WATER BUSINESS

OVERVIEW INFORMATION



August 2018

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1. CITY OF ONKAPARINGA OVERVIEW

- 1.1 City of Onkaparinga (CoO) is South Australia's largest council by population spanning both metropolitan and rural areas.
- 1.2 The Water Assets are subject to the regulatory regime established through the Water Industry Act 2012 and are operated under the governance of the Essential Services Commission of South Australia (ESCOSA), in addition to requirements of the Local Government Act 1999. CoO owns and operates two licenced water retailed entities:
 - 1.2.1 Intermediate Licence an established Community Wastewater Management Scheme (CWMS) comprised of 7 individual schemes, two wastewater treatment plants (one owned by TRILITY Pty Ltd), a trade waste scheme targeting the winemaking region and a number of pump stations.
 - 1.2.2 Minor Licence a relatively new alternative water harvesting and supply scheme (Water Business) comprised of five individual schemes - 4 stormwater harvesting schemes (3 of which have Managed Aquifer Recharge capability) and 1 recycled effluent network which distributes direct to customers.
- 1.3 The council is focussed on providing a high standard of service for its communities at an affordable cost. Any commercial arrangements proposed as part of this EOI must reflect this focus to ensure the customers of the schemes are not materially disadvantaged by any change in ownership arrangements. Notwithstanding customer pricing, council also expects offers to reflect appropriate financial value so that its broader community is also not disadvantaged through a poor return on the public investment in these assets.

2. **DESIRED OUTCOMES**

- 2.1 Through this Expression of Interest process (EOI) council is seeking to identify a shortlist of proponents presenting suitable commercial arrangements for:
 - 2.1.1 the possible future ownership and on-going operation of its Water Assets;
 - 2.1.2 the fulfilment of all regulatory obligations associated with the management and operation of the Water Assets;
 - 2.1.3 the expansion of the CWMS network to service the Sellicks Beach Old Survey Area;
 - 2.1.4 the connection of the Water Business to sources of recycled effluent which ensure sustainable supply and the fulfilment of the aims of the alternative water supply network;
 - 2.1.5 the ongoing management of current and future risks;
 - 2.1.6 the ongoing development of the CWMS network to support trade waste customers, network expansion opportunities and economic growth in the region; and
 - 2.1.7 which demonstrate a thorough understanding of the importance of community and social outcomes from operating a viable and robust wastewater business and water supply infrastructure network.

3. EXPECTATIONS OF PROPONENTS

- 3.1 Proponents to this EOI must (MANDATORY ASSESSMENT):
 - 3.1.1 Sign the declaration form
 - 3.1.2 Respondents that are interested in utilising Council owned land for the storage of wastewater or recycled effluent through Managed Aquifer Recharge must be prepared to accept and insure the long term risk of groundwater contamination and manage the scheme to Councils on-going satisfaction.
 - 3.1.2.1 We are looking for submissions to provide a high level management plan which details the risks of the recycled effluent/wastewater product to the particular aquifer, the risk mitigation activities which is also accompanied by letters of support from the Environment Protection Agency, Department of Environment, Water and Natural Resources and Department of health and Ageing.
 - 3.1.2.2 Respondents must also acknowledge that there are additional considerations on the potential use of the MAR fields for recycled wastewater storage which will should be addressed through the requested high level management plans including:
 - Existing licenced annual MAR injection volumes;
 - Customer acceptance of changes in water quality;
 - Council retaining a potential future interest in the wetlands and MAR fields for stormwater detention associated with greenfield development (particularly regarding the proposed Aldinga Development plan Amendment area – refer web link); and
 - The physical capacity of the targeted aquifers.
 - 3.1.2.3 Respondents that are unable to meet these criteria must demonstrate their ability to fulfil the terms of their proposal without the use of MAR for wastewater/recycled effluent storage.
 - 3.1.3 Provide information regarding its status as a Licensed Water Industry Entity by the Essential Services Commission of South Australia to provide "water retail services" pursuant to the Water Industry Act 2012 (SA) evidenced by:

a copy of a current license issued by the Commission and executed under seal in the name of the proponent for the provision of retail services specific to the aspect of the City of Onkaparinga's CWMSs that is the subject of the submitted bid.

or

Statement of guarantee that a license will be able to be obtained i.e. that there are no known inhibitors to the to the proponent obtaining a license.

or

A written exemption from the need to have a license pursuant to the Water Industry Act 2012 (SA) from an appropriate officer of the Essential Services Commission of South Australia.

- 3.2 Proponents to the EOI should (RISK AND OPPORTUNITY ASSESSMENT):
 - 3.2.1 Demonstrated capacity to make payment as per its commercial offer.
 - 3.2.2 Have demonstrable capability to successfully operate schemes of similar or larger scale.
 - 3.2.3 Not present any risks which could be measured as very-high (and therefore will be deemed as unacceptable) risks to the City of Onkaparinga and the existing (and future) customers of the CWMS with regard to risk exposure including the following areas:
 - risks to the natural environment considering legal, contamination and ecosystems
 - public safety considering people, property and infrastructure
 - socio-political issues considering public opinion, community concern and social health and wellbeing
 - business impact considering financial loss, failure to meet clients needs, materially disadvantaging customers through change in ownership arrangements
 - 3.2.4 Offer benefits for council and/or our communities arising from the delivery of the services by the proponent giving regard to opportunities in the following areas:
 - Community benefit for example improved access to services through extension of wastewater networks to areas not currently serviced.
 - Local economic development benefits for the City of Onkaparinga – for example business investment and employment generation.
 - Environmental benefit for example resource recovery, protection and/or conservation of water resources, commitments to carbon neutrality and/or greenhouse gas emissions reduction.
 - Social political benefits positive publicity or good will be generated for council.
 - Business impact benefits to the City of Onkaparinga (the organisation) in undertaking our functions and delivering of our services to the community.
- 3.3 Proponents to the EOI should present (COMMERCIAL INDICATORS):

- 3.3.1 A non-binding commercial offer which on balance would be considered by the evaluation panel to be of positive commercial value to the council.
- 3.3.2 Non-binding pricing for the harvested stormwater and recycled effluent products at least 15% less than the SA Water non-residential mains water price for irrigation customer within SA Waters current price determination period ending 30 June 2020.
- 3.3.3 Willingness to commit to investment in the interconnection of the network to sustainable wastewater/recycled effluent sources with assumptions and qualifiers clearly stated.
- 3.4 It is of the utmost importance that all responses include a discussion of the assumptions and qualifiers which have been applied to develop the EOI submission.

4. WATER BUSINESS OVERVIEW

- 4.1 The creation of the Water Business emerged from a period in the early 2000's market by severe drought, a growing awareness of the impacts of climate change and investment in water related infrastructure.
- 4.2 Between 2008 and 2015, around \$54m worth of alternative water harvesting, storage and distribution assets were created (and now owned) by the City of Onkaparinga through the Water Proofing he South project (WPS). WPS was a localised integrated water resource management strategy based in and lead by the City of Onkaparinga. These projects were funded through a combination of council, state and federal government sources.
- 4.3 Through WPS a number of 'fit-for-purpose' alternative water supply schemes were developed across the city by Council to maximise the use of water sources such as recycled water and stormwater. These projects aimed to replace traditional irrigation sources such as mainswater and groundwater so that overall water use in the region would continue to become economically, environmentally and socially sustainable.

5 Schemes were ultimately delivered through WPS and now comprise the assets of the WB:

- Hart Rd stormwater harvesting wetland, Managed Aquifer Recharge (MAR) scheme and distribution network at Aldinga in the city's south.
- Dalkeith Rd stormwater harvesting wetland, MAR scheme and distribution network at Seaford in the city's south.
- Byards Rd & Candy Rd stormwater harvesting wetland, MAR scheme with a remote stormwater harvesting pond, stormwater harvesting wetland and distribution network at Reynella in the city's north.
- Christies Creek a centrally located stormwater harvesting scheme comprising two wetlands and an above ground storage dam servicing the Morphett Vale.
- Willunga Effluent Reuse scheme a recycled water scheme servicing a small number of sites in the Willunga region.
- 4.4 The City of Onkaparinga also owns three storage lagoons with a total capacity of approximately 324ML in property areas adjacent to the Willunga WWTP. These storage lagoons provide a disposal path for treated waters emanating from the Willunga WWTP and they are currently leased by the Willunga Basin Water Company (WBWC). Only one of these dams (Dam 1) is necessary for the operation of the Willunga WWTP and considered part of the CWMS set of assets. Dam 1 is not presented to the market as part of the WB assets.

The remaining two dams (Dams 2 & 3) were constructed to provide balancing storage for the WBWC and to enhance economic development in the region. Dams 2 & 3 are considered to be assets of the Water Business. The transfer of this lease and the ownership of these dams (but not the land they are situated on) forms part of the WB assets being presented to the market.

The leases for all three dams provide Council with access to an annual volume of recycled water roughly equivalent to the dams' total volume (324ML). Council is able to draw this water directly from the dams at its discretion within a range of specified limitations. This water is also considered to be an asset of the water business being presented to the market.



4.5 City of Onkaparinga Water Business Locations

- 4.6 On 7 September 2010, Council adopted the following water allocation objectives to assist it with prioritising its use of harvested stormwater (each priority is further defined in the original document available on Council's website):
 - Priority 1 Ecological systems Harvest alternative water supplies to meet ecological requirements.
 - Priority 2 Priority rejuvenation Use alternative sources of water to enable the rejuvenation of priority community spaces for community benefit.
 - Priority 3 Sustainable development Use alternative sources of water to encourage sustainable growth and adaption.

It is expected that these priorities will be preserved and enhanced regardless of the ownership of these schemes.

4.7 Council's Water Business (WB) was created in December 2011 as an internal team tasked with progressively commercialising its water recycling assets created through the Water Proofing the South (WPS) projects.

The City of Onkaparinga also became a licensed water industry entity in 2013 underpinning its operation and management responsibility for its WB. Details of the City of Onkaparinga's application are available for download via: http://www.escosa.sa.gov.au/water-overview/licensing/retail-licences.aspx

The transition of WPS from infrastructure project to utility business to date has been met with several challenges – although the changing regulatory environment under the Water Industry Act 2012 has added pressure, the issue is primarily in establishing water storages sufficient to meet the available demand due to the following:

- highly variable rainfall during the harvesting season (May through September);
- water quality issues heavy inflows and carp leading to turbidity levels exceeding MAR injection criteria; and
- possible groundwater expression at our Byards Rd MAR scheme.

5. **CONTRACTUAL CONSIDERATIONS AND CONSTRAINTS**

- 5.1 Council understands that it may be constrained in the sale of the WB assets through its federal WPS funding agreements. Permission is required to divest these assets but has not yet been sought.
- 5.2 Minor contracts are in place with for the provision of hydrogeological services, hydraulic engineering advice, hydraulic mechanical and automation none of these are expected to be a constraint to the potential divestment of these assets.
- 5.3 The following customer agreement are in place or close to being in place noting that council's own sites represent a significant proportion of demand:
 - Department of Education and Child development (13 schools)
 - Thaxted Park Golf Course
 - Willunga Recreation Park
 - Willunga Bowling Club
 - Willunga Waldorf School.
- 5.4 The lease for the aforementioned Dams 2 & 3.
- 5.5 Related to the Willunga Dam leases, council has a Bulk Water Transfer Agreement in place with WBWC. This agreement provides for the transfer of councils water entitlement by virtue of the Dams 1,2 & 3 leases via WBWC pump station infrastructure (Councils owns the Willunga Effluent Reuse Scheme distribution infrastructure).
- 5.6 Respondents to this EOI should note that Council will need to negotiate the release, assignment or novation of the contractual arrangements described in this EOI brief. This negotiation process may impact on any second stage of this divestment process, should it occur, by introducing uncertainty around the cost to council for the sale of its Water Assets (and therefore relative benefit of any commercial offers) and the time frame required to complete any subsequent sale process.
- 5.7 Relevant information pertaining to the contracts, lease arrangements and operational obligations will be confidentially disclosed to shortlisted proponents should the City of Onkaparinga progress with a second phase of its divestment project.

6. TREATMENT OF COUNCIL OWNED LAND

6.1 There is a range of Council owned land potentially involved in the sale of its Water Assets. It is not proposed that any of this land is transferred to another party. Rather a new owner of the Water Assets would be expected to enter lease agreements with Council within the bounds of the local Government Act 1999 for the use of the Water Assets on Council land.

Council may also request (should a sale proceed) that infrastructure on its land be covered by easements.

6.2 Where wetlands are a part of the stormwater harvesting system, it is required that public access be retained and that these areas are maintained as public open space indefinitely.

7. **FINANCIAL PARAMETERS**

7.1 Assets

Value at 30 June 2016	Depreciation	Revaluation	Transfers and Upgrades	Value 30 June 2017
\$58,051,464	\$676,386	\$1,160,707	\$2,103,273	\$56,432,512

Council is seeking a non-binding commercial offer which reasonably reflects its investment in these assets as well as their value in the market. Any offers provided must be accompanied by a discussion that clearly articulates any assumptions or qualifiers that have been made to inform the development of the commercial offer and quantify the level of influence that assumption may have on the commercial offer.

For example, respondents should articulate any assumptions that have been made around their expected operating efficiencies, strategic gain and asset condition.

7.2 Maintenance of the Water Business assets is undertaken in accordance with manufacturer's specifications. A detailed program is not available as this work has occurred in an ad hoc manner due to the schemes generally not having reached full operating capacity.

7.3 Pricing

Council adopted its pricing policy on 7 September 2010 to recognise the importance of water pricing in meeting a range of alternative water scheme objectives. This was developed in line with the then current position of the Australian Government's National Water Commission which valued:

- Harvested stormwater at 80%; and
- Reclaimed water at 70% of the potable mains water price.

This pricing approach remains in place today.

7.4 Operating Budgets

The table below highlights the Operating Budgets as detailed in CoO's Annual Business plan for the last three years.

	2014-15	2015-16	2016-17
Expenditure	\$1,098,191	\$882,412	\$961,630
Income	\$1,082,828	\$1,448,689	\$869,179

7.5 It should be noted that due to the early stage of commercialisation of the Water Business, annual budgets (particularly expenditure) have a high degree of estimation. With the exception of the Willunga Effluent reuse scheme, none of the Water Business networks have yet run at full capacity. As a result the costs of a full harvest/supply cycle are unknown.

As water reserves have not been established to date, the income budgets also do not reflect the level of available demand or the pursuit of additional water sale opportunities.

7.6 CoO as part of its consideration of EOI responses is looking to understand the pricing methodology which will be applied by respondents. It is expected at a minimum that respondents will apply the pricing rules required by ESCOSA and established through the National Water Initiative Pricing Principles. However we are also seeking indicative customer pricing going forwards (IE annual cost per connection) as far as it is possible to create from the limited information provided in this EOI brief. A key part of CoO's consideration of responses to this EOI and a second stage should it eventuate is the impact of any transfer of asset ownership on consumer pricing.

We are looking for proponents to provide an outline of their proposed pricing methodology including an indicative retail price stack, their Weighted Average Cost of Capital (that will to be applied to generate a Return on Asset (ROA) charge) and a Risk Premium if it is intended to be recovered separately from the ROA. We are particularly interested in the assumptions and qualifiers that need to apply by the proponent to generate this kind of pricing information.

As a key driver of price, we are also interested in the respondent's proposed asset revaluation policy and fair value revaluation model as per AASB 116 as may be applied should the Water Assets transfers ownership through this process.

8. HART ROAD SCHEME

Hart Rd Scheme Aerial



Hart Rd Distribution Network



- 8.1 Constructed from 2013 by the City of Onkaparinga as part of stage 2 of its Water Proofing the South initiative, the reuse scheme exists within the Willunga Creek catchment and services Aldinga Beach and surrounding areas within the City of Onkaparinga.
- 8.2 The scheme's main feature is an urban wetland adjacent to Hart and Rowley Roads. It receives and treats runoff from the surrounding urban area. Captured water is then treated (UV disinfection and mechanical filtration) and injected into the underlying aquifer system (Tertiary Port Willunga Formation limestone aquifers) accessed via bores around the wetland site, where it is kept until needed to service local irrigation demands. A pressurised pipe network distributes harvested stormwater from these locations to parks and reserves, sports fields and schools.
- 8.3 Inline water quality monitoring (turbidity, salinity and pH) is carried out to ensure the compliant water quality criteria are met, at the following locations:
 - Post wetland, pre filtration and secondary treatment; and
 - Post treatment

If water quality criteria are not met, the water is transferred back through the treatment process.

- 8.4 The scheme comprises the following key components:
 - Common GPT incorporated into the wetland.
 - Open water wetland (holding capacity approx. 5ML).
 - Raw Water Sump.
 - Particulate Filter.
 - UV disinfection.
 - Clear Water Tank.
 - Distribution Pumps.
 - Four ASR production drillholes (two equipped for injection).
 - A control and monitoring system to manage the scheme.
- 8.5 Four injection wells are available in the Hart Rd system(shown as red boxes in above aerial image), however only two wells are currently equipped (HR361 and HR364). Treated water is injected into these two production wells.
- 8.6 The water injection season depends on water availability; however the injection season is restricted to the period 1st May to 30 September of each year under the rules set out in the McLaren Vale Prescribed Wells Area Water Allocation Plan (MVPWA WAP).
- 8.7 MAR injection is governed by EPA licence 42632 which sets out a range of management controls including a total annual injection limit of 180ML per annum. This licence is expected to be reviewed to align with the new Water Quality policy in the near future.
- 8.8 The site also has water entitlements by way of :
 - 8.8.1 Surface Water licence 118843 providing a harvesting volume of 452ML pa; and
 - 8.8.2 Groundwater extraction licence 211717 of up to 100% of water drained into the system allocated on a rolling 3 year expiry basis.
- 8.9 Over the last three harvest seasons, approximately 270ML has been injected at Hart Rd. Of this around 60ML was injected into well HR 361 (and may be lost

due to an issue from the construction of the well described further below) and the remainder into well HR 364.

- 8.10 Minor water quality exceedances have prevented injection for short periods of time with soluble aluminium and zinc the primary causes.
- 8.11 Recovery of freshwater was achieved at the end of 2016 and council sites have been supplied from the wetland and aquifer throughout the summer of 2017-18 (approx. 30-40ML).
- 8.12 Total current (metered) demand on this scheme is around 61ML with around 50ML of that contributed by Council (based on IPOS estimates). Opportunities for increased demand are present with future development, provision of environmental services to developers through stormwater detention and the sale of water to other water suppliers in the region.
- 8.13 Well HR 361
 - 8.13.1 An investigation was undertaken by Aqueon in May 2017, after higher than expected injection pressure was recorded. Data had shown that greater than 30m impress head was recorded, in comparison to the less than 5m impress head predicted.
 - 8.13.2 Recovered water from HR361 also had much higher salinity than anticipated. In 2016, HR361 was depth checked to 60m below ground level (bgl) which was not in line with the well construction data. This well was originally drilled to 78m bgl and was reportedly backfilled to 50m bgl to seal the well from the highly saline limestone layer.
 - 8.13.3 The investigation in May 2017 was to determine if the backfilled cement plug or the casing was damaged and causing the lower than expected recovery efficiency. Pump infrastructure was removed, a salinity profile recorded, and CCTV footage taken of the well. It was found that the pump infrastructure had been damaged at some point. It is also likely that the initial backfilling was unsuccessful.
 - 8.13.4 Salinity information indicated that the limestone layer was not completely sealed off, as extremely high salinity was experienced at a depth of 55m bgl.
 - 8.13.5 A program of works commenced on the 9th April 2018, 0.44 m3 of cement was tremie lined down to the base of the hole. This was allowed to set overnight which is consistent with the drilling procedure. The well depth was measured at 9am on the 10th April and was recorded to be 49.7 m below ground level just short of the specified 48 m. Discussions were held with the drilling contractor Olympic Boring, internal WGA and with City of Onkaparinga to determine the best course of action.
 - 8.13.6 Due to the high potential risk of over cementing the aquifer (if a small volume of cement is put down the hole it is unlikely to form a solid base with integrity) and because the cement had sealed passed the 50 m saline groundwater level it was decided that no additional cement would be added to the well at this time. If necessary, additional investigations will be carried out at a later date to determine if additional cement is required.
- 8.14 Respondents should note that the City of Onkaparinga is proposing to change the zoning of a 24 hectare section of privately owned land in Aldinga Beach. This area has been within the Deferred Urban Zone since the late 1980s. This means it has been identified and held for future urban development. This DPA has been requested and funded by the land owner, but it remains under the control of Council.

As part of the DPA process, a report on the management of post development stormwater flows has been prepared. This report acknowledges the potential importance of the Hart rd. wetlands and its MAR operations to future stormwater management for the area.

- 8.15 The key risks to successful ongoing operation at this site are:
 - Insufficient water for recharge.
 - Water quality impacts on harvestable water.
 - Release of carp into the wetland.
 - Customer sensitivity to water quality with a number of current and future schools targeted by the scheme.
 - Issues with production wells and aquifer system such as failure of the confining layers (no evidence of this to date).

9. DALKEITH ROAD

Dalkeith Rd Aerial



Dalkeith Rd network



9.1 The Dalkeith Road, Seaford Rise MAR scheme captures and treats stormwater from the surrounding urban catchment. No water is taken from Pedler Creek.

The harvested stormwater is treated via a series of detention ponds and wetlands (that incorporate a sediment pond and macrophyte zones) and mechanical filtration (mechanical filtration and UV disinfection), before recharge to the underlying target aquifer (Fractured Rock – Umberatana group). After a period of residence, the recharged water is recovered and provided to customers/end users (Council or third party)

- 9.2 Inline water quality monitoring (turbidity, salinity and pH) is carried out to ensure the compliant water quality criteria are met, at the following locations:
 - Post wetland, pre filtration and secondary treatment; and
 - Post treatment

If water quality criteria are not met, the water is transferred back through the treatment process.

- 9.3 The scheme comprises the following key components:
 - Common GPT incorporated into the wetland.
 - Open water wetland (holding capacity approx. 15ML).
 - Raw Water Sump.
 - Particulate Filter.
 - UV disinfection.
 - Clear Water Tank.
 - Distribution Pumps.
 - Seven ASR drillholes (three equipped for production).
 - A control and monitoring system to manage the scheme.
- 9.4 Although a total of seven production drillholes (shown as red boxes in above aerial image) have been installed on the site, only three drillholes are currently equipped for recovery and recharge.
- 9.5 The water injection season depends on water availability and is restricted to the period 1st May to 30 September of each year under the rules set out in the McLaren Vale Prescribed Wells Area Water Allocation Plan (MVPWA WAP).
- 9.6 MAR injection is governed by EPA licence 42632 which sets out a range of management controls including a total annual injection limit of 550ML per annum. This licence is expected to be reviewed to align with the new Water Quality policy in the near future.
- 9.7 The site also has water entitlements by way of :
 - 9.7.1 Surface Water licence 25112 providing a harvestable volume of 280ML pa; and
 - 9.7.2 Groundwater extraction licence 211719 of up to 100% of water drained into the system allocated on a rolling 3 year expiry basis.
- 9.8 In winter 2017, for the first time since 2014 there was sufficient source water in the Dalkeith wetlands to commence injection. A total volume of 4ML was recharged In August/ September. A primary water quality sample was collected on 15th August which reported exceedance of aluminium, lead, zinc with subsequent sampling on 30th August 2017 reporting elevated concentrations of aluminium, lead, molybdenum and selenium. A repeat water quality sample was not carried out due to insufficient source water. Overall, the volume recharged to the aquifer was limited by rainfall/ runoff capture amount.
- 9.9 Total current (metered) demand on this scheme is around 64ML with around 37ML of that contributed by Council (based on IPOS estimates). Opportunities

for increased demand are present with future development, network extension to Council reserves south of the existing network.

- 9.10 The key risks to successful ongoing operation at this site are:
 - Insufficient water for recharge.
 - Water quality impacts on harvestable water.
 - Release of carp into the wetland.
 - Customer sensitivity to water quality with a number of current and future schools targeted by the scheme.
 - Issues with production wells and the aquifer system such as failure of the confining layers through over pressurisation.
- 9.11 Additional known risks are:
 - 9.11.1 A contractor has damaged the supply main leading from the pump shed up Dalkeith Rd. At this point in time the system is unable to supply due to the damage. The contractor has proposed a repair and we are currently working through this process.
 - 9.11.2 Monitoring data indicates that there may be artesian conditions at the site. The original hydrogeological investigation study indicated that the water level was sub-artesian. During early injection activities, water levels were reviewed and no concerns identified but artesian conditions are showing as present. We will be reviewing this information to clarify site conditions.
- 9.12 Key opportunities at this site are:
 - An interconnection with SA Water's Southern Urban Reuse Pipeline to provide a secure supply of alternative water; and
 - Scheme extension to council reserves to the south of the existing network.
 - Scheme extension across South Rd to service potential development in Seaford Heights area.

10. BYARDS ROAD

Byards Aerial



Byards Network



10.1 The Byards Road, Reynella East ASR system lies within the Central Adelaide Plains Prescribed Wells Area and captures and treats stormwater from Glenloth Creek and Panalatinga Creek as well as Candy Road transfer station. The Byards Road, Reynella East site has been designed to harvest up to 800 ML per annum when fully operational.

10.2 Water is captured and treated in a series of detention ponds, wetlands (that incorporate a sediment pond and macrophyte zones) mechanical filtration and UV disinfection before being recharged to the underlying Fractured Rock Aquifer system. If local water sources are unacceptable, water can also be diverted from the Wilfred Taylor reserve dam or Brodie Road wetlands on the Christie Creek Scheme.

Water is typically recharged in the wetter winter months when stormwater is available and recovered in the drier summer months however injection is able to occur all year around. Recovered water is provided for irrigation.

- 10.3 Inline water quality monitoring (turbidity, salinity and pH) is carried out to ensure the compliant water quality criteria are met, at the following locations:
 - Post wetland, pre filtration and secondary treatment; and
 - Post treatment

If water quality criteria are not met, the water is transferred back through the treatment process.

- 10.4 The scheme comprises the following key components:
 - Common GPT incorporated into the wetland.
 - Open water wetland (holding capacity of approx. 10ML).
 - Raw Water Sump.
 - Particulate Filter.
 - UV disinfection.
 - Clear Water Tank.
 - Distribution Pumps.
 - Nine ASR drill holes six of which are equipped for production.
 - · Six shallow groundwater monitoring wells
 - A control and monitoring system to manage the scheme.
- 10.5 MAR injection is governed by EPA licence 42632 which sets out a range of management controls including a total annual injection limit of 800ML per annum. This licence is expected to be reviewed to align with the new Water Quality policy in the near future.
- 10.6 The site also has water entitlements by way of :
 - 10.6.1 A Surface Water licence is not presently required for this site.
 - 10.6.2 Groundwater extraction of 640ML per annum is provided for by way of a section 128 approval under the Natural Resources Management act. This expires 30 June 2018. We are not expecting any issues in receiving a new section 128 approval.
- 10.7 Total current (metered) demand on this scheme is around 41.5ML with around 25ML of that contributed by Council (based on IPOS estimates).

The primary value of this site however is through its connection to the Wilfred Taylor Reserve dam on the Christies Creek scheme. The Byards scheme significantly increases the stormwater harvesting capability of the Christies Creek scheme. Byards also provides essential additional storage as the Christies scheme has not yet met its connected demand through its available storage.

10.8 The Byards Road, Reynella East MAR scheme has been operating under a commissioning plan which incorporates a series of incremental steps through incrementally increasing the injection rates and the maximum head pressures in the injection wells.

A shallow groundwater monitoring system has also been implemented to provide information of the interaction between the shallow groundwater system and the production aquifer.

- 10.9 The commissioning plan has not been successfully implemented as yet. The commissioning plan requires successful injection of 100ML increments at maximum injection pressures. In 2014-15 8ML was injected and a further 53 ML in 2015-16.
- 10.10 During the 2016-17 injection season, a total volume of 3 ML was recharged to the fractured rock aquifer. This limited volume was due to turbidity issues and observed surface water ponding at discrete locations along the northern and southern sides of the wetlands. The shallow groundwater system is reported to naturally pond at some locations across the site. Preliminary visual inspections carried out during injection appeared to indicate that hydraulic loading associated with an equivalent injection pressure of 60 m head may be sufficient to induce additional surface expression of the shallow groundwater system in topographically low lying areas across the site.

A review of the aquifer hydraulic response to injection rates and equivalent pressure heads was carried out however there was no clear evidence to confirm that injection was the primary cause of surface expression of the shallow groundwater across the site. Furthermore, the 2016 winter was one of the wettest winters on recent record and other than anecdotal reports there was insufficient historical information to confirm or otherwise how much waterlogging may have occurred across this site prior to the establishment of the wetlands.

- 10.11 In late 2017, three injection trials were carried out first into three wells simultaneously and then into each well individually. Each test resulted in surface expression and/or observable changes in the shallow groundwater system. As a result we now need to consider the operational viability of this MAR system further. It may be possible to continue injecting stormwater however a number of impact scenarios need to be considered further.
- 10.12 The key risks to successful ongoing operation at this site are:
 - Insufficient water for recharge.
 - Water quality impacts on harvestable water.
 - Release of carp into the wetland.
 - Customer sensitivity to water quality with a number of current and future schools targeted by the scheme.
 - Issues with production wells and aquifer system such as failure of the confining layers.

11. CHRISTIES CREEK Christies Creek Aerial



Christies Creek Network



11.1 The Christies Creek Scheme is comprised of a storage dam in Wilfred Taylor reserve which is fed by the Brodie Road and Madeira wetlands and was completed in 2011-12. Stormwater is harvested from the surrounding rural/ urban catchment which is then passively treated through the corresponding wetlands (minimum 72 hour retention time), subsequently treated by

mechanical means (particulate filtration and UV disinfection) and then transferred to the Wilfred Taylor Reserve dam for distribution.

This storage dam is also connected to the Byards scheme via a pipeline along Panalatinga Rd and can either send water to the Byards wetland for aquifer recharge or distribution or it can receive water harvested/recovered from the Byards system.

- 11.2 The Christies Creek systems have a design capacity to harvest 110 ML/ year from the Madeira Wetland and 740 ML/year from the Brodie Road wetland. The lined Wilfred Taylor Reserve detention pond has a design capacity of 93 ML and is used to store the water prior to transfer for irrigation or transfer to Byards Road for recharge. Prior to distribution, the water is treated using particulate filtration and UV disinfection which is installed at all three distribution points. The scheme also includes a small pump station in Christies Downs equipped for dual reticulation supply to a small development. To date this system has not been used.
- 11.3 Inline water quality monitoring (turbidity, salinity and pH) is carried out to ensure the compliant water quality criteria are met, at the following locations:
 - Post wetland, pre filtration and secondary treatment; and
 - Post treatment

If water quality criteria are not met, the water is transferred back through the treatment process.

- 11.4 The scheme comprises the following key components:
 - Two open water wetlands (holding capacity of approx. 22ML).
 - Lined open water storage dam (93ML)
 - Raw Water Sump.
 - Particulate Filter.
 - UV disinfection.
 - Clear Water Tank.
 - Distribution Pumps.
 - Small pump station equipped for dual reticulation (not used)
 - One ASR drill hole equipped for recharge only (not used).
 - A control and monitoring system to manage the scheme.
 - Approx. 17km pressurised pipe distribution network.
- 11.5 Demand on this scheme is estimated to be 280ML (IPOS) with 64 ML being council demand. The scheme is rainfall dependant and to date has not serviced the connected demand.
- 11.6 Future development of this scheme is suggested to include the following:
 - 11.6.1 Connection to SA Water Christies Beach WWWTP to provide a secure source of alternative water into the network.
 - 11.6.2 Network extension South to the South Adelaide Football Club, Cardijn College and other surrounding areas of open space demand.

- 11.7 The key risks to successful ongoing operation at this site are:
 - Insufficient water for customer supply.
 - Water quality impacts on harvestable water.
 - Release of carp into the wetland.
 - Customer sensitivity to water quality with a number of current and future schools targeted by the scheme.

12. WILLUNGA EFFLUENT REUSE

Willunga Effluent Reuse Network



12.1 The Willunga Effluent Reuse Scheme (WER) distributes a portion of the recycled water that council is entitled to take (334ML) under its leases for the balancing storage dams with WBWC. Treated wastewater is discharged into to Dam 1 by TRILITY Pty Ltd from the Willunga Wastewater Treatment plant. WBWC through its operations also utilise all three dams for the storage of treated wastewater from SA Water's Christies Beach WWTP.

Council can draw its water entitlement from the dams at maximum rate of 42.5KL/Hr but has not installed infrastructure to do so. Instead, Council has entered a bulk water transfer agreement with WBWC. This provides for the transfer of water via WBWC's pump station (by way of a dedicated upgrade) at the allowed flow rate and at a pressure of 570kPa.

12.2 The WER then provides irrigation water to several private customers, Council's Rose Garden and Golf Course. Annual demand ranges from around 90ML to 115-130ML pa.