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Murray Darling Association Inc.

Region 7 Ordinary Meeting No 110
AGENDA

Indigenous Acknowledgement

"The Murray Darling Association acknowledges the traditional owners of this land and the waters on which we meet"

Location:	City of Campbelltown, Council Chambers, 172 Montacute Road Rostrevor
Time / Date:	Meeting with commence at 6:30pm on Thursday 22 August 2019 If you are unable to attend the meeting in person you can join by clicking on the following link: Join Zoom Meeting https://zoom.us/j/7555472561
Guest Speakers:	**Ms Rachael Hamilton** Coordinator Environment and Sustainability, City of Campbelltown **Mr Henry Haavisto** Manager Urban Trees, City of Campbelltown **Ms Deana Mildren** Regional Engagement Officer, Lower Murray, Murray-Darling Basin Authority
Chair (Acting):	Cr John Kennedy, City of Campbelltown
Secretary:	Jamie Barrett, City of Mitcham

1. **WELCOME**
   Mayor Jillian Whittaker, City of Campbelltown

2. **ATTENDANCE**
   2.1 Present:
   2.2 Apologies:

3. **CHAIRMAN'S OPENING AND WELCOME TO NEW MEMBERS**

4. **DECLARATION OF INTERESTS**

5. **MINUTES**
   Recommended that the Minutes of Meeting No 109 of Adelaide Metro Region 7 held on Thursday 16 May 2019 be confirmed.

Minutes from Previous Meeting

6. MURRAY DARLING ASSOCIATION BOARD MINUTES

Minutes of the Ordinary Meeting of the Board Meeting No 386, 387 and 388 held in May, June and July respectively can be viewed by clicking on the following link.

Minutes of the Ordinary Meetings of the MDA Board

7. REPORTS FROM THE CEO

Reports from the CEO for May, June and July 2019 can be viewed by clicking on the following link.

Chief Executive Officer Reports

8. PRESENTATIONS

8.1 Ms Rachael Hamilton & Mr Henry Haavisto

Coordinator Environment and Sustainability & Manager Urban Trees, City of Campbelltown

Heat Mapping, Canopy Preservation & Tree Valuation

8.2 Ms Deana Mildren

Regional Engagement Officer, Lower Murray, Murray-Darling Basin Authority

Update from the Murray Darling Basin Authority

9. CORRESPONDENCE

9.1 Letter dated 25 June 2019 – Adelaide Hills Council supporting Murray Darling Association (**Attachment 9.1**)

9.2 Email dated 25 June 2019 – Cr Andrew Tilley response to Adelaide Hills Council (**Attachment 9.2**)

9.3 Flyer received 3 July 2019 – Flyer on Water Scarcity by Communist Party of Australia (**Attachment 9.3**)

9.4 Research Article 2019 – A field and laboratory investigation of kerb side inlet pits using four media types (**Attachment 9.4**)

9.5 Media Release 9 July 2019 – MDA Response to 4Corners *Cash Splash* (**Attachment 9.5**)

9.6 Email received 25 July 2019 – City of Holdfast Bay resolution to continue membership with Murray Darling Association & Cr Lindop appointed the delegate (**Attachment 9.6**)

10. GENERAL REPORTS

Nil

11. OTHER BUSINESS

11.1 Motions for AGM Discussion

12. NEXT MEETING

The next meeting of the MDA Region 7 will be held on Thursday 21 November 2019 at the City of Port Adelaide Enfield, commencing at 6.30 pm.

13. CLOSE

The Murray Darling Association acknowledges and thanks the City of Campbelltown for its support in hosting this meeting of Region 7.

Attachment 9.1

Adelaide Hills
COUNCIL

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Woodside SA 5244
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mail@ahc.sa.gov.au
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File Ref: OC19/7930

25 June 2019

Mayor Heather Holmes-Ross
City of Mitcham
PO Box 21
Mitcham Shopping Centre
TORRENS PARK SA 5062

hholmes-ross@mitchamcouncil.sa.gov.au

Dear Mayor Holmes-Ross

I wish to advise that, at the recent Adelaide Hills Council Special Council Meeting held on Tuesday 7 May 2019 (minute attached), Council supported the Murray Darling Association (MDA) in its objective to ensure Local Government has a role in informing the decisions that impact our local communities under the Murray Darling Basin Plan. The Adelaide Hills Council supports their bid to secure recurrent funding for the provision of effective consultation and engagement with Councils within the Murray Darling Basin communities through their local representatives.

Therefore to assist the MDA receive recurrent funding, if you have not already done so, Adelaide Hills Council seeks the support of your Council in raising this matter with your local State and Federal representatives.

I would encourage you to join the MDA (if not already a member) and help them support the activation and development of advocacy opportunities for our Region.

Please contact me if you have any queries.

Yours sincerely

JCWisdom

Jan-Claire Wisdom
Mayor

Enc.

ADELAIDE HILLS COUNCIL
MINUTES OF SPECIAL COUNCIL MEETING
TUESDAY 7 MAY 2019
63 MT BARKER ROAD STIRLING

7.8 Murray Darling Association Support

Moved Cr Andrew Stratford
S/- Cr John Kemp **101/19**

Council resolves:

1. **That the report be received and noted.**
2. **That Council supports the Murray Darling Association (MDA) in its objective to ensure local government has a role in informing the decisions that impact our local communities under the Murray Darling Basin Plan, and in their bid to secure recurrent funding for the provision of effective consultation and engagement with councils within the Murray-Darling Basin communities through their local representatives.**
3. **That Council authorises the Chief Executive Officer (or his delegate) to:**
   a) **Write a letter of support to the Murray Darling Association for the State and Federal Governments to contribute to the ongoing funding of the MDA.**
   b) **Write to our local state and federal MPs encouraging them to support State and Federal Governments contributing to the ongoing funding of the MDA.**
   c) **Write to the LGA and all councils in our MDA region, encouraging them to join the MDA and support the activation and development of advocacy priorities of this region.**

Carried Unanimously

Jamie Barrett

From:	Cr Andrew Tilley
Sent:	Tuesday, 25 June 2019 11:57 AM
To:	jfinnie@ahc.sa.gov.au
Cc:	Jamie Barrett; Heather Holmes-Ross; Cr Darren Kruse; Nita Freer-Cooling
Subject:	MDA support.

Dear Mayor Jo,
We whole heartedly support your support for the Murray Darling Association. As you are aware Mitcham is the Chair Council and I have been the stand in Chairman since the resignation of the previous Chairman Cr David Shetliffe from Walkerville after the last Local Council Election. My role was ratified at the AGM on the 16 may at the Regional Meeting at Playford Council Chambers.

I have met with your staff member who attended the first meeting at the Mitcham Council Chambers this year and appreciate his attendance and clear interest in all things water related.

Just to help you in support of the MDA we aim to be active in two areas. One is to encourage local councils in our region to apply ‘Water Wise ‘ or Water Sensitive Urban Design principles in our planning and developments. At our quarterly meetings we invite member councils to present their latest and greatest achievements in this area. There are many exciting innovations in this area, and each council area presents different opportunities. We welcome all Councils to present Water Related Achievements.
Our aim is to ‘harvest these opportunities so that we may present them in achieving our second aim.
In addition we invite water Scientist from the many well researched people engaged in this area to explain their area of interest. We recently heard in detail about interventions by deep bores along the Murray between Morgan and Waikerie that intersect super saline underground streams from entering the river. This water is pumped back into existing Salt pans and the salt is harvested. Previously we had speakers from the Murray Darling Basin Authority in response to the SA Royal Commission in to the Murray and its recommendations. At the same meeting Professor Wayne Meyers from Uni SA’s Environment Department spoke about his lifelong interest in the Murray.

The second aim is to present to the other 11 regions of the MDA the savings and responsive attitudes Adelaide Metro and surrounding councils are showing towards our Water entitlement. Its worth noting that the other 11 regions of the MDA represent Country Towns, Villages, Farms, Graziers, Irrigators and environmental sites. Adelaide and SA’s role in water usage is unique and often criticised by our upstream neighbours.

In a reactive sense Adelaide residents are equally critical of upstream misuse of water entitlements. The board of the MDA represents the coming together of these tensions. Fortunately the conversations are underscored by existing constitutional rights and a general goodwill towards Water Sharing. Long term droughts, emotional irresponsible claims during well publicised political campaigns add to the tension.

Accordingly as you stress in your recent email, these are some of the reasons why Metro Local Councils need to support the MDA which is the only body representing the competing voices of the people. The MDA is unfunded except for the contributions of member councils. It has a staff of three hard working devoted people under a very dedicated CEO in Emma Bradbury. To function at is optimum each council of the Region needs to be represented.

Thank you again for passing on your letter of Support.
Regards Cr Andrew Tilley
Chair Region 7 MDA
City of Mitcham
0411158882

Andrew Tilley

Councillor Boorman Ward
City of Mitcham
0411158882 Sent from Mail for Windows 10

Attachment 9.3

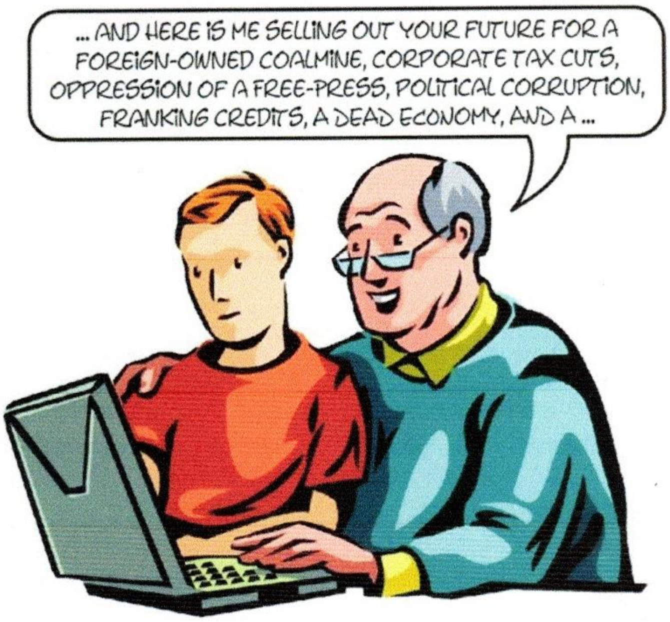
Communist Party of Australian
South Australian State Committee
(Environmental, Health and Safety Unit).
E-mail sa@cpa.org.au

Michael Perth, SA State President

To All: Mayors and Councillors, Adelaide Metropolitan area.

Water scarcity must be reassessed to how water is captured, managed, and used in our state

The signs of future problems have been showing up over a few decades that we do not have sufficient reserve supply of water. Adelaide's ground water is contaminated in many areas with toxic chemicals and heavy metals which make it unusable for watering vegetable gardens and fruit trees.



The latest report published in the Advertiser June 25, 2019 advises the water in areas of the McLaren Vale wine district is too salty for grape irrigation, with the blame being laid at excess extraction from underground aquifers. One of 10 wells is too salty for irrigation, the department report concludes the cause of the increased salinity appears to be extraction.

The future outlook

Economic growth, growing population with the insane drive for infill, more farming and climate change will inevitably increase pressure on our limited water supply. Los Angeles, is looking to capture more stormwater to recharge its aquifers as climate change threatens its old supplies. Los Angeles Times July 5th, 2018. UN data shows 2 billion people – a quarter of the world's population – are now using groundwater faster than can be replenished.

We are going to have to do things differently and much quicker to move to a more sustainable future. Adelaide's local councils have used some important initiatives in conserving water. Los Angeles is stepping up conservation such as paying residents $3 per square foot (1 ft² = 304.8 mm²) to shrink or get rid of water demanding green lawns.

Climate emergency

In a bold demonstration of leadership, Clover Moore, Lord Mayor of Sydney, has now declared a climate emergency. In doing so, Sydney has become the 24th Australian local government or territory to have formally acknowledged the climate emergency.

It follows in the footsteps of jurisdictions from all over the country, both big and small. From Vincent City in WA to Hobart, from Byron Bay to the Australian Capital Territory, millions of Australians have had their local representatives acknowledge the scale of the climate crisis, by putting their constituents their families, and our planet first. Local councils can't sit on the sidelines any more. In the face of the climate emergency the truth must be told. We are facing water and food scarcity. The Messenger weekly published an article "The suburbs searching for food" 26th June 2019 is a timely reminder of an underlying crisis of the Capitalist system, when workers cannot buy back what they produce resulting in poor diet.

Poor diet linked to increased cancer

A new study in the United States shows as many as 80,000 new cases of cancer reported in 2015 may have been diet related. The highest proportion of diet related cases associated with suboptimal diets showed colorectal cancer at 38.3%, cancer of the mouth, larynx with almost 26% of cases linked to diet. The study findings lend further support to the growing evidence that diet is a key component in cancer risk and prevention. The author Fang Fang Zhang, is an associated professor at the Friedman School of Nutrition Science and Policy at Tufts University, Boston, Massachusetts. Article published, "Preventable Cancer Burden Associated with Poor Diet in the United States" JNCI Cancer Spectrum, Vol 3, issue 2, June 2019.

2017 China shows a way, turned on the World's largest floating solar farm.

The floating on a lake over a collapsed coal mine, the power station in Anhui province can produce 40 megawatts of energy.

So why build solar plants on top of lakes and reservoirs? Fiona Harvey at The Guardian explains that building on bodies of water, especially manmade lakes that are not ecologically sensitive, helps protect agricultural land and terrestrial ecosystems from being developed for energy use. The water also cools the electronics in the solar panels, helping them to work more efficiently.

Floating solar farms have been in operation in the US since 2016, and also the UK built a 23,000 panel floating solar farm on the Queen Elizabeth 2 reservoir near Heathrow airport in 2016 to help power the Thames Water treatment plant.

- The Chinese province of Anhui has built an even larger floating solar plant which came online May 2018.
- Due to rising concerns surrounding air pollution-related deaths, China is trying to invest more heavily in renewable energy projects.
- A new study indicates that, on average, Chinese cities have cut deadly air pollution particles by 32% over the past four years.
- The new solar farms are part of the global shift away from energy generated from fossil fuels.
  Leanna Garfield reported, China's latest energy megaproject shows that coal really is on the way out, The Elder Scrolls, online Elsweyr, March 20, 2018

How could South Australia benefit from floating solar panels?

1) Floating solar panels on our reservoirs would keep the electronics cool, produce electricity and at the same time reduce evaporation.
2) Floating a trial of a limited number of solar panels on our lakes at the Coorong if it complies with an environmental impact requirements would also reduce evaporation of Murray River water.

The floating solar power station in Anhui province (Sungrow)

Innovations such as floating solar panels on reservoirs and lower lakes will not happen unless councils move from under the shadow of the state government and show the wider public that they are important and have initiatives which are lacking by major political parties.

Society needs to understand all relevant issues we are facing. There is rising pressure on limited water along the Murray Darling River system, questions of the type of irrigated crops grown. The need for informed debate has never been greater, we should be having a debate on population, water and food security, finding ways to grow more food with less water and salt resistant crops.

Scientific Consensus: Earth's Climate is Warming

- The Earth's average surface temperature has risen approximately 0.9°C since the late 1800s with most of this rise taking place in the past 35 years;
- The five warmest years in recorded history have occurred since 2010;
- Each year from 1993 to 2016, Greenland has been losing an average of 281 billion tons of ice mass and Antarctica an average of 119 billion tones, with Antarctica's loss rate tripling over the last decade; (1 ton = 0.907185 tonne)
- Sea levels rose 8 inches (8 inch = 20.32cm) in the past century, with the rise in the past two decades close to twice that of the past century;
- Increased rainfall events are increasing in number.
  - *Source: climate.nasa.gov/scientific-consensus/*

<u>*Michael Perth*</u> *web adelaidecommunists.org* *July, 2019*
State President

Attachment 9.4

Journal of Environmental Management 247 (2019) 281–290

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journal homepage: www.elsevier.com/locate/jenvman

Research article

A field and laboratory investigation of kerb side inlet pits using four media types

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A R T I C L E I N F O

Keywords:
Leaky well
Urban runoff
MUSIC modelling
Infiltration testing
Inflow rate
Emptying time

A B S T R A C T

Kerb side inlets with adjacent leaky wells are an emerging tool to harvest stormwater and to reduce runoff volumes and peak flow rates. This is achieved by collecting the first flush runoff into kerb side storages and infiltrating this water into the surrounding soil, thereby also reducing stormwater pollutant loadings. The hydraulic performance of the kerb side inlet, filter media and surrounding soil are key factors in the performance of these systems. However, no field or laboratory data are currently available for the hydraulic performance of a kerb side tree inlet pit. In this study, 12 tree inlet pits were constructed and filled with various media types including gravel, water treatment solids (a recycled waste product), sandy loam and clay to examine (1) leaky well infiltration rates (2) emptying times of the wells and (3) the well capacity (runoff storage volume) before and after runoff filtering through the wells. Using a laboratory model, the water harvesting performance of the kerb side inlet plate was also examined for various road longitudinal slopes. Using the field and laboratory data, simulation of the well performance was undertaken using the Model for Urban Stormwater Improvement Conceptualisation (MUSIC) to assess the capacity of these systems to reduce runoff volumes at the residential street scale. It was hypothesised that the type of filter media used in leaky well systems has a significant impact on the infiltration rate, regardless of the native soil type through which the stormwater eventually infiltrates. The results showed that the infiltration rates of systems filled with gravel were significantly higher than for the other media types, and this was followed by water treatment solids, sandy loam and clay. The results of the MUSIC modelling indicated that 2.8% of the mean annual runoff volume in the catchment could be harvested by the systems at the case study site. It was found that selection of high infiltration rate media and regular maintenance are the key factors for maintaining long-term performance of these systems.

1. Introduction

Urban stormwater drainage infrastructure is generally designed to rapidly discharge stormwater runoff to constructed channels, natural waterways and receiving waters to minimise local flooding and damage to built infrastructure (Boyd et al., 1993; Niemczynowicz, 1999). This approach has been shown to cause problems, particularly due to the rapid transfer of excess runoff and pollutants to receiving waterways. Sustainable stormwater management practices are designed to reduce the runoff volume, peak flow and to improve water quality (Ahiablame et al., 2013; Lim and Lu, 2016; Sharma et al., 2009). These practices include permeable pavements, rain gardens, wetlands, swales and infiltration facilities (Beecham and Chowdhury, 2012; Myers et al., 2013; Pezzaniti et al., 2012). More recently, a focus on liveability and urban greening has encouraged the increased adoption of infiltration facilities for passive street tree irrigation in urban environments (Payne et al.,

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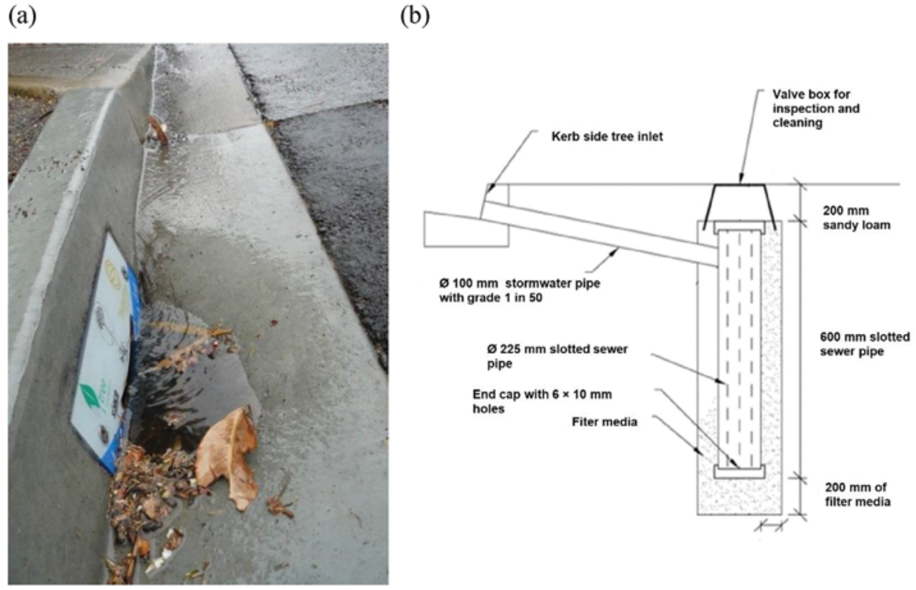

Fig. 1. (a) Photograph of the kerb side tree inlet harvesting road runoff; (b) Cross-sectional view of a leaky well.

2013).

The kerb side tree inlet (Fig. 1) with a leaky well is a relatively new approach to infiltration, specifically designed to harvest stormwater for street tree irrigation. Leaky well infiltration systems are designed to harvest road runoff and to allow subsequent exfiltration to the surrounding soil where the water may be potentially used by street trees (Johnson et al., 2016; Sapdhare et al., 2018). While the infiltration capacity of the system may be expected to decrease over time due to sediment clogging (Fletcher et al., 2007; Kandra et al., 2015), previous research has reported that vegetation or tree roots can create micropores which maintain hydraulic conductivity (Bartens et al., 2009). Other research has indicated that the hydraulic performance of infiltration systems is affected by the type of filter media (Pitt et al., 2008) and by seasonal weather patterns (Hatt et al., 2007; Kandra et al., 2015). In a recently published study on tree pits in Melbourne, Australia, a water balance model was applied to in-situ tree pits (Grey et al., 2018). The size of the tree pits was between 2.8 and 8% of the impervious area of the catchment block. Modelling indicated that the tree pits could reduce the flow volume by 90%. However, the size of these pits was comparatively much larger than those of leaky well systems.

In addition to their infiltration capacity, kerb side inlets can also be affected by the approach flow conditions. For example, the performance of four types of conventional street inlet were reported by Brown et al. (2009) including grated inlets, kerb-opening inlets, combination inlets and slotted inlets. The kerb side inlet used for the case study catchment was similar to a kerb-opening inlet except the size of the orifice was much smaller and of a different shape. The hydraulic performance of kerb inlets for roadway drainage has been studied for more than 60 years, and has been reviewed and summarised by Izzard (1950) and Li (1954) (as cited in Holley et al. (1992)) and Hodges et al. (2018). Izzard (1950)) developed an equation to determine the volumetric rate of kerb inflow and an equation to determine the length of inlet for 100% efficiency. Li (1954) presented an equation for the acceptance capacity of a stormwater inlet by comparing the flow entering the inlet with the bypass at the end of the channel (see Holley et al. (1992)). Li et al. (2018) concluded that the ponding and hydraulic performance of a road-bioretention strip system was affected by longitudinal slope. It is known that the longitudinal slope of a road will affect the capacity of conventional stormwater inlet pits to collect runoff (O'Loughlin et al., 1992), and the same applies to a kerb side inlet for infiltration. At present, however, there are no scientific data available on the collection performance of kerb side inlets used for infiltration at different slopes.

To address these knowledge gaps, a study was devised using field and laboratory data collection coupled with simulation tools to examine the hydrologic performance of kerb side inlets coupled with leaky wells. In this paper, we report on the results of a field study that examined the infiltration rate and storage capacity of kerb side inlets coupled with leaky well systems that included four different filter media types. A laboratory study was also used to examine the approach flow/capture flow relationship for the kerb side inlet device. Using these results, a computer model was applied to determine the runoff generated from the impervious and pervious areas at the experimental field site and to simulate the performance of leaky-well infiltration systems.

2. Material and methods

2.1. Study area

The experimental site (Fig. 2) was located in Eynesbury Avenue, Kingswood, approximately 5.6 km south of the Adelaide Central Business District, South Australia (34° 58′ 21.3996″ S, 138° 36′ 40.716″ E). The Adelaide region has mild winters with average maximum temperatures of 15–16 °C and a warm, dry summer with average temperatures of 29–32 °C (BOM, 2015). The average annual rainfall is 550 mm, and generally June is the wettest month with approximately 80 mm of rainfall. The local government authority at the study site, City of Mitcham, has been installing kerb side inlets as a means of improving stormwater management across their catchments by reducing runoff volumes and providing passive irrigation of street trees.

The pervious and impervious area of the total catchment, and the sub-area connected to each leaky well infiltration pit at the site was determined using a geospatial analysis tool (QGIS, version 2.10.1) in addition to aerial imagery (provided by the South Australian Department for Environment and Water) and a catchment cadastre (provided by the City of Mitcham). Impervious areas were assumed to include all roofs and roads (Mitchell et al., 2001). All impervious areas effectively drained to the road kerb and were therefore assumed to be connected to the kerb side tree inlet pits. Semi-impervious areas (assumed 50% impervious, 50% pervious) included driveways, footpaths and other paved areas. Pervious areas included nature strips, lawns and other undeveloped land spaces. The catchment characteristics are presented in Table 1.

Fig. 2. Aerial view of the experimental site at Eynesbury Avenue, Kingswood, South Australia.

Table 1
Catchment area including effective impervious, semi-impervious and pervious areas.

No	Source node	Total area (ha)
1	Catchment area (residential roads)	2.7
2	Impervious area (roofs + roads)	1.2
3	Semi-impervious area (driveways + footpaths + other paved areas)	0.44
4	Pervious area (nature strips + vegetated and non-vegetated areas)	1.14

2.2. Experimental setup

Kerb side tree inlets with adjacent leaky wells were installed at 28 locations in a residential street in the City of Mitcham, Adelaide, Australia between July and November 2014. Each location included an inlet plate at the kerb coupled with a leaky well storage system. The wells were 1 m deep and 0.44 m in diameter. The four types of media selected for the study were gravel, water treatment solids (WTS), sandy loam soil and native clay soil from the site. The gravel and sandy loam media were sourced from a local supplier (Marion Sand and Metal, South Australia). WTS were acquired from a drinking water treatment plant at Happy Valley, South Australia. A 100 mm horizontal PVC pipe connected the kerb side inlets to the leaky well. The surface of the leaky well was covered with sandy loam and a circular valve box was installed to enable access for inspection and testing.

2.3. Filter media physical characteristics

Generally, filter media physical characteristics such as the particle size distribution (PSD), dry bulk density and porosity variables are used to define media. Laboratory based experiments were conducted to investigate PSD, dry bulk density, porosity and hydraulic conductivity of the filter media. The PSD of coarse gravel was measured in accordance with Australian Standard AS 1141.1.1–2009 (Standards Australia, 2009). The 1.18 mm size sieve was used at the time of washing gravel. A Mastersizer 3000 (Malvern Instruments Ltd. Worcestershire, UK) was employed to measure the PSD of WTS, sandy loam and clay using laser diffraction for particles ranging in size from 10 nm up to 3.5 mm. The results of the PSD analysis were plotted and shown in Fig. 3. The dry bulk density of the filter media was determined using Australian Standard AS 1141.4–2000 (Standards Australia, 2000b) of three separate samples and an average value has been reported. The porosity and particle density were measured using Australian Standard AS 1141.6.1–2000 (Standards Australia, 2000a). The hydraulic conductivity of WTS, sandy loam and clay were tested at a commercial laboratory (SESL Australia) using a standard method for saturated hydraulic conductivity using the American Society of Testing and Materials (ASTM) Standard F 1815–97 (ASTM, 1997) and for the coarse gravel media, conductivity was determined based on a falling head method (McIntyre and Jakobsen, 1998). The results of these physical characteristics are presented in Table 2.

2.4. Infiltration test and analysis

To conduct constant head infiltration testing of the kerb side inlets, the experimental site was divided into three sub-catchments (A, B and C in Fig. 2) to test the spatial variability within the site. All three sub-catchments had identical clay soils. The road longitudinal slopes in A, B and C were 1.2%, 1.4% and 1.3%, respectively. The cross section slope (or cross fall) of the road was 3% in all three cases. Of the 28 leaky wells located in the street (Fig. 2), 12 were selected for infiltration testing, representing three replicates for each media type, with one replicate from each of the three sub-catchments. A constant head infiltration test was conducted under field conditions (Argue, 2013; ASTM, 2006) to measure the infiltration performance. The leaky wells were pre-soaked for 24 h prior to testing by filling the well with water and allowing it to dissipate (Argue, 2013). After 24 h, infiltration testing was carried out. Testing involved filling the leaky well with water and measuring the drop in water level at 5 min intervals, and then refilling the well each time with a measured volume of water (Fig. 4a). Published recommendations for testing the infiltration rate of biofilters (Hatt and Le Coustumer, 2008), specify that this interval should be 1 min for fast draining and 5 min for slow draining media, respectively. This process continued until there was a consistent water level drop measured in three consecutive measurements, indicating a constant head drop over 15 min. A marking needle was placed on top to ensure the water level was consistent in each fill, as shown in Fig. 4b. A 1000 mL measuring cylinder was used to measure the volume of water required to fill the leaky well. Testing was conducted for each well on four occasions to investigate the effect of seasonality in March 2016 (age 17 months), August 2016 (age 22 months), October 2016 (age 24 months) and

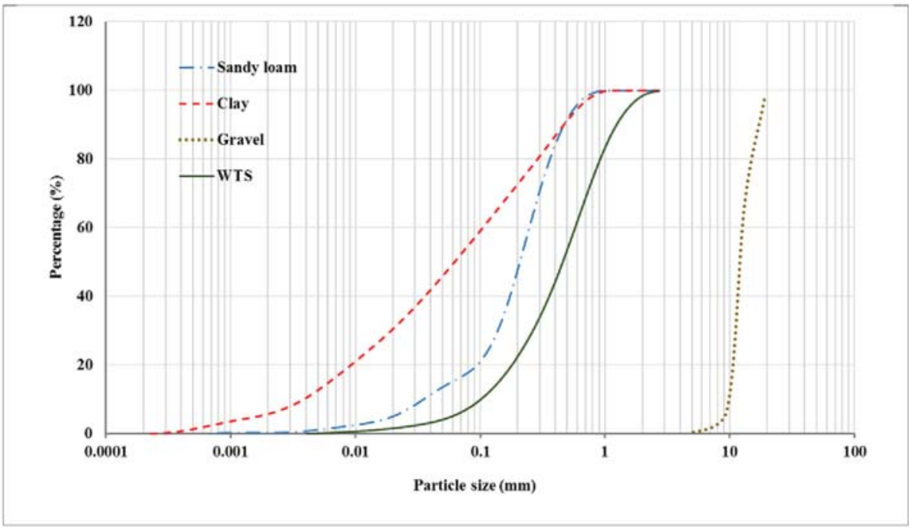

Fig. 3. Particle size distribution of the four kerb side inlet filter media.

Table 2
Physical properties of the four kerb side inlet filter media.

Filter media	Dry bulk density (g/cm^3)	Porosity (%)	Particle density (g/cm^3)	Hydraulic conductivity (mm/hr)
Gravel	1.6	40	2.66	358440
WTS	1.05	38	1.69	21.3
Sandy loam	1.59	25	2.12	1.1
Clay	1.34	38	1.61	0.2

January 2017 (age 27 months).

The infiltration rates were analysed to determine the differences between infiltration performance over the period of one year for the different media types by fitting longitudinal mixed models using the asreml (Butler et al., 2009) and asremlPlus (Brien, 2018) packages for the "R" statistical computing environment (R Core Team, 2018). The assumptions underlying the analyses were checked using residual-versus-fitted-values and normal probability plots and were found to be satisfactory. To estimate the individual performance of the media over the twelve months, predicted infiltration rates were obtained from the mixed model for each media at each time of measurement.

2.5. Emptying time

Where an infiltration system is to be employed for runoff drainage purposes, it is important to determine its emptying time to assess whether the system has capacity (storage is available) before a new storm occurs. Emptying time testing of the leaky well design was conducted on 12 leaky well infiltration pits immediately after conducting the constant head infiltration tests described in Section 2.4. Emptying time was measured by filling the well and visually inspecting levels until water was not visible at the base of the leaky well. Emptying times were only measured for gravel and WTS as the draining time for these systems were less than 8 h. Inspection of the sandy loam and clay wells was carried out the following day and repeated until the water

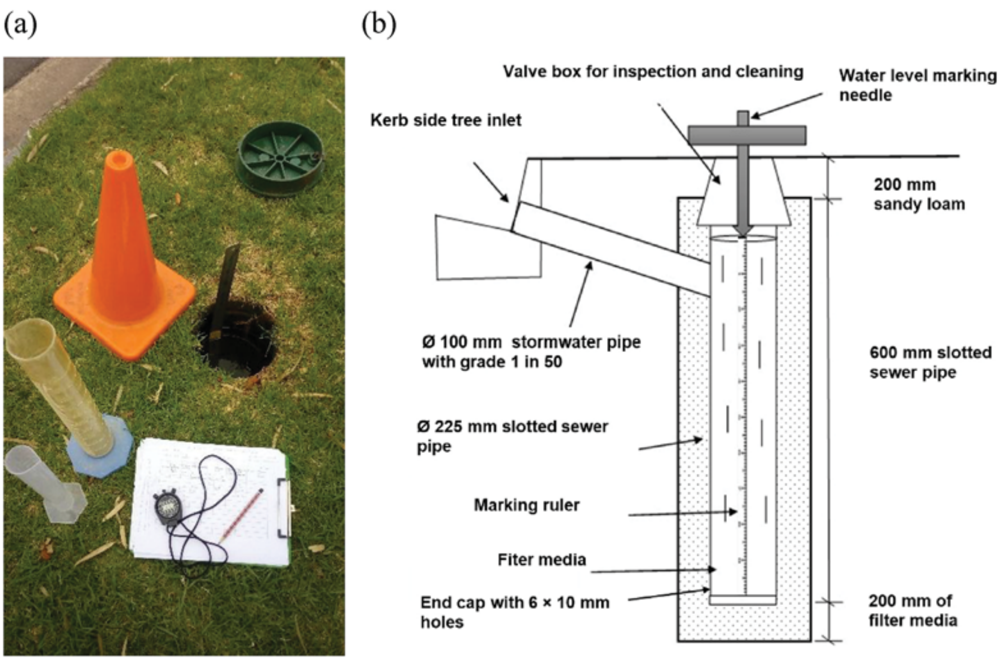

Fig. 4. (a) Photograph of infiltration testing equipment; (b) Conceptual diagram of infiltration testing.

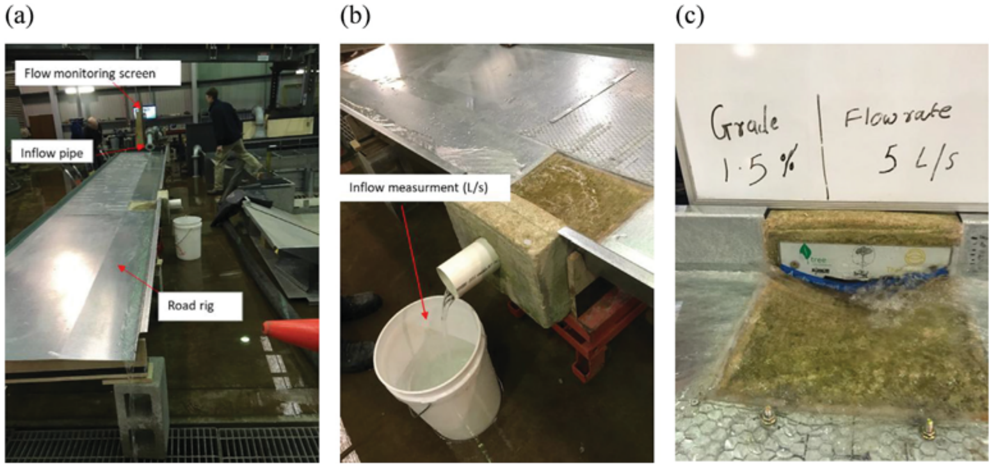

Fig. 5. (a) Inflow road rig; (b) Inflow measurement; (c) Inflow testing.

disappeared from the leaky well.

2.6. Inlet approach flow

Like conventional stormwater side entry pits (or catch basins), the volume of water captured by a kerb side tree inlet from a contributing catchment area can vary based on the upstream road longitudinal slope and the approach flow rate (depth and velocity). To examine the relationship between capture flow rate, upstream road longitudinal slope and approach flow rate, a laboratory simulation was undertaken using a full scale road and kerb model at the University of South Australia (Fig. 5a). Wire mesh was glued to the metal road surface to simulate road roughness beyond the kerb line. The kerb side tree inlet flows were collected in a 100 mm diameter PVC pipe attached to the inlet (an identical setup to that used in field conditions to supply the adjacent leaky well). An electromagnetic flow meter was calibrated to measure the approach flows using the services of a NATA accredited laboratory (Australian Flow Management Group, University of South Australia). The approach flows considered were 0.5 L/s, 1 L/s, 2 L/s, 2.5 L/s and 5 L/s. The road longitudinal slopes were 0%, 0.5%, 0.8%, 1%, 1.2%, 1.5%, 2%, 2.5% and 5%. The capture flow was estimated by measuring the time to fill a 20 L gradated bucket. The capture flow was measured three times for each slope/approach flow rate and the mean was reported.

2.7. Field site simulation

The Model for Urban Stormwater Improvement Conceptualisation (MUSIC, Version 6.1) was employed to simulate the experimental road runoff volumes and pollutant loads. The MUSIC software conceptualises stormwater management solutions for small to large catchments (e-water, 2017; Myers et al., 2013). MUSIC can be used to estimate and evaluate (Dotto et al., 2011; e-water, 2017; Montaseri et al., 2015):

- road runoff and water quality generated in a catchment area
- treatment performance of the systems
- the life cycle costs of the system

Rainfall records were collected from the nearest rainfall gauge to the site, which was the Scotch College gauge (Site 023105) located 1.27 km from the catchment centroid. The gauge was operated by the Australian Bureau of Meteorology and had a 100% complete record. Data was acquired at a 6 min time step for the period 13/07/2008 to 13/07/2016.

Urban catchment nodes were used to simulate the catchment with the pervious, semi-impervious and impervious areas reported in Table 3. A rainfall threshold of 1 mm was considered based on default values recommended for Adelaide (e-water, 2017; Myers et al., 2015). The soil storage capacity for impervious catchments was considered as 10 mm while for semi-impervious and pervious catchments 40 mm was used (Myers et al., 2015). The initial storage capacity and field capacity for semi-pervious and pervious areas were 25% and 30%, respectively. The infiltration capacity coefficient a and infiltration capacity exponent b had little impact on the simulation results and were considered as 200 and 1, respectively (Myers et al., 2015). Pollutant parameters were assumed to be those outlined by Myers et al. (2013).

The infiltration system node was selected to simulate the performance of the kerb side tree inlet and leaky well system. Models of the catchment pre- and post-installation were used to assess the overall efficiency of the infiltration pits. The pre-installation model (scenario S1) simulated the runoff volume and pollutant transport from the site prior to installation of the leaky wells. It contained no treatment nodes. The post-installation model (scenarios S2 to S6) simulated the runoff volume and pollutant transport from the site after installation of the leaky wells, which were represented by infiltration nodes. There were five variations considered. Scenario S2 represented the site with leaky wells installed as shown in Fig. 1 (220 mm storage pipe diameter). Scenarios S3 to S6 were used as a sensitivity analysis to examine the performance of the leaky wells with a gradually increasing diameter of PVC pipes (from 300 mm to 1000 mm). A value of 0.44 L/s was adopted for the high flow by-pass based on the point at which the capture flow volume for the kerb side inlet started to significantly reduce in our field study scenario (for 0.5% road longitudinal slope). We also conducted a sensitivity analysis and found that adopting higher bypass values did not have a significant effect on the MUSIC model results. The infiltration media depth was 1.0 m based on the field installation and this depth was maintained for scenarios S3 to S6. The exfiltration rate was adopted for clay soils for scenarios S2 to S6. A sensitivity analysis was also undertaken to examine performance in cases where native soil has a higher infiltration rate than the clays present at the case study site, To examine this, higher well exfiltration rates of 18 mm/h (5 time higher than clay soil) and 36 mm/h (10 times higher than clay soil) were assessed. The default values for evaporative loss (50%) and overflow width (2 m) were adopted. Other key parameters adopted for the infiltration system treatment nodes are presented in Table 3.

3. Results and discussion

3.1. In-situ infiltration rate testing

The infiltration rates for the leaky well systems from sub-catchments A, B and C were analysed with respect to the four filter media types and

Table 3
Infiltration system parameters adopted in MUSIC to simulate leaky well performance.

Infiltration system treatment node	S2 (Field case)	S3	S4	S5	S6	Justification of parameters
Pipe diameters (m)	0.225	0.30	0.375	0.500	1.0	
Excavated well diameter (m)	0.440	0.44	0.440	0.700	1.20	
Pond surface area/filter area[a] (m^2)	0.15	0.15	0.15	0.38	1.13	Excavated well area
Extended detention depth (m)	0.15	0.27	0.43	0.30	0.41	Volume of leaky well/pond surface area
Unlined filter media (m)	1.38	1.38	1.38	2.19	3.14	Circumference of excavated pit

[a] A uniform surface area representing the PVC pipe volume was assumed for the leaky wells.

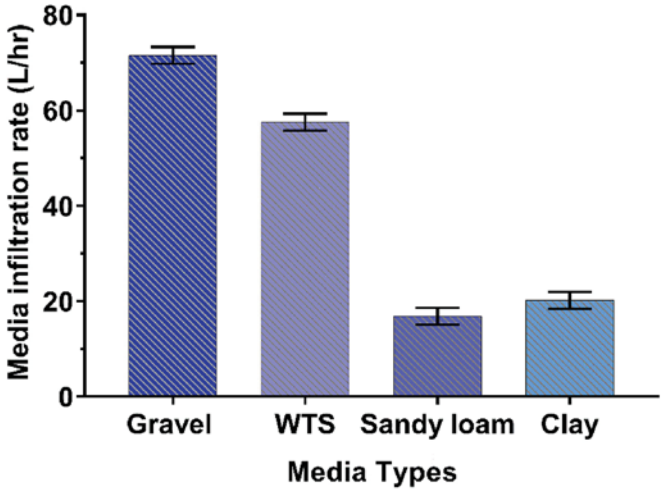

Fig. 6. Infiltration rates for four media types (error bars are ± 0.5 LSD*) *LSD = Least Significant Difference between the means.

with time. In terms of media type, the results of the mixed model analysis revealed that the infiltration rates for the gravel filter media wells were significantly higher ($p < 0.01$) than for all other media types. The mean infiltration rate for gravel (71.5 ± 8.8 L/h) was significantly higher than the mean values for clay (20.2 ± 1 L/h) and sandy loam (16.8 ± 1L/h), as shown in Fig. 6. The mean infiltration rate for WTS (57.5 ± 11.5 L/h) was significantly higher than for sandy loam and clay. There was no significant difference between the sandy loam and clay infiltration rates.

The results of the mixed-model analysis of infiltration rates with respect to time shows that there was significant variation between the four filter media types and over the four infiltration testing periods ($p = 0.0028$). Fig. 7 shows the mean infiltration rates for each media in the 17th and 22nd months of operation (wet period) and 24th and 27th months of operation (dry period).

The infiltration rates for sandy loam and clay were significantly higher in the 17th month, but were at their lowest in the 24th month. For gravel and WTS, the highest infiltration rates were observed in 17th month, and the lowest in the 22nd month of operation. These results indicate that, overall, the infiltration rate was highest in autumn and summer and lowest in winter.

The hydraulic conductivity of the gravel (358440 mm/h) was higher than all other filter media, followed by WTS (21.3 mm/h), sandy loam (1.1 mm/h) and clay (0.2 mm/h). These findings were consistent with the field infiltration tests where the infiltration rate was highest in gravel, which was significantly higher than the rates for WTS, sandy loam and clay. The higher field infiltration rate for gravel may be due to the higher permeability of the filter media, despite the fact that all pits were infiltrating into native soil in the same area. Previous investigations using model bioretention columns containing media types of varying conductivity have shown that higher overall infiltration performance occurred when the upper media layer had high conductivity overlaying a lower layer with low conductivity (Hsieh et al., 2007a; Hsieh and Davis, 2005). The field infiltration test results are also consistent with the particle size distribution, where media with finer particles (Fig. 3) presented the lowest field infiltration rates. In other studies, the particle size distribution of soil media has been widely used to quantify hydraulic conductivity (Arya and Heitman, 2010; Gupta and Larson, 1979; Hwang et al., 2002; Mazaheri and Mahmoodabadi, 2012).

The reason for the alignment of results is likely to be due to the total area of native clay soil which was exposed to standing water in the leaky well. For high conductivity media (e.g. gravel) the entire leaky well (the excavated pit) was immediately acting as a storage and the total exposed surface area of the excavated pit was infiltrating to the

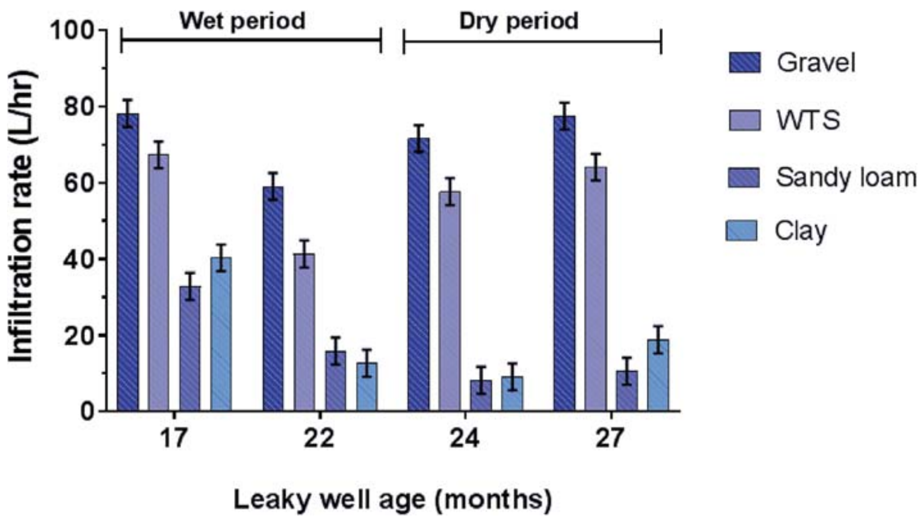

Fig. 7. Change of infiltration rate over time (error bars are ± 0.5 LSD) *LSD = Least Significant Difference between the means.

native clay surrounds. For low conductivity media (e.g. clay) the time required for water to empty from the slotted pipe was much slower, inhibiting the overall exposed surface area of water in the excavated pit to the surrounding native clay.

Overall, the findings suggest that gravel was a suitable filter media layer. The same gravel filter media has also been shown to retain pollutants without influencing water salinity levels. Gravel also retains a higher volume of stormwater per event due to its high porosity (Sapdhare et al., 2018).

Performance variation was observed between the four media leaky well infiltration pits over the 12 month testing period. The infiltration rate was generally lower in the wetter seasons (winter) and higher in the dry season (summer). Similar findings have been reported for a laboratory-based biofilter experiment which found that clay and organic material in the filter media may shrink in dry periods forming cracks (Hatt et al., 2007). These cracks may create macropores that in turn may increase the net infiltration rate. This has also been reported in a field study that monitored the hydraulic conductivity near a tree where, in a dry period, the native soil infiltration rate increased by 50% (Gadi et al., 2017).

Overall, the findings of this study suggest that to maximise the infiltration rates into clay soils, gravel is the most appropriate filter media type of the four materials tested. However, tree roots have the potential to modify the infiltration rates of the surrounding soil over time (Bartens et al., 2008), which may improve the overall performance of selected media over long periods, regardless of the initial media choice. Ongoing monitoring of infiltration rates and investigation into the proximity of street tree roots would provide further information to support guidelines regarding the lifespan and overall performance of the filter media.

3.2. Leaky well emptying times

The emptying times of the leaky wells were monitored for a period of 9 h after completion of the infiltration testing. The gradual fall in well water levels is shown in Fig. 8. The mean emptying times for the WTS and gravel leaky wells were 8 and 9 h, respectively. In contrast, the mean water level in the sandy loam and clay media infiltration pits after 8 h were 336 ± 79 mm and 315.3 ± 31 mm, respectively. The sandy loam and clay leaky wells took 21 and 22 h to empty, respectively. This was over twice as long as for the gravel and WTS media. The clay soils at this site represent a difficult case for infiltration and therefore performance would be better at sites which have a native soil with a higher hydraulic conductivity than clay. The results also show that the WTS emptying time was slightly higher than that of clay, contrary to the hydraulic conductivity data in Table 2. This is attributed to variations in the native clay soil surrounding each well.

While the overall hydraulic performance of infiltration based WSUD systems is influenced by the hydraulic conductivity of the underlying

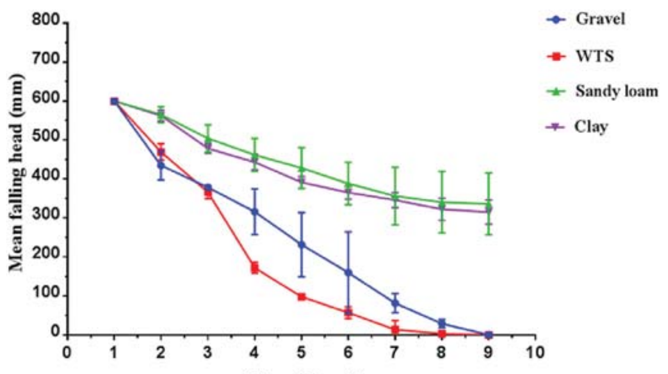

Fig. 8. Water levels in the saturated leaky wells over time.

native soil (Bockhorn et al., 2017; Grey et al., 2018), the underlying soil for all the leaky well infiltration systems in this study was the same. However, highly permeable filter media such as gravel are known to enhance the hydraulic performance of leaky wells (Hsieh and Davis, 2005; Hsieh et al., 2007b). The hydraulic conductivity and particle size of the filter media had a great influence on the emptying time of the leaky well. As discussed in Section 3.1, the wells with high hydraulic conductivity media were likely to empty with a higher exposed surface area than the wells with low conductivity media which were restricting the outflow of standing water in the well. The results for emptying time are also are consistent with the field infiltration testing and particle size distribution analysis - the leaky wells with high conductivity media (e.g. gravel) were emptying faster than the leaky wells with low conductivity media (e.g. clay).

Knowledge of the leaky well emptying time is important for drainage system design. The overall capacity of a drainage system depends on the availability of storage before the next storm occurs. The findings of this study suggest that when subjected to two storm events 10 h or more apart, the full leaky well capacity should be available for infiltration systems containing gravel and WTS media. However, up to 24 h is required before this assumption can be made for systems containing sandy loam and native clay media.

3.3. Inflow capture capacity with respect to road longitudinal slope and approach flow

As is the case for traditional stormwater pits, the approach flow rate and road longitudinal slope both influence the capture capacity of kerb side tree inlets. The capture flow rate as a function of the approach flow rate to the kerb side tree inlet is shown for various road longitudinal slopes in Fig. 9. The proportion of captured flow gradually decreased as either the approach flow rate or the slope increased. The results indicate that the most favourable road longitudinal slope is between 0 and 2% which leads to capture rates of 0.5–2.5 L/s. The inlet plate capture capacity decreased with higher approach flow rates up to 5 L/s. Steep road slopes of (> 2.5%) led to high water bypass rates.

Previous researchers have reported that road longitudinal slopes between 2 and 10% may be appropriate for stormwater harvesting (Chowdhury et al., 2011). Other studies have suggested that road longitudinal slopes of 0–2% are better than slopes of 3–8% for harvesting stormwater runoff (Maina and Raude, 2016). The findings of the current research suggest that these guideline values are reasonable for the kerb side tree inlet and confirm that designers need to carefully consider road longitudinal slope when using these systems for stormwater harvesting. The US EPA recommend maximum slopes for

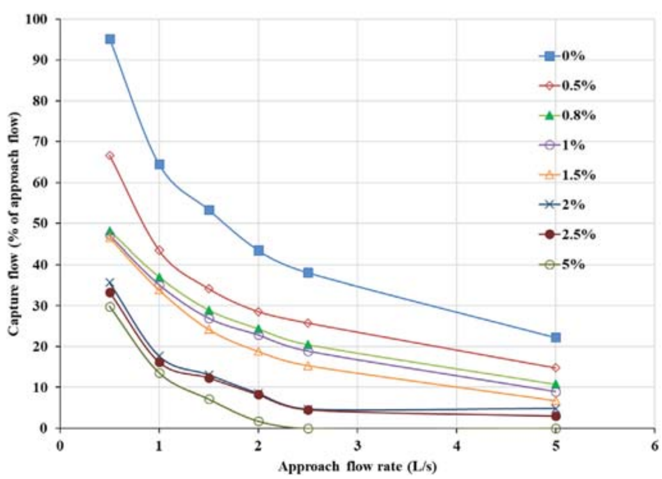

Fig. 9. Kerb side tree inlet capture flow performance (expressed as % of approach flow) for varying road longitudinal slopes.

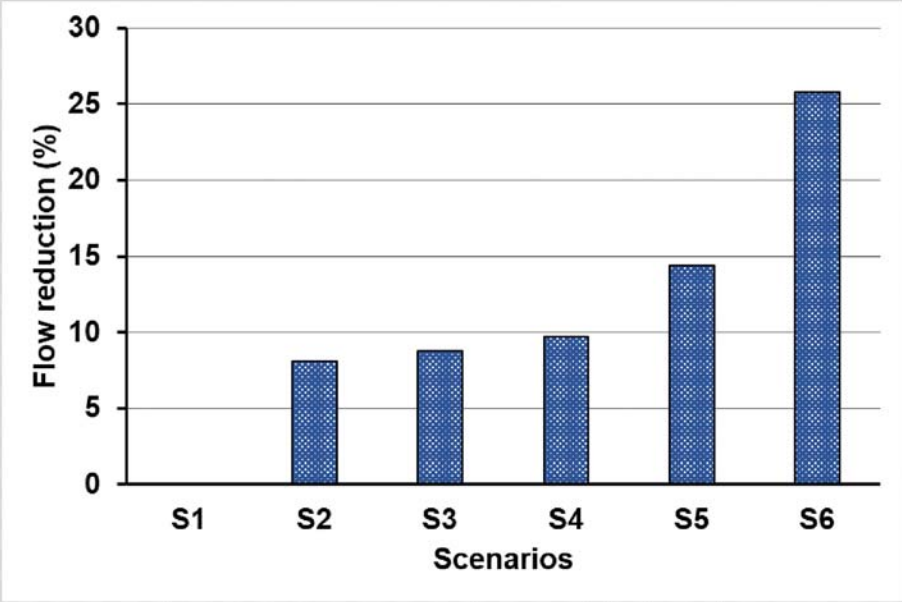

Fig. 10. The percentage reduction in catchment runoff volume for each simulated leaky well size scenario using MUSIC.

different types of green infrastructure, including 6% for bioretention systems, dry wells, grass channels and vegetated filter strips, and 5% for infiltration trenches, permeable pavements and vegetated swales (US EPA, 2014). However, it is important to consider the capacity of the inlet to achieve both flow reduction and passive irrigation benefits.

3.4. MUSIC modelling assessment results

The results of the MUSIC modelling for this catchment are presented in terms of flow reduction in Fig. 10. The MUSIC simulation for the pre-installation case (scenario S1) predicted an annual runoff of 8.48 ML/year. Fig. 10 shows that for the post-installation scenarios S2 to S4, there is a predicted reduction in annual runoff of between 8% and 9.7%. These reductions increase as the well diameter is gradually increased from S2 (base case of 225 mm) to S4 (375 mm). This indicates that the volume of the leaky well increases the runoff volume reduction.

In scenario S5, the leaky well diameter was further increased to 500 mm and the excavated infiltration pit diameter was increased to 700 mm. This resulted in a 14.4% reduction in annual runoff. The reduction increased further to 25.8% in scenario S6, which had a 1000 mm diameter leaky well and a 1200 mm diameter excavated infiltration pit. These results indicate that increasing the size of the infiltration pit is just as important as increasing the diameter of the leaky well pipe for achieving an overall reduction in catchment runoff volume.

When the overall infiltration rate of native soil was increased from 0.36 mm/h to 18 mm/h (five times the rate for clay), then the mean annual runoff volume reduction increased by 54%, 65%,73%, 59% and 70% for scenarios S2, S3, S4, S5 and S6, respectively. When an infiltration rate of 36 mm/h was assumed (ten times the assumed rate for clay), the mean annual runoff reduction increased by 114%, 126%, 136, 110% and 109% for scenarios S2, S3, S4. S5 and S6, respectively.

We note that the MUSIC modelling component of this study was undertaken on a catchment for which gauged flow data were not available and the impact of the kerb side inlet on runoff volume interception at the site was therefore based on an uncalibrated model. We believe that the MUSIC model provided a reasonable estimate of annual capture volume in this case study because when using MUSIC, the key parameter of concern in a catchment with a percentage impervious area greater than 30% is the percentage impervious area, and other parameters become less influential (Dotto et al., 2011). In this study, the impervious area was greater than 30%, as determined by analysis of aerial imagery across the whole case study site.

The results of the MUSIC model simulation for water quality treatment are not reported here. This is because while the arrangement of the infiltration node used in MUSIC is suitable for the determination of runoff volume reduction, the use of this node implies some residence time for water quality treatment to occur each timestep while bypass occurs, which is not theoretically valid for the kerb side inlet. A conservative assumption would be to assume pollutant load reduction which are equivalent to runoff volume reductions. For example, in the pre-installation case (scenario S1) MUSIC determined annual pollutant loads of 3810 kg for total suspended solids (TSS) 3.61 kg for total phosphorous (TP) and 17.5 kg for total nitrogen (TN) for the case study catchment. Using our conservative assumption, the 8% runoff volume reduction following installation of pits in Scenario S2 could be applied to S1 pollutant loads to find that annual pollutant loads are 304.8 kg for TSS, 0.28 kg for TP and 1.4 kg for TN. It should be noted that a higher reduction in pollutant loads may be expected in catchments where the ‘first flush’ runoff volume has a higher pollutant concentration compared to subsequent runoff flows (e.g. see Deletic (1998); Taebi and Droste (2004)), as the kerbside inlets capture this first flush runoff volume - but this cannot be simulated by MUSIC, and higher contamination in the first flush of runoff may not be typical of all urban catchments (Lee et al., 2002).

Overall, the results suggest that increasing the diameter of the leaky well pipe increased the reduction in annual runoff, but increasing the size of the infiltration pit had an even greater effect.

The reduction in flow volume can be maximised by optimising the system size with respect to the impervious catchment area. There are however practical restrictions in the potential size of the leaky well pipe and filter media diameter. The use of larger diameter leaky well pipes is likely to increase the cost of the system. Perhaps more importantly though, the limitations of where leaky wells can be placed become greater when a larger overall diameter is selected. This is because the systems applied in this study were purposefully designed to avoid impact on existing services including water supply and wastewater systems, driveways and footpaths. Increasing the leaky well diameter is likely to increase the infringement of these services, particularly when retrofitting in existing urban areas. With this limitation in mind, the MUSIC model simulation approach may facilitate producing systems with optimal volumes where shape can be varied according to site constraints. However, current weaknesses in the MUSIC modelling approach include the inability to model the influence of vegetation on the performance of infiltration based systems in urban areas. Street trees have been shown to increase the overall performance of infiltration systems in urban areas (Johnson et al., 2016) and further research is required to determine how this influence can be included in MUSIC simulations, or in other urban runoff simulation tools such as SWMM.

4. Summary and conclusions

This study has examined the capture flow rate, infiltration rate and emptying time of leaky well infiltration systems. It has used this information to estimate their performance in a residential catchment near Adelaide, South Australia. The results of the in-situ infiltration study showed that of the four media examined, a leaky well filled with gravel had the highest volumetric capacity and infiltration rate. Wells containing WTS media showed the next best performance. The mean emptying time of the leaky wells with gravel and WTS media was 9 and 8 h, respectively, which was much shorter than the emptying times for clay and sandy loam. The most significant factor influencing the infiltration rate and emptying time was the filter media hydraulic conductivity.

The kerb side tree inlet performance was influenced by both the approach flow rate and the road longitudinal slope. The inlet performed best at near 0% slope but captured little of the approach flow when the slope was increased to 5%. Based on these findings, it is recommended that kerb side tree inlets should be installed on roads with longitudinal slopes of between 0% and 2%. The MUSIC model simulation results for the kerbside infiltration systems showed that installation of leaky wells could reduce the annual runoff by 8.1%. However, it was possible to improve the performance of the leaky well systems to reduce runoff by more than 25% by increasing parameters such as the size of the leaky well pipe and the filter media pit size. The findings presented in this paper can be used to inform stormwater managers about appropriate selection and sizing of tree inlet pits in urban streets.

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Conflicts of interest

The authors declare no conflict of interest.

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MEDIA RELEASE

Tuesday 9 July 2019

MDA response to 4Corners *Cash Splash*

The Murray Darling Association (MDA), Australia's peak body representing local government across the Murray Darling Basin, has released a statement following the airing of the 4 Corners program ***Cash Splash*** on July 8th. The story inquired into whether government investment in irrigation efficiency measures has delivered value to the taxpayer and supported the objectives of the Murray Darling Basin Plan.

Our communities across Murray-Darling Basin are dependent on healthy, connected river systems, sustainable land management practices and effective regulation of water use and extraction to sustain our regional economies and agricultural productivity into the future.

The Murray-Darling Basin Plan is designed to achieve those objectives through a range of irrigation and other water efficiency programs.

"We are currently six years into a 12-year program, in the midst of drought and rapid climate change," MDA Chairman Cr David Thurley said. "The Basin Plan is ambitious and may be a world-leading initiative. Significant progress has been made, but it can only deliver on its promises if all parties commit to first-rate processes, to the best available science, and if we all stay the course."

MDA Chairman of the Murrumbidgee Region, Mayor Paul Maytom added "The public must have confidence that all investments in irrigation efficiency infrastructure are properly scrutinised, and that programs are designed to achieve the outcomes they set out to.

"We need to have a far clearer understanding of where these investments go. Accountability of the water efficiency programs that are funded with public money is essential to build trust and confidence in the Plan."

In 2018, local government across the Basin called for a National Water Registry to provide greater transparency, confidence and certainty in water markets. The call for greater transparency has been echoed by other agencies including the Almond Board, the Australian Local Government Association National General Assembly and others.

The MDA has also called for local government to have a role in the institutional and governance arrangements informing Basin Plan processes.

"The bottom line is we need to restore faith in all dealings on behalf of every Australian taxpayer in rolling out the Basin Plan," Cr Jane MacAllister said today. "Local government is where impacts and concerns of all sectors of the community play out on a daily basis."

Speaking from Wentworth Shire, location of this year's devastating fish kills she added "It is imperative that local government partner in practical ways to ensure public confidence."

“When we all work together, the Plan can deliver what it was set up to achieve. We should not be afraid to learn how communities are benefitting or being impacted. This is not about demonising any sector or agency. It is about working together to get the processes and the policy setting right to secure our future.”

The MDA continues to call on all governments, agencies, industries and communities to work together to ensure the integrity of the Basin Plan is uncompromised and delivers a healthy working Basin for all.

Background:

https://www.abc.net.au/4corners/cash-splash/11289412

MDA Submission to the review of the Murray-Darling Basin Joint governance arrangements 2018

MDA National Conference 2018 – Motion 9 – National Water Register

Jamie Barrett

From:	Nicole Roberts <NRoberts@holdfast.sa.gov.au>
Sent:	Tuesday, 23 July 2019 11:24 AM
To:	Admin MDA
Cc:	Pamela Jackson; Karrie McCann
Subject:	Council Resolution
Attachments:	Pages from 19-07-09 - Council Minutes.pdf

Dear administration,

Please see extract attached of the public minutes from City of Holdfast Bay's Council meeting on 9 July 2019. At this meeting, item 14.7- Murray Darling Association Membership, Council resolved it would continue to be a 'local government entity' member and nominated Councillor Lindop to vote as a delegate on the Murray Darling Association matters on behalf of Council.

If there is anything else we need to do in this respect, please let us know.

Regards

Nicole

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endorsed by Council at its meeting on 26 March 2019. Draft By-Law No's 5 and 6 were then submitted to the Dog and Cat Management Board with draft By-law No's 3 and 4 submitted to the Minister for Transport respectively for review and concurrence as required by legislation.

Following concurrence from these authorities, the By-laws were then presented for public consultation for 21 days.

The draft By-laws were further modified based on community feedback and are now ready for final endorsement by Council. Following Council's resolution, the By-laws are referred to the Legislative Review Committee and if approved, are gazette by publication in the Government Gazette. The By-laws commence operation 4 months from the date of their gazettal.

As Council's existing By-laws expire on 31 December 2019, the new By-Laws need to be gazetted no later than 31 August 2019 to be in effect by 1 January 2020.

Motion **C090719/1545**

That Council:

1. in exercise of the powers contained in Section 246 of the Local Government Act 1999, having satisfied the consultation requirements of the Act and having had regard to the submissions received from the public, the National Competition Policy Report, the Certificates of Validity provided by the Council's legal practitioner and the comments from the Dog and Cat Management Board in relation to By-Laws Number 5 and 6, the majority of Council, in the presence of at least two thirds of its members, hereby makes and passes the following By-laws:

- **Permits and Penalties By-law No. 1 of 2019;**
- **Moveable Signs By-law No. 2 of 2019;**
- **Local Government Land By-law No. 3 of 2019;**
- **Roads By-law No. 4 of 2019;**
- **Dogs By-law No. 5 of 2019; and**
- **Cats By-law No. 6 of 2019.**

2. that the Chief Executive officer be authorised to undertake all steps necessary to finalise the By-law review process and to give effect to the newly adopted By-laws.

Moved Councillor Smedley, Seconded Councillor Lonie **Carried Unanimously**

14.7 **Murray Darling Association Membership** (Report No: 267/19)

The Murray Darling Association (MDA) is an association of over 90 Local Government Municipalities, along with community groups, businesses and individuals with an interest in ensuring that the Murray-Darling Basin (the Basin) continues as a viable and valuable asset for all.

The City of Holdfast Bay has been a member of the MDA since 1997 as a 'local government entity' member (whole of Council). For the City of Holdfast Bay there is limited tangible benefit to the City's residents of being a member of the MDA however, the membership provides a financial contribution, which allows the MDA to continue its work for the benefit of South Australia as a whole. Council has received letters from Campbelltown City Council and Adelaide Hills Council seeking the support of the City of Holdfast in raising this matter with local State and Federal representatives and encourage joining of the MDA.

Renewal of the 'local government entity' membership for 2019/20 is an estimated cost of $3,600 (inc GST

Motion **C090719/1546**

That Council continues as a 'local government entity' member of the Murray Darling Association (MDA) and nominates Councillor Lindop to vote as a delegate on the Murray Darling Association matters on behalf of Council.

Moved Councillor Bouchee, Seconded Councillor Lonie **Carried**

14.8 **Public Interest Disclosure Act – Model Policy and Procedure** (Report No: 240/19)

The *Public Interest Disclosure Act 2018* (*the PID Act*) commenced on 1 July 2019 and replaces the *Whistleblowers Protection Act 1992* (*the Whistleblowers Act*). The Whistleblowers Act outlines the framework for the protection of appropriate disclosures about public interest information.

Under the PID Act, Council must within 3 months appoint responsible officers and ensure compliance with the PID Act and Guidelines in relation to:

- the information that needs to be provided to the Office of Public Integrity (OPI); and
- the required action in the event of disclosure.

It is not currently mandatory for Councils to adopt a Public Interest Disclosure Policy or Procedure but it is anticipated it will become mandatory for Council, with a draft Bill being prepared to include Councils. Consequently the Local Government Association (LGA) has recommended that Councils adopt a PDI policy and procedure as a matter of best practice and to reduce the risk on non-compliance with the Act in relation to compliance with timeframes for responding to appropriate disclosures.

The LGA has provided a model policy and procedure. These model documents were amended in red to include the relevant details specific to the City of Holdfast Bay and presented to Council for adoption.

Motion **C090719/1547**

That Council adopt the Public Interest Disclosure Policy and the Public Interest Disclosure Procedure.