Community Committee for Recycled Water Storage
(Northern Adelaide Irrigation Scheme)

Project Name	Northern Adelaide Irrigation Scheme					
Purpose	Community Committee for Recycled Water Storage					
Date	10/02/2016		**Time**	5pm – 7pm		
Meeting No.	5		**Frequency**	Fortnightly		
Facilitator	Matthew Bonnett, SA Water		**Minute Taker**	Jodi Kerrigan, SA Water		
Venue	Virginia Horticultural Centre, Old Port Wakefield Road, Virginia					
Attendance Ab = Absent Ap = Apologies P = Present	Michael Picard	P	Kieren Chappell	P	Mark Wilson	P
	Louis Marafioti	P	Eddie Stubing	P	Evie Arharidis	P
	Danny De Ieso	P	Matthew Sheedy	P	Greg Pattinson	P
	Susie Green	Ap	Peter Rentoulis	Ap	Paul Cleghorn	Ap
	Nick Pezzaniti	Ap	Dino Musolino	Ap	Felicia Nguyen	Ap
	Ross Trimboli	Ap	Rocco Musolino	Ab	Nghien Nguyen	Ab

1 Welcome and Apologies

Matt welcomed all members.

The agenda for the meeting was outlined as follows:
1. Welcome and apologies
2. Minutes of previous meeting and review of actions
3. Hydrogeology – Groundwater Recharge, Flow and Inter-Aquifer Leakage, Guest Presenter: Dr Glenn Harrington, Principal Hydrogeologist, Innovative Groundwater Solutions Pty Ltd.
4. Other business
5. Next meeting

The apologies were noted (as above).

2 Minutes of previous meeting and review of action items

The minutes of the previous meeting held 27 January 2016 were tabled. Matt outlined the status of the previous action items. It was noted that the tour of Bolivar Wastewater Treatment Plant and DAFF Plant is scheduled for Wednesday 17 February and members were welcome to bring a friend or their proxy.

A tour of the Australian Water Quality Centre was again proposed to the Committee. It was noted that a number of Committee Members are interested and will look to arrange a suitable date and time.

3 Presentation: Groundwater Recharge, Flow and Inter-Aquifer Leakage

Jane introduced the guest speaker:

- **Dr Glenn Harrington, Principal Hydrogeologist, Innovative Groundwater Solutions Pty Ltd.**

The presentation slides are attached.

The questions received and responses provided during the presentation are summarised as follows:

Clarification was sought about the percentage of water in sandstone. In response, it was noted that sandstone contains approximately 20 to 30 percent water.

A member asked if the term “coral rock” used by drillers relates to limestone. In response, it was noted that limestone is the general term and coral rock is a specific type. Some limestones are more difficult to model because of how water moves through cracks.

Clarification was sought around why people refer to the cone of depression in Virginia, when the presentation suggests the level of the water doesn’t decrease. In response, it was noted that in confined aquifers, the water level does not go down but the pressure decreases. In Virginia this has affected the direction of regional flows, which originally all went toward the coast.

A member sought clarification about the water quality and usage of the T3 and T4 aquifers and whether they could be used for storage and recovery. In response it was noted that the T3 and T4 are generally too saline however further information around the data gathered on this can be made available to SA Water and the Committee. Further to this, a question was asked whether the T3 and T4 aquifers were prescribed. In response it was noted that they are prescribed but there may not be a limit set.

A member asked where the T3 and T4 aquifers are recharged in South Australia. In response, it was noted that they are mostly in the Adelaide Hills and very little gets recharged on the plains.

A member asked how far the lowest point of the cone of depression is from the coast, it was noted that it is approximately 10km. Long term and intensive pumping can lead to the saltwater interface moving further inland and affect irrigation areas (e.g. Pioneer Valley in QLD). It was noted that this is not an immediate threat but is worth considering when discussing long term decisions on groundwater management.

A member asked whether a one meter rise in seawater would have any impact on the aquifer. In response it was noted that any increase in the sea level will result in the seawater coming further inland. The groundwater flows will adjust and the salt water interface will migrate further in.

In addition, a question was asked whether the saltwater interface migrating inland would affect pressure. In response, it was noted that seawater is approximately 40 times denser and as a general rule of thumb for every meter inland, the interface is approximately 40 metres down. A further question was raised about whether the freshwater could travel further out to sea. In response, it was noted that in preferential zones freshwater can be discharged off the coast which is referred to as ‘up-welling’s’ at sea.

A Committee member asked whether water from near the T2 saltwater interface could be recovered before going out to sea to substitute for water extracted from the cone of depression, or if the water could be shandied with the Bolivar water to improve the quality. In response, it was noted that the salinity of the water would need to be checked first. The zone is fragile and dynamic so care would need to be taken when deciding where to drill and the intensity of pumping so as not to pull in seawater.

A member asked about a new bore lining material they had heard of that doesn't leak. It was noted in response that water bore technology has come a long way but is behind the trends emerging from the petroleum industry where there is smarter pressure cementing and mixing with bentonite/clays, with more testing capability for cement integrity.

A member sought clarification around whether injected water will move a greater distance when there is less extraction during the wetter months. In response it was explained that it would require a system that is thoroughly managed for control and demand. There would need to be testing done to determine where the water would move and at what rate. Any large scale MAR requires testing to produce a high resolution characterisation of the aquifer.

A question was asked about Salisbury potentially injecting in one place and selling credits to people in a different area, and the risk of the injected water moving somewhere unexpected. In response, it was noted that it is highly recommended to carry out monitoring and not to stop at surface water and ground water model so that there is confidence around where injected water will go. It's a commonplace to characterise aquifer to produce maps with confidence.

A member asked whether there was a precedent at other sites. In response it was affirmed however pointed out that these systems are very site specific. An additional question was asked if there was a way to control the amount of water already injected if there were any issues discovered. In response it was noted that the water can be recovered if it moves in a path that wasn't predicted through Aquifer Storage Transfer and Recovery (ASTR).

A member asked why the City of Salisbury were injecting in one place and withdrawing from another. In response it was noted that while comment cannot be made on the location of City of Salisbury's scheme, the objective may be to recover pressure levels and "build the resource" rather than extract the injected water for reuse.

A member was interested to learn about whether flow paths change over time and if earthquakes have any impacts on these. In response it was acknowledged that the direction of flows can change over time and pumping is the biggest impact to this, however earthquakes don't have much of an impact on the direction of flow.

A member asked if monitoring is expensive. In response, it was noted that monitoring any MAR scheme is expensive. A good MAR scheme utilises the aquifer as a treatment stage. The time it takes to travel within the aquifer to the nearest domestic bore reduces the health risk. Another Committee member added that CSIRO explained the process around treatment in the last meeting. There was a further question regarding the placement of monitoring bores and whether the OBSWELL network could be used. It was noted that monitoring bores need to be placed where most useful and the OBSWELL bores may not be in the right place.

A member asked for further clarification around the aquifer filtration process as there was concern that it could have the potential to become blocked. In response it was noted that chemistry can have an impact and therefore testing how the water will interact with the aquifer would need to be done prior. In addition a question was asked about how contaminants could travel. In response, it was noted that it would depend on the particular chemistry or biology of the contaminant, the speed it moves through the aquifer and time.

A member was interested to know if there had been any site specific testing on the aquifer characteristics north of the Gawler River. In response it was noted that the process to assess a site needs to be agreed and the same information is needed for every site. Experts can provide a high level of broad information which determines whether site specific investigations will be pursued.

A member sought clarification about how much water will be required to be injected per bore and if that determines how many bores the scheme would require. In response it was noted that the amount of water injected will vary from site to site, the 300ML is specific to that particular site. In

addition is asked if any costing had been done to determine impacts on the scheme may have on growers. In response it was noted that pricing has not been finalised and that National and State subsidy will have an effect of prices.

A member asked where the monitoring bores would be placed. In response it was noted that it relates to the earlier question about how far the bubble moves. The water will move down the hydraulic gradient which is site specific. It becomes critical when you initially inject which can often be very fast, however during the resting period is when it recovers to natural hydraulics.

A member asked about the release of arsenic when pumping an aquifer (from material presented by CSIRO), it was noted that CSIRO had said that site specific chemistry will affect this process. Information from CSIRO will be provided to the member and the rest of the committee.

A member asked if mixing the water with one that's of better quality would improve the traces of arsenic or other contaminants, another member raised the possibility of treating water for specific contaminants. It was noted that further treatment is possible but will incur a cost; some contaminants require substantial treatment and may have minimal benefit or reduction in risk.

A member asked if the injected water could be extracted by domestic bores. In response it was noted that it could be extracted however prior to any MAR scheme extensive research would be needed to determine the characteristics of the aquifer at a specific site.

A member asked if stormwater could be used in conjunction with the recycled water. In response it was noted that this method is currently operating at a number of sites. Once the waters are mixed, the poorer standard of stormwater affects the class of water often will need to be treated again prior to irrigation use.

4 Other business

Matt informed the Committee that the Bolivar tour has been confirmed and for those that are attending to meet at the Virginia Horticulture Centre at 1pm and to respect the PPE requirements while onsite.

A member spoke of the scepticism the community has about the Government in the plan for NAP in the past and would like to see commitment from the Government that they are accountable for outcomes in NAP. In response it was reminded that the Committee are here to discuss what can and cannot be done in terms of finding a suitable solution for storage.

It was added that the EOI is continuing to run in parallel with the Committee meetings so that any probity issues won't impact on the process. Establishing a Master Plan for storage provides the market with the confidence that storage options can be identified. Once the preferred scheme and preferred proponent is identified, Government funding would then be pursued in order to keep water prices low to the end user.

5 Next meeting

The next meeting is scheduled for 24/02/2016 from 5-7pm at the Virginia Horticultural Centre.

The focus of the meeting will be on aboveground storage for recycled water. Tony Lennon Senior Project Manager, SA Water will be presenting on this topic.

Open Action Items Register

No.	Action	By Whom	Date Raised	Status
1.	Arrange a visit to Bolivar Wastewater Treatment Plant and advise Committee members	SA Water	11/11/15	Complete
2.	Dr. Glenn Harrington to send information to the Committee about T3 and T4 aquifer and aquifers further north.	Dr. Glenn Harrington	10/02/16	Underway
3.	Consider how an independent hydrogeological assessment of the technical modelling of any future managed aquifer storage schemes established as part of NAIS (in line with established Master Plan) could be undertaken and made publicly available.	SA Water	13/01/16	Underway
4.	Arrange a visit to AWQC and advise Committee members	SA Water	9/12/15	Underway