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InSite
Integrated Water Management

InSite Water Tool - compliance with the P&D Code | Stormwater for small-scale developments

Ian Adams
Director,
Organica
Engineering

Application of the online stormwater assessment tool for small-scale development

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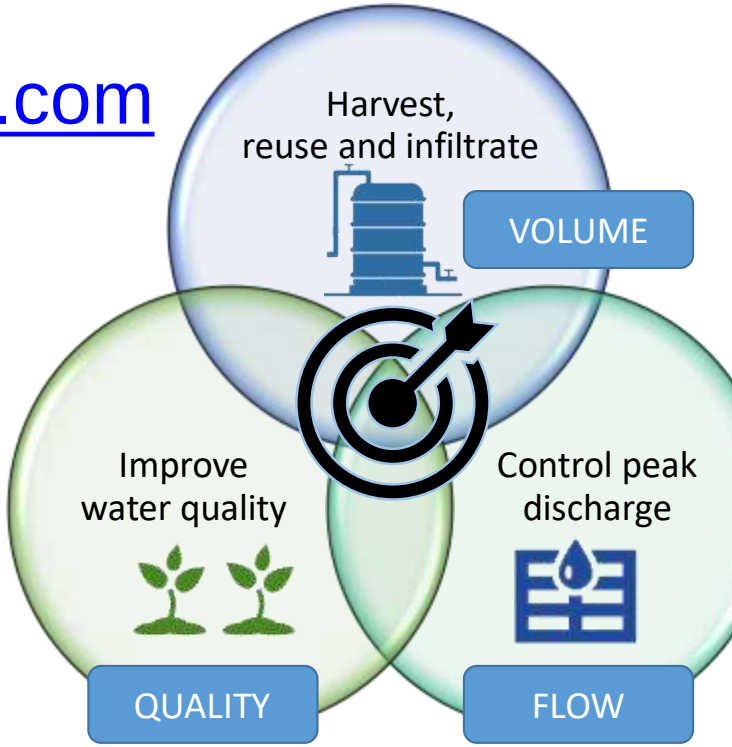
SA version:

www.watersensitivesa.insitewater.com

Other states website

www.insitewater.com.au



Business as usual will deliver this…..

Business as usual ….. Underperforming Asphalt

Source: AKing

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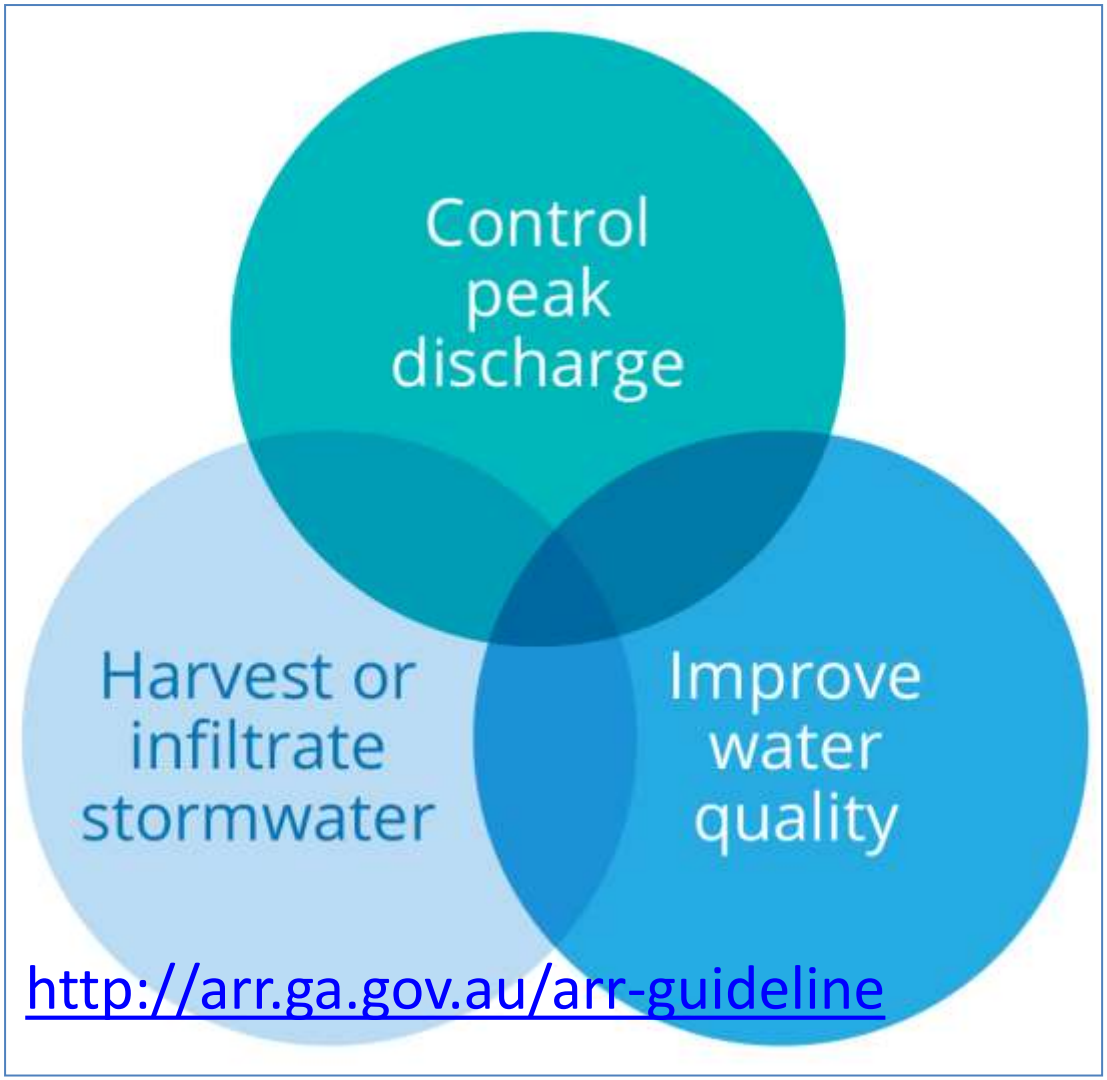
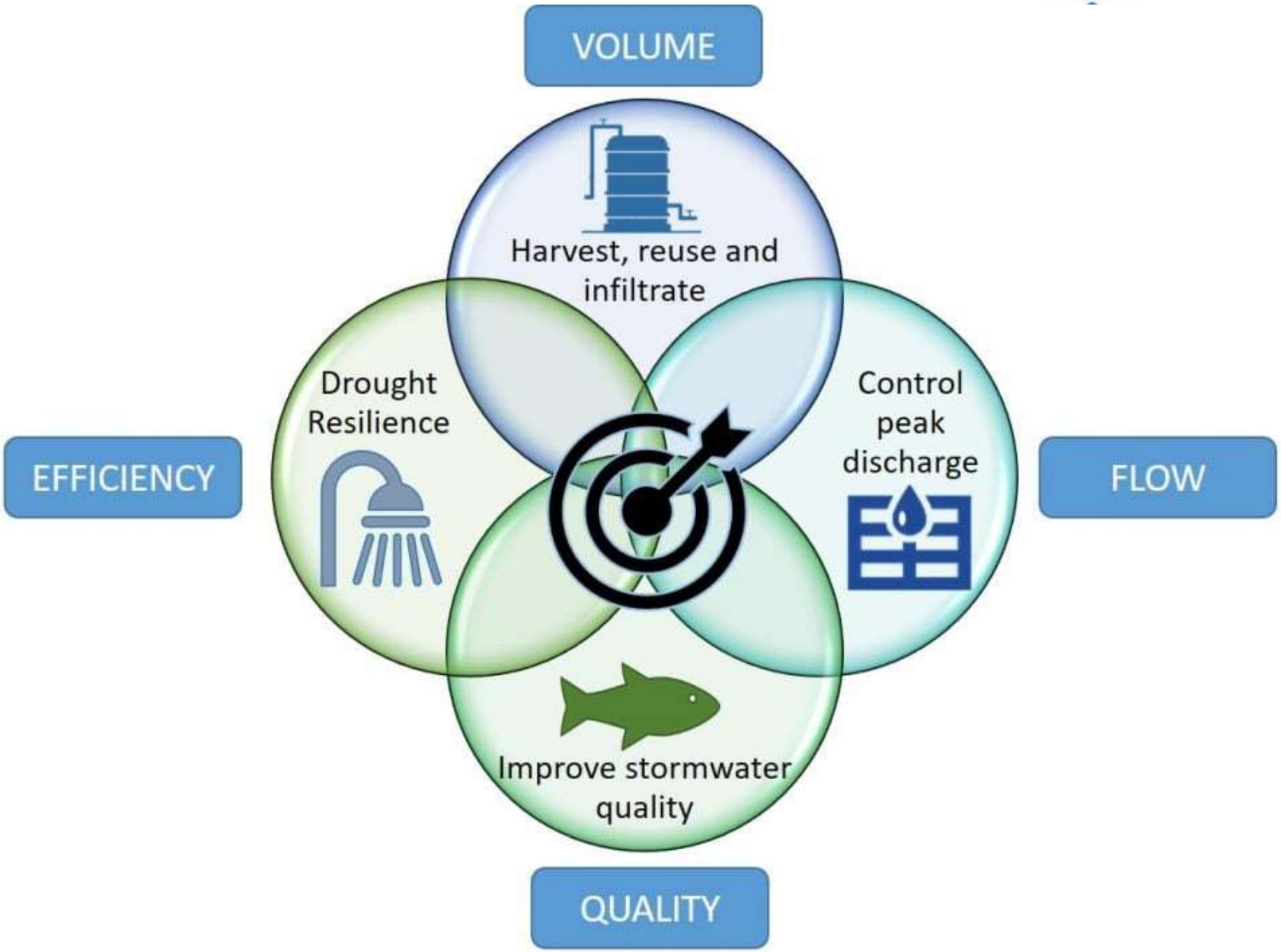
Management

www.i UNITIES.

Australian Rainfall and Runoff (ARR 2019 figure 9.4.1.)



- ARR 2019 Emphasises an ‘at source’ management strategy:
- This employs small facilities, widely distributed across the catchment, many of which will only service a small catchment or single property.
- Strategies of this type are most commonly part of a more comprehensive and integrated urban water strategy.


VOLUME
Harvest, reuse and infiltrate
Drought Resilience
Control peak discharge
EFFICIENCY
FLOW
Improve stormwater quality
QUALITY

About the site

Site Area
1180 m²

Proportion landscape area
26%

Site Imperviousness
57%

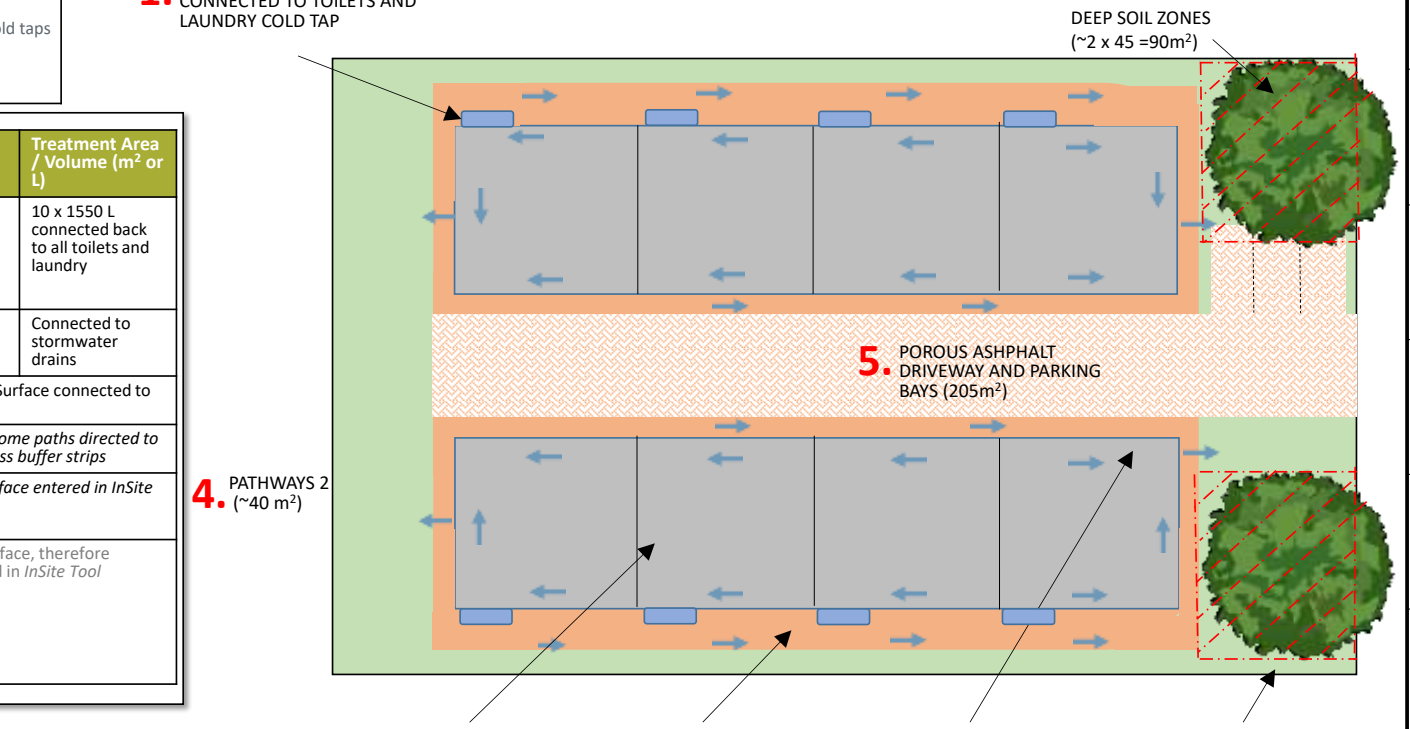
WSUD features
- Rainwater harvesting and use in toilets and laundry old taps
- Porous asphalt driveway and car parks
- grassed buffer for some path runoff

STORMWATER MANAGEMENT OBJECTIVES MET

QUALITY | VOLUME | FLOW | EFFICIENCY

1. **RAINWATER TANKS** 15,500L CONNECTED TO TOILETS AND LAUNDRY COLD TAP

	Catchment	Impervious Area (m²)	Treatment Type	Treatment Area / Volume (m² or L)
1.	Roof Area Catchment to Rainwater Tank (80% roof area)	360 m²	Rainwater retention only tank	10 x 1550 L connected back to all toilets and laundry
2.	Untreated Roof Catchment Area (20% roof area)	90 m²	None	Connected to stormwater drains
3.	Pathways 1	180 m²	Impervious Surface connected to drainage	
4.	Pathways 2	40 m²	*Flow from some paths directed to 43 m² of grass buffer strips*	
5.	*Porous asphalt driveway & carpark*	*205 m2*	*Pervious Surface entered in InSite Tool*	
6.	Landscaped Areas - frontyard* - backyard* - individual yards * *communal*	 140 m² 100 m² 65 m² 303 m²	Pervious Surface, therefore Not included in *InSite Tool*	



LEGEND
- Roof Area
- Permeable/porous paving
- Pathways (impervious)
- Landscaped Area
- Deep soil zone

REV	DESCRIPTION	INITS	DATE	INITS	DATE
				DRAFTED	APPROVED
A	ISSUE – PLANNING APPROVAL				

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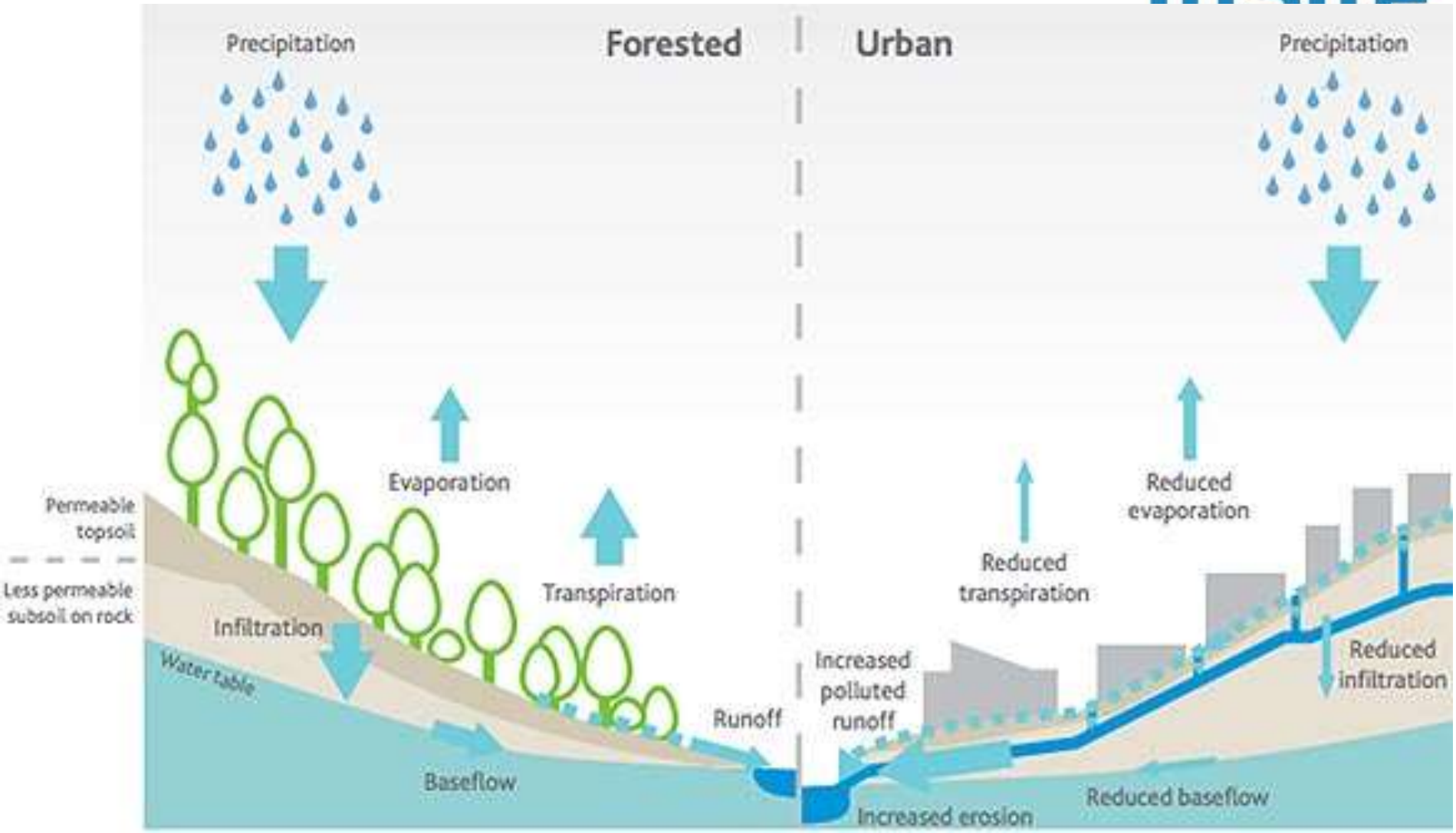
PROJECT 123 SMITH STREET
DRAWING TITLE **8 x TOWNHOUSES ON A LOT – STORMWATER MANAGEMENT PLAN**
PROJECT No. 123456-01 | DRAWING No. TP-12 | REV. A

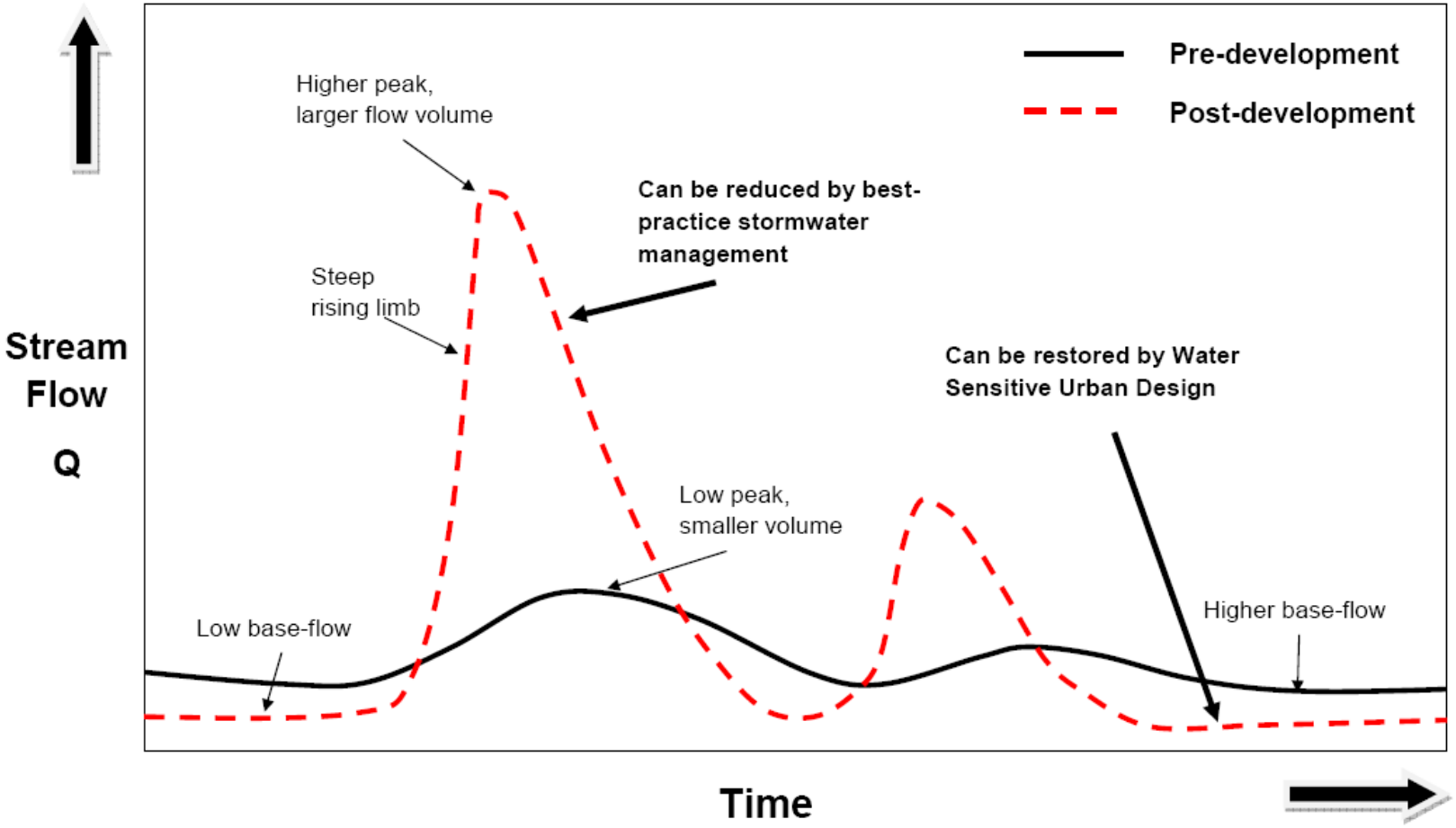
Annual average volume reduction targets

- *No greater than 10% increase – pre vs post development (minimum InSite target)*

Forested vs Urban catchments



Change to hydrograph pre and post development



Typical storm flow hydrograph pre and post development (after Wong et al 2011).

VOLUME

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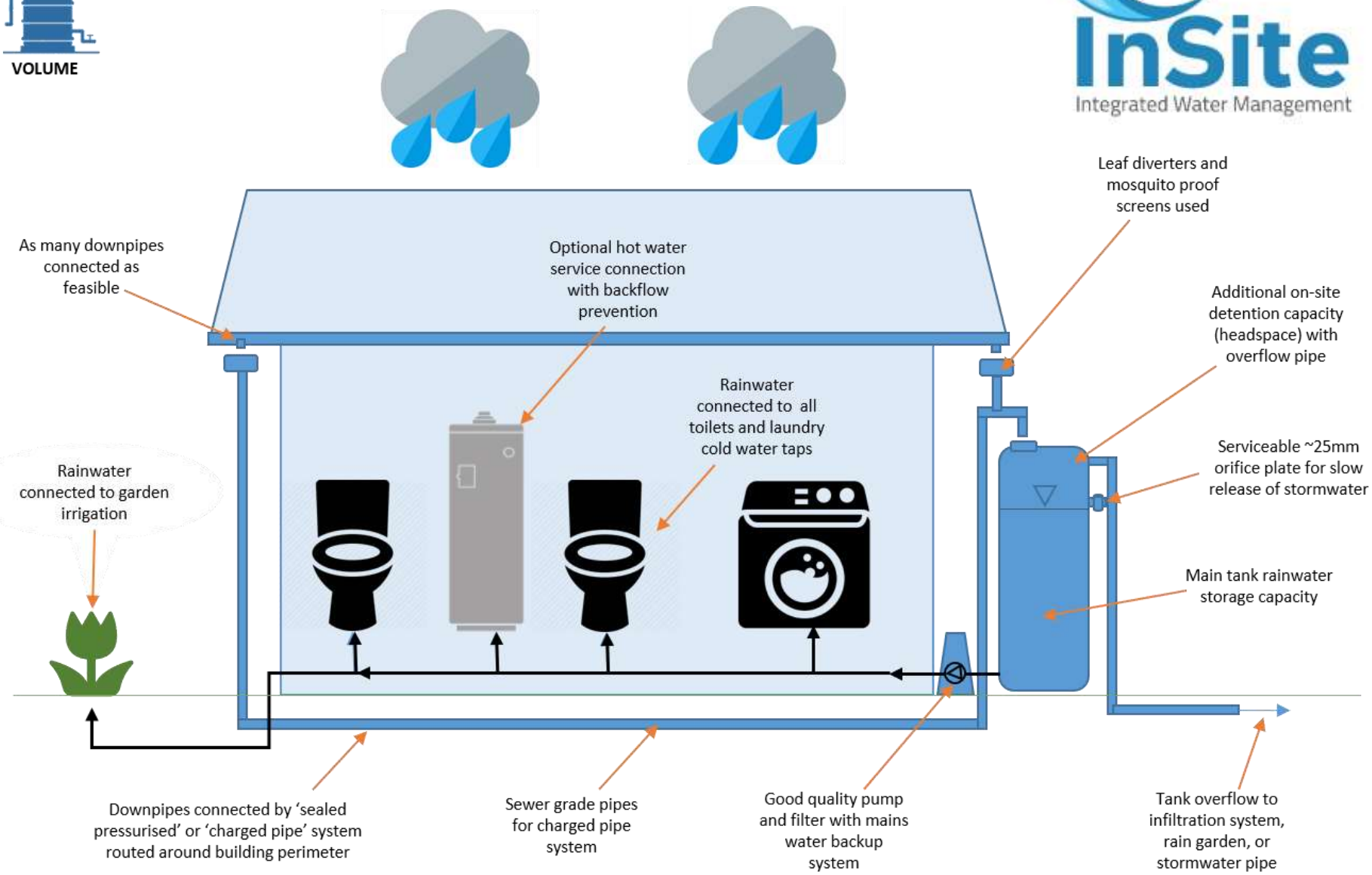


VOLUME

InSite
Integrated Water Management

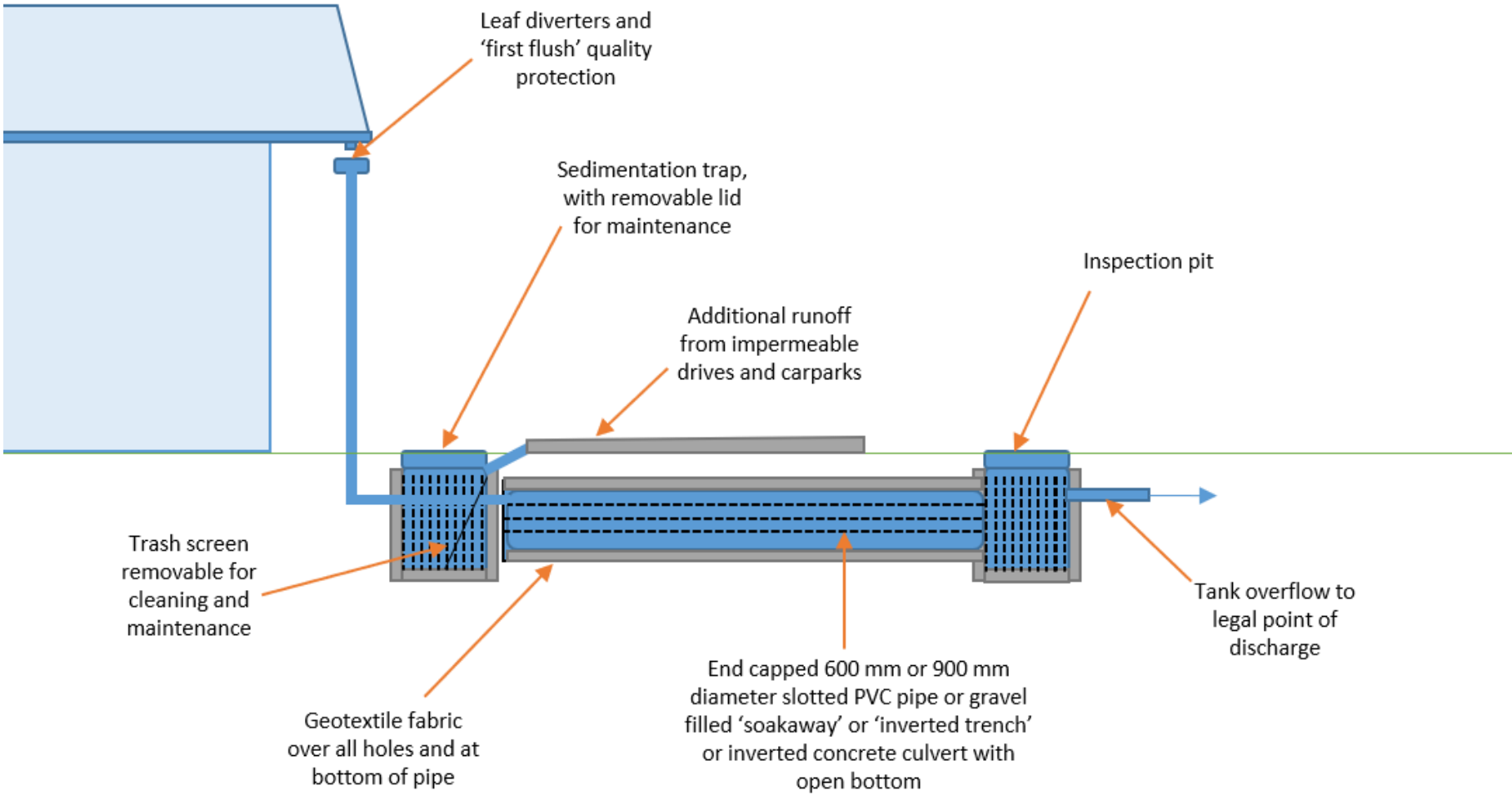
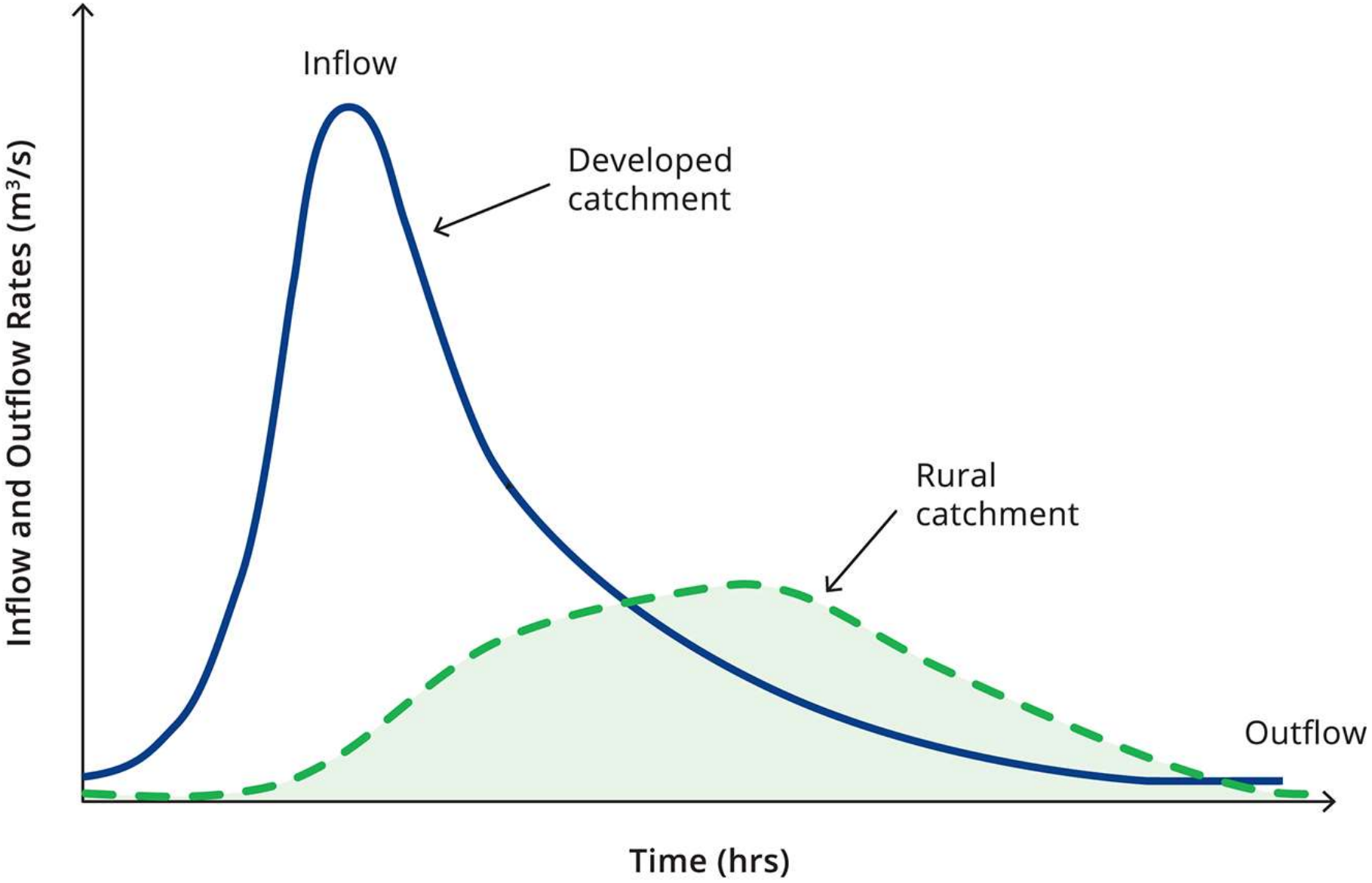
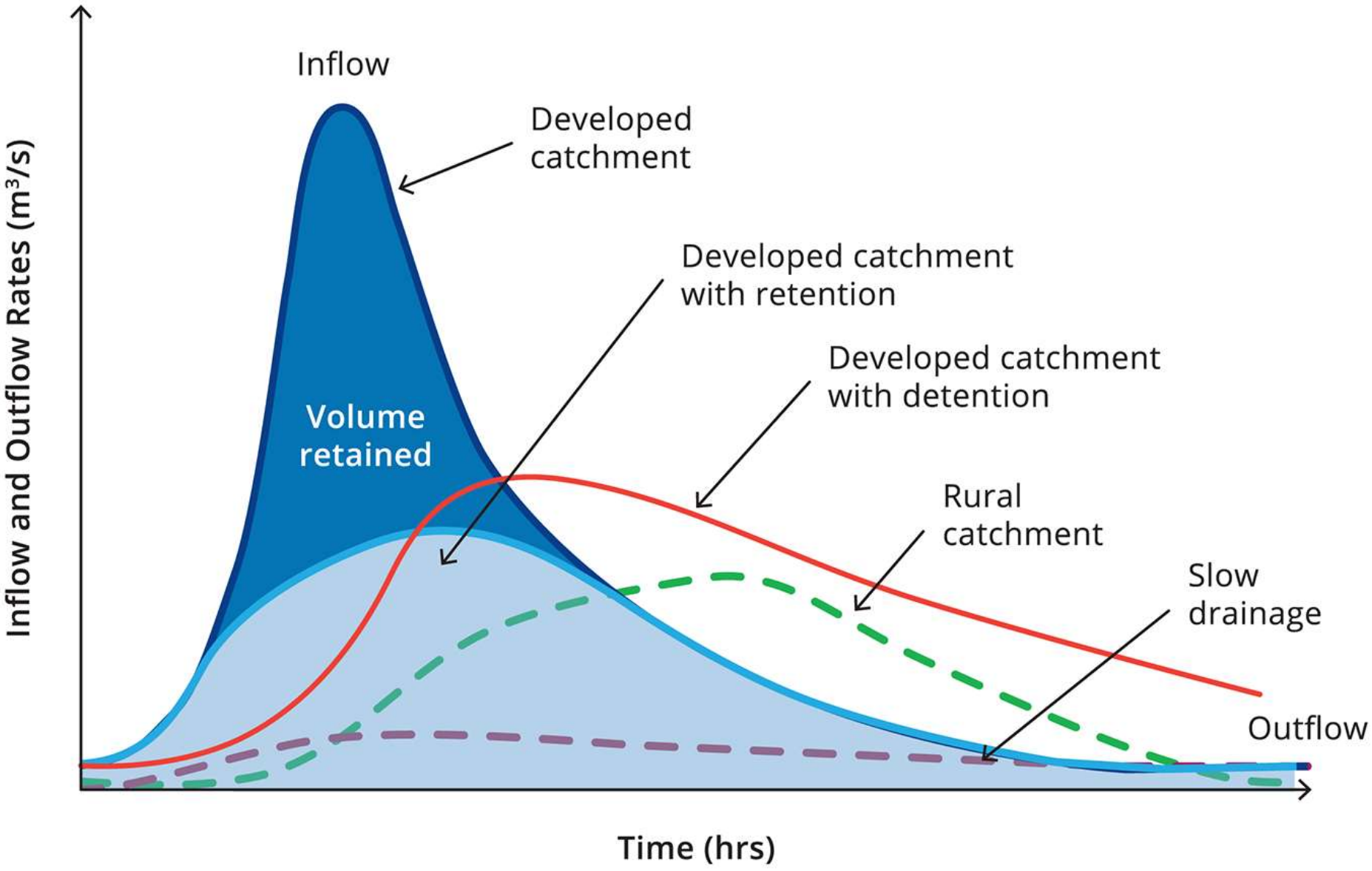
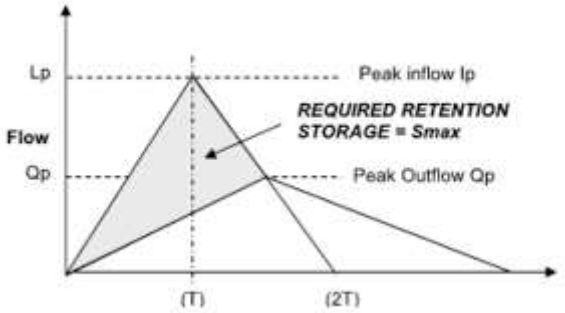


Figure 9: Infiltration trench, Doncaster Avenue, Colonel Light Gardens, City of Mitcham


Inflow
Developed catchment
Rural catchment
Outflow
Inflow and Outflow Rates (m³/s)
Time (hrs)


Inflow
Developed catchment
Developed catchment with retention
Developed catchment with detention
Volume retained
Rural catchment
Slow drainage
Outflow
Inflow and Outflow Rates (m³/s)
Time (hrs)



Inflow

Area represents volume stored

Time of peak storage

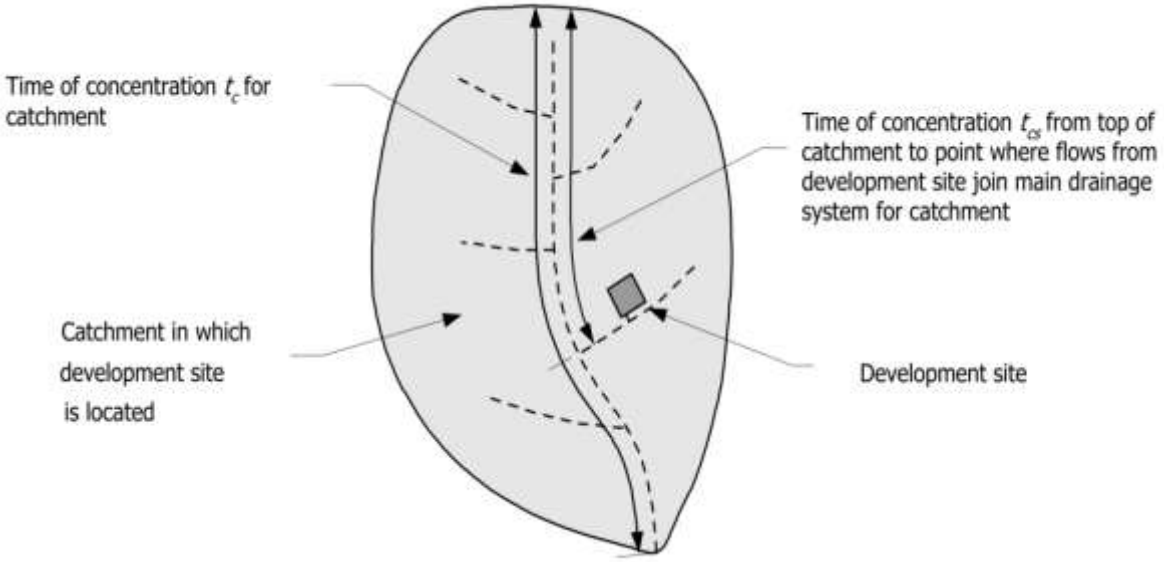
Volume released from storage

Outflow

Inflow and Outflow Rates (m^3/s)

Time (hrs)

Time of concentration



- The peak flow time of concentration from the top of the catchment to the development site, t_{cs} is compared to the total time of concentration for the catchment, t_c.
- The Permissible Site Discharge (PSD) varies with the position of the site within the catchment. The relationship between t_c and t_{cs} is as per the following figure.
- The time for stormwater to flow from the development site to the bottom of the catchment (site to outlet) is called t_{so}
- By default the t_c is set to 30 minutes in InSite, and the t_{so} is set to 10 minutes. This can be changed by the user.

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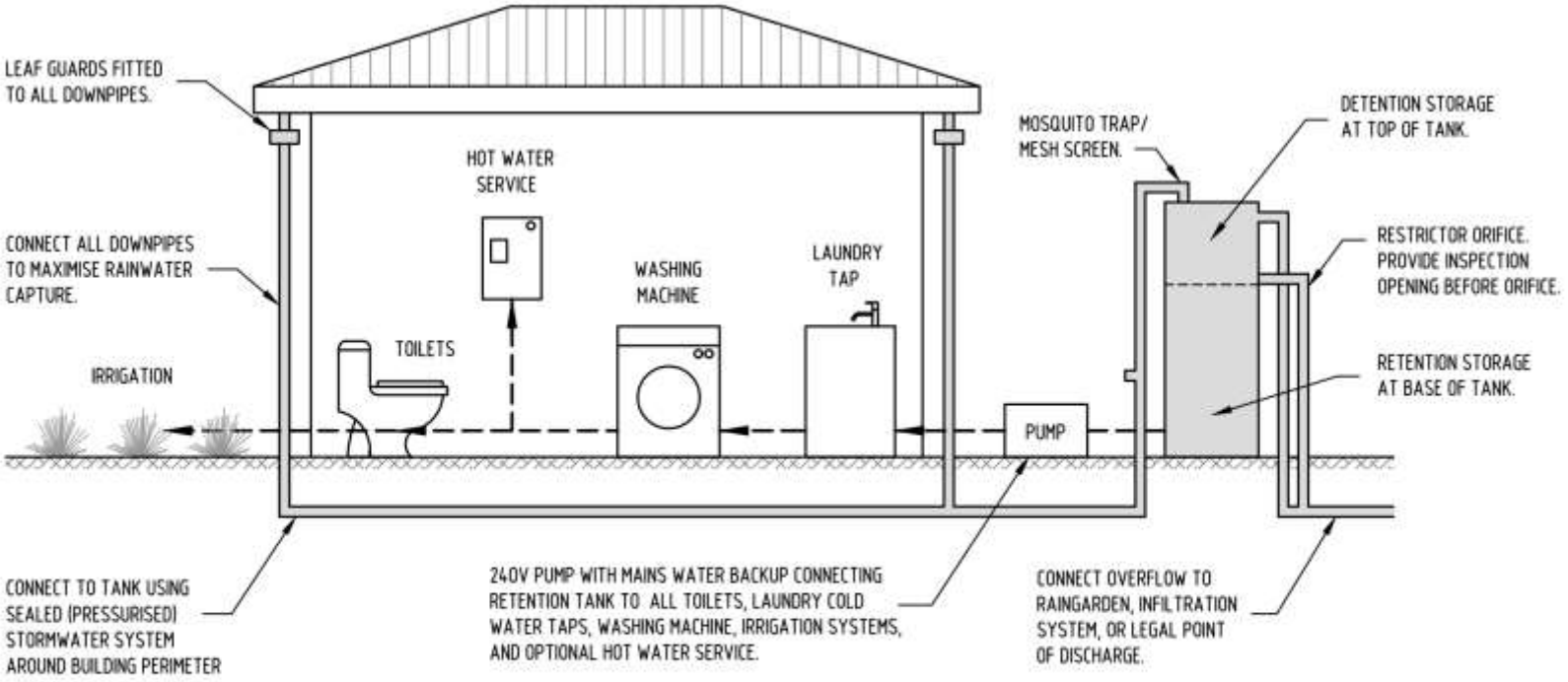
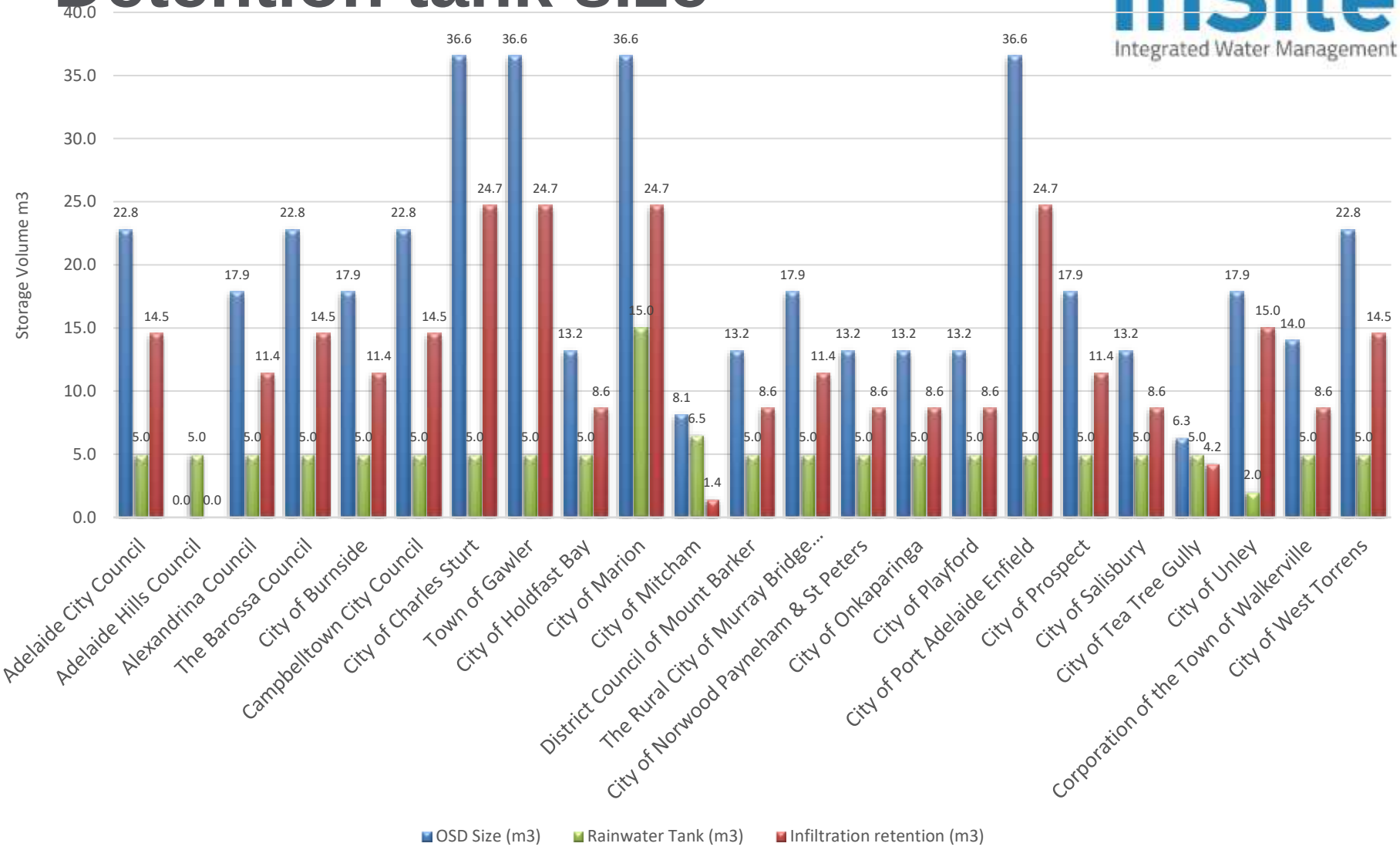
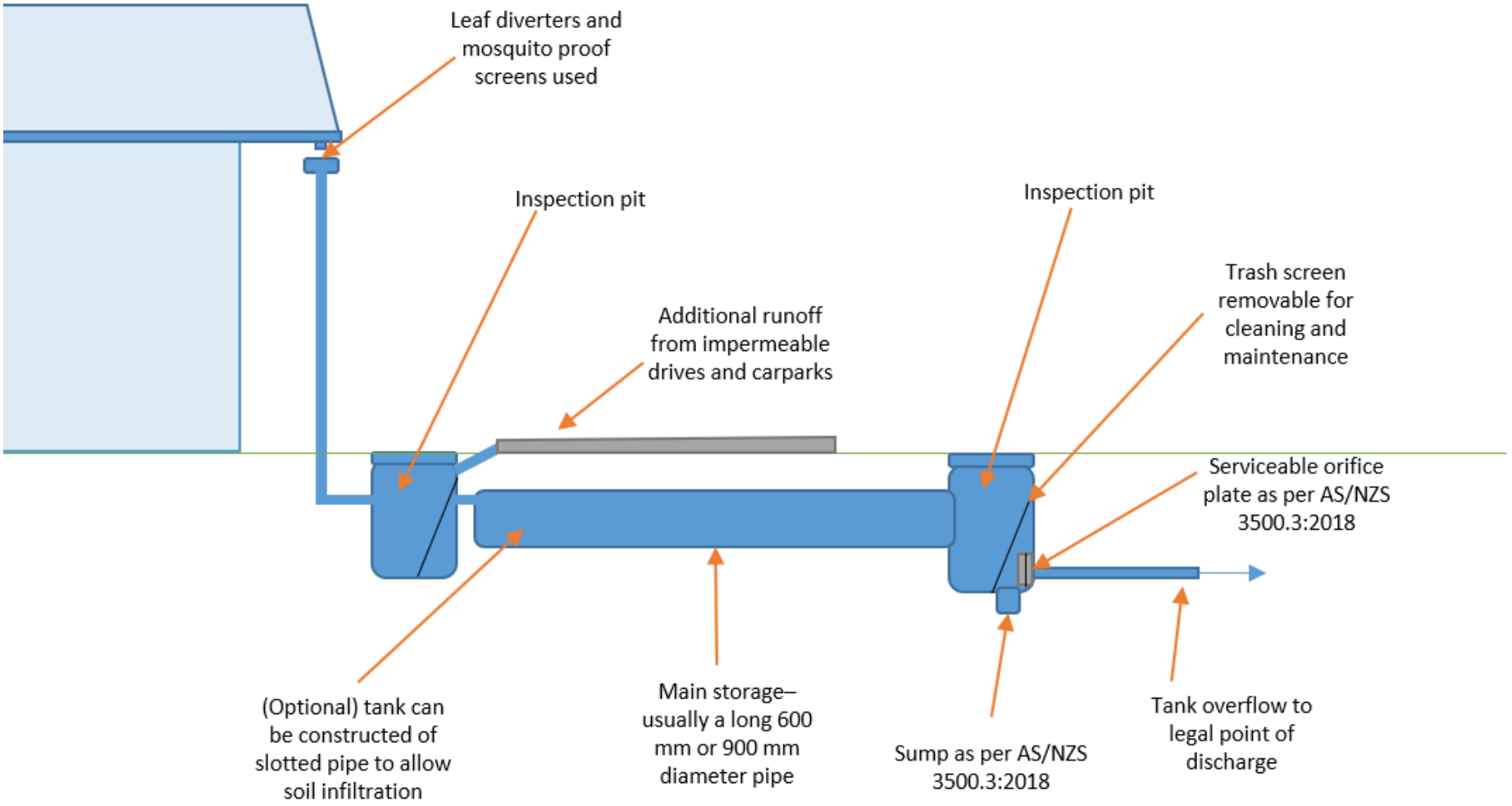


RETENTION TANK RETICULATION DETAIL

N.T.S.
NOTE: THE DESIGN AND INSTALLATION OF ALL STORMWATER SYSTEMS SHALL COMPLY WITH AS/NZS 3500.3:2018 "STORMWATER DRAINAGE".

- Comparative Retention and Detention tank size




Leaf diverters and mosquito proof screens used
Inspection pit
Inspection pit
Trash screen removable for cleaning and maintenance
Additional runoff from impermeable drives and carparks
Serviceable orifice plate as per AS/NZS 3500.3:2018
(Optional) tank can be constructed of slotted pipe to allow soil infiltration
Main storage– usually a long 600 mm or 900 mm diameter pipe
Sump as per AS/NZS 3500.3:2018
Tank overflow to legal point of discharge

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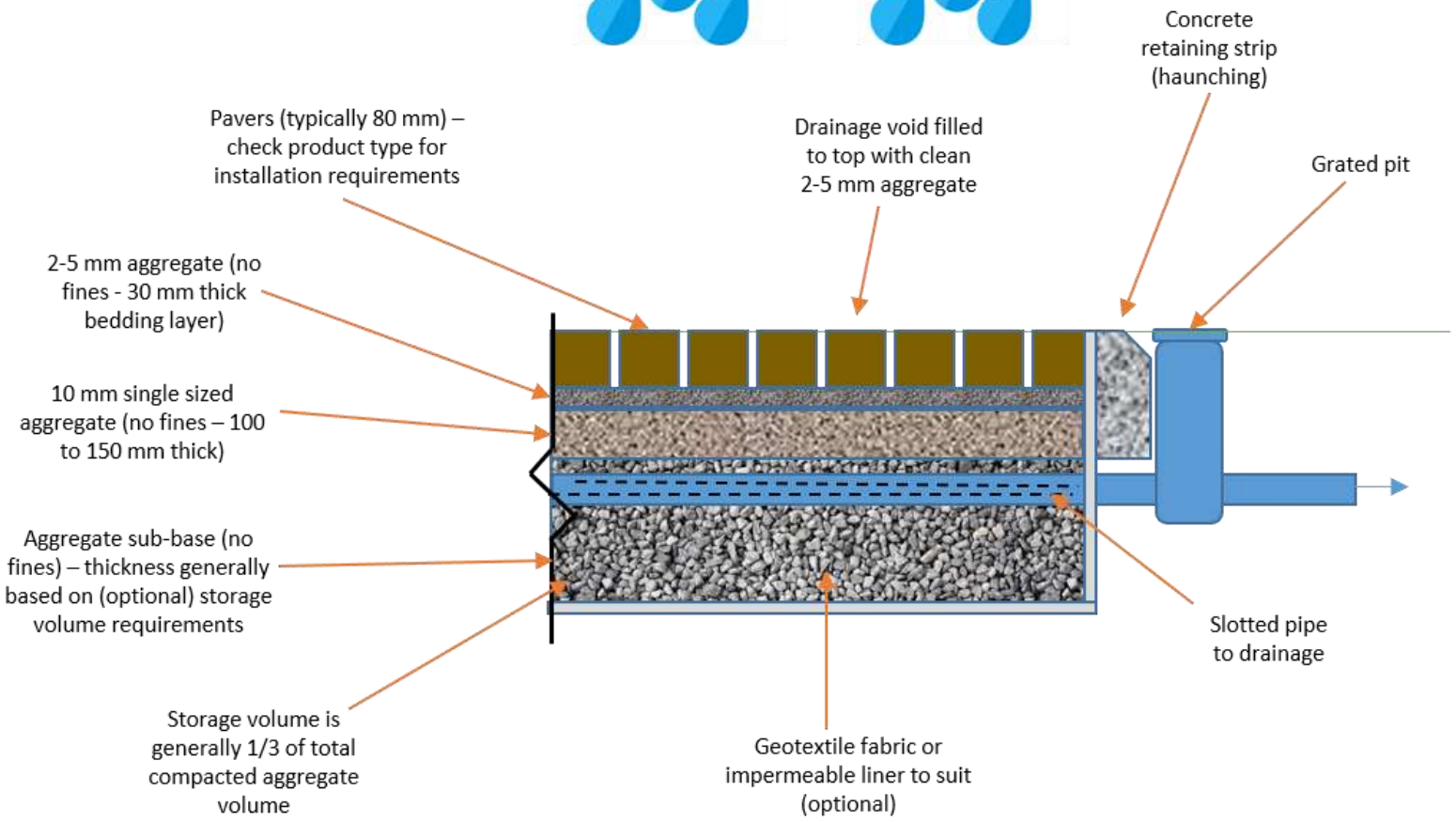
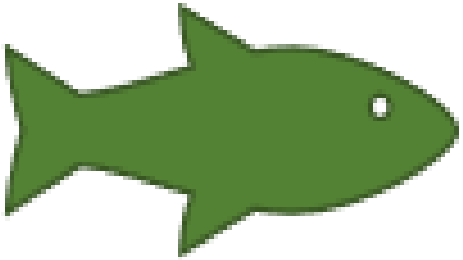


Figure 12: Permeable paving Kegworth Road, Melrose Park, City of Mitcham

Figure 10: Laura Avenue, St Marys porous asphalt surface in the , City of Mitcham and Cowandilla Community Hall carpark, City of West Torrens



QUALITY

- Uses nitrogen as a proxy
- 45% reduction in nitrogen = 100 points

QUALITY

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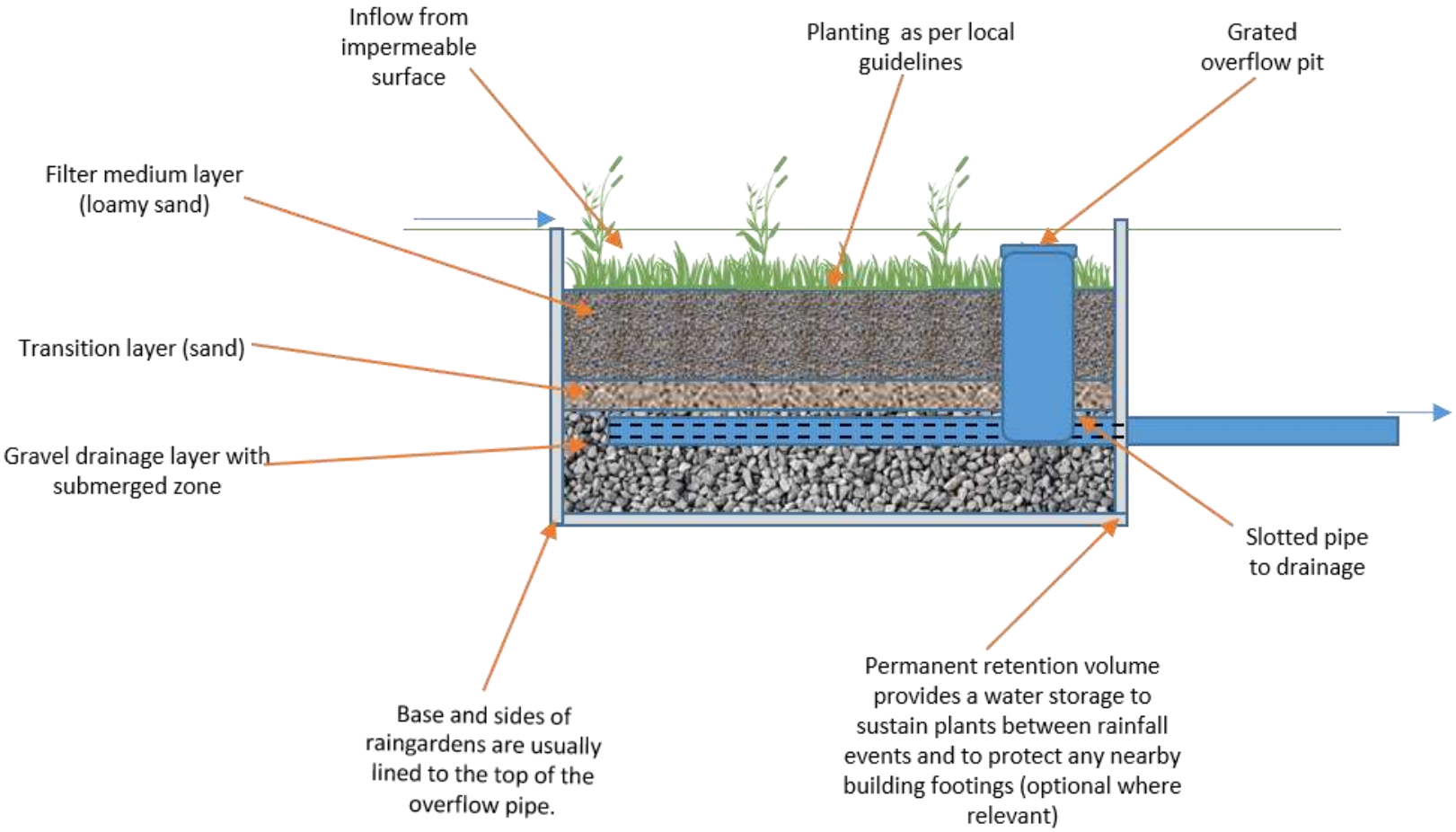

Figure 13: Typical raingarden barrel/tank (top left), bioretention basin/raingarden (top right) and bioretention swale (bottom) installations

- Uses the WELS scheme
- Similar to Green Star water calculators
- Uses water tank simulation

Typical fixture	Minimum requirements (used in InSite tool)	Best practice
Basins	4 Star WELS	5 Star WELS
Kitchen taps	4 Star WELS	5 Star WELS
Toilets	4 Star WELS	5 Star WELS
Showerheads	3 Star WELS (with flow between 7.5–9 litres/minute)	3 Star WELS (with flow between 6–7.5 litres/minute)
Urinals	4 Star WELS	5 Star WELS
Dishwashers	3 Star WELS	5 Star WELS
Washing machines	3 Star WELS	5 Star WELS
Baths	Medium Sized Contemporary Bath	Small square tub/combined shower

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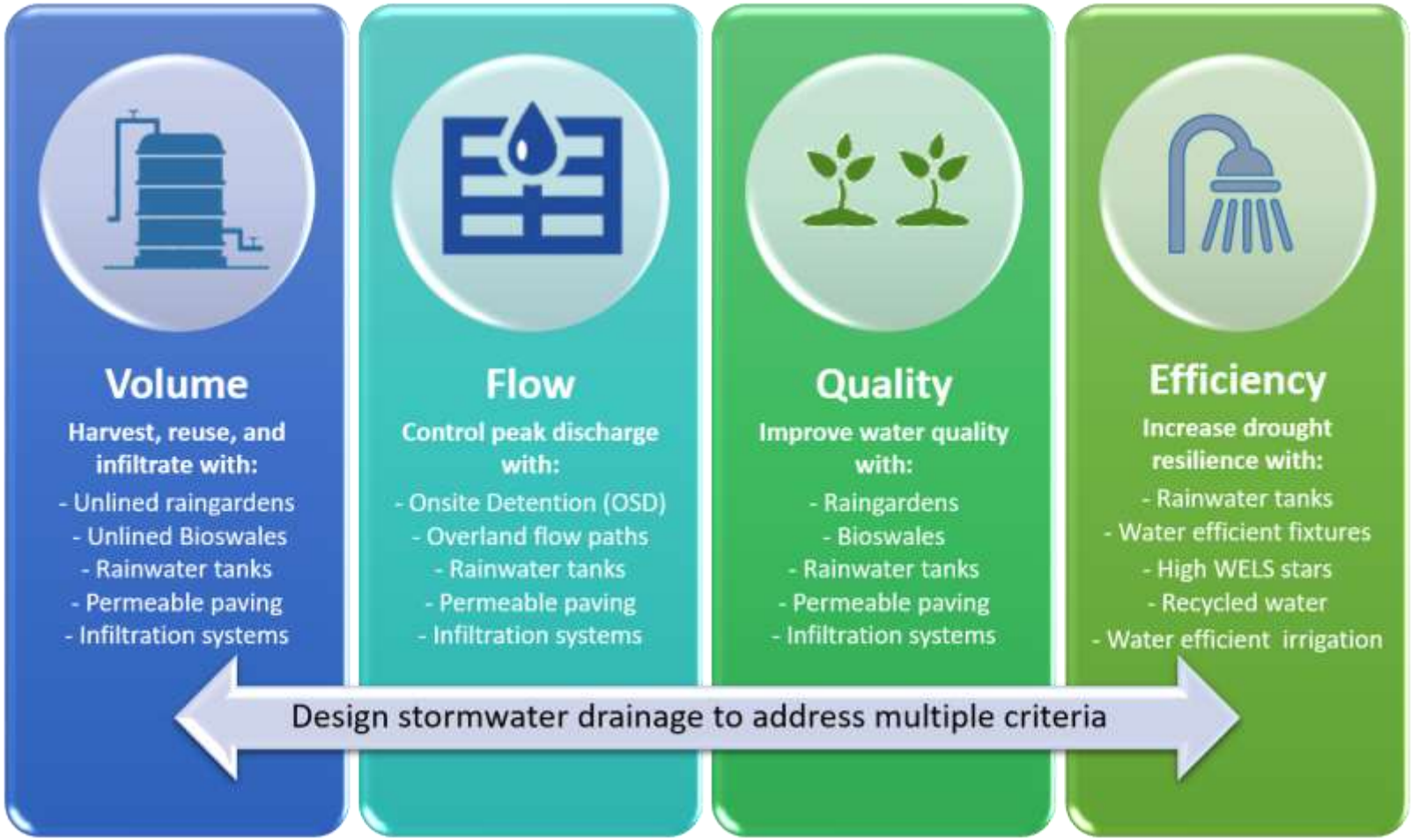

Demonstration run through

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https://www.watersensitivesa.insitewater.com

RAINWATER TANK SIZING

Volume management and 'source control' reduces runoff volume, downstream flooding and helps restore stream flows. InSite water will help optimise the size of rainwater retention tanks and water infiltration pits.

DETENTION TANK SIZING

Stormwater flow reduction (detention / retention) protects existing Council stormwater assets that are nearing capacity or already overcapacity. InSite Water will help you size stormwater detention tanks to meet Council requirements.

WATER QUALITY

Improving stormwater runoff quality improves the health of our rivers and coastal areas. We help you design Water Sensitive Urban Design (WSUD) treatments for smaller sites including: raingardens, infiltration, bioswales, swales and green roofs

WATER EFFICIENCY

InSite Water helps you specify water efficiency for your project to save money on bills and to increase your project's drought resilience. This includes appropriate use of rainwater and water efficient appliances.

About the site

Site Area
1180 m²

Proportion landscape area
26%

Site Imperviousness
57%

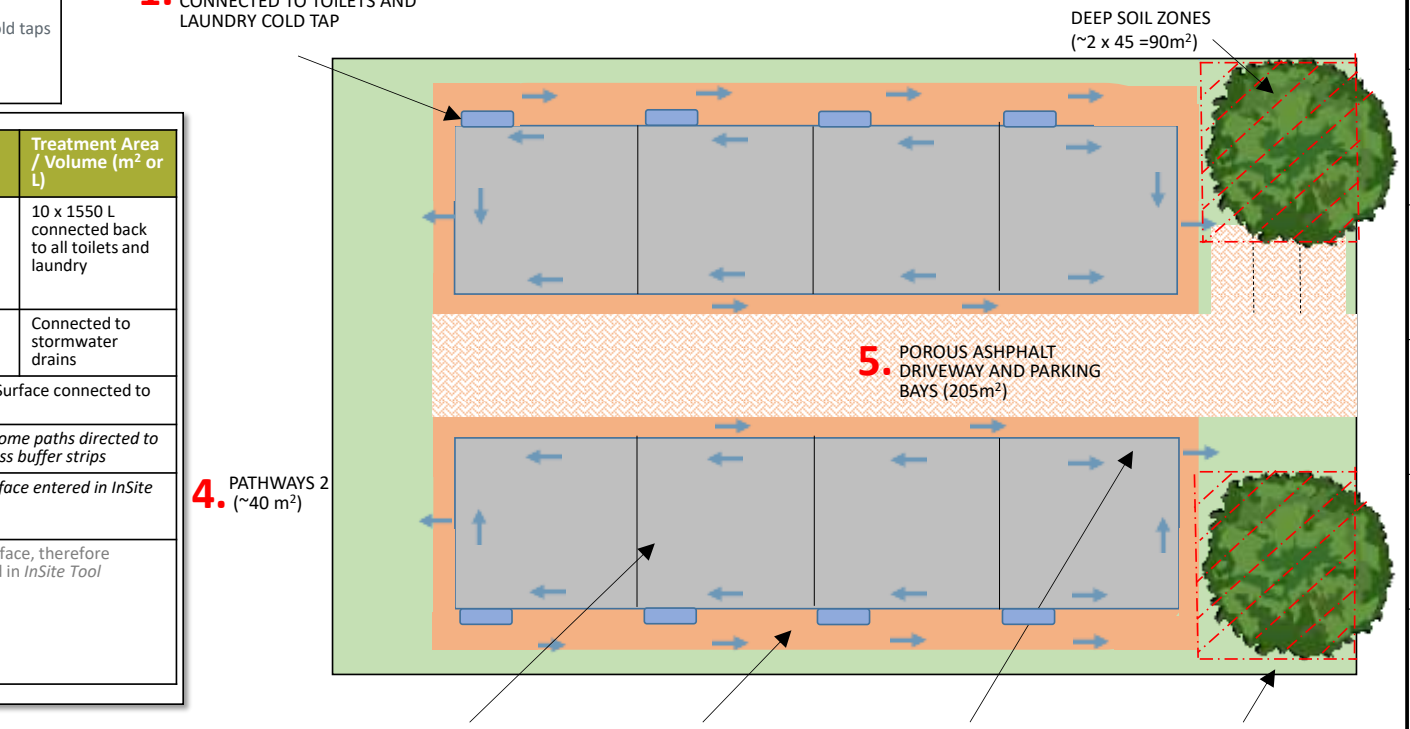
WSUD features
- Rainwater harvesting and use in toilets and laundry old taps
- Porous asphalt driveway and car parks
- grassed buffer for some path runoff

STORMWATER MANAGEMENT OBJECTIVES MET

QUALITY | VOLUME | FLOW | EFFICIENCY

1. **RAINWATER TANKS** 15,500L CONNECTED TO TOILETS AND LAUNDRY COLD TAP

	Catchment	Impervious Area (m²)	Treatment Type	Treatment Area / Volume (m² or L)
1.	Roof Area Catchment to Rainwater Tank (80% roof area)	360 m²	Rainwater retention only tank	10 x 1550 L connected back to all toilets and laundry
2.	Untreated Roof Catchment Area (20% roof area)	90 m²	None	Connected to stormwater drains
3.	Pathways 1	180 m²	Impervious Surface connected to drainage	
4.	Pathways 2	40 m²	*Flow from some paths directed to 43 m² of grass buffer strips*	
5.	*Porous asphalt driveway & carpark*	*205 m2*	*Pervious Surface entered in InSite Tool*	
6.	Landscaped Areas - frontyard* - backyard* - individual yards * *communal*	 140 m² 100 m² 65 m² 303 m²	Pervious Surface, therefore Not included in *InSite Tool*	



LEGEND
- Roof Area
- Permeable/porous paving
- Pathways (impervious)
- Landscaped Area
- Deep soil zone

REV	DESCRIPTION	INITS	DATE	INITS	DATE
				DRAFTED	APPROVED
A	ISSUE – PLANNING APPROVAL				

SUBMITTED FOR PLAN APPROVAL
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CLIENT
DRAWN DATE
DESIGNED DATE
SCALE NTS

PROJECT 123 SMITH STREET
DRAWING TITLE **8 x TOWNHOUSES ON A LOT – STORMWATER MANAGEMENT PLAN**
PROJECT No. 123456-01 | DRAWING No. TP-12 | REV. A

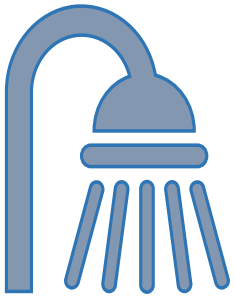
Multiple Criteria Analysis

STORMWATER MANAGEMENT OBJECTIVES MET

QUALITY

VOLUME

FLOW



EFFICIENCY

Stormwater solutions

	Catchment	Impervious Area (m^2)	Treatment Type	Treatment Area / Volume (m^2 or L)
1. 2. 3.	Roof Area 1 + Roof Area 2 + 50% Roof Area 3	1470 m^2 (155 + 165+ 1150)	Rainwater Tank	35,000 L (flushing systems and 350m^2 of irrigated landscaped areas)
3. 5.	50% Roof Area 3 + Treated carpark 5	1600 m^2 (1150 + 450)	Bioswale	25 m^2 (20 + 5) installed as bioswale
4.	Roof Area 4	210 m^2	Rainwater tank	5,000 L (plumbed to toilets)
6.	Treated Carpark 6	270 m^2 (120 + 150)	Grassed buffer	20 m^2 installed as grassed buffer
7.	Garden Area	900 m^2	Pervious Surface, therefore Not included in *InSite Tool*	

LEGEND

- Roof Area connected to Rainwater Tank
- Roof Area connected to Bioswale
- Impervious Areas and Surfaces
- Landscaped Garden Area
- Raingarden / bioswale
- Bunded chemical storage Area

NOTE – INDUSTRIAL SITE ENVIRONMENTAL MANAGEMENT
Where there is CHEMICAL or FUEL STORAGE, an appropriate Environmental Management Plan (EMP) must be developed to ensure that pollution does not enter the stormwater system or contaminate soils or groundwater. Please contact the EPA SA for further guidance www.epa.sa.gov.au/

In addition any operational stormwater pollution risks must be evaluated and managed by additional pollution prevention devices such as litter traps or intercept traps as appropriate.

About the site

Site Area
~4,450 m^2

WSUD features

- Rainwater harvesting and use in toilets and gardens
- Grassed buffers and bioswales to treat stormwater from roofs and carparks
- Non-potable water use for flushing systems, including toilet flushing, fire pump testing and in washdown bays

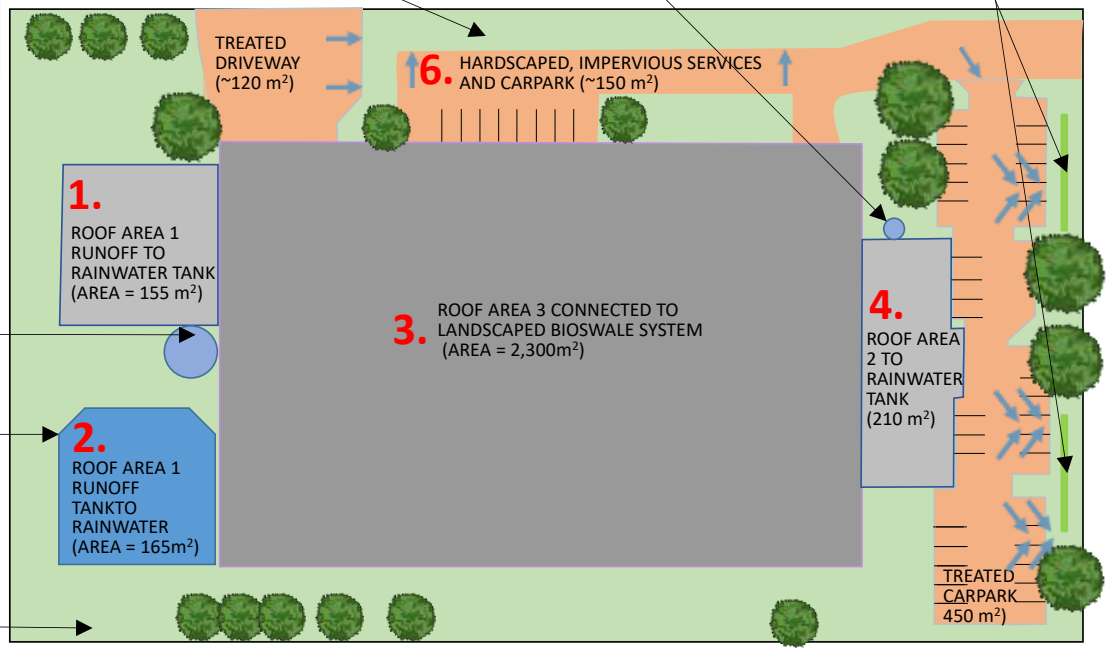
STORMWATER MANAGEMENT OBJECTIVES MET

QUALITY VOLUME FLOW EFFICIENCY

6. **GRASSED BUFFER** (20m^2) SERVICING TREATED DRIVEWAY & CARPARK

4. **RAINWATER TANK** CONNECTED TO TOILETS (5,000 L)

5. LANDSCAPED BIOSWALE SYSTEM (22 m^2) Adjacent to road



1. **RAINWATER TANK** (35,000m^2) CONNECTED TO FLUSHING SYSTEMS AND IRRIGATION (Irrigated area Garden 350m^2)
CHEMICAL STORAGE ROOFED AND BUNDED.
BUNDED AREA IS CONNECTED TO TRADE WASTE.
ROOF DIRECTLY CONNECTED TO RAINWATER TANK.

7. GARDEN AREA (TOTAL 900m^2)

REV	DESCRIPTION	INITS	DATE	INITS	DATE
		DRAFTED		APPROVED	
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DESIGNED DATE
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PROJECT 123 SMITH STREET
DRAWING TITLE **WAREHOUSE DEVELOPMENT – STORMWATER MANAGEMENT PLAN**
PROJECT No. 123456-01 DRAWING No. TP-12 REV. A

SECTION 04

Self-certification with Insite Water Tool

https://www.watersensitivesa.insitewater.com/?page_id=17

WATER SENSITIVE SA

Home Account My projects Reporting Support

Council Calculation Report

Please find below your Council Calculation Report for Testing 123

Please note this may take up to a minute to load.

1 of 6 Automatic Zoom

Stormwater Calculations

WATER SENSITIVE SA

Report for

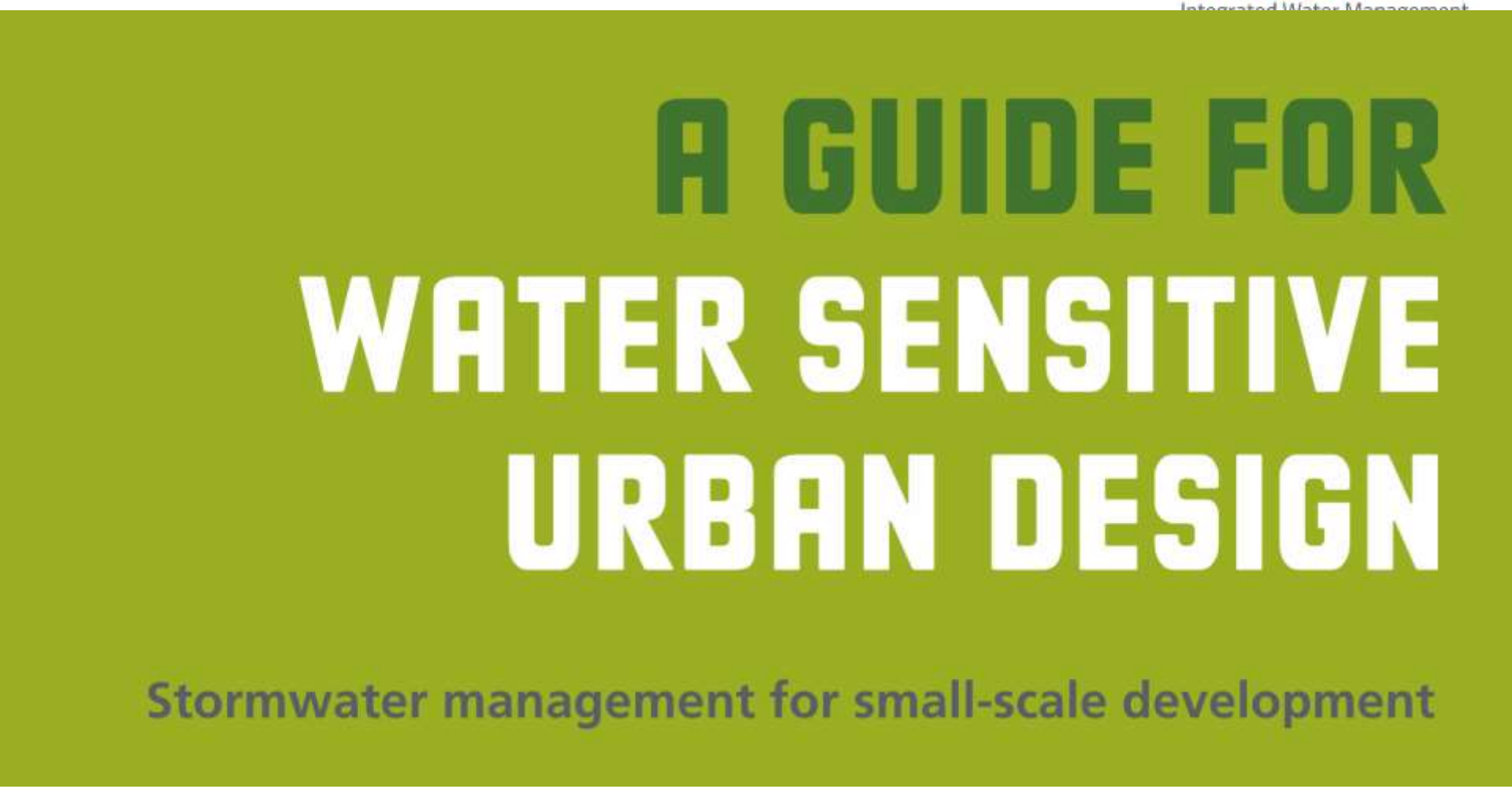
Project Details

Project Name	Testing 123
User Email	
Web files link	

REGISTERED USER LOGIN

Logout

Deemed to satisfy Guide



User Manual

- https://www.watersensitivesa.insitewater.com/?page_id=114

Figure 6 – This tank is performing poorly as a downstream flooding prevention device, as it is usually overflowing

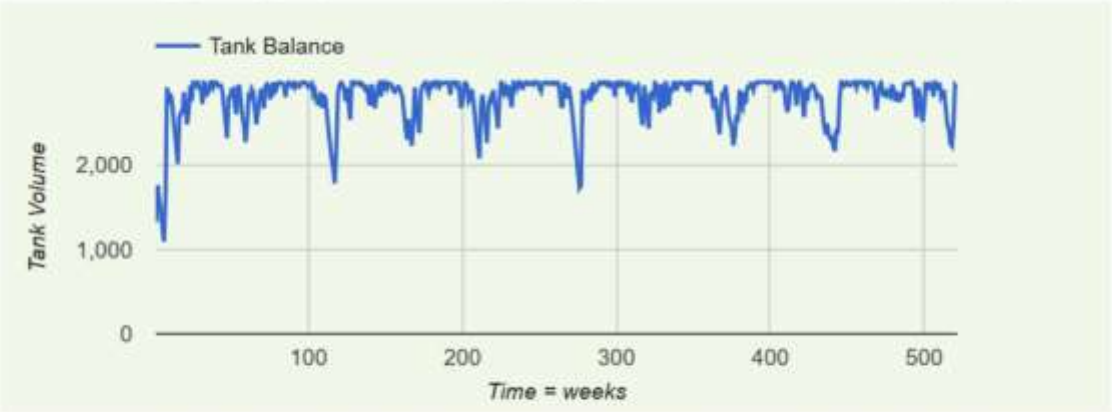
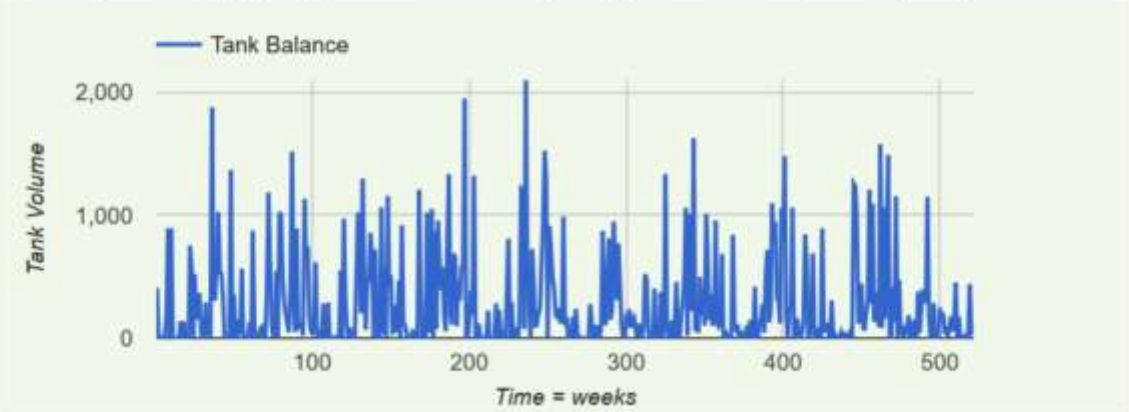


Figure 7 (below)-This tank is performing well as a downstream flooding prevention device, as it rarely overflows..



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Thank you!

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