WGV Waterwise Development Exemplar

2017/18 Partner Update

JOSH BYRNE & ASSOCIATES

July 2018

This report provides an update on the activities of the third year (2017/2018) of the WGV Waterwise Development Exemplar program.

Previous updates include:

- WGV Waterwise Development Exemplar - 2015/2016 Partner Update
- WGV Waterwise Development Exemplar - 2016/2017 Partner Update

The WGV WDE has been made possible through the continued support of the following partners.

LANDCORP

WATER CORPORATION

Government of Western Australia
Department of Water and Environmental Regulation

CRC for Water Sensitive Cities

LOW CARBON LIVING CRC

Curtin University

City of Fremantle

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Urban Development Institute of Australia WESTERN AUSTRALIA

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Cover image: WGV Pocket Park

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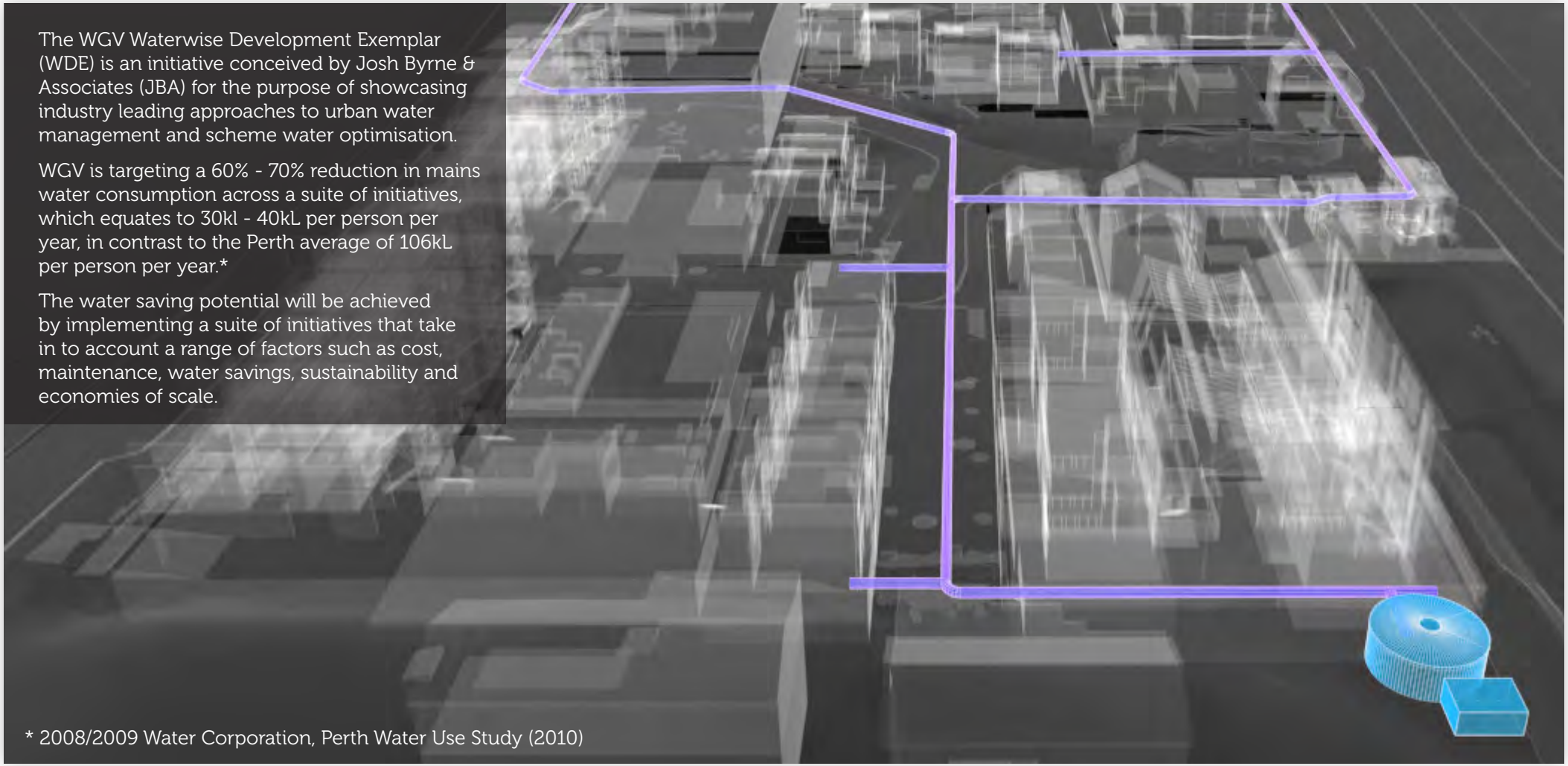
WGV - A Waterwise Development Exemplar

WGV is a 2.2ha infill development in the Fremantle suburb of White Gum Valley. The LandCorp 'Innovation through Demonstration' project showcases precinct-scale design excellence on many levels by incorporating a range of diverse building types, climate sensitive considerations, creative urban greening and leading-edge water management strategies. The innovations at WGV are being captured via a series of research programs in cooperation with a variety of research partners including Curtin University, the CRC for Low Carbon Living, CRC for Water Sensitive Cities and ARENA.

The WGV Waterwise Development Exemplar (WDE) is an initiative conceived by Josh Byrne & Associates (JBA) for the purpose of showcasing industry leading approaches to urban water management and scheme water optimisation.

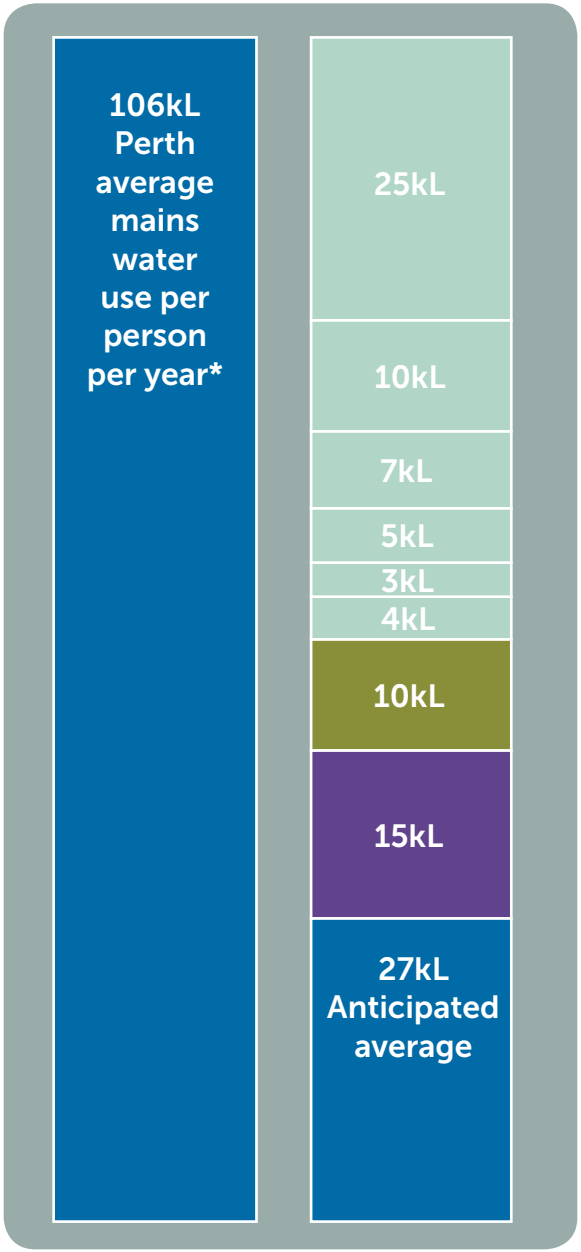
WGV is targeting a 60% - 70% reduction in mains water consumption across a suite of initiatives, which equates to 30kl - 40kL per person per year, in contrast to the Perth average of 106kL per person per year.*

The water saving potential will be achieved by implementing a suite of initiatives that take in to account a range of factors such as cost, maintenance, water savings, sustainability and economies of scale.



* 2008/2009 Water Corporation, Perth Water Use Study (2010)

Achieving the Water Saving Potential



* 2008/2009 Perth Water Use Study

Density Savings (25kL)

'Embedded' water efficiency gains are expected from increased development density when compared to the historical Perth average.

Indoor Water Efficiency (NCC)(10kL)

Inclusion of minimum specified water efficient fixtures (9 L/minute, 3 stars WELS rating) for all new dwellings under the National Construction Code (NCC).

Indoor Water Efficiency + (7kL)

Additional efficiency gains achieved via enhanced water efficient fixtures and appliances over and above the NCC requirements included in the development Design Guidelines (DGs).

Landscape Efficiency (5kL)

Mandated installation of water efficient irrigation with a rain sensor and programmable controller connected to the meter. Recommended adoption of hydrozoning principles, irrigation controls such as evapotranspiration sensors or soil moisture sensors, and the creation of microswales and basins to reduce runoff and recharge soil moisture.

Behaviour Change (3kL)

Planned resident education and support initiatives have been integrated with the One Planet Living Action Plan.

Smart Metering (4kL)

Real-time data logging will provide leak detection and feedback to users to support efficient water-use behaviour.

Rainwater Harvesting (10kL)

The supply and installation of a 3,000L rainwater tank is available in the sustainability package. DGs mandate dual plumbing to toilets and washing machines, provision of sufficient space for a rainwater tank and roof catchment area.

Community Bore (Groundwater) 15 (kL)

Groundwater from the superficial aquifer is supplied via a centrally controlled third pipe (purple pipe) system. DGs stipulate that irrigation controllers and individual meters be installed for optimal efficiency.

To achieve the full water saving potential, clear communication with and early uptake by residents was crucial.

The Design Guidelines (DGs) and the Residents Information Guide were developed to deliver this information.

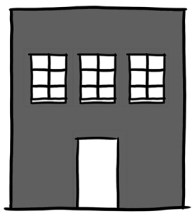
These documents provide information for residents on mandated 'development controls' and recommended 'design guidance' to ensure initiatives are implemented and the sustainable design aims for the site are achieved. Residents are required to submit their plans to the WGV estate architect for review prior to planning application and building licence approval.

Project Update

Single Residential Houses

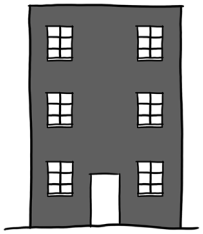
All detached house lots at WGV have been sold. Currently, there are only six vacant detached house lots out of 23, with some dwellings completed and others under construction or nearing completion. All detached lot owners have agreed to install a rainwater tank as part of LandCorp's sustainability package. Currently five Rainwater systems have been installed (plus Gen Y) and have been connected for data logging, along with property mains supply and community bore service. An additional four houses are ready to install their rainwater system and this will be taking place soon. It is expected that at least 17 detached homes will have their water use monitored by the end of the 208/19 period. All meters installed at the detached house lots are Itron TD8 20mm water meters with cyble sensors.

Gen Y



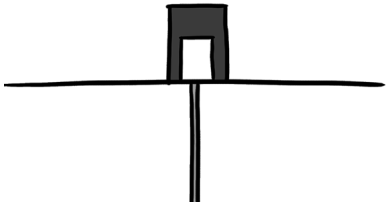
The Gen Y Demonstration House is now fully occupied. A 10,000L underground rainwater tank is located in the central courtyard supplies water for clothes washing and toilet flushing. Sub-metering of water use in the three apartments (mains and rainwater) is done using 20mm Elster meters with probe sensors, providing data to inform mains water savings and rain water utilisation in a strata managed development. The property mains water supply and community bore service are metered with an Elster 25MM meter with probe sensor and an Itron TD8 20mm with cyble sensor respectively.

Apartments



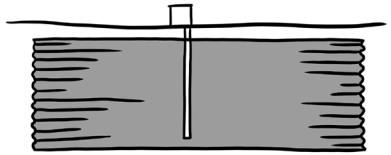
The SHAC (Sustainable Housing for Artists and Creatives) apartments are fully occupied and the Evermore apartments are due for completion before the end of 2018. The group housing site is still in planning phase. Water consumption data is being captured for SHAC (12 dwellings) using a Elster 50mm meter with probe sensor for the property mains meter and Itron TD8 25mm meters with cyble sensors for the community bore and 20mm for the apartment sub-meters.

Community Bore



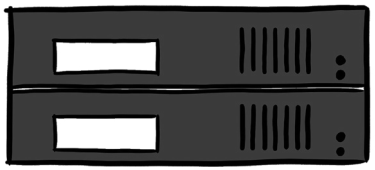
The community bore is irrigating public areas and the first completed houses are now connected. Baseline data on water use via smart metering and irrigation sub-metering is also online, hosted by SD Systems, and the irrigation scheduling has been bedded down using an SDS-50 Two-wire irrigation controller. The City of Fremantle took over the management and operation of the community bore scheme in May 2018. Community bore monitoring include data reports include information on pump set pressure, bore water levels and meter readings, bore run time, irrigation, filter and any equipment faults. Water level sensors have been installed in the bore and data is available through the Outpost Central data portal.

Landscaped Infiltration Basin



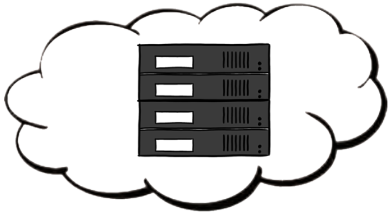
The landscaped stormwater infiltration basin, previously an old-style 'sump', is fully functioning and receiving stormwater from the surrounding areas, which is infiltrating into the superficial aquifer. It is also proving to be an asset to the site, providing attractive community green space and valuable urban habitat. Water level sensors have been installed with real time data displayed through an Outpost Central portal. Inflow monitoring and infiltration assessments will be undertaken during the 2018/19 period in association with the CRC for Water Sensitive Cities.

Data loggers



In the 2017/18 period, data logging of 16 dwellings was initiated, with an additional 59 dwellings to come online in the 2018/19 period. The data logging is carried out via two service providers. The data logging of property meter (mains water and community bore services) and the rain water tanks for the detached lots is done by Outpost Central using WASP data loggers using the 3G mobile network to transmit data to the Outpost Central server. The data logging of individual apartment water use (e.g. Gen Y, SHAC and Evermore) is done at the building scale using Schneider ComX 510 loggers and gateway servers.

Cloud Host Server



A cloud hosted server has been set up to receive data from Outpost Central and the apartment building data loggers as a central repository. From here it can be accessed for data visualisation (dashboards) or accessed for research purposes. In 2018/19 a database access platform will be established by Curtin University to streamline filtering and acquisition of data within research ethics guidelines.

Household Data Dashboard

A WGV data dashboard platform has been developed which will allow residents to access their real-time water and energy consumption data. The dashboard has been customised for each housing typology and induction sessions have been run for the first cohorts of residents from Gen Y, SHAC and detached houses. The dashboard system will continue to be refined based on feedback from users as it is rolled out across WGV.

Research Data Access

The necessary research ethics protocols have been established in line with National Health and Medical Research Council's (NHMRC) National Statement on Ethical Conduct in Human Research (2007). Compliance is being managed through Curtin University as part of the CRCLCL WGV Living Lab project, enabling data to be published and shared with project partners.

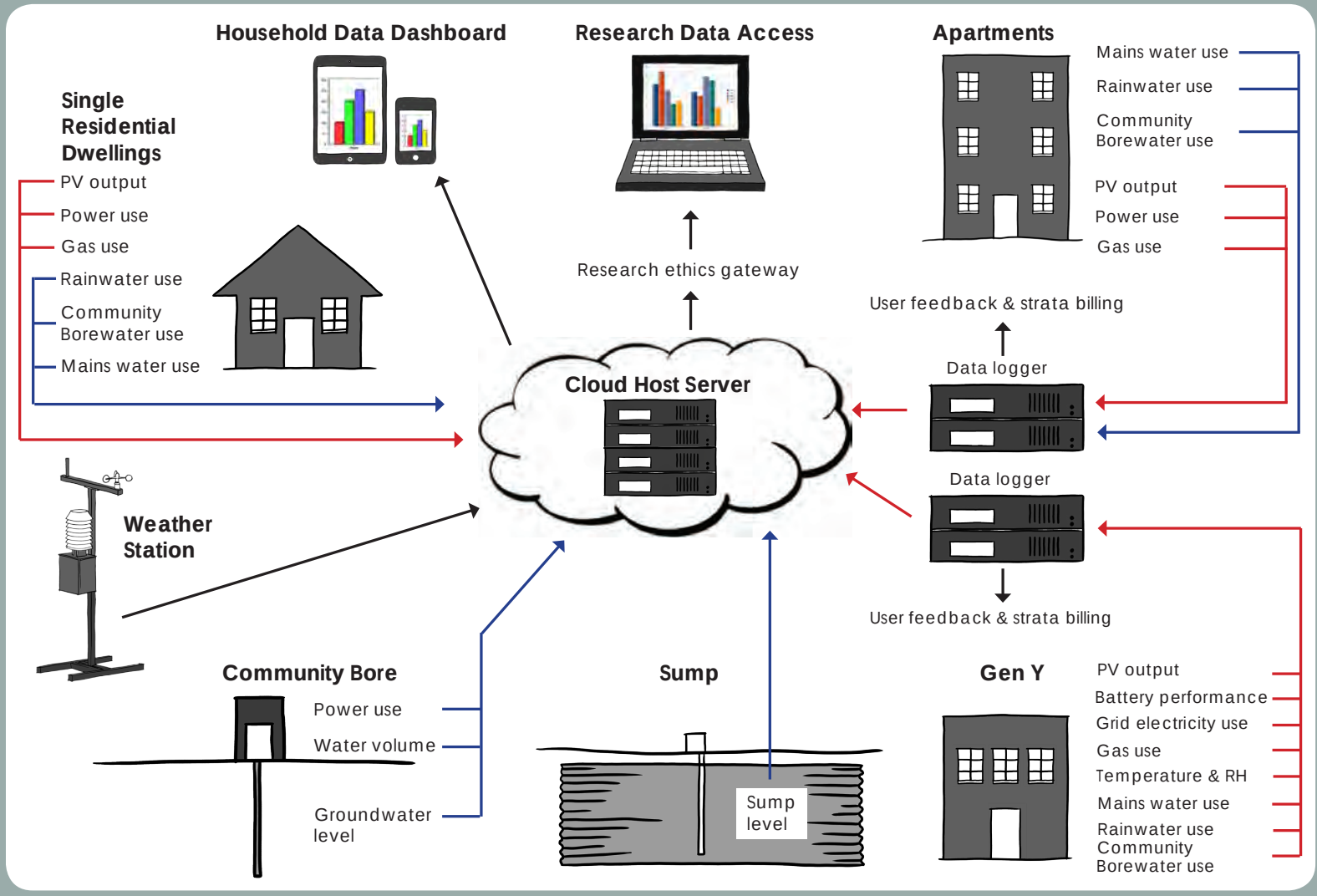
Research Aims & Monitoring Architecture

As WGV moves into occupation phase, data collection and analysis will be used to validate the water savings achieved. This includes the performance data via monitoring to evaluate the various initiatives, as well as the design, governance and operational experiences that are shared via events and case studies.

The principal research aims for the WGV WDE research program are:

- To quantify the scheme water savings across a range of residential typologies.
- To monitor the performance of the various water-based initiatives (technical, operational and behavioral) deployed at WGV.
- To critically assess the performance of the stormwater drainage design requirements for the site via real-time data capture.
- To analyse data and report on the performance findings to a broad audience that includes industry, local government and the community.

The following schematic shows the various components that are being monitored and the overall monitoring architecture.



What's Ahead

As construction is completed and more dwellings are occupied, all installation of smart metering equipment will be finalised and water consumption data (mains, community bore and rainwater) will be gathered. As the data becomes available the WGV WDE project will be able to address the principal research questions. These include:

1. What scheme water savings are achievable through the integrated approach to water efficiency adopted at WGV?
2. How effective are the various strategies/ technologies/systems in terms of their individual contribution towards scheme water savings?
3. How has the site's landscape vegetation performed based on the community bore irrigation supply?
4. Are stormwater infiltration sumps in the Perth metropolitan area oversized and can their design be optimised?
5. What are the key learnings from WGV, what are the areas for improvement and what are the areas that could benefit from additional research and development?
6. What are the energy intensity and carbon footprint implications of integrated, decentralised water systems compared to conventional water supply systems?

The occupation phase of WGV will see a continued alignment of the WGV WDE with other research components, as part of considered and integrated approach to achieving sustainability and liveability goals. This includes the CRCLCL and ARENA projects, which examine shared renewable energy in multi-residential and strata arrangements at SHAC, Gen Y and Evermore.

JBA will continue to work with the project stakeholders to understand the process of implementing industry leading integrated water management at this precinct scale.

Communications Activities

The WGV WDE continues to draw significant interest. This is being driven by the project's communication and community engagement strategy, which is supported by input from the relevant stakeholders. Communication events for the 17/18 year included site tours with key political and industry representatives, award wins, feature videos and magazine articles. A selection of the key achievements include:

Key Achievements

July 2017 – Density by Design - *WGV An Introduction* episode release

July 2017 – CRC WSC Case Study released

July 2017 – CRC WSC - Annual Water Sensitive Cities Conference - WGV tour

July 2017 – Social Impact Festival – *Can good Design Change the Great Australian Dream?* - presentation

July 2017 – Water Corporation – Senior Management WGV tour

August 2017 – Urban Design Forum WA (Planning Institute of Australia - PIA) – *Density by Design* presentation

September 2017 – Department of Communities & Housing Authority Management – WGV tour

October 2017 – AWA Water Awards – WGV Water Sensitive Urban Design award

October 2017 – Density By Design – *WGV Multi-residential Housing* episode release

November 2017 – TedXPerth presentation

November 2017 - Hackathon – *Innovation to Create Sustainable Communities* presentation

November 2017 – Australian Water Association - Water Awards – Winners Showcase and Networking Event

Density by Design Video Series

Launched in April 2017 the *Density By Design* online video series asks the question, *'Can good design change the great Australian Dream?'*

Hosted by Dr Josh Byrne and co-produced with VAM MEDIA, the series features key Australian developments with ground-breaking, innovative and affordable approaches to sustainable design.

Density by Design focuses on WGV and the research being conducted on low-carbon residential precincts undertaken by Curtin University Sustainability Policy Institute (CUSP) for the CRC for Low Carbon Living. (CRC for LCL).

A teaser for *Density by Design* WGV WDE episode can be found via the link DxD Teaser.

www.densitybydesign.com.au/wgv/

Interview with Ashley Vincent, General Manager Assets Planning Group, Water Corporation

Key Achievements cont.

November 2017 – NewWAterways – Water Sensitive Cities - interview

November 2017 – ABC TV News – Perth's Water Story

December 2017 – Ministerial tour

January 2018 – *Density by Design - Energy Innovation* episode release

February 2018 – ABC TV Gardening Australia - A Different Approach

April 2018 - Urban Design Forum WA (PIA) book - Density by Design article

May 2018 - Urban Design Forum WA (PIA) – WGV tour

May 2018 – PIA Conference - National tour

May 2018 – Rainwater Harvesting & Irrigation Australia Breakfast Presentation - Featuring Hon Dave Kelly Minister for Water and Dr Josh Byrne.

AWA Awards

WGV WDE won the Water Sensitive Urban Design Award at the 2017 AWA Awards. Stakeholder representatives include Greg Claydon (Department of Water and Environmental Regulation), Steve Capwell (Water Corporation), Greg Ryan (LandCorp), Dr Brad Pettitt (City of Fremantle) & Dr Josh Byrne (Josh Byrne & Associates).

Case Study

The CRC for Water Sensitive Cities (WSC) researches interdisciplinary responses to water problems, synthesising diverse research outputs into practical solutions to influence policy, regulation, and practice.

The CRCWSC has developed case studies to help build a body of evidence that can support and encourage the adoption of research outcomes. The detailed case studies capture and communicate the lessons learned from the early adoption of research knowledge in real-life projects.

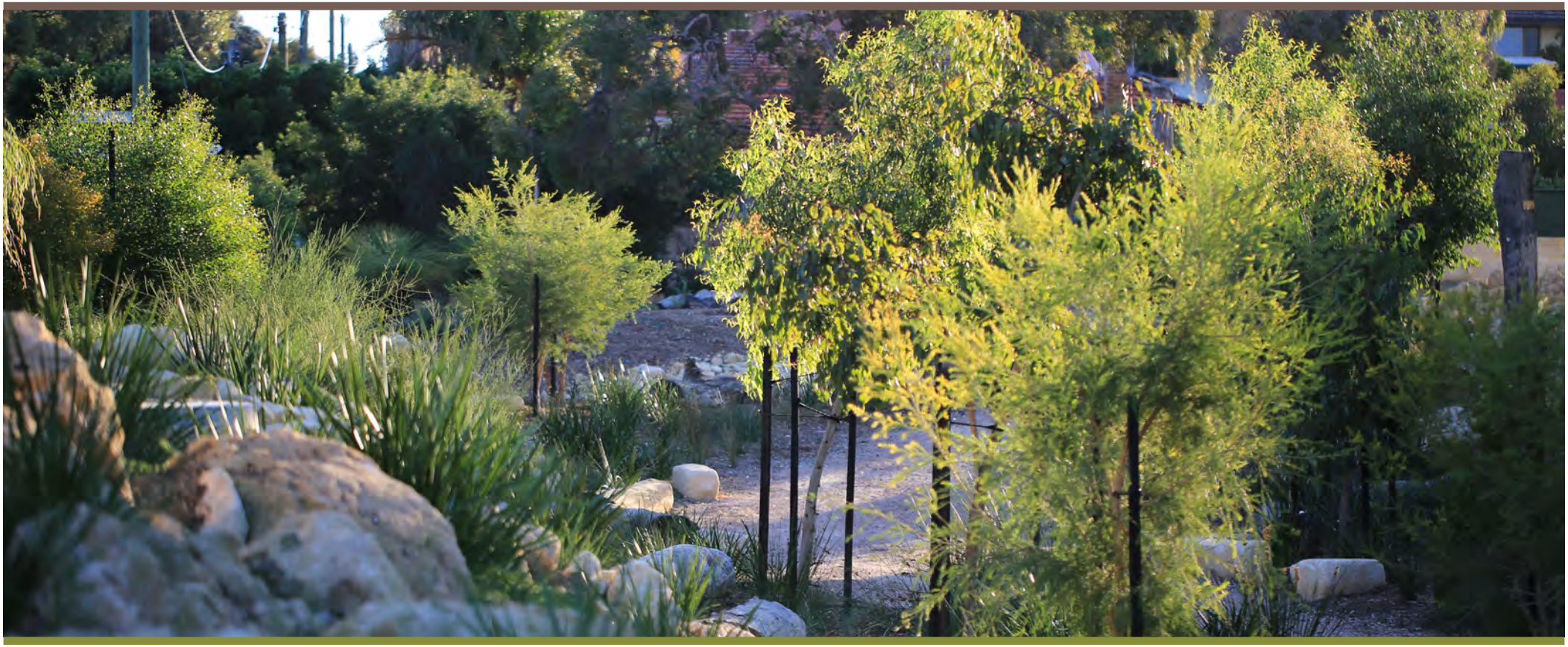
The WGV case study was developed in collaboration with project stakeholders to identify the key drivers and innovations that led to water sensitive cities outcomes, and it highlights the challenges faced during the process. The WGV case study can be found on the CRC WSC Website or by following the link: WGV Case Study

WGV Ministerial Tour

On the 7th December 2017 the Hon Dave Kelly MLA, Hon Peter Tinley MLA and the Hon Simone McGurk MLA took part in a guided tour of WGV.

The Ministers were accompanied Dr Brad Pettitt (Mayor, City of Fremantle), Dean Mudford (COO, LandCorp), Matt Read (Acting GM, LandCorp), Mike Rowe (Director General, Department of Water and Environmental Regulation) and Sue Murphey (Chief Executive Officer, Water Corporation).

After a site briefing the group was taken on a one hour tour of WGV's key points of interest, followed by an informal Q&A Session.



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