

Good design for easy...

WSUD Maintenance



STORMWATER
QUEENSLAND



wave
MAINTENANCE



STORMWATER
VICTORIA

Today's topics

- Who is Wave Maintenance
- Stonnington maintenance contract and assets
- Maintenance data
- Tree pits and raingardens in detail
- Easier maintenance design suggestion

AIM: To design and built WSUD systems that are easier to maintain, and therefore work to improve water quality every time it rains.



Who is Wave Maintenance

- Undertake maintenance, audit, training and rectification of all WSUD assets including wetlands, ponds, swales, raingardens and tree pits.
- Also Stormwater harvesting and other green infrastructure.
- Small Melbourne based company established in 2017.



Market assessment

- Created as we saw a gap in the market for delivery of good maintenance services of WSUD assets
- Few specialist companies delivering this service as core business
- Several as add-on to general landscape and streetscape maintenance
- Landscape maintenance low paid workforce, highly transient, low skill
- Good skill base for wetland and bushland maintenance
- Less so for streetscape WSUD such as tree pits and raingardens



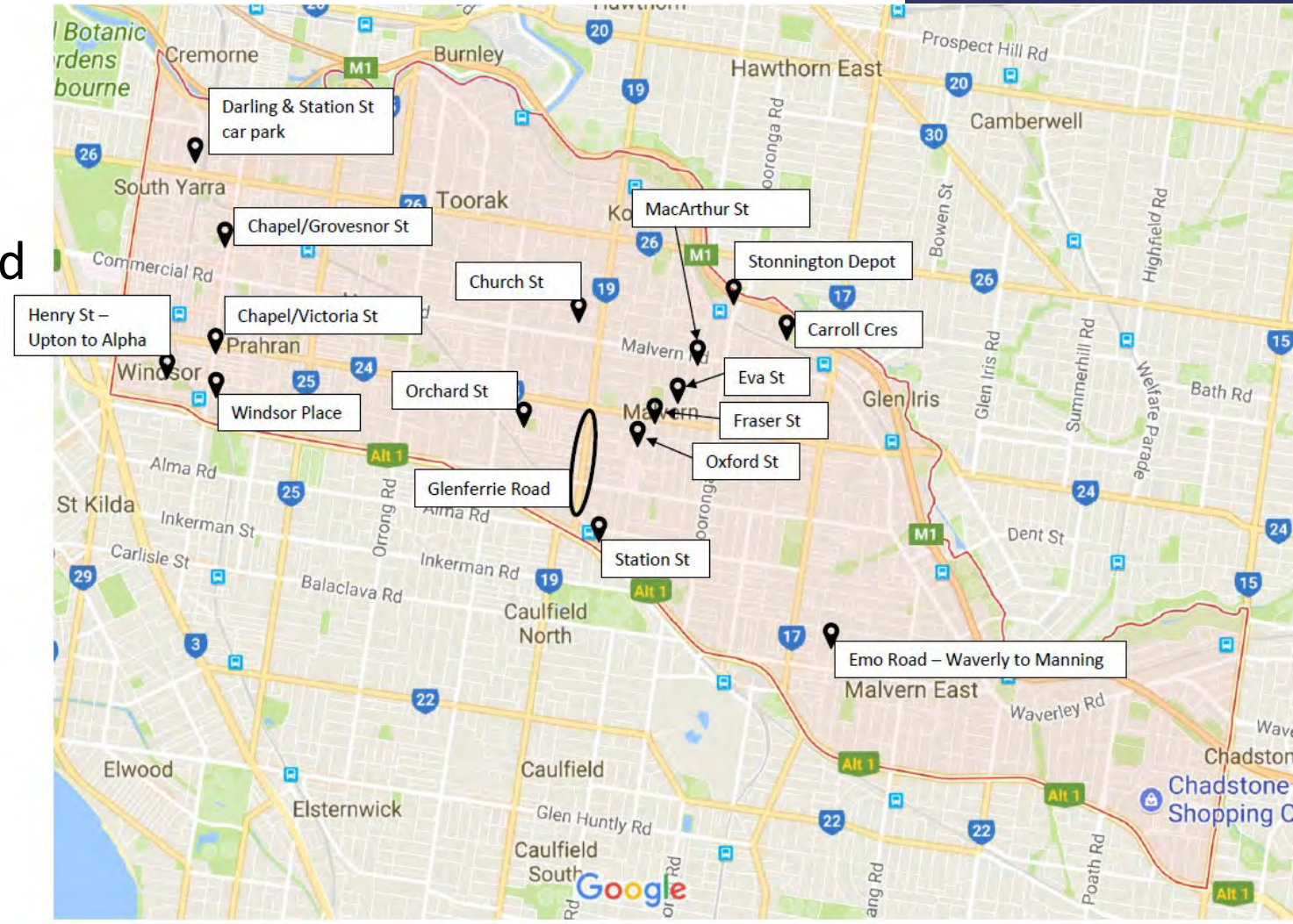
Who's doing WSUD maintenance

- Two main ways WSUD maintenance being delivered
 - In-house council crews, usually within the “horticultural” team
 - Under an external head contractor, either in the civil or parks area
- Problem is WSUD has both civil/drainage and horticultural components and therefore spans at least two and up to four different “divisions” or contracts within council (Plants & soil; pits & pipes, trees, litter/street-cleaning)
- Few councils have special contracts just for WSUD assets (Stonnington is the only one we are aware of at present).



Stonnington WSUD assets

- 160 individual WSUD assets
- Ranging in age from 5-15 years old
- Sized from 0.25sqm to 100sqm.
- These include 50 raingardens across 15 sites
- 106 tree pits across 3 sties







Maintenance Contract elements

- Quarterly (Jan, March, June Sept) visits to all assets to hand weed, remove dead plants, remove leaf and litter, clear inlets and outlets, monitor and ensure even mulch and filter layers. Report any damage.
- Additionally clean litter from all tree pits monthly
- Additional weeding visit to all raingarden (Oct, Nov)
- Additional leaf litter removal to all raingardens (April, May)
- Additional pruning and sediment forebay cleanout in June
- Provide inspection record and photos of each visit
- Reactive components of plant, mulch & filter replacement, watering and scarifying surface included as requested by council.



Starting contract

- Provided proposal in 2018 but lost on price. Audited sites as part of the proposal development. Noticed sediment levels were high and blocking all inlets.
- Another RFQ request in 2019. Again reviewed all assets for condition. Inlets still blocked. Sediment levels high, occupying a majority of the EDD.
- Awarded contract for 12 months and started in May 2019. Contract extended to Oct 2020.
- Spent extra time in May and June to unblock inlets, remove as much as possible of the sediment without total reset and compromising the existing vegetation too much.







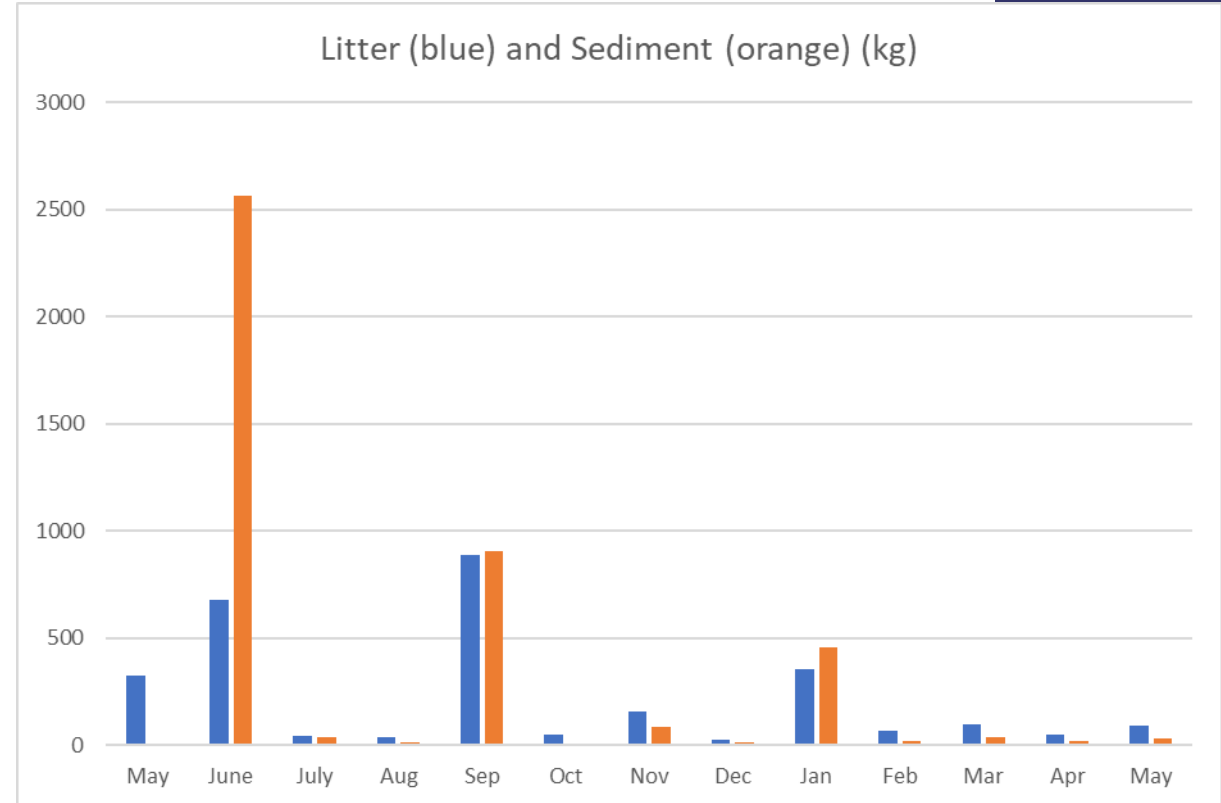
Data collection

- Utilisation of Google Forms to collect data on the spot via our smartphones
- Data collated into a single data base to track activity
- Ability to imbed photos
- Share data in spreadsheet form with council to allow easy digital data collection at their end rather than scans of hardcopy inspection sheets
- Possibility to integrate this into asset management database in the future

The screenshot shows a Google Form titled "Stonnington WSUD Maintenance" on a smartphone screen. The status bar at the top indicates "i-Fi Call", signal strength, Wi-Fi, time "11:55", and battery "95%". The URL "docs.google.com" is visible. The form title is "Stonnington WSUD Maintenance". Below the title, a message states: "The name and photo associated with your Google Account will be recorded when you upload files and submit this form. Not **ralf@wavemaintenance.com.au?** [Switch account](#)". A red asterisk label "*Required" is shown. The form has two visible sections: "Client *" with a radio button selected for "City of Stonnington", and "Date *" with a calendar icon. A blue pencil icon is in the bottom right corner.

12 Months of data

	Litter (kg)	Sediment (kg)	Activity
May	324.2	10	Tree pits and Raingarden leaf litter
June	676	2565	Quarterly plus prune and sediment
July	43	40	Tree pits only
Aug	38	15	Tree pits only
Sep	890	904	Quarterly All
Oct	49.3	2	Tree pits plus weeds
Nov	158.9	86.5	Tree pits plus weeds
Dec	23	15	Tree pits only
Jan	353	455	Quarterly All
Feb	65	20	Tree pits only
Mar	96.5	37.7	Quarterly All
Apr	51.9	18.1	Tree pits and Raingarden leaf litter
May	92.2	32.9	Tree pits and Raingarden leaf litter
Total	2861	4201	



	Litter (kg)	Sediment (kg)	Activity
June	440	35847	Rectifications plus Quarterly clean
July	42.5	23.5	Tree pits only
Aug	82	25	Tree pits only
Sept	200	500	Quarterly clean post rectification



Tree pits design – pros and cons



Tree pit – cleaning issues





Common litter



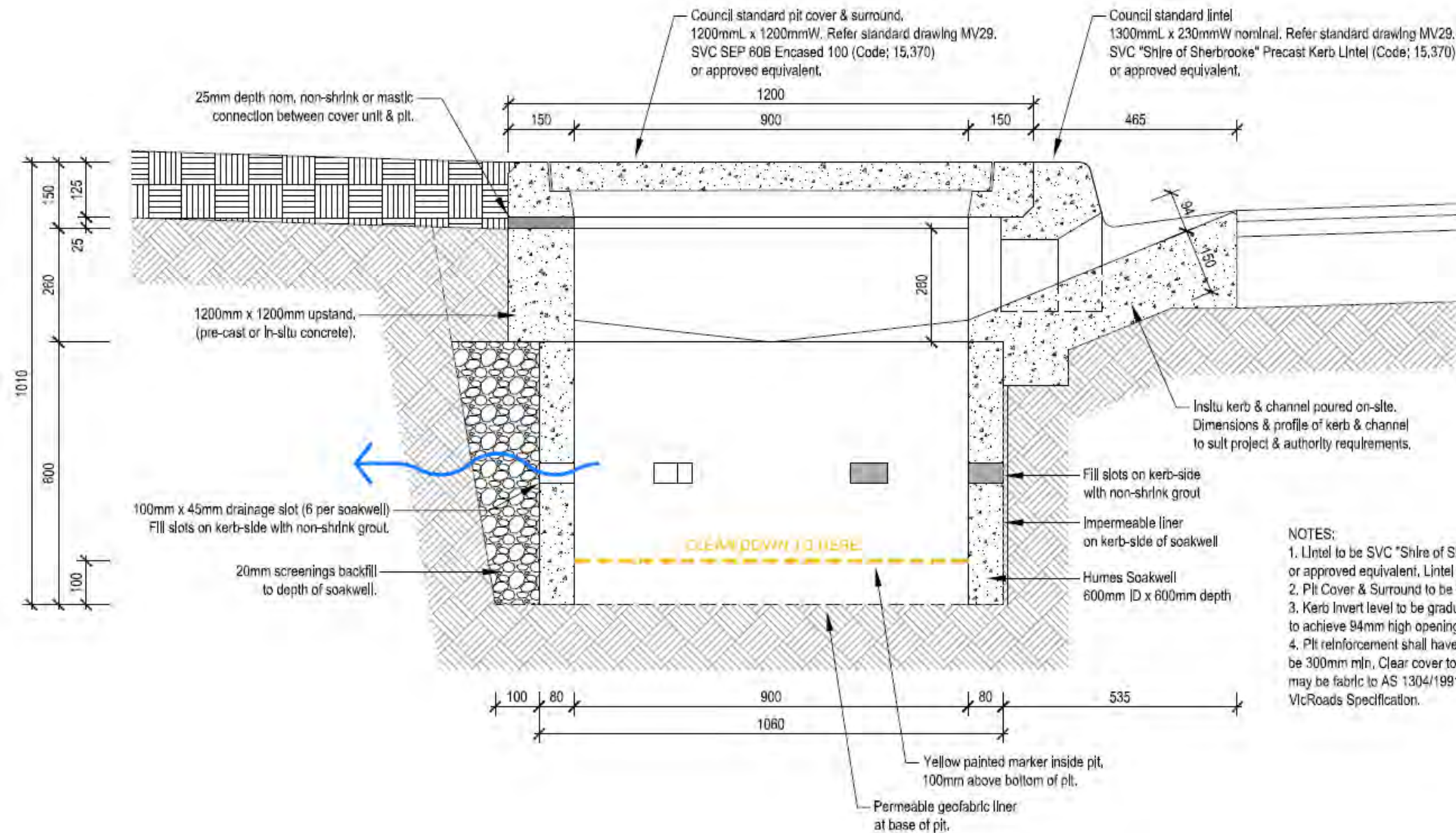
Better
Tree Pit
Designs





SVC Catch Pit for sediment and litter capture prior to infiltration systems





NOTES:

1. Lintel to be SVC "Shire of Sherbrooke" Precast Kerb Lintel (Code 15,370) or approved equivalent, Lintel to be supported on kerb tray & side pit walls.
2. Pit Cover & Surround to be SVC 60B Encased 100 or approved equivalent.
3. Kerb Invert level to be gradually decreased 300mm either side of pit Inlet to achieve 94mm high opening.
4. Pit reinforcement shall have the main bars positioned horizontally. Laps to be 300mm min. Clear cover to be 50mm min. Corner return reinforcement may be fabric to AS 1304/1991. Concrete grade VR330 / 32 to Section 610 VicRoads Specification.

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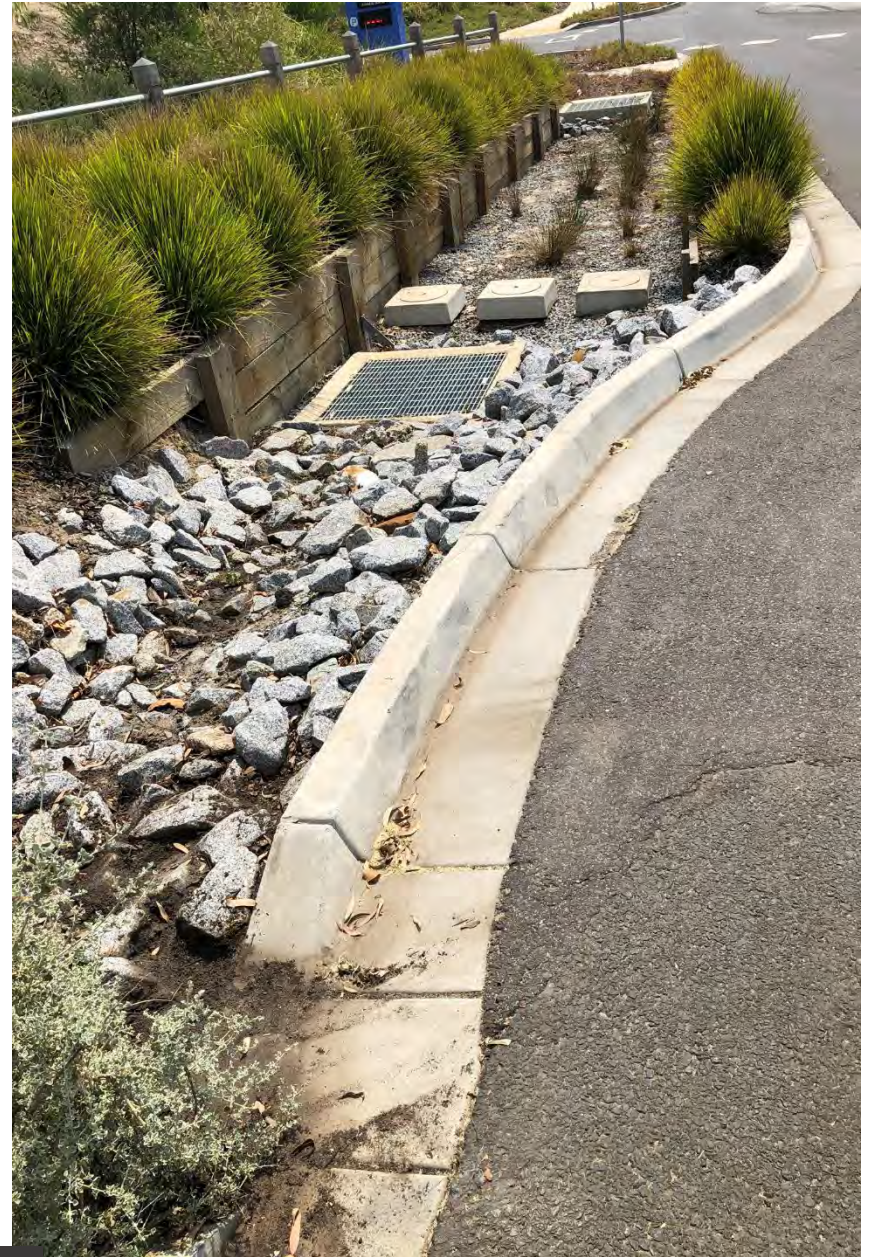
900mm DIA x 600mm SOAKWELL
SECTION

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Raingarden examples





Raingarden – cleaning issues



Raingarden rectifications



Raingarden rectifications – Sept clean



Raingarden inlet options



Raingarden inlet options



Raingarden inlet options



Raingarden inlet options

Summary – WSUD maintenance

- Sediment and leaf litter are the main pollutants that block inlets and clog systems. Needs to be removed regularly.
- Sediment traps at inlets need to be easy to clean. Shallow pits or flat concrete forebays with lips best (not rock riffles).
- Rock mulch fills with sediment and needs to be removed with sediment to unclog systems, quadrupling the volumes.
- Tree pits should have large clear openings and easy to lift lids to allow easy access to clear out debris and sediment.
- Most councils manage weeds and litter well, but not sediment.
- A clogged inlet make a raingarden and tree pit easier to maintain as it collects less litter and sediment.



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