





Reports and studies on stormwater/WSUD opportunities in Geelong

At the City scale, there are numerous opportunities for stormwater utilisation.











Stormwater/WSUD Systems installed in Geelong

New WSUD systems for irrigation

Systems installed: 7 since 2000

Used for irrigation: 3

Supply to civil maintenance facility: 1

Currently not used for irrigation: 3 (Water quality issues)

WSUD Sites Reviewed

1. Eastern Park, Geelong Botanic Gardens

Gardens and stand pipe for tree watering

2. Kardinia Park

2 sports grounds and 4 passive areas

3. Weddell Road, Western Oval

1 sports ground and saleyards operations

WSUD Sites reviewed

1. Eastern Park, Geelong Botanic Gardens A. Gardens; lawns, trees and garden beds and Area: 2.5 ha

B. Stand pipe for tree watering

Water budget: 23.3 ML (Potable water cost: \$54,000)



















Evaluating Irrigation Performance

Performance Criteria

- a. Total water use: kL or ML per Year
- b. Water Application Rate: ML/ha
- c. Water use relative to Water Budget: Volume & \$ increase or decrease
- d. Application Efficiency (Distribution Uniformity): DU %
- e. Precipitation Rate (PR): mm/hr
- f. Irrigation Index (Ii): Target range 0.9 to 1.1





Some questions re WSUD systems? 1. Does the system deliver the design performance? 2. Is the water quality suited to human health, landscape and equipment functioning? 3. Is the irrigation efficient and meeting water demands of the site? 4. Has the maintenance program been effective?

Summary of System Performance						
ltem No.	Stormwater Performance	Botanic Gardens (Eastern Park)	Kardinia Park	Weddell Rd Reserve		
1	Catchment yield quantity	×	×	√		
2	Catchment water quality	✓	~	×		
3	Storage capacity (on site tanks)	~	~	~		
4	Storage/wetland water quality	√?	✓	×		
5	Treatment - Disinfection equipment (UV)	×	~	~		
6	Treatment - Filtration equipment	~	×	~		
7	Pump/hydraulic equipment	~	~	~		
8	Control & monitoring systems	~	~	×		
9	Backup supply - Potable	~	~	~		

Key Issues With Stormwater Systems

Eastern Park (Geelong Botanic Gardens)

- Catchment yield quantity
 Storage quality visual algae
 Treatment disinfection (UV)

- Kardinia Park
- Catchment yield quantity
 Treatment filtration

Weddell Road

- Catchment water quality
 Storage/wetland water quality
 Control monitoring systems

I	Reliability of Supply
<u>Eastern Park</u> 2013/14 - 62% 2014/15 - 71% 2015/16 - 51%	(Geelong Botanic Gardens) Original design reliability: 80% to 90%
<u>Kardinia Park</u> 2013/14 - 42% 2014/15 - 48% 2015/16 - 55%	Original design reliability: 100% (Pool back up)
<u>Weddell Rd</u> 2013/14 – 92% 2014/15 – 95% 2015-16 – 22%	Original design reliability: +95%

ltem No.	Function/ Category	Parameter	Frequency
1	Water use	kL	Weekly
2	Water quality - Chemical	EC	Monthly
		рН	Monthly
		Nutrients	Monthly
		Hydrocarbons (oil)	Monthly
3	Water quality - Biological	BOD	Monthly
		E.coli	Weekly

ltem No.	Function/ Category	Parameter	Frequency
4	Water quality - Physical	Optical - NTU	Continuous (UV) Alarm
5	Hydraulic - Pumping	Flow rate	Alarm
		Pressure	Alarm
6	Hydraulic - Filter	Pressure differential	Removed

Learnings from stormwater experiences

1. Equipment \$ savings can result in significant loss of yield/performance.

2. Important to be knowledgeable of landscape performance standards, species water use characteristics, and monthly water demand.

3. Awareness and understanding of EPA water quality requirements essential.

4. Ready access to qualified maintenance personnel is essential.

Learnings from stormwater experiences

5. Secure back-up of supply is critical.

6. Real time monitoring of potable water back-up use.

7. Near real time comprehensive monitoring of all parameters impacting on functional performance.

8. Serviceability of pump and treatment equipment saves time and enhances quality of service.

For the Future

Planning for new WSUD systems for irrigation:

- 1. Establishing water quality requirements for turf and lawn sprinkler irrigated areas.
- 2. Monitoring and 'alarming' (real time) systems to detect operational issues.
- 3. Stakeholder engagement and building capacity in council to maintain storm water facilities.
- Review design assumptions regarding yield and reliability to have better knowledge of expected performance including predictability of potable water backup use (\$).

