

## Policy History

Revision No.	Council Meeting Date	Minute No.	Adoption Date
1	11 Oct 2011	0353	11 Oct 2011
2	13 Aug 2013	0255	13 Aug 2013
3	23 Sep 2014	0312	23 Sep 2014
4	22 Aug 2017	17/205	22 Aug 2017
5	23 Aug 2022	22/209	23 Aug 2022

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## Glossary

<b>AHD</b>	Australian Height Datum
<b>PMF</b>	Probable Maximum Flood
<b>AEP</b>	Annual Exceedance Probability - The change of flood of a given or larger size occurring in any one year, usually expressed as a percentage, e.g. if a peak flood discharge of 500m <sup>3</sup> /s has an AEP of 5% it means that there is a 5% chance (that is one-in-20 chance) of a 500m <sup>3</sup> /s or larger events occurring in any one year
<b>OSD</b>	On-site Stormwater Detention
<b>SRD</b>	Site Reference Discharge
<b>SSR</b>	Site Storage Requirement
<b>WSUD</b>	Water Sensitive Urban Design

## 1 Introduction

### 1.1 Background

A comprehensive assessment of flooding within the Griffith area has been completed and is outlined in the following studies:

- Aerodrome Overland Flow Flood Study (2010)
- Aerodrome Overland Flow Floodplain Risk Management Study and Plan (2011)
- CBD Overland Flow Flood Study (2012)
- CDB Overland Flow Floodplain Risk Management Study and Plan (2013)
- Lake Wyangan Flood Study (2012)
- Lake Wyangan Floodplain Risk Management Study and Plan (2013)
- Griffith Main Drain J and Mirrool Creek Flood Study 2015 Vol 1
- Griffith Main Drain J and Mirrool Creek Flood Study 2015 Vol 2 - Part 1

- Griffith Main Drain J and Mirrool Creek Flood Study 2015 Vol 2 - Part 2
- Griffith Main Drain J and Mirrool Creek Flood Study 2015 Vol 2 - Part 3
- Griffith Main Drain J and Mirrool Creek Flood Study 2015 Vol 2 - Part 4
- Griffith Main Drain J and Mirrool Creek Floodplain Risk Management Study and Plan (2015)

The studies determined that flooding presents significant financial and consequential risk to properties, business and agriculture within the Griffith LGA.

At Griffith, the Main Branch Canal forms a significant barrier to discharge from the majority of urban areas. Run-off generated within urban areas ponds behind Main Branch Canal until it is discharged via a number of subways situated beneath the Main Branch Canal. The present arrangement of subways do not have sufficient capacity to adequately convey the existing peak discharge generated within their respective sub-catchments.

The findings from the flood studies completed for the Griffith LGA highlight the need to manage the discharge of run-off within the LGA. Specifically, there is a need to ensure that any future development within the LGA does not exacerbate existing flood issues.

The construction of buildings, roads, paved areas and similar features is likely to increase the impermeable proportion of the catchment area. An increase in the proportion of impermeable land typically generates an increase in the peak and volume of run-off. Additionally, it may reduce the available flood warning time for properties located downstream.

Accordingly, there is a need for an On-site Stormwater Detention Policy to provide guidelines for the management of run-off from development areas, which covers both new developments and modifications to existing developments.

## **1.2 Policy Statement**

The primary aim of the OSD policy is to ensure that new developments and redevelopments do not increase the volume or peak discharge of run-off within a catchment or modify the temporal distribution of stormwater discharge whereby flood impacts are adversely affected at sites situated downstream during critical storm events up to and including the 1% AEP event.

The OSD solution should create a sustainable solution for stormwater flow management, which complements any Water Sensitive Urban Design (WUSD) aspects of the development. There should be neither increase in the site discharge to the downstream drainage system nor reduction in the volume of storage provided unless specifically allowed in the following sections.

## **1.3 Objectives**

The On-Site Stormwater Detention (OSD) Policy for the Griffith City Council LGA has been developed to manage the discharge of stormwater from new dwellings,

developments, sub-divisions and alterations to existing dwellings/developments. The objectives include the following:

- restrict peak flows from developments to which OSD restrictions apply, for all events up to and including the 1% AEP event, to estimated peak flows under pre-development conditions.
- ensure that development does not adversely affect the volume and temporal distribution of run-off conveyed via existing subways;
- manage the volume and distribution of run-off conveyed via secondary and tertiary drainage channels situated within the floodplain;
- prevent increases in downstream flooding and drainage problems that could:
  - increase flood losses
  - damage public assets
  - reduce property values
  - require additional expenditure on flood mitigation or drainage works.
- reduce post development peaks, throughout the catchment, to as close to natural levels as practical;
- encourage integration of OSD systems into the architectural design and layout of the development so that adequate storage areas are included in the initial stages of the site design;
- encourage integration of the OSD facilities into a sustainable overall water management plan for the site; and,
- require construction supervision of OSD systems by the OSD designer to improve construction standards.

#### **1.4 Areas to Which the Policy Applies**

It is important to recognise that two different types of flooding occur within the Griffith Local Government Area. The division in flooding has arisen from the varying types of geography within the Main Drain 'J' catchment and the presence of man-made structures, especially the Main Branch Canal. In general, the two types of flooding may require different approaches towards on-site stormwater detention management.

Differentiating the basis for determining on-site detention is derived from the location of the development site relative to the Main Branch Canal. Typically, areas situated to the north of the Main Branch Canal are locations where it is imperative that run-off is retained on site. However, within certain areas to the south of the Main Branch Canal, there may be benefit gained from allowing run-off to freely discharge off-site.

## **2 OSD Assessment Requirements**

The assessment of OSD requirements has been developed in consideration of the cumulative impact of urbanisation on run-off within the Griffith Local Government Area.

## **2.1 Developments to Which OSD Applies**

OSD requirements generally apply to all types of development and redevelopment on both flood liable and flood-free sites. These include but are not limited to the following:

- all subdivisions;
- single dwellings on lots created by a subdivision approved, unless a communal OSD system was constructed as part of the subdivision;
- all commercial, industrial and special-use developments and buildings;
- town houses, villas, home units, duplexes and dual occupancies;
- semi-detached residential/commercial and residential/industrial properties;
- buildings, car parks and other sealed areas of public sport and recreational facilities;
- single dwellings, extensions and additions;
- sites that include WSUD and water re-use .
- tennis courts;
- roads, car parks, paths and other sealed areas; and
- public buildings.

Consideration will be given to variations to the OSD only where it has been proven conclusively that infiltration/recycling or reuse of run-off will invariably reduce the site stormwater discharge for the full range of storm events and infiltration will not contribute to urban salinity.

## **2.2 Developments to Which OSD Does Not Apply**

The Griffith OSD policy does not apply to:

- sub-divisions of existing dual occupancies where no changes to the buildings or site are proposed;
- boundary adjustments and consolidations of allotments where no additional lots are created;
- minor developments, minor additions and repairs where the proposed development area is less than 100 m<sup>2</sup> (subsequent minor developments or additions shall require OSD).
- change of use where no physical changes to the outside of the building are proposed;
- new developments in subdivisions where OSD has already been provided for the entire subdivision (this will be assessed on a case by case basis);
- developments which do not increase the total roof and hardstand (concrete/paved/sealed) areas of an existing development, including developments whereby existing roof and hardstand areas are removed and replaced with roof and hardstand areas that do not increase the roof and hardstand area of the former development.

## **2.3 Area of the Site to Which OSD Applies**

Generally, OSD applies to the entire site, but there may be exceptions in certain circumstances, as follows:

### **2.3.1 Additions & extensions**

On an already-developed property, the OSD requirements apply only to the area of the new development, provided run-off from previously developed areas can be excluded from the OSD storage.

### **2.3.2 Dual occupancies**

Where an additional dwelling is proposed on a lot with an existing dwelling, the OSD requirements will relate to the additional dwelling and a curtilage for anticipated paths, driveways and paved areas. In the absence of details on the plans, the curtilage will be taken as 10% of the area of the proposed second dwelling. Where two or more dwellings are constructed on the same lot at the same time, the OSD requirements will be applied to the entire site.

### **2.3.3 Subdivision of an existing residential property**

When an existing residential property is subdivided to create a single additional lot, the OSD requirements will relate only to the area of the new allotment. The OSD storage facilities may be located on the remainder of the original property, provided the combined peak discharge (from both lots) is no greater than if the OSD systems were located on the new lot.

### **2.3.4 Subdivisions creating new public or private roads and paths**

The OSD requirements apply to the whole development area including roads and paths, not just the individual lots. The best solution will normally be for the detention storage to be located on one lot for the whole subdivision.

### **2.3.5 Undeveloped portions of a lot**

Portions of large lots which are unaffected by the development may be excluded from the area to be controlled by the OSD systems, provided flows from these areas can be diverted around the OSD system. Council approval must be obtained before excluding portions of a lot from the OSD requirements.

### **2.3.6 Floodways**

Creeks, waterways and drainage swales that carry major concentrated flows around the storage area are defined as floodways. The area of the floodway can be excluded from the site area for the purpose of calculating the site storage requirements, provided that the area is protected from development by an appropriate covenant or easement.

### **2.3.7 New development or redevelopment**

Where the proposed development is of a vacant site or a complete redevelopment of an already-developed property, the OSD requirement will relate to the unsealed area of the property.

### **2.3.8 Battle-axe blocks**

The access driveway to battle-axe blocks shall be included in the site area used for calculation of the site storage requirements.

## **2.4 Policy Variations**

Council will consider requests to vary control standards or provide/contribute to alternative storage facilities in accordance with the procedures outlined in Appendix A. For equity reasons, where OSD is waived for a particular site, equivalent expenditure on measures providing environmental and/or community benefits from the development, such as water quality improvements, will be required.

In some situations, where the site is flood prone and the watercourse flows through the site, Council may accept the provision of additional mainstream flood storage in lieu of OSD. In these cases, the storage must be available over the full range of storm events and allow for the fact that mainstream flood levels will tend to decrease over time. The additional storage required is expected to be comparable but not less than the site's OSD storage requirement. Any such provision will need to be considered in the context of the preliminary floodway line which has been developed for Main Drain 'J' and its tributaries.

## **3 Control Standards**

### **3.1 Catchment Areas to the North of Main Branch Canal**

Flooding and drainage issues within catchments situated to the north of the Main Branch Canal are exacerbated by the presence of man-made embankments. Of these, the Main Branch Canal is the most significant barrier overland flow, which causes floodwaters to pond behind the embankment for flood events up to and including the the 1% AEP event. Discharge of waters ponded behind the Main Branch Canal is controlled via a series of "subways" which are located along the Main Branch Canal. The areas covered by the OSD Policy are identified on Figure 1.

#### **3.1.1 Site Reference Discharge**

The Site Reference Discharge (SRD) for the orifice outlet is 65 L/s/ha.

On a case by case basis, with the written approval from Council's Director of Utilities, The Site Reference Discharge can be adjusted in accordance with the procedures outlined in Section 5.1 of the Upper Parramatta River Catchment Trust On-site Stormwater Detention Handbook.



This has been derived from consideration of the critical storm for the the 1% AEP event occurring in catchments situated to the north of Main Drain 'J'.

### **3.1.2 Site Storage Requirements**

The Site Storage Requirements (SSR) is determined by the consultant and shape of the storage so as to ensure a maximum discharge of 65 L/s/ha at the critical the 1% AEP storm.

### **3.1.3 Minimum outlet size**

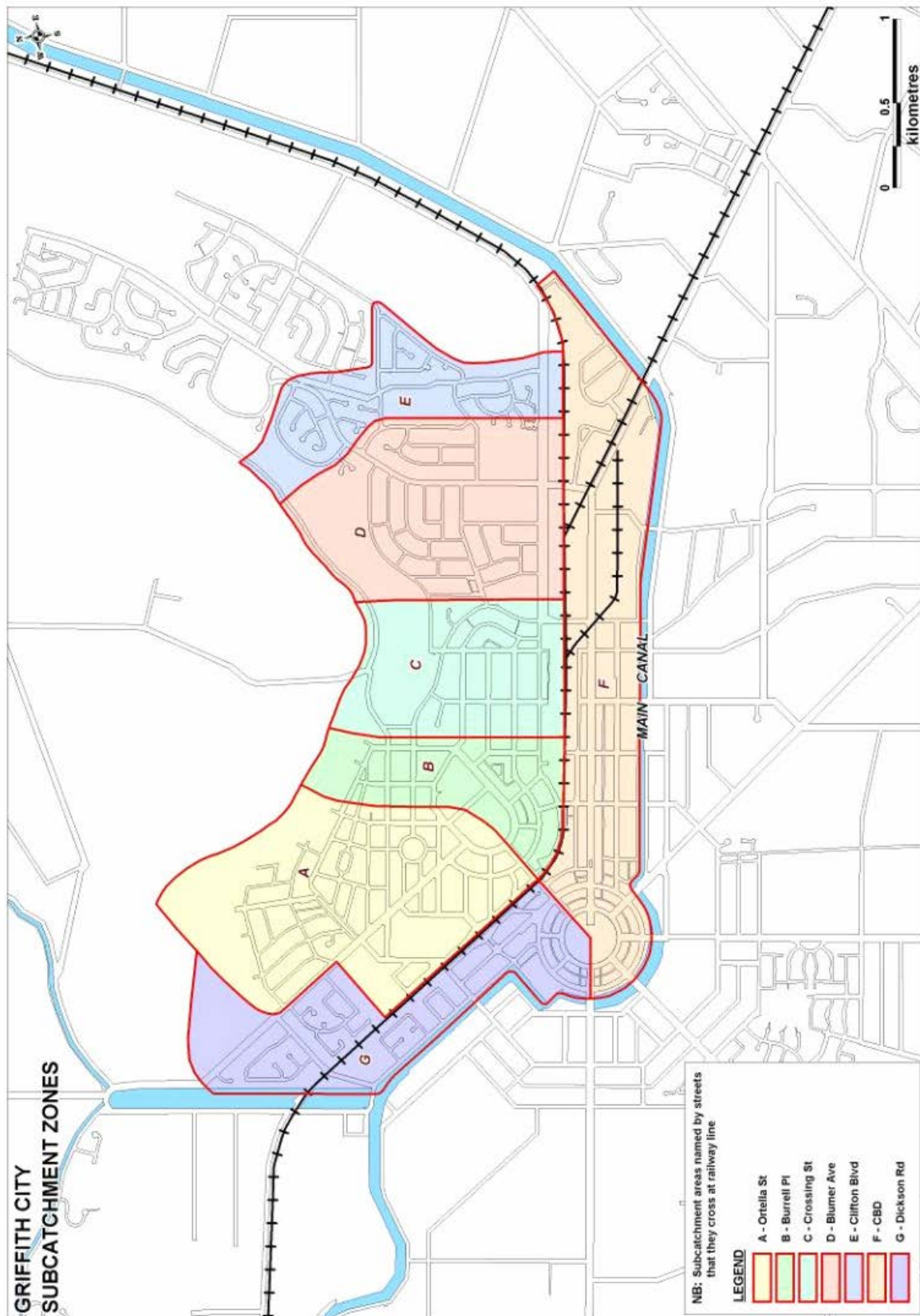
To reduce the likelihood of the primary or secondary outlets being blocked by debris, the outlet openings shall have a minimum internal diameter or width of at least 25 mm and shall be protected by an approved mesh screen. Minimum 90mm diameter pipelines within developments will only be accepted.

### **3.1.4 Ponding depths**

Guidelines to assist in determining depths and frequencies of ponding for different classes of storages are given in Table 1 Suggested Ponding Depths for Various Storm Events.



Figure 1 Griffith Urban Sub Catchment



**Table 1 Suggested Ponding Depths for Various Storm Events**

STORAGE AREA TYPE	SUGGESTED DEPTH	FREQUENCY OF INUNDATION
Pedestrian areas	Beginning to pond	5% AEP
	50 mm	1% AEP
Parking and driveways	Beginning to pond	10% AEP
	100 mm	5% AEP
	200 mm	1% AEP
Gardens	Beginning to pond	100% AEP
	200 mm	50% AEP
	400 mm	10% AEP
	600 mm	1% AEP
Private courtyards (where the area is between 25 -60 metres squared)	Beginning to pond	20% AEP
	300 mm	5% AEP
	600 mm	1% AEP
Paved recreation in common areas	Beginning to pond	6 times per year

It is emphasised that these are general guidelines that will be varied according to the nature of the development and the location of the storage. The maximum depth of ponding in above ground storages is 600 mm.

Council may approve deeper ponding in individual cases where the applicant demonstrates that safety issues have been adequately addressed. For example warning signs and or fencing should be installed where the depth exceeds 600 mm or adjacent to pedestrian traffic areas.

### 3.1.5 Safety fences

Surface storages should be constructed to be easily accessible, with gentle side slopes permitting walking in or out. A maximum gradient of 1(V):4(H) (ie. 1 vertical to 4 horizontal) will be required on at least one side to permit safe egress in an emergency. Where steep or vertical sides are unavoidable, due consideration should be given to safety aspects, such as the need for fencing or steps or a ladder, both when the storage is full and empty. Balustrades (fences) must comply with the Building Code of Australia while safety fences should comply with the Swimming Pool Act 1992.

### 3.1.6 Internal drainage system

The stormwater drainage system (*including surface gradings, gutters, pipes, surface drains and overland flowpaths*) for the property must:

- be able to collectively convey all run-off to the OSD system in a the 1% AEP event with a duration equal to the time of concentration of the site; and
- ensure that the OSD storage is by-passed by all run-off from neighbouring properties and any part of the site not being directed to the OSD storage, for storms up to and including the the 1% AEP event.

### **3.1.7 Signage**

Small OSD signs (*refer* Figure N3 in the Appendix of the Upper Parramatta Trust Onsite Stormwater Detention Handbook) shall be located in or near the OSD facility to alert future owners of their obligations to maintain the facility.

OSD Warning Signs (see Figure N1 of the Upper Parramatta Trust Onsite Stormwater Detention Handbook) are only required for OSD systems where deemed necessary by a Council because of the depth and/or location of the storage.

Signs are required at each entry into confined spaces, such as deep pits or underground storages. Guidance on the size of signs and appropriate materials is given in Appendix N of the Upper Parramatta River Catchment Trust On-Site Storm Water Detention Handbook.

## **3.2 Catchment Areas to the South of Main Branch Canal**

On Site Stormwater Detention requirements for development catchment areas to the south of the main branch canal will be assessed on a case by case basis. The villages of Yoogali, Hanwood & Yenda will be required to limit post development flows to pre development flows. In some instances, release of excess stormwater earlier on in a rainfall event may be more beneficial when considering the overall impacts on flooding.

# **4 Assessment and Approval of OSD**

## **4.1 Development Approvals for Subdivisions**

In general, OSD requirements are imposed at the subdivision stage, in the following manner:

- Development Application – submission and approval of a conceptual layout of the OSD system (Stormwater Concept Plan);
- Submission of Engineering Plans – submission and approval of the detailed design, including calculations and construction plans and details; and
- Release of Subdivision Certificate/Linen Plans – submission and approval of work-as-executed drawings, certificates of hydraulic compliance, and legal instruments on property titles protecting the OSD system.

An OSD system should be constructed at the time of subdivision and not deferred until the construction of the individual dwellings, except if it is proven that there are site restrictions (See Section 4 of the Upper Parramatta Trust Onsite Stormwater Detention Handbook).

#### 4.2 Development Approvals and Construction Certificates

When the OSD requirements are implemented through the development approval and construction certificate process, the approval is in three stages:

- Development Application – submission and approval of a conceptual layout of the OSD system (Stormwater Concept Plan);
- Construction certificate – submission and approval of the detailed design, including calculations and construction plans and details;
- Final Approval (Occupation Certificate) – submission and approval of work-as-executed drawings, certificates of hydraulic (and structural, if required) compliance and legal instruments protecting the OSD system.
- If the OSD system was constructed at the subdivision stage on individual allotments, the system should be re-certified at final approval (i.e. Occupation Certificate) to ensure it will function as designed and that run-off from the roof, paved areas and landscaped areas is directed to the OSD system.

## 5 References

- Engineers Australia, *Australian Rainfall and Runoff – A Guide to Flood Estimation*; Books 1 to 9.
- Upper Parramatta River Catchment Trust (1999), *On-site Stormwater Detention Handbook*, Third Edition, December 1999.