




WSUD – the East Coast experience		Retrospective
	Dorset Square example	
	Stonnington Depot example	
	Implementation Issues	
	WSUD Outlook	
	Little Stringybark Creek	
New Water 4 th November, 2013		
Presented by: Rod Wiese		 STORM CONSULTING www.stormconsulting.com.au

<h2 style="text-align: center;">WSUD – the East Coast experience</h2> <ul style="list-style-type: none"> • a brief retrospective • WSUD retrofit solutions into public realm areas of Melbourne. • Implementation issues – key learnings • the WSUD outlook 		
Overview	Rod Wiese E: rod@stormconsulting.com.au P: 9208 0102 M: 0411 880 128	 STORM CONSULTING

Why manage stormwater?



A few decades ago:
– nuisance water & flooding
Last 2 decades:
– above + improve water quality
Now – the above + reduce impacts of
urbanisation on receiving environment,
greening streets, etc (long list).

Retrospective

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Why consider WSUD?

Sporting fields	Passive Irrigation	Climate change
Protection of urban streams		Conservation of drinking water
Parks & gardens		
Increasing population	Heat island effect	Community
Greening streetscape	Urbanisation	Legislation
Public amenity	Political pressures	Sustainability
	Council policy	

Retrospective

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Impacts of Urbanisation

Affected feature	Response
Hydrology	Decreased low flow volume Increased frequency, magnitude and volume of peak flow Decreased groundwater recharge and lower water tables
Geomorphology	Increased channel erosion, incision and sediment transport
Water quality	Increased contaminant loads and concentrations
Ecology	Reduced frequency of connection between the stream channel and associated flood plain and wetland systems Habitat simplification Less diverse biotic communities Decreased nutrient retention and altered patterns of nutrient and energy cycling
Biodiversity	Decreased biodiversity values

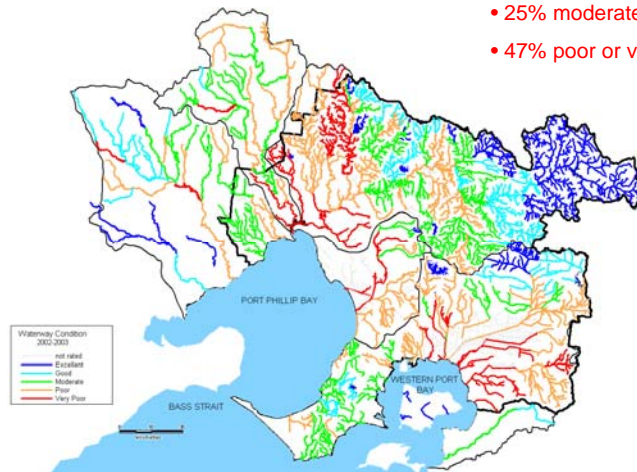
Source: Walsh, C.J., Leonard, A.W., Ladson, A.R. and Fletcher, T.D. (2004) *Urban stormwater and the ecology of streams*.

Retrospective

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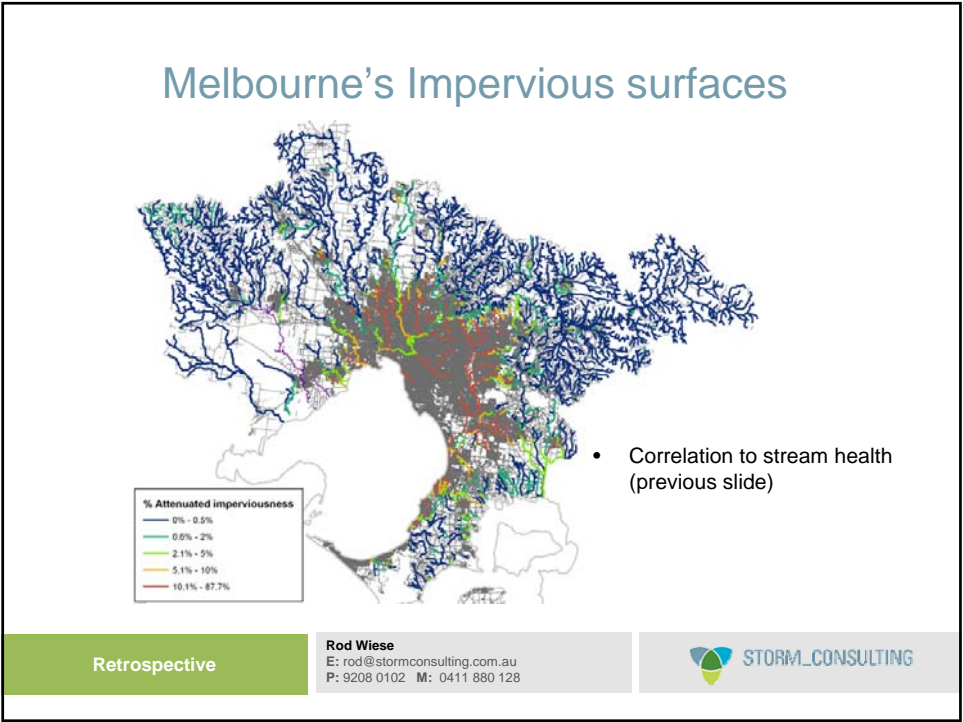
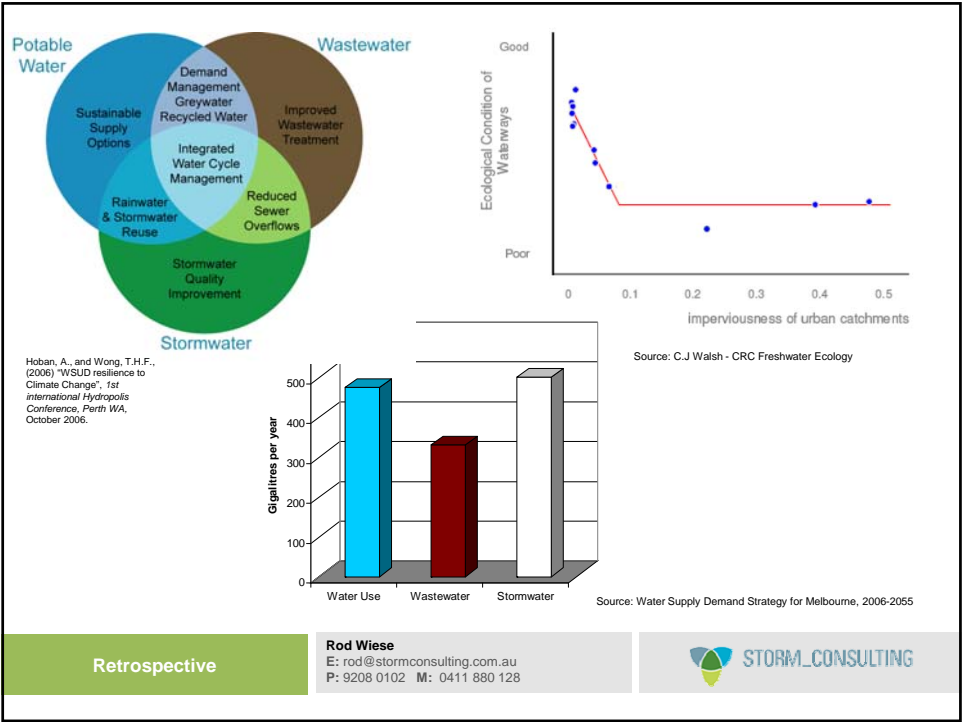
- 28% good or excellent condition
- 25% moderate condition
- 47% poor or very poor condition



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Urban Flooding



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Conventional Drainage Systems



Very efficient drainage upstream often results in flooding. Traditional response –
Stormwater Detention Basins



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Detention Basins




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Water Quality - Litter




Rubbish from the emptied stormwater drain on
Fitzroy Street in St Kilda, *The Age* 2007

Yarra River, Kew, *The Age* 2005

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Water Quality - Nutrients



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Water Quality Targets (Vic)

Pollutant	Current best practice performance objective:
Total Suspended Solids (TSS)	80% retention of the typical urban annual load
Total phosphorus (TP)	45% retention of the typical urban annual load
Total nitrogen (TN)	45% retention of the typical urban annual load
Total gross pollutants (TGP)	70% reduction of typical urban annual load
Flows	Maintain discharges for the 1.5 ARI* at pre-development levels
State Environment Protection Policy (SEPP) (Waters of Victoria) Stormwater treatment system performance objectives developed by Melbourne Water (CSIRO, 1999)	

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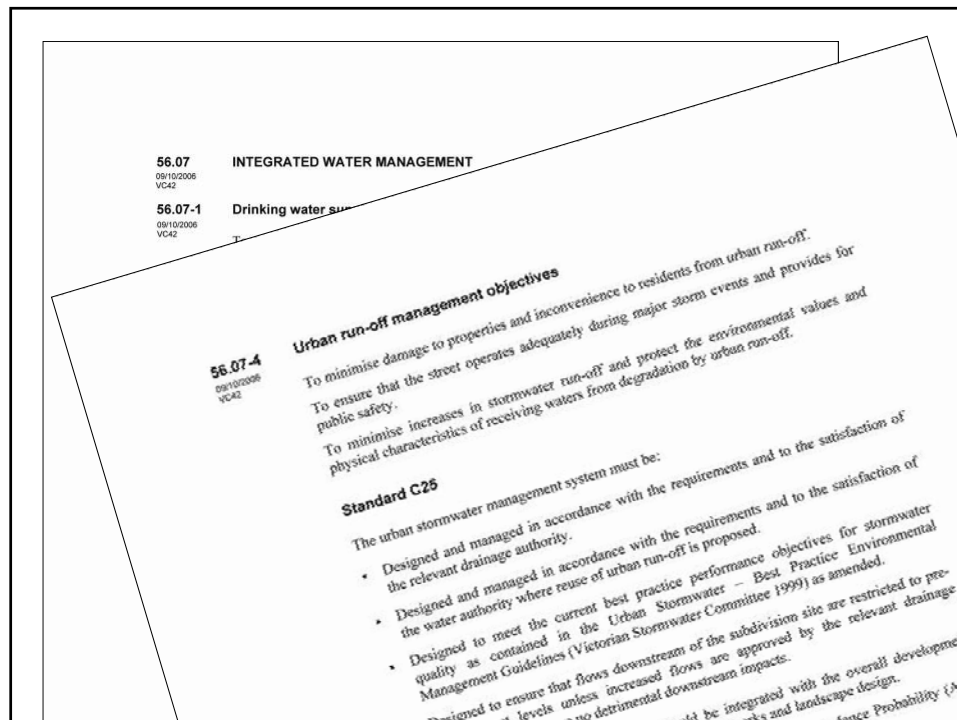


Water Quality Targets (NSW)

Pollutant	Current best practice performance objective:
Total Suspended Solids (TSS)	85% retention of the typical urban annual load
Total phosphorus (TP)	65% retention of the typical urban annual load
Total nitrogen (TN)	45% retention of the typical urban annual load
Total gross pollutants (TGP)	90% reduction of typical urban annual load
Flows	Post-dev flow duration of flows greater than the "stream-forming flow" being no greater than 3-5 times the natural duration of this flow
DECC (Oct 2007), Managing Urban Stormwater: Environmental Targets (DRAFT) Also currently used by the Growth Centres Commission and written into Landcom's DRAFT WSUD policy (May 2009)	

Retrospective

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WSUD – the East Coast experience

- a brief retrospective
- **WSUD retrofit solutions into public realm areas of Melbourne.**
- Implementation issues – key learnings
- the WSUD outlook

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Street Trees



WSUD Examples

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Street Trees



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Street Trees



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Car Parks



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Car Parks



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Streetscapes



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Streetscapes

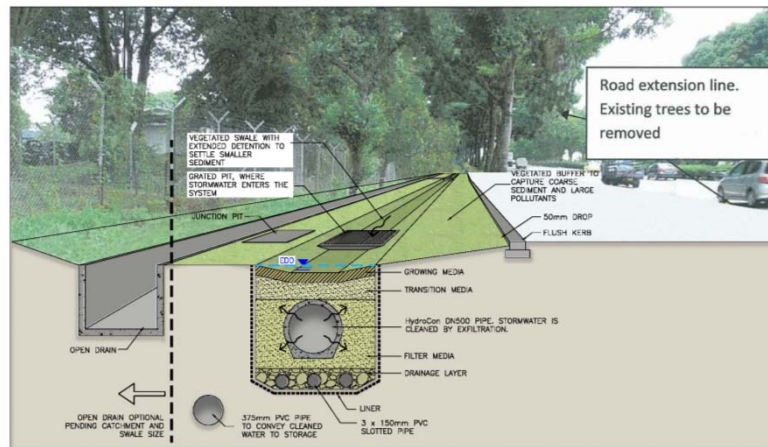


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Singapore road runoff



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Chirnside Park Gateway



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Permeable Paving

Increases recharge
Decreases runoff
Treatment
Harvesting

Pentridge Village
Source: ENVISS. 2011

Source: HydroCon. 2011

WSUD Examples

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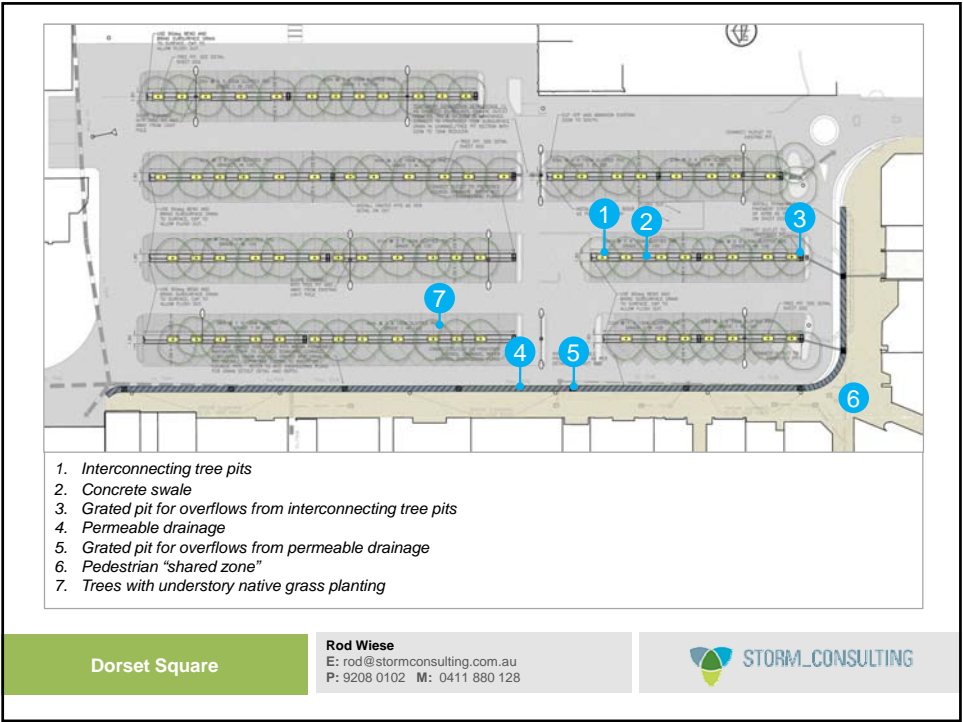
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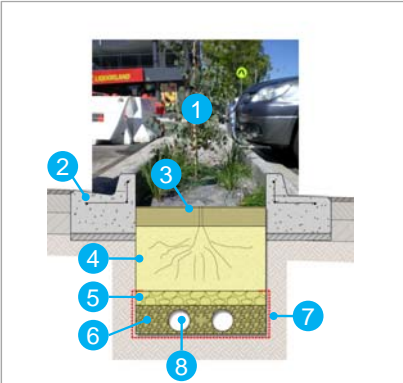
2009 Stormwater Victoria
Winner –
Urban Redevelopment

Dorset Square, Boronia, Victoria

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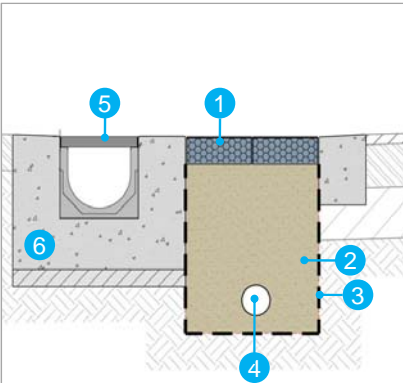


1. Tree and Lomandra planting
2. Kerb and channel
3. Mulch layer
4. Filter media
5. Transition layer
6. Drainage layer
7. Geotextile
8. Slotted pipe

Dorset Square

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1. Permeable pavement
2. Washed and compacted subgrade
3. Geotextile
4. Subsoil drain
5. Trench grate to capture overland flows
6. Concrete surround
7. Concrete edge strip

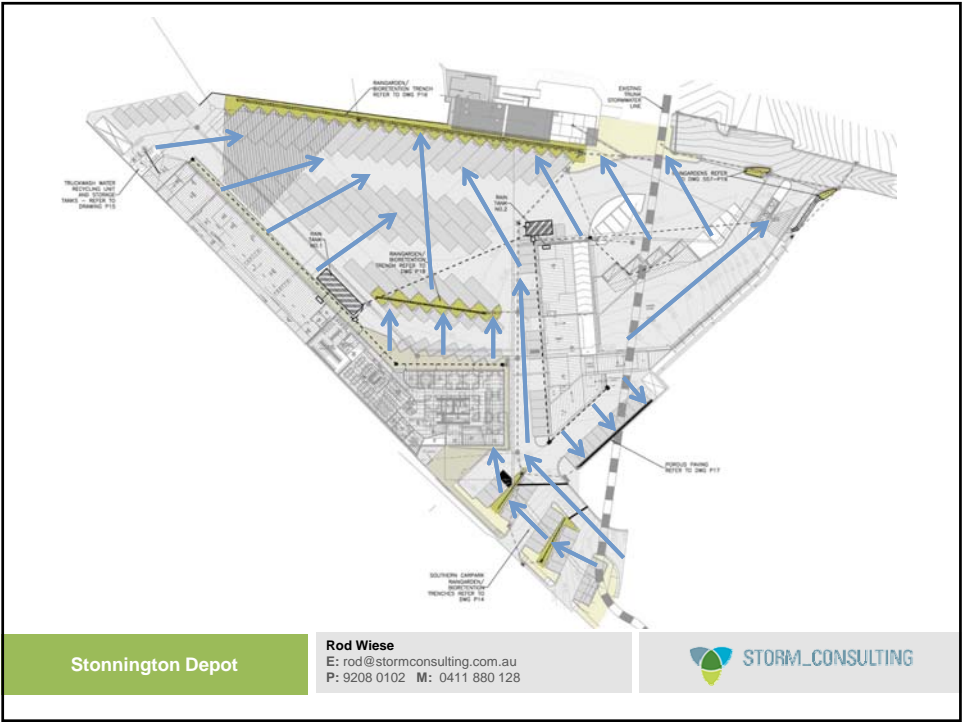
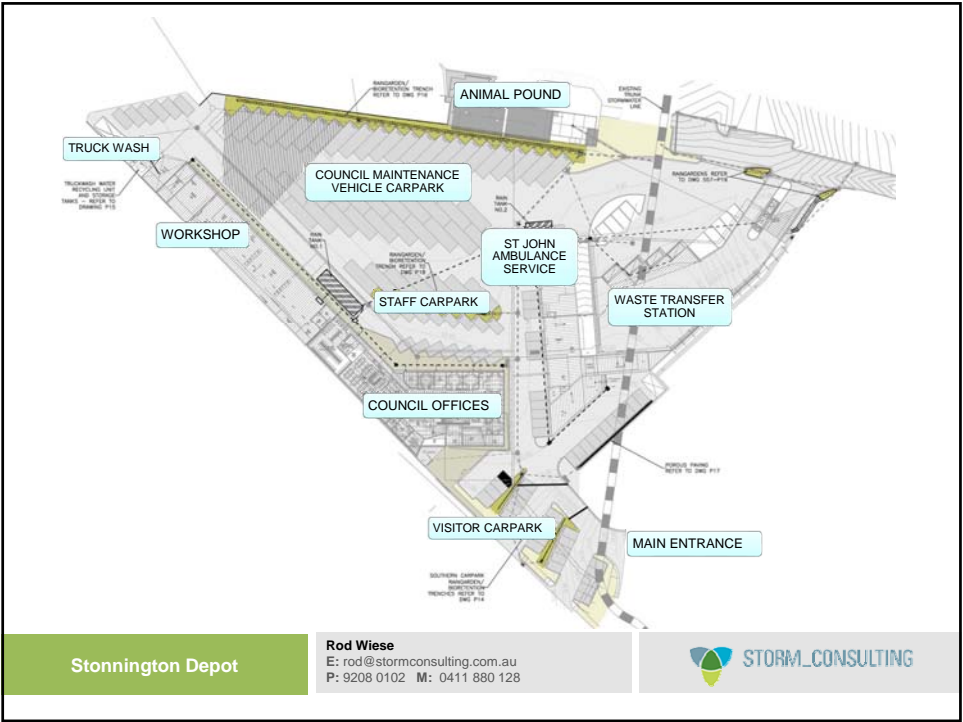
Dorset Square

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<h2>Sustainable Water at Stonnington Depot</h2>		Background
		Site Analysis
		Drivers for WSUD
		Water Quality
		Water Quantity
<p>Presented by : Rod Wiese, Managing Director, STORM Consulting</p>		Lessons Learned
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<h2>Background</h2>					
<ul style="list-style-type: none"> • Replacement of 100 year old Surry Rd Depot • Site previously used as a dog pound and Council storage yard • 1.5Ha site • All stormwater is directed into Gardiner's Creek • Melbourne Water - Lower Yarra River Protection Program provided considerable financial assistance • DSE also provided some funds for the harvesting measures 	 <p>Stonnington Depot location</p>	<table border="1"> <tr> <td> Stonnington Depot </td> <td> <p>Rod Wiese E: rod@stormconsulting.com.au P: 9208 0102 M: 0411 880 128</p> </td> <td>  STORM CONSULTING </td> </tr> </table>	Stonnington Depot	<p>Rod Wiese E: rod@stormconsulting.com.au P: 9208 0102 M: 0411 880 128</p>	 STORM CONSULTING
Stonnington Depot	<p>Rod Wiese E: rod@stormconsulting.com.au P: 9208 0102 M: 0411 880 128</p>	 STORM CONSULTING			





Completed raingardens

- Six separate raingardens
- Capture and treat flows from asphalt carparks and transfer station ramp
- Reduction of suspended solids and nutrients
- Capture spills/hydrocarbons from trucks
- Flat areas to the south of the site proved difficult
- Stencilling of the asphalt was required to direct stormwater evenly into raingardens



Stonnington Depot

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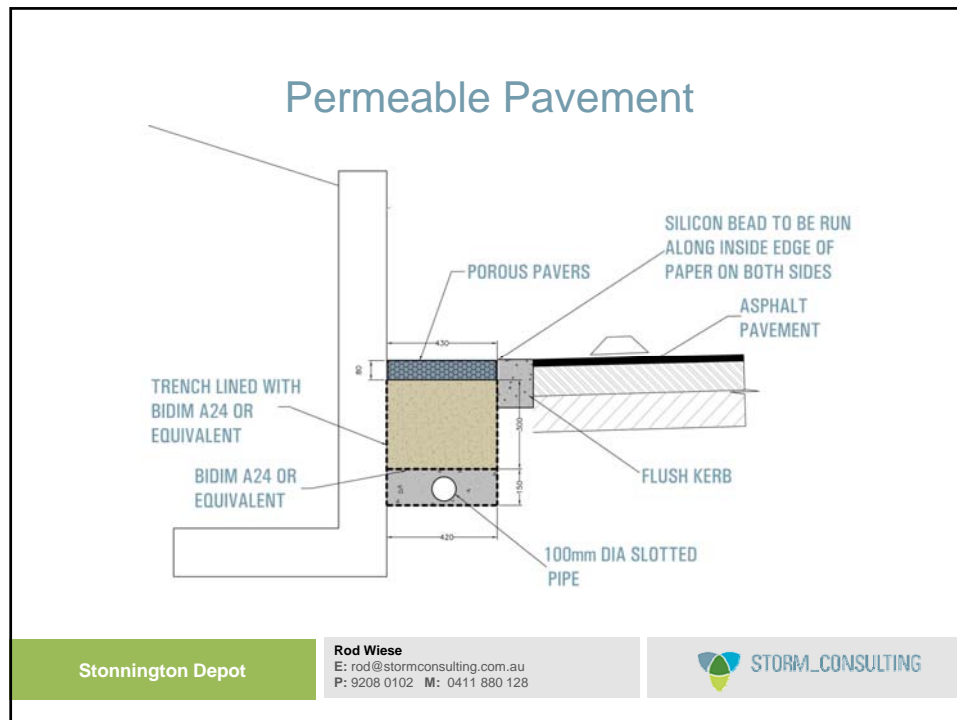
Completed raingardens

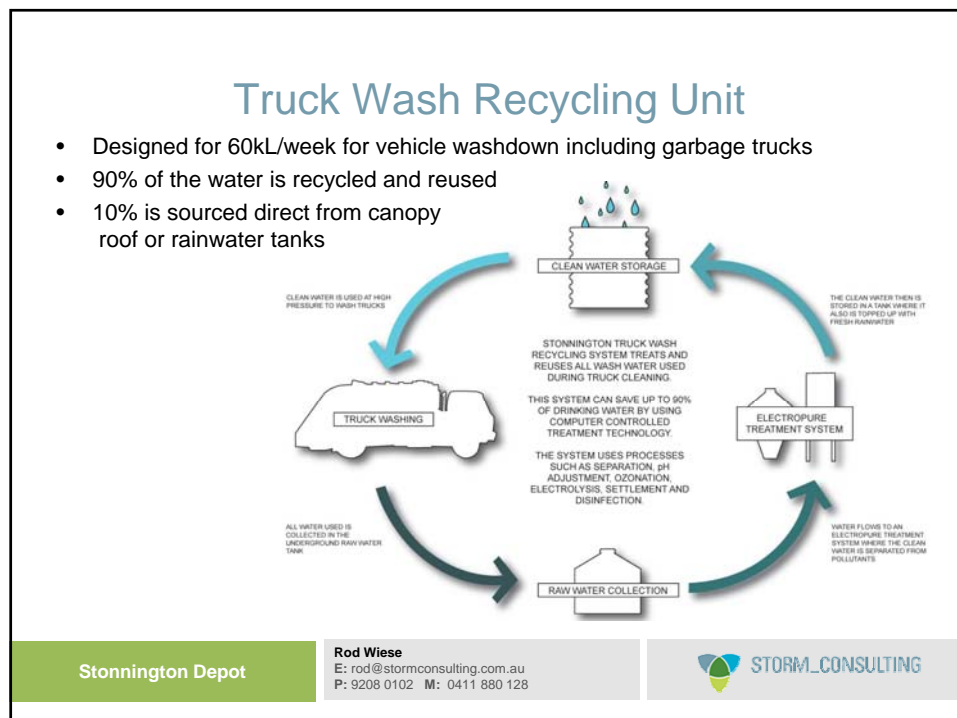
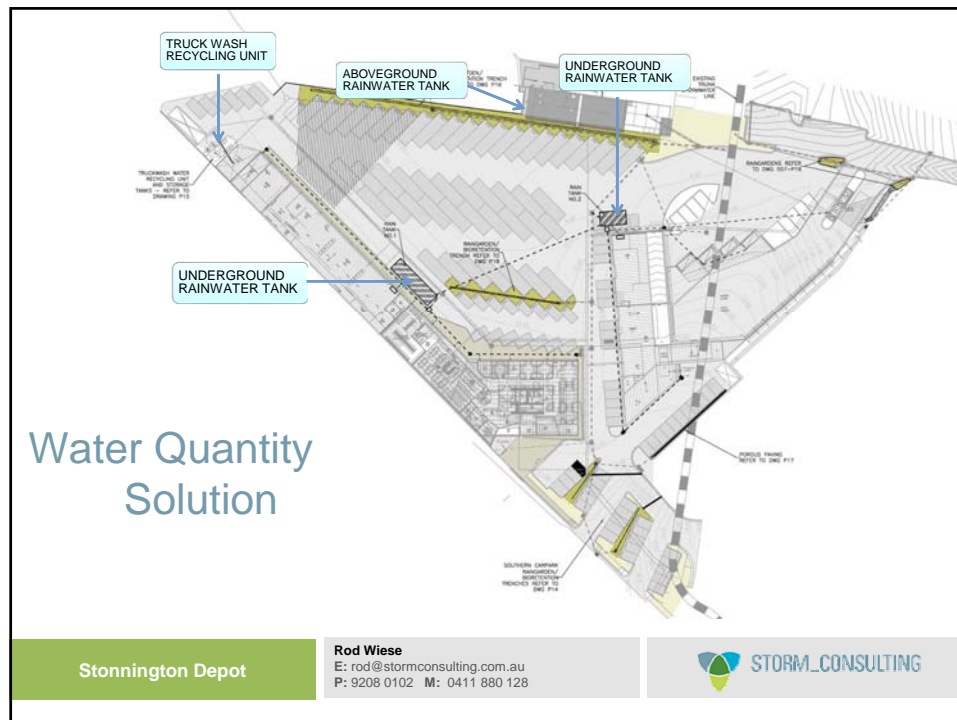


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Truck Wash Recycling Unit



Stonnington Depot

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Rainwater Tanks

- Rainwater collection from an area of 1Ha
- 165kL underground storage volume
- 1,170kL pa used for toilet flushing
- Other uses are:
 - transfer station washdown
 - truckwash rinsing and top-up
 - nursery and other irrigation.
- A 20kL aboveground tank services the pound building
- Stormwater harvesting tank??

Stonnington Depot

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Lessons Learned

- Where there's a will, there is usually a way
- Can not achieve everything (budget constraints)
- Provide adequate training for operation and maintenance of new equipment and technologies
- Need someone in Council to be the guru of new equipment/technologies
- Communication in multi-disciplinary design teams is critical
- Capacity building contractor is essential (hold points)
- Be committed to see it through

Stonnington Depot

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Ashgrove Estate

- An award winning development
- Optimises WSUD/SWH to:
 - Improved stormwater quality to downstream
 - Conservation of potable water (40%)
 - Reduces flooding frequency (from 5 yr to > 100 yr)
- Reduces the Effective Imperviousness

Ashgrove Estate

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Ground level

Reticulation to lots

Pump Station

800 kL u/gmd Stormwater Storage Tank

Ashgrove construction



Ashgrove Estate

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Ashgrove Basin A - constructed



Ashgrove Estate

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Finished product



Ashgrove Estate

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WSUD – the East Coast experience

- a brief retrospective
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- **Implementation issues – key learnings**
- the WSUD outlook

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WSUD Implementation Issues

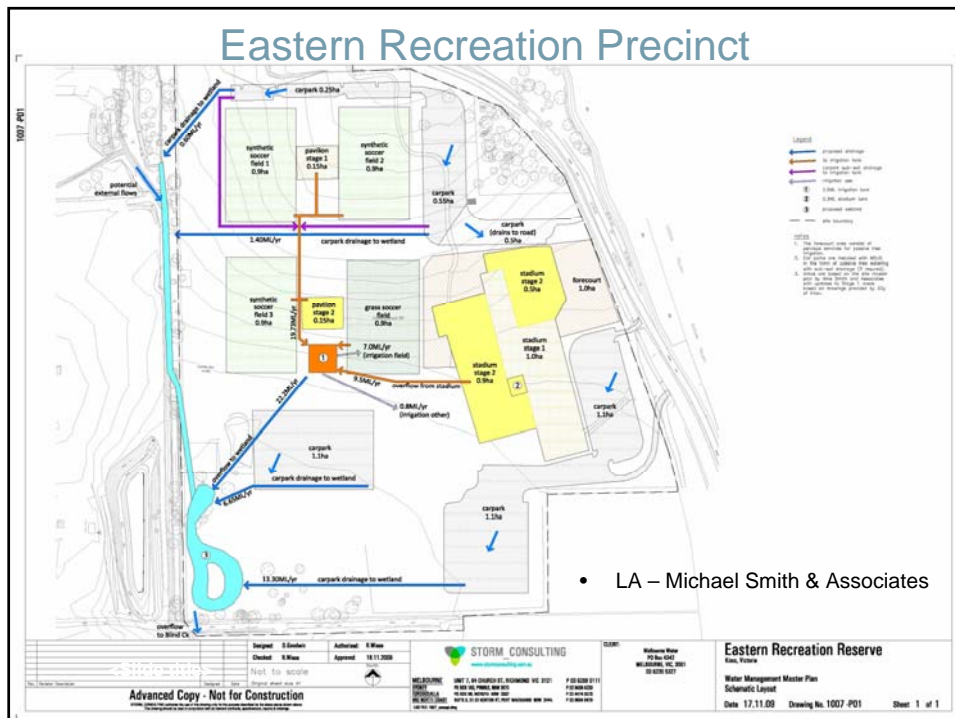
- Various disciplines required for optimal outcome
- Changing of the guard (lead consultant)
- Design collaboration
- Construction issues
- Maintenance

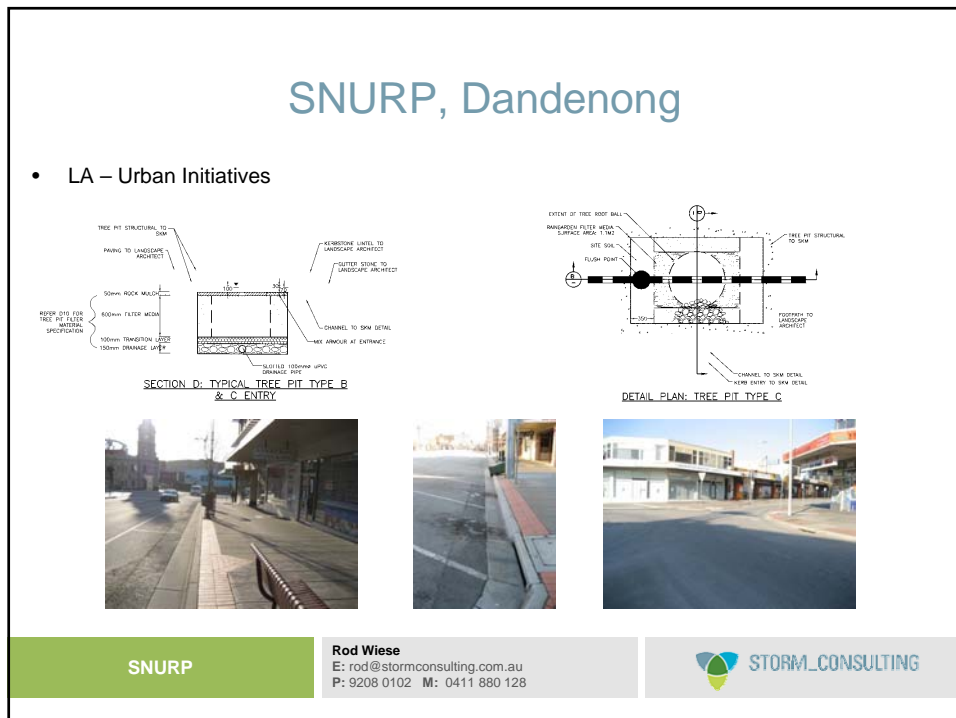
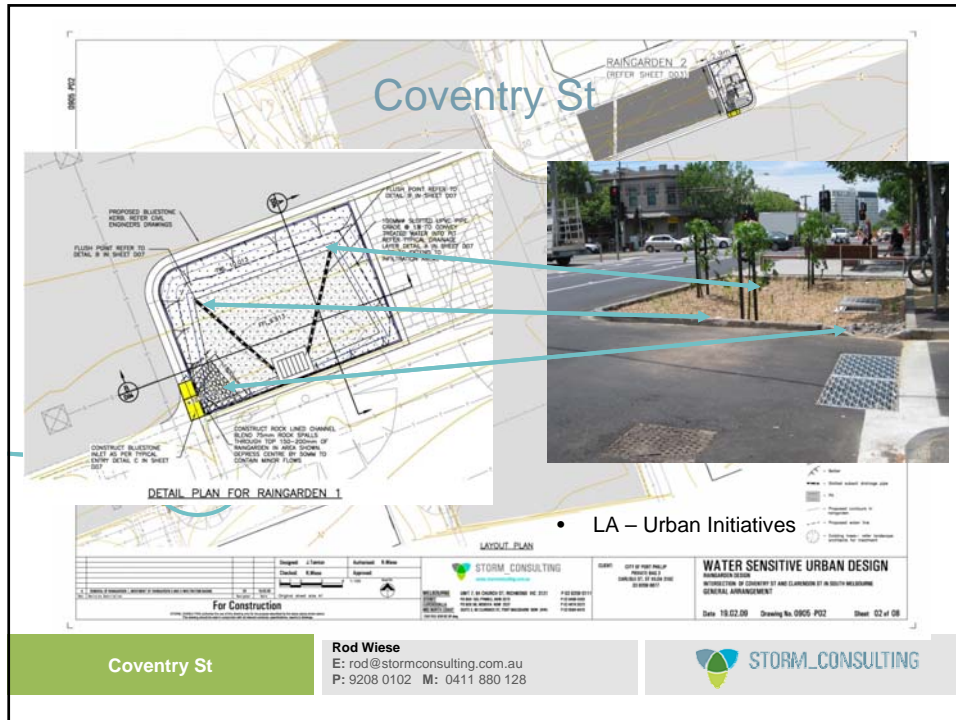
Implementation Issues

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Eastern Recreation Precinct





Main St Extension, Broadmeadows



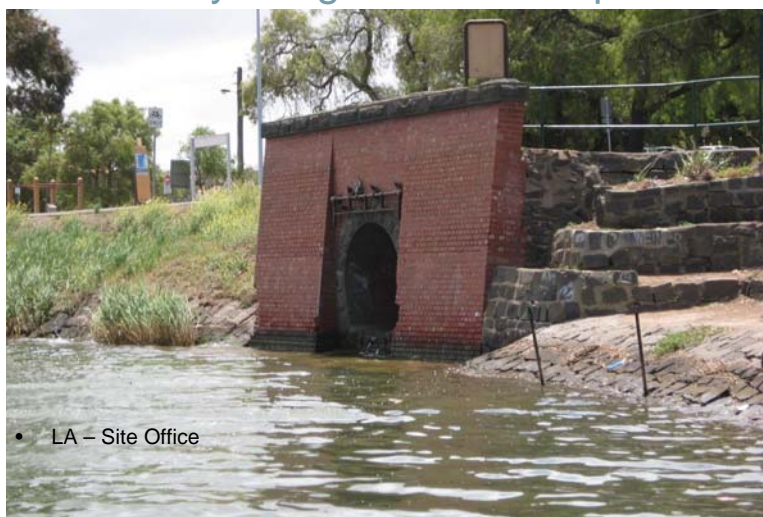
- LA - Outlines

Main St extension

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Maribyrnong River Masterplan

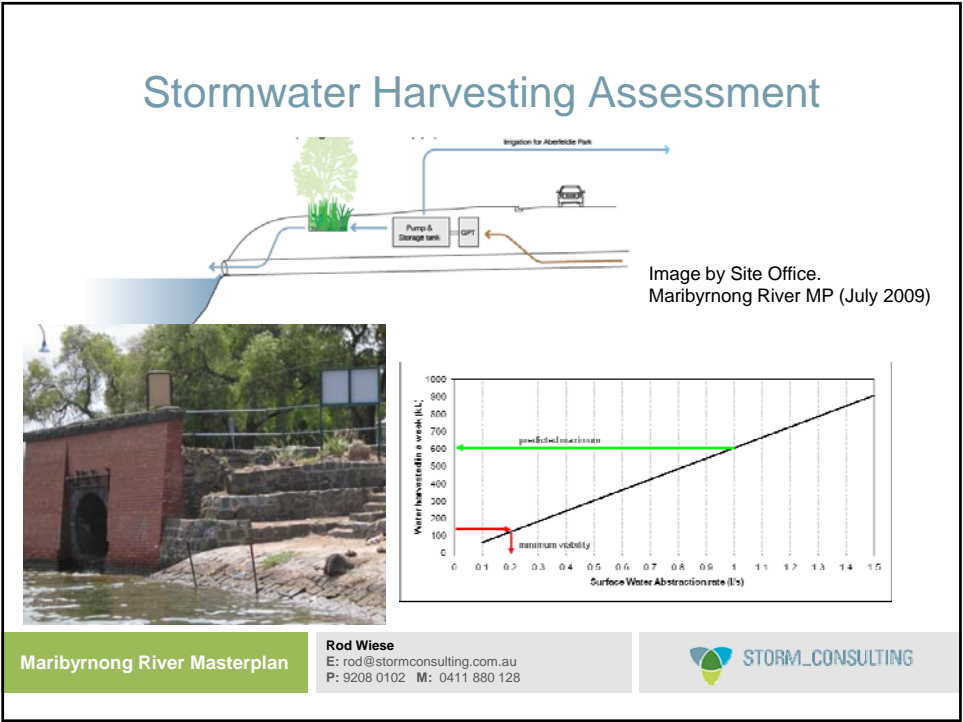
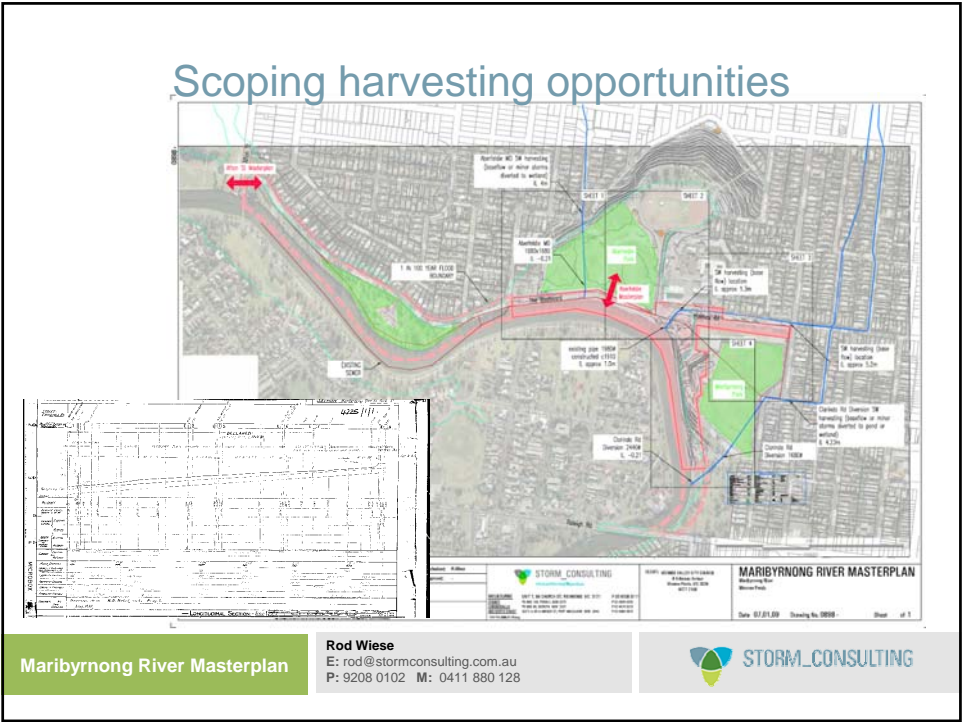


- LA – Site Office

Maribyrnong River Masterplan

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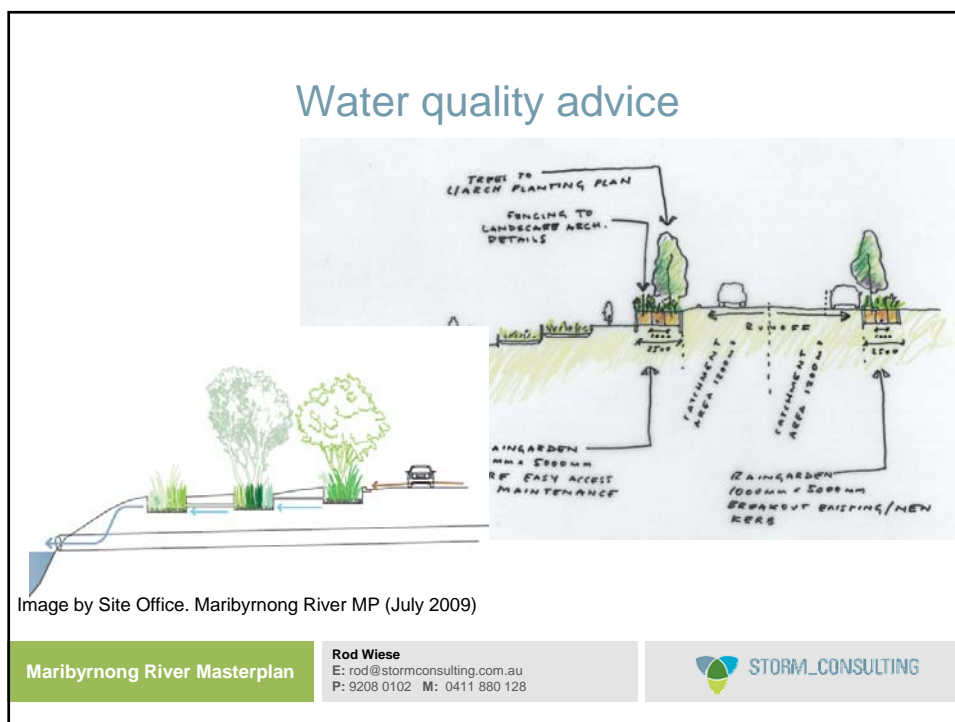
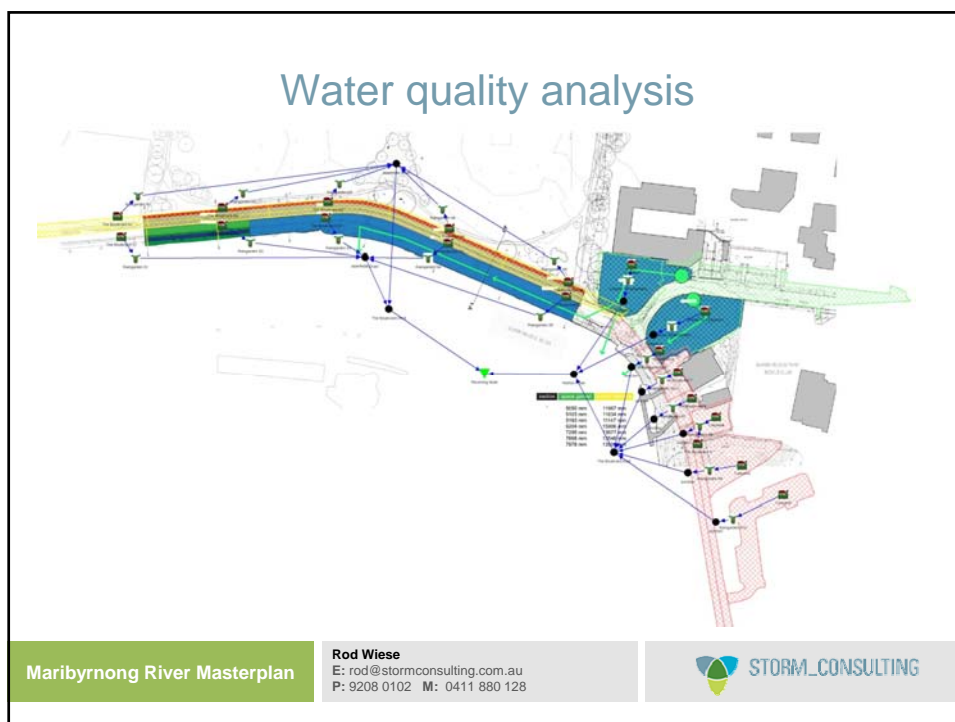


Image by Site Office. Maribyrnong River MP (July 2009)

Liaising with LA (Site Office)

- Intent
 - Having 1 integrated solution
 - Adding value to vision
 - Providing specific technical advice but allowing flexibility
- Meetings
 - On-site with specific stakeholders
 - Team meetings
- Phone calls & emails
 - Communicating generously
 - Capacity build specific to expertise
 - Provide quick sketches

Maribyrnong River Masterplan

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Key learnings

- Collaboration is the key!
 - More interaction = less project risk
- Understand your scope & where you need to input
- Respect the limitations of your expertise
- Trust other experts' judgment and learn from them
- Delegate – not micromanage
- Consequence vs compromise
- Be flexible and willing to consider new possibilities

Maribyrnong River Masterplan

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Maintenance

- Acknowledge that maintenance is an essential burden but also recognise the flow-on benefits
- Consider cost and ease of maintenance in design
- Maintenance requirements clearly outlined (KPI's)
- Identify consequences of no maintenance





WSUD Outlook

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Downstream Impacts of Urbanisation (Creation of Impervious Areas)

Affected feature	Response
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Geomorphology	Increased channel erosion, incision and sediment transport
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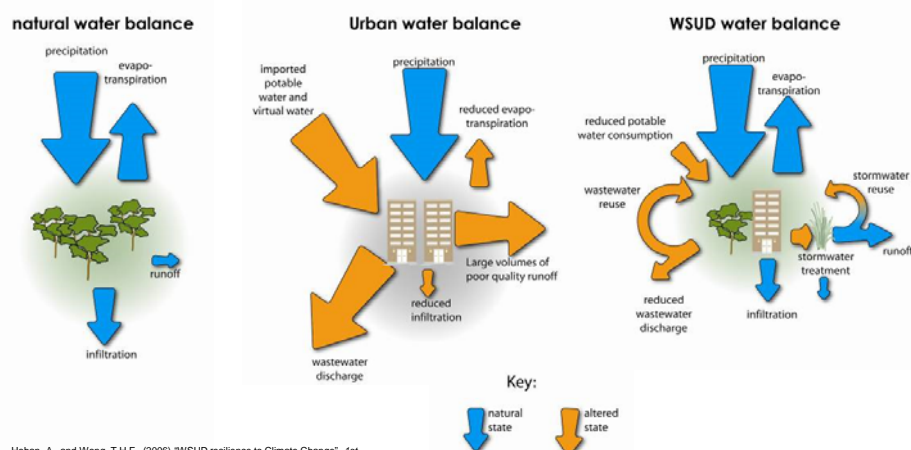
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WSUD Outlook

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The changing water balance...

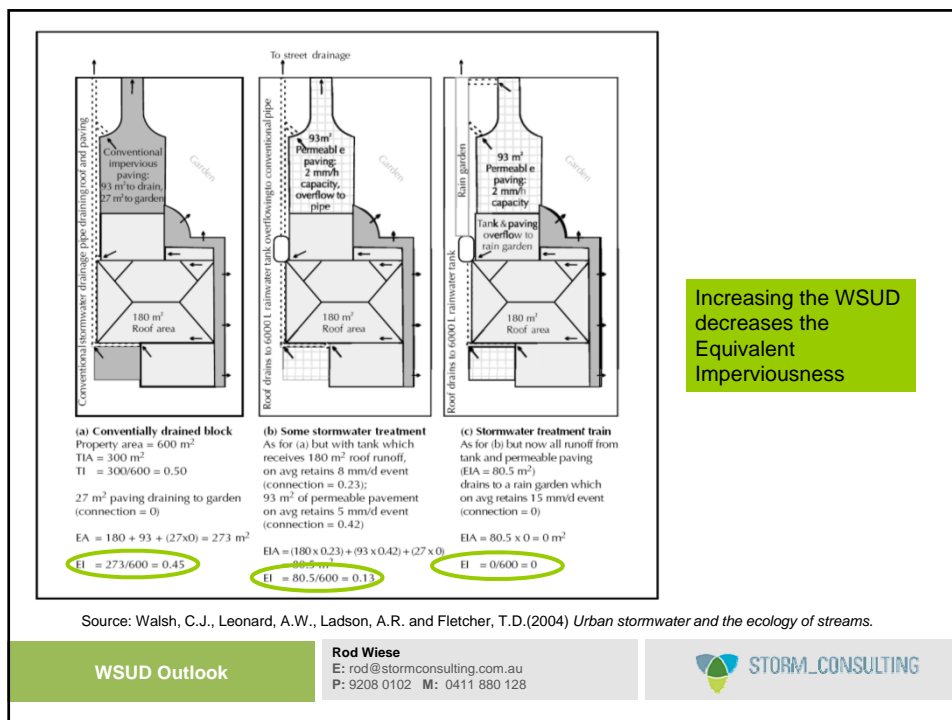


Hoban, A., and Wong, T.H.F., (2006) "WSUD resilience to Climate Change", 1st International Hydropolis Conference, Perth WA, October 2006.

WSUD Outlook

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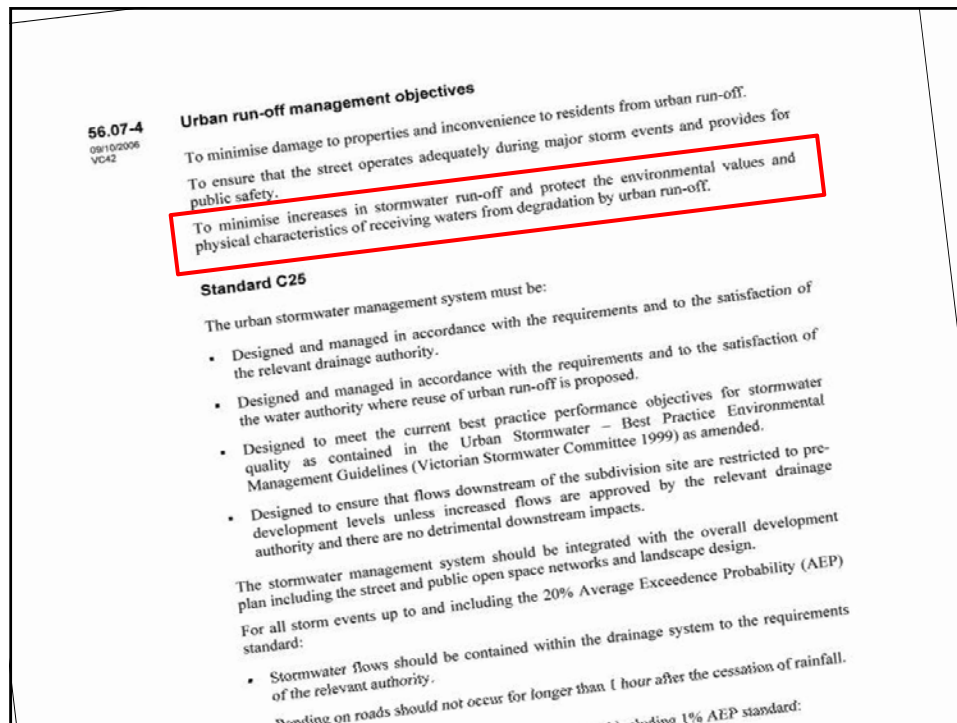
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WSUD Outlook

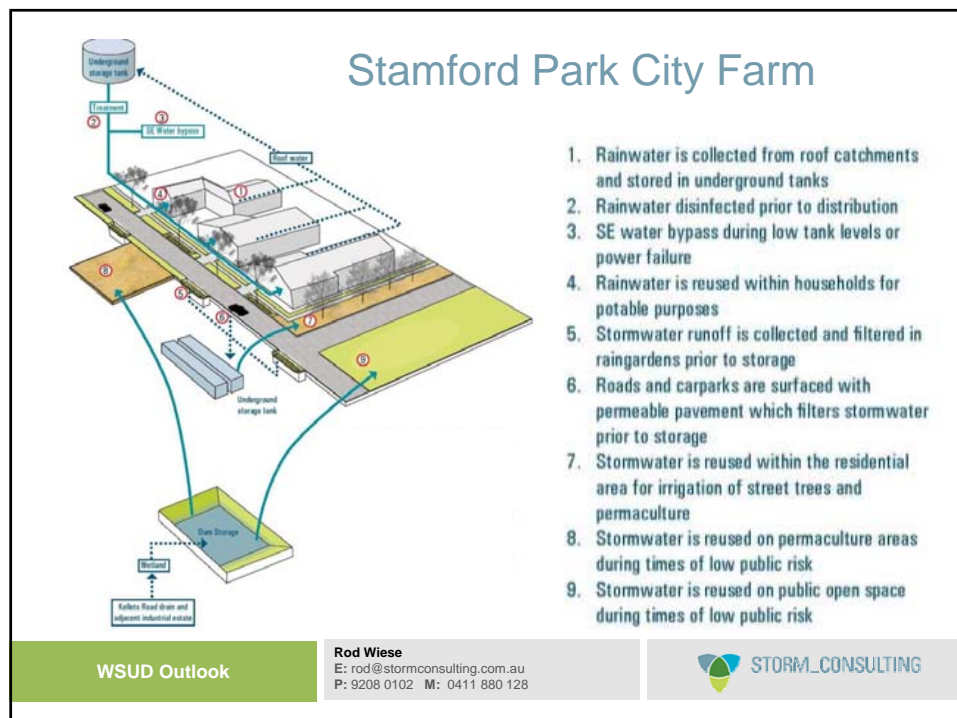
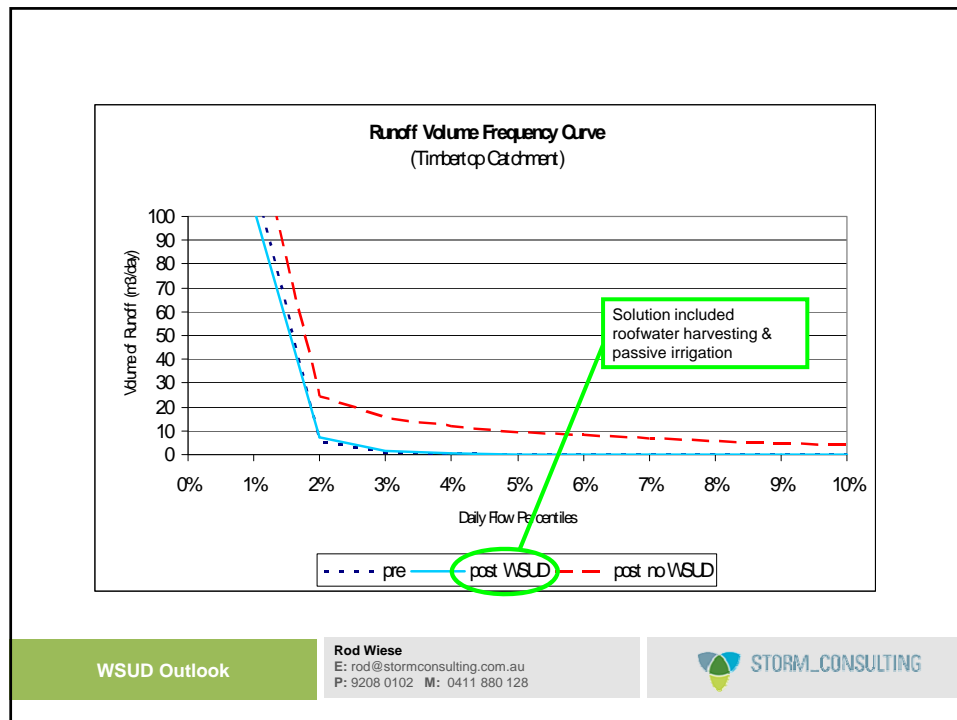
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We need to focus on Quantity...

Quality will almost look after itself.



Little Stringybark Creek

Biofiltration/Infiltration:

- Natural systems
- Treat and/or infiltrate
- Street-scale
- End of pipe

Stormwater Harvesting and Reuse:

- Capture stormwater for reuse (e.g. irrigation, toilet flushing)
- In locations with high water demand
- Generally Hard Engineered

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Street-scale



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Project goals:

- Streetscape infiltration basins
- Treating road runoff
- Simple and low cost
- Low impact
- Easy to maintain
- Easily replicable with little design

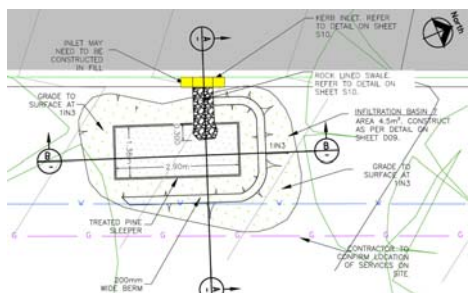


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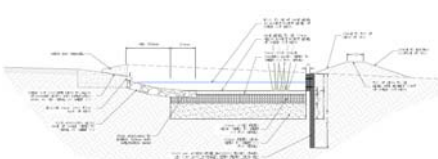
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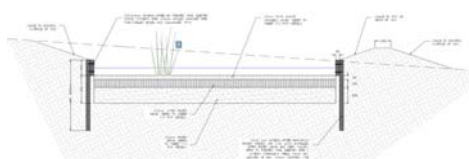
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Typical Infiltration Basin



Section A: Infiltration Basin




Section B: Infiltration Basin



Constructed Infiltration Basin

WSUD Outlook

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Smart Soaker

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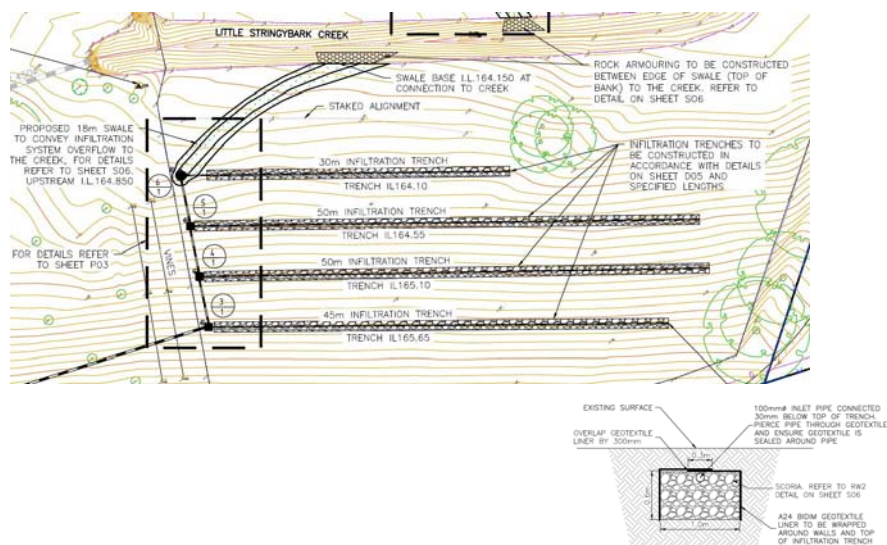


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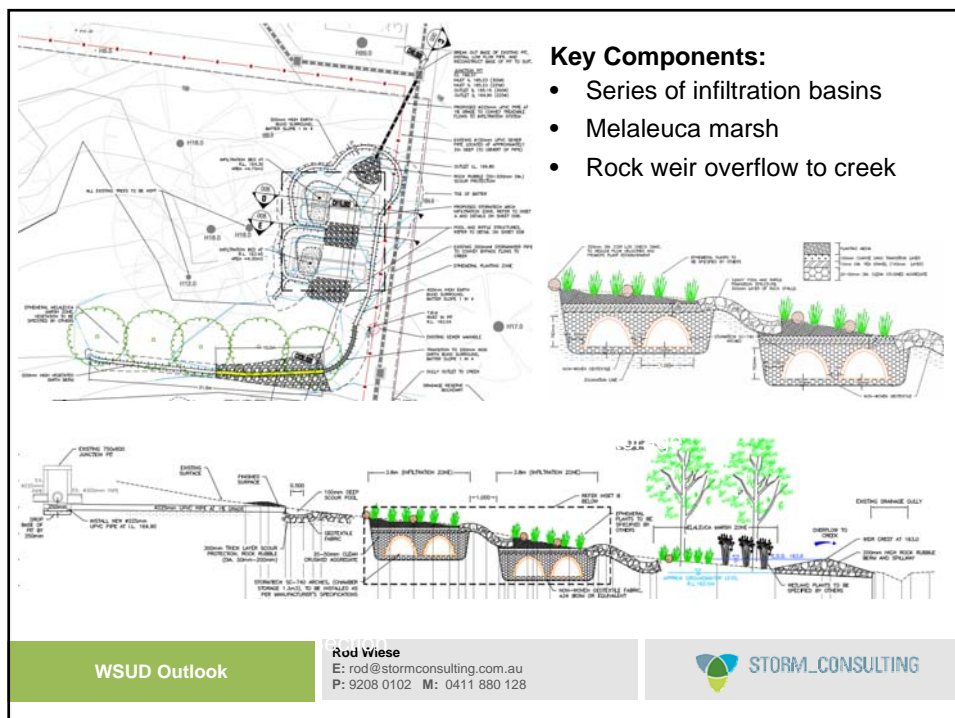
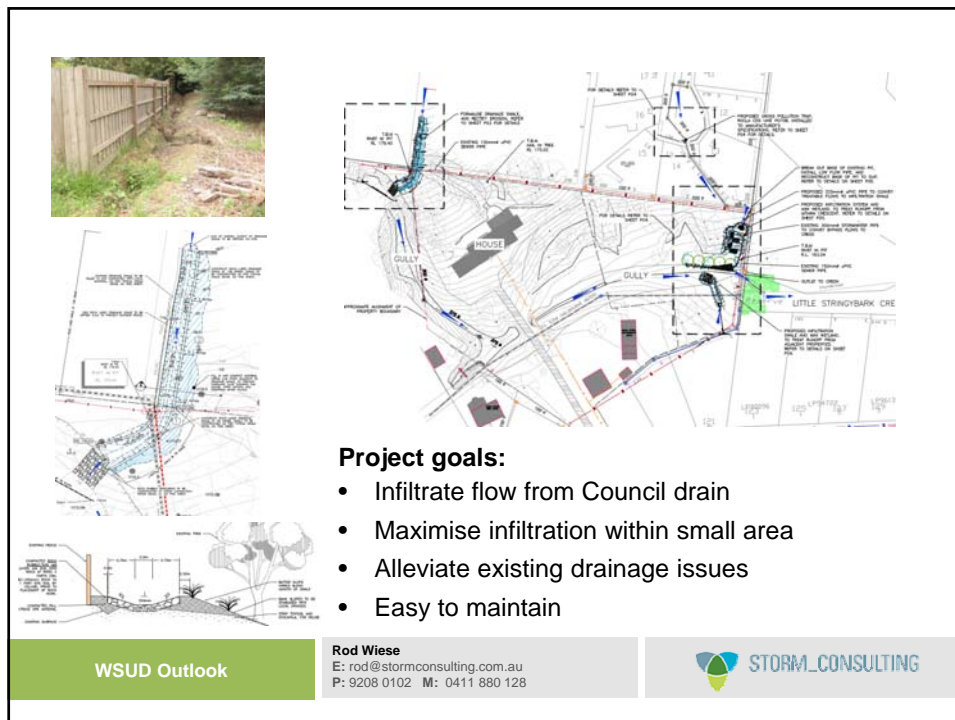
End of Pipe



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Stormwater Harvesting



WSUD Outlook

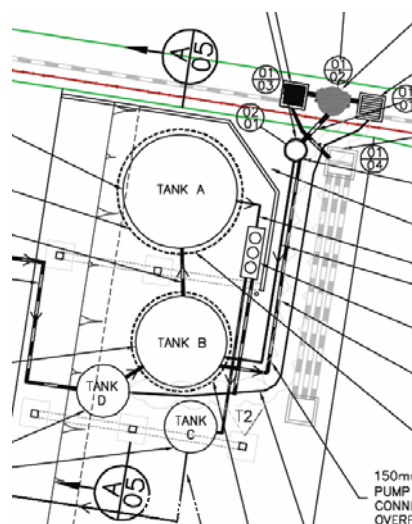
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Stormwater Harvesting – Petrol Station

Project Goals:

- Capture stormwater from road and roof
- Reuse for car wash and toilets
- Treatment of stormwater
- Leak for baseflow



WSUD Outlook

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LSC Key Learnings

Innovate to consider:

- Simplicity In Design
- Best Value For Money
- Ease of Maintenance/consequence of none
- New uses for standard products
- Value in Partnerships



WSUD Outlook

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Little Stringybark Partnerships

Project Partnerships:

- Project Team and Community
- Researchers, Designers, Council and Melbourne Water
- Project Team and Contractors



To effect change we need

good Policy

...here's something we have prepared earlier... ☺

WSUD Outlook

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STORM_CONSULTING

Our case study...

Central West Councils
**SALINITY
&
WATER QUALITY
ALLIANCE**



Central West
catchment
management authority

16 Councils in CWCMA

11 are in the Salinity & Water Quality Alliance

WSUD Outlook

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STORM_CONSULTING

What is this Policy?

- An initiative of Salinity & Water Quality Alliance, strongly supported by Central West CMA, which aims to:
 - Improve the quality & quantity of stormwater discharged to all receiving waters;
 - Reduce flooding and drainage impacts within and downstream of any proposed development;
 - Maximise efficient use of every drop of water consumed in the LGA in a cost effective manner without competing with BASIX; and
 - Minimise the impacts of urban salinity, where applicable.
- Forms the basis of a DCP for Council adoption
- Has supporting Technical Guidelines

WSUD Outlook

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Water Quantity during operation

Steps involved

Follow the bouncing ball...

Can mum or dad work this out?

- 1 Determine the total site impervious area
Add roof areas, garage areas, and all paved areas.
- 2 Reduce the Total site impervious area if permeable paving has been used
- 3 Determine which rainfall region you are located in: more than 800mm/year or less than 800mm/year
- 4 From Table 2 in the WSD Plan workout your rainfall threshold.
It is 0.022m for areas with less than 800mm/year rainfall and 0.016m for areas with more than 800mm/year rainfall
- 5 Calculate the Runoff Storage Volume
Runoff Storage Volume (m3) =
Total impervious area (m2) x rainfall threshold (m)
- 6 If you chose to use a rainwater tank then you can reduce the runoff storage volume in accordance with Table 3 in the WSD Plan.
- 7 Choose from either an infiltration trench or a raingarden and calculate the size in accordance with this guideline.

WSUD Outlook

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Interim Industrial Stormwater Code HCC

- Just completed
- Created to simplify
 - Compliance by developers
 - Assessment by Council staff
- An MS Excel tool created
- A plain English guide in support

WSUD Outlook

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New ESO for LSC

- Just launched recently
- Development is subject to WSUD scrutiny for both
 - Water Quality
 - Water Quantity
- Some concern over hindering development but...
- The first 4 have already been received within a week

WSUD Outlook

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Focus on Impervious Areas

*Restore the natural hydrological system
by
disconnecting the impervious areas in the catchment*

ie reduce effective imperviousness

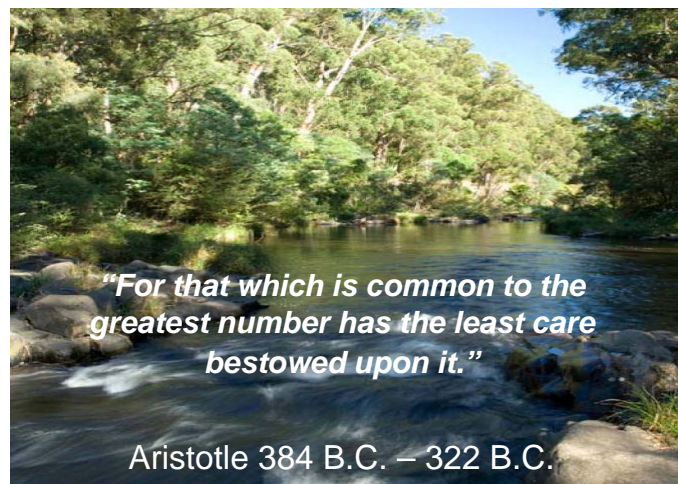


WSUD Outlook

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The Result - Protected waters!



Questions

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