

WGV – water sensitive development

Land use / development type	Scale
Residential infill development	Precinct
Public open space	Precinct

Stormwater controls	Scale
Stormwater treatment and harvesting	Precinct

Water reuse	Scale
Rainwater tank for in-house use	Lot
Community bore for irrigation	Precinct

Efficient use of water	Scale
Water saving fixtures	Lot
Waterwise landscaping	Precinct

Site conditions	
Soils	Sand over limestone
Groundwater	12 – 17 m
Slope	5% slope

Local government	Location
City of Fremantle	White Gum Valley

Providing more housing options between high density apartment living and low density single family homes is important, both in Australia and internationally. Addressing the 'missing middle' was at the core of LandCorp's 2.29 ha White Gum Valley (WGV) precinct development, where community, sustainability and affordability have been prioritised equally.

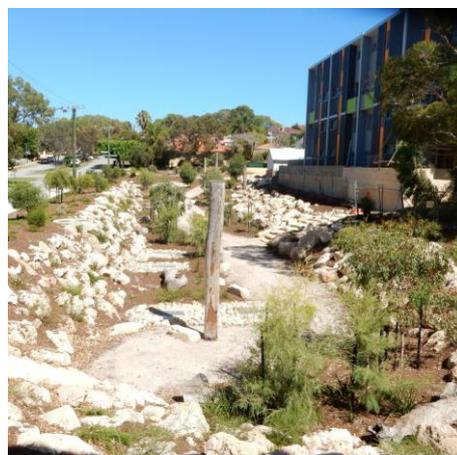
WGV addresses water, energy, community and biodiversity in its "One Planet Living" approach, which is based on the idea that we all need to live within the limits of one planet's natural resources.

The site was formerly a school for children with special needs (Kim Beazley School). When it closed in 2008, the WGV community felt that

subdividing the site into traditional 400m² lots did not align with the changing residential requirements of local young professionals and single parent households. Through a precinct design process involving the local community, a new model was developed that included 80 residential dwellings ranging from apartments to maisonettes and single residential homes to accommodate up to 180 residents.

A mutual objective between the stakeholders was to achieve a water sensitive urban development, which resulted in a community bore to irrigate public and private gardens in the precinct, lot scale rainwater harvesting for use in toilets and washing machines, water saving fixtures and waterwise landscaping throughout the precinct. WGV aims to achieve a 70% reduction in water consumption (based on Perth's single residential dwellings).

The project also provided an opportunity to demonstrate the conversion of a fenced-off stormwater sump into an infiltration basin that is now a functional piece of public open space.



Key Project Features

- Stormwater runoff from a catchment of over 12 hectares outside the development site is collected and infiltrated via underground infiltration cells within the retrofitted stormwater sump.
- The infiltration basin was accepted by City of Fremantle as public open space with full pedestrian access.
- Stormwater up to approximately the 5% annual exceedance probability (AEP) event is contained on lots.
- Stormwater runoff from streets up to the 20%AEP is piped to 10 underground infiltration chambers.
- Stormwater runoff from larger rainfall events (up to 1% AEP) from streets and lots are conveyed via road networks to infiltration cells.
- A community bore extracts groundwater from the superficial aquifer, providing a source of water for irrigation of public and private gardens within the precinct. This reduces reliance on mains water for irrigation. Extraction rates will be less than or equal to groundwater recharge rates across the precinct.
- Landscaping across the precinct has been designed with waterwise plants and hydro-zoning.

Development Costs¹

Community bore	\$235,000
Sump retrofit (civil construction)	\$347,000
Sump retrofit (landscape)	\$61,000
Rainwater tanks	\$4,000/lot

Maintenance Costs¹

Community bore	\$300/lot/annum
Infiltration cells	\$1,000/annum
Rainwater tank	At landowner's cost

¹All costs are site-specific and are an approximation given for guidance purposes only



Issues

The provision of non-drinking water to each lot, sourced from groundwater via the community bore, required the identification of a long-term service provider for the scheme. Although initially hesitant, the Department of Water, working with relevant stakeholders and the Minister for Water, facilitated an exemption to the *Water Services Act* to enable the City of Fremantle to operate the scheme, due to the City's familiarity with groundwater schemes. This will include individual metering at each lot and remote monitoring of usage and flow for supply issues and data. This arrangement provides a model for non-drinking water supply for future communities.

Considerable negotiations were also required between the consultants (Josh Byrne and Associates, on behalf of LandCorp) and the City of Fremantle to obtain support and approval of community access to the retrofitted stormwater sump. This required significant modelling and management of perceived risks.

Outcomes

Developing a precinct consistent with One Planet Living principles resulted in a project that showcases significant advances in sustainable development, particularly in the areas of urban form, water sensitivity and energy efficiency.

Together with passive solar design, the rooftop photovoltaic systems subsidised by LandCorp means WGV has achieved seven stars on the NatHERS rating for energy. This is a 60% reduction in reliance on the energy

grid, and up to 100% in some dwellings.

Key WSUD features are:

- A community groundwater bore reticulated to each lot through a purple pipe system. The system meets the requirements of the Departments of Water and Health and will be managed by the City of Fremantle.

- A retrofitted sump that doubles as valuable public open space.
- A reduction of potable water use by 60-70% throughout the precinct.
- Waterwise landscaping

This project also demonstrated that effective stakeholder and community education and involvement is critical for the successful delivery of sustainable developments.



Contact details for further information

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