Chapter G2: Sustainable Stormwater Management and Erosion/Sediment Control

Contents

1 Purpose ........................................................................................................................ 3
2 Application .................................................................................................................... 3
3 Context ......................................................................................................................... 3
4 Objectives ..................................................................................................................... 3
5 Controls ........................................................................................................................ 4
  5.1 Stormwater ............................................................................................................. 4
    5.1.1 Minor and Major Systems Design ................................................................. 4
    5.1.2 Disposal of Stormwater from Development Sites ........................................ 6
    5.1.3 Climate Change Controls ............................................................................ 8
    5.1.4 Onsite Stormwater Detention ...................................................................... 8
  5.2 Stormwater Quality and Waterway Protection ...................................................... 10
    5.2.1 Erosion and Sediment Control ................................................................... 10
    5.2.2 Stormwater Retention and Reuse ................................................................. 12
    5.2.3 Small/medium Scale Development – Site Discharge Index ....................... 13
    5.2.4 Large Scale Development ............................................................................ 13
    5.2.5 Design and Maintenance of Stormwater Treatment Measures .................. 16
  5.3 Waterfront Land .................................................................................................... 19
    5.3.1 Development on Waterfront Land ............................................................... 19
    5.3.2 Coastal Areas ............................................................................................... 22
6 Advisory Information ................................................................................................... 23
  6.1 Is the Proposal Small/medium Scale or Large Scale Development? .................... 23
  6.2 Other legislation or policies you may need to check ............................................. 24

Tables

Table 1: Pre and post development peak flow percentages .......................................... 9
Table 2: Retention storage depth ................................................................................... 12
Table 3: Pollutant load reduction .................................................................................. 15
Table 4: Watercourses and width of core riparian zone and vegetated buffer ............ 22
Table 5: Determining whether your development is small/medium scale or large-scale... 23
## Amendment history

<table>
<thead>
<tr>
<th>Version Number</th>
<th>Date Adopted by Council</th>
<th>Commencement Date</th>
<th>Amendment Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>14 October 2014</td>
<td>22 October 2014</td>
<td>New</td>
</tr>
<tr>
<td>2</td>
<td>23 June 2015</td>
<td>1 July 2015</td>
<td>Amendment</td>
</tr>
<tr>
<td>3</td>
<td>20 January 2020</td>
<td>12 February 2020</td>
<td>Amendment</td>
</tr>
</tbody>
</table>
1 Purpose

The purpose of this Chapter is to:

- Give applicants guidance about how to implement sustainable stormwater management in the development application process.
- Provide design principles for stormwater management that assist development.
- Outline controls for the management of stormwater (including water quality, waterway stability, detention, erosion and sediment control).

Advisory Note: In addition to the provisions outlined in this Chapter, you must refer to the supporting documents:


2 Application

This Chapter applies to all development in the Shoalhaven Local Government Area. Different sections of the Chapter will apply depending on the scale, location and type of the development.

Note: In Shoalhaven, State Environmental Planning Policy (Sydney Drinking Water Catchment) 2011 applies to land at Kangaroo Valley and parts of the Sassafras Area.

3 Context

Stormwater is a generic term for rainfall that is concentrated after it runs off all urban surfaces such as roofs, pavements, carparks, roads, gardens and vegetated open space and includes water in stormwater pipes and channels. Stormwater represents a significant proportion of the natural water cycle.

To some degree, all development has an impact on the behaviour of stormwater through the addition of impervious surfaces, diversions and drainage and through changes to water quality. Sustainable stormwater management is the application of controls on stormwater to mitigate, manage and control changes to the natural water cycle, to protect environmental values and to protect human life and assets.

4 Objectives

The objectives are to:

i. Manage stormwater flow paths and systems to ensure the safety of people and property.
ii. Protect and enhance natural watercourses and their associated ecosystems and ecological processes.

iii. Maintain, protect and/or rehabilitate modified watercourses and their associated ecosystems and ecological processes towards a natural state.

iv. Mitigate the impacts of development on water quality and quantity.

v. Encourage the reuse of stormwater.

vi. Integrate water cycle management measures into the landscape and urban design to maximise amenity.

vii. Minimise soil erosion and sedimentation resulting from site disturbing activities.

viii. Minimise the potential impacts of development and other associated activities on the aesthetic, recreational, cultural and ecological values of receiving water.

ix. Ensure the principles of ecologically sustainable development are applied in consideration of economic, social and environmental values in water cycle management.

x. Ensure stormwater systems and infrastructure are designed, installed and maintained so as not to increase the risk to life or safety or people.

xi. Provide Green and Golden Bell Frog friendly stormwater detention ponds in areas where Green and Golden Bell Frog are present.

xii. Ensure stormwater systems and infrastructure are appropriately designed and installed to minimise the ongoing maintenance costs as much as possible.

5 Controls

5.1 Stormwater

5.1.1 Minor and Major Systems Design

<table>
<thead>
<tr>
<th>Performance Criteria</th>
<th>Acceptable Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>P1</strong></td>
<td>General</td>
</tr>
<tr>
<td>Minor and major drainage systems are appropriately designed to:</td>
<td>A1.1 Runoff from impervious areas must not be concentrated or directed onto neighbouring properties.</td>
</tr>
<tr>
<td>• Not increase the risk to life or safety of persons during a storm event.</td>
<td></td>
</tr>
<tr>
<td><strong>Note:</strong> Refer to Supporting Document 1: Sustainable Stormwater Technical Guidelines.</td>
<td><strong>Minor System Drainage</strong></td>
</tr>
<tr>
<td>• Manage stormwater discharge from the development or work to safely convey stormwater flows.</td>
<td>A1.2 For residential and rural residential areas, drainage must be designed to cater for a 5 year Average Recurrence Interval (ARI) event.</td>
</tr>
<tr>
<td>• Discharge runoff from the development without adverse</td>
<td>A1.3 For mixed residential/commercial, commercial and industrial development, the drainage must be</td>
</tr>
</tbody>
</table>
impacts on existing infrastructure and neighbouring properties.

- Ensure continuity of overland flow paths where possible.
- Ensure stormwater systems are designed in accordance with industry standards.

**A1.4** Kerb and gutters are required where soil permeability is not sufficient to allow natural infiltration of stormwater runoff without causing adverse impacts onsite or to neighbouring properties.

**A1.5** Runoff from roofs and other impervious areas shall be directed to an existing or proposed stormwater system when it can be proven to Council’s satisfaction that the design capacity of the system is not exceeded.

**A1.6** Where onsite infiltration / absorption is proposed for stormwater disposal, supporting geotechnical reports are submitted with a development application to assess the suitability of the proposal.

**Note:** The geotechnical report shall also identify the depth to groundwater and measured on-site infiltration rate.

Where onsite infiltration is proposed for stormwater disposal, the applicant must demonstrate that this will not occur in areas with known soil or groundwater contamination.

**A1.7** Stormwater inlet structures must be designed with a blockage factor provision in accordance with the latest version of the Australian Rainfall and Runoff (ARR) guidelines.

**Major System Drainage**

**A1.8** Major system drainage must be designed for a 100 year ARI event.

**A1.9** Trunk stormwater systems (e.g. open channels, large conduits and overland flow paths) are designed for storms up to 100 year ARI event.

**A1.10** The following overland flow paths shall be utilised as major system flow routes:

- Roadways including footpath.
- Pathways.
- Parkland or open space.
A1.11 Flow paths must be designed to ensure a velocity depth product of less than 0.3 m²/s for a 100 year ARI storm event.

A1.12 The continuity of overland flow paths must not be obstructed by fences, walls, footpaths and the like.

Note: Overland flow paths on private land within subdivisions will not be supported.

Note: For example, where a roadway acting as an overland flow path discharges stormwater to a pathway, park, stormwater reserve, etc., the footpath must have a reverse crossfall to facilitate the overland flow.

5.1.2 Disposal of Stormwater from Development Sites

The specific objectives are to:

i. Ensure the protection of public health, surrounding land and the natural environment including soils, ground water and surface waters.

ii. Encourage harvesting of rainwater and the incorporation of pervious areas.

iii. Ensure stormwater is controlled in a way that minimises nuisance to adjoining properties.

iv. Set a minimum standard for the collection and management of stormwater on sites.

<table>
<thead>
<tr>
<th>Performance Criteria</th>
<th>Acceptable Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>P2 Stormwater is appropriately accommodated in the design including:</td>
<td>A2.1 Roof water is to be collected by gutter and downpipe systems, or other equivalent means, and conveyed to an approved discharge point in accordance with the requirements of Part 3.1.2 of the Building Code of Australia and AS 3500.3. This could be:</td>
</tr>
<tr>
<td>• Stormwater from roofed areas is collected, stored and/or conveyed to appropriate discharge points or disposal areas.</td>
<td>a) A gutter or table drain in a road reserve, or</td>
</tr>
<tr>
<td>• Paved/impervious areas associated with buildings and driveways are graded and drained to prevent the discharge of surface water onto adjoining land.</td>
<td>b) A stormwater easement or easement to drain water, or</td>
</tr>
<tr>
<td>• Permeable areas are utilised to reduce stormwater runoff.</td>
<td>c) A charged line system where (a) and (b) above are not available and the development site will have no more than two dwellings. Where a charged line system is proposed, the following must be included with the development application:</td>
</tr>
</tbody>
</table>
• Acknowledgement from adjoining property owners indicating a refusal to grant a drainage easement. The acknowledgement must indicate that a reasonable amount of compensation has been offered for the proposed drainage easement and that the advantages of creating an easement were explained.

• Demonstrate a minimum of 1.8m of fall between the roof gutters and the front boundary of the site.

• Demonstrate fall from the front boundary to the kerb line.

• Detailed design, inclusive of site plan and longitudinal section including all calculations, levels and further details of pits, gutters and maintenance facilities as required, or

  d) A disposal/absorption trench, where (a), (b) or (c) above are not available, and soil conditions are suitable, or

  Note: Supporting geotechnical reports are to be provided with a development application.

  e) A water tank/on-site detention system with an overflow connected to a disposal method in (a), (b), (c) or (d), above.

A2.2 Surface water from paved areas including driveways is to be directed to an approved discharge point (see A2.1) that minimises impact on adjoining land.

  Note:
  
  • The method selected for the discharge point in A2.1 and A2.2 above will be assessed against the suitability and hydraulic capability including pipe size and/or soil type.

  • Pervious/permeable paving should be considered for infrequently trafficked areas on private land.

  • Pervious/permeable paving and pavements on public roads will not be supported.
A2.3 Where the area of buildings, pavement and other impervious areas exceeds 65% of the site area, the proposal is to include details of the methods to be used to harvest rainwater and minimise increased runoff to surrounding land and public stormwater infrastructure. The details are to include assessment of pre-development and post development stormwater flows.

Note: The calculation of the 65% area may include reasonable assumption of future paved areas such as driveways not shown on plans at development application stage.

5.1.3 Climate Change Controls

<table>
<thead>
<tr>
<th>Performance Criteria</th>
<th>Acceptable Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>P3</td>
<td>A3.1 Climate change impacts, such as changes to rainfall intensity, shall be considered in system design as per relevant policies and/or Australian Rainfall and Runoff Guidelines.</td>
</tr>
<tr>
<td>P4</td>
<td>A4.1 Sea level rise shall be considered in system design as per relevant policies and/or Australian Rainfall and Runoff Guidelines.</td>
</tr>
</tbody>
</table>

5.1.4 Onsite Stormwater Detention

Onsite stormwater detention may be required for all development except for:

(a) Alterations, additions, ancillary structures and second storey additions in areas within the 5-year ARI flood extents as identified in a flood study or floodplain risk management study adopted by Council where:
   (i) The addition is less than 10% of the existing development footprint; and
   (ii) The overall site impervious areas are less than 50% of the site.

(b) Change of use where no increase in impervious area is proposed;

(c) New developments in subdivisions where onsite stormwater detention has already been provided for the entire subdivision and it has sufficient capacity for the additional development.
The use of onsite stormwater detention is appropriate for the needs of the development and is designed to ensure:

- Post development peak flow matches pre-development peak flow as closely as possible.
- Safe onsite stormwater detention measures.
- That the development does not place an unacceptable financial burden on landowners or the community.
- Compliance with industry standards.

**Performance Criteria**

**Acceptable Solutions**

A5.1 Onsite stormwater detention is to be sized to match pre-development peak flow rates for the 5, 20 and 100-year ARI rain events for the site.

A5.2 For development other than subdivision, pre and post-development peak flow calculations must be based on the:

- Impervious percentages in Table 1, or
- Actual impervious surface area as detailed on development plans, whichever is greater.

A5.3 For subdivisions, pre and post-development peak flow calculations must be based on the impervious percentages in Table 1.

**Note:** Lots within subdivisions containing existing dwellings/buildings must be considered.

**Table 1: Pre and post development peak flow percentages**

<table>
<thead>
<tr>
<th>Area impervious</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open space</td>
<td>25%</td>
</tr>
<tr>
<td>Low and medium density residential</td>
<td>80%</td>
</tr>
<tr>
<td>Industrial areas</td>
<td>80%</td>
</tr>
<tr>
<td>Commercial areas</td>
<td>90%</td>
</tr>
<tr>
<td>Half width road reserve</td>
<td>95%</td>
</tr>
</tbody>
</table>

A5.4 Onsite stormwater detention design must consider downstream boundary conditions for the 100-year ARI level of the receiving water.

A5.5 Detention storage must be located at a level above the 5-year ARI flood level.

A5.6 If onsite stormwater detention is provided in landscaped areas, the desirable maximum depth of ponding under design conditions is 300mm.
A5.7 Despite A5.6, the desirable maximum depth of ponding under design conditions can be increased to 1200mm provided that:

- Site slopes of the basin are 1:6 or shallower (less than 1:6); or
- The provided storage is fenced off.

A5.8 For subdivisions, onsite stormwater detention shall be:

- Designed at the subdivision stage.
- Constructed at the individual dwelling stage where OSD is proposed to be provided on each lot.
- Constructed at the subdivision stage where OSD is proposed to be provided through dedicated detention storage.

**Note:** OSD should be kept to a minimum when proposed on public land and the application must clearly demonstrate that the system is cost effective and well designed in terms of maintenance and safety.

A5.9 50% of any retention volume can contribute towards the onsite stormwater detention volume required for the development, where continual reuse of the retention volume can be demonstrated.

---

5.2 Stormwater Quality and Waterway Protection

This Section aims to encourage an approach to stormwater management that considers the natural hydrological and ecological processes of the surrounding environment. This may include onsite collection and reuse of water flows as part of an integrated treatment train provided in addition to conventional stormwater treatment measures.

5.2.1 Erosion and Sediment Control

The specific objective is to:

i. Prevent litter and sediment from building sites entering waterways.
Mandatory Controls

1. An erosion and sediment control plan or soil and water management plan must be prepared in accordance with the following for any development that involves the disturbance of the soils surface, or the placement of materials that may erode, or cause erosion:

- Managing Urban Stormwater: Soils and Construction Volume 2 (DECCW, 2008) (Blue Book Vol. 2) and,

Note:
- Where there is an inconsistency between these documents, the ‘Blue Book’ will prevail.
- The above standards are minimum requirements. Additional works may be required depending upon exposed area and prevailing weather conditions. Refer to Supporting Document 1: Sustainable Stormwater Technical Guidelines.
- The erosion and sediment control measures are to be retained until the disturbed areas are revegetated. Refer to Supporting Document 2: Planning for Erosion and Sediment Control on Single Residential Allotments Guideline.
- Hay bales are not to be used as sediment control devices.

General Controls

<table>
<thead>
<tr>
<th>Performance Criteria</th>
<th>Acceptable Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>P6 The development or work will not:</td>
<td>A6.1 Where vegetation exists on the site, buffer zones of vegetation shall be retained along the boundaries of the site where practicable, particularly those adjacent to creeks and street gutters.</td>
</tr>
<tr>
<td>• Cause erosion and/or siltation.</td>
<td>A6.2 Sediment and erosion control measures shall not adversely impact on stormwater management measures of the site or any existing public drainage structures or systems.</td>
</tr>
<tr>
<td>• Have an adverse impact on receiving waterways from increased concentrations and loads of sediment.</td>
<td>Note: Activities that have the potential to pollute must comply with standards of the Environmental Operation Act 1997.</td>
</tr>
</tbody>
</table>
5.2.2 Stormwater Retention and Reuse

This section applies to all development that is not subject to BASIX.

Note: BASIX applies to certain residential development. Refer to State Environmental Planning Policy (Building Sustainability Index: BASIX) 2004 for more information.

<table>
<thead>
<tr>
<th>Performance Criteria</th>
<th>Acceptable Solutions</th>
</tr>
</thead>
</table>
| P7 The development provides adequate retention storage where there is an increase in impervious surface area. | A7.1 The volume of retention storage provided is to be equal to or greater than: 

\[ \text{storage depth at Table 2} \times \text{increase in impervious surfaces compared to pre-development} \]

Note: Refer to Supporting Document 1: Sustainable Stormwater Technical Guidelines for more information.

Table 2: Retention storage depth

<table>
<thead>
<tr>
<th>Development type</th>
<th>Storage depth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alterations, additions, ancillary structures and second storey additions</td>
<td>10mm</td>
</tr>
<tr>
<td>Dwelling houses and dual occupancy</td>
<td>10mm</td>
</tr>
<tr>
<td>Medium Density</td>
<td>9mm</td>
</tr>
<tr>
<td>High Density</td>
<td>8mm</td>
</tr>
<tr>
<td>Industrial</td>
<td>6mm</td>
</tr>
</tbody>
</table>

P8 The reuse of stormwater is optimised to provide an alternative water supply.

A8.1 Residential development shall install rainwater tanks to meet a portion of supply such as outdoor use, toilets, laundry.

A8.2 Any overflow from rainwater tanks shall be directed into an existing stormwater system where possible, alternatively the overflow will be managed so that it does not cause nuisance to neighbouring properties.
5.2.3 Small/medium Scale Development – Site Discharge Index

This Section applies to small/medium scale development, but not in relation to alterations, additions, ancillary structures and second storey additions where:

   a) The addition is less than 10% of the existing development footprint; and
   b) The overall site impervious areas are less than 50% of the site.

**Performance Criteria**

P9 Site discharge has a minimal impact on receiving waterways and stormwater systems.

**Acceptable Solutions**

A9.1 Development shall be designed to achieve a site discharge index that does not exceed 0.1.

A9.2 For car parks exceeding a trafficable impervious area of 300m² and/or 10 parking spaces, stormwater treatment measures are required to achieve an 80% reduction in Total Suspended Solids unless stormwater runoff is discharged to a treatment device elsewhere within the development.

5.2.4 Large Scale Development

This section applies to large scale development.

Note: Refer to Section 6.1 of this Chapter for guidance as to whether, for the purposes of stormwater management, the proposed development is a large scale development.
## Performance Criteria

**P10** Large scale development mitigates adverse impacts by:

- Minimising post development pollutant loads to not unduly impact on the quality of receiving waterways.
- Protecting stream stability and habitats through retention, infiltration and detention to limit post development flows.

## Acceptable Solutions

**A10.1** For development within Sydney’s drinking water supply catchments, a neutral or beneficial effect must be demonstrated in accordance with the State Environmental Planning Policy (Sydney Drinking Water Catchment) 2011.

**A10.2** For development outside Sydney’s drinking water supply catchments, pollutant load reduction must be a minimum reduction of the post development average annual load of pollutants in accordance with Table 3, and the following as relevant:

- For greenfield sites or sites draining to a natural stream of 3rd order or lower, the 1.5 year ARI pre-development peak discharge must be maintained; and
- For development discharging to a natural stream, the post development duration of stream forming flows must be no greater than a stream erosion index of 2; and
- For development discharging to a tidal area or natural watercourse, outlets must be designed to limit erosion and sedimentation at the discharge point; and
- For development discharging to St Georges Basin, Swan Lake, Lake Conjola, Burrill Lake, Lake Tabourie, Willinga Lake and Wollumboola Lake, a higher Total Phosphorus reduction target of 65% must be achieved; and
- For development discharging into an area of significant biodiversity value, the post-development residual pollutant concentrations must not exceed the ecological trigger values listed in the Australian and New Zealand Guidelines for Fresh and Marine Water Quality; and
• Uncoated metal (i.e. copper etc) roofs, facades and/or downpipes are will not be supported due to heavy metal concentrations in stormwater runoff from these surfaces being harmful to receiving waterways.

**Note:**

• Water quality modelling is to demonstrate reductions in pollutant loads. The reduction targets must be achieved within the site boundary of the proposed development.

• Refer to Supporting Document 1: Sustainable Stormwater Technical Guidelines.

• The Model for Urban Stormwater Improvement Conceptualisation (MUSIC) modelling program, or an equivalent as approved by Council, is appropriate to model (simulate) pollutant loads. The MUSIC model must be submitted with the Development Application.

• Applicants are encouraged to discuss the proposed stormwater quality strategy for large scale developments with Council by arranging a pre-lodgement meeting with Council’s Development Advisory Unit (DAU).

**Table 3: Pollutant load reduction**

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Post development average annual load reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross pollutants</td>
<td>End of stormwater network solution is to achieve the following:</td>
</tr>
<tr>
<td></td>
<td>• Litter: Retention of litter greater than 40mm for flows up to the 4 exceedances per year (EY) event (3-month ARI peak flow).</td>
</tr>
</tbody>
</table>

Page | 15
Coarse sediment: Retention of sediment coarser than 0.125mm for flows up to the 4EY peak flow.

| Total suspended solids | 80% |
| Total phosphorus       | 45% |
| Total nitrogen         | 45% |

5.2.5 Design and Maintenance of Stormwater Treatment Measures

This section sets out controls for large scale development that requires stormwater treatment measures.

Note: Refer to Section 6.1 of this Chapter for guidance as to whether, for the purposes of stormwater management, the proposed development is a large scale development.

Performance Criteria

P11 Stormwater treatment measures for large scale development are appropriately designed and are able to be maintained appropriately to ensure their optimal efficiency including:

- Protection of permanent stormwater treatment against siltation/sedimentation and clogging during construction.
- Not unduly increasing health and safety risks.
- Not unduly increasing maintenance requirements of stormwater infrastructure by Council.
- Design in accordance with best industry practices.
- Ensuring the ongoing reduction of stormwater pollutants.

Acceptable Solutions

A11.1 Where practicable, trunk drainage is to be provided as a naturally vegetated stable channel.

A11.2 Where practicable due to adequate catchment area, constructed wetlands are preferred over the use of bio-retention basins and water quality ponds. The preference between a water quality pond and bioretention device will depend on site specific constraints.

Note: Incorporation of OSD into constructed wetlands and water quality ponds is encouraged provided this would not damage vegetation.

A11.3 An Operation and Maintenance Plan shall be submitted to Council for all stormwater treatment measures proposed, whether the asset is to remain in private ownership or to be handed over to Council.
A11.4 System design shall allow for maintenance (i.e. access and room to operate safely) at all times.

A11.5 Stormwater treatment measures must not be connected until the majority of catchment infrastructure is completed and landforms stabilised with impervious or fully established grassed surfaces. Bioretention devices and constructed wetlands must be established offline from inflows until they are fully established.

A11.6 Where the development is staged, sacrificial zones must be included in the design of the stormwater treatment measures. Sacrificial zones are to be rectified upon completion of development at the developers cost.

A11.7 Structural stormwater treatment measures must be able to bypass flows in excess of the design discharge with negligible afflux resulting from overtopping or blockage of the device.

A11.8 Trash racks are generally preferred over proprietary gross pollutant traps (GPTs) by Council. In some circumstances Council may consider proprietary GPT devices where it can be demonstrated that

- The device can achieve the desired treatment performance; and
- The maintenance costs are less than that of an equivalent conventional device; and
- No specialist equipment is required to carry out maintenance activities; and
- Major consumable parts e.g. filters and cartridges are not required to be purchased by Council on a regular basis.

Where a proprietary GPT is supported by Council, the developer must provide documentation from the supplier providing evidence that the proposed device has been
appropriately sized for the contributing catchment.

**Note:** Pit litter baskets are not supported by Council.

A11.9 In the event of a stormwater discharge, stormwater treatment structures must not allow the release of any previously trapped material.

A11.10 Stormwater treatment measures must consider mosquito control in the design, including:

- Permanent water ponding;
- Water depth;
- Exposure to sunlight and wind; and
- Proximity to residential development.

**Note:** Expert advice may be required to support the development application.

A11.11 All filter media used in bioretention stormwater treatment measures must meet the current specifications for Filter Media in Adoption Guidelines for Stormwater Biofiltration Systems or a demonstrated and approved equivalent and be verified by a soil laboratory registered by the National Association of Testing Authorities.


A11.13 Development adjacent to a watercourse or stormwater drain addresses environmental impact on the waterbody.

A11.14 Constructed wetlands and bio-retention basins must be located in a treatment train approach immediately downstream of a sediment basin/forebay that:

- Has been sized to capture approximately 75% of coarse sediment; and
• Is offline from the stormwater network to allow flows exceeding the capacity of the piped stormwater network to bypass the treatment devices.

The sediment basin/forebay can be either wet or dry. A trash rack can be incorporated into the sediment basin inlet structure provided the invert of the trash rack is above the permanent water level of the pond.

A11.15 Bioretention devices must be designed in accordance with the latest version of the Adoption Guidelines for Stormwater Biofiltration Systems (CRC for Water Sensitive Cities) and Facility for Advancing Water Biofiltration (FAWB) Guidelines.

Note: Where there is an inconsistency between these documents, the ‘Adoption Guidelines for Stormwater Biofiltration Systems’ Guidelines will prevail.

A11.16 Constructed wetlands must be designed in accordance with the latest version of the Melbourne Water Wetland Design Manual or a demonstrated and approved equivalent.

5.3 Waterfront Land

5.3.1 Development on Waterfront Land

This section applies to all waterfront land as defined by the Water Management Act 2000.
Chapter G2: Sustainable Stormwater Management and Erosion/Sediment Control

Note:

- **Watercourses** are defined according to:
  - Shoalhaven LEP 2014 Natural Resource Sensitivity – Water Map; or
    - Category 1 being the highest, most valuable, and category 3 being the lowest.
  - The *Water Management Act 2000*; or
    - The *Water Management Act 2000* uses a different method to order streams – the Strahler Method. This method ranks the stream based on the number of upstream tributaries draining to it at that point.
  - Where necessary, the relevant NSW State Government agency must be consulted to determine the appropriate classification.

- The category will define the **Core Riparian Zone** width which must be protected/rehabilitated and an adjoining vegetated buffer width.

- Any works within 40m of a **watercourse** is considered a controlled activity requiring approval through the issuing of a Controlled Activity Approval (CAA).

<table>
<thead>
<tr>
<th>Performance Criteria</th>
<th>Acceptable Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>P12 Buffers and setbacks to <strong>watercourses</strong> are appropriately provided through:</td>
<td>A12.1 The minimum width of the <strong>core riparian zone</strong> is in accordance with Table 4 or as specified by the <em>Water Management Act 2000</em>.</td>
</tr>
<tr>
<td>- Core riparian zones areas being established or maintained in accordance with the relevant guidelines.</td>
<td>A12.2 The <strong>core riparian zone</strong> must be maintained, restored or rehabilitated using appropriate local species with a range of canopy, understorey and groundcover species to enable a healthy and diverse ecosystem.</td>
</tr>
<tr>
<td>- Development or works on waterfront land complying with State Government legislation and guidelines.</td>
<td>A12.3 Topsoil shall be reused from the <strong>development</strong> site where it contains known or potential seedbank on the development site.</td>
</tr>
<tr>
<td>A12.4 Transport infrastructure and services (i.e. sewer, electricity, gas and communication) shall be located outside the <strong>core riparian zone</strong>.</td>
<td>A12.5 Despite A12.4, where services must traverse the <strong>core riparian zone</strong>, the</td>
</tr>
</tbody>
</table>
development application must demonstrate that there will be minimal impact on the function and integrity of the core riparian zone.

A12.6 Pathways, cycleways and pervious recreational areas shall be located outside the core riparian zone unless all of the following is satisfied:

- An opportunity exists for the community to connect with and explore the watercourse in a strategic location.
- There will be minimal impact on the riparian function.
- The integrity of the riparian land is maintained.

A12.7 Bushfire asset protection zones shall be located outside the core riparian zone or vegetated buffer and should be incorporated into the development footprint.

A12.8 Crossings of waterways or other activities must have regard to the minimum structure requirements for fish passage in accordance with relevant NSW state government requirements.

A12.9 Works carried out on waterfront land comply with the Water Management Act 2000.

Note: Refer to Supporting Document 1: Sustainable Stormwater Technical Guidelines and WaterNSW for information on:

- In-stream works.
- Laying pipes and cables in watercourses.
- Outlet structures.
- Riparian corridors.
- Vegetation Management Plans.
- Watercourse crossings.

A12.10 Stormwater disposal over/ across/ through public waterfront reserves should be avoided to prevent erosion and need for remedial actions.
### Table 4: Watercourses and width of core riparian zone and vegetated buffer

<table>
<thead>
<tr>
<th>SLEP 2014 Watercourse Categories</th>
<th>Width of core riparian zone</th>
<th>Vegetated buffer width</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensitive area (watercourse category 1) – Environmental Corridor</td>
<td>40m</td>
<td>10m</td>
</tr>
<tr>
<td>Sensitive area (watercourse category 2) – Terrestrial and Aquatic Habitat</td>
<td>20m</td>
<td>10m</td>
</tr>
<tr>
<td>Sensitive area (watercourse category 3) – Bank Stability and Water Quality</td>
<td>10m</td>
<td>Merit based</td>
</tr>
</tbody>
</table>

### 5.3.2 Coastal Areas

This section applies to all development discharging stormwater to coastal cliffs or coastal dunes.

<table>
<thead>
<tr>
<th>Performance Criteria</th>
<th>Acceptable Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>P13 Stormwater discharge will not cause significant erosion of the cliff or dune face.</td>
<td>A13.1 The quantity of stormwater discharged to the cliffs or dune face is limited by compliance with the provisions of this Chapter.</td>
</tr>
<tr>
<td></td>
<td>A13.2 Stormwater is discharged to stable well vegetated areas and/or energy dissipation structures.</td>
</tr>
<tr>
<td></td>
<td>A13.3 The design shall maximise the capture and discharge of roof and surface flow stormwater to the street, or if not away from the cliff line, by discharging to the bottom of the cliff.</td>
</tr>
<tr>
<td></td>
<td>A13.4 Stormwater discharges must not be directed to the base of a dune or cliff where the cliff or dune is Crown land.</td>
</tr>
</tbody>
</table>
6 Advisory Information

6.1 Is the Proposal Small/medium Scale or Large Scale Development?

Table 5 provides guidance as to whether, for the purposes of stormwater management, the proposed development is a small/medium scale or large scale development.

Table 5: Determining whether your development is small/medium scale or large-scale

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Determination</th>
<th>Scale and documentation required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is the proposed development:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) A Torrens or community title subdivision creating 10 or more additional lots?</td>
<td>Yes to any of these questions</td>
<td>Large-scale development</td>
</tr>
<tr>
<td>b) A subdivision of land greater than 3,500m² irrespective of how many Torrens or community title allotments are created?</td>
<td></td>
<td>An integrated water cycle management strategy (IWCMS) must be submitted with the development application.</td>
</tr>
<tr>
<td>c) An integrated housing subdivision?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d) A development with a development footprint greater than 2,500m²?</td>
<td>No to all these questions</td>
<td>Small/medium scale development</td>
</tr>
<tr>
<td>e) An industrial, commercial or residential development (including alterations and/or additions), where the new impervious area for the site exceeds 1,000m²?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note:  
- In relation to d) above, development footprint includes any structures and impervious areas. It does not refer to the size of the land.  
- In relation to industrial, commercial or residential development at e) above, this includes the construction or designation of car parking spaces, whether the spaces are covered or uncovered, basement or elevated type car parking spaces or car parking spaces that are remote to the development which they serve.  
- An IWCMS must include a report and drawing demonstrating how the development meets the relevant stormwater controls.
### 6.2 Other legislation or policies you may need to check

**Note:** This section is not exclusive and you may be required to consider other legislation, policies and other documents with your application

<table>
<thead>
<tr>
<th>Council Policies &amp; Guidelines</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Engineering Design Specifications</td>
<td></td>
</tr>
<tr>
<td>• Sustainable Stormwater Technical Guidelines (Supporting Document 1)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>External Policies &amp; Guidelines</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Adoption Guidelines for Stormwater Biofiltration Systems (CRC for Water Sensitive Cities)</td>
<td></td>
</tr>
<tr>
<td>• Australian and New Zealand Guidelines for Fresh and Marine Water Quality</td>
<td></td>
</tr>
<tr>
<td>• Australian Rainfall and Runoff Guidelines (2019)</td>
<td></td>
</tr>
<tr>
<td>• Building Code of Australia</td>
<td></td>
</tr>
<tr>
<td>• Facility for Advancing Water Biofiltration (FAWB) Guidelines</td>
<td></td>
</tr>
<tr>
<td>• Guidelines for Filter Media in Biofiltration Systems (Version 3.01) (Facility for Advancing Water Filtration 2009)</td>
<td></td>
</tr>
<tr>
<td>• Planning for Erosion and Sediment Control on Single Residential Allotments Guideline (Landcom 2004) (Supporting Document 2)</td>
<td></td>
</tr>
<tr>
<td>• Wetland Design Manual (Melbourne Water)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Legislation</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Environmental Operation Act 1997</td>
<td></td>
</tr>
<tr>
<td>• Shoalhaven LEP 2014</td>
<td></td>
</tr>
<tr>
<td>• State Environmental Planning Policy (Building Sustainability Index: BASIX) 2004</td>
<td></td>
</tr>
<tr>
<td>• State Environmental Planning Policy (Sydney Drinking Water Catchment) 2011</td>
<td></td>
</tr>
<tr>
<td>• Water Management Act 2000</td>
<td></td>
</tr>
</tbody>
</table>