

## On-site stormwater detention

### 1. Overview

#### 1.1 At a glance

You may be required to install an on-site stormwater detention (OSD) when landowners and developers are proposing to connect or develop a property that connects to a stormwater asset owned by either Sydney Water or the City of Sydney Local Government Area (LGA).

#### 1.2 Scope

Our guide explains what you need to do when building an OSD system.

#### 1.3 Objective

Our guide helps you understand the requirements for an OSD system. It helps us:

- support urban development
- protect the community by making sure development activities don't increase the risk of floods
- make sure the OSD system is maintained correctly and regularly.

## 2. Guide details

### Background

Changes in land use for urban development generally increase stormwater run-off. Building hard surfaces such as pavements, roofs and site drainage increase the volume and speed of stormwater run-off. They also reduce the capacity of stormwater to soak into the ground.

As the capacity of existing stormwater drainage systems is limited, if you're building or developing a new property you may need to provide on-site stormwater detention (OSD) systems to ensure stormwater run-off doesn't increase flooding downstream of your development.

On-site stormwater detention temporarily stores stormwater run-off. This means the run-off rate and volume can be controlled to ensure the receiving system is not overloaded.

The required size of storage and rate of discharge vary depending on the location, size and subsequent impact of your development.

This guide specifically addresses the requirements for Sydney Water, and is supplementary to any council guidelines. Please check with your local council for their requirements. Unless otherwise agreed, the owner or developer is responsible for all costs associated with meeting our requirements.

## 3. Does my property need an OSD system?

If you're connecting to or developing a property that connects to a stormwater asset owned by us or City of Sydney LGA, you may need to install an OSD system. Properties that must have a system include (but are not limited to):

- all commercial, industrial and special use (for example, community, education, recreational) buildings or structures
- town houses, villas, home units or other strata subdivisions. These may use a single OSD system for the total site area if it's located on common property and the body corporate is responsible for maintenance
- dual occupancy lots. Each lot within the dual occupancy must have its own OSD system. Each individual lot owner is responsible for maintenance
- sealed sporting facilities (for example tennis, basketball courts).

### Properties that don't need an OSD system

You may not need an OSD system if:

- you're building a single residential dwelling
- the original total site area is under 250 m<sup>2</sup>
- the development site is at the lower section of the catchment
- you're refurbishing an existing building and maintaining the existing drainage system.

## 4. Designing the OSD system

Designs of the OSD system must be prepared by an appropriately qualified professional. The design must follow and meet:

- the requirements in this guideline
- the requirements in the [Onsite stormwater detention policy](#)
- current best practice/principles outlined in the [Australian rainfall and run-off guideline](#).

The design must also be certified by a chartered civil engineer stating that it has been prepared accordingly.

## Design calculations

Your OSD system must be able to:

- store the run-off caused by a storm event up to 100-year ARI for the site
- control the rate of discharge to ensure downstream stormwater assets can handle the extra run-off.

To achieve this, the OSD system must be designed to meet two key requirements:

- Permissible Site Discharge (PSD) – PSD is the maximum rate of discharge for the total site that the existing downstream stormwater system can handle
- Site Storage Requirement (SSR) – SSR is the minimum storage volume needed to temporarily store and offset the excess stormwater run-off due to the development.

To determine your PSD and SSR, email our team at [stormwater@sydneywater.com.au](mailto:stormwater@sydneywater.com.au) with the following information about your site:

- development address
- total site area (m<sup>2</sup>)
- existing pre-development impervious area (m<sup>2</sup>)
- proposed post-development impervious area (m<sup>2</sup>).

We'll then calculate and inform you of the PSD and SSR for your site.

## Design specifications

Site run-off collection. The total flow from the site (from OSD storage and free run-off) cannot exceed the calculated PSD.

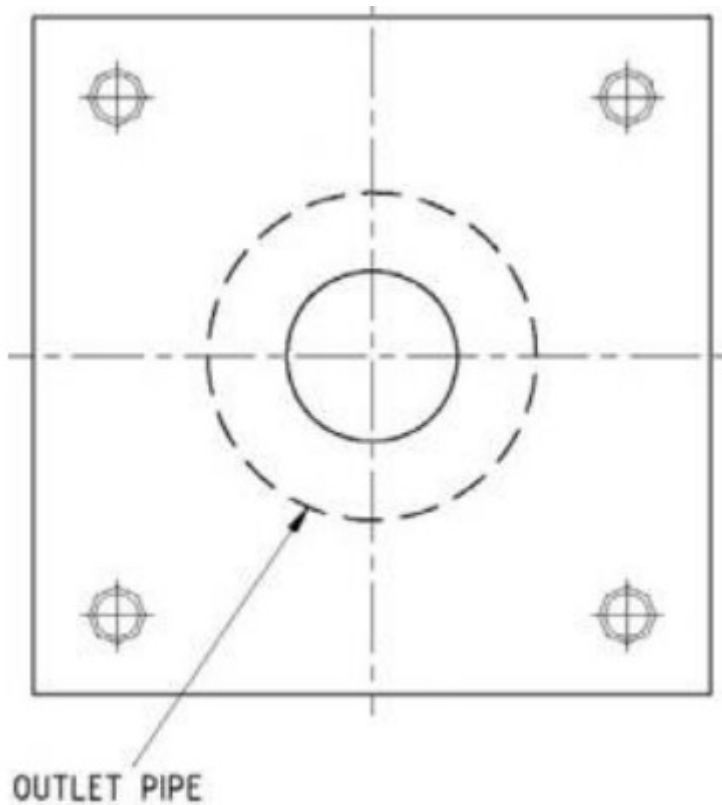
The development's drainage system must be able to transport all run-off from a 100-year ARI storm event to the OSD storage. If this isn't practical, (for example because of topography limitations), we may allow up to 10% of your site area to drain externally either to the street or other stormwater system (for example, council's stormwater system).

Surface inlets must have suitable grates to stop debris from entering the OSD system. This minimises blockages that may slow the steady discharge of run-off and potentially cause flooding.

Below ground storage	Above ground storage
Access must conform to the current confined space regulation.	Maximum depth of the above ground storage must not be over 300 mm at full capacity.
You must install step irons if the fall is 120 mm or more.	Minimum surface slope is 1.5%.
Where there's a risk of gas build up or hydrostatic pressure, you must install a release valve.	The maximum water level of the OSD systems storage at capacity must be at least: <ul style="list-style-type: none"> <li>• 300 mm below all habitable floor levels on-site</li> <li>• 150 mm below pedestrian entries and exit facilities.</li> </ul>

## Orifice plate and discharge rate

The orifice plate controls the discharge rate from the OSD storage. The OSD storage discharge rate (plus any free run-off) must be less than the calculated PSD for the site. The orifice plate must be a minimum 200 mm x 200 mm flat stainless-steel plate and 3 mm thick. The orifice diameter must be 40 mm or more.



## 5. What are your responsibilities?

You must regularly maintain your OSD system to prevent potential problems. This helps ensure that if there's a storm, the OSD system functions as designed.

If your OSD system discharges directly into a Sydney Water owned drainage system, you must enter into a formal agreement with us which sets out your ongoing OSD maintenance responsibilities.

You'll need to register this agreement on the property title, so the information is stored on the title of the land and not lost over time as properties change ownership.

We'll provide you with a standard proforma for the solicitor. The agreement will set out:

- that the property owner/strata will regularly maintain and repair the OSD system at their expense
- that the property owner/strata will not fill or modify the OSD system (to prevent changes to the original approved design)
- a dispute resolution process.

If the OSD system discharges directly into a drainage system not owned by Sydney Water, you may be required to enter into an agreement with your local council. Please contact your local council for further information.

## 6. How do you get approval?

### Design approval

Before you begin construction, you must submit to us:

- certification of design by a chartered civil engineer, verifying that it has been designed to meet the calculated PSD and SSR
- a plan and elevation of OSD system with all dimensions
- the location of OSD storage in relation to overall development and site drainage
- a detailed design of orifice including:
  - all dimensions
  - maximum storage discharge rate specifications
  - the percentage (if any) of the site area that will drain to the street or other stormwater system.

### Post construction

After construction of the OSD system is complete, you must submit to us:

- Work-As-Executed (WAE) plans prepared and signed by a registered surveyor
- Certificates of Hydraulic Compliance that confirm the system has been constructed and will function as designed. Identify any variations from the approved design, and state that these variations will not affect the performance of the OSD system.

To avoid delays in certification, we encourage developers and builders to have the OSD designer supervise and certify the construction of these systems.

## 7. Definitions

Term	Definition
<b>ARI – Average Recurrence Interval</b>	The average or expected value of the periods between exceedances of a given rainfall total accumulated over a given duration. It is implicit in this definition that the periods between exceedances are generally random.
<b>Impervious area</b>	Surfaces that are covered and prevent stormwater run-off from infiltrating the soil, for example asphalt, concrete, pavers, rooftops.
<b>Orifice plate</b>	A structure which controls the rate of discharge from the OSD storage.
<b>Permissible Site Discharge (PSD)</b>	The maximum rate of discharge for the total site.
<b>Site Storage Requirement (SSR)</b>	The minimum storage volume needed to temporarily store and off-set the excess stormwater run-off caused by development.
<b>Australian Rainfall and Run-off (ARR) guideline</b>	A national guideline for the estimation of design flood characteristics in Australia. Published by Engineers Australia.

## 8. References

Document type	Title
Legislation	<ul style="list-style-type: none"><li>• <i>Sydney Water Act 1994</i> – section 47 gives Sydney Water the power to acquire land.</li><li>• <i>Land Acquisition (Just Terms Compensation) Act 1991</i> – sets out Sydney Water’s obligation to acquire land designated for acquisition, and the process for owner-initiated acquisition in cases of hardship.</li><li>• <i>Environmental Planning and Assessment Act 1979</i> – provides for the designation of land for acquisition through environmental planning instruments and makes such acquisitions subject to the hardship provisions in the <i>Land Acquisition (Just Terms Compensation) Act</i>.</li></ul>
Policies and procedures	<i>On-site detention Policy</i>

