

Purpose

The purpose of this Policy is to:

- Ensure that development is compatible with the design capacity of the existing stormwater system so as not to increase the incidence of downstream flooding;
 - Minimise maintenance issues with the stormwater system caused by private connections and to provide a consistent standard;
 - Ensure that stormwater capture and conveyance within a development site is properly managed through the provision of drainage infrastructure to appropriate capacity and standard;
 - Ensure that stormwater capture and conveyance within a development site is provided so that stormwater does not constitute a potential hazard or nuisance to persons or property including adjoining property;
 - Ensure that on-site detention systems are designed and constructed to be compatible with other aspects of site planning; and
 - Ensure that drainage works do not cause inconvenience or safety hazards to pedestrians or vehicular traffic.
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Scope

This Policy applies to the management of stormwater runoff from Shire of Boddington (Shire) buildings and private properties.

Definitions

Term	Meaning
Policy	This Shire of Boddington policy titled “Stormwater Management and Connection”.
ARI	Average Recurrence Interval Event.

Policy Statement

- Stormwater from buildings and surface water runoff is the responsibility of the landowner to effectively manage and to appropriately detain/retain stormwater on their property.
- All new subdivision/development within the municipality is required to detain stormwater on site and where possible retain stormwater. Where site conditions dictate, there may be a need to use appropriate bio retention to remove nutrients from stormwater runoff which may include soil amendments and use of nutrient absorbing plants. The minimum design criteria is to detain stormwater on site for the 1 in 1 year, 1 hour average recurrence interval (ARI) storm event. The total post-development 1 in 1 year ARI site runoff is to be controlled to be no greater than the pre-development 1 in 1 year ARI site runoff.
- Surface drainage systems are to be designed to ensure that overflows, with a 1 in 100 year ARI storm event do not present a hazard to people or cause damage to off-site property.

- Stormwater flows, ARI events, time of concentration, and runoff coefficients are to be in accordance with the relevant Australian Standards and/or guidelines endorsed by Engineers Australia.
- Rainfall intensity is to be in accordance with accepted guidelines or information relevant to the district. Appendix 1 sets out the rainfall intensity for Perth which is to be applied to the Shire of Boddington until there is updated information relevant.
- Stormwater runoff from impermeable surfaces in developments is to be managed in any one or more of the following ways, to the satisfaction of Council:
 - Soak wells;
 - Stormwater detention basins;
 - Rainwater tanks;
 - Infiltration basins and infiltration trenches;
 - Diversion or catch drains across a slope to convey runoff at a non-erosive velocity and to divert runoff from upslope areas around the site of a disturbance or an area at risk of erosion;
 - Installation of barriers positioned so as to intercept runoff and sediment;
 - Installation of sediment fences to reduce runoff velocities and cause the deposition of silt;
 - Swales;
 - Rain gardens;
 - Planting of continuous vegetated buggers; and/or
 - Any other method identified as being acceptable for controlling stormwater runoff to the satisfaction of Council.
- On site stormwater detention storage areas are to be located:
 - In an appropriate location, generally in or near the lowest point of the site;
 - So as to collect runoff from all roofed and impervious areas;
 - Clear of any surface flow path conveying stormwater runoff from adjoining land. If overland flow from adjoining properties enters the detention systems then this flow is to address the 1 in 100 year ARI event and conveyed by suitable means to bypass the detention system. Alternatively, the detention system can be enlarged to cater for the additional catchment areas;
 - As part of the overall development scheme for the site;
 - So that pedestrians movements are clear of the top water level for storms up to the 1 in 1 year ARI event;
 - On common property in the case of development within strata title schemes. Below ground storage can be provided under private courtyards provided that the surcharge point from the storage area and the primary means of access for maintenance is clearly provided from common property;
 - To ensure that no upstream pits have grate levels lower than the detention top water level; and
 - So that access to the system is readily available and not via any enclosed structures.
- Detention/retention may be achieved in clayey sites or where high groundwater exists by use of infiltration basins and infiltration trenches with associated trickle feed/outlets, appropriate fill, and/or sub-soil drainage systems.
- Vegetated basins for storing events greater than 1 in 1 year ARI events, 1 hour is to have batters no steeper than 1:6 and operational water depth not exceeding 0.9 metres.
- All above ground storage is to be integrated into landscaping areas which are to be appropriately vegetated.
- Soak wells are to be provided and maintained for impervious areas including car parks, driveways, and roofs. The collection points and soak wells are to be located so as to minimise the amount of runoff entering the road reserve. Soak wells are to be provided at the minimum

rate of storage to address the impervious area. Runoff is to be collected and conveyed in an above ground system with a grated overflow entry to the soak well, enabling first flush sediments to settle out reducing maintenance needs of the soak well. If the soak well has become inoperative, the property owner is to undertake such maintenance as directed. Additional requirements are set out in Appendix 2.

- All premises are to be provided with gutters, downpipes, or other associated drainage features to ensure effective stormwater disposal away from buildings and other impervious surfaces. Stormwater management systems are to be designed to avoid the potential for erosion, damage, or any other defects to the property or adjoining properties caused by stormwater. All stormwater systems are to ensure that stormwater is adequately detained and ideally retained on the lot at least for 1 in 1 year ARI storm events, 1 hour average stormwater events. Where Council approval is required for property drainage systems, Council requires details of the work proposed including the locations, size, grade, and class of all pipes proposed, as well as the position of all pits and existing and proposed structures, trees, overland flow paths, and existing and proposed impervious areas.
- Where stormwater is unable to be retained on site, Council is to consider connections where justified by the proponent and where there is capacity in the stormwater system to manage peak flows. Connection to Council's stormwater system may be provided at the proponent's cost subject to approval. Approvals are to be provided in writing. Connections to Council's stormwater system are to be in accordance with the requirements of Appendix 3. Applications are to be accompanied with a refundable bond as set out in the Fees and Charges to ensure the approved work is in accordance with the approved plans and specifications.
- A Stormwater Drainage Plan is generally required for infiltration and conveyance systems seeking development approval. Plans are to demonstrate the appropriateness of the proposed drainage system within the site and, as relevant, the proposed connection to Council's stormwater system. Plans are to contain sufficient information to assess whether the proposed stormwater management system is feasible, both within the site and as relevant in its connection to Council's stormwater system, and function as designed. Where a Stormwater Drainage Plan is required by Council, the Plan is to provide the information set out in Appendix 4 unless varied by Council.
- Nothing in this Policy prevents a proponent carrying out a Stormwater Drainage Plan that demonstrates drainage of the development by alternative means. Preparation of a Plan is to be in accordance with a brief approved by Council and is to be carried out by a professional engineer experienced in drainage design.

Appendix 1 – Rainfall intensity for Perth

OUTPUT IFD TABLE
Rainfall Intensity (mm/hr) for Perth

Duration	Average Recurrence Interval (Years)							
	1	2	5	10	20	50	100	500
5m	59.35	78.17	102.62	119.02	142.65	177.59	207.44	290.89
6	55.19	72.60	95.01	110.00	131.62	163.54	190.77	266.70
7	51.74	67.99	88.74	102.57	122.56	152.02	177.10	246.93
8	48.82	64.08	83.44	96.31	114.92	142.32	165.62	230.37
9	46.30	60.72	78.88	90.92	108.37	134.01	155.79	216.21
10	44.09	57.77	74.90	86.23	102.66	126.78	147.25	203.94
11	42.13	55.16	71.38	82.08	97.63	120.42	139.74	193.17
12	40.38	52.83	68.24	78.39	93.15	114.76	133.07	183.63
13	38.81	50.73	65.42	75.08	89.13	109.70	127.10	175.09
14	37.38	48.83	62.87	72.08	85.50	105.13	121.71	167.41
15	36.07	47.10	60.55	69.36	82.21	100.97	116.82	160.45
16	34.88	45.51	58.42	66.87	79.19	97.18	112.37	154.11
17	33.77	44.04	56.47	64.58	76.43	93.71	108.28	148.31
18	32.75	42.69	54.66	62.46	73.87	90.50	104.52	142.97
20	30.93	40.26	51.43	58.69	69.32	84.79	97.81	133.48
25	27.27	35.43	45.02	51.21	60.32	73.53	84.62	114.87
30	24.52	31.80	40.22	45.63	53.62	65.17	74.85	101.16
35	22.36	28.95	36.47	41.28	48.41	58.70	67.29	90.59
40	20.61	26.64	33.45	37.79	44.23	53.51	61.25	82.18
45	19.15	24.73	30.96	34.90	40.79	49.25	56.29	75.30
50	17.93	23.11	28.86	32.48	37.90	45.68	52.15	69.56
55	16.87	21.73	27.06	30.42	35.44	42.65	48.63	64.70
60	15.96	20.53	25.51	28.63	33.32	40.03	45.60	60.53
75	13.85	17.80	22.06	24.72	28.73	34.47	39.21	51.92
90	12.32	15.82	19.56	21.89	25.42	30.45	34.60	45.73
2.0h	10.21	13.09	16.14	18.03	20.89	24.97	28.34	37.32
3	7.82	10.00	12.27	13.67	15.80	18.82	21.32	27.94
4	6.46	8.25	10.09	11.22	12.94	15.39	17.40	22.73
5	5.57	7.11	8.67	9.62	11.09	13.16	14.87	19.37
6	4.94	6.30	7.66	8.49	9.78	11.59	13.07	17.00
8	4.09	5.20	6.31	6.98	8.02	9.48	10.68	13.84
10	3.53	4.49	5.43	5.99	6.87	8.12	9.13	11.80
12	3.13	3.98	4.80	5.29	6.06	7.15	8.04	10.36
14	2.83	3.60	4.36	4.82	5.53	6.54	7.36	9.52
16	2.59	3.30	4.01	4.44	5.11	6.05	6.82	8.85
18	2.40	3.06	3.72	4.13	4.76	5.64	6.37	8.29
20	2.24	2.86	3.49	3.87	4.46	5.30	5.99	7.82
22	2.10	2.68	3.28	3.65	4.21	5.01	5.67	7.41
24	1.98	2.53	3.11	3.46	4.00	4.76	5.39	7.06
36	1.50	1.93	2.39	2.67	3.10	3.72	4.23	5.59
48	1.22	1.57	1.96	2.21	2.57	3.10	3.53	4.71
60	1.03	1.33	1.67	1.89	2.21	2.67	3.05	4.09
72	0.89	1.16	1.46	1.65	1.94	2.35	2.69	3.62

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Appendix 2 – Standard Requirements for Soak Well and On Site Detention

The purpose of these requirements is to prevent increased stormwater runoff entering the Shire's stormwater system and causing overloading and flooding. The Shire is to have regard to rainfall intensity which is to be in accordance with accepted guidelines or information relevant to the district.

- Where there is no available stormwater system to connect to, proponents are generally to provide 1m³ of onsite storage for every 100m² of impervious surface, which is the total of all roofs, paving, and driveways. As a guide, a 900mm x 900mm soak well holds about 0.5m³.
- Where a stormwater connection system is available, the landowner is to provide a silt trap on the property side of the connection point (see diagram below).
- Gutters and downpipes require an overflow relief in the event of a blockage in the stormwater system. The gutter may be designed to prevent flooding, and downpipes are not to be directly connected to the stormwater pipes below ground, without some means of escape.
- Sub soil drains are required to be connected to the stormwater disposal system. These pipes are to work efficiently for the structural integrity of dwellings, so maintenance is essential.

- Paving around the dwelling is to be a minimum of 50mm below the house or building floor level and slope down a minimum of 25mm in the first metre away from the building. Some paving areas may also need to be connected to a drainage system, depending on the landscape.
- Driveways that fall towards the street need to have a stormwater grate at the edge of the property to catch the runoff.
- Commercial developments are to manage stormwater on site. Because of the generally large areas of impervious surface, the design of the system usually needs to be slowly released to the street system, where available, through a slow release silt trap. The design would usually require a professional consultant or engineer.
- All stormwater pipes from private property that have been approved to discharge into the Shire's stormwater system are to be connected via a storm water grate as detailed below:

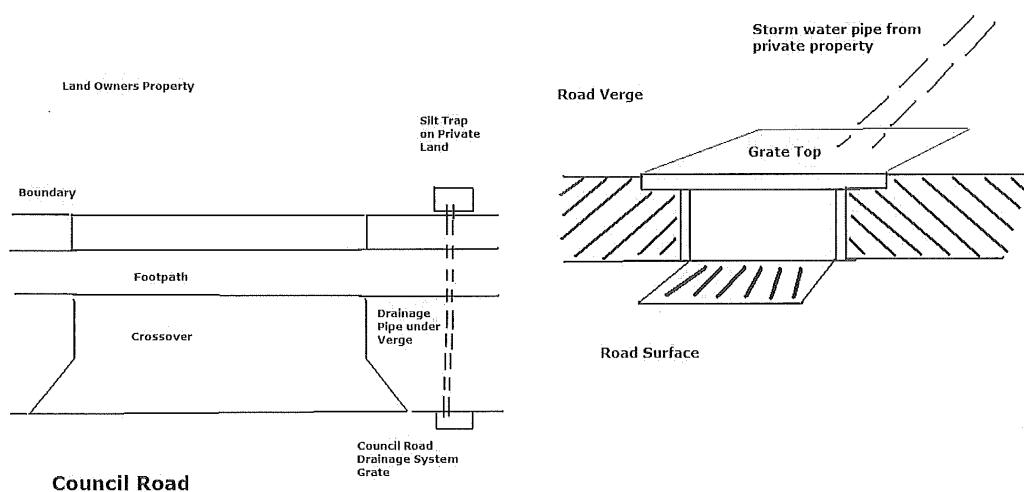
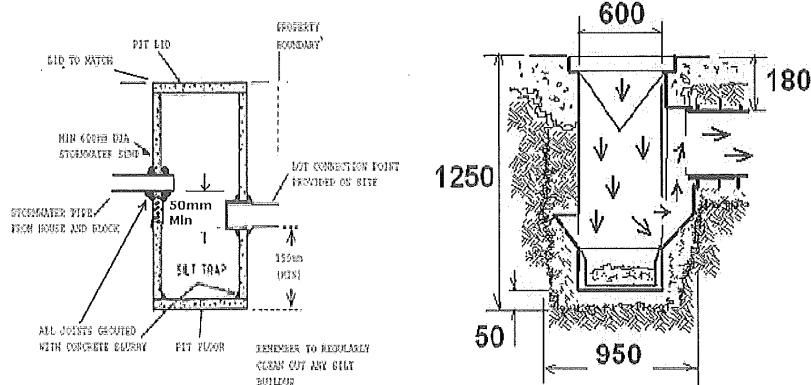


Diagram 2: Residential Silt Trap

Commercial Pollutant Arrestor Pit



Appendix 3 – Standard Requirements for Connection to the Shire's Stormwater System

All drainage works connecting to the Shire's stormwater system (open or piped) is to be designed and constructed so that:

- Stormwater flows are controlled to recognise best practice limits;
- Stormwater infrastructure should withstand expected traffic loads; and
- Stormwater infrastructure is not to impede other uses of public land (e.g. access to adjoining properties, other service authority, etc.).

The piped property drainage system is to capture and convey, to a lawful point of discharge, stormwater runoff from impervious areas including roofs, driveways, and paved areas, areas subject to changes to natural ground level including cut or filled areas, and areas where the natural or pre-development overland flow regime is disrupted to the potential detriment of an adjoining property.

Carrying out of the development is not to introduce, impede, or divert stormwater runoff in such a manner as to increase the rate or concentration of stormwater flow across a boundary onto adjoining private property. Any proposed flow onto adjoining properties is only permissible where an easement is secured and if it can be managed so as to not exceed pre-development flow rates and concentrations.

Piped systems are to meet the minimum pipe diameter, cover, and gradient criteria specified in the current relevant Australian Standard. Such systems are to be designed so that any overflow does not point against, or enter into, buildings.

Unless otherwise agreed to by the Shire, the following is to be designed, constructed, and suitably maintained:

- A throttled direct lot connection;
- A 100mm diameter pipe;
- At the inlet a 90 degree elbow with an open ended perforated riser is to be used, enabling discharge flows to mimic pre-development flows;
- A silt trap included at the entry point with access for maintenance; and
- Connections to piped minor conveyance systems are to be close to a manhole in the minor conveyance system to facilitate maintenance. If no manhole exists in close proximity, the proponent is responsible for installing one to Shire specifications.

Drainage connections may be to an inlet pit/well liner or pipeline in the street verge. They may also be made to an open 'Vee' drain or to a properly shaped gap in the kerb line. Connections can also be made to drainage reserve or easement through private property provided the requisite approvals are acquired.

Any drainage pipe connecting from private property into a Shire piped drainage system requires the installation of a manhole/silt trap to be situated and built within the private property prior to connection into the Shire system, to stop any silt or debris from entering the pipeline system.

Council is to allow a private drain pipe connection to be cut into the existing kerb of a street to allow the water to drain down the kerb face if the pipe is of a small diameter (approx. 90mm) and the connection makes use of a standard commercial shaped drainage fitting to match the kerb profile.

Overflow connections from soak wells are to be made from the final soak well of the private drainage system. All connections are to have a trapped manhole placed at the boundary of the lot prior to entering the Shire's system. Connections are to be fitted with a non-return valve to prevent surcharging from the Shire's stormwater system.

All connections are to have a provision for an overflow which is to be located to allow stormwater to flow overland to the street without entering buildings. Connections are to only be made to manholes; no direct connections to pipes is to be permitted. Where a new manhole is required, it is to be approved by the Shire and constructed, by the proponent or by the Shire, at the proponents cost.

Where the proponent makes a connection, the proponent is required to have a road-opening permit prior to commencing work and to comply with requirements for works in road reserves. A Traffic Management Plan may be required.

Connections are to be smoothly and neatly grouted.

Maintenance of connections is the responsibility of the landowner. The Shire accepts no responsibility for any maintenance costs or damages arising through the lack of maintenance of the connection, backflow prevention, or overflow provisions. All maintenance of the silt trap is the

landowner's responsibility and the Shire is not to accept any liability for any damage or failure of the silt trap.

The Shire may require pollution control facilities to be installed to remove sediments, rubbish, and oils prior to connection to the Shire's stormwater system. Pollution control is required on connections from car parks and paved areas in commercial, industrial, light industrial, and mixed business areas. Pollution control facilities are to be selected and designed to suit the site, and are to be approved by the Shire.

Whoever installs the private drainage connection is totally responsible for checking the location of services (e.g. power, water, sewer, telephone. etc.) and for any liability if damage is done. If the builder declines to make good any lack of meeting the Shire's requirements, the Shire is to retain the bond and use Shire staff to complete the works.

The Shire is not responsible for damage done to private drainage pipes on street verges by other groups, individuals, or service authorities.

Appendix 4 – Stormwater Drainage Plan

The Stormwater Drainage Plan is to be in accordance with this Policy and is to include plans, diagrams, and information that shows:

- The proposed method of stormwater disposal and sufficient design level information to demonstrate that the proposed system drains;
- The plan of the site showing location, size, and levels of soak wells, pipes, and other drainage features;
- Any constraints such as trees, services, structures, and easements that may affect the viability of the drainage or on-site detention/retention system;
- Existing ground levels or contours;
- Proposed locations and levels of roofs, driveways, parking, and other paved or sealed areas;
- Details of any proposed connections to the Shire's drainage system, including size, level, and location;
- A table showing volume calculations, including lot area, impermeable area, and minimum soak well volume required; and
- Construction details for soak wells, other stormwater structures, and any proposed connections to the Shire's stormwater system.

The Shire may also require the following information as applicable:

- Detailed engineering drawings;
- Location, layout, and dimensions for all stormwater management structures and measures;
- All information and specifications necessary to enable the stormwater management system to be constructed in accordance with the design intent, and to enable a 'works as executed' plan to be prepared;
- Existing and proposed finished surface contours at relevant intervals (i.e. 0.1m for flat sites to 1.0m for sloping sites) and spot levels;
- Proposed and existing building locations and floor levels;
- Street levels including gutter and kerb heights and levels;
- Proposed infiltration measures (e.g. soakage trenches, swales, landscaping, permeable pavements, etc.);
- Proposed discharge points to the Shire's stormwater system and levels at these locations;
- Any surface flow paths or flood-affected areas;
- Vertical information sufficient to assess the impact of runoff from adjacent properties and demonstration that existing surface flows on adjacent properties is not altered as a result of the proposed development;
- Location, extent, depth, volume, and maximum storage level of each on-site detention storage;
- Location and details of each discharge control device;
- Orifice plate dimensions and centreline levels;
- Pit locations, dimensions, and levels (surface and invert), and pipe inverts and grades;

- Location and levels of internal drainage system;
- Levels and locations of the discharge points for each storage;
- Cross sections through storages, orifice pits and tanks as necessary;
- Structural details (including reinforcing where applicable);
- A maintenance schedule that clearly and simply sets out the routine maintenance; and/or
- Justifications that the proposed design measures won't cause adverse stormwater impacts on adjoining properties.

Responsible Officer	Executive Manager Development Services
History	Adopted 19 August 2014 (Resolution 102/14) Amended 23 March 2023 (Resolution 25/23)
Delegation	
Relevant Legislation	Section 3.25, Local Government Act 1995 Land Administration Act 1997
Related Documentation	Shire of Boddington – Local Planning Scheme No.3