



*Lifestyle Capital of Victoria*

# Frankston City Council

## *Guidelines for On-Site Stormwater Detention*

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# 1. Introduction

The development of land often leads to an increase in the impervious area. This increase in impervious areas (roof, driveways and hard paving) leads to increases in stormwater runoff which adversely impacts and places additional pressure on the Council drainage network, and can increase the likelihood of more severe and frequent local flooding.

On-site stormwater detention systems are designed to reduce these impacts by temporarily detaining stormwater on-site and slowly releasing it over time into the existing network.

## 2. Council Requirements for an On-Site Detention System

The requirement for an on-site detention system will be determined by Council during the assessment of a planning applications, and will be included as a condition on the planning permit issued by Council. As a general rule, on-site detention will be required where there is a significant increase to the impervious area above the drainage design parameters.

Where 'on site detention' of stormwater discharge from the site is a requirement of development, the drainage system is to be designed to satisfy the following requirements (Unless otherwise specified):

*“Provision of a stormwater detention system with a volume capable of retarding the 10 year ARI (10% AEP) flow from the developed site back to a 5 year ARI (20% AEP) pre-development value”.*

Please refer to Council’s Development Guidelines for details on estimation of runoff.

Note: There may be anomalies where a Planning Permit may not be required, although there may still be a significant increase in impervious areas (e.g. boarding houses, some medical establishments, etc.). In this case, the outflow will need to be limited to the pre-development rates and Council will issue a Permissible Site Discharge (PSD) at the time of request for a Stormwater Discharge Point, however the drainage design will need to be approved by the relevant building surveyor.

## 3. Key Components of On-Site Detention Systems

The main components of an On-Site Stormwater Detention (OSD) system comprises of:

- A runoff collection system to collect storm water run-off from impervious areas consisting of gutters, downpipes, trench grates, pits and pipes
- A runoff storage system with a volume capable of storing the excess runoff.
- An outlet device (orifice pit) to control the rate of stormwater discharge from the runoff storage system to the Council drainage network.

Each of these components are discussed in further detail below.

### 3.1 Runoff collection systems:

The runoff collection system collects the runoff from all impervious areas and directs it to the runoff storage system.

All site drainage must be designed generally in accordance with Australian Standard AS3500.3:2018 National Plumbing and Drainage Code – Stormwater Drainage.

### 3.2 Runoff storage systems:

The runoff storage systems are designed to temporarily store stormwater runoff during a storm and may consist of the following (or a combination of the following):

- Below ground pipes, pits or tanks
- Above ground tank(s) plumbed in for reuse and fitted with a discharge control orifice to maintain an active storage volume within the tank
- Above ground facility (i.e. car park areas)

Each of these storage systems are discussed in further detail below.

#### 3.2.1 Below ground storage systems:

The site storage is generally to be provided below ground in a fixed storage system. The following must be taken into consideration in the design of Below ground storage systems:

- The maximum water level in the storage system is to be at least 300mm below the habitable floor levels on the site.
- Any ponding of water resulting from blockages shall be at a visible and readily accessible location.
- Be clear of any tree protection zones.
- All storage pipes need to have rubber ring joints and have a minimum cover of 250mm.

### 3.2.2 Above Ground Storage systems:

Above ground storage will only be considered within common property areas (i.e. car park areas) where all other storage options have been excluded due to site constraints.

In this instance the above ground storage design must:

- Address site safety issues and not be hazardous
- Not compromise the integrity of the building foundations
- Not have a ponding depth greater than 150mm

### 3.2.3 Rainwater tank storage systems:

Detention within rainwater tanks can contribute towards the total storage volume requirement provided the following:

- The rainwater tanks must be plumbed in for re-use for laundry, toilet flushing, landscape irrigation, etc., and be minimum 2000L.
- Must be fitted with a discharge control orifice to maintain an active storage within the tanks.
- Only up to one third of the total volume of each tank can be used for detention.
- Storage within rainwater tanks can only contribute up to 50% of the total required detention volume.

Please note Council may reduce the storage volume credited to the rainwater tanks in proportion to the amount of roof area being directed to the tank.

### 3.3 Discharge control outlet:

The discharge control outlet (commonly referred to as an orifice pit) is generally located at the lowest point on the on-site detention system between the storage system and the Council drainage network, and must be located within the property of the property. The discharge control outlet is designed to limit the discharge to Council network to the Permissible Site Discharge (PSD).

The discharge control outlet is expected to use an orifice and baffle wall arrangement. The pit must contain an orifice at the bottom of a baffle wall located centrally within this pit. The orifice must be sized to limit the discharge of water from the site to the maximum permissible site discharge rate.

In some cases, a multi-cell system may also be considered an acceptable discharge control outlet.

### 3.3.1 Orifice Sizing:

The required orifice diameter is calculated as follows:

$$d = 21.9 * \sqrt{ PSD / \sqrt{H} } \text{ mm}$$

Where

d = Orifice diameter (mm)

PSD = Permissible site discharge (L/s)

H = Height difference between top water level to centre of orifice (m)

## 4. Soakage Systems:

Soakage systems may only be installed in site specific instances where they are considered an acceptable alternative. Council's acceptance of soakage designs is also subject to the hydraulic conductivity of the soil. All soakage designs must be submitted with a soil analysis report undertaken by a geotechnical consultant.

The design of the soakage system including sizing, type and location shall be determined based on the soil analysis findings and in accordance with the requirements outlined in Council's Development Guidelines, and Chapter 11 (Infiltration measures) of the 2005 CSIRO publication by Melbourne Water titled '*WSUD Engineering Procedures: Stormwater*'.

The soakage pits or tanks shall be installed to manufacturers' specifications.

## 5. Pump Systems

Pump systems are discouraged and generally not supported by Frankston Council, unless in exceptional circumstances, due to their increased maintenance and failure considerations. The use of a pump system generally indicates fall from the road frontage and any overland surcharge would impact adjacent property. Pump networks must not discharge to the road kerb, they must be connected to a Pit within Council's drainage network.

Prior approval from Council will be required for the incorporation of any pump pits.

## 6. Water Sensitive Urban Design:

Water Sensitive Urban Design (WSUD) is a key component of sustainable water management. WSUD can be used to improve stormwater quality and for water conservation, as well as to reduce local inundation and reduce runoff volumes.

Please refer to the Council's Development Guidelines and WSUD Engineering Procedures: Stormwater (Melbourne Water, 2005) for further information on incorporating WSUD in drainage designs.

## 7. Connection to Council Drainage System:

Connection to the Council drainage infrastructure must be to the nominated stormwater point of discharge, and must be constructed in accordance with Council standards and specifications.

Please note that developers may be required to construct new public infrastructure assets. These assets must be constructed to Council standards and specifications. Please refer Council's Development Guidelines for further information.

## 8. Overland Flows:

The onsite detention system must be designed to safely convey overflows to an adequate Council overland flow path or drainage system. In the case that no suitable overland flow path or drainage system is available, the onsite detention system will need to be designed to detain the 100 year ARI (1% AEP) storm on-site.