the current irrigation demands and a potential future connection to an alternative water supply. However, there are sections of reticulation system throughout the Arboretum that is due for upgrade
- The Arboretum has an automatic irrigation system
- There is a 2.0m high chain wire mesh surrounding the plant nursery area.

Water Risk Assessment

The two available water sources available to the site include a minimum Class C recycled water from the Euroa WMF and the existing stormwater supply.

The risks associated with these two water sources for the Euroa Arboretum are as defined below:

Human Health

- A water quality analysis of the water current used at the Euroa Arboretum suggests that it only conforms to a Class B standard of recycled water (as outlined in Water Quality Sampling section of the report)
- According to the all key recycled water guidelines including the Guidelines for Environmental Management – Use of Recycled Water (EPA, 2003) Class B recycled water is suitable for its current use for irrigation with restricted public access, however it is not permitted for toilet flushing.

Environmental Health

- Harvested stormwater – potential environmental impacts on Sevens Creek. Since its construction in the 1990's, the dam would be providing less runoff to the Sevens Creek. Any increase in size of this storage would further impact flows

Soil Health

- The water used at the Arboretum provides no significant risks for soil health with measurements of pH, conductivity, sodium adsorption ration and hardness all within guideline limits.

Improvement to Water Management Practices

An additional water supply that could be considered at the Arboretum in the future is the Class C minimum recycled water from the Euroa WMF, supplied through a holistic township recycled water scheme.
This scheme is deemed viable and would require further investigation to confirm technical viability, required environmental approvals and costs. These schemes are further defined in the township and precinct alternative water solutions section of the report.

Facility Design

The following section of the reports provides the prioritised actions recommended for implementation at the Euroa Arboretum to improve the drought resilience, safety and water management practices.

The key actions associated with the facility design for the Euroa Arboretum are presented in Figure 51 and include:

Priority 1 Projects:

- 1.1 Educational programs to ensure the operators of the irrigation system on site are aware of the relevant procedures as well as safety and sustainability considerations regarding the reuse of alternative water

- 1.2 As per the Euroa Arboretum's existing site practices the irrigation controller should be set to ensure irrigation is occurring on the irrigated area at a time that limits exposure to the public as well as provides a 4-hour withholding period
- 1.3 As per the Euroa Arboretum's existing site practices access to the irrigated area during watering must be restricted with lockable gates
- 1.4 Signage is required to inform the public that an alternative water supply is being used on site
- 1.5 Metering should be installed to monitor the use of alternative water on the site
- 1.6 Use of the existing water supply for non-potable uses beyond irrigation is outside of the alternative water use guidelines. Further treatment of the existing water supply is required to enable its use for toilet flushing
- 1.7 An alternative water use management plan should be in place to ensure the Euroa Arboretum adhere to all the key safety considerations for the use of an alternative water supply
- 1.8 A remote monitoring system should be put in place to provide a simple means to monitor the performance of the irrigation system and alternative water supply on site

Priority 2 Projects:

- 2.1 The connection of an alternative water supply to site is a priority action, however it is unlikely to be implemented in less than 3 months
- 2.2 A Reclaimed Water Users Agreement should be in place with the sites Committee of Management to ensure all the key safety considerations are adhered to on site.

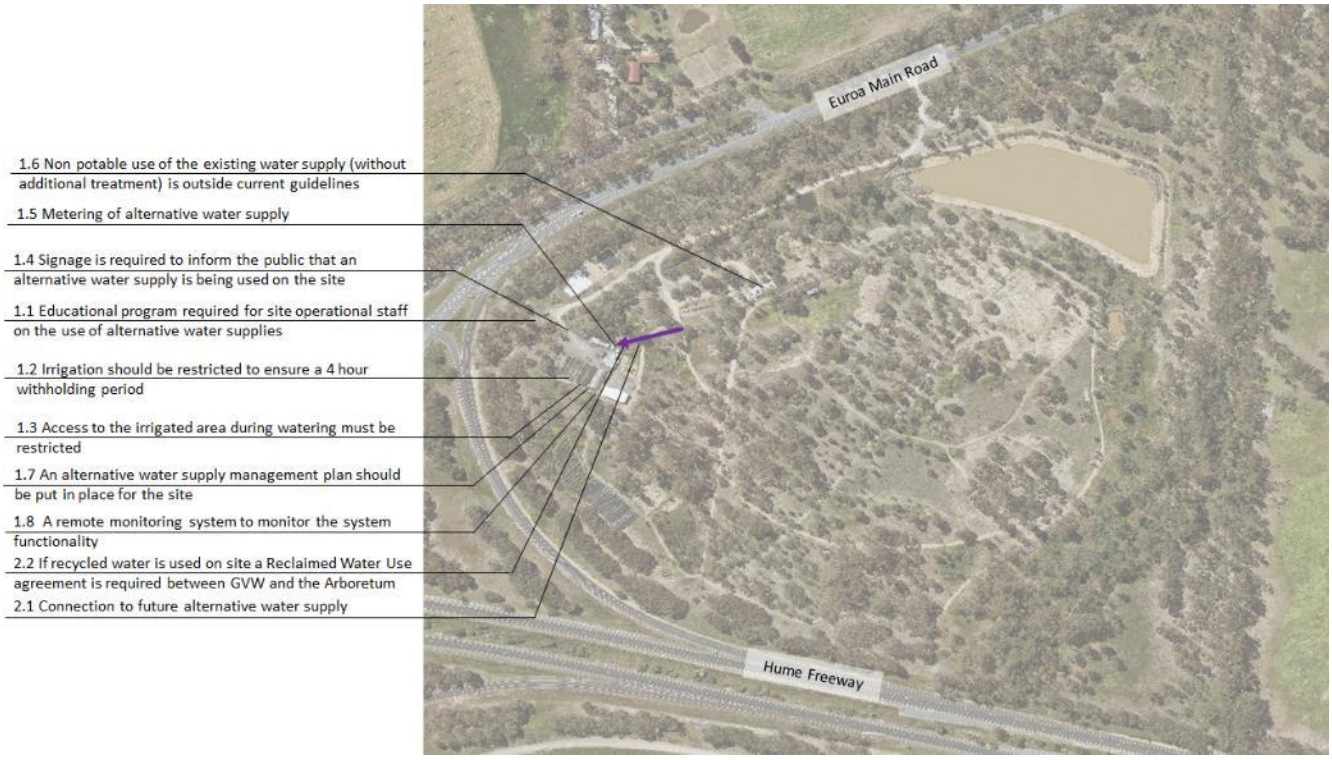


Figure 53 – Euroa Arboretum Facility Design

St Johns Primary School

As defined earlier in the report the St Johns Primary School does not currently irrigate their sports oval. However, in recent years they had been using a groundwater supply using an onsite pump. The maximum water demand estimated for the site is 3ML/year.

Drought Resilience Assessment

Table 10 below summarises the drought resilience and water risk assessment for the St Johns Primary School.

The drought resilience assessment for St Johns Primary School, reviewed the available water sources to meet the irrigation demands for the site. Through this assessment the following water sources were investigated:

- Groundwater from sources local to the St Johns Primary School
- Stormwater harvested from the Blackwood Lane Drain
- Rainwater harvested from the St Johns Primary School buildings
- Recycled water provided from the Euroa WMF as part of a whole of township recycled water system.

The current water balance for the site is presented in Figure 54.

Figure 54 – St Johns Primary School Water Balance Summary

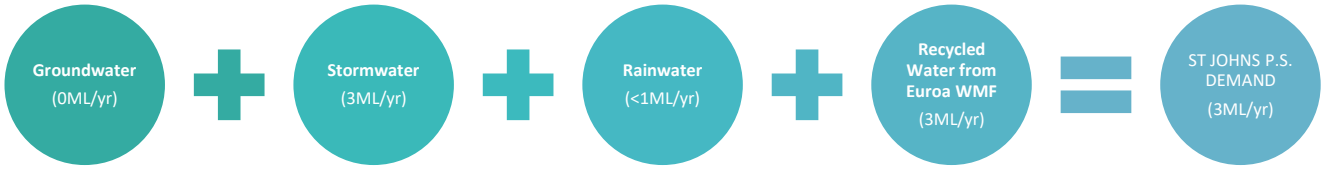


Table 10 – St Johns Primary School drought resilience & water risk assessment summary

Alternative Water Supplies Assessments	Groundwater	Stormwater	Rainwater	Recycled Water (Class B)
Harvestable volume (est.) – ML/year	0	>3	<1	>3
Long term viability	✗	✓	✗	✓
Environmental risks		LOW-MED		LOW-MED
Human health risks		MED		MED
Soil risks		LOW		LOW
Infrastructure risks		MED		LOW

* defines current water supply for the site

Key findings from the drought resilience and water risk assessment are provided below:

Water Supply Options

- St Johns Primary School has historically relied on water supplied from their onsite groundwater system, however in recent months this supply has been disconnected due to lack of available water
- Rainwater cannot provide sufficient water to meet current water demands, therefore the risks associated with this water source has not been assessed
- Based on the findings of the groundwater assessment detailed earlier in the report (see Figure 4), groundwater does not meet beneficial reuse requirements.

- The Blackwood Lane Drain Stormwater Harvesting Scheme could supply treated stormwater for irrigation purposes to several sites including St Johns Primary School. Further details on this scheme are provided in later sections of the report
- The Euroa Recycled Water Scheme could supply treated wastewater from the WMF for irrigation purposes to several sites including the St Johns Primary School. Further details on this scheme are provided in later sections of the report.

Existing Infrastructure

- The storages on site are sufficient to meet future irrigation demands and a future connection to an alternative water supply
- St Johns Primary has an automatic irrigation system and groundwater pump
- 2.0-3.0m high colourbond and chain wire mesh fencing surrounds the property.

Water Risk Assessment

There are two water sources available to the site include a minimum of Class C recycled water from the Euroa WMF and stormwater. The risks associated with these two water sources are as defined above for the Friendlies Society Oval.

Improvement to Water Management Practices

Alternative water supplies available for the site include:

- Class C minimum recycled water from the Euroa WMF, supplied through a holistic township recycled water scheme
- A precinct-based stormwater harvesting and reuse scheme that could divert water from the Blackwood Lane drain before it discharges into the Sevens Creek.

Both of these schemes are deemed viable options that would require further investigation to confirm technical viability, required environmental approvals and costs. These schemes are further defined in the township and precinct alternative water solutions section of the report.

Facility Design

The following section of the reports provides the prioritised actions recommended for implementation at the St Johns Primary School to improve the drought resilience, safety and water management practices.

The key actions associated with the facility design for the St Johns Primary School are presented in Figure 51 and include:

Priority 2 Projects:

- 2.1 The connection of an alternative water supply to site is a priority action, however it is unlikely to be implemented in less than 3 months
- 2.2 If recycled water is used on site, a Reclaimed Water Users Agreement should be in place with the school to ensure all the key safety considerations are adhered to on site
- 2.3 Educational programs to ensure the operators of the irrigation system on site are aware of the relevant procedures as well as safety and sustainability considerations regarding the reuse of alternative water supplies
- 2.4 The irrigation controller should be set to ensure irrigation is occurring on the irrigated area at a time that limits exposure to the public as well as provides a 4-hour withholding period
- 2.5 Access to the irrigated area during watering must be restricted with lockable gates
- 2.6 Signage is required at the site to inform the public that alternative water is being used
- 2.7 Regrading, top soiling and planting of drought proof grasses on oval
- 2.8 Metering should be in place to monitor the use of alternative water on site
- 2.9 If harvested stormwater is used on site an alternative water use management plan should be in place to ensure the St Johns Primary School adhere to all the key safety considerations for the use of an alternative water supply.

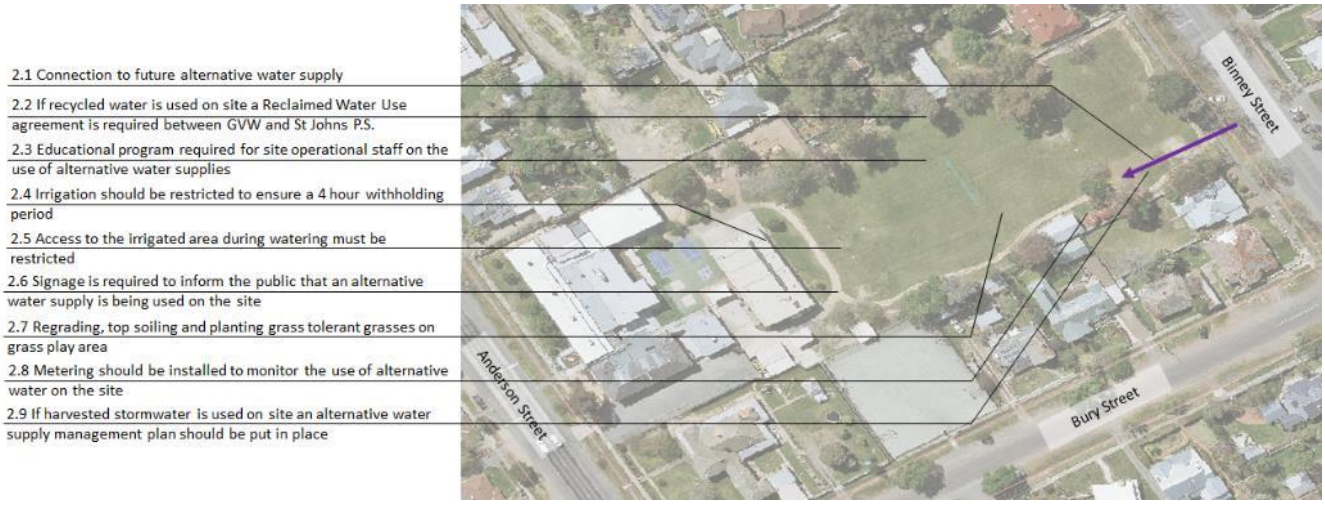


Figure 55 – St Johns Primary School Facility Design

Euroa Primary School

As defined earlier in the report the Euroa Primary School does not currently irrigate their sports oval. The maximum water demand estimated for the site is 4ML/year.

Drought Resilience Assessment

Table 11 below summarises the drought resilience and water risk assessment for the Euroa Primary School.

The drought resilience assessment for Euroa Primary School, reviewed the available water sources to meet the irrigation demands for the site. Through this assessment the following water sources were investigated:

- Groundwater from sources local to the Euroa Primary School
- Stormwater harvested from Blackwood Lane Drain
- Rainwater harvested from Euroa Primary School buildings
- Recycled water provided from the Euroa WMF as part of a whole of township recycled water system.

The current water balance for the site is presented in Figure 56.

Figure 56 – Euroa Primary School Water Balance Summary

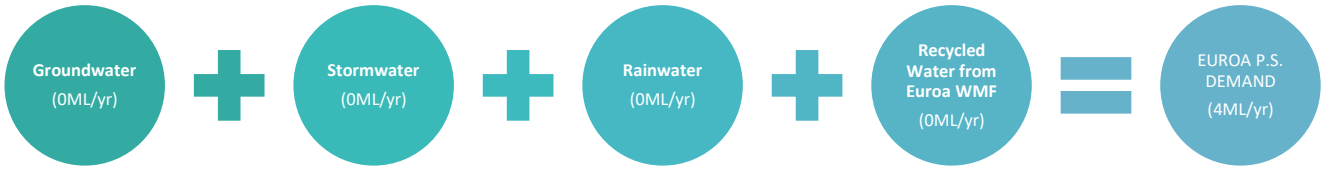


Table 11 – Euroa Primary School drought resilience & water risk assessment summary

Alternative Water Supplies Assessments	Groundwater	Stormwater	Rainwater	Recycled Water (Class B)
Harvestable volume (est.) – ML/year	0	>4	<1.5	>4
Long term viability	✗	✓	✗	✓
Environmental risks		LOW-MED		LOW-MED
Human health risks		MED		MED
Soil risks		LOW		LOW
Infrastructure risks		MED		LOW

* defines current water supply for the site

Key findings from the drought resilience and water risk assessment are provided below:

Water Supply Options

- Rainwater cannot provide sufficient water to meet current water demands, therefore the risks associated with this water source has not been assessed
- Based on the findings of the groundwater assessment detailed earlier in the report (see Figure 4), groundwater does not meet beneficial reuse requirements.
- The Blackwood Lane Drain Stormwater Harvesting Scheme could supply treated stormwater for irrigation purposes to several sites including Euroa Primary School. Further details on this scheme are provided in later sections of the report

- The Euroa Recycled Water Scheme could supply treated wastewater from the WMF for irrigation purposes to several sites including the Euroa Primary School. Further details on this scheme are provided in later sections of the report.

Existing Infrastructure

- There is no infrastructure on site to support the use of alternative water for irrigation on the Euroa Primary School site
- A 1.5m chain wire mesh fencing surrounds the property.

Water Risk Assessment

There are two water sources available to the site which include a minimum of Class C recycled water from the Euroa WMF and stormwater. The risks associated with these two water sources are as defined above for the Friendlies Society Oval.

Improvement to Water Management Practices

Alternative water supplies available for the site include:

- Class C minimum recycled water from the Euroa WMF, supplied through a holistic township recycled water scheme
- A precinct-based stormwater harvesting and reuse scheme that could divert water from the Blackwood Lane drain before it discharges into the Sevens Creek.

Both of these schemes are deemed viable options that would require further investigation to confirm technical viability, required environmental approvals and costs. These schemes are further defined in the township and precinct alternative water solutions section of the report.

Facility Design

The following section of the reports provides the prioritised actions recommended for implementation at the Euroa Primary School to improve the drought resilience, safety and water management practices.

The key actions associated with the facility design for the Euroa Primary School are presented in Figure 57 and include:

Priority 2 Projects:

- 2.1 The connection of an alternative water supply to site is a priority action, however it is unlikely to be implemented in less than 3 months
- 2.2 If recycled water is used on site a Reclaimed Water Users Agreement should be in place with the school to ensure all the key safety considerations are adhered to on site
- 2.3 Educational programs to ensure the operators of the irrigation system on site are aware of the relevant procedures as well as safety and sustainability considerations regarding the reuse of alternative water supplies
- 2.4 The irrigation controller should be set to ensure irrigation is occurring on the irrigated area at a time that limits exposure to the public as well as provides a 4-hour withholding period
- 2.5 Access to the irrigated area during watering must be restricted with lockable gates
- 2.6 Signage is required at the site to inform the public that alternative water is being used
- 2.7 Regrading, top soiling and planting of drought proof grasses on oval
- 2.8 Metering should be in place to monitor the use of alternative water on site
- 2.9 If harvested stormwater is used on site an alternative water use management plan should be in place to ensure the Euroa Primary School adhere to all the key safety considerations for the use of an alternative water supply.

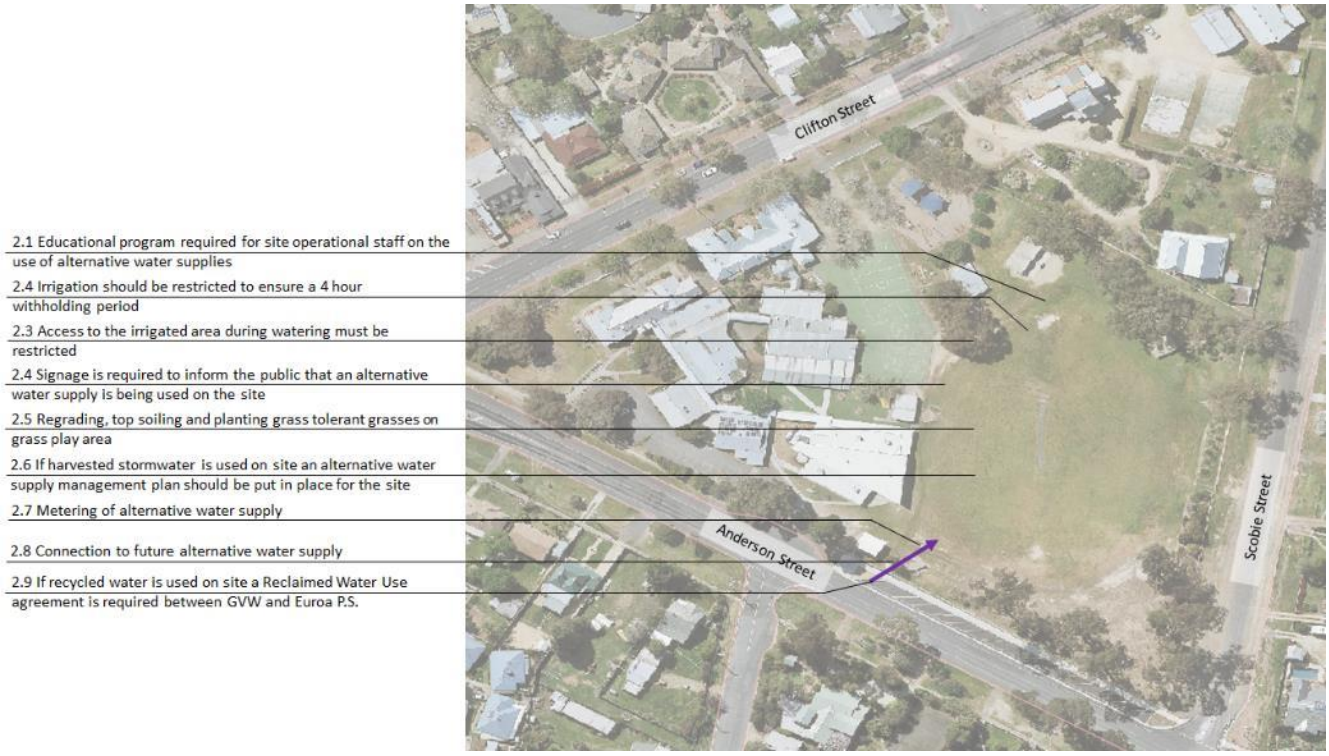


Figure 57 – Euroa Primary School Facility Design

Euroa Secondary College

As defined earlier in the report the Euroa Secondary College does not currently irrigate their sports oval. The maximum water demand estimated for the site is 5ML/year.

Drought Resilience Assessment

Table 12 below summarises the drought resilience and water risk assessment for the Euroa Secondary College.

The drought resilience assessment for Euroa Secondary College, reviewed the available water sources to meet the irrigation demands for the site. Through this assessment the following water sources were investigated:

- Groundwater from sources local to the Euroa Secondary College
- Stormwater harvested from Blackwood Lane Drain
- Rainwater harvested from Euroa Secondary College buildings
- Recycled Water provided from the Euroa WMF as part of a whole of township recycled water system.

The current water balance for the site is presented in Figure 58.

Figure 58 – Euroa Secondary College Water Balance Summary

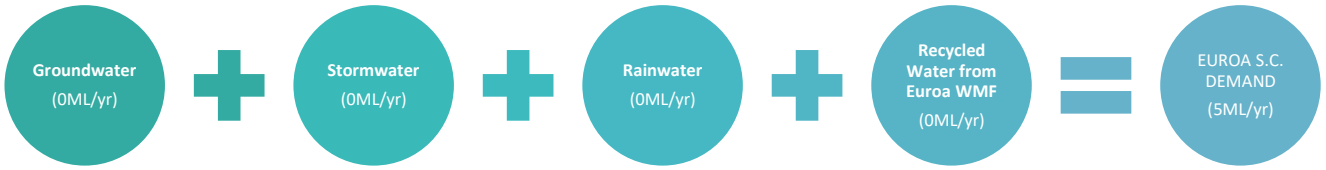


Table 12 – Euroa Secondary College drought resilience & water risk assessment summary

Alternative Water Supplies Assessments	Groundwater	Stormwater	Rainwater	Recycled Water (Class B)
Harvestable volume (est.) – ML/year	0	>5	<1.5	>5
Long term viability	✗	✓	✗	✓
Environmental risks		LOW-MED		LOW-MED
Human health risks		MED		MED
Soil risks		LOW		LOW
Infrastructure risks		MED		LOW

* defines current water supply for the site

Key findings from the drought resilience and water risk assessment are provided below:

Water Supply Options

- Rainwater cannot provide sufficient water to meet current water demands, therefore the risks associated with this water source has not been assessed
- Based on the findings of the groundwater assessment detailed earlier in the report (see Figure 4), groundwater does not meet beneficial reuse requirements.
- The Blackwood Lane Drain Stormwater Harvesting Scheme could supply treated stormwater for irrigation purposes to several sites including Euroa Secondary College. Further details on this scheme are provided in later sections of the report

- The Euroa Recycled Water Scheme could supply treated wastewater from the WMF for irrigation purposes to several sites including the Euroa Primary School. Further details on this scheme are provided in later sections of the report.

Existing Infrastructure

- There is no infrastructure on site to support the use of alternative water for irrigation on the Euroa Secondary College site
- A 1.5m chain wire mesh fencing surrounds the property.

Water Risk Assessment

There are two water sources available to the site include a minimum of Class C recycled water from the Euroa WMF and stormwater. The risks associated with these two water sources are as defined above for the Friendlies Society Oval.

Improvement to Water Management Practices

Alternative water supplies available for the site include:

- Class C minimum recycled water from the Euroa WMF, supplied through a holistic township recycled water scheme
- A precinct-based stormwater harvesting and reuse scheme that could divert water from the Blackwood Lane drain before it discharges into the Sevens Creek.

Both of these schemes are deemed viable options that would require further investigation to confirm technical viability, required environmental approvals and costs. These schemes are further defined in the township and precinct alternative water solutions section of the report.

Facility Design

The following section of the reports provides the prioritised actions recommended for implementation at the Euroa Secondary College to improve the drought resilience, safety and water management practices.

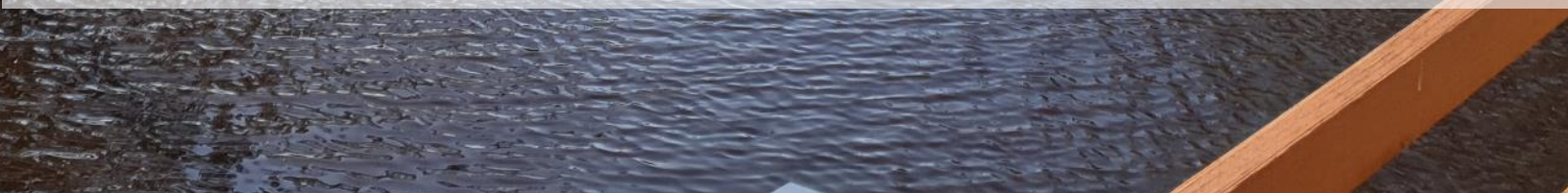
The key actions associated with the facility design for the Euroa Secondary College are presented in Figure 59 and include:

Priority 2 Projects:

- 2.1 Educational programs to ensure the operators of the irrigation system on site are aware of the relevant procedures as well as safety and sustainability considerations regarding the reuse of alternative water supplies
- 2.2 The irrigation controller should be set to ensure irrigation is occurring on the irrigated area at a time that limits exposure to the public as well as provides a 4-hour withholding period
- 2.3 Access to the irrigated area during watering must be restricted with lockable gates
- 2.4 Signage is required at the site to inform the public that alternative water is being used
- 2.5 Regrading, top soiling and planting of drought proof grasses on oval
- 2.6 If harvested stormwater is used on site an alternative water use management plan should be in place to ensure the Euroa Primary School adhere to all the key safety considerations for the use of an alternative water supply
- 2.7 Metering should be in place to monitor the use of alternative water on site
- 2.8 The connection of an alternative water supply to site is a priority action, however it is unlikely to be implemented in less than 3 months
- 2.9 If recycled water is used on site a Reclaimed Water Users Agreement should be in place with the school to ensure all the key safety considerations are adhered to on site.

Figure 59 – Euroa Secondary College Facility Design

TOWNSHIP AND PRECINCT ALTERNATIVE WATER SOLUTIONS



The following section of the report provides concept designs for the township and precinct based on alternative water solutions outlined in the report.

These schemes include:

- Gobur Street Stormwater Harvesting Scheme
- Blackwood Lane Stormwater Harvesting Scheme
- Euroa Recycled Water Scheme – servicing all sites

It should be noted that these recycled water schemes only make provision for water supplies for the priority community green spaces defined in this report. These schemes do not make provision for an alternative water supply to Council green spaces.

Further details of these concepts are provided below including indicative costs, key infrastructure and estimated water supplied from the scheme.

The Indicative capital and operational costs of the schemes below have been banded into the following categories:

- LOW – Less than $1M
- MED – $1M to $2M
- HIGH – $2M to $10M

GOBUR STREET STORMWATER HARVESTING SCHEME

Overview

The Gobur Street Stormwater Harvesting Scheme is proposed to capture runoff from the upstream catchment which has an area of over 30ha. A preliminary water balance assessment of the catchment has estimated that this scheme can provide approximately over 15ML/year, which is sufficient to service the irrigation demands of Friendlies Society Oval, Euroa Tennis Club, Euroa Lawn Bowls Club and Euroa Croquet Club. The scheme would ensure that stormwater flows less than a 1-year ARI (100% AEP) would capture, stored, treated, and reused.

A concept design for this scheme is provided in Figure 60. The key assets within this scheme include:

- A diversion pit located on the Gobur Street Drain, that will direct stormwater to an underground storage
- Underground storage within the Friendlies Society Oval reserve
- A pump station and treatment system to ensure a fit for purpose water quality is achieved for the system
- Over 1km of rising main to distribute the harvested stormwater to storages on the sites noted above

The functionality of this scheme would be such that

Further investigations for this scheme would require:

- A detailed water balance assessment which demonstrates the scheme can achieve 80% security of supply
- Citing and availability of space for key assets
- Planning constraints assessment
- Cost estimate

Summary of Scheme

Capital Cost	Advantages	Disadvantages
MED	• Lower capital cost than recycled water scheme • Improved runoff quantity and quality to Sevens Creek	• Scheme will only achieve 80% security of supply • On average every year, 20% of the time there will be no available water to irrigate the sites noted above
Operational Cost (Annual)		
LOW		

		• Strathbogie Shire Council will be required to maintain and operate the scheme • The scheme will include a treatment system which will require regular maintenance

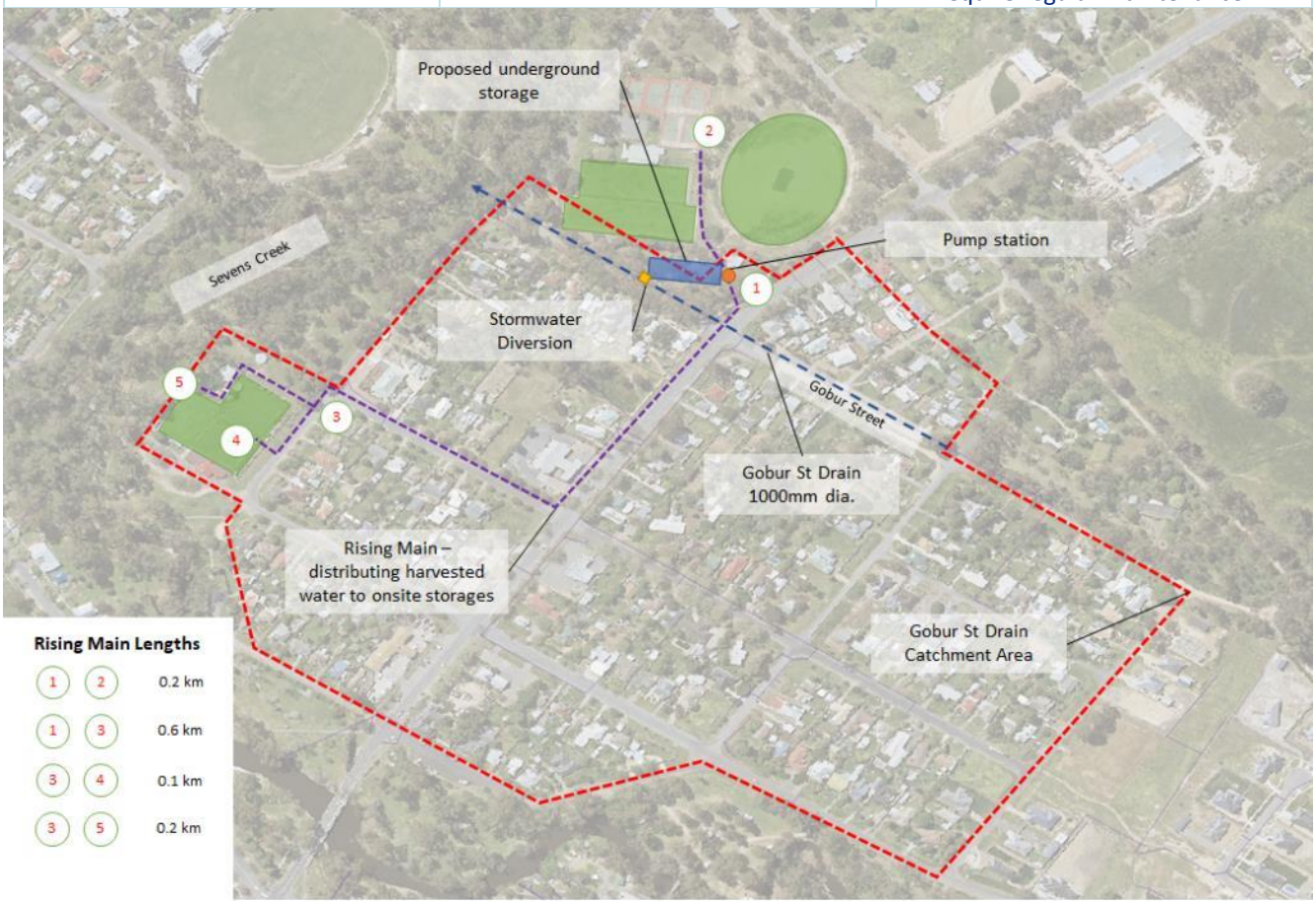


Figure 60 – Gobur Street Stormwater Harvesting Scheme Concept Design

BLACKWOOD LANE STORMWATER HARVESTING SCHEME

Overview

The Blackwood Lane Stormwater Harvesting Scheme is proposed at the future retarding basin. The scheme has the potential to capture runoff from the upstream catchment which has an area of over 60ha.

A preliminary water balance assessment of the catchment has estimated that this scheme can provide approximately over 35ML/year, which is sufficient to service the irrigation demands of St Johns and Euroa Primary Schools, Euroa Secondary School and the Memorial Oval. The scheme would ensure that stormwater flows less than a 1-year ARI (100% AEP) would capture, stored, treated and reused.

A concept design for this scheme is provided in Figure 61. The key assets within this scheme include:

- A diversion pit located on the Blackwood Lane Drain, that will direct stormwater to an above ground storage
- Above ground storage within the base of the proposed retarding basin
- A pump station and treatment system to ensure a fit for purpose water quality is achieved for the system
- Over 3.6km of rising main to distribute the harvested stormwater to storages on the sites noted above

Further investigations for this scheme would require:

- A detailed water balance assessment which demonstrates the scheme can achieve 80% security of supply
- Citing and availability of space for key assets
- Planning and stakeholder approvals constraints assessment
- Cost estimate

Summary of Scheme

Capital Cost	Advantages	Disadvantages
MED **Operational Cost (Annual)** **LOW**	• Lower capital cost than recycled water scheme • Improved runoff quantity and quality to Sevens Creek • The scheme can be integrated into the design and construction of the proposed retarding basin	• Scheme will only achieve 80% security of supply • On average every year, 20% of the time there will be no available water to irrigate the sites noted above • Strathbogie Shire Council will be required to maintain and operate the scheme • The scheme will include a treatment system which will require regular maintenance

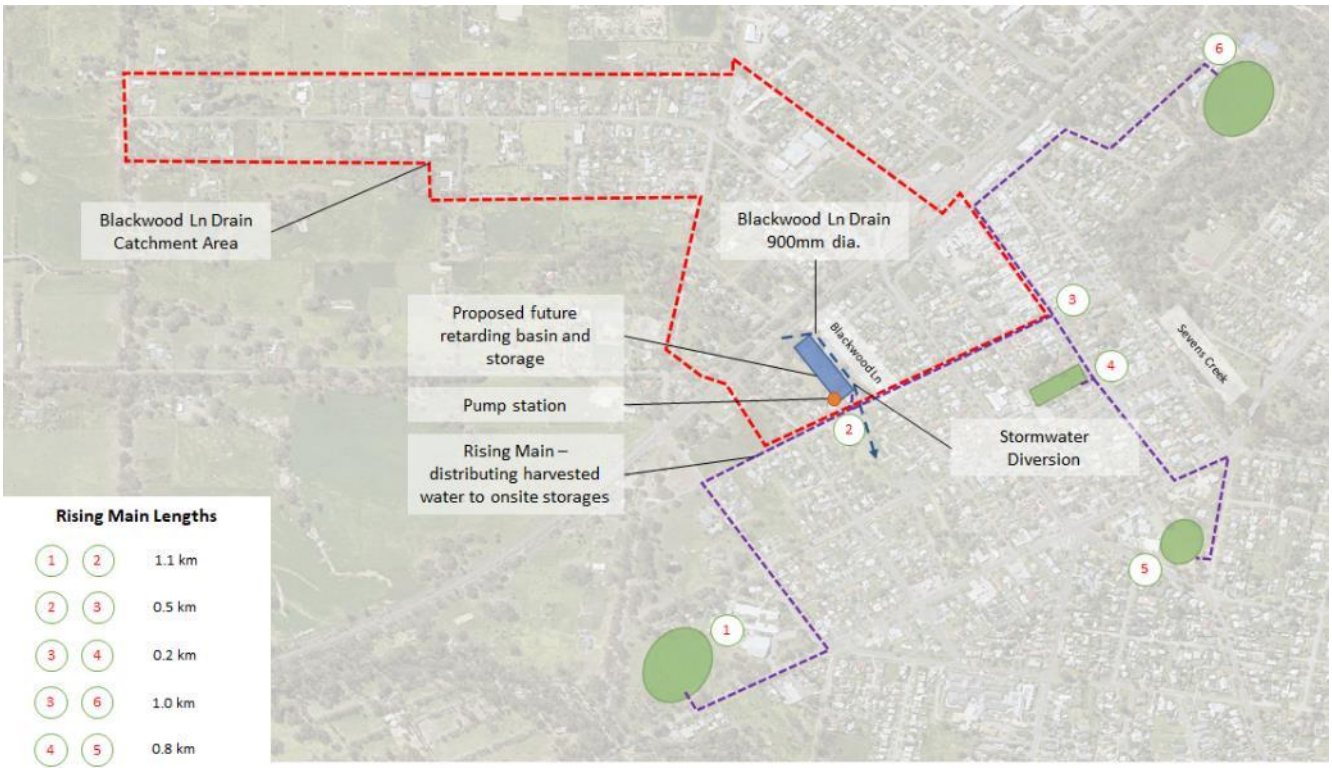


Figure 61 – Blackwood Lane Stormwater Harvesting Scheme Concept Design

EUROA RECYCLED WATER SCHEME

Overview

The Euroa WMF currently treats approximately 350ML/year (on average) of wastewater from the township. Currently 70ML/year is used on the Euroa Golf Course and 200ML/year on farming land. Recently a user pays standpipe has been installed on Golf Course Road which also provides a small volume of water to local users. These existing users will be retained if the scheme is expanded. A future scheme will treat wastewater from the Euroa WMF to a Class B recycled water. This scheme will provide almost 100% security of supply to meet the irrigation demands at all the site within Euroa.

A concept design for this scheme is provided in Figure 62. The scheme construction is proposed such that all sites except the Euroa Arboretum are connected to recycled water in Stage 1. Stage 2 is optional where recycled water is provided to the Euroa Arboretum if the existing alternative water supply system is insufficient to meet future demands.

The key assets within this scheme include:

- Pump station and treatment system at the Euroa WMF site
- The treatment process to achieve a Class C minimum recycled water could include:
    - A process to reduce turbidity (sedimentation and filtration) to allow the disinfection process to be effective
    - Ultraviolet light disinfection or chlorination (calcium or sodium hypochlorite dosing) to maintain a free chlorine residual of 0.5 mg/L.
- Leveraging the existing supply network to the Euroa Golf Course
- Depending in the suitability of the existing network, potentially over 7.3km of rising main will be required to distribute the recycled water to storages on the sites noted above.

Further investigations for this scheme would require:

- Citing and availability of space for key assets
- Confirmation of rising main alignment
- Planning and stakeholder constraints assessment
- Cost estimate
- Business case development and funding

Summary of Scheme

Capital Cost	Advantages	Disadvantages
MED	• Scheme provides almost 100% security of supply • Beneficial reuse of wastewater from WMF • Scheme operated and maintained by GVW • Future scheme will provide Class B water • Future scheme can potential use some of the existing infrastructure in place	• Large capital cost will require funding support • Extensive infrastructure required to support the scheme
Operational Cost (Annual)		
LOW		

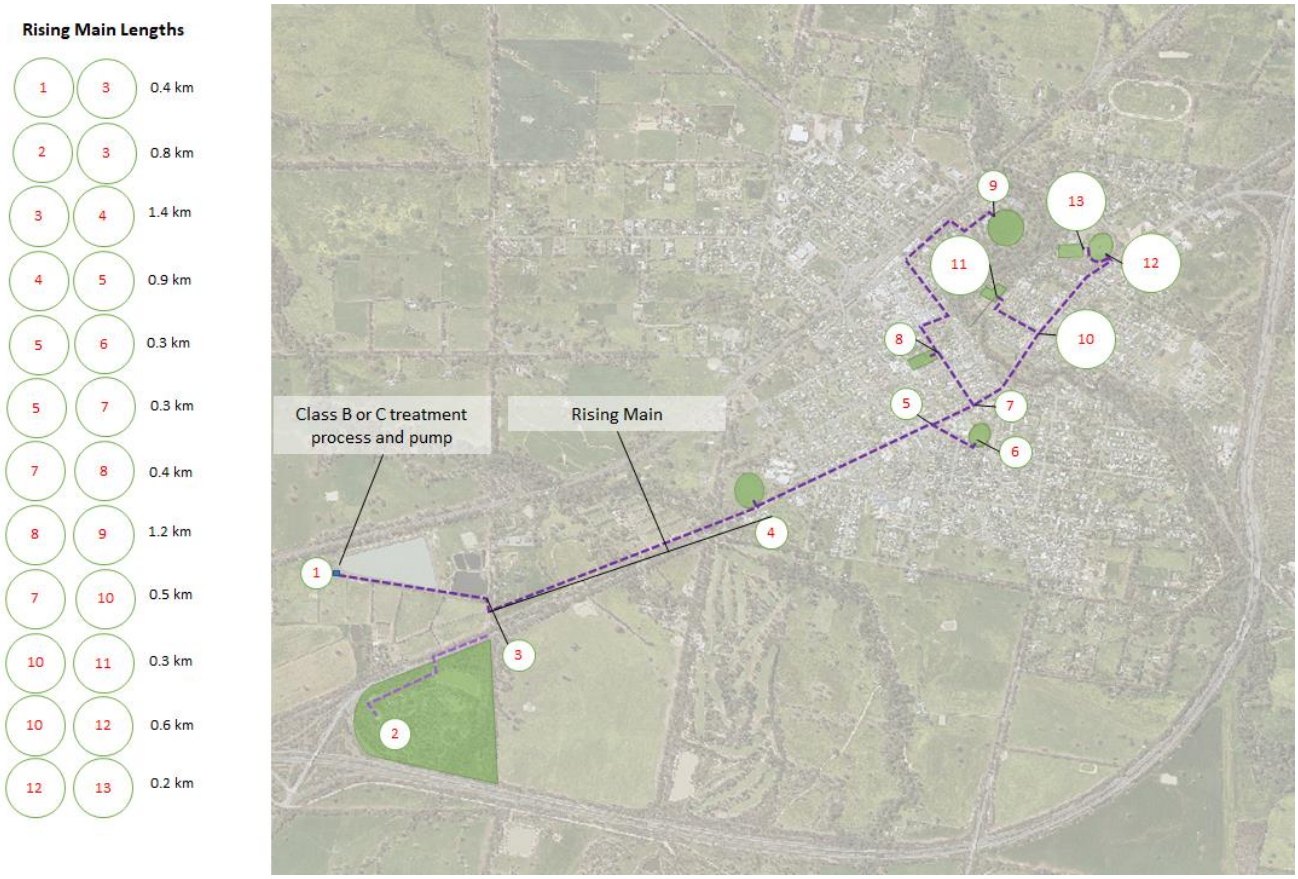


Figure 62 – Euroa Recycled Water Scheme Concept Design

NEXT STEPS

Based on the findings of the Euroa Greening Stage 1 project the following next steps are recommended to progress the project and ultimately ensure an alternative water supply for the key sites within the township:

- Strathbogie Shire Council, GVW and Alliance for Water Stewardship to review the recommendations provided in this report and agree on priority actions
- Project update to stakeholders outlining key findings and next steps
- Based on the findings of this report Strathbogie Shire Council, GVW and Alliance for Water Stewardship to consider next steps to prioritise an alternative water supply for Euroa. This prioritisation will be subject to additional investigation
- Strathbogie Shire Council, GVW assist the lead organisation for each site to seek funding and support implementation of priority actions

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EPA (2003) Guidelines for Environmental Management of Reclaimed Water

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Department of Primary Industries (2014) Primefact 1337 - Farm water quality and treatment

Department of Environment and Resource Management (2009) Irrigation water quality – Salinity and Soil Structure Stability

Goulburn Valley Water (2020) Reclaimed Water Use Agreement

APPENDIX A – WATER QUALITY TESTING RESULTS