ALICE SPRINGS WATER ADVISORY COMMITTEE

MEETING No. 5
8.30 am 29th May 2018
Central Australian Development Office
Todd Mall

Workshop report and minutes

Meeting opened 8.30 am

1. Attendance

PRESENT:

Members

Robyn Grey-Gardner (Acting Chair)	Alice Springs resident (remote water & water quality expert)
Richie Hayes	Agriculture/Horticulture representative
Wendy Stuart	Central Land Council
Adam Davis	Power & Water Corporation
Rod Cramer	Rural residents association
Alex Read	Arid Lands Environment Centre (proxy for Jimmy Cocking)

NT Government representatives (Non-members)

Robbie Henderson	Water Planner (DENR)
Peter Somerville	Manager Planning & Development (DIPL)
Adrian Tomlinson	Water Planner (DENR)
Tim Bond	Director Water Planning & Engagement (DENR)
Michelle Rodrigo	Water Planner (DENR)

Observers

Jethro Laidlaw	Demand management Programs (Power & Water)
Stephen Baloban	Acting Director Technical Services (ASTC)

Apologies:

Ms Veronica Lynch	Indigenous / AAPA representative
Dr Jocelyn Davies (Chair)	CDU University Fellow/ geographer
Mr Eli Melki	Alice Springs Town Council
Mr Glenn Marshall	Alice Springs resident (urban water efficiency expert)

2. Introduction

Robyn Grey-Gardner (Acting Chair) welcomed attendees and introduced the meeting which was to proceed in 'workshop format.' The workshop was organised by DENR and is co-hosted by Power and Water. The workshop was arranged at the request of ASWAC members (see minutes meeting #4 25th October 2017). Objectives of the workshop were for participants to:

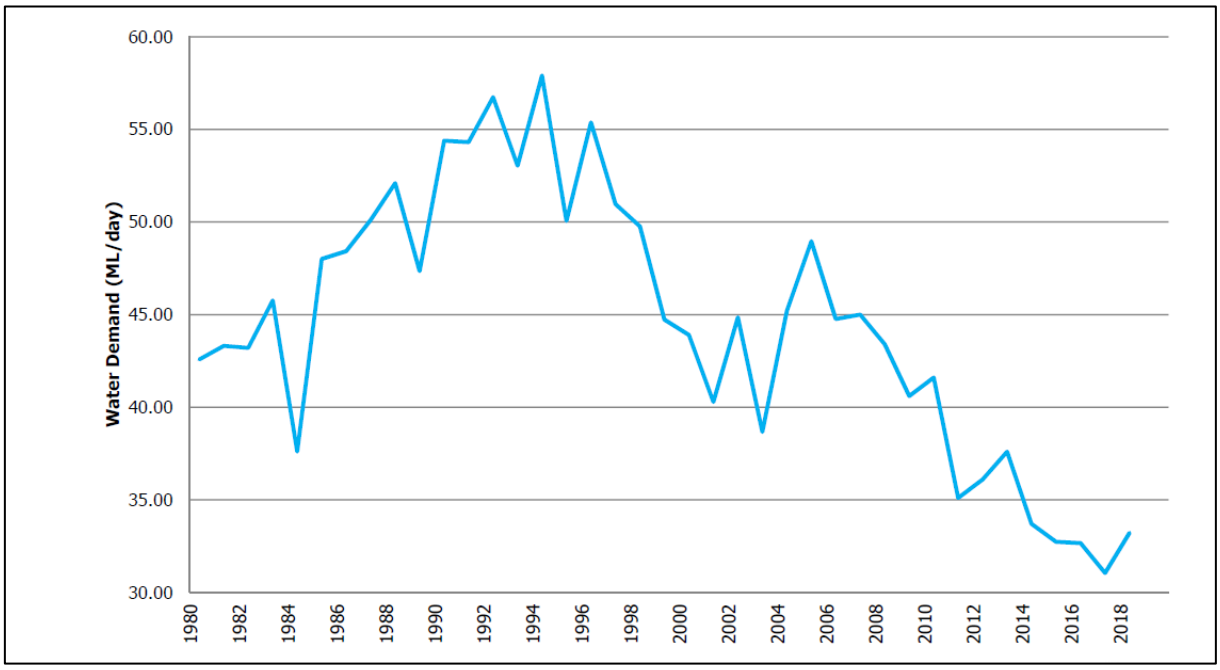
1. Enhance their understanding of demand management 'drivers' in relation to Alice Springs potable water resources (particularly focused on Amadeus basin aquifers)
2. Increase their understanding of stakeholders roles and responsibilities
3. Improve their knowledge of demand management strategies (what works and what doesn't)
4. Develop advice or recommendations to DENR (within the scope of DENR core business and the Alice Springs Water Allocation Plan)
5. Identify relevant actions / activities that can be undertake by other agencies (PAWC, Department of health, Alice Springs Town Council, ALEC etc.).

3. Presentation: potable water demand and supply issues

Adam Davis from Power and Water provided a presentation 'Alice Springs Potable Water Demand and Supply Issues' about drivers for demand management from Power and Water's perspective. The presentation and discussion included:

- Alice Springs peak day demand
  - A graph was presented (Figure 1) showing peak day demand from 1980 to 2018. Peak day demand peaked at approx. 57 ML/day in 1994 and has generally declined since to approx. 33 ML/day
  - Theoretical peak day demand is slightly more than 55 ML/day.
  - Some key events impacting on reduced peak day demand include significant reduction in leaks, demand management activities (Alice Water Smart); price of water has doubled in 5 years

Figure 1: Graph of peak day demand



- Cost drivers (of peak day demand)
  - Infrastructure capacity is required to meet peak day demand i.e. bores, pumps, pipelines, tanks all need to be big enough to meet peak day demand. This is expensive infrastructure.
  - Capacity only used for a few days a year
  - Similar issues to why large power customers have peak/off peak tariffs, to try and flatten the demand curve (for water this could be achieved by summer / winter tariffs)
  - Peak day demand is not currently a major issue as the bulk of the existing infrastructure is built for historical peaks so there is some spare capacity in the system

- Alice Springs annual demand
  - A graph showing annual production and population (1980 – 2018) was presented (Figure 2). Significantly, the production of water was reducing while population was increasing, demonstrating increased efficiency and impacts of leak detection and other demand management work (Alice Water Smart).
  - A graph was presented (Figure 3) showing Mereenie Aquifer rate of decline (1972 – 2018). Observations include that the rate of decline has reduced over the past 20 years. However the water levels at production bores and overall water levels continue to decline as more water is being extracted than is recharged.

Figure 2: Annual water production and population (1980 – 2018)

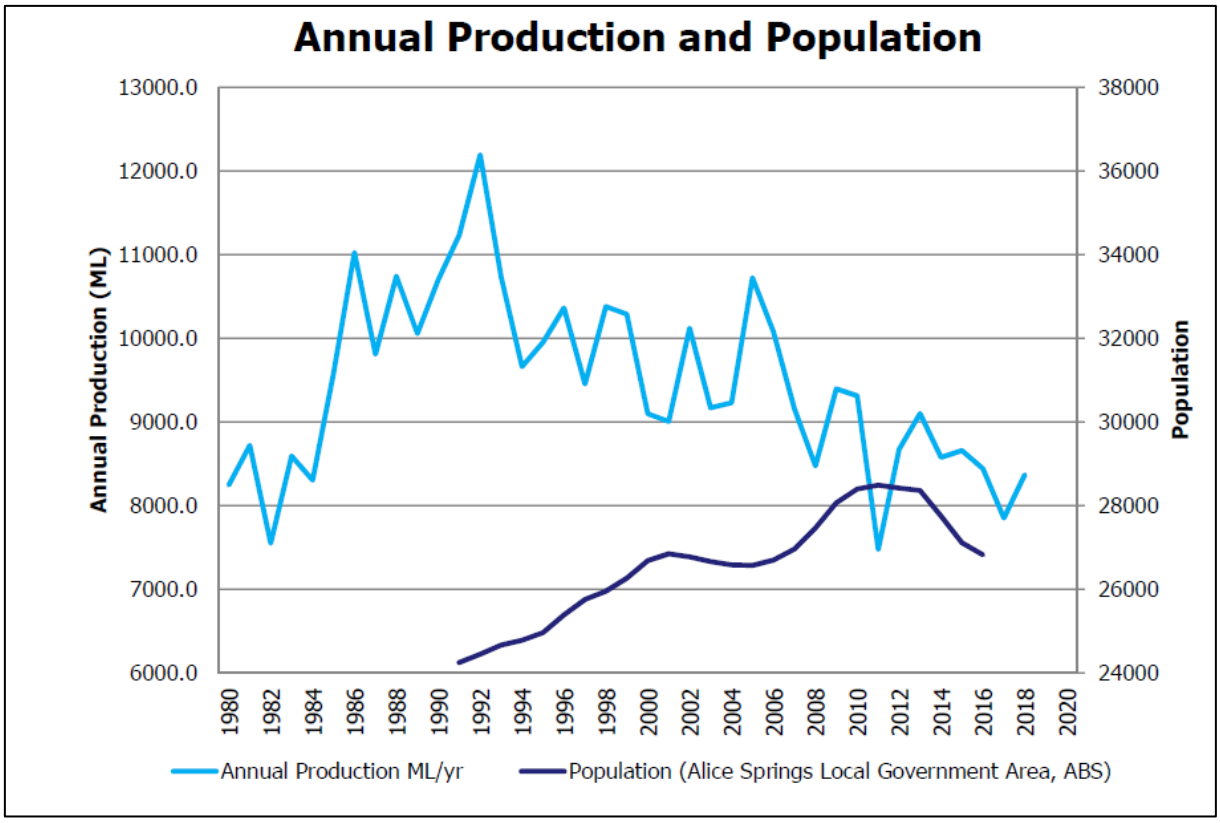
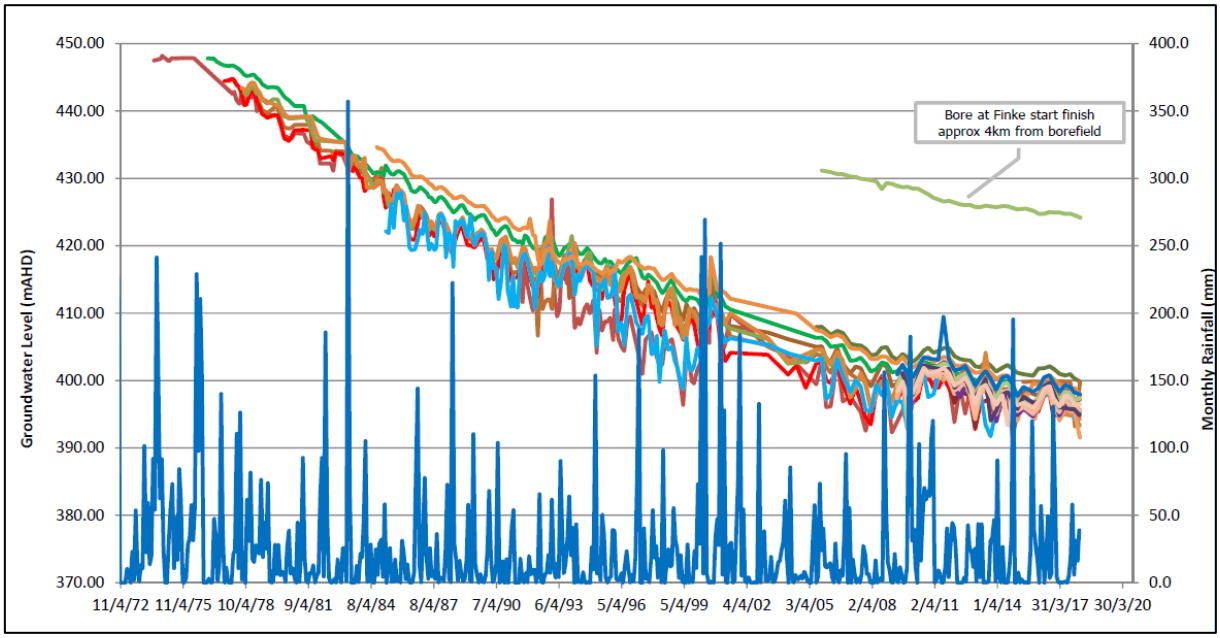


Figure 3: Annual demand and standing water levels in Roe Creek bores



- Cost drivers (of annual demand)
  - Annual demand is the key driver on rate of decline of the aquifer
  - This means that older bores run out of water and are no longer useable, therefore new bores are required to be drilled.
  - At current demand rates, and rate of decline of aquifer levels, it is expected that no new bores will be required for at least 10 years

- Carbon emissions and electricity
  - CO2 emissions – Alice Springs Power Generation approx.. 0.6 kg C02-e/kWh. (Dropping as the proportion of solar increases)
  - 1ML of water equates to 600kg CO2. An average house in Alice uses 0.4ML/yr = 240kg CO2. By comparison a return car trip to Adelaide = approx 900kg CO2
  - PWC are investigating installing solar at the borefield to reduce both power costs and CO2 emissions (approx 20%)

- Operational Costs
  - Majority of PWC's operational costs (maintenance and replacement of assets) are fixed regardless of demand.
  - The marginal costs include: (i) Power - $350 per ML, (ii) Chlorine - $5 per ML and (iii) Pump Replacement/maintenance - $30 per ML
  - Total approx $400 per ML
  - The water is sold for $1,930 per ML. Therefore financially beneficial for PWC to supply more water.
  - An average residential bill is 25% fixed and 75% consumption based, which encourages water savings. However, water and sewer bills come together, so the consumption based charge is often masked by the additional fixed charge of the sewer bill.
  - PWC costs are approx 80% fixed and 20% consumption based.

- Population projections
  Adam provided a summary of a presentation Prof Dean Carson presented at CDU on the 4th Dec 2017 for discussion. Population is relevant as a significant driver of peak day and annual demand. Significant points included:
  - Capital cities are growing and regional centres are not, and this is a global trend.
  - This is generally because less labour is required for the traditional industries of regional centres (Agriculture, farming…); more industries operating as fly in fly out, (Consultants, Road works, major construction)
  - Businesses/Gov centralise staff to the major centres for efficiency
  - Mining generally has little impact on local economies when more than 50km from the town. Two, of very few ways to a grow regional centre, is to attract and retain retirees, or build a world class university
  - Discussion included that Government has set aspirational targets for population increase of 40,000 by 2030. Participants discussed the likelihood of actual population increase and possible drivers for increase or decrease (e.g. USA support for Pine Gap)

- Social Drivers
  - Long term sustainability of the water resource as a whole, preserving water for future generations. It is a finite resource
  - Cost to consumers – currently common pricing territory wide, so little impact in the short term, but this could change.
  - Lower bills – lower cost of living, especially for hardship customers

Summary / conclusions

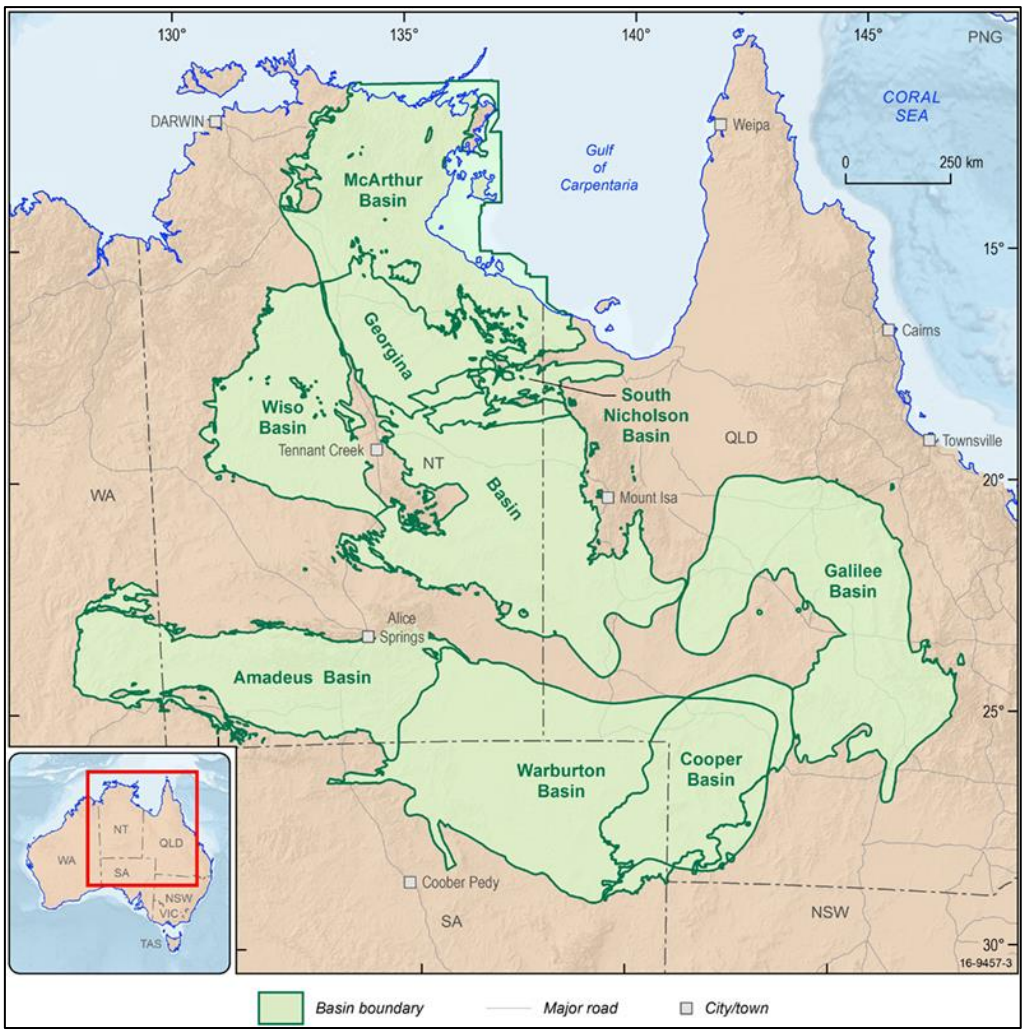
- *No immediate need for demand management to offset PWC capital expenditure*
- *Population growth, and hence water demand growth, likely to be low*
- *Water levels at bore field are still dropping, but not as fast as previously anticipated. Awaiting model results to update forward projections*
- *Significant energy and CO2 emissions required to pump water, but it is financially beneficial for PWC to sell more.*

4. Presentation: sustainability of the resource

Robbie Henderson (DENR) provided an introductory presentation about the source of Alice Springs potable water supply; the Amadeus basin aquifers.

- Amadeus basin
  - A map was presented (Figure 4) showing the location and extent of the basin
  - Basin is very old (formed from around 900 million years ago) and comprised of sediments up to 14 km thick
  - The MacDonnell Ranges formed around 350 million years ago – this 'event' folded the sedimentary layers so they were no longer lying flat. Some sandstones hold water – these are the aquifers

Figure 4: Location and extent of Amadeus Basin



- A conceptual 'water balance diagram' and aquifer cross section diagram were shown to describe their location, and movement of water into and out of the Amadeus basin aquifers (Figures 5 & 6):

Figure 5: North south cross-section of Amadeus basin aquifers

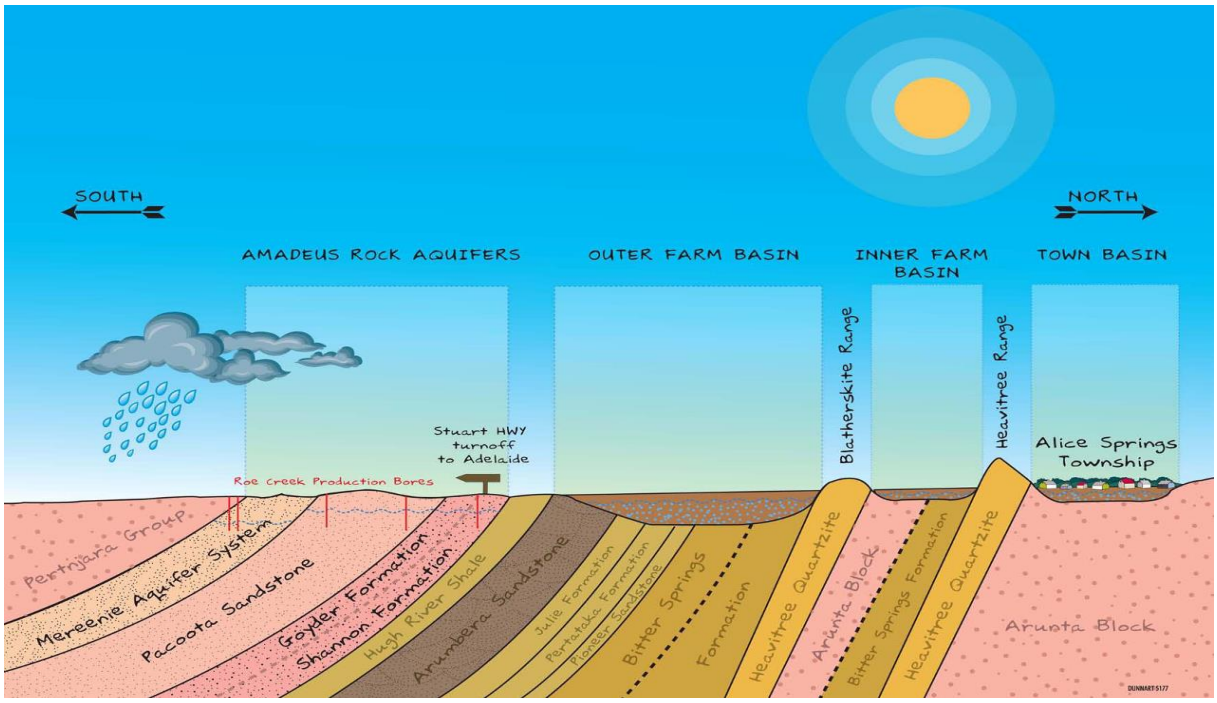
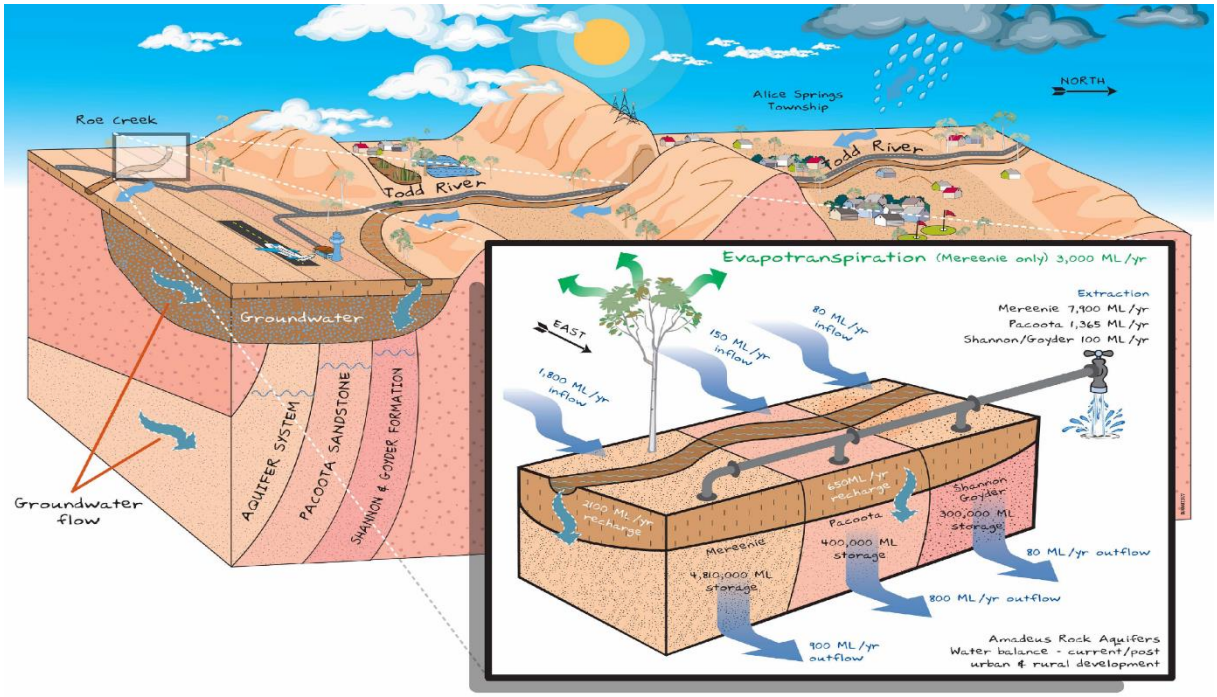


Figure 6: Conceptual water balance model for the Amadeus basin aquifers



John Wischusen (DENR) provided a brief update on research activities currently underway that aim to improve understanding of the Mereenie aquifer system. The presentation included

- Preliminary drilling results (data) was presented, however John emphasised that investigations are still in progress. John provided an insight into the challenges faced in establishing monitoring bores in the field.
- DENR and Power and Water are collaborating with Geoscience Australia 'Exploring for the Future Program' (Federal Government) to incorporate Aerial Electromagnetic (AEM) data into the water assessment. The AEM data provides an indication of the conductivity of an aquifer, which in combination with calibration from local drilling data can be used to improve the understanding of aquifer characteristics and water quality.
- Geoscience Australia have committed to sharing data and reporting within 1-2 years (i.e. 2019)
- The hydrological model for the Mereenie aquifer system is being updated, it will be further refined with the inclusion of the Geoscience Australia AEM data

Summary / conclusions:

- *The Amadeus aquifers are a non-renewable source of good quality (low salinity) water; water levels will continue to gradually decline as water is extracted*
- *Investigations to date appear to indicate good quality water extends to significant depth at Rocky Hill*
- *Nothing has been found to alter the currently understanding that the resource is finite and non-renewable*

Further background to the Mereenie Aquifer system hydrological study:

- The research is a collaboration between the Water Resources Division (DENR) and the Power Water Corporation (PWC)
- Budget is approximately $1 million
- Investigations concentrate on the Mereenie aquifer system, including the area that underlies the Rocky Hill management zone (proposed site for future Alice Springs water supply)
- The research objectives include:
  - improve knowledge of the spatial variation in aquifer characteristics and the distribution of water quality to provide greater confidence in the amount of potable groundwater stored
  - address identified knowledge gaps
  - establish important planning parameters such as the potential performance of individual production bores to optimise borefield configuration and construction methodologies
  - Develop a groundwater model for application to a number of predictive scenarios under various bore field configurations to investigate usage optimisation of the groundwater resources.

5. Activity – ranking the drivers of demand management

Participants were organised into two groups and asked to rank the 'drivers for demand management' in order from the most to least important. In other words, to determine which factors provide the strongest reason for why (and if) investments should be made into demand management. The exercise was designed to generate discussion and critical assessment of drivers to increase committee members understanding of the issues. (NB: The activity was not a planning exercise that would input into a demand management project).

Drivers in order of importance:

Group 1:

Driver	Comments
1. Sustaining the water resource	Resource is finite, responsibility to future generations
2. Cost of living (social drivers)	Cost of living is a big issue
3. Energy use / greenhouse gas emissions	Emissions from water use are high
4. Defer new bore-field infrastructure	
5. Character of Alice Springs	
6. Peak day demand	
7. 'Do nothing'	While not a driver per se, this statement was in support for investments in demand management rather than to let efficiency slip by the way side.

Group 2:

Driver	Comments
1. Sustaining the water resource	Resource is finite, responsibility to future generations
2. Resource protection	Need to preserve the good quality (low salinity water), recognising that it is limited
3. Defer new bore-field infrastructure	Important even if its further down the track than previously envisaged
4. Cost of living (social drivers)	
5. Character of Alice Springs	Need to align with community values. However there was discussion about whether the community want a town that reflects the arid environment or the notion of an 'oasis'
6. Energy use / greenhouse gas emissions	
7. Peak day demand	
8. Meet future demand	Attract industry – allow for growth
9. 'Do nothing'	Do not support a 'She'll be right' or do nothing approach

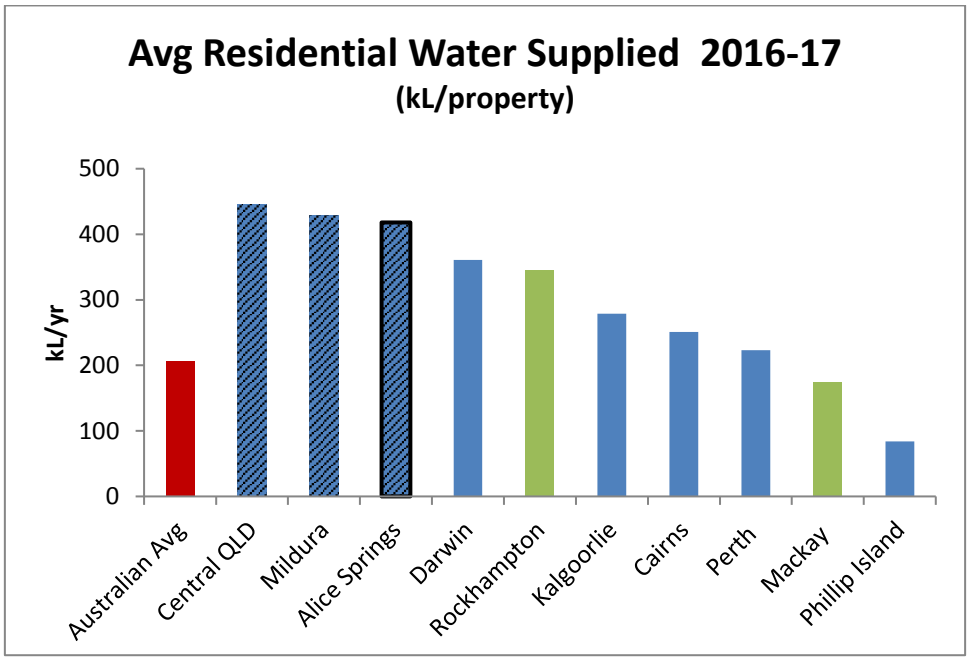
6. Demand Management Strategies

Jethro Laidlaw (Power & Water) presented on 'Living Water Smart in Alice Springs.' The presentation focused on sharing outcomes and lessons learned from the Alice Water Smart project and ongoing demand management activities undertaken by Power and Water in Darwin, Katherine and several remote communities.

- Alice Springs is a unique and challenging environment for achieving low water use:
  - Hard place to have a garden (dry, variable and large seasonal temperature range)
  - High proportion renters and others not paying water bills directly
  - No millennium drought (entrenched water hungry customers)
  - Relatively high pressure and TDS

- Alice Springs per capita water use is high compared to the national average and towns of comparable size, some other regional towns that share similar climate also share similar water use levels, but others use significantly less (Figure 7). Figure 7 also shows water use data for Rockhampton and Mackay, two towns in a similar region with relatively similar climate, however very different per capita water use. Difference is largely explained by Mackay having smart metering for all connections to inform customers of leaks and water use habits in real time, Rockhampton does not.

Figure 7. Alice Springs water use compared with other Australian towns



- The end uses of Alice Springs water was presented: 56% is in the garden. The next highest 'uses' are shower (11%) and leaks (11%)

- By sector reticulated potable water use is split: residential (56%), commercial (21%) and government (23%)

- Residents had been surveyed about their understanding of water issues: Only 6% of Alice residents surveyed knew the current price of water. Only 2% knew that there was 300-400 years of water supply left in the water resources (many thought there was much less water remaining).

- Water savings can be achieved most efficiently by targeting irrigation and leaks. The average Alice Springs house was found to be leaking 80 kKL/year (this was 1 in 3 houses leaking an average of 240kKL/year).

- Irrigation efficiency can be improved by using appropriate drippers (that handle high pressure) and smart irrigation controllers. Smart irrigation controllers can detect leaks and can be programmed to moderate watering based on climate. Other actions include picking the correct plants, watering at night, mulching, and checking irrigation for leaks.

- Alice Springs already has infrastructure that could support roll out of 'smart meters' that would allow connected properties to receive automated leak alerts and real time water use data.

- There is an opportunity to target water users by sector. For example targeting government sector only can reach 23% of use in Alice Springs with relatively less investment

- Darwin Water Smart program is achieving or surpassing target water savings – the investment has been effective.

- The business case for investing in demand management is currently much stronger in Darwin (where reduced water use could defer hundreds of millions in infrastructure upgrades) and Katherine (impacted by PFAS).

Summary / conclusions

- Reduction in Alice Springs water use could likely be achieved effectively and efficiently with activities targeting specific sectors (e.g. Government), and focusing on leaks and irrigation.
- Development of 'smart technology' is proving to be effective in achieving water savings
- At the present time PWC sees Alice Springs as a lower priority for demand management investment relative to Darwin, Katherine and several remote communities that have water security issues
- Power and Water supports demand management and efficiency as a 'business as usual' activity

7. System mapping

Workshop attendees participated in a session to 'map' the system that creates the resulting 'volume of water used from the Amadeus basin aquifers.' The purpose of the system map is to improve understanding of the different factors that interact to drive water use. This includes the various actors, policies, regulations, attitudes, social norms, behaviours and the relationships between them.

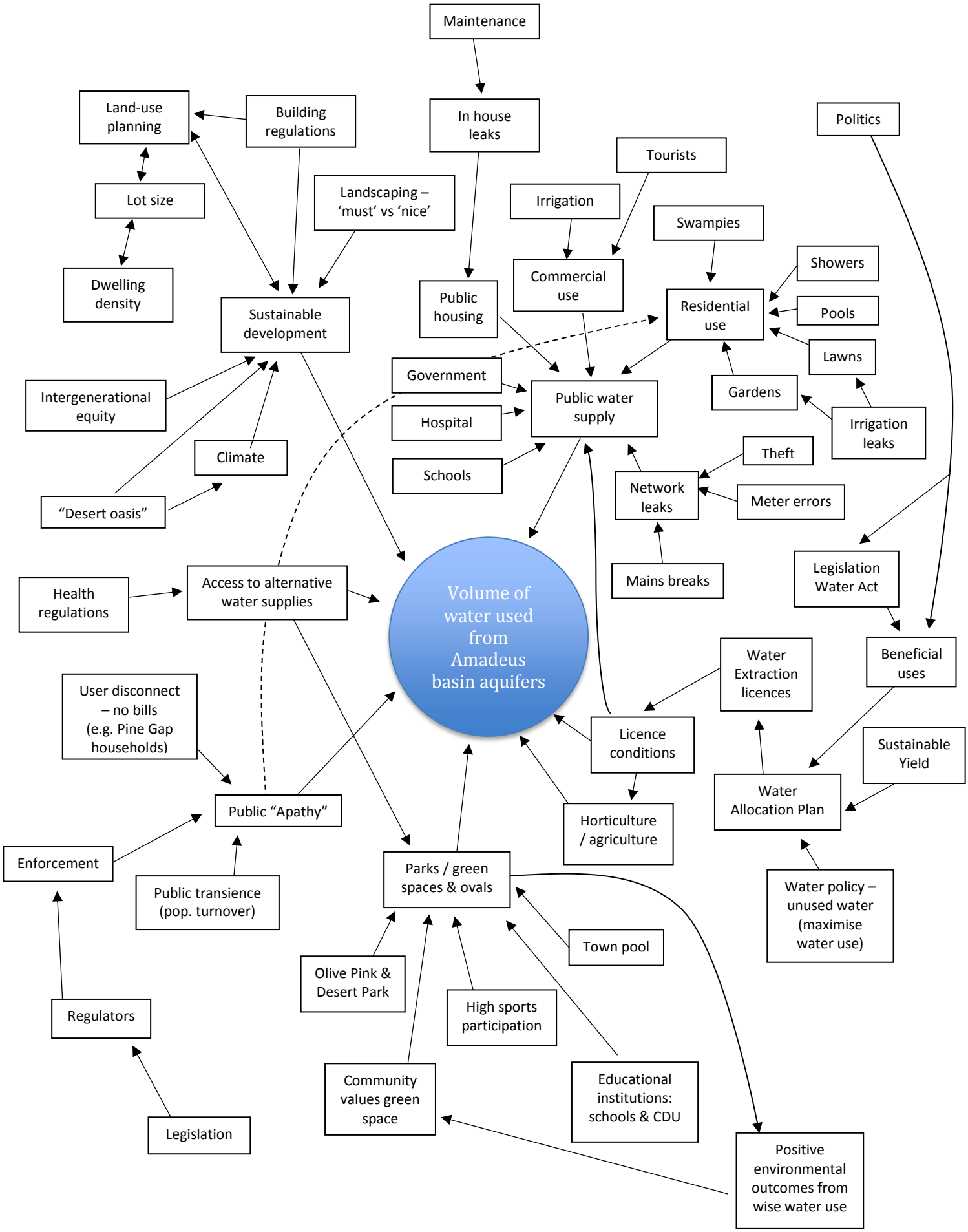
The systems map connects causal factors with arrows, which represent the direction of influence.

Systems maps can be used to identify:

- Factors that impact an issue (water use)
- Interactions between factors (e.g. feedback loops)
- Where change can be made within a system to achieve a desired change
- How or where the system could be 'redesigned'
- Who has control over different parts of system
- Where does the Alice Springs water Allocation Plan fit within the system

The system map reproduced on the next page (Figure 8) was developed by participants. It is not complete and may be further refined at future meetings.

Figure 8. Alice Springs Water Use System Map



8. Trade and unused water policy

Tim Bond (DENR) provided an overview of the draft Unused Water Policy and the Trading Licenced Water Entitlements Policy.

- The policies aim to provide transparency around the decisions of the Controller of Water Resources in these areas. They are also consistent with the Territory Government's commitment to the National Water Initiative. These two policies are with the Solicitor for the Northern Territory and require endorsement by Cabinet. Feedback from Water Advisory Committee's is also being sought.
- The intention of the Unused Water Policy is to make sure Licensees are fully using their allocations for their intended purposes. The focus is not on situations where there has been a good short-term reason for water not being used (e.g. plant disease or rainfall conditions) and the allocation is still needed for the approved purpose. Rather the focus is upon recovering water that is not being used or has been obtained for speculative purposes. The Policy will give a transparent and consistent basis for how this is done.
- The intent of the policy for Trading Licenced Water Entitlements is to provide efficiency and maximise use of limited resources and migrate allocations toward optimal uses. This will become increasingly important as resources approach full allocation.
- A request was made to committee members seeking comments on how to improve the policies and how the policies would be applied in the Alice Springs Water Control District. Written feedback can be sent to Robbie directly.
- Draft policies are attached to this report

9. Conclusions and closing matters

Robyn Grey Gardener (acting chair) facilitated the closing session.

New Action items

1.1	*Write up visual reminder of water use systems map*	DENR	Next ASWAC meeting August 2018

Recommendation

ASWAC makes the following recommendation to DENR and the Controller; that DENR makes completion of Mereenie Aquifer System investigations and modelling a high priority for the Department. ASWAC also request that DENR works closely with Geoscience Australia to access data and reports of AEM survey work as soon as possible.
Raised by Rod Cramer; passed unanimously.

Forward agenda

- Review outcomes of the demand management workshop (this workshop) and formulate recommendations to (a) DENR, (b) other agencies, as appropriate.

- Discuss terms of reference for the review of the Alice Springs Water Allocation Plan (review due to be completed by January 2021)

Next Meeting

Late August 2018, date to be confirmed. WS indicated Monday or Friday would suit her best.

Meeting closed 2.45pm