



Streetscape WSUD Solutions

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SA Local Government Officers Assoc.
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Water Sensitive SA - established to build the capacity of all organisations with a role in the planning, design, approval, construction or maintenance of new developments and infrastructure to implement best practice water sensitive urban design (WSUD)

Water Sensitive SA Program Partners



LOCAL GOVERNMENT RESEARCH & DEVELOPMENT SCHEME



Guiding Principles of WSUD

- Re-integrate water back into urban landscape – create microclimate
- Re-use of water at source (or close as possible)
- Protect receiving water quality (streams and marine)
- Fit for purpose water use
- Solutions at a range of scales



Unions Street Dulwich, B-Pods
(infiltration systems)

Highlights package – streetscape solutions

1. Biofilters / raingardens
2. Infiltration systems

Drawing upon:

Adoption guidelines for stormwater Biofiltration systems
CRC for Water Sensitive Cities.

Designing Streetscape Raingardens
DesignFlow.

Construction of WSUD Assets
Maintenance of WSUD Assets
DesignFlow.



Angas Street, Adelaide adjacent SAPOL
Photo: Water Sensitive SA

Raingardens



Deacon Ave, Mile End



Franklin Street. Image: City of Adelaide



Lochiel Park, (SA)

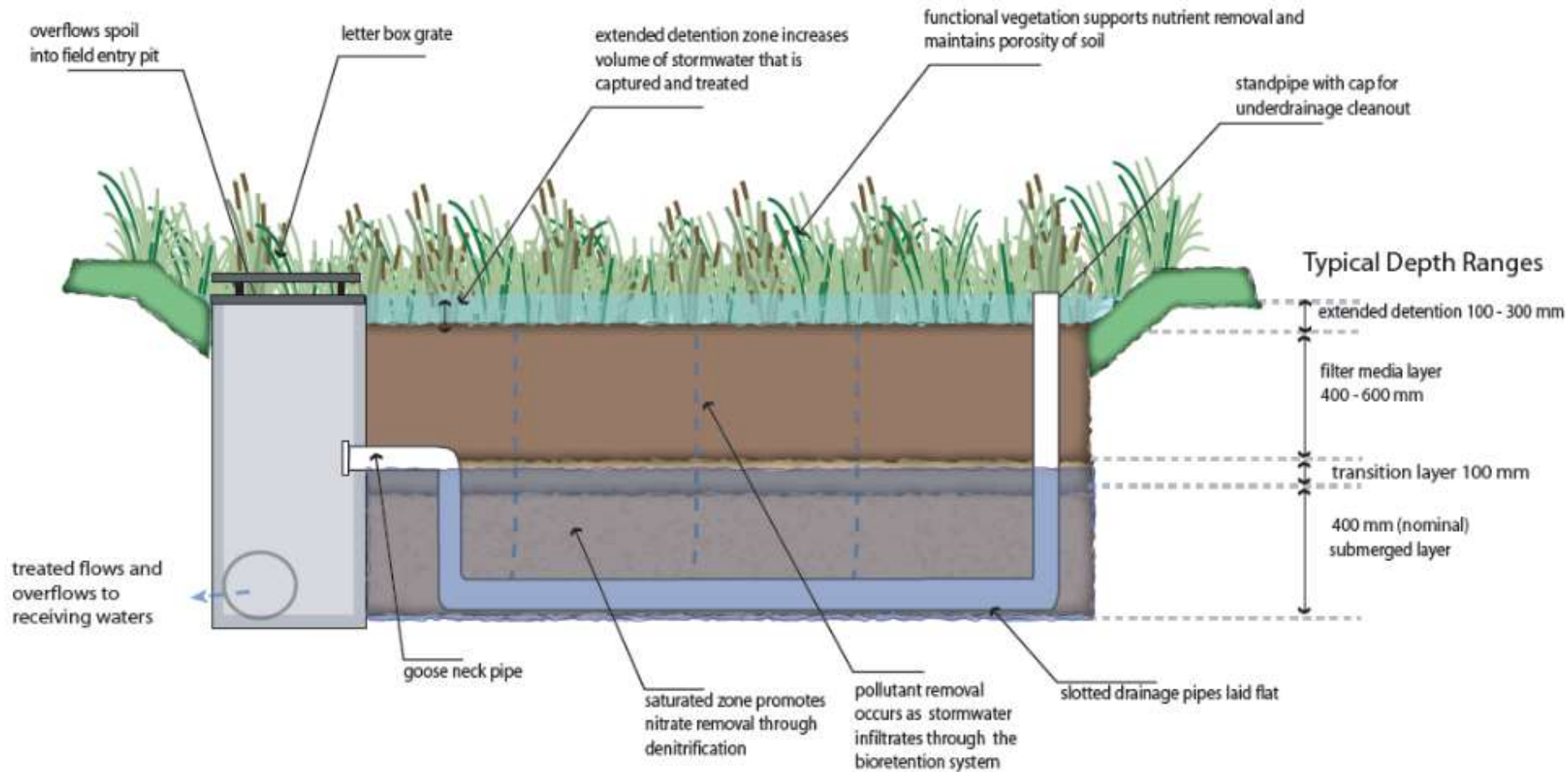


Brooker Terrace, Richmond



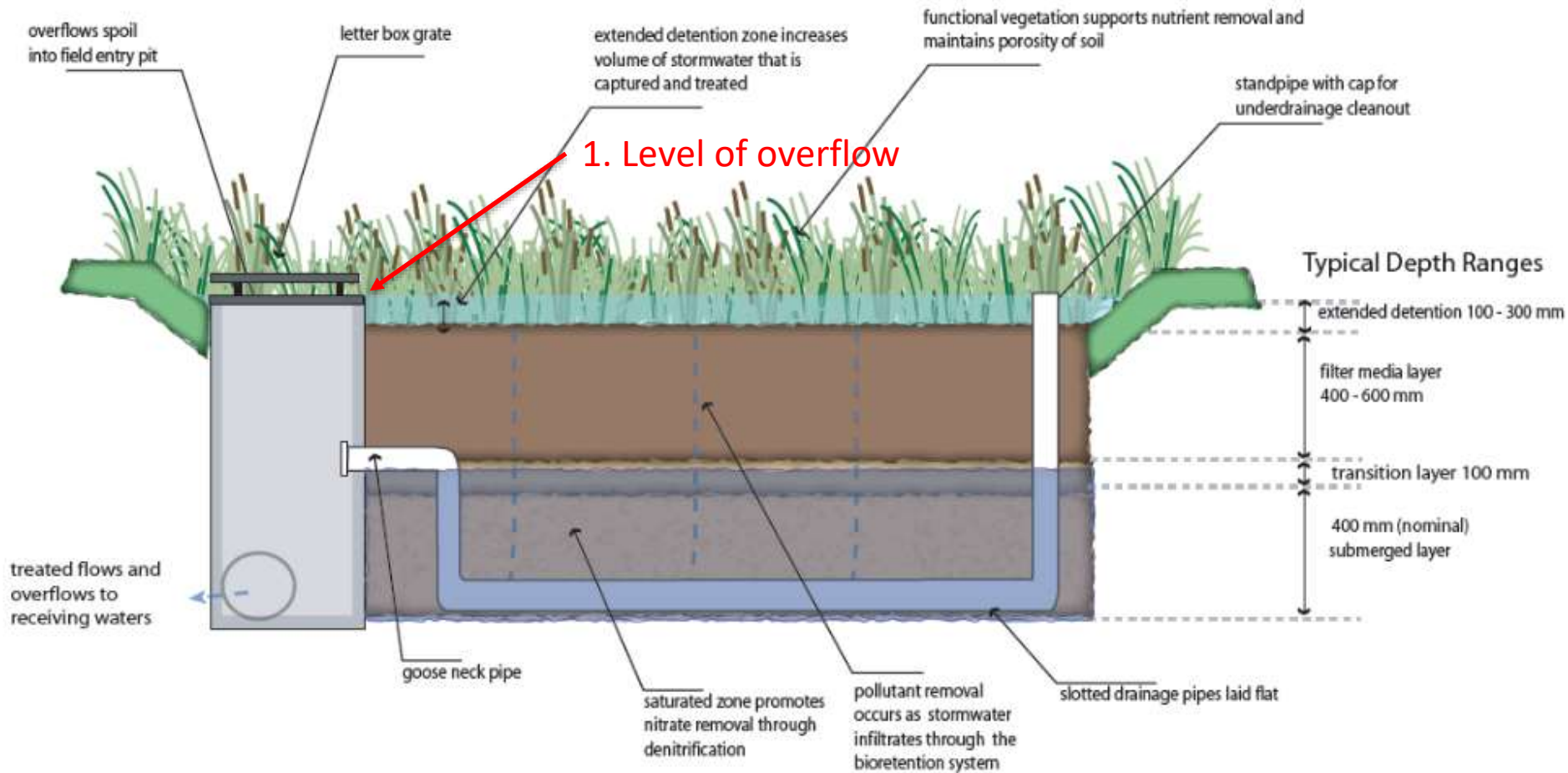
Jellicoe Street, Auckland (NZ) Source: DesignFlow

Raingardens - Overview



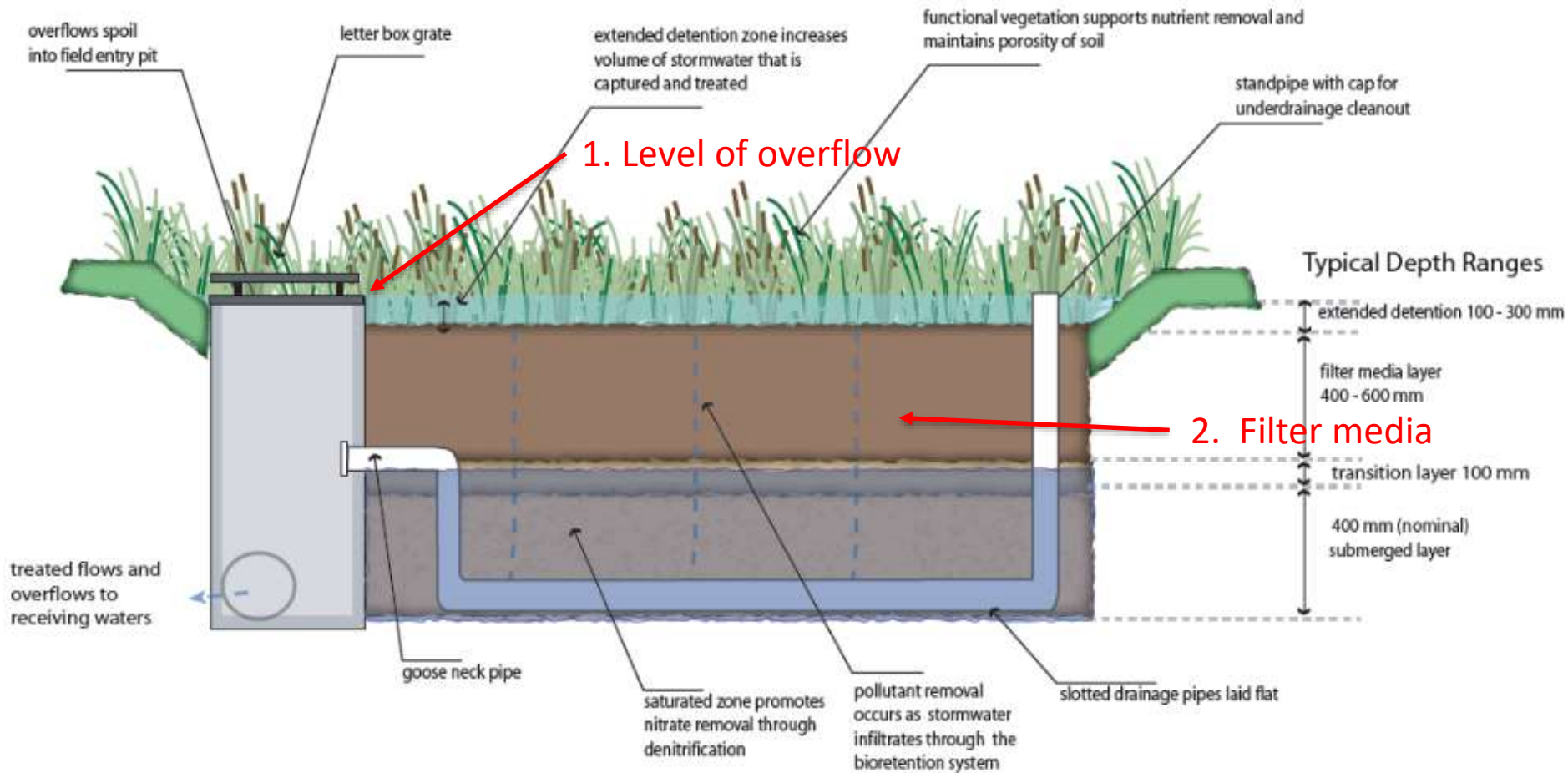
Source: Designflow

Raingardens - Overview



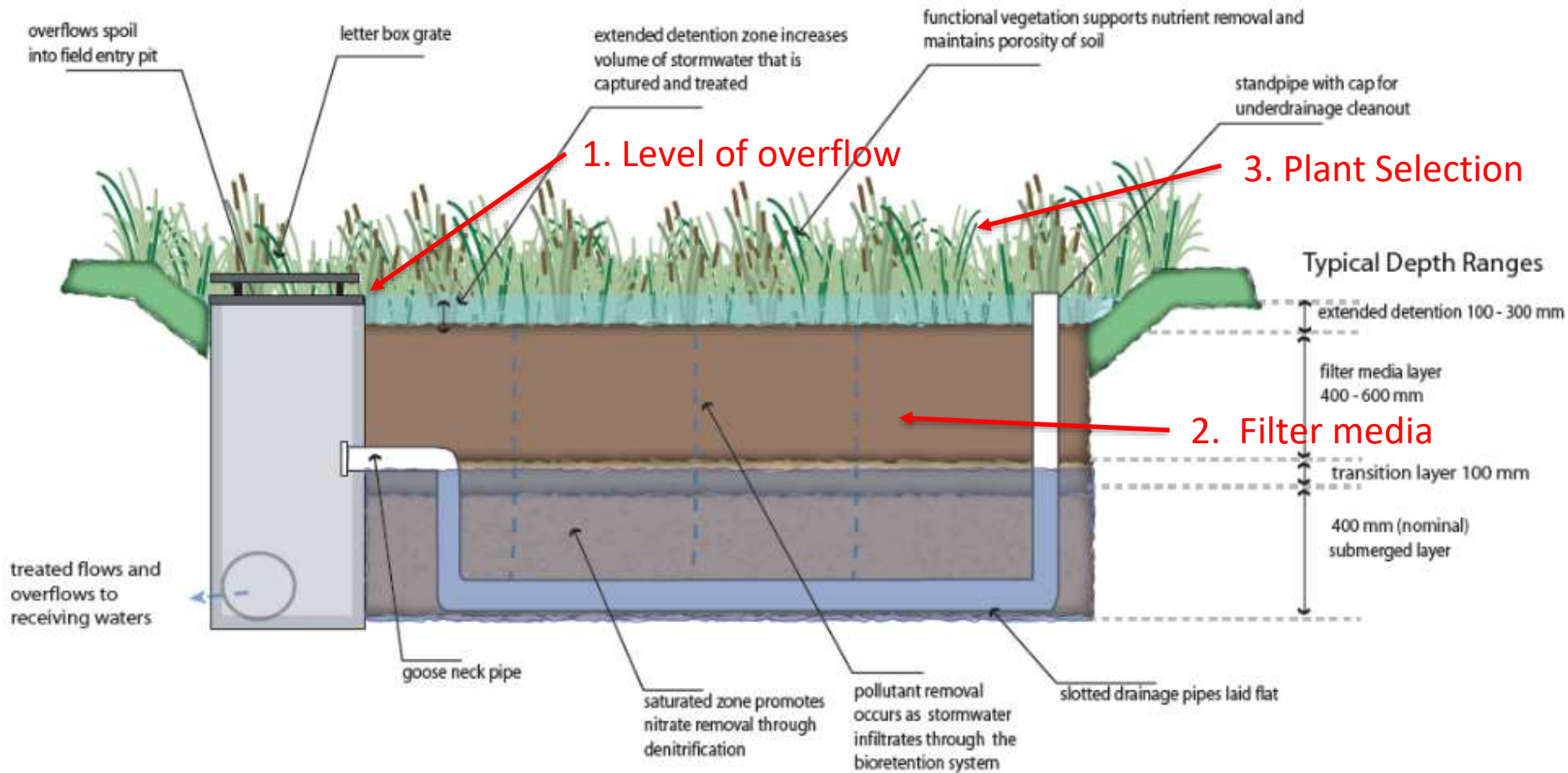
Source: Designflow

Raingardens - Overview



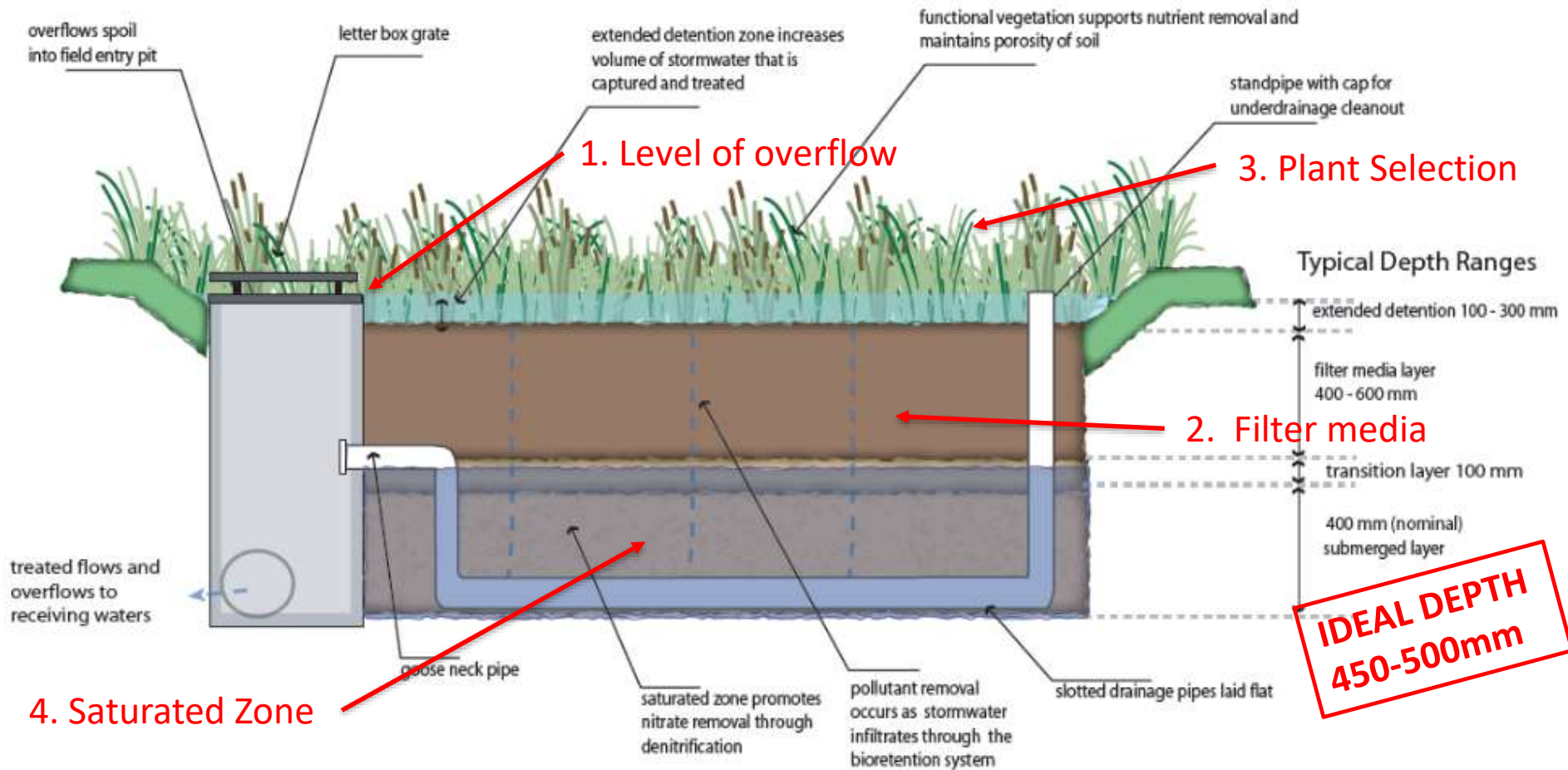
Source: Designflow

Raingardens - Overview



Source: Designflow

Raingardens - Overview



Source: Designflow

Ah ha moments.....



www.ew.com

Small systems – no overflow structure, no worries!



Murchison Street, Mansfield Park

Raingarden Species Selection

Planting zones

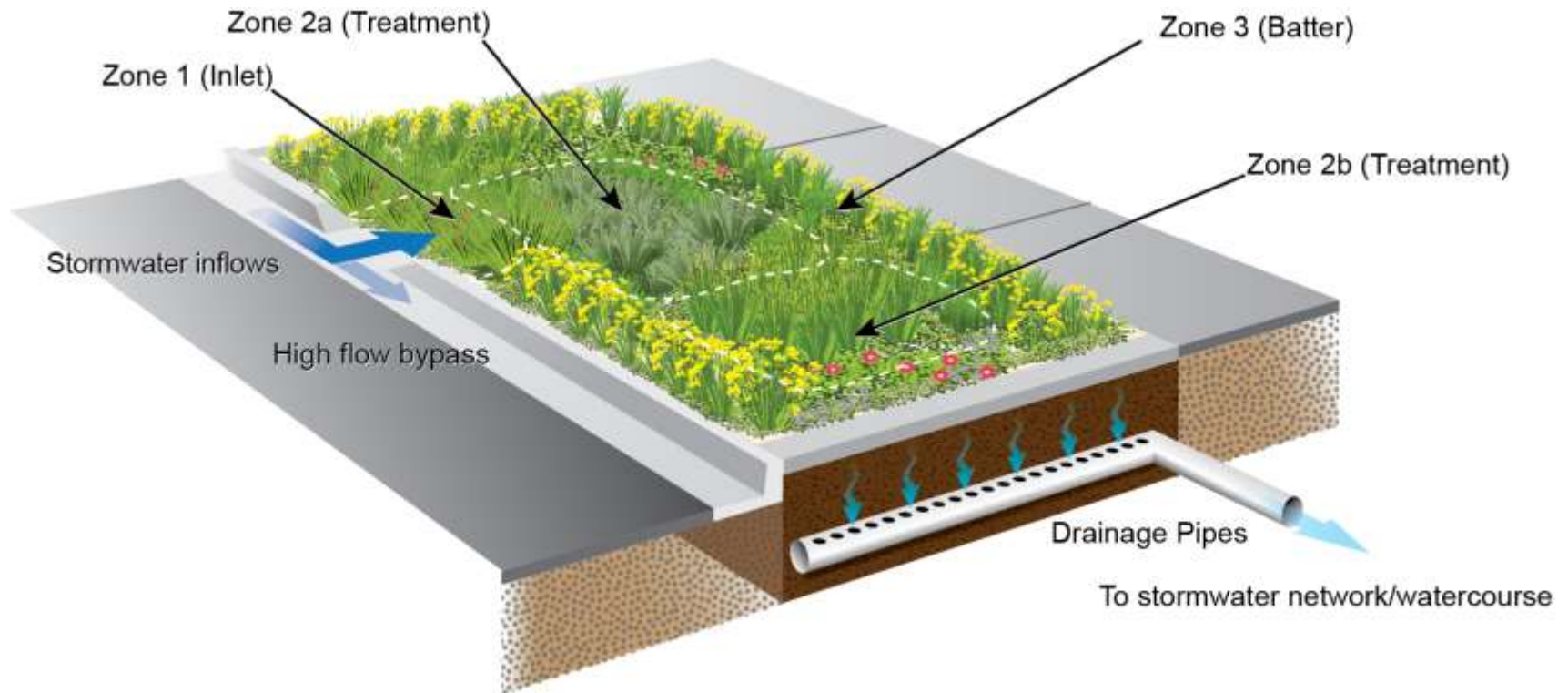


Figure 1 – Raingarden zones for plant selection

Raingarden Planting zones

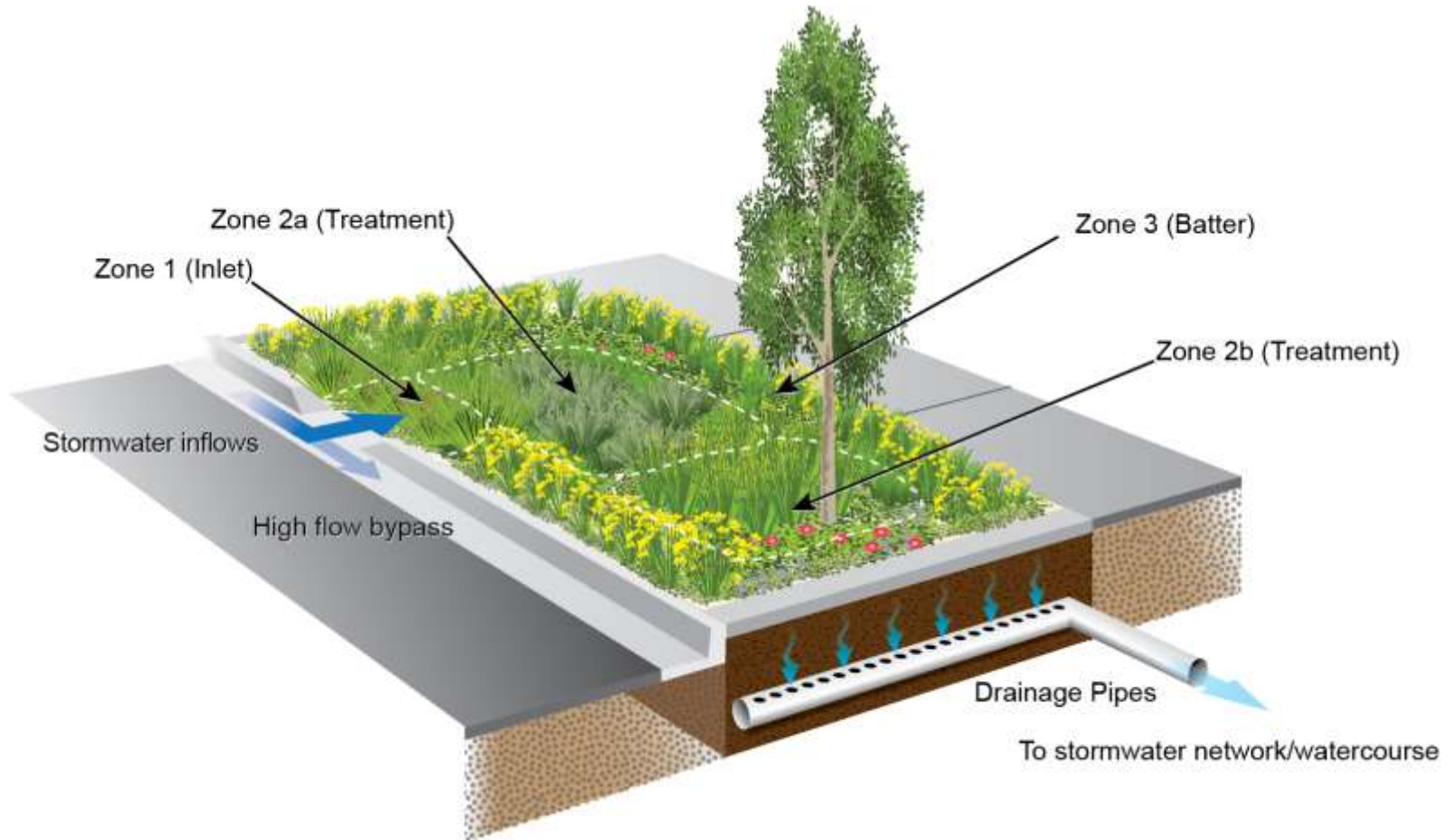


Figure 1 – Raingarden zones for plant selection

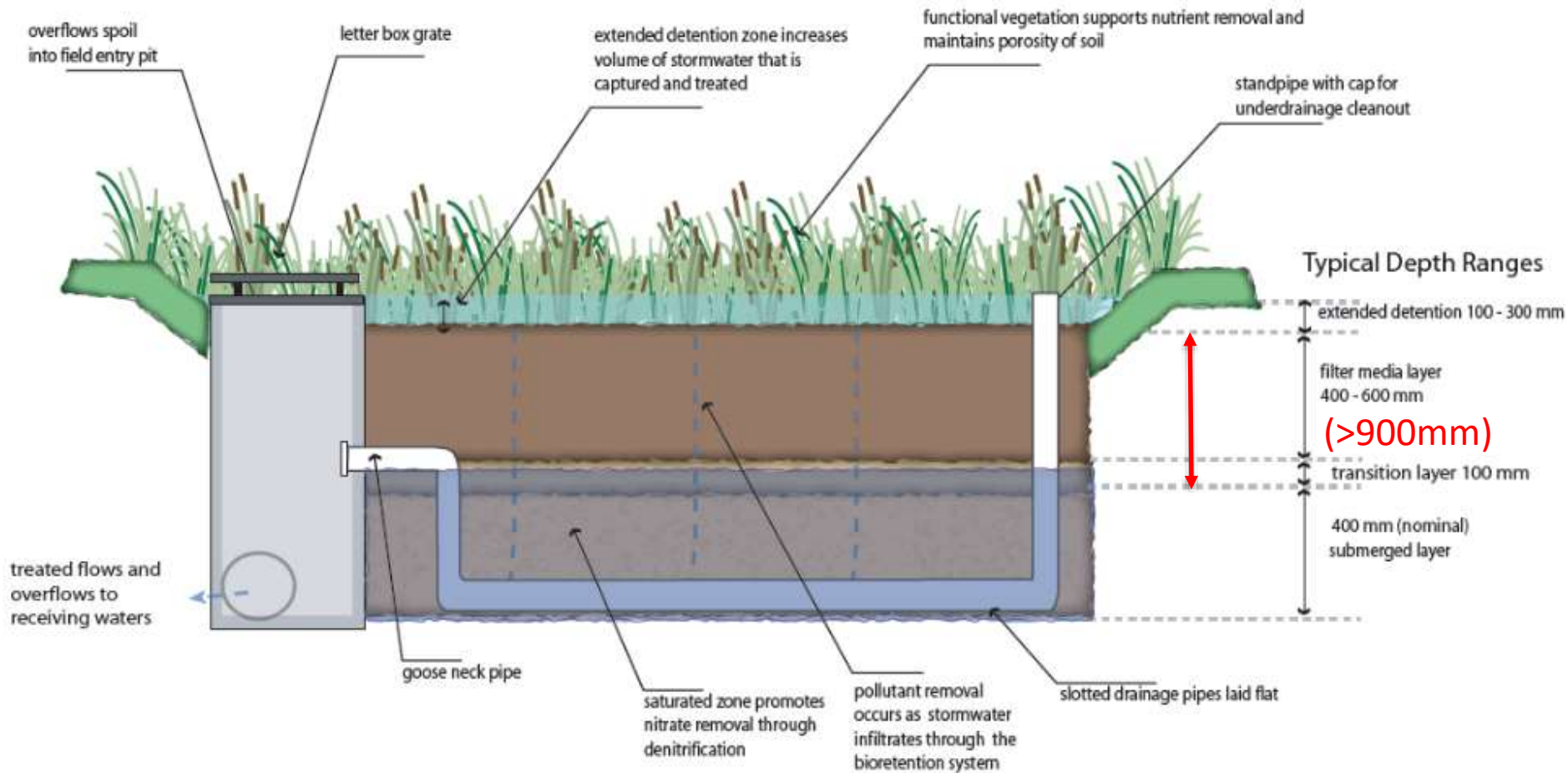
Trees & Raingardens



Angas Street raingarden early and established, showing arrangement of filter media

Images: Adelaide City Council and Water Sensitive SA

Filter media depth - Trees













Source: Designflow



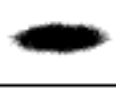



Plant species proven to be effective at Nitrogen removal

	Form	Zone				Species	Common name	Height (mm)	Preferred location	
		1	2a	2b	3					
		✓	✓			<i>Carex appressa</i>	Tall Sedge	1000	All	Less frost tolerant
		✓	✓			<i>Carex tereticaulis</i>	Rush Sedge	600-1200	All	Spiky
				✓	✓	<i>Goodenia ovata</i>	Hop Goodenia	1000-2500	All	Spreading shrub
		✓	✓	✓	✓	<i>Ficinia nodosa</i>	Knobby Club-rush	500-1500	All	Formerly <i>Isolepis nodosa</i>
		✓	✓			<i>Juncus amabilis</i>	Gentle Rush	600-1200	All	Less common juncus species in Adelaide region

Adapted from EPA Raingarden 500 guidelines













Plant species proven to be effective at Nitrogen removal

	Form	Zone				Species
		1	2a	2b	3	
		✓	✓			<i>Carex appressa</i>
		✓	✓			<i>Carex tereticaedosa</i>
				✓	✓	<i>Goodenia</i>
		✓	✓	✓	✓	<i>Ficinia nana</i>
		✓	✓			<i>Juncus amplexicaulis</i>

Common name	Height (mm)	Preferred location
Sedge		
Herb		
Mat forming		
Grass		
Shrub		
Tree		

Adapted from EPA Raingarden 500 guidelines

Plant species for companion planting

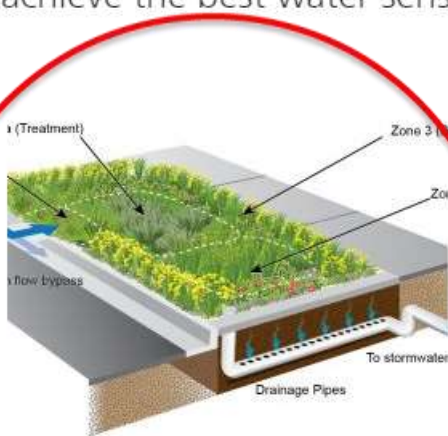
Image	Form	Zone				Species	Common name	Height (mm)	Preferred location	Comment
		1	2a	2b	3					
		✓	✓			<i>Bolboschoenus caldwellii</i>	Marsh Club Rush	300-1200	Often coastal	Spreading sedge
			✓	✓	✓	<i>Crassula helmsii</i>	Swamp Crassula	50	All	Spreading riparian herb, ground cover
			✓	✓	✓	<i>Dichondra repens</i>	Kidney weed	200	All	Spreading herb, ground cover
					✓	<i>Ranunculus lappaceus</i>	Australian Buttercup	500	Adelaide Hills	
			✓	✓	✓	<i>Selliera radicans</i>	Shiny Swamp-mat	50	All	Spreading riparian herb, turfy
					✓	<i>Wahlenbergia stricta</i>	Austral Bluebell	100-900	All	Spreading herb

Download raingarden guide

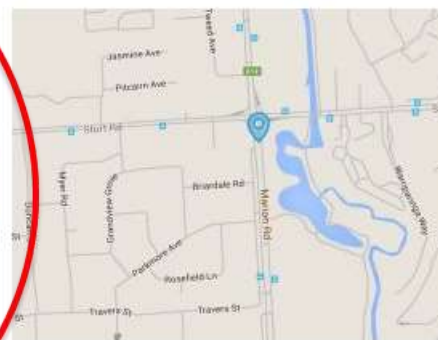


Water Sensitive SA is a capacity building program that provides stakeholders across all disciplines within the development and urban water management industries, with the support they need to achieve the best water sensitive urban design outcomes.

**LIVEABLE
WATER SENSITIVE
COMMUNITIES**



Raingarden plant selection guideline



WSUD projects in SA - case studies, interactive map



Streetscale raingardens – design & practice, 24 May

A guide to rainwater tank size selection for Kent Town

Latest News

Call for abstract – AWA 2017 conference: Water in the community
27 April 2017

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Specification

Bioretention Technical Design Guidelines:

- References [Adoption Guidelines for Stormwater Biofiltration Systems](#), CRC for Water Sensitive Cities

Key Requirements:

- Hydraulic conductivity of 100-300 mm/hr
- Some organics (3-5%)
- Some silts and clays allowed (<5%)

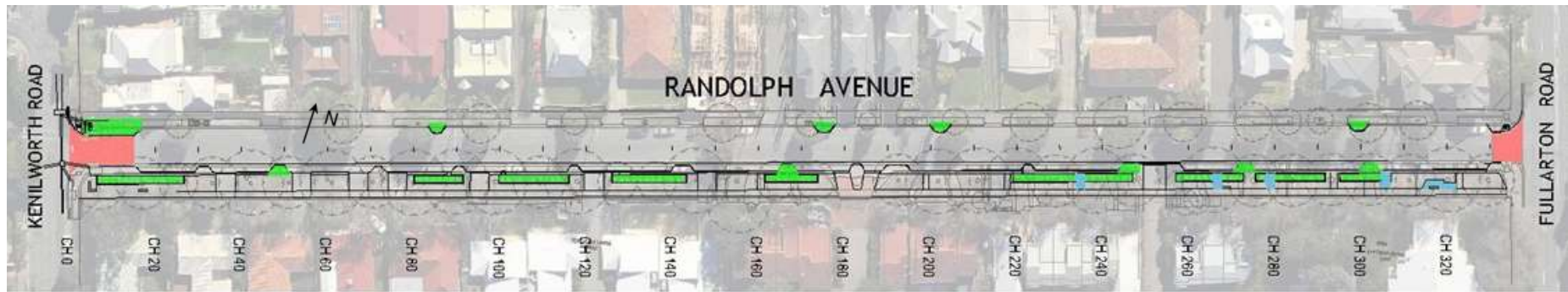
Source: Designflow

More information

[Water Sensitive SA website](#)

[Raingarden 500 Grant Program](#)

Randolph Ave, Streetscape Upgrade City of Unley



LOCALITY PLAN

NOT TO SCALE

 Denotes raingarden

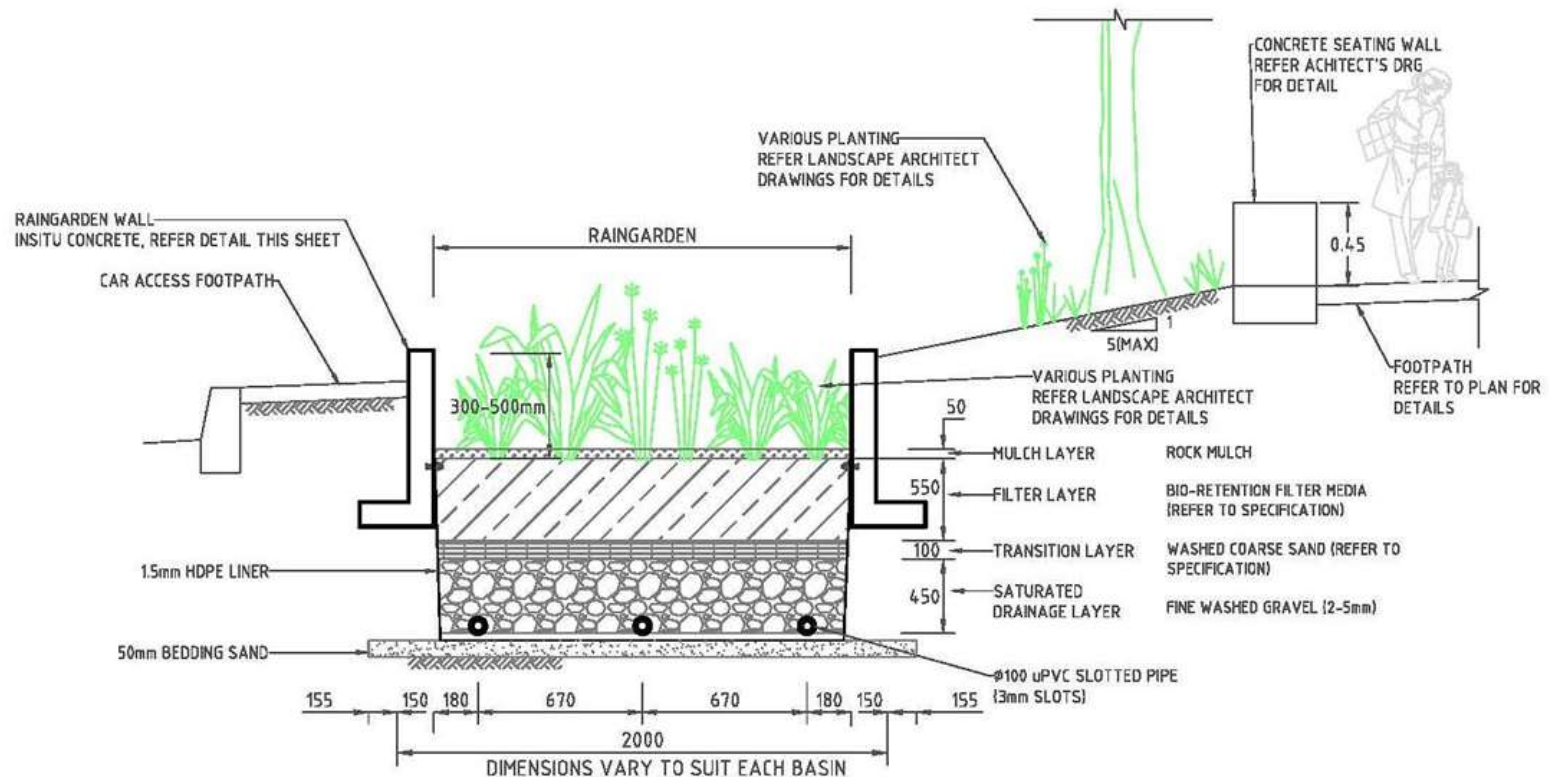
Bioretention – raingardens

- 10 raingardens of dimensions 1.70-2.10m wide x 6.75-25.5m long)
- Total area 245m² (0.5% of impervious contributing catchment)
- A saturated zone of 450mm depth to assist plant viability and storage capacity
- A design infiltration rate of 160mm/hr through filter media
- HDPE lined system with no exfiltration

Stormwater infiltration wells

- 31 infiltration wells of dimensions 600x400x450 mm deep
- Waterproof membrane top and bottom with geofabric and 20mm screenings around the perimeter, providing lateral infiltration to adjacent trees and garden beds.

Typical Raingarden Cross Section



Raingardens and trees



Raingarden in full sun



Raingarden shaded to the west by mature tree

Infiltration systems the hero



July 2015 - establishment



January 2016



September 2016



WATER SENSITIVE SA

LIVEABLE WATER SENSITIVE COMMUNITIES



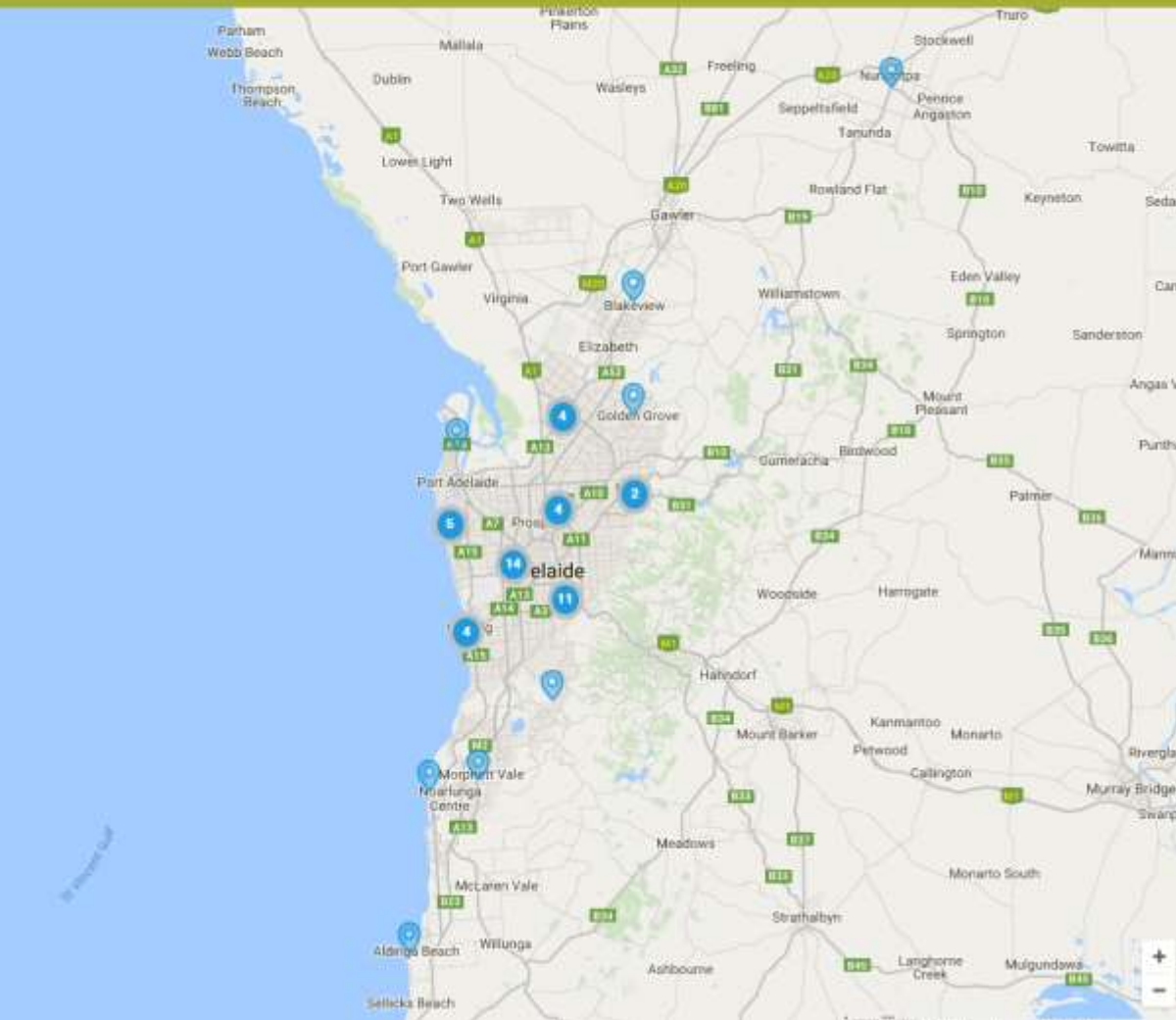
Streetscale raingardens –
design & practice, 24 May

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WSUD project search



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Interactive Map

Local government, developers and industry have shown leadership and innovation, integrated water sensitive urban design into their projects to deliver a wide range of benefits to the community.

The drivers behind any WSUD project may range from a need to provide water for recreational open space to protecting marine water quality. The solutions (referred to as WSUD element type) to these challenges may vary depending on these objectives, unique site constraints and available budget.

Water Sensitive SA has developed an interactive map that provides a filtering function to enable you to search for WSUD projects under the categories below.

Infiltration

Organisation / Local Government Area

Function / Driver

Development Type

56 projects matching the current criteria.

Reset

This map has been developed with a database kindly provided by the **Goyder Institute for Water Research**.

Do you have a new WSUD project you would like to submit or add more details and images to an existing project?

Update WSUD Project

Submit WSUD Projects

Infiltration systems

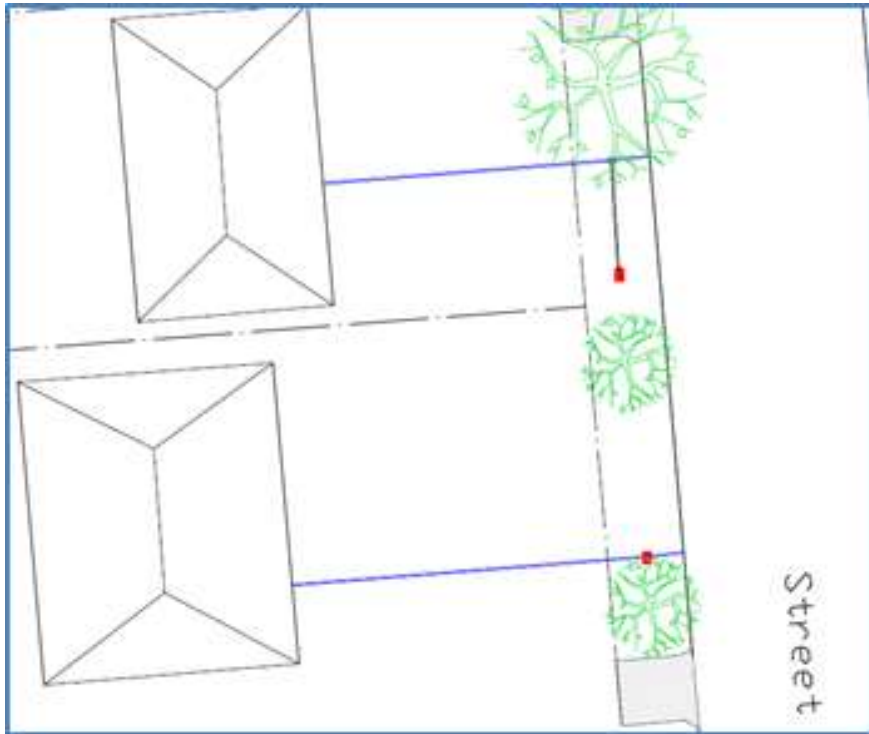
- Burnside B-Pods
- City of Mitcham
 - streetscapes and
 - reserves



East Parade, Kingswood Source: City of Mitcham



City of Burnside, B-pods



Typical B-Pod layout along a street Source: City of Burnside

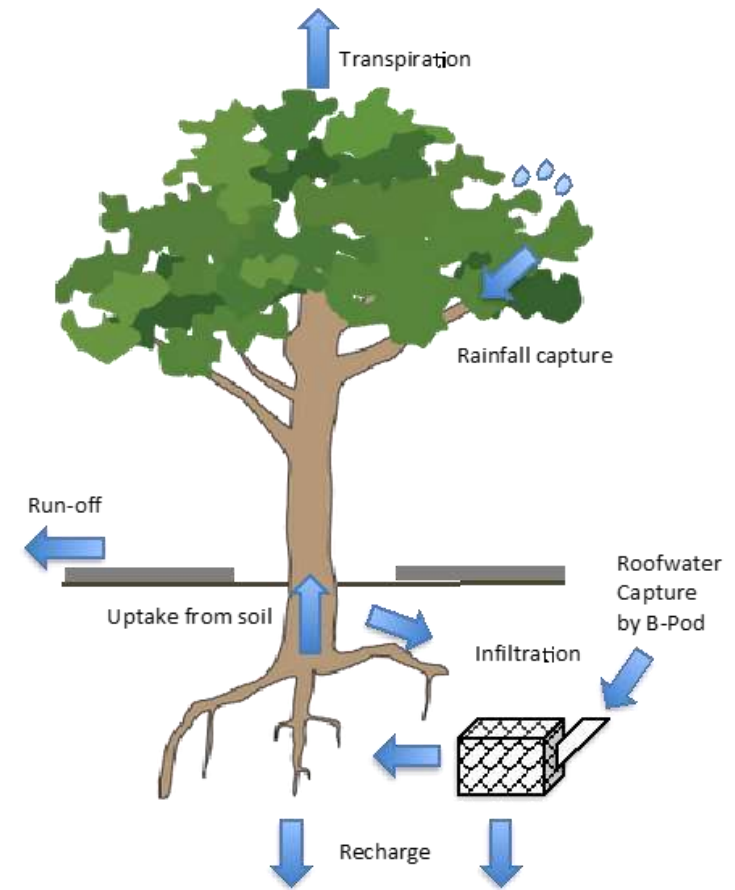


B-Pod- Installation Source: City of Burnside

City of Burnside, B-pods



Union Street Dulwich



Street tree water cycle showing

Find case studies



www.watersensitivesa.com/resources/wsud-projects-title/case-studies-page/



Randolph Avenue Streetscape Upgrade Fullarton

A series of ten raingardens treat stormwater and 31 stormwater infiltration wells provide passive irrigation for new street trees.

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Burnside B-Pods

Catch it, keep it, use it: Burnside City Council's B-Pod stormwater retention cells support young and established street trees and a community landscaping project in the nature strip.

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Oaklands Park stormwater harvest & re-use project

Stormwater treatment wetland integrated into urban parkland that contributes to an aquifer storage and recovering scheme, which supplies water for irrigation of local parks and sporting fields.

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City of Mitcham - Reserves



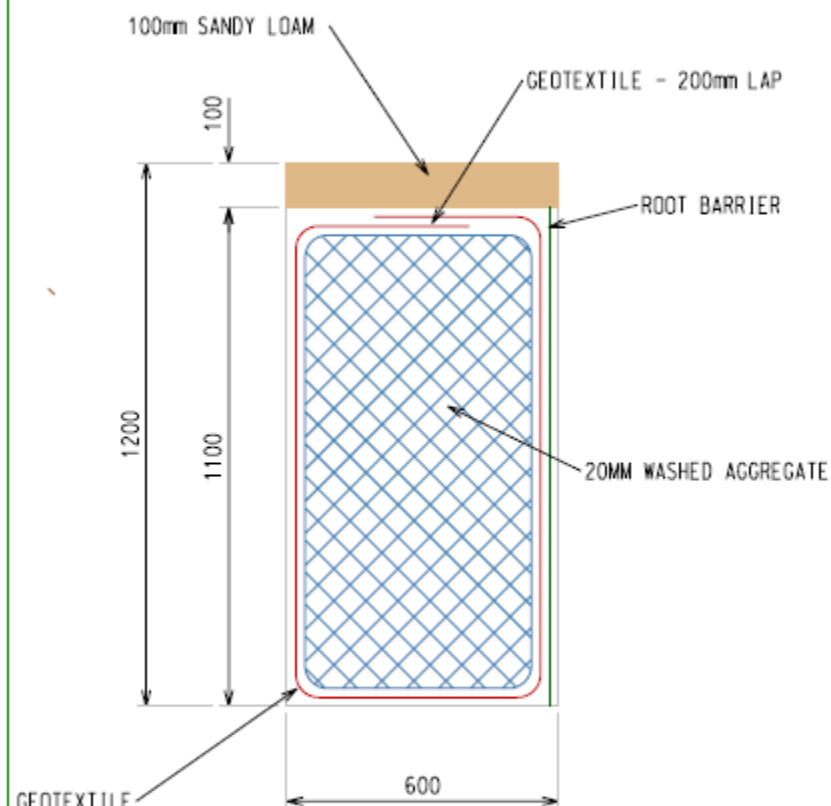
Letchford Street Reserve, Bedford Park, during construction
City of Mitcham



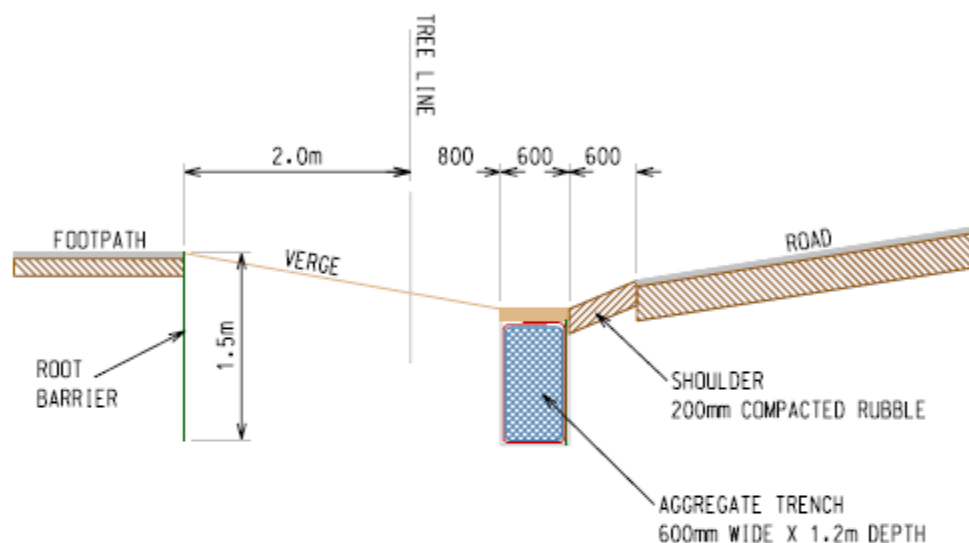
Letchford Street Reserve, Bedford Park, after construction
City of Mitcham

City of Mitcham – Doncaster Avenue





INFILTRATION TRENCH



INFILTRATION TRENCH LOCATION

TYPICAL DETAIL
AGGREGATE FILLED INFILTRATION TRENCH
DONCASTER AVENUE, COLONEL LIGHT GARDENS



City of Mitcham – TreeNet inlets



Our priority projects:



PP1 - The case for water sensitive urban design – cost-benefit analysis

PP2 – life cycle cost analysis

PP3 – Deemed to comply guideline

PP4 – Online stormwater assessment tool for small-scale development

PP5 - MUSIC Guidelines for SA

PP6 – Review & update of WSUD technical manual



Source: A.King

Our priority projects:



PP1 - The case for water sensitive urban design – cost-benefit analysis

PP2 – life cycle cost analysis

PP3 – Deemed to comply guideline

PP4 – Online stormwater assessment tool for small-scale development

PP5 - MUSIC Guidelines for SA

PP6 – Review & update of WSUD technical manual

- Suite WSUD standard drawings
- pdf and CAD



Source: A.King

Upcoming training & events



24
MAY 17

Streetscale raingardens - design & practice

24 MAY - 9:00am to 4:15pm

20
JUN 17

Urban infill development - but not as we know it!

20 JUNE - 10:00am to 12:30pm

Source: Monash University





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