Integrated Water Cycle Management Plan
Evaluation Study

VOLUME 1 – Report

April 2010

DLM Environmental Consultants Pty Ltd
Strategies for a Water Efficient Future

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EXECUTIVE SUMMARY

Integrated Water Cycle Management

Integrated Water Cycle Management (IWCM) is a structured process in which water supply, sewerage, stormwater and other relevant water resources are managed in an integrated manner.

The aim of IWCM is to ensure that the maximum value of available water resources is realised, water is used optimally and environmental impacts are minimised in ways which are consistent with broader catchment and river management objectives.

The overall Objectives of this Evaluation Study are:

- To clearly identify the relevant "catchment" context within which the urban water service is to be provided
- To identify the targets of the LWU by considering all licences and management documents
- To audit available data and information to confirm compliance with targets
- To identify, describe and scope any additional data/information requirements, that is, any missing data to confirm compliance with targets
- To assess how well the water cycle management systems (water supply, sewerage and stormwater systems) in Griffith are performing against targets
- To identify key water cycle issues in Griffith where there are non-compliances against targets
- To identify and assess existing actions, programs and/or commitments which adequately address any issues raised.(the Business as Usual (BaU) scenario)
- To assess likely main actions required and timing to determine if a simple or detailed strategy is likely.

Targets and Obligations

A number of plans, strategies, initiatives and legislative requirements which impose obligations, tasks and responsibilities on the water businesses of Griffith City Council have been addressed, including:

- The Australian Drinking Water Guidelines
- The Murrumbidgee Water Sharing Plan – water supply entitlements and allocations
- Licences – for the Griffith and Yenda Sewage Treatment Plants
- A range of Acts and Regulations
- Council's Management, Business and Strategic Plans

Catchment & Water Resource Considerations

The evaluation has considered Griffith in the context of the catchment (the Lower Murrumbidgee sub-catchment of the broader Murrumbidgee Catchment).

Current Urban Water Systems

The Study has also addressed water availability, impacts of drought and land uses in the context of the existing water supply, sewerage and stormwater services provided by Council.

Methodology

The methodology employed for the Study, involved:

- establishment of a Project Steering Committee and a Project Reference Group;
- assemblage of relevant information and data from Council, Government Departments, Murrumbidgee Irrigation and Murrumbidgee CMA.

Audit of Data to Identify Issues

Data was complied and assessed for adequacy and suitability in determining Council's compliance with its targets and obligations.

IWCM Issues

IWCM Issues are defined as failures of Council to meet its service obligations now and/or over the 30 year planning horizon of the Evaluation Study.

Issues were identified via a detailed review of Council's data and information, water demand analysis and community consultation through the Project Reference Group involving stakeholders and community representatives. From this, a number of issues were identified as well as actions recommended to address them. These are discussed in Section 7 of this Report.

The Issues were analysed to assess whether they have been or are being addressed by formally resolved actions, contracts or committed capital works projects – the "Business as Usual" (BaU) Scenario.

For those Issues not addressed by BaU, the question as to whether a Simplified or Detailed IWCM Strategy is required was determined on the basis of whether significant capital works will be needed within the next 10 years.

The identified Issues are listed below:

a. IWCM URBAN ISSUES

No.	IWCM Issue	Comments/Recommended Actions	Required Strategy
1.	Biosolids Management Council does not have a long term strategy for biosolids management	Council has significant land areas available and intends to continue anaerobic digestion, air drying and spreading onsite. (Approximately 1000 tonnes is processed annually) The REF for the new plant proposed that sludge disposal continue onsite.	BaU
2.	Population Growth Is a population growth rate of 0.7% pa appropriate for Griffith?	A report commissioned by Council (the McCrindle Report) projected growth rates of approximately 1.4% pa. Council has adopted a growth rate of 0.7% pa; which is more in line with Department of Planning Projections to 2036. Council will review the growth projections after the 2011 Census.	BaU
3.	Environmentally Sensitive Areas Potential for pollution of environmentally sensitive areas	Council has water and wastewater monitoring programs in place and is subject to compliance under the POEO Act and Health Act.	BaU
4.	Water Supply Assets A high percentage of distribution and rectification pipework is at or older than 30 years	Council has an asset replacement and renewal program in place and is developing an Asset Management Plan (to be completed in 2011)	Simplified
5.	Sewerage to Villages Lake Wyangan (60ET), Nericon (40ET) and Tharbogang (40ET) are predicted to grow. These Villages are not currently sewered`	Council's forward planning has identified the need to provide sewerage to these Villages with implementation planned for: - Lake Wyangan: Reticulation provided in 2009; Connection: 2013/14 - Nericon: Provision: 2013/14 - Tharbogang: Provision: 2018/19	Simplified
6.	Pollution Reduction Program Compliance with more stringent discharge conditions under PRP issued by DECCW	Council is proceeding to develop a new MBR Treatment Plant, with construction scheduled to commence in August 2010	BaU

No.	IWCM Issue	Comments/Recommended Actions	Required Strategy
7.	Algae in Maturation Lagoons Carry over of algae in discharge from the Maturation Lagoons	This will not be an issue upon commissioning of the new MBR Plant	BaU
8.	Sewerage Assets Sewerage assets are aging	Sufficient annual expenditure is being directed to asset replacement. Council is preparing an overall Water Supply and Sewerage Asset Management Plan (refer No.4 above)	Simplified
9.	Secure Yield – Climate Change Impacts Office of Water/CSIRO Climate Change models predict: • average surface availability may reduce by up to 9% by 2030 • "best" estimate of change in rainfall (from historical) is a reduction of 4% • runoff may reduce by 1% • groundwater extraction is predicted to increase by around 22%, to become 21% of total average use	It is recommended that Council determine "secure yield" and identify potential back up supplies from groundwater as well as developing targets for securing water from alternative sources (eg improved uptake of rainwater tanks and or recycling).	Simplified
10.	Demand Management Targets A range of potential demand management options has been identified in the modelling undertaken. Council has not yet adopted Target Water Savings	Council is preparing a Demand Management Strategy and will implement water saving measures with associated targets. Council will consider the Demand Management Plan in 2010	BaU
11.	WTP Upgrade Provision for increasing the capacity of the Water Treatment Plant has been allowed in Council's Capital Works Program for 2023/24. Demand Management modelling has indicated that this could be deferred beyond 2038	Future upgrade timelines will be evaluated when the proposed demand management initiatives are completed and assessed	Simplified

No.	IWCM Issue	Comments/Recommended Actions	Required Strategy
12.	TBL Performance Results (2007/08) A number of issues have been identified from a review of Griffith's service provision performance (based on 2007/08 TBL Performance Reports). These are listed below: a) Water Supply		
	• low residential water charge	Council will review as part of Demand Management Strategy development	Simplified
	• high average duration of interruptions to supply	Due to ageing water supply system. Council will address as part of Asset Management Plan	Simplified
	• annual residential water usage is high	Addressed as part of Demand Management Strategy	Simplified
	• water losses are high	Addressed as part of Demand Management Strategy	Simplified
	b) Sewerage		
	• odour complaints are high on a Statewide basis	Council will investigate sources and implement control strategies	Simplified
	• high suspended solids in effluent	Will be addressed when new MBR Plant is commissioned	BaU
	• Operating costs per property are high	Council will review its processes and analyse data to understand why costs are high	Simplified
	• Pumping costs are high	This is the nature of the topography in Griffith with a larger than normal number of pump stations	BaU
13.	Water Restrictions and Impact on Revenue	Council sets its income/revenue annually. The pricing is based on anticipated lower demands. Prices will continue to be increased in line with demand and the potential impacts of demand management issues	BaU

No.	IWCM Issue	Comments/Recommended Actions	Required Strategy
14.	Long term viability of Lake Wyangan as a raw water back up water source	Water can be transferred to Lake Wyangan from the Canal and stored or transferred to provide off-stream storage. A Management Plan for Lake Wyangan is being developed with Murrumbidgee Irrigation. The strategy will review storage levels	Simplified
15.	Reclaimed water reuse Potential to reduce demand on potable supplies by using reclaimed water for irrigating parks, sporting fields, open space areas, etc	Council is reviewing reuse options. Target date for possible implementation is 2011/12. Incorporated in Council's Demand Management Plan	Simplified
16.	Water Storage Capacity Is there enough storage capacity in service reservoirs?	Current capacity is 55ML or 1.5 times Peak Day Demand	BaU

b. NON-URBAN WATER SERVICING ISSUES

No.	Item	Issue	Relevant Department/Agency for Referral
1.	Flooding App. A: Sections 2 & 4: (Pages A15 & A46)	Problems with existing trunk drainage system to cope with 1/100 year recurrence interval events. System designed for 1:10 year events	Griffith City Council and Murrumbidgee Irrigation
2.	CMA Targets: App. A: Section 2: (Page A17)	A number of the Murrumbidgee CMA's Resource Condition targets impinge on Salinity, Soils, Vegetation, Aquatic Ecosystems etc	Murrumbidgee CMA
3.	Water Quality Objectives: App A: (Page A20)	Achievement of water quality objectives under the NWI. Intergovernmental Agreement on Over Allocation	Murrumbidgee CMA
4.	Water Quality: App. A: (Page A24)	Limited monitoring for pesticides in Little Mirrool Creek has revealed the presence of pesticides (low concentration).	Murrumbidgee Irrigation Limited

Data Gaps

Where insufficient or inadequate information and/or data was available to identify IWCM Issues, data gaps have been identified and recommended actions to address them.

Recommendations

It is recommended that Griffith City Council develop a Simplified Strategy within the next 10 years, involving:

- development of an asset replacement and renewal program to be adopted and endorsed by Council, to replace aging water supply and sewerage infrastructure; such renewal programs to be based on age of assets, materials and condition assessments.

- determination of a secure water supply source yield including identification of back up supplies of groundwater; developing targets for implementation of demand management measures; and sourcing water from alternative sources.

- determination of timelines for upgrade of the Water Treatment Plant, based on assessment of the impacts on usage of implemented demand management measures and review of population growth.

- investigation and development of strategies to address:
  a. Water Supply
     - low residential water charges
     - high average durations of supply interruptions
     - high residential water consumption
     - unaccounted for water and system leakage/losses
     - water business operating costs.

  b. Sewerage
     - number of odour complaints
     - sewerage business operating costs.

- implementation of sewerage services to the villages of Lake Wyangan, Nericon and Tharbogong.

- investigation of the long term viability of Lake Wyangan as a backup raw water supply source.

- investigation and development of strategies for the reuse of reclaimed water.

ACKNOWLEDGEMENTS

This Evaluation Study has been prepared with the considerable assistance of the Group Manager Water and Sewer, David Tull at Griffith City Council, and his staff.

Input provided by members of the Steering Committee and Project Reference Group is also gratefully acknowledged.

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Tables

Figures

Attachments

The Evaluation Study is presented in two Volumes

Volume 1: Evaluation Study Report

Volume 2: **Appendices containing Technical and Supporting Information.**

These Appendices represent detailed assessments of Griffith's Water Supply and Sewerage Services.

The Appendices are listed below:

Appendix A**:** Urban Water Services in Griffith
Appendix B: Griffith System Boundaries
Appendix C: Demand Management and Projections
Appendix D: Information and Data Assessment
Appendix E: IWCM Related Targets, Obligations, Responsibilities and Requirements
Appendix F: IWCM and Other Issues
Appendix G: Glossary and Abbreviations

1. INTRODUCTION

1.1 BACKGROUND & GENERAL

Griffith City Council covers an area of 1,600 square kilometres and is located in the Murrumbidgee Irrigation Area (MIA).

The City of Griffith itself has a population of nearly 16,000 and is located in the Riverina region of NSW, 570 kilometres by road from Sydney. Some small towns and villages within the City are Yenda, Bilbul, Yoogali, Widgelli, Lake Wyangan, Hanwood, Beelbangera, Tharbogang and Warburn.

Water Supply

Griffith City Council provides water supply services to a population of 22,000 (9,540 assessments), with potable supplies from the Griffith and Yenda water Treatment Plants.
Raw water supply for the City is provided by Murrumbidgee Irrigation's Main Northern Canal.
Water from the Canal is delivered to a 300 ML in ground storage (Hayes Lease Lagoon) for supply to the Griffith Filtration Plant and to 18 ML storage at the Yenda Plant.

Council also operates a raw water supply system for use on Council owned parks and gardens, schools, golf course and airport irrigation at Griffith.
Yenda has a full dual supply to the residential and business area of the Village

The potable water supply system comprises:

- Griffith WTP (Dissolved Air Flotation): Capacity: 60 ML/d
- Yenda WTP (Microfiltration): Capacity: 2 ML/d
- 4 Service Reservoirs (Capacity: 55 ML)
- 1 Pump Station (Capacity: 63 ML/d)
- 50 Kms of transfer and trunk supply mains
- 433 Kms of trunk reticulation mains.

Yenda is provided with a dual supply system (both raw and filtered (potable) supplies).

Sewerage

Council provides sewerage services to a population of 21,000 (7,790 assessments) in Griffith, Yenda and Bilbul.
There are three (3) Treatment Plants:

Griffith STP:

- Trickling Filter (Secondary Treatment)
- Built in 1992
- Capacity: 65,000 EP

Note: Council is building a new MBR (capacity 65,000 + EP Biological capacity), to replace the existing Plant, as required by the PRP issued by DECCW The current peak biological load is approximately 24,000 EP).

Yenda STP:

- Oxidation Ponds, mechanically aerated
- Built in 1981
- Capacity: 34,000 EP

Bilbul STP:

- Oxidation Pond
- Built in 1990
- 310 EP Capacity

The Griffith and Yenda STPs discharge to Main Drain J, which drains to Mirrool Creek. Bilbul STP discharges to evaporation lagoons.

The overall sewerage system also comprises:

- 29 Pumping Stations (Capacity: 13 ML/d)
- 54 kms of Rising Mains
- 169 kms of Gravity Trunk Mains and Reticulation.

Stormwater

All the urban areas of Griffith LGA (including Griffith, Tharbogang, Yenda, Yoogali, Hanwood, Bilbul and Beelbangera) have stormwater drainage systems.

The drainage systems are within the catchment of the major Murrumbidgee Irrigation main drain "J".

The stormwater discharges to Mirrool Creek which drains to Barren Box Swamp – for storage and water quality improvement.

(Figure B12 in Volume 2: Attachment B shows the drainage system).

1.2 BEST PRACTICE REQUIREMENTS

The NSW Department of Water and Energy (DWE), now the NSW Office of Water, has introduced a range of Best Practice Criteria which Local Water Utilities are required to comply with in order to pay a dividend from the surplus of the water supply and sewerage businesses and for financial assistance under the Country Towns Water Supply and Sewerage Program (CTWS&SP).

There are six (6) Criteria to be complied with, namely:-

- Strategic Business Planning
- Pricing (including Developer Charges, Liquid Trade Waste Policy and Approvals)
- Water Conservation
- Drought Management
- Performance Reporting
- Integrated Water Cycle Management.

Griffith City Council has embraced the concept of Best Practice Management of its water supply and sewerage undertakings and is progressively working towards full compliance with the above criteria.

1.3 INTEGRATED WATER CYCLE MANAGEMENT: DEFINITIONS AND PROCESS

Traditionally, local authorities have managed water supply, sewerage and stormwater drainage systems as separate entities.

Integrated Water Cycle Management (IWCM) is a structured process in which water supply, sewerage, stormwater and other relevant water resources are managed in an integrated manner using a whole – of – water cycle approach.

The aim is to ensure that the maximum value of available water resources is realised, water is used optimally and environmental impacts are minimised in ways which are consistent with broader catchment and river management objectives.

The IWCM approach adopted involves the following five basic principles (as defined in the DEUS (now the Department of Water and Energy) IWCM Guidelines).

1. Consideration of all water sources (including treated effluent, rainwater, stormwater and groundwater) in water resource planning;
2. The sustainable and equitable use of all water resources;
3. Consideration of all water users;
4. Integration of urban water use and natural water processes; and
5. A whole of catchment integration of natural resource use and management.

These principals require the effective and efficient delivery of water services as well as the implementation of sustainable water conservation and water demand practices.

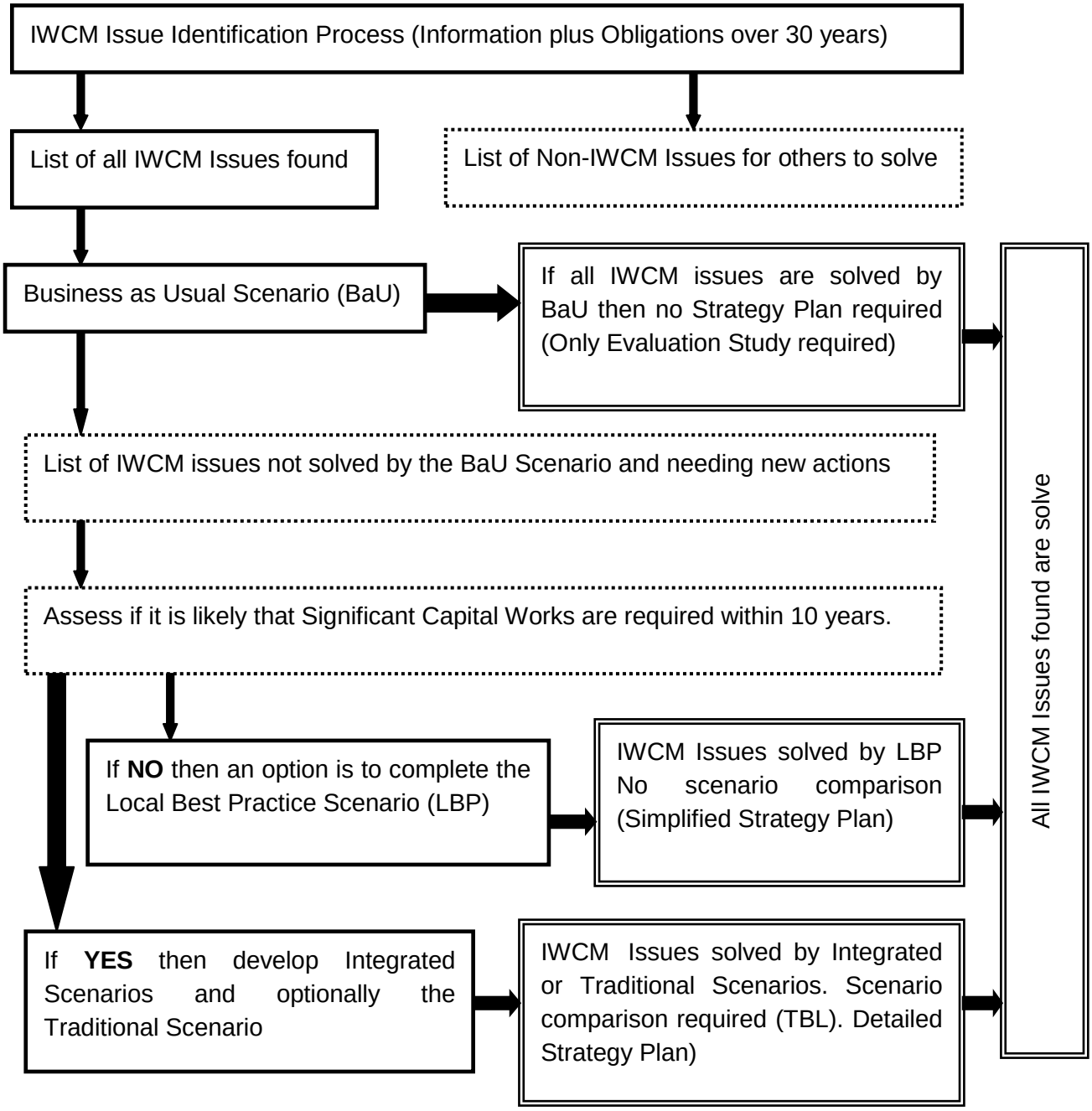
IWCM provides a framework to assist in identifying water management issues and concerns/problems and to address these by determining appropriate management responses so that Triple Bottom Line (TBL) objectives (social, environmental and economic) are met.

It aims to minimise the potential for poor or ill informed decisions in planning water delivery services; to ensure optimal use of water resources; to improve business management and to enhance water resource management.

Development of the IWCM Strategy involves two steps:

- Step 1 Evaluation Study
- Step 2 Strategy Plan (If IWCM issues are not solved by existing actions).
  - Simplified (No significant capital works within 10 years)
  - Detailed (Significant capital works within 10 years).

The process involves the identification of issues and development of solutions. The following chart shows how IWCM issues are managed.



(Source: DWE, Integrated Water Cycle Management, Generic Scope of Works, August 2007)

There are three (3) specific reference Documents which are pivotal to this IWCM, namely:

i) Best Practice Management of Water Supply and Sewerage Guidelines, August 2007, DWE
ii) Integrated Water Cycle Management Guidelines for NSW Local Water Utilities, October 2004, DEUS.
iii) Council's Scope of Works for Preparation of an Integrated Water Cycle Management Strategy, dated June 2009 (based on DWE's "IWCM Scope of Works", August 2007)

1.4 STAGE 1 OF THE IWCM; THE EVALUATION STUDY

The Evaluation Study is the foundation document of the IWCM process. It describes the urban water service obligations of Griffith City Council, sets the circumstances of the area within which Council operates, lists all related information and data, defines any IWCM issues, considers all existing Council actions and commitments by developing the Business as Usual (BaU) Scenario and defines the remaining IWCM issues which the BaU Scenario does not solve.

The assessment of IWCM issues will look at a 30 year planning period.

The Evaluation Study will be used to determine the relevant IWCM process to solve any remaining issues.

1.5 OVERALL OBJECTIVES OF THIS EVALUATION STUDY

The overall Objectives of this Evaluation Study are:

- To clearly identify the relevant "catchment" context within which the urban water service is to be provided
- To identify the targets of the LWU by considering all licences and management documents
- To audit available data and information to confirm compliance with targets
- To identify, describe and scope any additional data/information requirements, that is, any missing data to confirm compliance with targets
- To assess how well the water cycle management systems (water supply, sewerage and stormwater systems) in Griffith are performing against targets
- To identify key water cycle issues in Griffith where there are non-compliances against targets
- To identify and assess existing actions, programs and/or commitments which adequately address any issues raised.(the Business as Usual (BaU) scenario)
- To assess likely main actions required and timing to determine if a simple or detailed strategy is likely.

1.6 METHODOLOGY

The methodology utilised in the development of this Evaluation Study involved.

- Compiling and assessing the relevance and completeness of Council's data base and related catchment and water resources information;

- Determining system boundaries (service boundaries; administrative boundaries and physical boundaries)
- Assessing the adequacy of existing water supply, sewerage, trade waste and stormwater facilities and operations to meet statutory requirements and provide a community acceptable level of service;
- Reviewing and assessing the Council's future planning strategies (including 30 year Capital Works Programs and Financial Management Plans) in terms of capacity to maintain acceptable levels of service and ability to adapt to growth, changes in statutory requirements, sustainability etc;
- Determining Council's requirements, obligations and objectives;
- Identifying and addressing any gaps in the data base and forward planning strategies;
- Determining the community's expectations and needs and identifying and assessing the "issues";
- Determining with Council and the Project Reference Group if the identified issues can be addressed by existing actions (the Business-as-Usual scenario);
- determining how any remaining IWCM issues can be addressed (simplified or Detailed Strategy).

The key activities undertaken in this Evaluation Study were:

i) a substantive review of information and data relevant to the IWCM
ii) identification and consideration of IWCM "Issues"

The principal sources of information for these reviews were:

i) Griffith City Council
ii) Murrumbidgee CMA
iii) Murrumbidgee Irrigation
iv) Department of Water & Energy (now the NSW Office of Water)
v) Department of Environment, Climate Change & Water
vi) Library and internet searches

A full list of references obtained and used is provided in **Appendix D – Volume 2**, along with an assessment of adequacy and gaps.

2. METHODOLOGY

2.1 STEERING COMMITTEE & PROJECT REFERNCE GROUP

A Steering Committee was initially assembled, comprising representatives of Council, DECCW, NSW Health, NSW Office of Water, Murrumbidgee CMA and Murrumbidgee Irrigation. (Details of Steering Committee membership are presented in Attachment 1).

Potential members of the Project Reference Group (PRG) were identified and invited to become members.

Representatives were sought from business groups, industry, indigenous groups and the general community.

There were no acceptances from indigenous groups or the general community.

The resulting PRG, then, comprised industry, commerce and stakeholder representation.

2.2 INFORMATION & DATA ACQUISITION & REVIEW

Data required for the evaluation was obtained from Council, DECCW, NSW Health, NSW Office of Water, Murrumbidgee Irrigation and the CMA.

Much of the data was also accessed from various State and Commonwealth Government web sites.

2.3 DATA REVIEW

Data was collected, recorded and reviewed.

A range of documents was produced (which are presented as Volume 2 – Technical and Supporting Information) and these were provided for comment and feedback to members of the Steering Committee.

2.4 DATA ASSESSMENT & UTILISATION

The data was compiled, collated and assessed under the following category headings:

i) Urban Water Services and Demand Management **(Appendices A and C: Volume 2)**
The existing water supply and sewerage services in Griffith were assessed, including an analysis of historical water demand, demand management measures (for Council to consider implementing) and 30 year water demand projections (based on a range of demand management measures). Council has been concurrently developing a Demand Management Strategy (which has not yet been adopted by Council).
This Section also incorporated information about, and assessment of, catchment and water resource aspects.

ii) System boundaries (**Appendix B: Volume 2**)
The boundaries applying to Griffith LWU were defined in terms of service boundaries, administration boundaries and physical boundaries.

iii) Targets, Obligations, Responsibilities and Requirements (Appendix E: Volume 2)
The key, relevant, water business, catchment and legislative targets, obligations, responsibilities and requirements applicable to Griffith were collated, reviewed and summarised.
This review was used to generate data gaps and potential IWCM Issues.

2.5 IDENTIFICATION OF ISSUES

IWCM Issues are defined as failures by the LWU to meet targets and service obligations.
Current and potential issues were identified, discussed with Council & the Steering Committee and presented to the PRG.

A subsequent meeting of the PRG (along with representatives of the Steering Committee) was held in Griffith on 2 November 2009.

The IWCM process was outlined and issues were presented and discussed. The PRG raised additional community issues for discussion and contributed suggested options for addressing outstanding issues.

The list of issues was modified and finalised as a result of the meeting.

These issues were separated into two categories; IWCM Urban Issues and Non-Urban Issues.

They were then documented and presented in **Appendix F: Volume 2: IWCM & Other Issues**.

2.6 DATA GAPS

Identification of data gaps and strategies to address them is another aspect of the evaluation process.
These gaps are identified where there is no data, insufficient data or unsuitable data to confirm compliance with the identified targets.
The identified data gaps have been listed in **Appendix D: Volume 2: Information and Data Assessment,** along with a priority assessment and an action plan to address the gaps.

2.7 ADDRESSING THE IDENTIFIED ISSUES

The evaluation process requires a determination of which actions fall within a "Business-as-Usual" (BaU) scenario. If issues are not resolved by BaU, the requirements of the next IWCM stage need to be recommended – that is, preparation of a Simplified Strategy or a Detailed Strategy.

i) Business as Usual Approach
The Business as Usual Approach (BaU) applies when the LWU has committed to an action that will resolve the issue. Examples of such firm commitments are where significant preliminary elements have been completed, for example:

- ❒ Formal regulatory requirements have been sought and approved;
- ❒ A draft options report has been completed;
- ❒ Council has formally resolved to adopt the option.

NSW Office of Water has advised that statements of intention to proceed (as maybe included in a management plan or strategic business plan) or listing of expenditure in a capital works plan do not satisfy BaU requirements.

If any of the IWCM issues cannot be addressed by BaU, then a further "second stage" IWCM strategy study is required. The IWCM Evaluation Study then recommends that a simplified or detailed strategy be developed.

ii) simplified IWCM Strategy
Issues not addressed by BaU are examined to identify whether a simplified scenario will address them.

A Simplified Strategy should be implemented when there is some confidence the issues can be addressed by:

- ❒ some additional locally suitable best practice actions;
- ❒ some minor capital works within the next ten years;
- ❒ or significant capital works that can take place ten years or more in the future.

If the simplified scenarios solve all remaining IWCM issues then the evaluation process is completed by the development of a simplified strategy plan and no comparison of multiple scenarios using Triple Bottom Line Analysis is required.

iii) Detailed IWCM Strategy
If issues remain that cannot be addressed under the BaU or a Simplified Strategy then a detailed strategy plan is required. This is required where significant capital works are required within the next ten years. A detailed strategy plan develops full scenarios including a traditional (stand alone) and integrated scenarios. These scenarios are groupings of options that have been identified by the LWU to address the issues. Details of this approach are provided in NSW Office of Water's "IWCM Generic Scope of Work Evaluation and Strategy" Guidelines.

3. PROVISION OF URBAN WATER SERVICES IN GRIFFITH

3.1 GENERAL

Griffith City Council provides water supply services to a population of 22,000 (9,540 assessments), with potable supplies from the Griffith and Yenda water Treatment Plants.
Raw water supply for the City is provided by Murrumbidgee Irrigation's Main Northern Canal.
Water from the Canal is delivered to a 300 ML in ground storage (Hayes Lease Lagoon) for supply to the Griffith Filtration Plant and to 18 ML storage at the Yenda Plant.

Council also operates a raw water supply system for use on Council owned parks and gardens, schools, golf course and airport irrigation at Griffith.
Yenda has a full dual supply to the residential and business area of the Village

Sewerage services are provided to a population of 21,000 (7,790 assessments) in Griffith, Yenda and Bilbul.

A full description of the Griffith water supply, sewerage and storm water services is provided in **Volume 2,** Appendix A.

3.2 SYSTEM BOUNDARIES

There are essentially three boundaries which apply to a Local Government Owned Water Utility (LWU), namely:

- Service Boundaries
- Administrative Boundaries and
- Physical Boundaries

a) Service Boundaries

Griffith City Council, as the Local Water Utility (LWU), provides water supply, sewerage and stormwater to the following towns:-

Potable Water Supply:
- Griffith
- Yenda

and the Villages of:
- Beelbangera
- Bilbul
- Hanwood
- Lake Wyangan
- Nericon
- Yoogali
- Tharbogang

Raw Water Supply: Irrigation of:
- Council Parks & Gardens
- Schools
- Golf Course
- Airport

Sewerage:
- Griffith
- Yenda
- Bilbul
- Yoogali
- Hanwood
- Beelbangera

Stormwater:
- Griffith
- Beelbangera
- Bilbul
- Hanwood
- Lake Wyangan
- Nericon
- Tharbogang
- Yoogali

b) Administrative Boundaries

Griffith City Council is responsible for the planning, operation and management of all water supply, sewerage and stormwater services within the City, subject to the regulatory functions of a number of NSW State Government Departments, namely:-

* NSW Office of Water.
* NSW Health.
* Department of Environment, Climate Change and Water (DECCW).

Other Agencies relevant to the operation and management of Griffith's water supply, sewerage and stormwater services include:-

* Murray Darling Basin Commission, Canberra (in relation to the Murrumbidgee River and Wetland Management).
* State Water, Dubbo; (in relation to water allocations from the Murrumbidgee River).
* NSW Department of Primary Industries.
* NSW Department of Lands.
* NSW Roads and Traffic Authority.
* Murrumbidgee Catchment Management Authority
* Murrumbidgee Irrigation, centred in Griffith.

c) Physical Boundaries

Griffith is located in the Murrumbidgee Local Government region of New South Wales, is within the Murrumbidgee catchment and is surrounded by Leeton, Murrumbidgee, Narrandera and Carrathool Shires.

The City is located in the Riverine Plain of the Murrumbidgee River valley, on the boundary of the Mid-Murrumbidgee and the Lower Murrumbidgee sections of the Murrumbidgee catchment.

Figure 1 below shows Griffith in relation to the surrounding Shires.

Figure 1: Murrumbidgee Local Government Boundaries

(Source: NSW Department of Local Government - Local Council Boundaries

3.3 IWCM RELATED OBLIGATIONS, RESPONSIBILITIES & REQUIREMENT

3.3.1 Introduction

There are a number of plans, strategies, initiatives and legislative documents and requirements which impose obligations, tasks and responsibilities on Local Water Utilities.

A detailed discussion of all such requirements is provided in Volume 2: Appendix E.

The externalities presented in Appendix E include:

- Australian Drinking Water Guidelines
- Water Entitlements
- Licences
- Contract Obligations

- Levels of Service
- Legislative Requirements
- Performance Reporting and Best Practice Compliance
- Management and Business Plans, and
- Other Compliance Aspects.

The ones most relevant to this IWCM Study are:

3.3.2 Australian Drinking Water Guidelines

The Australian Drinking Water Guidelines (ADWG 2004) provide the generally accepted criteria for drinking water quality standards for LWUs.

NSW Health defines the requirements for monitoring frequencies and number of samples and Council's obligation is to comply with these requirements.

The analysis results for Griffith (270 samples) and Yenda (191 samples) for the period 1 July 2006 to 30 June 2009 are summarised in the Table below:

Table 1: NSW Health Analysis Results

		Compliance (Meeting Guideline Values)	
Period	**Parameter**	**Griffith**	**Yenda**
July 2006 – June 2009	Total Coliforms	97%	98%
	E. coli	100%	100%
	pH	100%	96%
	Turbidity	100%	100%
	TDS	100%	100%
	Others	All	All
	Chemical	100%	100%
	Except		
	Fluoride (daily)	93%	68%
	Fluoride (weekly)	94%	73%

Source: NSW Health Drinking Water Database

The Drinking Water Guidelines have recently been revised to now incorporate a risk based framework for the Management of Drinking Water Quality.

It is expected that this will become the standard for LWUs to implement in the future.

A key requirement of the Framework is the preparation of a Drinking Water Quality Management Plan. Griffith City Council is currently developing a Management Plan. A Gap Analysis has been completed.

3.3.3 Water Entitlements

Water entitlements for the City (as supplied by Murrumbidgee Irrigation) from the Murrumbidgee River via MI's Main Supply Canal are detailed below:

Type 1 General Security Licence No. WAL 15364		*Type 3 High Security (Irrigation) Licence No. WAL 300010*		*Type 6 High Security (Domestic) Licence No. WAL9446*		*Type 7 High Security (Town Water Supply) Licence No. WAL 9444*	
Location	***Volume (ML)***	***Location***	***Volume (ML)***	***Location***	***Volume (ML)***	***Location***	***Volume (ML)***
Developer Contributions	40	Developer Contributions	1171	Developer Contributions	77		14407
Griffith Gold Club	300	Hanwood Oval	17				
Yenda Golf Club	78	Cirrilo Purchase 24/03/09	102				
Picnic Area and Lookouts	37	Boys – 30/04/09	10				
TOTAL	**455**		**1300**		**77**		**14407**

Joint Water Supply Accounts: [(1)]

MI Licence Number:	***Volume (ML)***	***GCC***	***Farmers Name***	***Type***
2158800	112	90	Bordignon	A3 High Security Water
2187402	131	122	Singh and Kaur	A3 High Security Water
2182600	106	94	G Kirby	A3 High Security Water

Table 2: Griffith City Council – Water Entitlements

Note [(1)]: The terminology "Joint Water Supply Accounts" is an administrative term used by Murrumbidgee Irrigation for members of MI with irrigation entitlements. It allows a number of accounts to be joined under one licence. The Accounts relevant to Griffith City Council relate to 3 farms which Council owns and which have attached water entitlements. These entitlements are "joined" to Council's Licence.

Note [(2)] To mitigate against increased demands as a result of development, Council requires <u>all</u> developers to provide a High Security Water Entitlement, as required for development approval. This ensures that the existing town water entitlement is not diminished.

In summary, Council holds entitlements of 14407 ML/a as Town Supply Entitlement, 1377 ML/a of High Security Entitlements, 455 ML/a of General Security Entitlements and 304 ML of "Shared" High Security Entitlements. These "accounts" are held with Murrumbidgee Irrigation under account number 2111101. (In this region, MI holds the town water allocations with State Water for those towns drawing water from MI's supply system, such as Griffith). Account number 2111101 is an administration account, in MI's management system, and is an aggregation of all Council's Licenses and entitlements, as set in Table 2 above.

3.3.4 Licences

Sewage Treatment Plant Licences

a) Griffith Sewage Treatment Plant

The **Griffith Sewage Treatment Plant** (located at Duchatel Road, Griffith) is required to operate in accordance with DECCW (EPA) Licence No. 1604.

The Licence Discharge Point is at the outlet of Pond 5 into the MI drainage channel, labelled as EPA ID1.

The current licence discharge limits are shown below:

Table 3: Discharge Volumes

Unit of measure	***Volume Limit***
megalitres per year	2800

Table 4: Concentration Limits

Pollutant	***Units of Measure***	***50 percentile concentration limit***	***90 percentile concentration limit***	***3DGM concentration limit***	***100 percentile concentration limit***
Oil & Grease	milligrams per litre	-	-	-	10
Faecal Coliforms	colony forming units per 100 millilitres	-	200	-	600
Total suspended solids	milligrams per litre	-	-	-	30
Biochemical oxygen demand	milligrams per litre	-	-	-	30

Table 5: Current Load Limits

Assessable Pollutant	***Load Limit (kg)***
BOD (Enclosed Waters)	36000
Nitrogen (total) (Enclosed Waters)	26648
Oil & Grease (Enclosed Waters)	4336
Phosphorus (total) (Enclosed Waters)	2900
Total suspended solids (Enclosed Waters)	60000

The current Licence includes a **Pollution Reduction Program (PRP)** which stipulates that the actual load of assessable pollutants must not exceed a set of annual, permissible load limits as well as concentration limits; (which was defined in the Licence as at 1 March 2008). The PRP also stipulates effluent irrigation limits and odour control measures.

Details of the PRP requirements are shown below:

Table 6: Proposed Load Limits

Assessable Pollutant	***Load Limit (kg)***
Total suspended solids	27,000
BOD	18,000
Oil & Grease	3,600
Total nitrogen	18,000
Total phosphorus	540
Thermotolerant coliforms (cfu/100mL	200

(To be achieved by 1 March 2010)

Table 7: Effluent Quality

Parameter	***Minimum performance requirement***
Biochemical oxygen demand (mg/L)	10
Total suspended solids (mg/L)	15
Total phosphorus (mg/L)	0.3
Total nitrogen (mg/L)	10
Ammonia nitrogen (mg/L)	2
Oil & grease (mg/L)	2
pH	6.5 – 8.5

(To be achieved by 31 July 2009)

Odour Control

Ozonation of trickling filters to be achieved by 31 July 2009

Council is also required to submit annual returns, notify of any harm to the environment as a result of the sewerage system operation, provide written reports as requested by DECCW submit annual performance reports and manage biosolids (storage, treatment, transportation and disposal) in accordance with DECCW's Biosolids Guidelines.

b) Yenda Sewage Treatment Plant

The **Yenda Sewage Treatment Plant** is licensed under EPA Licence No.1402. The Licence Discharge Point is from Pond No. 3 (labelled as ADP001) to MI Drainage Channel with the Effluent Quality Monitoring Point being discharge from Pond 3.

Licence Limits have been imposed for pH, Total Suspended Solids, BOD and Faecal coliforms as detailed below:

Table 8: Yenda STP Licence Conditions

Parameter	*Units of Measure*	*50 percentile concentration limit*	*80 percentile concentration limit*	*90 percentile concentration limit*	*100 percentile concentration limit*
pH	pH				5.5 - 9.5
Faecal Coliforms	colony forming units per 100 millilitres				600
Total suspended solids	milligrams per litre				50
Biochemical oxygen demand	milligrams per litre				50
Volume Limit	ML/year				150

c) Bilbul Sewage Treatment Plant

The **Bilbul Sewage Treatment Plant** is not required to be licensed.

Reporting conditions also stipulate Nitrate and Nitrite, Ammonia Nitrogen, Total Nitrogen, Oil & Grease, Total Phosphorus and Total Kjeldahl Nitrogen concentrations. There are no PRP requirements for this Plant.

3.3.5 Contract Obligations

Griffith City Council has entered into two (2) Contracts in relation to the development and procurement of the Water Reclamation Plant Upgrade.

These Contracts are for:

i) Detailed Design: Awarded to Hydroscience Pty Ltd for $1.855m
ii) Supply of Membranes: Awarded to Koch Membrane Systems for $2.505m.

Council is also party to a Contract with Murrumbidgee Irrigation for supply of water from MI's canal system.

The Contract is a typical agreement which MI has with its "customers" and is framed around supply to irrigators. The Town water supply component of supply has the same level of security as Town Supplies elsewhere, except that the carrier is MI, not State Water. Allocations under the Town Water Supply Entitlement are still assessed and managed by the NSW Office of Water.

3.3.6 Levels of service

The Griffith Strategic Business Plan for Water Supply and Sewerage (2005) details the Levels of Service for both Water and Sewerage Services, which are commitments/targets set by Council to comply with Best Practice Management. The current Levels of Service are presented in Table 9 below:

Table 9: Water Supply Levels of Service

Description	***Unit***	***2009 Level of Service***
Service Provision		
Service area		All residential areas and industrial areas where economically viable
Connection time for a new service in serviced areas (90% of the time)	days	21
Availability of Supply		
Fire Fighting:		
Compliance with the Building Code of Australia and NSW Fire Brigade requirements (for all residential, commercial and industrial areas)	% area served	100 (urban) 70 (Rural)
Pressure:		
- Min. pressure when delivering 6 L/min	Metres head	30 (Griffith) 12 (Yenda)
- Max. static pressure	Metres head	70 (Griffith) 30 (Yenda)

Supply		
Supply in accordance with Council design standards.	L/s (throughout system)	0.15 typically
Consumption Restrictions in Droughts:		
In accordance with restrictions defined in Council's Drought Management Plan & as required by the NSW Office of Water		
Supply Interruptions to Consumers		
Temporary supply arrangements during interruptions		Where possible
Planned *(95% of time):*		
- Notice given to domestic customers	Hours	48
- Notice given to commercial customers	Hours	48
- Notice given to major industrial customers	Days	7
Unplanned:		
- Maximum duration	Hours	8
- Frequency	No./ year	80
Response Times		
(Defined as time to have staff onsite to commence rectification after notification of problem)		
Supply Failure:		
All Customers:		
- During working hours	Hours	1
- Out of working hours	Hours	2
Customer Complaints:		
Personal / Oral	Working Days	1
Written	Working Days	10
Note: Times apply for 95% of occasions		
Service Provision:		
Time to provide a domestic individual connection to water supply in serviced area (90% of time)	Working days	21
Water Quality		
(In accordance with the Drinking Water Quality Guidelines of Australia, NHMRC&AWRCM 2004, or as amended)	CFU/100ml	0
Sampling Frequency:	CFU/100ml	10
Physical & chemical testing	In accordance with NSW Health requirements	0
Microbiological Results:		
Total coliforms – 95% of samples	CFU/100ml	0
Maximum in any sample	CFU/100ml	10
E.coli (in any sample)	CFU/100ml	0
Physico-chemical Parameters		
Percentage Compliance with 2004 NHMRC/AWRCM Australian Drinking Water Quality Guidelines:	As required by NSW Health and ADWG (Refer Appendix E for monitoring schedule)	

Table 10: Sewerage Levels of Service

Description	***Unit***	***2009 Level of Service***
Availability of Service		
- Extent of areas serviced.	Service area	100% within the defined service area
System Failures		
Category One:		
- Failure due to rainfall and deficient capacity (overflows).	No./ 5 year	0
Category Two:		
- Failures due to pump or other breakdown including power failure.	No /year	2
Category Three:		
- Failures due to main blockages and collapses (fat and tree roots).	No./ year	150
Response Times for System Failures (Defined as the maximum time to have staff on site to commence rectification).		
Priority One: (Major spill, significant environmental or health impact, or affecting large number of consumers i.e. a major main).		
- Response time during working hours	Minutes	30
- Response time after hours	Minutes	60
Priority Two: (Moderate spill, some environmental or health impact, or affecting small number of consumers i.e. other mains).		
- Response time during working hours	Minutes	30
- Response time after hours	Minutes	60
Priority Three: (Minor spill, little environmental or health impact, or affecting a couple of consumers).		
- Response time during working hours.	Hours	1
- Response time after hours.	Hours	2
Response Times for Complaints		
General Complaints and Inquiries:		
Written complaints.	Working days	5
Oral complaints.	Working days	1
Note: times for 95% of complaints.		
Odour Complaints		
Treatment works	No./ year	<2
Pumping Stations	No./ year	<4
Effluent Discharge and Sludge Management		
Failure to meet licence limits and statutory requirements (100 percentile)	No. of samples/ year	0

3.4 CATCHMENT PERSPECTIVE

3.4.1 General

A detailed discussion of Griffith in relation to the catchment is contained in **Volume 2:** Appendix A**.**

The following is a general summary of the catchment aspects which relate to consideration of IWCM Issues.

3.4.2 Location

Griffith is located in the Murrumbidgee Irrigation area and relies on the Murrumbidgee Irrigation system for its water supply. The Griffith Local Government Area (LGA) is shown in Figure 2.

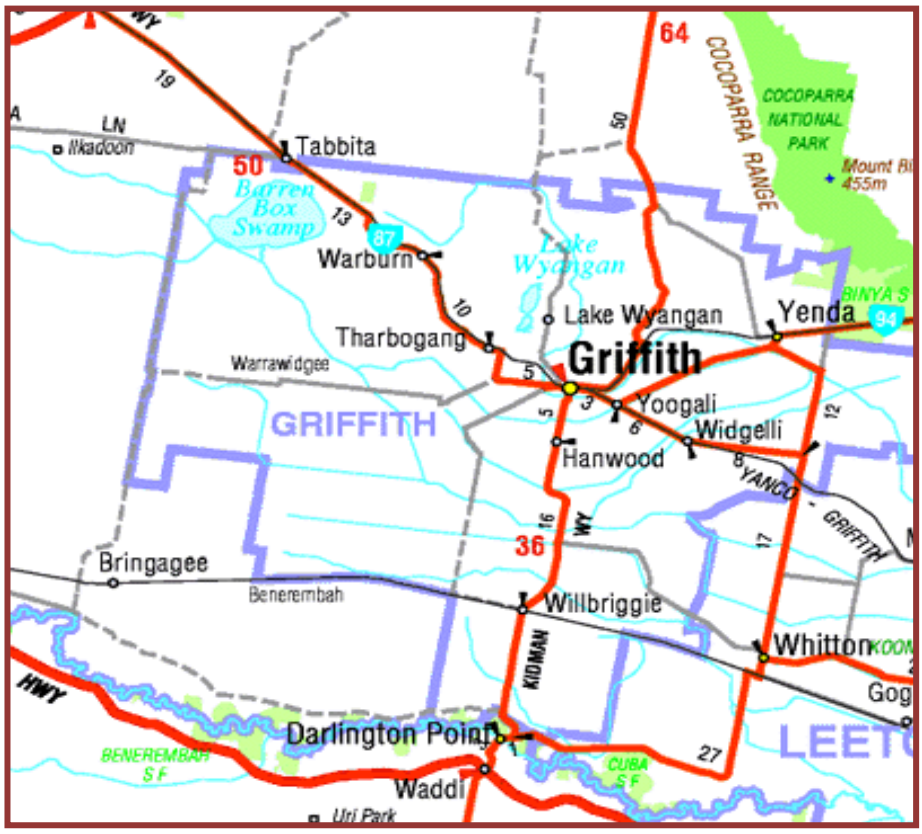


Figure 2: Griffith LGA

The principal catchment elements are summarised in Figure 3.

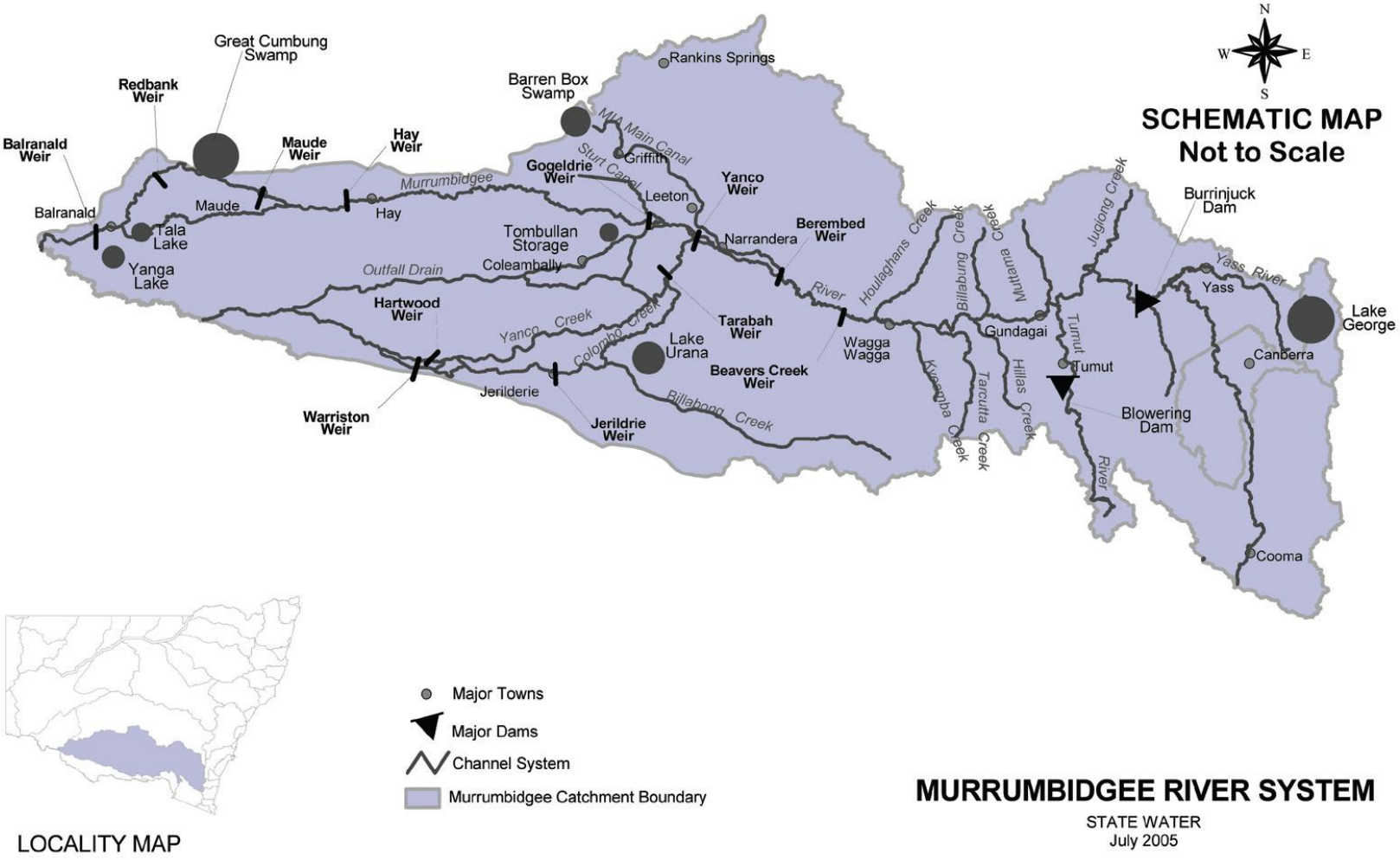


Figure 3: Griffith in relation to Murrumbidgee Catchment

3.4.3 Climate

The climate in Griffith is seasonally consistent, with temperatures varying from maximum of 31.6°c in summer to 16.3°c in winter (average maximum).

Rainfall is low at 406 mm/annum (average for 1909 to 2009).

3.4.4 Population Growth & Development

Population projections for Griffith are discussed in Appendix A**, Section 2C.**

The most recent population projections provided by the NSW Department of Planning for the Local Government Area are presented below.

Table 11: DoP Population projections for Griffith LGA

Griffith	2006	2011	2021	2026	2031	2036
LGA	24,900	25,900	27,700	28,400	29,000	29,500

Council engaged consultant McCrindle Research in 2008 to prepare a land use strategy, including a demographic analysis of the Griffith LGA.

McCrindle's utilised Series B data from the ABS population projections for Griffith and arrived at substantially greater populations than the Department of Planning's projections, namely:

Year 2033: 34,905
Year 2038: 36,587

Council has since adopted the following projections for planning purposes. These projections are based on a growth rate of 0.7% pa and closely align with those determined by the Department of Planning.

Table 12: Population Projections for Griffith

(assuming growth at 0.7%)

	2006 Census	**2011**	**2016**	**2021**	**2026**	**2031**	**2036**	**2041**
Griffith LGA	23,799	24,644	25,519	26,425	27,362	28,333	29,339	30,380
Griffith City	15,826	16,388	16,970	17,572	18,196	18,842	19,510	20,203

These projections will be further reviewed following the 2011 Census.

3.4.5 Topography

Griffith is located in the Murrumbidgee Catchment on the boundary between the Mid-Murrumbidgee section and the Lower Murrumbidgee section. The topography is generally characterised as *Riverine Plain* with an average fall of 0.02% to the west. The Plains have a general slope away from the River to the north west and south west, which has enabled the development of large irrigation areas.

In Griffith City itself the topography is generally flat, being located on the north eastern edge of the Riverine Plain.

3.4.6 Geology, Soils & Physical Characteristics

The City is underlain by bedrock which is defined as Devonian conglomerates, quartzites and sandstone. The surrounding plain consists of Pleistocene fluvial and Aeolian sediments.
*[The geology of the catchment is shown in Figure A4**: Volume 2:** Appendix A**]***

The urban area of Griffith is underlain by duplex, clay loams. Subsoils are typically medium clays, whilst topsoils usually vary from sandy loams to red – brown clay loams.

3.4.7 Land use

The principal land uses in the Griffith area are:

- Residential and rural development
- Irrigated orchards, vineyards, rice and vegetables
- Sheep and cattle grazing
- Industrial use, including wineries, food manufacturing, tourism, retail trade, manufacturing and education.

3.4.8 Flooding

Before the construction of Burrinjuck and Blowering Dams, small or moderate floods occurred in the Murrumbidgee Catchment almost every year, following winter/spring rains. These floods would typically spill over the top of the river banks and affect the lower parts of the floodplain. Once every 10 or 12 years a major flood would cover the entire floodplain.

Building of both Dams has allowed these floods to be largely managed; thus reducing the damage to properties and agriculture. The Dams also allowed management of flows for irrigation.

Most small and moderate floods are contained in the storages. Burrinjuck Dam's capacity in proportion to its catchment area is relatively low, so it has limited capacity to contain large floods.

Blowering Dam has a greater capacity to mitigate large floods.

Griffith and several of its surrounding villages are subject to flooding, mainly from the Main Drain system. Griffith is reliant upon the irrigation drainage system, under the control of Murrumbidgee Irrigation, for its drainage. Some rural areas experience flooding from both the Mirrool Creek and the Little Mirrool Creek systems.

The extent of flooding in Griffith is shown in Figure 4.

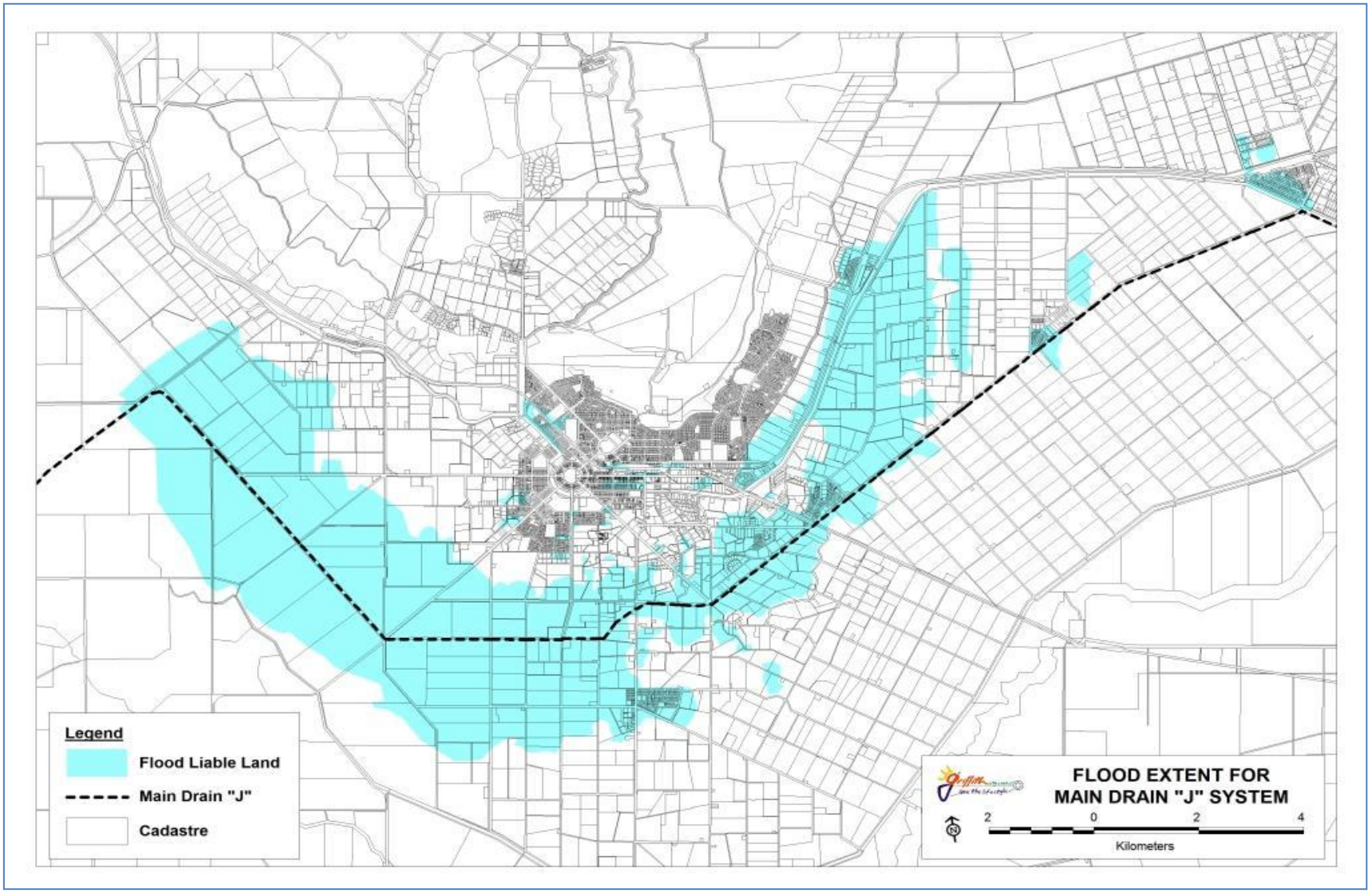


Figure 4: Griffith Flood Liable Land

3.4.9 Murrumbidgee Catchment Action Plan

The Murrumbidgee CMA's Catchment and Management Targets are discussed in Appendix A**, Section h.**

All of the key issues in the CMA's Action Plan (particularly those relating to storm water drainage systems, erosion, management of the floodplain, management of wetlands, revegetation, sediment transportation reductions, salinity reductions (particularly in relation to urban salinity) and water use efficiency gains) will all need to be considered in future infrastructure development within Griffith LGA.

The key issue for Griffith is considered to be salinity reduction targets, particularly in relation to urban salinity. Urban salinity can adversely impact on the water supply and sewerage infrastructure, particularly concrete structures and pipework.

Council needs to work closely with the CMA in ensuring that urban salinity is managed and controlled.

3.4.10 Environmentally Sensitive Zones

The Department of Environment, Climate Change & Water has identified environmentally sensitive areas in Griffith and these are shown in Figure A5 in Appendix A**: Volume 2.**

3.5 SURFACE WATER

- System Storages

Major water storages that directly affect the Lower Murrumbidgee include Burrinjuck Dam (on the Murrumbidgee) and Blowering Dam (on the Tumut River).

Important weirs in the system include: Berembed, Yanco, Gogeldrie, Hay, Maude, Redbank and Bairanald.

Also, Barren Box Swam, Tombullen Storage and Lake Wyangan are important storages in the system and are relied on by surrounding irrigation districts during low river flow periods.

Griffith's raw water supply is delivered from the Murrumbidgee River at Berembed Weir to Murrumbidgee Irrigation's Main Northern Canal. The upstream storages (Burrinjuck and Blowering Dams) provide a high level of security for the City's water supply.

- Sources and Entitlements

Griffith obtains its bulk water supplies from the Murrumbidgee River via Murrumbidgee Irrigation's Main Northern Canal.

The current water entitlements from the Murrumbidgee River system are linked to Ml's entitlements and allocations. These entitlements are summarised in the previous Section 3.3.3.

It should be noted that Griffith's total water supply entitlements amount to 0.5% of Murrumbidgee Irrigation's total entitlements (allocations) from the Murrumbidgee River (and 5% of Ml's High Security entitlements).

- Water Quality

Water quality data for the Murrumbidgee River at the Yanco Creek Offtake is presented in Table A9: Attachment A. This is not the offtake for supply to Griffith, but it is the nearest monitoring station to the offtake for the Main Northern Canal, which supplies Griffith. There is a DWE monitoring site on the Murrumbidgee River at Narrandera, but the advice from the Department is that there is no acceptable water quality data for this site.

The water quality in the Murrumbidgee River and Yanco Creek at this point is very good quality, compared to other regulated rivers in the Murray-Darling Basin. There are no major water quality issues in this stretch of the river system.

The potential for algal blooms is an ever present risk, but the phosphorus levels have been consistently low for the last 5 years, thereby reducing this risk.

Murrumbidgee Irrigation, under its EPA Licence, undertakes environmental monitoring at a number of sites (for EC, nutrients and pesticides). There are no monitoring sites on the main Northern Canal. The site most relevant to Griffith is on Little Mirrool. Analysis results for pesticides over the past five years are summarised in Table A10 in Appendix A**: Volume 2.**

- Groundwater

The Lower Murrumbidgee is a designated Groundwater Management Area; a distinct hydrogeological region with its own hydrogeology and groundwater usage characteristics.

There are three (3) groundwater systems in the Griffith area, namely:

i) the shallow Shepparton Formation Aquifers, which can be as high as 2m from the surface (although these levels have been dropping since this drought commenced in 1997/09). This water is very saline.

ii) the deep Shepparton Formation, starting at about 20 metre below surface level. Good quality water; high yields

iii) the Calivil Formation Aquifer, which is high quality water at 70+ metres depth below surface level

Griffith is located within this Groundwater Management Area. Although the City does not utilise groundwater as an urban water source, this is a potential supply source if supply becomes unavailable from the Channel.

No studies have been carried out to date by Council on the potential location or suitability of groundwater reserves.

(It is understood that there are two potential groundwater sources at up to 70m depth. There are no yield estimates available for these sources).

3.6 URBAN WATER SYSTEMS

3.6.1 Levels of Service

The water supply Levels of Service applying in Griffith are documented in Tables 9 (Water Supply) and 10 (Sewerage), above (Section 2.3.6)

3.6.2 Relevant Land Use in Griffith

The principal sources of economic growth and development in the urban areas of Griffith include:-

- Agricultural production) grapes, vegetables, fruit, rice, wheat, chickens)
- Agricultural produce processing
- Light engineering
- Small business enterprises
- Support industries and commercial enterprises

A list of all Licences issued by DECCW, under the Protection of the Environment Operations Act, 1997 (POEO) is provided in **Volume 2:** Appendix A**.**

DECCW advises that there are currently no contaminated sites listed for Griffith.

All the licensed activities in Griffith are subject to a Trade Waste Agreement with Griffith City Council.

3.6.3 Current Water Supply Services

The Water Supply, Treatment and Distribution systems for Griffith are discussed in detail in **Appendix B: System Boundaries**.
The Levels of Service are presented here as well as a summary of the actual service provided.

Water Supply Service Summary

Key aspects of the water supply service to the towns in Griffith are summarised in Table 13 below:-

Table 13: Summary of Water Supply Services

Water Source:	Supply from MI's Main Canal Ex Murrumbidgee River	
Entitlements:	• Town Entitlement	14,407 ML/yr
	• High Security (for general purposes)	1,377 ML/yr
	• General Security (Parks, Golf Courses, Picnic Areas & Lookouts.)	455 ML/yr
	• Joint Accounts (High Security)	306 ML

		Total	**16,545ML**
Populations:	LGA (2006) Census		23,799
	Griffith		15,826
Metered Customers: (2007/08)	Residential		7,706
	Non-Residential		1,478
		Total	9,184
Total Water Extracted: (2007/08)			6,821 ML
Annual Consumption: (2007/08) (Refer Table A13 below)			5,516 ML
Unaccounted for Water: (2007/08)			1,305 ML (20.6%)
Treated (Potable) Water: Quality Compliance	Total System : Compliance E.coli		100%

Water Consumption

Details of water consumption in Griffith are summarised in Table 14 below:-

Table 14: Actual Water Consumption

Annual Consumption		**(2007/08)**
Potable Supply		
Peak Annual Demand Recorded		6844 ML (2006/07)
Peak Month Demands	2009	49 ML (Feb.)
	2008	38 ML (Jan.)
	2007	41 ML (Jan.)
	2006	**54.7 ML** (Jan.)
	2005	47.8 ML (Dec.)
	2004	44.1 ML (Feb.)

Consumptions by User Category **(2007/08)** (Potable) [based on water extracted from all sources]	
Residential	3,655 ML (57.8%)
Commercial	539 ML (8.5%)
Industrial	170 ML (2.7%)
Rural	422 ML (6.7%)
Public Parks & Open Space	226 ML (3.6%)
Bulk Sales	0 ML
Unbilled authorised	298 ML (4.7%)
Unaccounted for Water	1,305 ML (20.6%)
System Losses	-498 ML (-7.8%)
Total	**6,322 ML**

The level of "unaccounted for water" is very high and needs to be addressed.

Similarly, water losses at 7.8% are high, but are being addressed in a water loss rectification program.

The biggest user of **potable water** is Casella Wines, which uses 380 kL/day (approximately 140 ML/year). This represents approximately 2% of the total metered consumption for the City. Other major consumers are DeBortoli Winery (118 ML/year), Warburn Estate Winery (74 ML/year) and Council itself (162 ML/year). Overall, the 20 biggest users consume around 697 ML/year, or 12.6% of metered consumption.

The biggest **raw water** user is Ted Scobie Oval, which consumes 65 ML/year.

Ted Scobie Oval is Crown Land, managed by Council. The 20 biggest raw water users consume a total of around 263 ML/year.

Peak day demands by User Category are not known.

The demand management modelling carried out as part of this study (Refer **Appendix C: Volume 2**) indicates that at current per capita rates of consumption, the Water Treatment Plants will reach capacity in 2025/6.

Council's 30 Year Forward Capital Works Program allows for augmentation of water treatment facilities to commence in 2023/24.

Water Treatment:-

Griffith operates 2 Water Treatment Plants, namely:-

- Griffith WTP: (60 ML/d capacity)
- Yenda WTP: (2 ML/d capacity)
- Total Capacity: 62 ML/d
- Peak Day Demand: 49 ML/d

  [Note: Peak Day since 1994: 54.7 ML (2005/06)]
- Peak Hourly Demand: 306 ML/d (2008/09)

The current Peak Day Demand for Griffith's Water Treatment Plants is approximately 79% of the total capacity.

Currently, commercial/industrial use accounts for 16.6% of total consumption.

Water Quality

Water quality produced by Griffith's Water Treatment Plants is typically of high quality. In the period, 2004/05 to 2007/08, the Treatment Plants met all Australian Drinking Water Quality Guidelines for physical, chemical and microbiological criteria as shown in Table 14 below.

Implementation by Council of the modelled demand management measures is expected to increase the life of the plant to beyond 2038.

Future upgrades of the WTP will, therefore, be re-evaluated by Council in the light of actual demand reductions.

Table 15: Water Quality Compliance Results

Criteria	2004/05	2005/06	2006/07	2007/08
Physical	100%	100%	100%	100%
Chemical	100%	100%	100%	100%
Microbiological				
• E.coli	100%	100%	100%	100%
• Total coliforms	100%	100%	100%	100%

(Source: DWE Performance Reports; 2004/05; 2005/06; 2006/07; 2007/08)

Assets & Asset Management

Griffith has an Asset Register in place which lists the following information for Griffith and Yenda as appropriate:-

- WTP's and Pump Stations
- Reservoirs
- Filtered Water Mains
- Filtered Water Fittings
- Raw Water Mains
- Raw Water Fittings.

Table 16: Condition of Water & Sewerage Assets

Asset	Gross Current Replacement Value	Fair Value	Accumulated Depreciation	Annual Depreciation	Residual Value
Water Supply and Sewerage Treatment Active Assets	97,212,325	90,758,019	6,454,306	792,026	58,819,995
Potable Water Supply Mains	61,517,847	49,946,474	11,571,373	609,075	-
Raw Water Supply Mains	4,956,387	3,206,534	1,749,853	87,987	-
Sewer Mains and Reticulation	55,900,501	40,781,126	15,119,375	596,636	-
Sewer Manholes	9,670,455	8,565,397	1,105,057	76,523	4,835,227
Totals	***229,257,514***	***193,257,550***	***35,999,963***	***2,162,246***	***63,655,222***

Table 16 indicates that Water Supply Assets are in reasonable condition, but are aging and that a program of asset replacement / renewal is necessary, which Council has in place.

Councils Asset Register indicates that a high percentage of distribution and reticulation pipework is at or older than 30 years.

Council also recognises that it has a high percentage of AC pipes which will need to be replaced over the next 30 years.

Council's asset management strategy is framed around its asset register (which documents asset age and condition) and the 30 Year Forward Capital Works Program is designed to ensure that these assets are replaced and refurbished, as required.

A copy of the Capital Works Program is appended as Attachment 2.

3.6.4 Current Sewerage Services

Griffith City Council provides sewerage services to Griffith, Yenda, Yoogali, Hanwood and Bilbul.

On-site septic tank systems (located primarily on the urban fringes of Griffith and the three smaller villages; Lake Wyangan (60ET); Nericon (40ET) and Tharbogang (40ET)) are administered in accordance with the provisions of the Local Government Act.

Sewerage Services Summary

Key aspects of the sewerage services in Griffith LGA are summarised in Table 17 below:-

Table 17: Summary of Sewerage Services

		2007/08	2008/09
Population Serviced:	Permanent	21,000	21,500
	Peak	23,000	23,500
Connected Properties:	Residential	7,006	7,226
	Non- Residential	787	698
Unsewered Urban Premises (%)		2.6	-
No. of on-site systems		1,388	1400 (1)
Volume of Sewage treated (kL/property)		308	256
Volume Recycled		18%	11% (2)
Biosolids Re-used (On site uses)		0%	0%
Infiltration (assessed)		Not measured	
EPA Licences:	Griffith	Licence No.1604 Licence to discharge to MI drainage channel	
	Yenda	Licence No.1402 Licence to discharge from Pond3	
	Bilbul	Not licensed	
Public Health Incidents		0	0
Environmental Incidents (Cat. 1)		15	0
(Cat. 2/3)		0	0
Odour Complaints		15	3
Service Complaints		7	0

Source: DWE Performance Report 2007/08

Note (1): The increase in on-site systems is due to urban expansion in the Lake Wyangan area. The Villages of Lake Wyangan and Nericon will be connected to sewerage in 2013/14 and Tharbogang in 2018/19.

There are no reported issues associated with these on-site systems. Performance is monitored under Council's "On-site Sewage Management Plan".

Note (2): The reduction in volume recycled is due to the cessation of a trial "FILTER" reuse project (a land based sewage treatment project aimed at nutrient removal) because it was unable to achieve DECCW Licence requirements."

Sewerage Systems

Principal aspects of Council's sewerage infrastructure include:-

- Treatment Works: 3 No.(Griffith, Yenda & Bilbul)
- Pumping Stations: 29 No.
- Pumping Capacity: 13 ML/d
- Length of Main: Gravity Reticulation: 169 kms
  Pumping (Rising)Mains: 54 kms
- Total Length of Main 223 kms

Sewage Treatment:-

Treatment Plants:

Griffith: Trickling Filter (currently being updated to MBR technology plant)
Built: 1992
Yenda: Oxidation Ponds
Built 1981
Bilbul: Oxidation Pond
Built 1990

Capacities of the plants are: Griffith: 65,000EP
Yenda: 34,000 EP
Bilbul : 310 EP
Total: 99,310 EP

Current Plant Inflows (2007/08) are:

Griffith: 1,486 ML/yr
Yenda 113 ML/yr
Bilbul 0.09 ML/yr

The Griffith Plant, which discharges from Pond 5 into the MI drainage channel, labelled as EPA ID 1 is licensed by DECCW (EPA) under Licence No 1604.

Yenda STP (Licence No. 1402) discharges from Pond 3 to MI Drainage Channel at Licence Point ADP 001.

There is no discharge from the Bilbul Plant – all effluent is evaporated

Flow data at the Treatment Plants is summarised in Table 18 below:

Table 18: Annual Flows at Sewage Treatment Plants

	Griffith	**Yenda**
Flow Categorisation		
-Annual Residential Inflow	1583 ML	108 ML
-Annual Non-Residential Inflow	146 ML	5 ML
-Trade Waste	200 ML	0
-Infiltration	na	na
Average Dry Weather Flow		
-Permanent population	46 L/s	3.6 L/s
-Peak population	46 L/s	3.6 L/s
Peak Dry Weather Flow		
-Permanent population	78 L/s	5 L/s
-Peak population	78 L/s	5 L/s
Peak Wet Weather Flow		
- Peak Day	8.6 ML/d	1.8 Ml/d
- Peak Hour	200 L/s	17 L/s

Essentially, the Plants currently have ample capacity to treat the flows generated. Demand modelling has indicated that the existing Plant has sufficient hydraulic capacity beyond the 30 year planning horizon.

Council has, however, resolved to upgrade the Griffith Plant to MBR technology, to comply with more stringent discharge conditions imposed by the EPA (DECCW), as discussed below.

Griffith Sewage Treatment Plant operates under a Pollution Reduction Program (PRP) as discussed in **Appendix E: Volume 2.**

Similarly, the Licence conditions applying to the Yenda Sewage Treatment Plant are discussed in Appendix E.
The design for the new MBR Plant has been developed following a full review of population growth, trade waste aspects, infiltration and the potential for reuse.

The process has received Section 60 Approval from the NSW Office of Water and allows for a further upgrade in 10-12 years time.
A comparison of the existing DECCW Licence requirements and those for the new Plant is shown below:

Parameter	Current (kg)	Proposed (kg)	
BOD	36,000	18,000	(50% reduction)
N	26,648	18,000	(32% reduction)
TSS	60,000	27,000	(55% reduction)
P	2,900	540	(81% reduction)
O&G	4,336	3,600	(17% reduction)
Thermotolerant coliforms(cfu/100mL)	-	200	-

Effluent Quality:

Effluent analysis results (mean values) for both the Griffith and Yenda Plants are shown in Table 19 below.

Table 19: Analysis Results for Griffith & Yenda STP's (2008 EPA Licence Periods)

Parameter	**Griffith STP**		**Yenda STP**	
	90%ile limit	% Compliant	90%ile limit	% Compliant
pH (units)	-	-	5.5 – 9.5	83
BOD (mg/L)	30	100	50	100
TSS (mg/L)	30	58	50	83
Total N (mg/L)	10	?	-	-
Faecal coliforms (per 100 ml)	200	100	600	100
Oil & Grease (mg/L)	10	100	-	-
Total P (mg/L)	-	-	-	-

These are generally very good treatment results.

The only parameter of concern in these results is the Total Suspended Solids results for both Plants, particularly the Griffith Plant. It would seem that there is substantial carry over, at times, of algae from the Maturation Lagoons. The new MBR Plant will address this issue.

Trade Waste Management

Council has recently updated its Trade Waste Policy (August 2009) and is proceeding to implement it.

Trade Waste information is summarised in Table 20 below:

Table 20: Griffith Trade Waste Discharges

Large Trade Waste Dischargers:	4
No. of Trade Waste Discharges:	225
Volume of Dischargers:	
- Total (from Council records)	200 ML/yr
- Large dischargers (daily max.)	614 kL/d
- Equiv. BOD of large dischargers	6131EP
- Equiv. TSS of large dischargers	5009EP
Industry Categories:	All

Assets and Asset Management

Council maintains an excellent Asset Register which lists the following information:-

- Sewer Pump Stations
- Sewer Rising Mains
- Gravity Sewers
- Sewer Manholes.

The assets are listed with the Water Assets in Table 16 above.

Table 16 (above) and Council's Asset Register indicate that the Sewerage Assets are in reasonable condition, are aging, but sufficient annual expenditure is being directed to maintenance.

As with the water supply assets, Council's 30 Year Forward Capital Works Program is designed to ensure that assets are replaced/refurbished as required. (Refer Capital Works Program in Attachment 2 to this Report).

3.6.5 Current Stormwater Services

All the urban centres of Griffith (including Griffith, Tharbogang, Yenda, Yoogali, Hanwood, Bilbul and Beelbangera) have stormwater drainage systems. The drainage systems of the Villages are typical of rural villages with table drains predominant.

Griffith and the surrounding villages lie within the catchment of the major Main Drain "J" drainage channel.

All of Griffith's stormwater discharges to a sophisticated network of drainage canals which are owned and operated by Murrumbidgee Irrigation. (Refer to layout in Figure B12 in **Appendix B: Griffith System Boundaries**).

In effect, all stormwater in the City is collected and returned to the Mirrool Creek system, for reuse.

Barren Box Swamp is a terminal depression for drainage water from Mirrool Creek and it is used for storage and for improving water quality.

Griffith is somewhat unique in that Murrumbidgee Irrigation (MI) owns and operates both the irrigation water supply and the drainage system in and around the City. Both the water supply and drainage management are covered by a Contract between MI and Council. MI is responsible for water quality in its drains, but has no direct control over the quality of drainage water it receives.

A copy of the Contract with MI is appended as Attachment 3.

Expansion of the urban area and rural residential development has meant that portions of the irrigation system have been converted from farm to urban use. In many cases, the original drainage channels have been filled in and replaced with alternative stormwater drainage systems.

During some seasons (especially in autumn), the combination of urban runoff and farm releases creates a backwater problem on the floodplain. This is most apparent when heavy rainfall coincides with rice field discharge just before harvest. Water is held in a largely static condition until the discharges dissipate.

The low grades of the system mean that the drainage system is relatively wide and deep. This has created some problems, particularly with erosion, public safety, mosquito breeding and carp damage.

3.7 CLIMATE CHANGE ASPECTS

The Department of Water and Energy has recently (August 2008) provided modelling results of potential climate change impacts which are relevant to water service planning.

For Griffith the potential impacts of climate change include:

- Reduced rainfall and runoff
- Increasing rainfall variability
- Increased maximum temperature
- Increasing evaporation
- Possible increase in damage to underground infrastructure, particularly pipelines
- Increases in water usage and demand
- The need for water conservation and reuse initiatives (like grey water reuse, effluent reuse etc)
- Population changes as a result of migration away from rural and particularly irrigation areas.

The CSIRO's Sustainable Yields project has predicted the following:

- Average water availability for the region under historical climate is 4,270 GL/year of which 53% (2,257 GL/year) is currently used. Groundwater use is about 407 GL/year or 17% of total water use.

- If the recent climate (1997 to 2008) were to persist, average surface water availability would reduce by 30%. The relative level of surface water would be 62%.
- The best estimate of climate change by 2030 is less severe than the recent past. Average surface water availability would reduce by 9% and surface water diversion by 2%.
- Rainfall could vary from – 17% in dry years to +8% in wet years, with a "best estimate" change from historical of -4%.
- Likely future development of farm dams would reduce total runoff by 1%. Although likely commercial plantation forestry expansion would have significant local effects on runoff, the impact on average annual runoff for the entire region would be negligible.
- Groundwater extraction is expected to increase by around 22% to become 21% of total average annual water use by 2030.

Griffith's Town Water Supply Entitlement has a very high level of security.

However, cuts to this Town Entitlement have in recent years been imposed by the Office of Water (as high as 50% cut for short periods) because of water shortages in the system (as a result of the drought).

As previously discussed, given the availability of groundwater reserves, it might be prudent for Council to investigate the viability of sinking bores to augment supply into the future.

Council will need to consider these possible predictions in planning its future water supply needs.

It is understood that Council may be required to assess the "secure yield" of its water source in the next year or two.

3.8 DEMAND MANAGEMENT

Demand management modelling was carried out as part of this study (utilising the Demand Management software developed by the former Department of Water and Energy).

The modelling is presented in **Appendix C** to this Evaluation Study and includes:

- a modelling of a range of demand management measures relevant to the water consumption patterns in Griffith;
- determination of potential water savings which could result from implementation of a range of measures.

The main conclusions of the modelling are:

- Water consumption has reduced from a high of 6,844 ML in 2006/07 to 5,516 ML in 2008/09, with an average over the six (6) year period (from 2002/03 to 2007/08), of 6324 ML ;
- The average annual water production (water treated) since 1994/95, has been 7,780 ML;

- Unaccounted for water (UFW) since 2002/03 has averaged 18.5%. This is considered to be high and a target of 5 – 6% UFW would be more appropriate. System losses in 2007/08 were approximately 7.8%;
  Residential water consumption is relatively high by national standards at 1,414 L/per residential property per day or 491 L/person/d (in 2007/08). Approximately 55% of this water is used outside the home (lawns, gardens, pools etc);
- The peak to average day usage ratio is 2.2 (2007/08), which is similar to similarly sized cities throughout NSW;
- Council's water usage charges are based on an inclining block tariff, with the first 200 kL provided at $0.55/kL. Thereafter, the charge is $0.90/kL (2009/10 charges). These charges are low in comparison with other regional cities and towns in NSW. The State wide median consumption charge in 2007/08 was $1.30/kL.

The demand management modelling has indicated that:

i). Dual reticulation for all new residential development and implementation of BASIX (with both rainwater use and dual reticulation), will deliver the greatest benefits in terms of **water savings**.
Conservation pricing for residential users and permanent (low level) water saving measures will also yield significant water savings.
Conservation pricing is shown to yield the highest annual water savings with clearly the highest utility and community **benefit/cost ratio**, followed by permanent low level water restrictions.

ii). Full uptake of the demand management initiatives modelled may deliver significant water savings – up to 3,128 Ml/year (or 46% reduction) for Option 4 initiatives, or 1,839 Ml/year (or 27% reduction) for Option 3 initiatives.

iii). The results indicate that the capacity of the Water Treatment Plant will be reached by 2025/26. Implementation of Options 1 and/or 2 will extend the life until 2027. Implementation of Option 3 demand management initiatives is expected to extend the life of the plant (in terms of capacity) to 2038.

iv). the capacity of the Sewage Treatment Plant is not expected to be reached within the 30 year planning period.

4. AUDIT OF DATA & INFORMATION

4.1 OBJECTIVES

The auditing process is a holistic evaluation of Council's (and other) available data in relation to the water supply, sewerage and stormwater services provided.

Section 2 has outlined the urban water services administered by Griffith City Council (in terms of the catchment context, the water resources context and the water services context) and has presented much of the data and information relevant to this audit. **Appendix D: Volume 2** outlines the information and data which has been collected and assessed.

4.2 CATCHMENT CONTEXT AUDIT

The major issues adversely affecting the water cycle have been identified by the IWCM Guidelines, 2004 (Department of Water & Energy) as:-

- resource scarcity
- sustainability of water extraction
- salinity
- deforestation
- greenhouse
- acid soils
- soil erosion
- algal blooms
- chemical contaminants
- biodiversity reduction
- flooding.

Other issues considered in this study under the catchment context include:

- rainfall and climate
- population growth and development
- topography
- geology, soils and physical characteristics
- land use
- the Catchment Action Plan
- climate change.

The results of the audit and discussion about the above issue categories are presented in Table 21 below.

Table 21: Audit of Catchment

Item	Relevant to Griffith LWU	Comment	Potential Issue
Resource Scarcity	✓	Supply is from the Murrumbidgee River System and is very secure.	• Potential for river flows to cease for a period. (This has a likelihood of less than once every 100 years). • potential changes to the regulatory framework perhaps involving reductions of entitlements/allocation in any review of the Water Sharing Plan. • contamination of raw water supply. • population and/or demand increases. • potential for increased supply costs.
Water Extraction	✓	Supply is from the Murrumbidgee River System and is very secure.	As above
Salinity	✓	Murrumbidgee Catchment Management Authority has identified river salinity and dry land salinity as catchment issues. Increasing levels of river salinity may impact on treated water quality. Dry land salinity (and, in particular, urban salinity) is a consideration in stormwater management and re-use of wastewater effluent.	Possible future increases in water treatment costs. Management of any future effluent re-use schemes.
Deforestation	X	Not an issue in the Catchment Action Plan	None
Greenhouse & Climate change	✓	Climate modelling (DWE, 2008 & CSIRO, 2008) predicts the region is likely to be affected by increased maximum temperatures increasing rainfall variability and reduced	• possibility of reductions to entitlement/allocations within the planning horizon. • the need to manage

Item	Relevant to Griffith LWU	Comment	Potential Issue
		availability of surface water over the next 30 years. Council's Town water entitlement exceeds current usage (2007/08) by 160%. (Town entitlement 14,407 ML; usage 5,516 ML). Demand modelling predicts that consumption in 2037/38 will be between 13,110 ML/year and 7,700 ML/year (depending on population growth and the success or otherwise of demand management measures implemented by Council).	demand via implementation of demand management measures. • the need to identify alternative water source options.
Acid Soils	X	Acid and sodic soils have been identified by Murrumbidgee CMA as an NRM issue.	Not evident in Griffith
Soil Erosion	✓	Soil erosion has been identified as a catchment wide issue; but river water quality does not indicate increased turbidity levels in recent years.	Possible future increases in water treatment costs.
Algal Blooms	✓	Algal blooms are an issue for the Murrumbidgee River, tributaries and adjacent wetlands. This is more of an access issue than a water quality one. Council has a very active monitoring program for Lake Wyangan and the town water supply. Each water treatment plant has an off-stream storage to provide security of supply and enable treatment if algal blooms occur. There are no known instances in the last 20 years of the need to respond to emergency water supply issues resulting from algal infestation. The Griffith Plant has PAC dosing capability and Yenda is	• Management of nutrient discharge in effluent and stormwater. • Possible increased water treatment costs.

Item	Relevant to Griffith LWU	Comment	Potential Issue
		a Microfiltration Plant. MI has the ability to mix and aerate water at weirs if required.	
Chemical Contaminants	✓	No evidence of significant input to Murrumbidgee River, tributaries or wetlands. MI monitors for EC, nutrients and pesticides in Little Mirrool Creek, but this is not a raw water source for Griffith. Council monitors the supply channel for pesticides and, to date, has not detected any contamination. Council has responded positively to the management of potential inputs of contaminants by implementing a Trade Waste Policy and initiating stormwater treatment.	None
Biodiversity Reduction	X	Biodiversity enhancement is a principal target for Murrumbidgee CMA. No impacts on or by Griffith's water business.	None
Flooding	X	Flooding is an issue for the Riverine floodplain and is an issue for Griffith	None for IWCM Matter for Council and MI

The Catchment Context review has identified a range of issues which are further considered in Chapter 7.

4.3 WATER RESOURCE CONTEXT AUDIT

4.3.1 Water availability

The CSIRO in a June 2008 Report ("Water Availability in the Murrumbidgee") indicated availability of water reducing by 9% by 2030 (under their "best estimate" of the impacts of climate change)

Based on population growth projections of 0.7% pa for Griffith, the anticipated 2039/40 consumption is estimated at approximately 13,100 ML pa **(Appendix D: Volume 2).**

Council has a Drought Management Plan in place (in conjunction with MI) and a Demand Management Plan is currently being finalised.

Council currently holds entitlements amounting to 14,407 ML/a as Town Supply Entitlement and an overall entitlement of 16,543 ML/a.

It should be noted that a full allocation of this entitlement may not always be possible (as has been the case in recent years, as a result of the drought). As discussed earlier, this is a potential risk to security of supply.

The Water Sharing Plan (DIPNR, 2004) makes provision for increases in water extractions (subject to the long-term extraction limit – yet to be determined (based on conditions applying in 1999/2000) and also for reductions to supplementary access licenses and general security access licenses (until extractions return to the limit).
Necessary environmental flows for ecosystems impacted by climate change may cause a change in the legislation to ensure better protection for these ecosystems. Any such reduction can't be predicted at present.

4.3.2 Water Quality Objectives

Water Quality Objectives for the Murrumbidgee River were established by the Environmental Protection Authority (EPA) in 1999.

These water quality objectives, as well as water quality monitoring results are presented in Table A9 of Appendix A**: Volume 2.**

The sampling record is, unfortunately, severely limited. The lack of data for chlorophyll-a, algae/blue-green algae, faecal coliforms, thermotolerant coliforms and chemical contaminants makes the overall assessment of protection of environmental values difficult.

However, it would seem that the Water Quality Objectives (set by the then EPA in 1999) are being met for all the listed indicators. There is no bacteriological data available for the test site and there is only limited information on algae/blue-green algae. The phosphorus levels, although generally low in comparison with other rivers like the Murray, say, reach levels which can trigger algal blooms. Levels as high as 0.128 mg/L of total phosphorus have been recorded. Levels above 0.05 mg/L have regularly been recorded in the summer/autumn – which is the danger period for algae production.

Blue Green Algae, therefore, is potentially an issue, particularly in the summer and autumn months. Salinity levels may be lower than expected because of the drought. Groundwater levels have declined significantly due to lack of rainfall replenishment and are typically now at levels below the invert of the River and, therefore, not discharging into the river water. This situation may reverse when groundwaters are recharged in wet seasons.

Measures are in place under the Murrumbidgee CMA's Action Plan to ensure that Target salinity levels are achieved into the future.

Murrumbidgee Irrigation also undertakes on-going water quality monitoring throughout their irrigation supply system. The closest site to Griffith's raw water offtake is a monitoring site on Little Mirrool Creek, downstream of Leeton.

The data indicates that levels of the pesticides Diuron, Simazine and Metolachlor were detected in Little Mirrool Creek in 2006 at EPA "notification levels", with no follow up action required.

It should be noted that the monitoring site applies to farm drainage water in Little Mirrool Creek and does not apply to canal supply water, which is kept totally separate from the drainage. Council has recently tested the canal supply water (with NSW Health) and no pesticides were detected.

4.3.3 Water Resource Issues

Possible water resource issues identified from the audit of the water resource context data and information are:

- Reduced security of future water availability from the Murrumbidgee River system, particularly in drought years
- contamination of water supplies by blue-green algae.

4.4 URBAN CONTEXT AUDIT

4.4.1 Water Supply Services

Performance data for Griffith's water supply systems for 2006/07 & 2007/08 are presented in Table 22 below, along with a comparison of state wide medians.

Table 22: Key Water Supply System Performance data – 2 Year Comparisons

Item	***2006/07***	***2007/08***
Connected Properties	7,870	8,110
Residential consumption (kL per property)	675	548 (1)
Typical residential Bill ($ per assessment)	497	442
Number of mains breaks (per 100km)	14	15
Drought Water Restrictions (% of time)	49	100 (2)
Water Quality Complaints (per 1000 properties)	1	1
Water Service Complaints (per 1000 properties)	4	6
Chemical Water Quality	100	100

Compliance (%)		
Microbiological (E.coli) Water Quality Compliance (%)	100	100
Infrastructure leakage index	-	-
Water losses per connection (L per day)	148	110
Operating Cost ($ per property)	562	551 (3)
Management cost ($ per property)	219	228 (3)

(Source: DWE Performance Reports)

Note (1): Water consumption is considerably in excess of the state wide median and is an Issue to be addressed by Council.

Note (2): Levels of Restrictions were:

- Level 2: November 2007 – June 2008
- Level 3: September 2007 – November 2007
- Level 4: June 2007 – September 2007.

Note (3): Operation costs are considerably in excess of the state wide median and need to be addressed by Council.

Asset Management

Griffith City Council maintains a Register for its water supply assets and assesses the condition and value of its assets on a "fair value" basis.

Council is currently developing a full Asset Management Plan.

A review of Council's Water Asset register indicates:

- A significant percentage of Council's assets, particularly water mains, has less than 50% residual life
- A significant amount of asbestos cement pipe exists in the reticulation system (particularly in the 30+ year age bracket)
- As well as the need to complete the asset register and develop an Asset Management Strategy, Council is also reviewing its financial management by undertaking a financial analysis and developing a Financial Management Plan (as part of the parent Strategic Business Plan)

Targets and Obligations

Griffith's water supply generally complies with the Australian Drinking Water Guidelines, the Fluoridation of Public Water Supplies Act, 1957 and the Public Health Act, 1991.

NSW Health analysis results indicate 100% compliance with all parameters except system total coliforms, where 3% exceeded the requirement in the period July 2006 to June 2008 in Griffith and 2% exceeded in Yenda.

Over the same period, there have been no exceedances for E.coli.

There was no follow up action required by Health and, therefore, the water supply systems are deemed to comply with the Health Act,1991.

Rainwater Tanks

Council has advised that there are over 1900 rainwater tanks in use in Griffith, each approximately 5000 litre capacity. This represents approximately 23% of the number of properties served with potable water, and is estimated to save between 170 and 200 ML/year for treated supply.

A program to encourage more rainwater harvesting in Griffith, including consideration by Council of a subsidy or rebate, is warranted, based on the demand management modelling carried out.

Drought Management

Council has a Drought Management Plan in place. (Hydroscience, 2007) which was adopted by Council on 10 February 2009.

The key elements of this plan are:

Trigger Annual Use (ML/a)	Restriction Level	Targets	
		Residential Demand (L/property/d)	Total Demand (ML/d)
8000+	0	1640	21.9
7500	1 (80% external use)	1438	20.5
7000	2 (75% external use)	1340	19.1
6700	3 (70% external use)	1290	18.3
5100	4 (40% external use)	980	14.0
2860	5 (No external use)	550	7.8
2290	6 (No external use; 80% internal use)	440	6.3
1710	7 (No external use; 60% internal use)	330	4.7

4.4.2 Sewerage Services

Performance data for Council's sewerage business for 2006/07 & 2007/08 are presented in Table 23 below.

Table 23: Key Sewerage System Performance Data – 2 Year comparisons

Item	***2006/07***	***2007/08***
Number of connected properties	7639	7793
Volume of sewage collected (ML)	1,848	2,042
Volume of sewage treated (kL per property)	253	308
Typical Residential Bill ($ per assessment)	354	372
Operating cost ($ per property)	278	442
Management cost ($ per property)	126	141
Treatment cost ($ per property)	116	118
Sewer Chokes/Collapses (per 100km of main)	158	111
Sewer Overflows (per 100km of main)	6	3
Odour Complaints (per 1000 properties)	1.6	2.3
Service Complaints (per 1000 properties)	47	53
Sewage treated that was compliant with Licence (%)	61	61

Performance is generally good on a State wide comparison basis. Areas which require improvement or attention include:

- Relatively high incidence of mains chokes and collapses

Licence Compliance

The Griffith STP has consistently met EPA Licence Limits for all parameters, except suspended solids, where there was only 58% compliance in 2008. [Refer Table A21 in Appendix A**: Volume 2**].

The Yenda STP has consistently met BOD and SS limits, but not pH nor suspended solids.

The Griffith STP is subject to a Pollution Reduction Program (PRP). [Refer **Appendix E: Volume 2** for details.].

Council is currently developing its new Water Reclamation Plant to comply with the PRP before July 2011.

Trade Waste

There are no issues with Griffith's Trade Waste Management. Council's Trade Waste Policy has been fully and successfully implemented.

Effluent Reuse

All treated effluent is currently discharged to the MI Canal. Six (6) industrial properties reuse treated effluent on their sites.

The industries are:

- Cemax Quarries
- Nugan Food Processing
- Tarac Distillery
- Pace Farm
- DeBortoli Wines
- Casella Wines

All these industries currently recycle water from their own operations.

Cemax, Nugan and Tarac are large distances from the Griffith STP and, therefore, uneconomic to service with reclaimed water from Council's STP.

Pace Farms have a large number of small farms, only one of which is in close proximity to the STP.

DeBortoli Wines and Casella Wines are located at Bilbul and Yenda respectively. They both have their own wastewater treatment plants.

None of the industries are considered economical to service with effluent. Being generally food and wine producers, options for reuse are limited.

Council has no details of reuse by these industries.

Water Supply & Sewerage Assets

Council's water supply and sewerage asset valuations are summarised in Table 12 in Appendix A**: Volume 2.**

The total valuation (WDV) of water supply and sewerage infrastructure assets is nearly $64 million. The Fair Valuation of Assets (as at 30 June 2008) was assessed at $193 million.

Generally, the assets are in good condition, although 40% have been assessed as needing to be renewed or replaced during the 30 year time frame of this evaluation study
With an aging infrastructure base, this is an area that Council will need to address.

4.4.3 Stormwater Services

There are no state wide performance criteria for stormwater services. Griffith City Council is currently developing a Floodplain Risk Management Plan.

Murrumbidgee irrigation owns and operates the drainage system in and around Griffith, under a Contract with Council. All stormwater from Griffith and the villages is discharged to MI's irrigation drainage system.

There are, therefore, no other viable opportunities for stormwater harvesting/reuse. All stormwater is essentially reused under the current arrangements.

There is no Asset Register or Asset Management Plan in place for the stormwater system. This is an issue for consideration by Council in conjunction with MI.

5. IWCM TARGETS, OBLIGATIONS, RESPONSIBILITES & REQUIREMENTS

There are a number of targets, obligations, responsibilities and requirements which a Local Water Utility is required to meet.
Targets are requirements that must be met by the utility, either for health, levels of service or environmental reasons and non-compliances are then assigned as IWCM Issues which need to be addressed.
A full assessment of Council's compliance with these targets, obligations, responsibilities and requirements is contained in **Appendix E: Volume 2.**
A summary is provided below and the resulting IWCM Issues are discussed in Chapter 7.

5.1 DRINKING WATER QUALITY

For the assessment period of 1 July 2006 to 30 June 2009, NSW Health water quality monitoring results show that the water supply has generally complied with the Australian Drinking Water Guidelines (2004), except for:

- Griffith - non-compliance with fluoride concentrations.
- Yenda - non-compliance with pH and fluoride concentrations.

5.2 LICENSES

Licence Compliance

The Griffith STP has consistently met EPA Licence Limits for all parameters, except suspended solids, where there was only 58% compliance in 2008. [Refer Table A21 in **Appendix A**].
The Yenda STP has consistently met BOD and SS limits, but not pH nor suspended solids.
The Griffith STP is subject to a Pollution Reduction Program (PRP). [Refer Appendix E for details].
Council is currently developing its new Water Reclamation Plant to comply with the PRP before July 2011.
The Plant will be a MBR process which was chosen for its future potential for reuse. The reuse phase will be considered by Council post construction. Initially, it is proposed to reuse water reclaimed for onsite landscaping and MBR process water. This is estimated to use approximately 10% of the water produced.

Trade Waste

There are no issues with Griffith's Trade Waste Management. Council's Trade Waste Policy has been fully and successfully implemented.

5.3 CONTRACTS

Council is party to 2 existing Contracts in relation to the STP upgrade (Detailed Design Contract and Supply of Membranes Contract), as well as a "Member Contract" with Murrumbidgee Irrigation.

5.4 LEVELS OF SERVICE

The Levels of Service Council has committed to in its Strategic Business Plan are presented in Sections 3.6.4 (Water Supply) and 3.6.5 (Sewerage) above.
There is no available information as to Council's compliance with the Levels of Service.

5.5 PERFORMANCE

Performance results and comparisons with state wide median performances, for 2007/08 are presented in Tables 24 and 25 below.

Table 24: Overall Water Supply System Performance

Item	2006/07	2007/08	2007/08 State Median
Number of connected properties	7,872	8,110	-
Residential assessments (%)	83	83	91
Renewals expenditure(% of current replacement cost)	0.3	0.9	0.1
Residential Water usage charge (c/kL)	40	45	130
Residential access charge per assessment ($)	-	108	110
Typical residential bill per assessment ($)	-	442	370
Urban population without reticulated water supply (%)	0	0	0.8
Water quality complaints per 1,000 properties	1	1	3
Water service complaints per 1,000 properties	4	6	9
Average duration of service interruption (min)	180	180	120
Number of water main breaks per 100 km of water main	14	15	9
Average annual residential water supplied (Inland) kL/property)	675	548	230
Real losses/Leakage (L/connection/d)	148`	110	80
Energy consumption per ML (kW hr)	469	383	710
Residential revenue from usage charges (% of residential bill)	67	69	71
OMA per 100 km of main ($'000)	984	926	1,040
OMA per property ($)	562	551	300
OMA per kilolitre (cents)	51	64	100
Treatment cost per property ($)	111	119	29
Pumping cost per property ($)	6	5	25
Energy cost per property ($)	6	6	13
Capital expenditure per property ($)	356	279	262

Table 25: Overall Sewerage System Performance

Item	*2006/07*	*2007/08*	*2007/08 State Median*
Number of connected properties	7639	7793	-
Volume of sewage collected (ML)	1,848	2,042	-
Volume of sewage treated (kL per property)	253	308	240
Typical Residential Bill ($ per assessment)	354	372	440
Operating cost ($ per property)	278	442	320
Management cost ($ per property)	126	141	107
Treatment cost ($ per property)	116	118	101
Sewer Chokes/Collapses (per 100km of main)	158	111	44
Sewer Overflows (per 100km of main)	6	3	12
Odour Complaints (per 1000 properties)	1.6	2.3	0.4
Service Complaints (per 1000 properties)	47	53	11
Sewage treated that was compliant with Licence (%)	61	61	100
Sewer Chokes/Collapses (per 100km of main)	158	111	44
Sewer Overflows (per 100km of main)	6	3	12
Odour Complaints (per 1000 properties)	1.6	2.3	0.4
Service Complaints (per 1000 properties)	47	53	11
Sewage treated that was compliant with Licence (%)	61	61	100

Although performance is generally good on a State wide comparison basis, there are a number of areas which require improvement or attention and these are listed as Issues in Chapter 7.

6. DATA GAPS

A number of data gaps have been identified as part of this IWCM Evaluation Study.

Data gaps are identified where there is no data; insufficient data; or unreliable data, to the extent that an assessment of Council's compliance with Targets and/or Obligations is not possible.
The assessed data gaps are listed below, along with an assessment of their importance (High (H), Medium (M), Low (L) and recommendations for Council to implement to address the gaps.

Table 26: Data Gaps

	Reference	Data Gap	Ranking (H, M or L)	Recommended Action
1.	App. A Section 3c (Page A25)	Information on availability and sustainability of groundwater as an alternative or additional water supply source	H	Investigate and prepare report.
2.	App. A Section 4e (Page A36) & App. C Section 2.2 (Page C5)	Verification of water losses and unaccounted for water	M	Council has commenced a Water Loss management and rectification process. Verification of losses and UFW to be determined and documented.
3.	App. C Section 4.2.2 (Page C13)	Results of system loss reduction program	M	As per 2. Above.
4.	App. E Section 6 (Page E11)	Is Griffith LWU achieving its Levels of Service (?)	L	Council to provide relevant information.
5.	App. E Section 7 (Page E12)	Items not reported in 2007/08 TBL Performance Report	L/M	Council to address items listed in Appendix E Section 7 for 2009/10 and subsequent reports.
6.	App. E Section 8 (Page E14)	Update of 2001 Emergency Response Procedures Manual	H	Council to update in 2010/11.
7.	App. E Section 8 (Page E14)	Update of 2003 Backflow Prevention Policy	H	Council to update in 2010/11.

7. CONSIDERATION OF ISSUES

7.1 GENERAL

The principal elements of the IWCM Evaluation Study are the identification and consideration of targets/obligations and information/data gaps leading to the determination of key water cycle issues, which are then reviewed against Council's existing actions, programs and / or commitments [under the Business as Usual scenario].
The identification of Issues has been discussed in Sections 1 and 2 (as well as in the Appendices in Volume 2) and the Issues have been verified and reviewed by the Project Reference Group (PRG), and the Project Steering Committee.

7.2 REFERENCE GROUP CONSIDERATION OF ISSUES

To assist in verification of the Issues, and to discuss development of possible solutions and/or actions, Griffith City Council formed a Project Reference Group (PRG), involving relevant Council staff, Councillors and the community. This Group was formed in addition to the Steering Committee, which included representatives from State Government Departments, Murrumbidgee Irrigation and Murrumbidgee CMA (but no community representation except for Councillors).

A PRG Workshop was held in Griffith on 2 November 2009, at which the issues listed in this Report were presented and discussed.

A list of Invitees and Attendees is included as Attachment 1.

The issues were categorised by the Group as being either IWCM Issues or Non-IWCM Issues (that is, outside the IWCM processes and, therefore, to be addressed by other sections of Council (not the water and sewerage section) and/or external agencies).

Each of the Issues relevant to the IWCM process was also considered in terms of the Business as Usual scenario

7.3 SUMMARY OF ISSUES

The Issues identified by the Study and verified by the PRG and the Steering Committee are presented in Table 27 below.

General

The key aspect of the IWCM process is to identify solutions to urban water servicing problems or Issues.

Issues are defined as any non-compliances with a utility's urban water service targets, both now and within the 30 year planning horizon.

During the processes of defining targets, assessing compliance and identifying issues, two categories of ISSUES typically arise – namely, specific IWCM Issues and also, non-urban Water Service Issues.

The IWCM is interested specifically in the IWCM Urban Issues.

Other, non-urban Issues need to be referred to the relevant authorities and agencies for their consideration.

For completeness, the non-urban Issues identified during the Griffith IWCM Evaluation Study are also listed here with the Department / Agency to which they should be referred.

A. IWCM Urban Issues

The identified issues and recommended actions are presented in Table 27 below:

Table 27: IWCM Urban Issues

No.	Reference	IWCM Issue	Comments/Recommended Actions	Required Strategy
1.	App. A: Section 1 (Page A2)	Biosolids Management Council does not have a long term strategy for biosolids management	Council has significant land areas available and intends to continue anaerobic digestion, air drying and spreading onsite. (Approximately 1000 tonnes is processed annually) The REF for the new plant proposed that sludge disposal continue onsite.	BaU
2.	App. App. A: Section 2 (Page A8)	Population Growth Is a population growth rate of 0.7% pa Appropriate for Griffith?	A report commissioned by Council (the McCrindle Report) projected growth rates of approximately 1.4% pa. Council has adopted a growth rate of 0.7% pa; which is more in line with Department of Planning Projections to 2036. Council will review the growth projections after the 2011 Census.	BaU
3.	App. A: Section 2: (Page A17)	Environmentally Sensitive Areas Potential for pollution of environmentally sensitive areas	Council has water and wastewater monitoring programs in place and is subject to compliance under the POEO Act and Health Act.	BaU
4.	App. A: Section 4: (Page A41)	Water Supply Assets A high percentage of distribution and rectification pipework is at or older than 30 years	Council has an asset replacement and renewal program in place and is developing an Asset Management Plan (to be completed in 2011)	Simplified
5.	App. A Section 4: (Page A42)	Sewerage to Villages Lake Wyangan (60ET), Nericon (40ET) and Tharbogang (40ET) are predicted to grow. These Villages are not currently sewered`	Council's forward planning has identified the need to provide sewerage to these Villages with implementation planned for: Lake Wyangan: Reticulation provided in 2009; Construction scheduled for 2013/14 Nericon: Provision: 2013/14 Tharbogang: Provision: 2018/19	Simplified

No.	Reference	IWCM Issue	Comments/Recommended Actions	Required Strategy
6.	App. A: Section 4: (Page A45)	Pollution Reduction Program Compliance with more stringent discharge conditions under PRP issued by DECCW	Council is proceeding to develop a new MBR Treatment Plant, with construction scheduled to commence in August 2010	BaU
7.	App. A: Section 4: (Page A45)	Algae in Maturation Lagoons Carry over of algae in discharge from the Maturation Lagoons	This will not be an issue upon commissioning of the new MBR Plant	BaU
8.	App. A: Section 4: (Page A46)	Sewerage Assets Sewerage assets are aging	Sufficient annual expenditure is being directed to asset replacement. Council is preparing an overall Water Supply and Sewerage Asset Management Plan (refer No.4 above)	Simplified
9.	App. A: Section 4: (Page A51)	Secure Yield – Climate Change Impacts Office of Water/CSIRO Climate Change models predict: • average surface availability may reduce by up to 9% by 2030 • "best" estimate of change in rainfall (from historical) is a reduction of 4% • runoff may reduce by 1% • groundwater extraction is predicted to increase by around 22%, to become 21% of total average use	It is recommended that Council determine "secure yield" and identify potential back up supplies from groundwater as well as developing targets for securing water from alternative sources (eg improved uptake of rainwater tanks and or recycling).	Simplified
10.	App. C	Demand Management Targets A range of potential demand management options has been identified in the modelling undertaken.	Council is preparing a Demand Management Strategy and will implement water saving measures with associated targets. Council will consider the Demand Management Plan in 2010	BaU

No.	Reference	IWCM Issue	Comments/Recommended Actions	Required Strategy
		Council has not yet adopted Target Water Savings		
11.	App. C: Section 4: (Page C21)	<u>WTP Upgrade</u> Provision for increasing the capacity of the Water Treatment Plant has been allowed in Council's Capital Works Program for 2023/24. Demand Management modelling has indicated that this could be deferred beyond 2038	Future upgrade timelines will be evaluated when the proposed demand management initiatives are completed and assessed	Simplified
12.	App. E: Section 7: (Page E14)	<u>TBL Performance Results (2007/08)</u> A number of issues have been identified from a review of Griffith's service provision performance (based on 2007/08 TBL Performance Reports). These are listed below:		
		a) <u>Water Supply</u>		
		• low residential water charge	Council will review as part of Demand Management Development Strategy	Simplified
		• high average duration of interruptions to supply	Nature of ageing water supply system. Council will address as part of Asset Management Plan	Simplified
		• annual residential water usage is high	Addressed as part of Demand Management Strategy	Simplified
		• water losses are high	Addressed as part of Demand Management Strategy	Simplified
		b) <u>Sewerage</u>		
		• odour complaints are high on a	Council will investigate sources and implement control	Simplified

No.	Reference	IWCM Issue	Comments/Recommended Actions	Required Strategy
		Statewide basis	strategies	
		• high suspended solids in effluent	Will be addressed when new MBR Plant is commissioned	BaU
		• Operating costs per property are high	This is a feature of the system	BaU
		• Pumping costs are high	This is the nature of the topography in Griffith with a larger than normal number of pump stations	BaU
13.	PRG Issue (1)	Water Restrictions and Impact on Revenue	Council sets its income/revenue annually. The pricing is based on anticipated lower demands. Prices will continue to be increased in line with demand and the potential impacts of demand management issues	BaU
14.	PRG Issue (2)	Long term viability of Lake Wyangan as a raw water back up water source	Water can be transferred to Lake Wyangan from the Canal and stored or transferred to provide off-stream storage. A Management Plan for Lake Wyangan is being developed with Murrumbidgee Irrigation. The strategy will review storage levels	Simplified
15.	PRG Issue (3)	Reclaimed water reuse Reduce demand on potable supplies by using reclaimed water for irrigating parks, sporting fields, open space areas, etc	Council is reviewing reuse. Target date for possible implementation is 2011/12. Incorporated in Council's Demand Management Plan	Simplified
16.	PRG Issue (4)	Water Storage Capacity Is there enough storage capacity in service reservoirs?	Current capacity is 55ML or 1.5 times Peak Day Demand	BaU

B. Non-Urban Water Servicing Issues

Table 28: Non Urban Water Servicing Issues

No.	Item	Issue	Relevant Department/Agency for Referral
1.	Flooding App. A: Sections 2 & 4: (Pages A15 & A47)	Problems with existing trunk drainage system to cope with 1/100 year recurrence interval events. System designed for 1/10 year events.	Griffith City Council and Murrumbidgee Irrigation
2.	CMA Targets: App. A: Section 2: (Page A17)	A number of the Murrumbidgee CMA's Resource Condition targets impinge on Salinity, Soils, Vegetation, Aquatic Ecosystems etc	Murrumbidgee CMA
3.	Water Quality Objectives: App A: (Page A20)	Achievement of water quality objectives under the NWI. Intergovernmental Agreement on Over Allocation	Murrumbidgee CMA
4.	Water Quality: App. A: (Page A24)	Limited monitoring for pesticides in Little Mirrool Creek has revealed the presence of pesticides (low concentration).	Murrumbidgee Irrigation Limited

7.4 RECOMMENDED ACTIONS

Sixteen (16) IWCM Urban Issues have been identified, of which ten (10) have been assessed as being addressed as part of Business as Usual (BaU). Since none of these unresolved Issues will require significant capital works within the next 10 years, those not capable of resolution by BaU will require strategies to be prepared under the "Simplified Scenarios".

Four (4) non-urban Water Related Issues have been identified for referral to the City Council, Murrumbidgee CMA and Murrumbidgee Irrigation.

8. RECOMMENDATIONS

1. That Council receive and endorse this Integrated Water Cycle Management Evaluation Study and refer it to the NSW Office of Water (Mr Paul Lee, Regional Manager South, Water Utilities Branch) for approval;

2. That Council resolve to proceed to develop strategies to address the unresolved Issues identified in Table 27 via the Simplified Scenario and that these be finalised and adopted within the next 10 years.

ATTACHMENTS

ATTACHMENT 1: REFERENCE GROUP

ATTACHMENT 2: 30 YEAR FORWARD CAPITAL WORKS PROGRAMS

ATTACHMENT 3: MURRUMBIDGE IRRIGATION MEMBER CONTRACT

ATTACHMENT 1: REFERENCE GROUP

The Table below lists the invitees and attendees at the joint PRG and Steering Committee meeting held in Griffith on 2 November 2009.

Name	Organisation	Attendance
Cr. Bill Lancaster	GCC	No
David Tull*	GCC	Yes
Frank Dyrssen*	GCC	Yes
Paul Lee*	NSW Office of Water	Yes
Richard Scott	NSW Health	No
Joanne Lothian*	Dept. Environment Climate Change & Water	No
Rob Kelly*	Murrumbidgee Irrigation	No
Durgananda Chaudary*	GCC	No
Mick Walsh*	GCC	Yes
Ben Bryant	Manager Orlando Wines	No
Lindsay Gulliver	De Bortoli Wines	No
Matt Boudreau	Casella Wines	No
John Tyrell*	GCC	Yes
Steve Oosthuysen*	GCC	Yes
Sonika Patonia	GCC	Yes
Craig Tilston	Griffith Chamber of Commerce	Yes
John Searson	Murrumbidgee CMA	No
Daryl McGregor*	DLM Environmental Consultants P/L	Yes

Apologies: Cr Bill Lancaster, GCC
Richard Scott. NSW Health

Notes: 1. Those marked * above also attended the Steering Committee Meeting held on 1 July 2009

ATTACHMENT 2: 30 YEAR FORWARD CAPITAL WORKS PROGRAMS

30 Year Capital Works Programme ($'000)

Sewerage Business

Item	Project	Type of works			Project Total	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19
		Improved LOS	Growth Works	Asset Renewals													
	Griffith																
1	Griffith WRP Design	50%	50%		**600**			600									
2	Griffith WRP Construction -Stage 1	50%	50%		**23,250**			15,300	7,950								
3	Griffith WRP - Landscaping/ Weather		100%		**200**			100	50	50							
4	Griffith WRP Construction - Stage 2		100%		**7,000**												
5	Griffith WRP Membrane Replacement			100%	**5,500**												
6	Replacement of GWRP Elec /Mech Equipment			100%	**1,250**								50		50		50
7	GWRP Effluent Reuse Project		100%		**850**							100	250	250	250		
8	Biosolids Strategy		100%		**40**							40					
9	Griffith WRP - Various	50%		50%	**260**								10	10	10	10	10
10	Upgrade of Pump Stations (civil & electrical)			100%	**1,850**			45	65	200	30	30	30	30	30	30	100
11	Pump Station G21 (Murrumb Av)		100%		**500**								500				
12	Pump Station G27 (Farm 9 Collina)		100%		**550**						550						
13	Pump Station (Farm 11 Collina)		100%		**500**											500	
14	Pump Station G31 (E of TWG)		100%		**0**												
15	Pump Station G32 (S of GWRP)		100%		**650**											650	
16	Pump Station G40 (S of GWRP)		100%		**0**												
17	Pump Station G41 (S of GWRP)		100%		**1,110**												
	Bilbul																
20	Pump Station PSBI2		100%		**300**												
	Yenda																
25	Upgrade of Yenda S.T.P equipment			100%	**210**					30			30				
26	Pump Station YE4		100%		**300**									300			
	Lake Wyangan																
30	Sewerage for Lake Wyangan and Nericon	100%			**1,600**							400	400	400	400		
31	Rising Main (G7 To GWRP)		100%		**850**										850		
32	Pump Station (2 Off)		100%		**850**			350						500			
33	Trunk Reticulation		100%		**580**								80	200	300		
	Tharbogang																

35	Sewerage for Tharbogang village		100%		**900**												450
	Hanwood																
38	Pump Station HA7		100%		**300**												300
	Mains Renewals																
40	Renewals of sewers and rising mains			100%	**11,496**			246	200	300	300	300	300	250	250	250	300
	Miscellaneous																
42	Upgrade of SCADA & Telemetry Systems	100%			**730**			30	10	10	10	10	50	10	10	10	10
43	Plant & Equipment			100%	**3,116**			208	101	151	13	113	102	34	162	119	13
44	Capital - various	90%		10%	**1,519**			19	50	50	50	50	50	50	50	50	50
				Total	**66,861**			**16,898**	**8,426**	**791**	**953**	**1,043**	**1,852**	**2,034**	**2,362**	**1,619**	**1,283**
		Improved LOS						7,997	4,030	55	55	455	500	460	460	60	60
		Other New System Assets						8,400	4,025	50	550	140	830	1,250	1,400	1,150	750
		Renewals						501	371	686	348	448	522	324	502	409	473

30 Year Capital Works Program Sewerage cont'd

2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34	2034/35	2035/36	2036/37	2037/38	2038/39	2039/40
				7,000																
	2,500										3000									
		100			100		120			120		120		120		140		140		140
10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
100	30	30	30	100	100	30	30	30	100	100	30	30	30	100	100	30	30	30	100	100
									550	560										
		300																		
			30				30				30				30				30	
450																				

300	300	300	300	300	400	400	400	400	400	400	400	500	500	500	500	500	500	500	500
100	10	10	10	10	200	10	10	10	10	10	10	10	10	10	50	10	10	10	50
100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
1,110	**3,000**	**900**	**530**	**7,570**	**960**	**600**	**750**	**600**	**1,220**	**1,350**	**3,630**	**820**	**700**	**890**	**840**	**840**	**700**	**840**	**800**	**950**
150	60	60	60	60	250	60	60	60	60	60	60	60	60	60	100	60	60	60	60	100
450	0	300	0	7,000	0	0	0	0	550	560	0	0	0	0	0	0	0	0	0	0
510	2,940	540	470	510	710	540	690	540	610	730	3,570	760	640	830	740	780	640	780	740	850

Griffith City Council - Long Term Infrastructure Plan					**25/05/2009**											
CAPITAL WORKS PROGRAMME ($'000)		**WATER SUPPLY**														
	Type of works			**Project Total**												
Project	Improved LOS	Growth Works	Asset Renewals		Actual 2007/08	Budget 2008/09	Proposed 2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19
Repaint/ Refurb Reservoirs 30Ml (1986)			100%	**250**		25										
Repaint/ Refurb Reservoirs 14Ml (1977)			100%	**452**										354		
Repaint/ Refurbish Reservoirs 9Ml (1949)			100%	**356**		12										267
Refurb Reservoir(Scenic Hill) -Raw Water	50%		50%	**0**												
Upsizing of Griffith W.T.P (15Ml)		100%	0%	**9,000**												
Upgrade (Elec/Mech/civil) Griffith W.T.P	60%		40%	**2,098**		342	160	174	154	100	100	100	50	250	20	20
Pressure Zoning	100%			**570**		200	320	250								
15 ML Storage (Scenic Hill)		100%		**3,098**								500	2,500			
Scada/Telemetery		100%	0%	**513**		8	31	20	6	6	6	6	6	6	100	6
Trunk Main Ext- Stage 1		100%		**3,762**		1,060	262	720	440	500	550	500		325	465	
Trunk Main Ext- Stage 2		100%		**3,016**												600
Trunk Main Ext- Stage 3		100%		**3,463**												
New Water Meters/ RPZ's	100%			**1,985**		180	110	75	60	60	60	60	60	60	60	60
Upgrade (Elec/Mech) Yenda W.T.P	25%	25%	50%	**393**		10	13		10					30		
Repaint/ Refurb Storage Reservoirs 2x Yenda	0%		100%	**357**		147										
Membrane Replacement			100%	**330**										110		
Raw Mains Replacement (4M)			100%	**96**							96					

Raw Mains Replacement (4H)			100%	**71**							71					
Raw Mains Replacement (3M)			100%	**474**										100	100	100
Raw Mains Replacement (3H)			100%	**1,720**												
Potable Mains Renewals (4M)			100%	**912**		296	406	300	206							
Potable Mains Renewals (4H)			100%	**209**					100	109						
Potable Mains Renewals (3M)			100%	**238**							238					
Potable Mains Renewals (3H)			100%	**5,619**								250	300	400	300	300
Potable /Raw Mains Renewals General(2M-2H)			100%	**3,000**												
Water Meter/ RPZ's Renewals			100%	**1,600**		60	50	50	50	50	50	50	50	50	50	50
New Mains (Potable)		100%		**3,102**		30	127	75	100	100	100	100		100	100	100
New Mains (Raw)		100%		**40**		20	0		40							
Various	90%	10%		**3,100**				100	100	100	100	100	100	100	100	100
Replace Elec/ Mech Equip P/Stations	100%			**980**			180		200				100			
Plant and Equipment			100%	**5,614**		201	208	346	194	108	182	105	290	108	210	63
Sundry Tools	100%			**320**		28	10	10	10	10	10	10	10	10	10	10
Miscellaneous	20%	30%	50%	**1,353**		72	0	33	40	40	40	40	40	40	45	45
		Total Capital		**58,091**		**0**	**1,877**	**2,153**	**1,710**	**1,183**	**1,603**	**1,821**	**3,506**	**2,043**	**1,560**	**1,721**
	Improved LOS			**8,273**		0	719	536	463	228	228	228	298	326	181	181
	Growth Works			**26,808**		0	423	835	611	628	678	1,128	2,528	461	689	730
	Renewals			**23,010**		0	735	782	637	327	697	465	680	1,257	691	810
			Total	**58,091**												
	Possible Subsidy															

30 Year Capital Works Program Water Supply cont'd

2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34	2034/35	2035/36	2036/37	2037/38	2038/39	2039/40	2040/41
																	250				
																250					
						98															
	89																				
				5,000	4,000																
20	50	100	100			50	10	10	10	10	100	250	20	20	20	20	100	20	20	20	20
																					98
6	6	6	6	6	6	6	6	100	6	6	6	6	6	6	6	6	6	100	6	6	6
516	1,050	850																			
			750	765		800	828	320													
60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
		130					30					150					30				
								217					140								

						110										110				
100	74																			
							100	200	200	200	200	200	200	200	220					
300	326	400	400	400	400	400	300	300	300	300	243									
												300	300	300	300	300	300	300	300	300
50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	100					100					100					100				100
150	150	150	150	150	150	150	150	150	150	150	150	200	200	200	200	200	200	200	200	200
10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
1,457	**2,210**	**2,001**	**1,771**	**6,686**	**4,921**	**2,079**	**1,789**	**1,662**	**1,031**	**1,031**	**1,164**	**1,471**	**1,231**	**1,091**	**1,111**	**1,351**	**1,001**	**985**	**891**	**891**	**1,089**
181	299	262	229	169	169	299	183	175	175	175	329	357	181	181	181	281	237	181	181	181	281
646	1,180	1,012	880	5,895	4,130	930	965	544	130	130	130	167	130	130	130	130	137	224	130	130	228
631	732	728	663	623	623	851	642	944	727	727	706	948	921	781	801	941	628	581	581	581	581

ATTACHMENT 3: MURRUMBIDGEE IRRIGATION: MEMBER CONTRACT

ANNEXURE A: MEMBER CONTRACT

Parties

MURRUMBIDGEE IRRIGATION Limited ACN 084 943 037

THE MEMBER IDENTIFIED IN SCHEDULE 1

(As amended at the general meeting on 7 September 2006)

TABLE OF CONTENTS

PREAMBLE

The Company seeks to ensure the satisfaction of customers' expectations through achieving high quality performance at competitive prices. That goal converts into our objectives:

- to provide timely cost efficient and effective services;
- to provide an environmentally sustainable irrigation area;
- to be commercially and technically excellent; and
- to provide a safe and satisfying work culture.

The attached Member Contract sets out the terms under which the Company will provide services to you.

The Member Contract also links the responsibility for on-farm works and behaviours, especially in environmental sustainability matters, with the provision of services. In that way it recognises the social, economic and financial aspects of irrigation that are integral to environmental improvement.

The Company has a number of licences that permit it to operate and service your needs. The Company needs surety that those licences will not be jeopardised by the actions or inaction of a minority of its customers.

We need all to work together to ensure our future success, by further developing and maintaining a healthy and sustainable irrigation area and the Member Contract ensures that the Company can act to protect the broad interest of customers for the benefit of all.

This Preamble does not form part of the Member Contract.

PARTIES **MURRUMBIDGEE IRRIGATION Limited ACN 084 943 037**

AND **MEMBER IDENTIFIED IN SCHEDULE 1**

IT IS AGREED

1. DEFINITIONS AND INTERPRETATION

1.1 Definitions

In this Contract, unless the context otherwise requires:

(1) **"Access Charges"** means the amounts determined under **subclause 12.1(1)**;

(2) **"Access Arrangements"** means the arrangements determined under **clause 18**;

(3) **"Access Licence"** has the meaning given to that term in the Act;

(4) **"Act"** means the *Water Management Act 2000* (NSW);

(5) **"activity"** has the same meaning in this Contract as it has in the *Environmental Planning and Assessment Act 1979* (NSW);

(6) **"Area of Operations"** means the area that can be serviced by the water supply and drainage Works of the Company and includes the areas comprising:

(a) the former Yanco No 1 and Mirrool No 1 Irrigation Areas constituted under the former *Irrigation Act 1912* (NSW); and

(b) the former Benerembah, Tabbita and Wah Wah Domestic and Stock Water Supply and Irrigation Districts constituted under the former *Water Act 1912* (NSW);

(7) **"Availability Announcement"** means any determination made from time to time by the relevant Government Agency with respect to the percentage of water allocation available to the Company in any Season under the Company's Access Licences for diversion from the Murrumbidgee River;

(8) **"Business Day"** means a day that is not a Saturday, Sunday or any other day that is a public holiday or a bank holiday in New South Wales;

(9) "**Charges**" mean:

(a) Access Charges;

(b) Usage Charges; and

(c) any other sum of money charged by the Company under this Contract;

(10) **"Claim"** includes any claim, legal action or demand;

(11) **"Company"** means Murrumbidgee Irrigation Limited ACN 084 943 037;

(12) **"Company's Base Allocation"** means the types and quantity (expressed in Megalitres) of water allocation held by the Company under its Access Licences;

(13) **"Company's Drainage Works"** means the Works specified in **Schedule 6**;

(14) **"Company's Employees"** means the Company's employees, contractors, officers, invitees, agents, clients, licensees and those Persons who at any time are under the control of and are in the Area of Operations with the consent (express or implied) of the Company;

(15) **"Company's Nominee"** has the same meaning in this Contract as it has in the Constitution;

(16) **"Company's Works"** means the Works specified in **Schedules 5, 6**, and **7**;

(17) **"Company's Supply Works"** means the Works specified in **Schedule 5**;

(18) **"Constitution"** means the constitution of the Company;

(19) **"Contract"** means this agreement and all annexures and schedules to it;

(20) **"Conversion Rules"** means the rules determined by the Company under **clause 25.1**;

(21) **"Corresponding Shares"** has the same meaning as it has in the Constitution;

(22) **"Cost"** includes any cost, charge, expense, outgoing, payment or other expenditure of any nature whatever, including all reasonable and proper professional fees;

(23) **"Damage"** includes loss or damage to property;

(24) **"Default Notice"** means a notice given under **clause 28.2**;

(25) **"Disputes Committee"** means a committee constituted under **clause 31.2**;

(26) **"Disputes Panel"** means the disputes panel empanelled under the Constitution;

(27) **"Drainage"** includes surface and subsurface drainage;

(28) **"Drainage Service Entitlement"** means the entitlement set out in **Schedule 8**;

(29) **"Event of Default"** means any one of the events referred to in **clause 28.1**;

(30) **"Government Agency"** means a department of State, statutory authority, public authority, instrumentality, corporation, body or person whether Federal, State or local;

(31) **"High Security Allocation Holder"** means a holder of a type 3, 4, 5, 6 and 7 (as defined in **Annexure A**) Member's Base Allocation and identified as such in **Schedule 3**;

(32) **"Inactive Member's Base Allocation"** means a Member's Base Allocation that has no Landholding associated with it and which has been approved under **clause 26.2** to be inactive;

(33) **"Land and Water Management Plans"** means the Land and Water Management Plan or Plans (if any) from time to time required and approved by the relevant Government Agency for the Area of Operations;

(34) **"Landholding"** means the property described in **Schedule 2**;

(35) **"Landholder"** has the same meaning in this Contract as in the Constitution;

(36) **"Law"** means any statute, rule, regulation, proclamation, order, ordinance or by law whether present or future and whether Federal, State, territorial or local (in this subclause referred to as a **"Statutory Provision"**) and includes:

(a) any such Statutory Provision as amended or re-enacted from time to time; and

(b) any statute, regulation, rule, proclamation, order, ordinance or by-law enacted in replacement of that Statutory Provision;

(37) **"Licences"** means:

(a) any licence held by the Company under section 122 of the Act;

(b) any Access Licence held by the Company; and

(c) any licence held by the Company under the *Protection of the Environment Operations Act 1997* (NSW);

(38) **"Megalitre"** means one million litres;

(39) **"Member"** means the Person or Persons identified in **Schedule 1**;

(40) **"Member Director"** has the same meaning in this Contract as in the Constitution;

(41) **"Member's Annual Allocation"** means the volume of water determined under **clause 5.1**;

(42) **"Member's Base Allocation"** means the type and quantity (expressed in numbers of Megalitres) of water allocation held by the Member and set out in **Schedule 3** as varied from time to time under **clause 24**;

(43) **"Member's Works"** means Works owned by or under the control of the Member;

(44) **"Meter"** means a water measurement apparatus used to measure and account for water;

(45) **"Month"** and **"Monthly"** means respectively calendar month and once each calendar month;

(46) **"Normal Security Allocation Holder"** means a holder of a type 1 or 2 (as defined in **Annexure A)** Member's Base Allocation and identified as such in **Schedule 3**;

(47) **"Notice of Intention"** means a notice given by the Company under **clause 28.5(1)**;

(48) **"Off-Allocation Supply"** means a volume of water determined under **clause 7.1**;

(49) **"Other Conditions"** means the other conditions set out in **Schedule 9**;

(50) **"Permitted Use"** means any activity undertaken by the Member in respect of a Member's Annual Allocation that is consistent with this Contract, the Licences and any relevant Law or Requirement;

(51) **"Person"** includes a firm, an unincorporated association, a Government Agency or body corporate;

(52) **"Requirement"** means any statutory requirement, notice, order or direction received from or given by any Government Agency;

(53) **"Season"** means each period determined under **clause 17.1**;

(54) **"Stakeholder Representation Body"** means the Ricegrowers' Association, MIA Council of Horticultural Associations, Wah Wah Management Board and any other body or organisation recognised by the Company as representing the Member's interests;

(55) **"Shares"** means shares in the Company;

(56) **"Transfer Rules"** means the rules determined under **clause 24.1**;

(57) **"Usage Charges"** means the amounts determined under **clause 12.1(2)**; and

(58) **"Work"** has the same meaning in this Contract as "*water management work*" has in the Act.

1.2 Interpretation

In this Contract, unless the contrary intention appears:

(1) references to:

(a) one gender include the other genders;

(b) the singular include the plural and the plural include the singular;

(c) a party include:

(i) in the case of a body corporate, its successors, assigns and substitutes (including Persons taking by novation); and

(ii) in the case of a natural person, the person's executors, administrators, assigns and substitutes (including Persons taking by novation);

(d) a Government Agency include a Government Agency to which the functions of a former Government Agency are or have been allotted;

(e) any organisation that has ceased to exist will be deemed to be references to an organisation having substantially the same objects as the organisation that has ceased to exist;

(f) the president of an organisation will, in the absence of a president, be read as references the senior officer for the time being of the organisation or any other person fulfilling the duties of president;

(g) an officer or body of persons includes any other officer or body for the time being exercising the powers or performing the functions of that officer or body;

(h) a right include a remedy, authority or power;

(i) this Contract or any other instrument include any amendment, variation or replacement of any of them;

(j) a Schedule or Annexure are to a schedule or annexure to this Contract;

(k) any statute, rule, regulation, proclamation, order, ordinance or by-law include that statute, rule, regulation, proclamation, order, ordinance or by-law as amended or re-enacted from time to time and any statute, rule, regulation, proclamation, order, ordinance or by-law enacted in replacement of it;

(2) an agreement, representation or warranty in favour of two or more Persons is for the benefit of them jointly and severally;

(3) an agreement, representation or warranty on the part of two or more Persons binds them jointly and severally;

(4) every obligation undertaken by a party to this Contract will be deemed to be and construed as, a covenant by that party;

(5) a reference to anything (including any amount) is a reference to the whole and each part of it and a reference to a group of Persons is a reference to all of them collectively, to any two or more of them collectively and to each of them individually;

(6) all monetary amounts are in Australian dollars, unless otherwise stated;

(7) headings are for convenience only and do not affect the interpretation, or form part, of this Contract;

(8) the preamble does not form part of this Contract;

(9) "including" and similar expressions are not words of limitation; and

(10) where a word or expression is given a particular meaning, other parts of speech and grammatical forms of that word or expression have a corresponding meaning.

2. REMEDIES

2.1 The parties acknowledge and agree that:

(1) monetary damages alone may not be a sufficient remedy for breach of this Contract; and

(2) in addition to any other remedy that may be available at law or in equity, each party is entitled to interim, interlocutory or permanent injunctions or any combination of them to prevent a breach and to compel specific performance of this Contract.

3. COMMENCEMENT AND TERMINATIONS

3.1 This Contract will commence in accordance with the Constitution.

3.2 This Contract will expire on the cancellation of the Company's Access Licence.

4. SUPPLY OF WATER BY COMPANY

4.1 Subject to the terms of this Contract, the Company must supply:

(1) the Member's Annual Allocation; and

(2) the Off-Allocation Supply (if any),

in each case:

(3) to the Company's Supply Works; and

(4) in accordance with the Access Arrangements.

4.2 The Company is under no obligation to supply water under **clause 4.1:**

(1) if the Company is entitled elsewhere in this Contract to suspend the supply of water to the Member;

(2) unless and until the Member's Annual Allocation for the relevant Season has been determined;

(3) unless and until the Company has been given access to water under an Access Licence in accordance with the Availability Announcement;

(4) unless and until the Company and the Member have agreed upon satisfactory arrangements for payment of arrears (if any) of Charges;

(5) unless and until the Company is reasonably satisfied that the Member's Works are adequate to deal with the supply of water requested by the Member;

(6) unless and until the Member has complied with reasonable requests (if any) from the Company to advise the Member's intended use of water supplied to the Landholding for the relevant Season for the purposes either of demand management or water use efficiency monitoring programs and the Company has approved that use; and

(7) if supply of water, in the reasonable opinion of the Company, would result in a breach of any right or entitlement of a third party where such breach might reasonably expose the Company to liability to such third party.

5. MEMBER'S ANNUAL ALLOCATION

5.1 As soon as practicable after any Availability Announcement for the relevant Season, the Company must determine the volume of water (if any) available to the Member in respect of the Landholding for that Season.

5.2 The Company must notify the Member of the Member's Annual Allocation and any increase under **clause 5.5** for the Season in a newspaper or newspapers circulating generally throughout the Area of Operations.

5.3 If the Member is a High Security Allocation Holder, the Company must make available for supply to the Member the same percentage of the Member's Base Allocation as the Company is entitled to of the Company's Base Allocation for the type(s) of allocation.

5.4 If the Member is a Normal Security Allocation Holder, the Company must usually make available for supply to the Member the same percentage of the Member's Base Allocation as the Company is entitled to of the Company's Base Allocation for the type(s) of allocation.

5.5 Subject to **clauses 5.3** and **5.4**, the Company may increase the Member's Annual Allocation on one or more occasions in any Season following increases in the percentage available to the Company in respect of the Company's Base Allocation for the type(s) of allocation held by the Member.

5.6 The Company may reduce the Member's Annual Allocation if, in the reasonable opinion of the Company, a reduction is required following a decrease in the percentage of water available to the Company in respect of the Company's Base Allocation for the type(s) of allocation held by the Member.

5.7 The Company may refuse to continue to make available the Member's Annual Allocation to the Member if, in the reasonable opinion of the Company, this is required to comply with the Company's obligations under the Licences.

5.8 The Company must notify the Member in writing of a refusal to supply the Member's Annual Allocation under **clause 5.7** as soon as practicable.

6. MEMBER'S OBLIGATIONS

6.1 The Member must request the Member's Annual Allocation and any Off Allocation Supply in the manner and within the time determined by the Company and notified by the Company to the Member.

6.2 The Member must not take water from the Company's Supply Works:

(1) if there is an Event of Default subsisting; or

(2) otherwise than in accordance with this Contract, including the Access Arrangements.

6.3 The Member may use the Member's Annual Allocation only for or in connection with Permitted Use.

7. OFF ALLOCATION SUPPLY

7.1 The Company may, in any Season, determine that a volume of water is available to the Member in addition to the Member's Annual Allocation.

7.2 The Company must notify the Member of a determination under **clause 7.1** as soon as practicable.

8. MEASUREMENT OF WATER USAGE

8.1 The supply of water by the Company to the Landholding must, where appropriate, be measured by a Meter.

8.2 The Company must use its best endeavours to maintain the Meter, whether installed by the Company or the Member, in good repair and condition.

8.3 The Company may, at such intervals as it determines:

(1) take and record readings from the Meter; or

(2) require the Member to take and record readings from the Meter.

8.4 In the absence of manifest error, the quantity of water supplied by the Company as registered by the Meter will be taken to be conclusive evidence and proof of the quantity of water actually supplied unless the Company decides, on reasonable grounds, that a materially different quantity was supplied.

8.5 Where:

(1) the Meter is out of repair;

(2) in the opinion of the Company, the Meter is measuring incorrectly; or

(3) there is no Meter or other instrument measuring supply,

the Company may determine the quantity of water supplied to the Member using any reasonable means it considers fit.

8.6 The Company's determination of the quantity of water supplied under **clause 8.5** will be taken to be the actual quantity of water supplied to the Member.

8.7 The Company must give the Member notice in writing of its determination under **clause 8.5.**

8.8 The Member must take all reasonable steps to ensure the safekeeping of the Meter installed on the Landholding and must not prevent access by the Company or the Company's Employees to the Meter.

8.9 The Member must not interfere with, alter or remove, or allow interference, alteration or removal of, a Meter or other apparatus for the measurement of water without the prior written consent of the Company.

9. DRAINAGE

9.1 In discharging water from the Landholding the Member must:

(1) comply with water quality standards prescribed by the Company having regard to the requirements of the Licences;

(2) comply with any conditions of the Drainage Service Entitlement;

(3) ensure that water discharges only through the Company's Drainage Works; and

(4) not exceed volumes or flow rates (if any) specified in the Drainage Service Entitlement.

9.2 In respect of the Landholding, the Member must comply with the reasonable directions of the Company, notified by the Company to the Member in writing, for the purpose of reducing the impact of pesticides, nutrients, salt and any other contaminant or water condition on receiving waters.

9.3 The Company is not obliged to allow the Member to discharge any substance into any Works if:

(1) the Member has no Drainage Service Entitlement;

(2) the Member fails to comply with **clauses 9.1** and **9.2**; or

(3) to do so may contravene or cause a contravention of any of the Licences.

10. DRAINAGE SERVICE ENTITLEMENT

10.1 The Company must from time to time determine an entitlement which enables the Member to drain water into the Company's Works.

10.2 The Member must comply with the requirements of the Drainage Service Entitlement.

10.3 The Company must notify the Member in writing of each Drainage Service Entitlement as soon as practicable.

10.4 The Member and the Company agree that each Drainage Service Entitlement is deemed to be included in this Contract in **Schedule 8** on the date that is 14 days from the date of the notice referred to in **clause 10.3**.

11. OTHER CONDITIONS

11.1 The Member must comply with the Other Conditions.

12. CHARGES

12.1 Each Season, the Company must determine charges:

(1) **Access Charges:** in accordance with the Company's pricing policy, to apply irrespective of whether or not water is delivered to the Member; and

(2) **Usage Charges:** in accordance with the Company's pricing policy to apply in respect of each Megalitre of water supplied to the Member in a Season.

12.2 The Company must notify the Member of each determination under **clause 12.1** as soon as practicable and in any case by no later than 30 September each year.

12.3 The Member must pay the Charges as directed in the notice given under **clause 12.2** in the case of charges other than the Access Charges and Usage Charges, or as otherwise directed.

12.4 The Member's obligation to pay any Charges is not affected:

(1) by a failure to receive a notice;

(2) by virtue of the fact that a notice is addressed to the wrong person for any reason; or

(3) by virtue of the fact that a notice is not addressed to a Member,

unless it is established to the reasonable satisfaction of the Company that such failure is due to the neglect or default of the Company or the Company's Employees, in which case:

(4) the Member's obligation to pay the Charges will not arise until the Member receives a written notice from the Company setting out the Charges payable by the Member and date by which those Charges must be paid; and

(5) the Company may not charge interest under **clause 12.6** on the Charges to be paid by the Member until the expiry of the due date for payment under **subclause 12.4(4).**

12.5 Without limiting **clause 12.3,** the Company may from time to time require the Member to reimburse the Company for an appropriate part (as determined by the Company from time to time, and notified to the Member, having regard to the applicability of the Land and Water Management Plan to the Landholding) of the reasonable Costs incurred by the Company implementing any Land and Water Management Plan.

12.6 The Company may charge interest on any Charges due from the Member from the date on which those amounts respectively fell due for payment until they are paid. The rate of interest to apply is that rate set by section 356 of the Act.

13. CONSTRUCTION, MAINTENANCE AND REPAIR OF MEMBER'S WORKS

13.1 The Member must, at the Member's Cost, ensure that all of the Member's Works connected to the Company's Works are properly cleaned and maintained.

13.2 The Member must, in accordance with any relevant Laws or Requirements, construct, alter, remove or improve (or procure, in accordance with any relevant Laws or Requirements, approval, construction, alteration, removal or improvement of) any of the Member's Works deemed reasonably necessary or desirable by the Company as notified by the Company in writing to the Member, for the efficient management and conveyance of water supply to and Drainage from the Landholding.

13.3 If the Member defaults under **clause 13.1** or **13.2,** the Company or the Company's Employees may enter the Landholding and clean and maintain, construct, alter, remove or improve the relevant Member's Work(s) as deemed reasonably necessary or desirable by the Company.

13.4 All Costs reasonably incurred by the Company or the Company's Employees in entering the Landholding and cleaning and maintaining, constructing, altering, removing or improving the relevant Member's work(s) as deemed necessary or desirable by the Company will constitute a debt due from the Member to the Company that must be paid by the Member to the Company on demand.

14. LAND & WATER MANAGEMENT PLANS

14.1 The parties acknowledge and agree that:

(1) the Area of Operations is, or will be, affected by a Land and Water Management Plan;

(2) the Company may be the Person having responsibility for implementation of the Land and Water Management Plan;

(3) the Land and Water Management Plan is likely to contain a number of obligations, some of which will apply to the Company, some to the Member and some to third parties; and

(4) it may be necessary or expedient, as a result of implementation of the Land and Water Management Plan:

(a) for the Company to make mandatory certain new practices and to change some customary practices to enable the objectives of the Land and Water Management Plan to be achieved; and

(b) for the Member to obtain appropriate training and certification to comply with the Land and Water Management Plan provisions.

14.2 At his or her own Cost, the Member must adopt any new or changed practices required under **clause 14.1(4)** provided such practices are, in the Company's reasonable opinion, necessary for achieving the objectives of the Land and Water Management Plan.

15. ACCESS TO LANDHOLDING

15.1 The Member acknowledges that the Company has rights to enter land within the Area of Operations under section 120 of the Act.

15.2 In addition to the Company's rights under the Act, the Member must give the Company and the Company's Employees reasonable access to the Landholding for any purpose related to or in connection with the subject matter of this Contract.

16. MEMBER NOT TO CAUSE A CONTRAVENTION OF THE LICENCES

16.1 The Company must notify the Member from time to time in writing of the Company's obligations under its Licences.

16.2 The Member must not knowingly do or omit to do anything that may cause a contravention of the Licences.

16.3 The Member indemnifies and will keep indemnified the Company from and against all Claims and Costs to which the Company will or may become liable as a result of any contravention referred to in **clause 16.2** except to the extent that the negligence of the Company causes or contributes to the quantum of any such Claims or Costs.

17. SEASON

17.1 Each year the Company must determine, in consultation with the Member in a manner the Company considers appropriate, the period during which the Member will be supplied with water and to which the determination of the Member's Annual Allocation relates.

17.2 The Company may vary the Season.

17.3 The Company must notify the Member of the Season and any variations under **clause 17.2** as soon as practicable.

18. ACCESS ARRANGEMENTS

18.1 The Company must determine arrangements for the supply of the Member's Annual Allocation to the Member and other users of water and the priority of access to available water flows.

18.2 The Company may, from time to time, vary the Access Arrangements.

18.3 The Access Arrangements must not be inconsistent with this Contract.

18.4 The Company must notify the Member of the Access Arrangements and any variations under **clause 18.2** as soon as practicable.

19. SUBDIVISION

19.1 The Company and the Member acknowledge that subdivision of a Landholding is relevant for the purposes of supply of water to and drainage of water from a Landholding.

19.2 As soon as possible after lodging a plan of subdivision of a Landholding with the relevant Government Agency, the Member must:

(1) notify the Company of his or her intention to subdivide the Landholding; and

(2) enter into good faith negotiations with the Company regarding the reallocation of water between the subdivisions.

19.3 The Company may determine a new Member's Base Allocation in respect of any one or more of the Landholdings created by the subdivision.

19.4 If the Company determines a new Member's Base Allocations under **clause I9.3** the Member must enter into a new Member Contract with respect to each new Member's Base Allocation.

19.5 In respect of subdivisions carried out for the purpose of change of land use to urban, rural residential or industrial purposes, the Company may refuse to determine a new Member's Base Allocation in respect of any one or more of the Landholdings created by the subdivision, or impose other conditions on any new contract for any one or more of the Landholdings.

19.6 Any remaining Member's Base Allocation not allocated to a Landholding under **clauses 19.3** or **19.5** will become Inactive Member's Base Allocation.

20. OWNERSHIP OF INTELLECTUAL PROPERTY

20.1 The intellectual property in any device, method, technical know-how, innovative work, system, procedure or any other innovation or invention jointly owned, developed, manufactured, improved or invented by the Company and the Member will be the joint property of the Company and the Member unless otherwise agreed in writing.

21. STOCK DAMAGE TO COMPANY'S WORKS

21.1 In this **clause 21:**

(1) **"former Irrigation Areas"** means the areas comprising the former Yanco No 1 and the Mirrool No 1 Irrigation Areas constituted under the former *Irrigation Act 1912* (NSW); and

(2) **"former Irrigation Districts"** means the areas comprising the former Benerembah, Wah Wah and Tabbita Domestic and Stock Water Supply and Irrigation Districts constituted under the former *Water Act 1912* (NSW).

21.2 The Member must ensure that stock owned or under the control of the Member does not cause any Damage to the Company's Works.

21.3 If stock owned by or under the control of the Member causes Damage to any of the Company's Works the Company may issue a warning to the Member that it holds the Member responsible for such Damage and provide an opportunity for the Member to show cause why the Company should not hold the Member responsible.

21.4 If, after the Member has responded under **clause 21.3** the Company is reasonably satisfied that the Member is:

(1) not directly or indirectly responsible for the Damage: the Company must give the Member notice in writing that it does not hold the Member responsible for the Damage; or

(2) directly or indirectly responsible for the Damage: the Company may:

(a) require the Member to pay the Cost of the Damage to the Company's Works; or

(b) give the Member notice that, if there are any subsequent occasions of Damage:

(i) if the Landholding is in the former Irrigation Areas: the Member may be required to meet half the Cost to fence the boundary of the landholding and the Company's adjacent land with the Company meeting the remaining half of the Cost;

(ii) if the Landholding is in the former Irrigation Districts: the Company may fence the works from the remainder of the Landholding at the Cost of the Company; or

(iii) any further Damage by stock from the Landholding to the Company's Works may result in the suspension or cancellation of any water supply to the Landholding, in addition to claims for recovery of the Cost of repairing Damage caused.

21.5 All fences constructed under this **clause 21** will in future be the responsibility of the adjoining Landholder (in former Irrigation Areas) or the Landholder (in former Irrigation Districts) for maintenance and replacement.

21.6 All fences constructed under this **clause 21** will be constructed so that they are effective in excluding stock from the Company's Works, including where necessary the installation of offline stock watering facilities.

22. OTHER DAMAGE TO COMPANY'S WORKS

22.1 This **clause 22** does not limit or apply to Damage referred to in **clause 21.**

22.2 The Member must not cause any Damage to the Company's Works.

22.3 If the Member causes Damage referred to in **clause 22.2** to the Company's Works the Company may issue a warning to the Member that it holds the Member responsible for such Damage and provide an opportunity for the Member to show cause why the Company should not hold the Member responsible.

22.4 If, after the Member has responded under **clause 22.3** the Company is reasonably satisfied that the Member is:

(1) not directly or indirectly responsible for the Damage: the Company must give the Member notice in writing that it does not hold the Member responsible for the Damage; or

(2) directly or indirectly responsible for the Damage: the Company may:

(a) require the Member to pay for the Damage to the Company's Works; or

(b) give the Member notice that any subsequent occasions of Damage to the Company's Works may result in the suspension or cancellation of any water supply to the adjacent landholding, in addition to a Claim for recovery of the Cost of repairing the Damage.

23. CONTROL OF NOXIOUS WEEDS

23.1 In addition to any Law or Requirement, the Member must control noxious weeds (as defined in the *Noxious Weeds Act 1993* and any regulation made under that Act) on any of the Company's land which dissects the Landholding, or forms part of its boundary or is within 20 metres from the boundary of the Landholding.

23.2 If any of the Company's land less than 40 metres wide is situated between the Landholding and a Landholding of another member of the Company, the requirement for each Member to control noxious weeds extends to noxious weeds located on that part of the Company's land that is located between the boundary of the Landholding and the middle line of the Company's land.

23.3 In controlling noxious weeds on the Company's land the Member must:

(1) comply with all Laws and Requirements including guidelines for best management practice approved by the relevant Government Agency applicable to the carrying out of weed control activities;

(2) accept the supervision and advice of the Company's Employees with respect to noxious weeds;

(3) provide any information reasonably requested by the Company or the Company's Employees with respect to the Member's weed control activities;

(4) obtain all appropriate training and any necessary certification for use of the chemicals and equipment for control; and

(5) not do anything which is reasonably likely to pollute the Company's Works.

23.4 The Member acknowledges that he or she is not permitted to apply any control sprays to the flow area of the Company's Works.

23.5 If the Member fails to perform an obligation in accordance with **clauses 23.1** or **23.2** within a reasonable time (and in any event, within 30 days) after receiving a notice from the Company, the Company or the Company's Employees may undertake works to control the relevant noxious weeds.

23.6 All Costs reasonably incurred by the Company in carrying out works to control the relevant noxious weeds under **clause 23.5** will constitute a debt due from the Member to the Company that must be paid by the Member to the Company on demand.

24. TRANSFER AND VARIATION OF MEMBER'S BASE ALLOCATION

24.1 The Company must determine rules governing:

(1) the permanent transfer of the Member's Base Allocation including transfers to other members of the Company;

(2) the creation of new Member's Base Allocation by utilising an increase in the share component, or any uncommitted part of the share component, of an Access Licence that is held by the Company;

(3) arrangements for the cancellation of the Member's Base Allocation and corresponding reduction in the share component of the Company's relevant Access Licence;

(4) the temporary transfer of the Member's Annual Allocation including transfers to other members of the Company;

(5) the creation of new Member's Annual Allocation by the temporary transfer of allocation into the water allocation accounts of the Company;

(6) arrangements for the temporary transfer of the Member's Annual Allocation out of the water allocation accounts of the Company; and

(7) other dealings in relation to Member's Base Allocation including leasing and licensing.

24.2 The Company may, from time to time, amend the Transfer Rules.

24.3 The Company must notify the Member in writing of the Transfer Rules and any amendments to the Transfer Rules under **clause 24.2** as soon as practicable.

24.4 The Member must transfer and/or vary the Member's Base Allocation and Member's Annual Allocation in accordance with the Transfer Rules.

24.5 In transferring the Member's Base Allocation the Member must also deal with any Corresponding Shares in accordance with the Constitution.

25. CONVERSION OF MEMBER'S BASE ALLOCATION

25.1 The Company must determine rules governing:

(1) the conversion of the Member's Base Allocation from one type of allocation to another;

(2) the move to irrigate horticulture on land designated for mixed farming purposes.

25.2 The Company may, from time to time, amend the Conversion Rules.

25.3 The Company must notify the Member in writing of the Conversion Rules and any amendments to the Conversion Rules under **clause 25.2** as soon as practicable.

26. MAKING MEMBER'S BASE ALLOCATION INACTIVE

26.1 In the event that a Member wishes to dispose of his or her Landholding but does not wish to dispose of the Member's Base Allocation or a part of it, the Member must apply to the Company to retain the remainder as an Inactive Member's Base Allocation.

26.2 The Company must notify the Member of its approval or refusal within 30 days of receipt of an application from the Member under **clause 26.1**.

26.3 If the Company gives its approval under **clause 26.2** the Member must transfer his or her Corresponding Shares to the Company's Nominee in accordance with the Constitution.

26.4 For the period during which the remainder of the Member's Base Allocation is Inactive Member's Base Allocation, Charges continue to accrue, and the Member's rights to enter into temporary and permanent transfers also continue in respect of the Inactive Member's Base Allocation.

26.5 To reactivate Inactive Member's Base Allocation, the person must apply to the Company for the transfer of the Corresponding Shares.

26.6 On application by the Member and subject to compliance by the Member with the Transfer Rules and the Constitution, the Company must reactivate an Inactive Member's Base Allocation.

26.7 The terms of this Contract continue to apply so far as is possible during the term for which the Member's Base Allocation is Inactive Member's Base Allocation.

27. BREACH OF OBLIGATIONS LINKED TO LICENCES

27.1 If the existing manner of use of the Landholding (including, if relevant the application of water), in the reasonable opinion of the Company, breaches or is likely to breach any of the Licences the Company must give notice to the Member:

(1) specifying the manner in which the use results or may result in a breach of any of the Licences; and

(2) recommending alterations to the use of the Landholding to remedy or avoid the breach of the Licences.

27.2 Within 60 days, or such longer period as has been allowed by the Company, of receipt of a notice under **clause 27.1**, the Member must provide the Company with:

(1) written evidence that the recommendations of the Company are being implemented by the Member; or

(2) a written proposal setting out reasonable (in the opinion of the Company) alternatives to the Company's recommendations under **clause 27.1(2)** in relation to the use of the Landholding.

27.3 If the Member proposes alternatives under **clause 27.2(2)** the Company must, within 30 days, advise the Member that:

(1) that the Member's proposal under **clause 27.2(2)** is acceptable; or

(2) that the Member's proposals is not acceptable, in which case the Member will be in default.

28. DEFAULT

28.1 An Event of Default occurs if:

(1) any money payable by the Member under this Contract remains unpaid for 28 days after the date appointed for payment although no formal or legal demand has been made;

(2) the Member fails to perform any obligations on the part of the Member to be performed under this Contract;

(3) in the case where the Member is a natural person, the Member becomes bankrupt;

(4) in the case where the Member is a body corporate, the Member becomes insolvent; and

(5) the Member repudiates this Contract.

28.2 If a default referred to in **clause 28.1** occurs, the Company must give written notice to the Member that:

(1) particularises the relevant Event of Default; and

(2) states that the Company either:

(a) waives the Event of Default; or

(b) requires the Member to remedy or rectify the default within the time specified in the notice.

28.3 Subject to giving any prior demand or notice required by Law and without prejudice to any other claim that the Company may have against the Member with respect to the Event of Default, if the Member defaults as specified under **clause 28.1** the Company may, after the period referred to in **clause 28.2(2)(b)**:

(1) suspend all or part of the Member's Annual Allocation (if any) pending remedy of the default and without any obligation to make up any shortfall in supply to the Member once the default is remedied;

(2) suspend all or part of the Member's Drainage Service Entitlement, if any, pending remedy of the default and without any liability to make up for the impact of flooding from the suspension of the Drainage Service Entitlement, to the Member once the default is remedied;

(3) if appropriate, encourage the Member to transfer all (or such part as the Company may require) of the Member's Base Allocation; or

(4) suspend all or part of the Member's right to access the Member's Annual Allocation to which they would otherwise have been entitled.

28.4 Without notice to the Member, any Costs incurred by the Company in remedying a default may be treated by the Company as a liquidated debt payable by the Member to the Company.

28.5 Despite any other provision in this Contract, before the Company can exercise its rights under **clause 28.3** it must:

(1) give the Member written notice that it intends to exercise those rights; and

(2) comply with **clauses 28.6** to **28.8** inclusive.

28.6 The Member may make representations to the Company with respect to a Notice of Intention and the Member's non-compliance with his or her obligations under this Contract which has given rise to the Company's entitlement to exercise its rights under **clause 28.3.**

28.7 The Company must consider any representations made under **clause 28.6** in good faith.

28.8 If the Company in its sole and unfettered discretion is not satisfied with the representations made under **clause 28.6** and in any event at the expiration of 30 days from but not including the date of the Notice of Intention the Company may exercise its rights under **clause 28.3**.

28.9 The Company's rights under **clauses 28.1** to **28.8** inclusive are in addition to any other rights the Company may have at law or in equity.

28.10 Nothing in **clauses 28.1** to **28.9** prevents the Company from immediately suspending either the supply of water to the Member or the exercise of the

Drainage Service Entitlement rights of the Member, where the Company, upon becoming aware of a default by the Member, reasonably determines that immediate suspension is necessary.

29. LIMITATION OF LIABILITY

29.1 Nothing done or omitted to be done by the Company or any person acting under the authority of the Company will render the Company or that Person liable for any loss, damage, sum of money, costs, cause of action, liability, claim or demand of any type by the Member or any other person, so long as the action or omission of the Company or person acting under the authority of the Company was bona fide for the purpose (directly or indirectly) of compliance with the Licences.

29.2 To the extent permissible by Law, any and all implied warranties or representations by the Company are negatived.

29.3 In particular, and without limitation, the Company makes no warranty as to the quality of or suitability for any purpose of any water delivered by it and the Company expressly states:

(1) that the water delivered by the Company is in no way fit for human consumption, or for use in contact with humans; and

(2) the Company makes no warranty that any water delivered by the Company is of a quality or suitability fit for watering livestock.

29.4 The Company makes no warranty that any particular volume of water will be available at any time or times unless expressly agreed by the Company in a particular instance.

29.5 The Company indicates and the Member acknowledges that from time to time the Company treats water in the Company's Works with chemicals to control submerged weeds.

29.6 The Company may offer the treated water referred to in **clause 29.5** to the Member after having notified the Member that the water is treated and the Member takes delivery of that water at his or her own risk.

29.7 The limitations on the liability of the Company contained in this **clause 29** are in addition to the indemnities provided by section 137 of the Act and section 36 of Schedule 9 of the Act.

30. FORCE MAJEURE

30.1 In this **clause 31**, **"Prescribed Event"** means an event that:

(1) is beyond the control of a party **("Affected Party")**;

(2) occurs without the fault or negligence of the Affected Party,

and includes:

(3) act of God;

(4) war, riot, insurrection, vandalism, sabotage, lightning, explosion, earthquake, subsidence, flood or drought;

(5) strike, lock out, ban, limitation of work and other industrial disturbance; and

(6) a major structural failure of any one or more of the Company's Works or Member's Works.

30.2 If the Affected Party:

(1) is prevented from or delayed in performing an obligation (other than to pay money) by a Prescribed Event;

(2) as soon as possible after the Prescribed Event occurs, notifies the other party of full particulars of:

(a) the Prescribed Event;

(b) the effect of the Prescribed Event on performance of the Affected Party's obligations;

(c) the anticipated period of delay; and

(d) the action (if any) the Affected Party intends to take to mitigate or remove the effect and delay; and

(3) promptly and diligently acts to mitigate or remove the Prescribed Event and its effect,

then the obligation is suspended during, but for no longer than, the period the Prescribed Event and its effects which continue to prevent the Affected Party from meeting such obligation.

30.3 The party which is not the Affected Party must use reasonable endeavours to remove or mitigate the Prescribed Event and its effects.

31. DISPUTES

31.1 Any dispute relating to any matter or thing arising out of this Contract, except for disputes with respect to Charges, may be referred by either party for consideration by the Disputes Committee in accordance with this **clause 31**.

31.2 If a dispute between the Company and the Member arises in connection with this Contract or its subject matter then a Disputes Committee will be constituted by the secretary of the Company comprising of not less than five and not more than nine members of the Disputes Panel including at least:

(1) three directors, including two Member Directors (if available) representing members holding the same class of Shares (and type of allocation) as the Member and in respect of the Landholding which the dispute involves; and

(2) two members of the Company who are not directors,

each chosen by the secretary having regard to:

(3) objective and unbiased consideration of the dispute;

(4) availability of panel members;

(5) expertise of panel members; and

(6) possible conflicts of interest of panel members.

31.3 The Disputes Committee must conduct its business in the same manner as is specified in the Constitution for the conduct of meetings of the directors.

31.4 The Disputes Committee is empowered to consider and to make recommendations to the Company in relation to any matter affecting the Member and the Company arising out of this Contract, except for matters relating to Charges.

31.5 The Disputes Committee may not consider any matter or issue otherwise than on the application of either:

(1) the Company; or

(2) the Member **("Applicant")**.

31.6 The application under **clause 31.5** must:

(1) be in writing;

(2) be signed by the Applicant;

(3) be in the form prescribed by the Company (if any) from time to time; and

(4) provide, in relation to the matter or issue which is the subject of the dispute:

(a) an accurate description of any affected Landholding;

(b) the nature of the dispute and the date on which the dispute commenced;

(c) copies of any correspondence, notices, plans, data or other information which may be directly relevant to the matter or issue;

(d) a succinct statement of the result, remedy or outcome sought by the Applicant; and

(e) a succinct statement of the basis on which the Applicant believes that result, remedy or outcome to be just and reasonable.

31.7 The Disputes Committee may request additional information from the Applicant or from the directors or other members of the Company, and the Applicant or the directors or other members must provide that information (subject to rights of privilege and to the law relating to secrecy and confidential information) to the Disputes Committee within the time prescribed by the Disputes Committee (and otherwise within a reasonable time).

31.8 The Disputes Committee must, in relation to any matter or issue brought to it by application made under this **clause 31**:

(1) act as an expert and not as an arbitrator;

(2) consider the matter or issue as quickly as possible in the circumstances;

(3) act in accordance with the principles of natural justice;

(4) take into consideration all documents, information and other material that the parties give to the Disputes Committee which the Disputes Committee in its absolute discretion considers relevant to the dispute;

(5) hold any hearings it may regard as necessary or desirable in open session; and

(6) notify the Applicant and the other party in writing of its findings of fact (if any) and any recommendation it has determined to make, or its determination to make no recommendation (as the case may be), within 7 days of its reaching a determination.

31.9 The findings and recommendations of the Disputes Committee:

(1) must be considered by the Company and accorded appropriate weight in the Company's deliberations;

(2) must be considered and taken into account by the Member; and

(3) do not take effect at law as any binding proof of any fact alleged, nor as any binding order to or against the Applicant or the Company, nor as any judgement or binding resolution of the matters or issues in relation to which the recommendation is made.

31.10 The Disputes Committee may, in circumstances where it is just and equitable to do so, order that the Applicant must pay all or part of the Costs directly and reasonably incurred by the Company in the application to the Disputes Committee, in the hearing of the application and in any recommendation made.

31.11 The Applicant agrees for the benefit of the Company to pay any monies that the Member is ordered to pay under **clause 31.10.**

31.12 Any person who serves on the Disputes Committee will be entitled to remuneration, at a rate from time to time determined by the Company, on a daily basis in respect of every day, or part of a day, that the Committee meets and that person attends.

31.13 The Company may reimburse the reasonable expenses of the members of the Disputes Committee properly and necessarily incurred in the conduct of the business of the Disputes Committee.

32. REVIEW

32.1 The Company must review this Contract on:

(1) the first anniversary of the formation of the Company; and

(2) every fifth anniversary of the formation of the Company.

32.2 In the reviews referred to in **clause 32.1** the Company must consult with and consider in good faith any representations made by the Members and the Stakeholder's Representation Body.

33. VARIATION AND AMENDMENT

33.1 This Contract may be amended by:

(1) agreement in writing between the Company and the Member; or

(2) special resolution of the Company in general meeting in accordance with the Constitution. An amendment under this **subclause 33.1(2)** will take effect 28 days after the Company gives notice to the Member in writing that the special resolution varying the Contract was passed.

34. APPROVALS AND CONSENTS

34.1 Unless otherwise stated in this Contract, if a party's approval or consent is required it:

(1) must not be unreasonably withheld; and

(2) will not be effective unless in writing.

35. NOTICES

35.1 A notice or other communication connected with this Contract **("Notice")** required to be in writing has no legal effect unless it is :

(1) served personally on the addressee;

(2) delivered at the address for service of the addressee;

(3) if the address is in Australia and the Notice is being sent from within Australia, sent by security post, certified mail or postage pre-paid, to the address for service of the addressee;

(4) if the address is outside Australia or if the Notice is being sent from outside Australia, sent by prepaid airmail to the address for service of the addressee; or

(5) sent by facsimile to the facsimile number of the addressee.

35.2 Where the Notice is delivered or sent in a manner provided by **clause 35.1** it is deemed given to and received by the party to which it is addressed:

(1) if delivered, upon delivery;

(2) if mailed from within Australia to an address in Australia, on actual delivery to that address as evidenced by Australia Post or other documentation;

(3) if mailed to an address outside Australia, or mailed from outside Australia, on the fifth Business Day (at the address to which it is mailed) after mailing; or

(4) if sent by facsimile before 4 p.m. on a Business Day at the place of receipt, on the day it is sent and otherwise on the next Business Day at the place of receipt.

35.3 Despite **clause 35.2(4)**:

(1) a facsimile is not deemed given and received unless at the conclusion of the transmission the sender's facsimile machine issues a transmission report which indicates that the relevant number of pages comprised in the notice have been sent; and

(2) a facsimile is not deemed given and received if it is not received in full and in legible form and the addressee notifies the sender of that fact within three hours after conclusion of the transmission or by 12 noon on the Business Day on which it would otherwise be deemed given and received, whichever is the later.

35.4 The Company's address for service and facsimile number as at the date of this Contract are:

Attention:	Company Secretary
Address:	PO Box 519 LEETON NSW 2705
Facsimile No:	(02) 6953 0198

35.5 The Member's address for service and facsimile number (if any) as at the date of this Contract are set out in **Schedule 4**.

35.6 A party may change its address for service or facsimile number by giving notice of that change to each other party.

35.7 Any Notice issued by the Company is binding on the Member unless it contains a manifest error. The Member must immediately notify the Company of any manifest error of which the Member becomes aware.

35.8 The Company may from time to time issue amending Notices. These Notices will replace or amend any prior relevant notices issued to the Member.

35.9 A Notice relating to this contract must be written in English and may be given by an authorised representative of the sender.

36. SEVERABILITY

36.1 All the provisions of this Contract will so far as possible be construed so as not to be invalid, illegal or unenforceable in any respect.

36.2 Despite **subclause 36.1**, if any provision of this Contract on its true interpretation is illegal, invalid or unenforceable, that provision will as far as possible be read down to such extent as may be necessary to ensure that it is not illegal, invalid or unenforceable and as may be reasonable in all the circumstances so as to give it a valid operation of a partial character.

36.3 If any provision of this Contract or any part of it cannot be so read down, that provision or part will be deemed to be void and severable and the remaining provisions of this Contract will not in any way be affected or impaired.

37. TERMINATION BY MEMBER

37.1 At any time on the giving of 30 days written notice to the Company, the Member may terminate this Contract and all rights or obligations of the parties will cease except any rights or obligations of the parties to one another arising out of anything occurring before the termination.

37.2 A notice of termination under **clause 37.1** is ineffective unless either all of the Member's Base Allocation of the Member is cancelled in accordance with **rule 16.3** or **rule 16.4** of the Constitution or the Member:

(1) transfers his or her Member's Base Allocation in accordance with the Transfer Rules; and

(2) transfers or surrenders his or her Corresponding Shares in accordance with the Constitution.

38. WAIVER

38.1 An action of the Company will only be binding against the Company as a waiver if in writing and signed by an authorised officer of the Company.

38.2 No custom or practice which evolves between the parties will constitute a waiver or lessen the Company's right to insist upon the Member's strict performance or observance of any provision of this Contract or to exercise any of the Company's other rights.

38.3 Regardless of the Company's knowledge at the time, a demand by the Company for Charges or the subsequent acceptance of Charges will not constitute a waiver of any earlier default by the Member.

39. GOVERNING LAW

39.1 This contract is governed by and construed according to the laws of and applicable in New South Wales.

39.2 The Company and the Member submit to the jurisdiction of the courts of New South Wales and courts having jurisdiction therein.

ANNEXURE A

Member Contract - TYPES OF BASE ALLOCATION

Type 1 - Normal Security Allocation for irrigation

Type 2 - Normal Security Allocation for recreation use

Type 3 - High Security Allocation for irrigation

Type 4 - High Security Allocation for industrial purposes

Type 5 - High Security Allocation for stock and rural household (non potable) purposes

Type 6 - High Security Allocation for domestic (non potable) use

Type 7 - High Security Allocation for town water supply purposes

MURRUMBIDGEE IRRIGATION Limited ACN 084 943 037

REGISTERED IN NEW SOUTH WALES

MEMBER CONTRACT

SCHEDULES

Schedule 1: **Name of Member**

_____

_____

_____

Schedule 2: **Landholding and Landholding Reference Number**

_____

_____

_____

Schedule 2A: **Class and Number of Shares Held by Member**

_____

_____

_____

Schedule 3: **Type & Amount of Base Allocation**

megalitres	Type
megalitres	Type
megalitres	Type

Schedule 4: **Address and Facsimile Number for Service of Notices**

_____

_____

_____

Schedule 5: **Company's Supply Works**

EXECUTED as an agreement

THE COMMON SEAL of
MURRUMBIDGEE IRRIGATION Limited
was affixed in accordance with section 127 of the *Corporations Act 2001*:

.....
Director/Secretary

.....
Name of Director/Secretary (BLOCK LETTERS)

SIGNED by **the Member**
in the presence of:

.....

.....
Signature of Witness

.....
Name of Witness (BLOCK LETTERS)

.....
Address of Witness