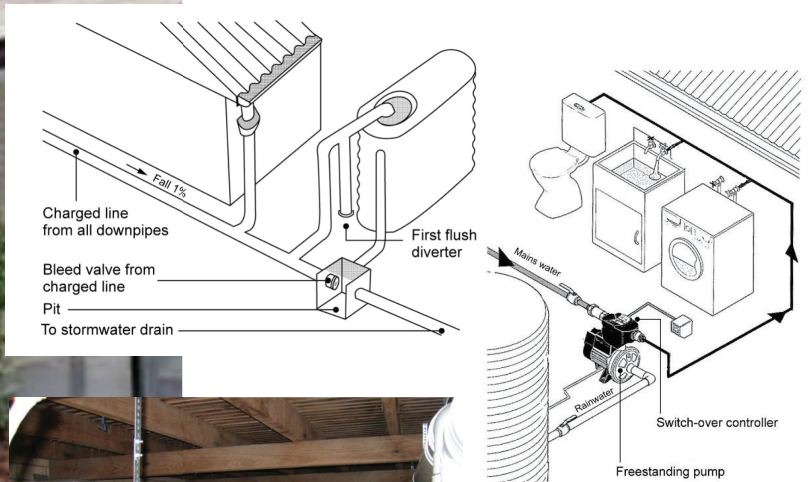


Worked Example - Residential Development

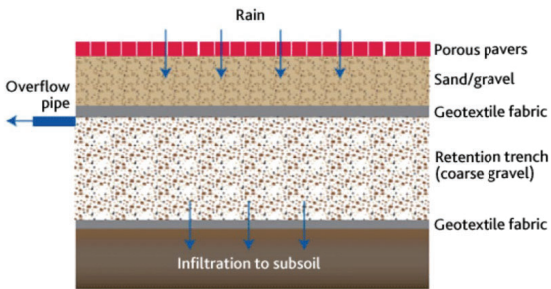


What controls apply when?

Clause 55.03-4 Standard B9	Construction of any of the following in a residential zone (includes Township Zone and Mixed Use Zone): <ul style="list-style-type: none">• One or more additional dwellings on a lot• Two or more dwellings on a lot• Extension to a dwelling in a multi unit development• Residential building (new or extension)
Clause 55.07-5 Standard B39	Construction of an apartment building of up to four storeys in a residential zone (including applied zones)
Clause 58.03-8 Standard D13	Construction of an apartment building of five or more storeys in a residential zone, <u>or</u> construction of an apartment building (any height) in other zones.



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Example – Four dwellings on a lot

B: Site layout plan, catchment areas and WSUD treatment systems

- Planterbox raingarden – elevated above ground level to minimize risk of damage
- All driveways constructed from permeable pavement
- 1,500lit – 2,000lit tanks connected to toilets for all dwellings (3 bedrooms)

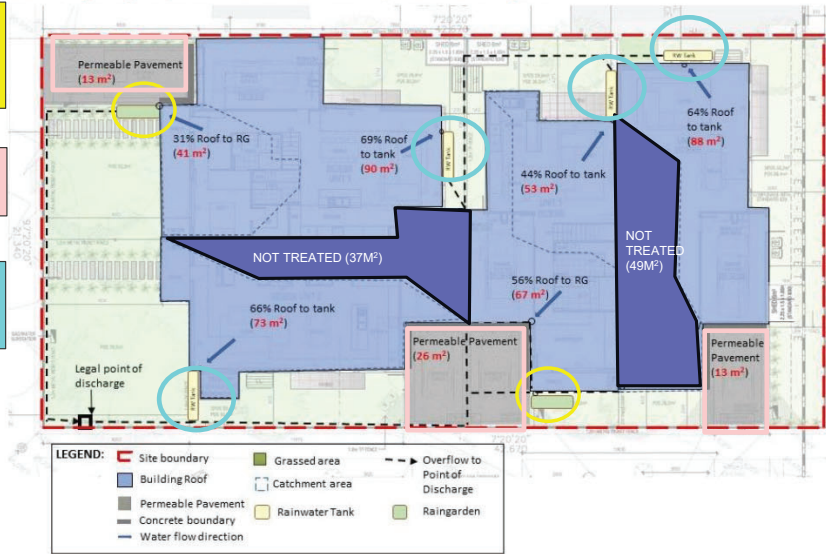


Figure 1: Site layout plan

- B: Site layout plan, catchment areas and WSUD treatment systems:**
- B1:** Provide a site layout plan showing all building roofs and covered areas, pervious (unsealed) surface areas and impervious (sealed) surface areas with dimensions. These details must be consistent with the plans and other documents lodged with the planning application.
 - B2:** Show the site boundary, dimensions, and total site area on the site layout plan.
 - B3:** Show the legal point of discharge (see checklist for further description).
 - B4:** Specify the area draining to each downpipe, treatment and legal point of discharge – includes both impervious and pervious areas (see checklist for further description).

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Melbourne Water STORM Rating Report

TransactionID: 777732
 Municipality: DAREBIN
 Rainfall Station: DAREBIN
 Address: 100 Bones Road
 Darebinvale
 VIC 3075
 Assessor: Darebin City Council
 Development Type: Residential - Multiunit
 Allotment Site (m2): 911.00
 STORM Rating %: 117

Note permeable paving area is set at 0m² with no treatment – this is technically correct, as STORM assumes this is impervious (ie no specific modelling)

Description	Impervious Area (m2)	Treatment Type	Treatment Area/Volume (m2 or L)	Occupants / Number Of Bedrooms	Treatment %	Tank Water Supply Reliability (%)
Roof_1_toTank	90.00	Rainwater Tank	2,000.00	3	132.20	88.80
Roof_1_toRaingarden	41.00	Raingarden 100mm	2.00	0	133.85	0.00
PermeablePave_1	0.00	None	0.00	0	0.00	0.00
Roof_2_toTank	73.00	Rainwater Tank	2,000.00	3	153.10	84.40
Roof_2_toSW	37.00	None	0.00	0	0.00	0.00
PermeablePave_2	0.00	None	0.00	0	0.00	0.00
Roof_3_toTank	53.00	Rainwater Tank	1,500.00	3	164.00	82.00
Roof_3_toSW	67.00	Raingarden 100mm	2.00	0	131.55	0.00
PermeablePave_3	0.00	None	0.00	0	0.00	0.00
Roof_4_toTank	88.00	Rainwater Tank	2,000.00	3	136.40	87.20
Roof_4_toSW	49.00	None	0.00	0	0.00	0.00
PermeablePave_4	0.00	None	0.00	0	0.00	0.00

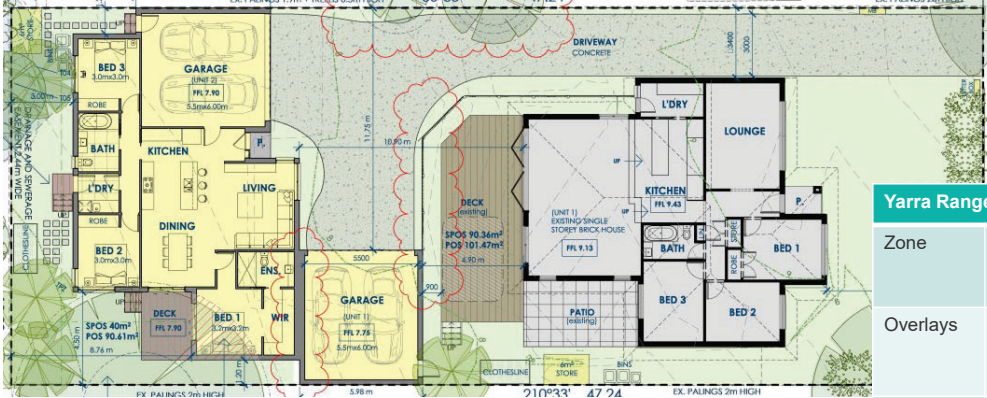
Figure 2: STORM model inputs and output

Fully compliant with B9

- ✔ Meets BPEM – STORM rating >100%
- ✔ Cooling/greening – raingardens, reduced site coverage
- ✔ Practical – clear connection between treatment and LPOD; raingardens are in planter boxes to minimize maintenance/risk of damage; add note on plan to ensure tanks connected to toilet/laundry at building permit stage

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Real life example – Construction of second dwelling on a lot



Yarra Ranges Planning Scheme	
Zone	Neighbourhood Residential Zone (NRZ)
Overlays	Significant Landscape Overlay (Schedule 23)
PPF	19.03-3L Water Management 15.01-2L Environmentally Sustainable Development
PSAs Strategic	Integrated Water Management Plan 2017

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19.03-3L Water management

02/12/2022
C195yran

Strategies

Incorporate Water Sensitive Urban Design principles and best practice stormwater management standards in development proposals.
Support the use of drought proof landscaping and retention of existing vegetation to reduce water consumption.
Minimise the impacts of reticulated services infrastructure on the landscape and environment.

Domestic

Facilitate the capture, storage, and recycling of stormwater and wastewater for non-drinking purposes.
Support water sensitive urban design as part of stormwater drainage infrastructure.
Ensure waterways and groundwater are not contaminated by household wastewater.

15.01-2L Environmentally Sustainable Development

02/12/2022
C195yran

Policy application

This policy applies to use or development of land for the following:

- Three or more dwellings on a lot.
- A residential building, residential village or retirement village.
- Commercial or office building with a gross floor area of more than 500 metres square.
- An extension to the gross floor area of an existing commercial or office building by more than 500 metres square.
- In the case of additions, the policy only applies to the additions to an existing building.

- No structure plan/DCP in place – site based solution
- No specific local planning policy regarding SWQ/WSUD
- ESD policy does not apply
- No guidance in IWMP/Engineering Guidelines regarding preferred treatment type on private land



Yarra Ranges Council Development Engineering Guidelines

7.7 Water Sensitive Urban Design (WSUD).....	24
7.7.1 MUSIC software.....	24
7.7.2 Storm calculator.....	24
7.7.3 Payment of levies to Melbourne Water.....	25
7.7.4 Little Stringybark Creek.....	25

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What should the application include?

Multi unit developments

- STORM report (standalone or part of ESD report)
- Written response to standards, either by drainage engineer or project planner/architect (more likely)
- Site plans and upfront landscape plan. Must show what asset is proposed and where it is to be located
- 'Standard drawing' of stormwater asset (rain garden only)

The application material must have sufficient detail for you to be able to answer 3 key questions:

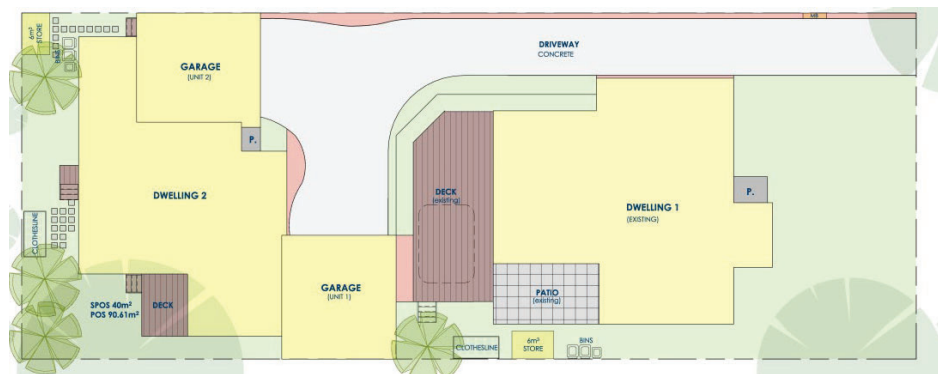
1. What are they doing to meet Best Practice (ie comply)?
2. Does it actually meet Best Practice?
3. Is it on the plans?

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Step 1 – What are they doing?

Application material provided:

- Planning Report (including Rescode assessment)
- Landscape Plans
- Site and elevation plans



OBJECTIVE
55.03-4 Permeability objective
 To reduce the impact of increased stormwater run-off on the drainage system. To facilitate on-site stormwater infiltration.

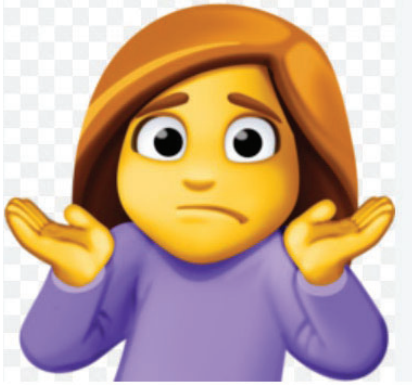
Standard B9
 The site area covered by the pervious surfaces should be at least the minimum area specified in the schedule to the zone, or if no minimum is specified in a schedule to the zone, 20 percent of the site.

GUIDELINES	COMPLIANCE
Decision guidelines Before deciding on an application, the responsible authority must consider: <ul style="list-style-type: none"> • The design response. • The existing site coverage and any constraints imposed by existing development. • The capacity of the drainage network to accommodate additional stormwater. • The capacity of the site to absorb run-off. • The practicality of achieving the minimum site coverage of pervious surfaces, particularly on lots of less than 300 square metres. 	The permeability of the site is approximately 42.84%. The permeable surface area of the proposed development is in excess of the 20% as required by the Rescode. Drainage / absorption and run off shall be to council or relevant authority's approval.

- Report does not mention BPBM response/requirements in B9 response
- No tanks/SWQ shown on site/architectural plans
- No tanks/SWQ shown on landscape plans

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Step 2 – Does it comply?



No modelling submitted with application!

Option 1

RFI

This is the correct “statutory” response

Option 2

DIY

This is the pragmatic response if you have the time (water tanks only)

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Do I have enough information to make a STORM model?



PROPOSED AREAS:			
UNIT 1	LOCATION	M ²	
	GROUND FLOOR	145.95	P.O.S
	PORCH (P)	2.44	101.47m ²
	GARAGE	37.87	S,P,O,S
	TOTAL BUILDING AREA	183.82	90.36m ²
UNIT 2	LOCATION	M ²	
	GROUND FLOOR	119.43	P.O.S
	PORCH (P)	1.25	90.61m ²
	GARAGE	37.87	S,P,O,S
	TOTAL BUILDING AREA	157.30	40.00m ²
TOTAL LOT SIZE			864.02m ²
TOTAL FOOTPRINT PROPOSED			341.12m ² 39.48%
TOTAL HARDSTANDING (DRIVEWAY) EXCL. PERMEABLE PAVEMENT			152.75m ² 17.68%
TOTAL SITE PERMEABILITY			370.15m ² 42.84%
TOTAL GARDEN AREA			333.03m ² 38.54%

Site area – 864.02m²
 Total pervious – 370.15m²
 Total impervious – 493.87m²

Dwelling 1 roof – 183.82m²
 Dwelling 1 bedrooms - 3

Dwelling 2 roof – 157.30m²
 Dwelling 2 bedrooms - 3

Driveway/hard surface – 152.75m²

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STORM Calculation Results:

Storm Rating: 52%

An additional 48% of treatment is required to achieve Water Quality objectives

Select Report Format:

PDF Format
XLS Format

Export Result

Results for individual treatments:

Impervious Area Names	Impervious Area (m ²)	Treatment Type	Treatment Size (m ³ or L)	Occupants / Number of Bedrooms	STORM Rating (%)	Tank Water Supply reliability (%)
Unit 1 - Roof	183.82	Rainwater Tank	2000	3	71.2	93
Unit 2 - Roof	157.3	Rainwater Tank	2000	3	79.6	92.5
Driveway	152.75	None	0	0	0	0

Return to Calculations

2 x 2,000lt water tanks (total 4,000 lt)

STORM Calculations Results

STORM Calculation Results:

Storm Rating: 70%

An additional 30% of treatment is required to achieve Water Quality objectives

Select Report Format:

PDF Format
XLS Format

Export Result

Results for individual treatments:

Impervious Area Names	Impervious Area (m ²)	Treatment Type	Treatment Size (m ³ or L)	Occupants / Number of Bedrooms	STORM Rating (%)	Tank Water Supply reliability (%)
Unit 1 - Roof	183.82	Rainwater Tank	5500	3	99.4	99.1
Unit 2 - Roof	157.3	Rainwater Tank	4700	3	103.4	86.5
Driveway 1	152.75	None	0	0	0	0

Return to Calculations

5,500lt tank + 4,700lt tank (total 10,200lt)

Warning: a treatment size greater than 4719.00 L at row 2 will not result in significant additional treatment

STORM calculator

The STORM Calculator

Welcome to the STORM Calculator. You now need to submit details relating to your development site.

Questions? Have a look at the help page or contact your Council's Planning or Environmentally Sustainable Design department as part of the Council permit requirements.

* Required field

Municipality: *

Rainfall Station: *

Click here to find the location of a Total Site Area: *

Address: *

Suburb / Postcode: *

Assessor: *

Development Type: * Residential - Multiunit

You now need to list every impervious area (hard surfaces e.g. roof, road) on your site and detail your planned treatment measures.

All hard surface areas must be listed with their area - if there is no treatment choose NONE in the treatment field box.

- You can add or delete rows by selecting the Add Treatment Row and Delete Selected Rows buttons.
- Once you have finished select Calculate.
- Select Restart to clear all details and begin again.

Impervious Area Names	Impervious Area (m ²)	Treatment Type	Treatment Size (m ³ or L)	Number of Bedrooms	Delete Row
Unit 1 - Roof	183.82	Rainwater Tank	6000	3	<input type="checkbox"/>
Unit 2 - Roof	157.3	Rainwater Tank	6000	3	<input type="checkbox"/>
Driveway 1	152.75	None	0	0	<input type="checkbox"/>

Add Treatment Row Delete Selected Rows Calculate Restart

Warning: a treatment size greater than 5514.60 L at row 1 will not result in significant additional treatment

STORM calculator

The STORM Calculator

Welcome to the STORM Calculator. You now need to submit details relating to your development site.

Questions? Have a look at the help page or contact your Council's Planning or Environmentally Sustainable Design department as part of the Council permit requirements.

* Required field

Municipality: *

Rainfall Station: *

Click here to find the location of a Total Site Area: *

Address: *

Suburb / Postcode: *

Assessor: *

Development Type: * Residential - Multiunit

You now need to list every impervious area (hard surfaces e.g. roof, road) on your site and detail your planned treatment measures.

All hard surface areas must be listed with their area - if there is no treatment choose NONE in the treatment field box.





- You can add or delete rows by selecting the Add Treatment Row and Delete Selected Rows buttons.
- Once you have finished select Calculate.
- Select Restart to clear all details and begin again.

Impervious Area Names	Impervious Area (m ²)	Treatment Type	Treatment Size (m ³ or L)	Number of Bedrooms	Delete Row
Unit 1 - Roof	183.82	Rainwater Tank	6000	3	<input type="checkbox"/>
Unit 2 - Roof	157.3	Rainwater Tank	0.0	3	<input type="checkbox"/>
Driveway 1	152.75	None	0.0	0	<input type="checkbox"/>

STORM tells you once you hit your maximum water tank capacity – if not 100%, means they need **less** hard surface or **additional** treatment for driveway/hard surface.

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3. What's on the plans?

Location and type of SWQ treatment	
Size of SWQ treatment	
Whose land is it on?	
SWQ treatment shown on landscape plan	
Legal point of discharge	Established, serviced residential area – assume front of lot, confirm through internal referral

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HOLD POINT – RFI REQUIRED



Information required

- Modelling/assessment to demonstrate how and that they will achieve BPEM stormwater quality treatment as required under Standard B9
- Amended plans showing size, location and type of any treatment assets in accordance with modelling

Key issues

- Based on preliminary assessment by STORM, water tanks only are likely to be insufficient to meet BPEM and comply Standards B9/C25
- Require either reduction in hard surfacing or provide additional stormwater treatment assets sited/designed to treat driveway areas (eg in-ground raingarden)

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Other things to consider

- Does your Council have a preference (including publicly available guidelines) as to what stormwater treatment assets are suitable for different contexts? If something won't be accepted, flag this.
- Applicant capacity and product availability:
 - Raingardens need additional modelling and specific design.
 - Permeable paving – consider what and where. Engineering may need to advise re: driveway materials
- Where would it need to go – low point/before LPOD. Can runoff get there? How does this fit in with the development layout/landscaping?
- Ongoing maintenance – what's required and is this reasonable given the use/layout of the site
- Resourcing, capacity and processes for enforcement – what does your Council do?

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