

Ministerial Building Standard MBS 009

On-site retention of stormwater

May 2023



**Government of
South Australia**

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1. SCOPE AND APPLICATION

- 1.1 This Standard is published as a Ministerial Building Standard that forms part of the Building Rules under section 80 of the *Planning, Development and Infrastructure Act 2016* and must be read in conjunction with the requirements of that Act and the Planning, Development and Infrastructure (General) Regulations 2017.
- 1.2 This Standard sets out cost-effective technical solutions for *stormwater retention* systems for retaining some *surface water* runoff on-site.
- 1.3 The provisions of this Standard apply to Class 1 and 2 dwellings, and Class 10a buildings associated with Class 1 and 2 buildings (as defined by the *Building Code*), where the *relevant authority* has directed that on-site *stormwater retention* devices must be incorporated as part of the stormwater drainage system.
- 1.4 Unless otherwise stated, a reference to the *Building Code* or an Australian Standard in this Standard is a reference to the edition current at the time of application.

2. PERFORMANCE REQUIREMENTS

- 2.1 In addition to *Performance Requirements H2P1(1)* and *H2P1(3)* of Volume Two of the *Building Code* for Class 1 buildings and associated Class 10a buildings, *surface water* runoff from a storm having an *average recurrence interval* of 1 in 5 years must be retained on site.
- 2.2 In addition to *Performance Requirements F1P1* and *F1P3* of Volume One of the *Building Code* for Class 2 buildings and associated Class 10a buildings, *surface water* runoff from a storm having an *average recurrence interval* of 1 in 5 years must be retained on site.

3. DEEMED TO SATISFY PROVISIONS

3.1 Acceptable on-site *stormwater retention* devices

- 3.1.1 Where the *relevant authority* has directed that on-site *stormwater retention* must be provided and incorporated as part of the stormwater drainage system to satisfy **Performance Requirement 2.1 or 2.2** as relevant, the retention can be achieved on suitable soil types (refer **clause 3.3**) by the installation of one or more appropriate on-site retention devices, acceptable forms of which are either *soakage trenches* or *soakage wells*, sized in accordance with the relevant tables provided in this Standard.

3.2 Selection of appropriate design table and percentage of run-off to be retained

- 3.2.1 Selection of the appropriate table for the sizing of a retention device for a particular site must be as directed by the *relevant authority*. The *relevant authority* must also determine the percentage of roof runoff to be retained on-site by the retention device/s.

3.3 Site restrictions on the use of on-site retention of stormwater

- 3.3.1 The use of on-site retention devices is restricted to soil types classified as Class A and S or Class M, where the characteristic surface movement, (y_s value) is equal to or less than 25mm, as defined in Australian Standard AS 2870 – *Residential slabs and footings*, and where the following conditions exist:
- the slope of the natural ground does not exceed 1 in 10; and
 - the depth to rock is 1.2m or greater; and
 - the ground-water table is permanently below 1.5m from the *natural ground surface* or the *final ground surface*, whichever is the lowest.

- 3.3.2** The use of on-site retention devices is not recommended on sites that have deep moisture changes such as those classified as M-D, H1-D, H2-D, E-D sites, nor Class P sites as defined in Australian Standard AS 2870 – *Residential slabs and footings*. Their use is also not suitable for sites where the slope of the land is more than 1 in 10.
- 3.3.3** On-site retention devices must not be installed in fill (refer **Figures 3.1(a)** and **3.1(b)**).

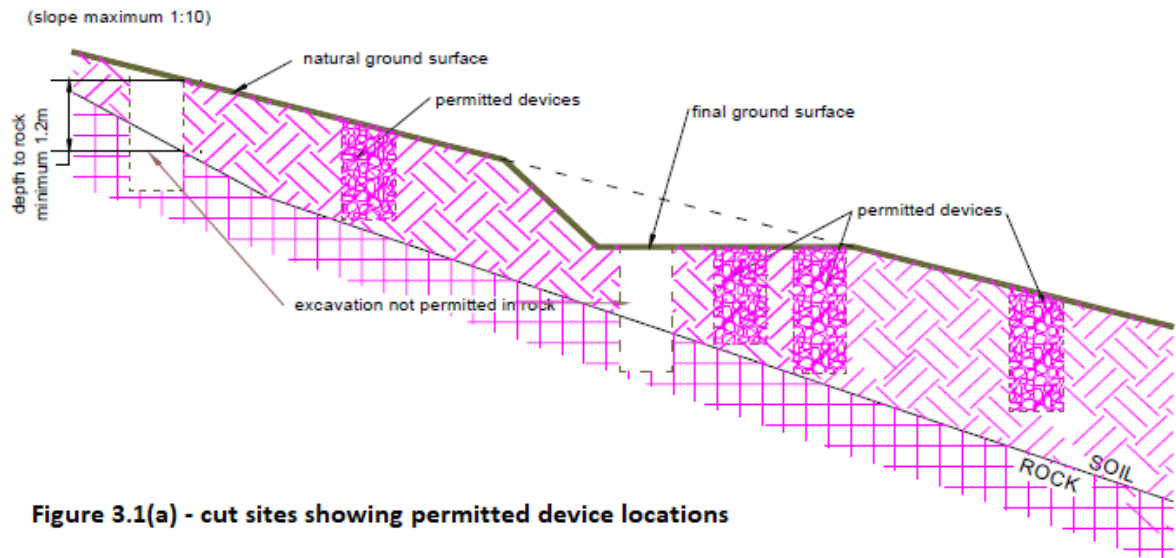


Figure 3.1(a) - cut sites showing permitted device locations

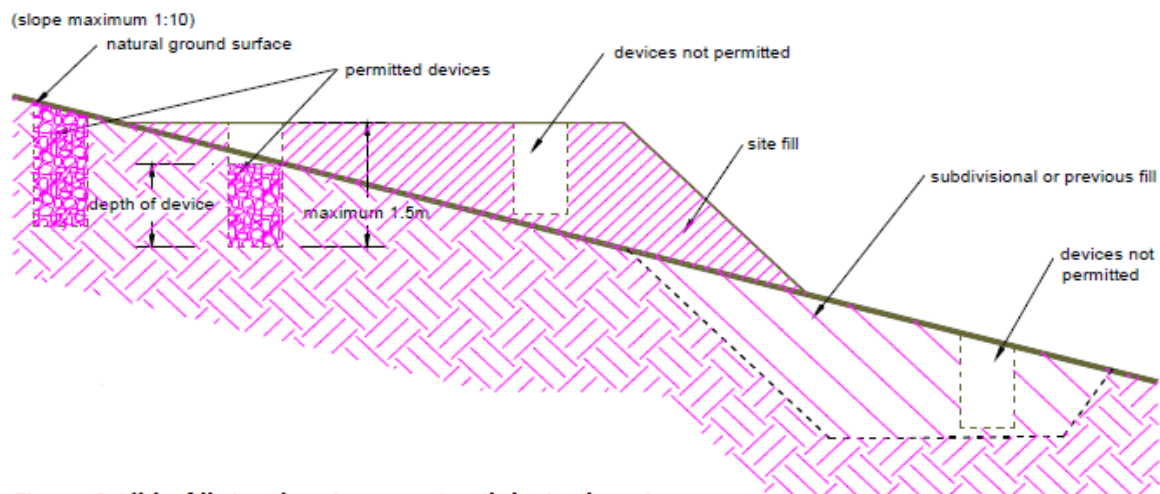


Figure 3.1(b) - fill site showing permitted device location

Note: Figures 3.1(a) and 3.1(b) are not to scale

3.4 Soakage trenches

- 3.4.1** Where the *relevant authority* responsible for issuing development approval has identified that on-site *stormwater retention* is necessary as part of the stormwater drainage system to avoid stormwater damaging or creating a nuisance to other property, *soakage trenches* constructed in accordance with **clause 3.4.3** and **Figure 3.4** can be used in conjunction with the stormwater provisions in the *Building Code* to satisfy **Performance Requirement 2.1** and **2.2**.
- 3.4.2** Where *soakage trenches* are to be used to achieve on-site retention of surface stormwater run-off for a particular storm event, the sizing of the device/s must be in accordance with the relevant design criteria applicable to the site as set out in **Tables 3.1, 3.2** or **3.3** herein. The total *required* length may be achieved by the installation of a single trench or multiple *soakage trenches* and interpolation of the tables is permitted.

Note that numbers greater than 10 have been rounded to the nearest whole number for simplicity. Refer to the Appendices for worked examples showing how to apply the tables to the design of a soakage device.

Table 3.1 - Total required length of soakage trench (metres)
ARI = 1 in 5 year, 30 minute storm event

Soakage Trench dimensions (metres)		Soil Type	Catchment Area (m ²)									
			20	40	60	80	100	120	140	160	180	200
		Total required length of soakage trench (metres)										
width	0.3	A/S	4.3	8.6	13	17	22	26	30	35	39	43
depth	0.5	M-D	5.8	12	18	23	29	35	41	47	53	58
width	0.3	A/S	2.4	4.8	7.2	9.6	12	14	17	19	22	24
depth	1	M-D	3.0	6.0	9.0	12	15	18	21	24	27	30
width	0.3	A/S	2.0	4.0	6.1	8.1	10	12	14	16	18	20
depth	1.2	M-D	2.5	5.0	7.6	10	13	15	18	20	23	25
width	0.6	A/S	2.3	4.6	6.9	9.2	12	14	16	18	21	23
depth	0.5	M-D	3.0	5.9	8.9	12	15	18	21	24	27	30
width	0.6	A/S	1.2	2.5	3.8	5.1	6.4	7.7	9.0	10	12	13
depth	1	M-D	1.5	3.1	4.6	6.1	7.7	9.2	11	12	14	15
width	0.6	A/S	1.1	2.1	3.2	4.3	5.4	6.5	7.6	8.7	9.8	11
depth	1.2	M-D	1.3	2.6	3.8	5.1	6.4	7.7	9.0	10	12	13
width	0.9	A/S	1.5	3.1	4.7	6.2	7.8	9.4	11	13	14	16
depth	0.5	M-D	2.0	4.0	6.0	8.0	10	12	14	16	18	20
width	0.9	A/S	0.8	1.7	2.6	3.5	4.4	5.2	6.1	7.0	7.9	8.8
depth	1	M-D	1.0	2.0	3.1	4.1	5.1	6.2	7.2	8.2	9.3	10
width	0.9	A/S	0.7	1.5	2.2	3.0	3.7	4.5	5.2	6.0	6.7	7.5
depth	1.2	M-D	0.9	1.7	2.6	3.4	4.3	5.2	6.0	6.9	7.8	8.6

Table 3.2 - Total required length of soakage trench (metres)
ARI = 1 in 5 year, 1 hour storm event

Soakage Trench dimensions (metres)		Soil Type	Catchment Area (m ²)									
			20	40	60	80	100	120	140	160	180	200
		Total required length of soakage trench (metres)										
width	0.3	A/S	4.3	9.4	14	19	24	28	33	38	43	47
depth	0.5	M-D	7.2	14	22	29	36	43	50	58	65	72
width	0.3	A/S	2.6	5.3	8.0	11	13	16	19	22	24	27
depth	1	M-D	3.8	7.6	11	15	19	23	27	30	34	38
width	0.3	A/S	2.2	4.5	6.8	9.1	11	14	16	18	21	23
depth	1.2	M-D	3.2	6.3	9.5	13	16	19	22	25	29	32
width	0.6	A/S	2.5	5.0	7.6	10	13	15	18	20	23	25
depth	0.5	M-D	3.7	7.4	11	15	19	22	26	30	33	37
width	0.6	A/S	1.4	2.9	4.4	5.8	7.3	8.8	10	12	13	15
depth	1	M-D	1.9	3.9	5.9	7.8	9.8	12	14	16	18	20
width	0.6	A/S	1.2	2.5	3.7	5.0	6.3	7.5	8.8	10	11	13
depth	1.2	M-D	1.6	3.3	4.9	6.6	8.2	9.9	12	13	15	17
width	0.9	A/S	1.7	3.4	5.2	6.9	8.6	10	12	14	16	17
depth	0.5	M-D	2.5	5.0	7.5	10	13	15	18	20	22	25
width	0.9	A/S	1.0	2.0	3.0	4.0	5.0	6.0	7.1	8.1	9.1	10
depth	1	M-D	1.3	2.6	3.9	5.3	6.6	7.9	9.2	11	12	13
width	0.9	A/S	0.8	1.7	2.6	3.4	4.3	5.2	6.1	6.9	7.8	8.7
depth	1.2	M-D	1.1	2.2	3.3	4.4	5.5	6.6	7.7	8.9	10	11

Table 3.3 - Total required length of soakage trench (metres)
ARI = 1 in 5 year, 2 hour storm event

Soakage Trench dimensions (metres)		Soil Type	Catchment Area (m ²)									
			20	40	60	80	100	120	140	160	180	200
		Total required length of soakage trench (metres)										
width	0.3	A/S	4.6	9.2	14	19	23	28	32	37	42	46
depth	0.5	M-D	8.1	16	24	33	41	49	57	65	73	81
width	0.3	A/S	2.6	5.3	7.9	11	13	16	19	21	24	27
depth	1	M-D	4.4	8.7	13	18	22	26	31	35	40	44
width	0.3	A/S	2.2	4.5	6.8	9.1	11	14	16	18	21	23
depth	1.2	M-D	3.7	7.4	11	15	19	22	26	30	33	37
width	0.6	A/S	2.5	5.0	7.6	10	13	15	18	20	23	25
depth	0.5	M-D	4.3	8.5	13	17	21	26	30	34	39	43
width	0.6	A/S	1.5	3.0	4.5	6.1	7.6	9.2	11	12	14	15
depth	1	M-D	2.3	4.6	7.0	9.3	12	14	16	19	21	23
width	0.6	A/S	1.2	2.6	3.9	5.2	6.6	7.9	9.2	11	12	13
depth	1.2	M-D	1.9	3.9	5.9	7.9	9.8	12	14	16	18	20
width	0.9	A/S	1.7	3.5	5.2	7.0	8.8	11	12	14	16	18
depth	0.5	M-D	2.9	5.8	8.7	12	15	17	20	23	26	29
width	0.9	A/S	1.0	2.1	3.1	4.2	5.3	6.4	7.5	8.6	9.6	11
depth	1	M-D	1.5	3.1	4.7	6.3	7.9	9.5	11	13	14	16
width	0.9	A/S	0.8	1.8	2.7	3.7	4.6	5.5	6.5	7.4	8.3	9.3
depth	1.2	M-D	1.3	2.7	4.0	5.3	6.7	8.0	9.4	11	12	13

- 3.4.3** *Soakage trenches* must be constructed in accordance with the following-
- (a) the top of the *soakage trench* must be not less than 300mm below the *final ground surface*;
 - (b) the distance from the *final ground surface* to the base of the *soakage trench* must not be more than 1.5m;
 - (c) *soakage trenches* must be orientated parallel to the contour lines of the *natural ground surface* of the area in which the *soakage trench* is to be located;
 - (d) the *soakage trench* must be filled with single size aggregate with a minimum particle size of 20mm and maximum size of 75mm;
 - (e) the geo-textile fabric must completely encapsulate the aggregate backfilled *soakage trench*;
 - (f) the *soakage trench* must be fitted with an inspection point to enable maintenance and cleaning;
 - (g) all pipework must be a minimum of 90mm diameter Class 6 UPVC; and
 - (h) cover to pipework must be-
 - (i) under soil – 100mm; or
 - (ii) under paved or concrete areas – 50mm; or
 - (iii) under areas subject to light vehicular traffic-
 - (A) reinforced concrete – 75mm; or
 - (B) paved – 100mm.

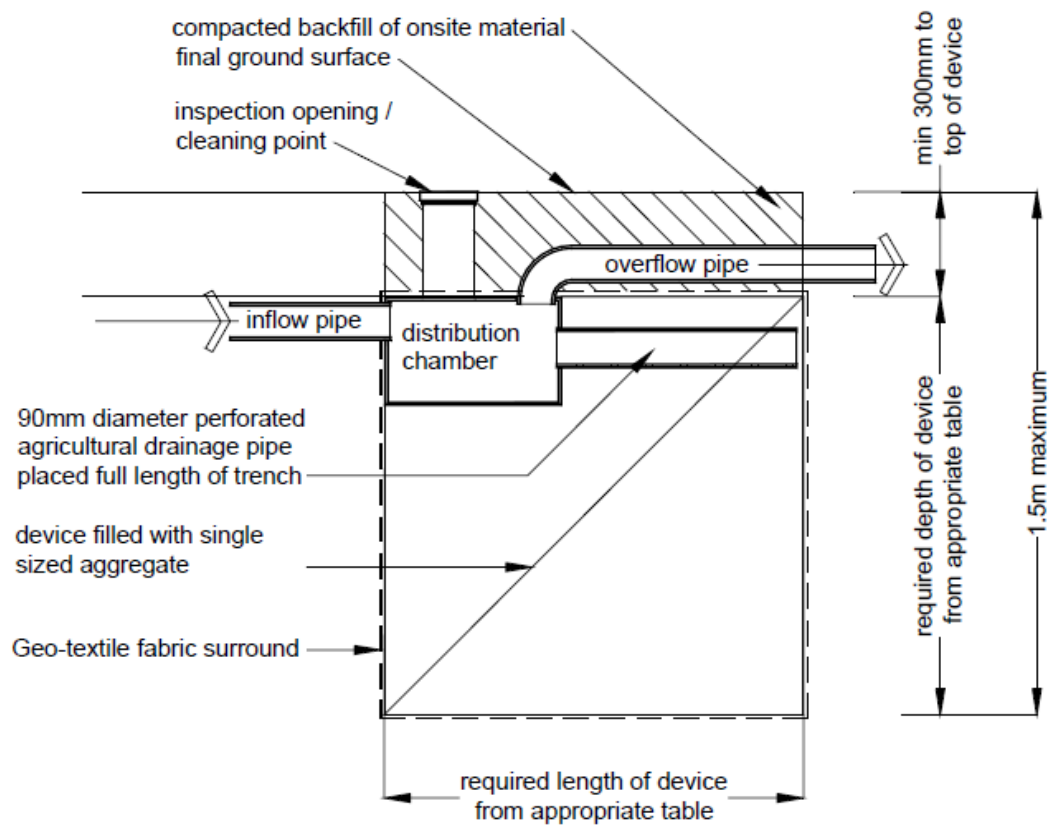


Figure 3.4 - soakage trench
Note: Figure 3.4 not to scale

3.5 Soakage wells

3.5.1 Where the *relevant authority* has identified that on-site *stormwater retention* is necessary as part of the stormwater drainage system to avoid stormwater damaging or creating a nuisance to other property, *soakage wells* constructed in accordance with **clause 3.5.3** and **Figure 3.5** can be used in conjunction with the stormwater provisions in the *Building Code* to satisfy **Performance Requirements 2.1** and **2.2**.

3.5.2 Where *soakage wells* are selected to achieve on-site retention of surface stormwater run-off, sizing of the device/s must be in accordance with the relevant design criteria applicable to the site as set out in **Tables 3.4, 3.5** or **3.6** herein. Total *required* depths more than 1.2m are to be achieved by the installation of multiple *soakage wells*. Interpolation of the tables is permitted.

Note that numbers greater than 10 have been rounded to the nearest whole number for simplicity.

Refer to the Appendices for worked examples showing how to apply the tables to the design of a soakage device.

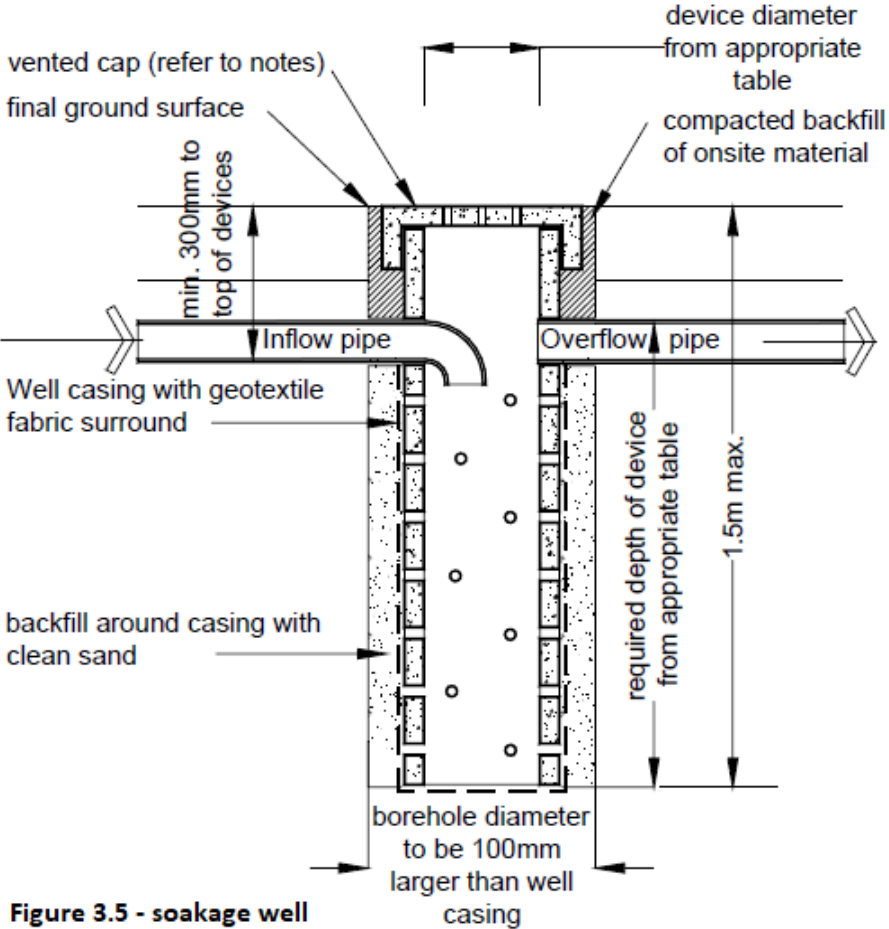


Figure 3.5 - soakage well

Note: Figure 3.5 is not to scale

Table 3.4 - Total required depth of soakage well (metres)
ARI = 1 in 5 year, 30 minute storm event

Soakage well diameter (metres)	Soil Type	Catchment Area (m ²)									
		20	40	60	80	100	120	140	160	180	200
		Total required depth of soakage well (metres)									
0.1	A/S	17	*	*	*	*	*	*	*	*	*
	M-D	33	*	*	*	*	*	*	*	*	*
0.2	A/S	5.6	11	17	23	*	*	*	*	*	*
	M-D	9.2	18	*	*	*	*	*	*	*	*
0.3	A/S	2.8	5.6	8.5	11	14	17	*	*	*	*
	M-D	4.2	7.2	13	17	*	*	*	*	*	*
0.6	A/S	0.8	1.7	2.6	3.4	4.3	5.2	6.1	6.9	7.8	8.7
	M-D	1.1	2.2	3.3	4.4	5.5	6.6	7.7	8.8	9.9	11
0.9	A/S	*	0.8	1.2	1.6	2.0	2.5	2.9	3.3	3.7	4.2
	M-D	*	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.4	4.9
1.2	A/S	*	*	0.7	0.9	1.2	1.4	1.7	1.9	2.2	2.4
	M-D	*	0.6	0.8	1.1	1.4	1.7	2.0	2.2	2.5	2.8
1.5	A/S	*	*	*	0.6	0.7	0.9	1.1	1.2	1.4	1.6
	M-D	*	*	*	0.7	0.9	1.1	1.3	1.4	1.6	1.8

* soakage well configuration not permitted

Table 3.5 - Total required depth of soakage well (metres)
ARI = 1 in 5 year, 1 hour storm event

Soakage well diameter (metres)	Soil Type	Catchment Area (m ²)									
		20	40	60	80	100	120	140	160	180	200
		Total required depth of soakage well (metres)									
0.1	A/S	20	*	*	*	*	*	*	*	*	*
	M-D	35	*	*	*	*	*	*	*	*	*
0.2	A/S	6.5	13	*	*	*	*	*	*	*	*
	M-D	10	20	*	*	*	*	*	*	*	*
0.3	A/S	3.3	6.6	10	13	17	*	*	*	*	*
	M-D	4.7	9.5	14	19	*	*	*	*	*	*
0.6	A/S	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10
	M-D	1.3	2.5	3.8	5.1	6.3	7.6	8.9	10	11	13
0.9	A/S	*	0.9	1.4	1.9	2.4	2.9	3.3	3.8	4.3	4.8
	M-D	0.6	1.1	1.7	2.3	2.9	3.5	4.0	4.6	5.2	5.8
1.2	A/S	*	0.5	0.8	1.1	1.4	1.7	1.9	2.2	2.5	2.8
	M-D	*	0.6	1.0	1.3	1.6	2.0	2.3	2.6	2.9	3.3
1.5	A/S	*	*	0.5	0.7	0.9	1.1	1.3	1.4	1.6	1.8
	M-D	*	*	0.6	0.8	1.0	1.3	1.5	1.7	1.9	2.1

* soakage well configuration not permitted

Table 3.6 - Total required depth of soakage well (metres)
ARI = 1 in 5 year, 2 hour storm event

Soakage well diameter (metres)	Soil Type	Catchment Area (m ²)									
		20	40	60	80	100	120	140	160	180	200
		Total required depth of soakage well (metres)									
0.1	A/S	16	*	*	*	*	*	*	*	*	*
	M-D	36	*	*	*	*	*	*	*	*	*
0.2	A/S	6.0	12	18	*	*	*	*	*	*	*
	M-D	11	22	*	*	*	*	*	*	*	*
0.3	A/S	3.2	6.4	9.6	13	16	*	*	*	*	*
	M-D	5.4	11	16	*	*	*	*	*	*	*
0.6	A/S	1.0	2.0	3.1	4.1	5.2	6.2	7.3	8.3	9.3	10
	M-D	1.5	3.0	4.5	6.0	7.6	9.1	11	12	14	15
0.9	A/S	*	*	*	*	*	*	*	*	*	5.2
	M-D	0.7	1.4	2.1	2.8	3.5	4.2	4.9	5.6	6.3	7.0
1.2	A/S	*	0.5	0.9	1.2	1.5	1.8	2.1	2.4	2.8	3.1
	M-D	*	0.8	1.2	1.6	2.0	2.4	2.8	3.2	3.6	4.1
1.5	A/S	*	*	0.5	0.8	1.0	1.2	1.4	1.6	1.8	2.0
	M-D	*	0.5	0.8	1.0	1.3	1.6	1.8	2.1	2.4	2.6

* soakage well configuration not permitted

3.5.3 Soakage wells must be constructed in accordance with the following-

- (a) the top of the perforated section of soakage well casing must be not less than 300mm below the *final ground surface*;
- (b) the distance from the *final ground surface* to the base of the soakage well must not be more than 1.5m (*refer to notes re depth limitations*);
- (c) perforations to the concrete or uPVC casing must not be less than 5% of the surface area of the casing and must be uniformly distributed;
- (d) all pipework must be a minimum of 90mm diameter;
- (e) the soakage well must not be filled with aggregate;
- (f) the soakage well must be capped for safety reasons;
- (g) the cap must be vented to the *final ground surface*;
- (h) the cap must be easily identifiable and accessible for cleaning purposes; and
- (i) cover to pipework must be-
 - (i) under soil – 100mm;
 - (ii) under paved or concrete areas – 50mm; or
 - (iii) under areas subject to light vehicular traffic-
 - (A) reinforced concrete – 75mm; or
 - (B) paved – 100mm.

3.6 Setback distances

- 3.6.1 Retention devices shall be located a minimum of 3m from all property boundaries, (excluding front boundaries and/or reserves) and 3m from footings of all structures located on the allotment.
- 3.6.2 A minimum clear spacing of 1m between the sides of the retention device and any service trench is *required*.

3.7 Distances between devices

- 3.7.1 Where two or more retention devices are installed, the clear distance between the edges of the devices must be 1.5 times the depth of the deepest device.

3.8 Overflow device

- 3.8.1 All on-site retention devices must be fitted with an *overflow device* at the inlet end of the device.

3.9 Overflows

- 3.9.1 Overflows must be disposed of to the street water table or other public infrastructure designed to accept stormwater in accordance with the requirements of the *relevant authority*.
- 3.9.2 Surface stormwater run-off discharging from overflows must be disposed of in a way that avoids the likelihood of damage or nuisance to other property.

3.10 Filtration device

- 3.10.1 A device for the filtration of the surface stormwater run-off must be located between the gutter and the inlet pipe of the retention device.
- 3.10.2 Filtration devices must be identifiable, accessible and cleanable.

3.11 Gutters and pipework

- 3.11.1 All associated gutters and pipework *required* to direct the surface stormwater run-off to the device, and pipework from the device to the off-site stormwater disposal system must be designed and installed in accordance with-
- (a) Australian Standard *AS/NZS 3500.3 Plumbing and drainage – Stormwater drainage*; or
 - (b) for Class 1 buildings - **Part 7.4 Gutters and downpipes** of Volume Two of the *Building Code*.

APPENDIX A

A1 INTERPRETATION

Average recurrence interval (ARI) applied to rainfall, means the expected or average interval between exceedances for a 5 minute duration rainfall intensity.

Building Code has the same meaning as defined in section 3 of the *Planning, Development and Infrastructure Act 2016*.

Catchment area means the proportion of the surface catchment area, expressed in square metres, that the *relevant authority* requires stormwater run-off from, to be retained.

Final ground surface means the ground surface from which the device is installed.

Natural ground surface means the ground surface prior to human intervention.

Over-flow device means a device used with the on-site *stormwater retention* system to divert overflow away from structures and buildings in the event of a blockage of the system or run-off exceeding the system's capacity.

Performance Requirement has the same meaning as defined in the *Building Code*.

Professional engineer has the same meaning as defined in the *Building Code*.

Relevant authority for the purposes of this Standard means the council or the State Planning Commission.

Required means required by this Standard.

Roof catchment area means the total area, expressed in square metres, of the roof measured on the horizontal (no allowance for slope or vertical surfaces) and is to include the roof area of any fully or partly covered carport, portico, verandah, balcony, porch or similar structure attached to the building.

Soakage trench means a retention device, installed horizontally.

Soakage well means a retention device installed vertically.

Stormwater retention means the practice of inhibiting the release of stormwater run-off into the existing infrastructure through the installation of on-site soakage devices that retain surface stormwater run-off on-site. The run-off is absorbed into, and percolates through, the surrounding soil strata.

Surface water has the same meaning as defined in the *Building Code*.

APPENDIX B

B1 WORKED EXAMPLES – Using *soakage trenches*

B1.1 A single unit development having a total *roof catchment area* of 160m² is located on an allotment with Class A soil. The *relevant authority* has specified the following design parameters:

ARI = 1 in 5

Storm event = 1 hour

Roof run-off to be retained = 50% of the total roof catchment area*.

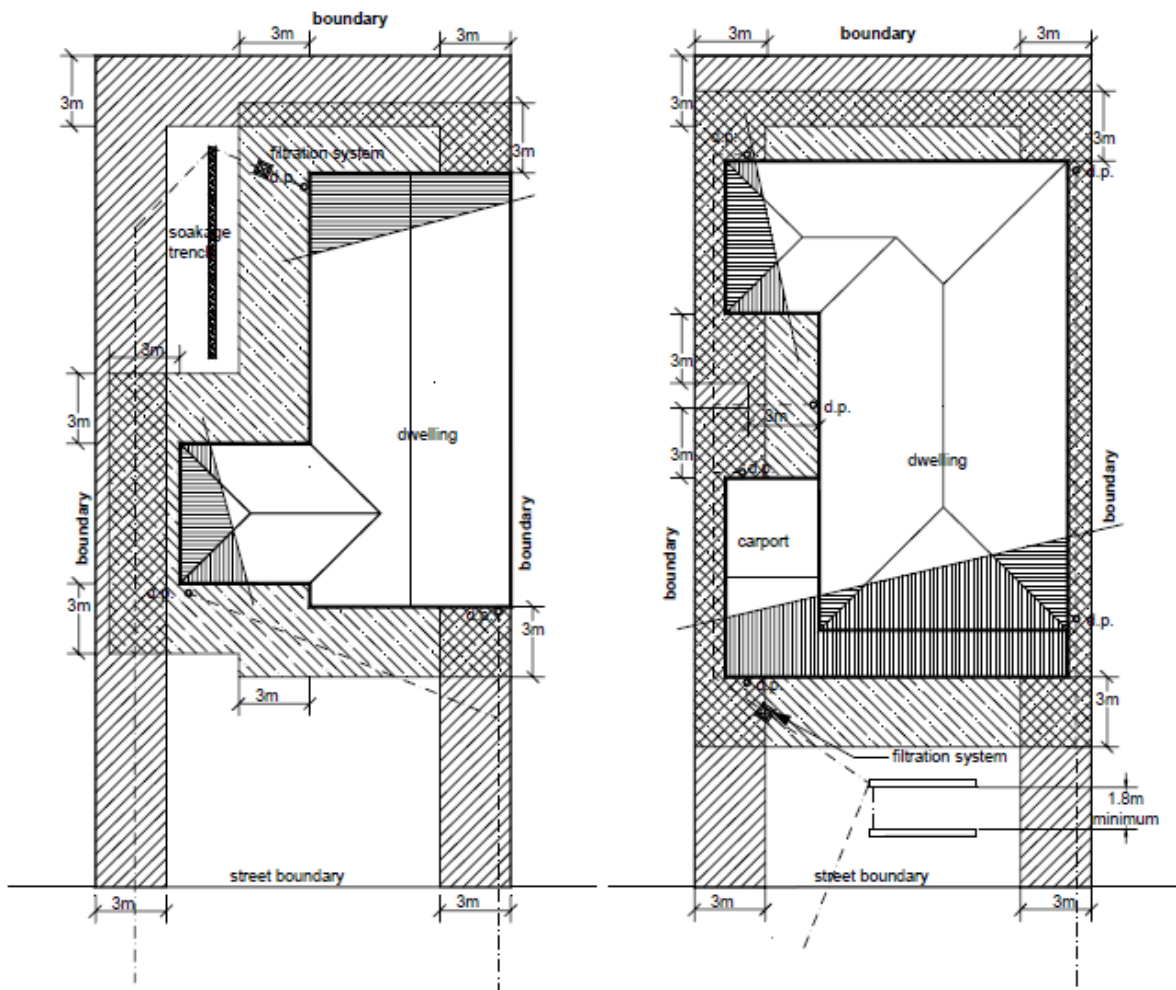
* The percentage of runoff to be retained on-site is determined by the *relevant authority* responsible for local stormwater management.

The design parameters specified necessitate the use of **Table 3.2**. By determining the *catchment area required* to be retained, an appropriately sized device can be selected for the configuration of the allotment.

Catchment area = 80sqm (50% of 160sqm)

Selected device = one 0.3m wide by 1.2m deep by 9.1m long trench or two 0.3m wide by 1.2m deep by 4.55m long trenches.

Refer to **Figure B1** for examples of how *soakage trenches* can be used to provide the *required stormwater retention* on-site.



OPTION 1 - Single Trench -
one trench @ 300mm wide
x 1.2m deep x 9.1m long

OPTION 2 - Multiple Trenches
two trenches @ 300mm wide
x 1.2m deep x 4.55m long

Notes

- Stormwater disposal including overflows as directed by the relevant authority
- Stormwater drainage system to AS/NZS 3500.3.2
- Construction of soakage trenches is not permitted in these zones



Minimum clear distance between sides of devices
= 1.5m deep x 1.2
= 1.8m

Figure B1 - Location of soakage trenches

Note: Figure B1 not to scale

B2 WORKED EXAMPLE – Using *soakage wells*

B2.1 A single unit development having a total *roof catchment area* of 200m² is located on an allotment with Class M-D ($y_s < 25\text{mm}$) soil. The *relevant authority* has specified the following design parameters:

<i>ARI</i>	=	<i>1 in 5</i>
<i>Storm Event</i>	=	<i>30 minutes</i>
<i>Run-off to be retained</i>	=	<i>50% of the total roof catchment area*</i>

* The percentage of runoff to be retained on-site is determined by the *relevant authority* responsible for local stormwater management.

The design parameters specified necessitate the use of **Table 3.4**. By determining the *catchment area* to be retained, an appropriately sized device can be selected for the configuration of the allotment.

<i>Catchment area</i>	=	<i>100sqm (50% of 200sqm)</i>
<i>Selected devices</i>	=	<i>0.9m diameter soakage well with total depth of 2.5m</i>
	=	<i>multiple soakage wells required – two at 0.8m deep plus one at 0.9m deep</i>

Refer to **Figure B2** for examples of how *soakage wells* can be used to provide the *required stormwater retention* on-site.

B3 NOTES

B3.1 Depth limitations

- (a) The specification has limited the depth of soakage devices to 1.5m due to restrictions imposed on excavation depths greater than 1.5m by the *Work, Health and Safety Regulations 2012* and the likely impact of water on the soil/foundations at depths greater than 1.5m.
- (b) The maximum depth of 1.5m used in the specification may be exceeded if-
 - (i) the allotment conditions (slope, depth to water table and rock) are confirmed in a report from a *professional engineer* as suitable and that existing and proposed building structures will not be adversely impacted by retaining runoff at the proposed depth; and
 - (ii) the additional requirements of the *Work, Health and Safety Regulations 2012* are complied with.

B3.2 Maintenance

- (a) In addition to the installation of filtration devices to the on-site *stormwater retention* system, retention trenches and wells should be inspected and cleaned on a regular basis.
- (b) Overflow, discharge or bleed-off pipes from roof mounted appliances such as evaporative air conditioners, hot water services and solar heaters should not discharge onto the *catchment area*.

B3.3 Sizing tables

- (a) The sizing tables were prepared by the Urban Water Resource Centre – University of South Australia incorporating the following design parameters:
 - (i) Rainfall intensities for a 1 in 5 year *average recurrence interval*:
 - 30 minute storm duration = 33.4mm/hr
 - 1 hour storm duration = 21.7mm/hr
 - 2 hour storm duration = 14.0mm/hr
 - (ii) The hydraulic conductivity used to calculate the size of the soakage devices in Class A and S sites is 2.5×10^{-5} m/s (assumes a blockage of 50%).
 - (iii) The hydraulic conductivity used to calculate the size of the soakage devices in Class M-D sites is 5×10^{-6} m/s (assumes a blockage of 50%).
 - (iv) Infiltration rates under steady state flow were derived from the Darcy Law Equation, with a time step of 1 minute.