9.3/18
Edition 1

Stormwater Management

Development Control Plan

Sutherland Shire Council

This page has intentionally been left blank.

TABLE OF CONTENTS

This page has intentionally been left blank.

1. INTRODUCTION

Managing stormwater sustainably improves the quality of development and helps to protect and improve the quality of the Shire's waterways. Traditionally stormwater management involved piped discharge from a site and stormwater detention. Current stormwater philosophy regards stormwater as a resource to be harnessed and utilised prior to any consideration of site discharge. This can be achieved by Water Sensitive Urban Design (WSUD).

The purpose of this Development Control Plan (DCP) is to ensure all development has regard to:

- managing stormwater in an environmentally sustainable way in order to protect a valuable resource and
- reduce the impacts of stormwater discharge.

All development applications under Sutherland Local Environmental Plan 2000, Menai Town Centre Local Environmental Plan 1992 and Sydney Regional Environmental Plan 17 (Kurnell Peninsula 1989) will need to demonstrate stormwater management outcomes that minimise the volume of stormwater runoff through water retention, infiltration and reuse techniques in accordance with this DCP.

Residual stormwater runoff across other lands will require a legally created easement and associated formal drainage system.

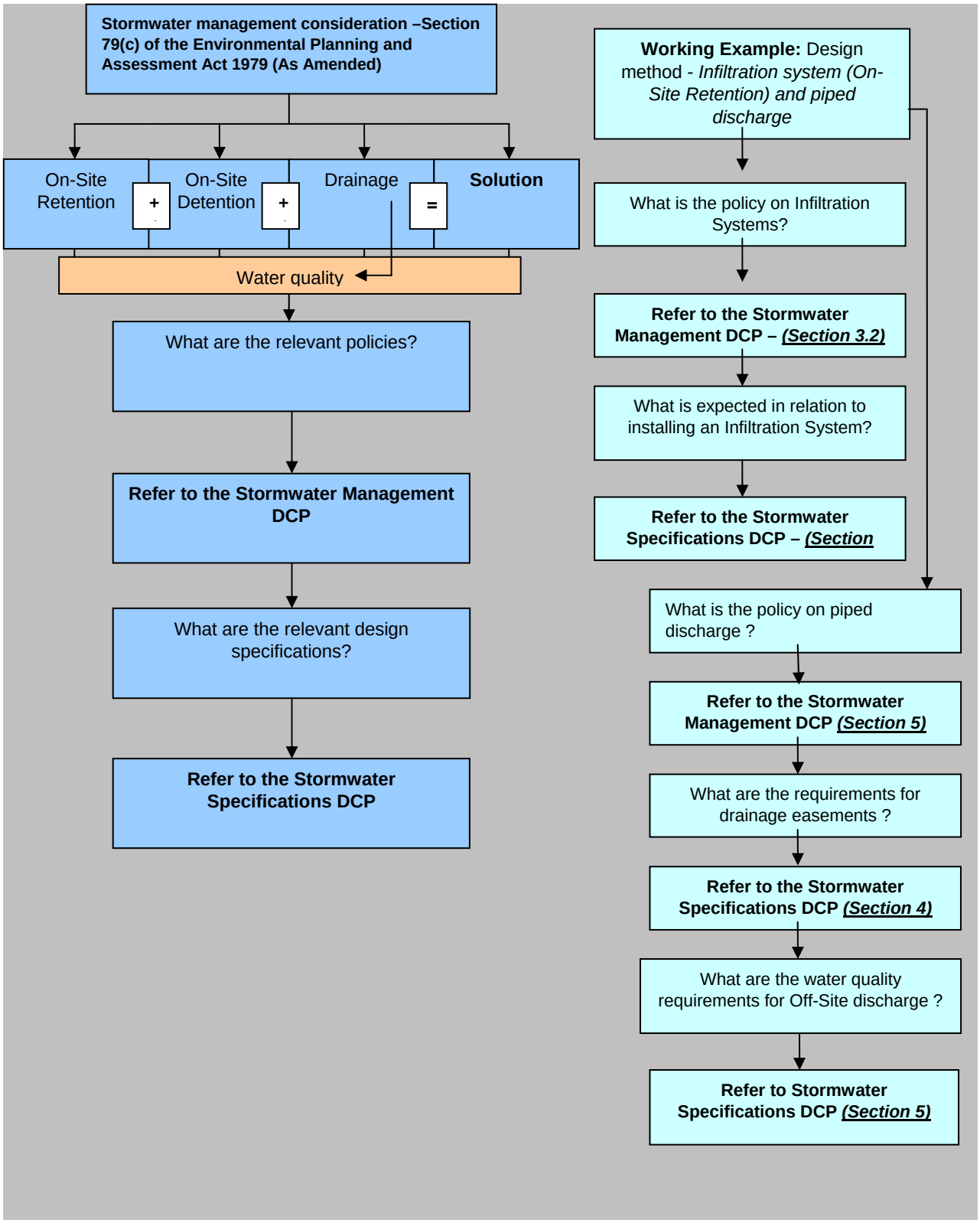
This development control plan is effective from 24 May 2005.

How does this Development Control Plan function?

The Development Control Plan is separated into three sections for consideration, they being:

1. On- Site Retention
2. On-Site Detention
3. Drainage

Water quality considerations apply in circumstances where stormwater is discharged off-site. The following diagram outlines how the DCP is applied in a broad sense and an example of how it would function in a particular scenario.



Important note: **This DCP recognises the water conservation principles of State Environmental Planning Policy (Building Sustainability Index: BASIX) 2004. The rainwater harvesting provisions for all forms of residential housing with the exception of residential flat buildings is regulated by BASIX and not this DCP or the Stormwater Specifications DCP.**

1.1 Objectives

The objectives of this DCP are:

(a) to ensure that Water Sensitive Urban Design techniques are incorporated and fully exploited in all new developments prior to consideration of On-Site Detention and stormwater discharge off-site;

(b) to minimise the volume of stormwater runoff;

(c) to preserve, restore and enhance water body and riparian zones as natural systems;

(d) to promote water conservation through on-site water retention and reuse;

(e) to protect downstream properties from the impacts of excessive runoff and flooding;

(f) to ensure that building areas are free from flooding;

(g) to ensure that stormwater management is integrated with urban design to maximise opportunities to reuse stormwater;

(h) to ensure that the quality of stormwater discharged from a development does not impact on the environment and receiving waters in terms of sedimentation, water pollution and other impacts;

(i) to utilise natural surfaces and landforms to act as natural influences on overland flow paths and to allow for on-site infiltration where suitable.

(j) to maintain stormwater runoff in its natural catchment by the most direct route.

1.2 Where does this plan apply?

This plan applies to all land within the Sutherland Shire Council local government area subject to Sutherland Local Environmental Plan 2000, the Menai Town Centre Local Environmental Plan 1992 and Sydney Regional Environmental Plan 17 (Kurnell Peninsula 1989).

2. PRELIMINARY

2.1 Submission requirements and calculations

(a) A site analysis that includes details regarding stormwater management opportunities with regard to achieving Council's DCP objectives.

(b) A concept Stormwater Management Plan certified by a suitably qualified and experienced Chartered Professional Engineer registered on the National Professional Engineer Register (NPER) in Civil Engineering that includes:

- A statement justifying that the hydraulic design satisfies the requirements of Council's Stormwater Specifications DCP.

- Any infiltration or stormwater absorption system shall require a geotechnical engineers report confirming the suitable permeability of the site.

- As a minimum, the geotechnical report must be in accordance with the pro-forma found in Appendix A of Council's Stormwater Specifications DCP.

- Emergency spill plans must accompany development applications that involve hazardous materials.

- Drainage systems must be analysed using the most appropriate and accurate full hydrograph producing computer model such as ILSAX, DRAINS, RAFTS or similar. Rational method triangular hydrographs are not acceptable.

- The most recent and appropriate to the location, Intensity-Frequency-Duration (IFD) rainfall data is to be used for all hydrologic calculations.

- The most appropriate discharge and water level calculation procedures are to be used in hydraulic analysis.

- Hydraulic models for pre and post-developed conditions shall consider surface contours, appropriate runoff coefficients and any existing or proposed drainage structures.

- Calculations are to be certified by a suitably qualified and experienced Chartered Professional Engineer registered on the National Professional Engineers Register (NPER) in Civil Engineering.

- The design of OSD facilities shall account for the total allotment area.

- Information relating to rainwater tank(s) such as, support structure, location, plumbing connections and intended reuse must be shown on the concept stormwater management plan.

2.2 Exemptions to Stormwater Management

(a) Development applications for ancillary structures associated with a residential dwelling are exempt from stormwater management provisions.

(b) Additions to a dwelling, up to and including 20 square metres are exempt from any stormwater management regulations imposed by Council.

(c) Additions to a dwelling, over 20 square metres and up to and including 40 square metres in area are exempt from the development standards except that a rainwater tank must be installed, but no smaller than 1,000 litres capacity.

(c) Where an addition to a dwelling, in accordance with subclause (c) includes a bathroom, toilet, or laundry, harvested rainwater must be utilised for toilet flushing or laundry purposes.

2.3 Stormwater Management Principles

(a) All developments shall be designed to comply with the Stormwater Specification DCP.

(b) On-Site Retention methods measures shall be utilised in the management of stormwater.

(c) Residual stormwater generated from the site shall be conveyed across other lands by gravity to the receiving stormwater systems within the natural catchment by the most the most direct route.

(d) Where possible, stormwater runoff from impervious areas of the site shall be directed to landscaped areas.

(d) The rate of stormwater runoff (both piped and overland) from the post-developed site shall not exceed the rate of runoff from the pre-development site based on the Permissible Site Discharge (PSD).

(f) In some circumstances, stormwater management drainage systems may require greater rainwater volume harvesting then specified by the BASIX SEPP.

3. ON-SITE RETENTION

Purpose: *Australia is a continent of extremes. It is the driest inhabited area on earth, with high variable rainfall patterns. It also is a country affected by flooding, particularly in urban settlements where localised flash flooding from intense thunderstorms occurs frequently. This means that communities are on the one-hand facing frequent water supply problems and at other times, managing flood events where lives can be lost and damage to properties and the environment can cost millions.*

The purpose of On-Site Retention is to help address these issues by managing stormwater as a resource, not a waste. Harvesting stormwater for re-use and minimising stormwater runoff is an effective means of reducing consumption of potable water and also the impacts of stormwater on flooding and the environment.

3.1 Pervious areas

(a) Pervious areas, natural surfaces and landform need to be maintained to act as natural influences on overland flow paths and allow for infiltration to underlying soil.

(b) Open car parking areas are to utilise pervious surface treatments where site conditions are suitable.

(c) Non-porous paving shall be graded to direct runoff onto adjoining grassed or landscaped areas or into another source control device prior to discharge off-site.

(d) Sediment traps, vegetated filter strips or the like are to be installed upstream of porous paving to reduce sediment inputs and minimise likelihood of clogging, particularly during the construction phase.

3.2 Constructed Infiltration Systems

(a) On the map marked 'Areas Suitable for On-Site Infiltration', Development sites indicated as 'High Permeability' must provide constructed infiltration systems except where a geotechnical report is provided which demonstrate that the site is unsuitable.

(b) On the map marked 'Areas Suitable for On-Site Infiltration', Development sites indicated as 'Medium Permeability' are encouraged to provide constructed infiltration systems except where a geotechnical report is provided which demonstrate that the site is unsuitable..

(c) On the map, marked 'Areas Suitable for On-Site Infiltration', Development sites, which are not identified, or are indicated as 'Low Permeability', on-site infiltration systems may be considered if supported by a geotechnical report.

(d) Surcharge from the infiltration system must not exceed the Permissible Site Discharge rate. Surcharge shall not be concentrated across a boundary.

3.3 Rainwater harvesting and use

(a) All development, (unless those exempt by clause 2.2 or regulated by the BASIX SEPP) are to provide rainwater tank(s) at a size specified by Council's Stormwater Specifications.
(b) All rainwater storage, subject to the specification under Sutherland Local Environmental Plan 2000 must be permanently connected by a licensed plumber for the purpose of toilet flushing and laundry uses.

(c) For development where a permanent irrigation system is installed or a dedicated car washing bay(s) is provided, harvested rainwater shall be used for these purposes.

(d) For residential development, consideration should be given to maximising use of harvested rainwater for other purposes such as filling chemically treated swimming pools.

(e) Rainwater tanks shall not be considered as landscaped area under Sutherland Local Environmental Plan 2000, except where a underground tank is provided with a minimum soil cover of 300mm.

4. ON-SITE DETENTION

Purpose: *To objective of On-Site Detention (OSD) is to ensure that the peak discharge rate of stormwater flow from new development is no greater than that of the Permissible Site Discharge (PSD). OSD systems temporarily detain stormwater on-site, restricting the discharge to a rate that can be accommodated by Council's existing drainage system. OSD applies to all forms of development other than single dwellings.*

4.1 Single dwelling exemption

(a) OSD shall be provided for all development other than single dwellings.

4.2 Other exemptions

(a) Properties may be exempt from these provisions where it can be shown that the discharge from a property:

- does not pass through Council stormwater drainage infrastructure, eg, natural systems such as mangroves, creeks, a pipe, culvert, bridge, overland flow path or other control source and;
- the peak rate of flow is equal to or less than the PSD in all storm events up to and including the 1% AEP event.

4.3 Permissible Site Discharge

(a) The site stormwater peak flow shall be limited to the PSD rate for all storms up to and including the 1% AEP event.

(b) The maximum impervious area for PSD calculation is 75% of the allotment. This takes into account development or other works (whether legal or not) that has occurred since the majority of the public drainage infrastructure was designed and installed.

4.4 Piped discharged

(a) For single dwellings and dual occupancy developments a single piped stormwater discharge point with a peak flow of not more than 30 litres/seconds may be connected to the kerb and gutter of a public roadway.

(b) Residual stormwater from residential developments of more than two dwellings and all other forms of development including industrial and commercial shall be discharged to Council's stormwater drainage network by a formal piped connection.

(c) An overflow path to cater for blockage of the system or flows in excess of the 1% AEP storm shall be provided

(d) Development activities shall not cause an adverse impact on adjoining or any other properties. This includes maintaining surface flow paths and not increasing water levels in these flow paths. Diverting flows from one catchment to another shall not be permitted.

5. DRAINAGE

Purpose: *The purpose of stormwater drainage is to responsibly manage rainfall runoff from developed areas in a manner that does not cause or contribute to nuisance, flooding, property damage, water pollution, sedimentation, environmental degradation or risk to life.*

5.1 Pipes

a) Residual stormwater generated from the site shall be conveyed across other lands in accordance with this development control plan and the Stormwater Specifications DCP.

b) Where inter-allotment drainage is required through an adjoining property, an applicant shall acquire a drainage easement over the affected property, before the issuing of a construction certificate.

c) Where it is neither reasonable nor possible to provide a legally created easement, information must be provided specifying the reasons why it cannot be achieved and proposing an alternative solution.

d) Exposed pipe work below a foreshore building line shall be covered, vegetated and not visible from a waterway.

5.2 Piping or modifying waterways

a) Requests to pipe or modify waterways such as open drains, creeks or ephemeral water bodies shall be submitted to the Director, Engineering for approval prior to any works being undertaken.

b) The approval of any works issued by the Director, Engineering shall be in accordance with this DCP and Council's Stormwater Specifications DCP.

5.3 Overland flow paths

a) Overland flow paths shall be provided for all drainage networks to cater for flows in excess of that which can be conveyed by the minor system (regardless of its capacity) or in the event of a blockage of that system.

b) Overland flow paths shall convey the 1% AEP storm event assuming 50% blockage of all inlet pits (not pipes) in the drainage network.

c) Overland flow paths shall remain safe for vehicles, people, and in particular, children and the less mobile in all storms up to and including the 1% AEP event.

d) In new development legal drainage easements shall be created over all overland flow paths and drainage networks sufficient to fully contain the 1% AEP storm event.

e) Overland flow paths shall not be obstructed.

f) Minimum freeboard of 500 mm over the 1% AEP water surface level shall be provided for habitable floor levels (or as dictated on Section 149 Certificate) and 200 mm for garage floors, car parks and pedestrian access ways.

5.4 Controls for properties affected by flooding

a) Council's Flood Risk Management DCP shall apply to all land identified as being potentially affected by flooding. Applications for development on land identified as being potentially subject to flooding shall include an assessment of flood risk. This assessment shall determine the area of inundation of the land under pre and post developed conditions and what actions are proposed to ensure that the level and severity of flooding is not worsened by the proposed development.

b) The impact of sea level rise caused by the Greenhouse Effect must be considered when selecting a tail water level for hydraulic calculations. The best available estimates of the Greenhouse impacts over the life of the project are to be considered. Such estimates can be obtained from the CSIRO's Climate Impact Centre and the NSW Environment Protection Authority. A minimum allowance of 200mm for the estimated rise in sea level by the year 2030 due to the Greenhouse effect shall be accounted for.

c) The finished floor level and any outside openings for any residential, commercial, industrial or other habitable structure, or major addition to any such structure, shall be a minimum 500 mm above the level of the 1% Annual Exceedance Probability (AEP) flood. Land shall only be filled to the minimum extent required to support and access a structure. The finished level of car parks and above ground garages shall be no lower than the level of the 1% AEP flood plus a 200mm freeboard.

d) For hospitals, civil defence headquarters or other essential services finished floor levels shall be a minimum 500mm above the following flood levels: hospitals and civil defence headquarters - 0.2% AEP, other essential services - 0.5% AEP

Note: Council may apply a greater minimum freeboard requirement where flood risk warrants. Refer to the Section 149 Certificate of the property for specific flood notations and development restrictions.

5.5 Seepage, Pump out and charged systems

a) Seepage water from basement car parks shall be managed by re-using that water for beneficial purposes on-site.

b) Seepage water from basement car parks shall not be discharged to the kerb and gutter of a Council roadway unless it can be demonstrated that dry weather flows are not a nuisance. A formal piped connection to Council's stormwater drainage network is required.

c) Pump systems for disposal of stormwater are not permitted except to drain basement car parks and the runoff from the driveway of a basement car park.

d) Charged systems are not permitted.

e) Sub-surface flows from retaining walls that intersect high ground water flows must not be discharged to the kerb and gutter of a Council roadway. A formal piped connection to Council's stormwater drainage network is required.

5.6 Dehumidification

a) Dehumidification from basement car parks shall not be discharged to the kerb and gutter of a Council roadway unless it can be demonstrated that dry weather flows are not a nuisance. A formal piped connection to Council's stormwater drainage network is required.

6. WATER QUALITY

Purpose: *The objective of water quality controls is to minimise the impacts of stormwater discharged from a development site on the environment and receiving waters.*

6.1 Short and long term water quality objectives

(a) All proposed developments shall demonstrate compliance with each short-term water quality objective shown in Appendix B and to the fullest extent possible all of the long-term goals. Consideration shall also be given to the Stormwater Management Plan appropriate to the catchment, i.e: (Lower Georges River, Woronora River or Hacking River) and the Australian Government National Water Quality Management Strategy (NWQMS).

6.2 Water quality control devices

(a) Water quality control devices shall comply with the provisions of Section 5.1 of the Stormwater Specification Development Control Plan.

APPENDIX A - GLOSSARY

Australian Height Datum (AHD), Australian surface level datum approximately corresponding to mean sea level.

Annual Exceedance Probability (AEP), the chance of a flood of a given or large size occurring in any one year, expressed as a percentage. For example, there is a 1% chance of a 1% AEP storm event occurring in any given year.

Annual Recurrence Interval (ARI), the long-term average number of years between the occurrence of a flood as big as, or larger than, the select event.

Base Flow, that part of groundwater flow that reappears on the surface as part of stream flow.

Best Management Practice (BMP), activities, prohibition of practices, maintenance procedures and other management practices to prevent or reduce pollution or flooding. They may involve both structural works and non-structural measures.

Catchment, source area for runoff flowing to a particular point. It always relates to an area above a specific location.

Catchment Storage, retention of water that a catchment naturally induces during a storm event.

Constructed Wetland, means of water quality enhancement through simulation of the processes of a natural wetland.

Detention, holding or detaining stormwater for short time period prior to discharge (Detention is not Retention).

Detention Basin, storage area used to temporarily store stormwater flows during a rainfall event in order to reduce the peak discharge flow. Water is not permanently stored in a Detention Basin.

Detention Storage Volume, volume of water temporarily stored in a Detention Basin during a storm event.

Discharge, rate of flow of water measured in m^3/sec.

Easement, land under/on which, stormwater infrastructure or other watercourses including overland flow paths are located.

Ecologically Sustainable Development (ESD), development that improves the quality of life, both now and in future in a way that maintains the ecological processes on which life depends. The basic premise of ESD is that future generations are entitled to the same expectations with regard to quality of life, availability of resources and health of the environment as people of today.

Flood, relatively high stream flow, which overtops the natural or artificial banks in any part of a stream, river, estuary, lake or dam and/or local overland flooding associated with major drainage and/or coastal inundation resulting from super-elevated sea levels and/or waves overtopping coastline defences excluding tsunami.

Flood Liable Land, land susceptible to flooding by the Probable Maximum Flood.

Floodplain, area of land that is subject to inundation by floods upto and including the Proabale Maximum Flood.

Floodways, those areas of the floodplain where a significant discharge of water occurs during floods. They are often aligned with naturally defined watercourses or formal drainage systems including both pipe networks and overland flow.

Flood Storage Areas, those parts of the floodplain that are important for the temporary storage of floodwaters during passage of a flood. The loss of flood storage can increase the severity of flood impacts by reducing natural flood attenuation.

Freeboard, factor of safety used in relation to the setting of floor levels to compensate for uncertainties in the determination of flood levels, wave action, localised hydraulic behaviour, impacts that are specific event related, such as obstructions and other effects like "climate change".

Gross Pollutant Trap (GPT), device designed to remove typical gross pollutants found in urban stormwater such as litter, cigarette butts, leaves, debris, sediment, grease, oil, , etc…

Hydraulics, the study of water flow in waterways; in particular, the evaluation of flow parameters such as water level and velocity.

Hydrograph, graph showing how the discharge or stage/flood level at any particular location varies with time during a flood.

Hydrology, the study of the rainfall and runoff process; in particular, the evaluation of peak flows, flow volumes and the derivation of hydrographs for a range of floods.

Infiltration, process by which water is transferred from the surface of the ground into the soil.

Mathematical/computer Models, the mathematical representation of the physical processes involved in runoff generation and stream flow.

National Water Quality Management Strategy (NWQMS), introduced by the Commonwealth, State and Territory Governments in 1992 as a response to growing community concern about the condition of the nation's water bodies and the need to manage them in an environmentally sustainable way.

Non-Emergent Macrophyte, plant that grows in an aquatic environment such as a wetland, but remains entirely below the water surface as differentiated from an Emergent Macrophyte.

Overland Flow Paths, provided for all drainage networks to cater for flows in excess of that which can be conveyed by the minor system (regardless of its capacity) or in the event of a blockage of that system.

Peak Flow, maximum instantaneous discharge from a catchment during a storm event.

Percentage Impervious, percentage of catchment area covered by surfaces that are essentially impervious to rainfall such as buildings, roads, footpaths, carparks, etc…

Permanent Storage Volume, volume of water stored permanently in a Constructed Wetland or Water Quality Control Pond.

Permissible Site Discharge (PSD), greatest peak stormwater flow permitted from an individual allotment. The PSD shall be modelled to accurately represent the hydrology of the existing site considering topography, land usage, drainage and any other relevant characteristics.

Porous Pavement, surfaces that allow the transfer of water through to the soil below.

Post-Development Peak Flow, peak stormwater flow from a catchment after development.

Pre-Development Peak Flow, peak stormwater flow from a catchment prior to development.

Probable Maximum Flood (PMF), the largest flood that could conceivably occur at a particular location. The PMF defines the extent of flood liable land, that is, the floodplain.

Probable Maximum Precipitation (PMP), greatest depth of precipitation for a given duration meteorologically possible over a given size storm area at a particular location at a particular time of year, with no allowance made for long-term climatic trends. It is the primary input to estimation of the Probable Maximum Flood.

Retention, refers to the permanent storing of runoff (or other waters) during and after storm events for reuse or other beneficial uses.

Riparian Zone, water course or body of water, usually a creek or river, whether permanent or intermittent and the area of land adjacent to it including the soil, vegetation and associated ecological community.

Rainfall Runoff, rainfall that results in overland flow.

Sediment Control Ponds or Sediment Basins, temporary basins used to control high sediment export associated with construction activities. Usually placed at the lowest point of the development. Addition of a coagulant for flocculation is sometimes required in order to meet standards appropriate for discharge.

Sediment Trap, prevents the progression of sediment downstream by trapping it for removal.

Site-Specific Stormwater Controls, measures constructed on-site to control stormwater runoff from a specific development.

Stormwater Management Plan (SMP), adopted plan for stormwater management within a specific catchment. It typically describes existing catchment conditions and values, identifies management issues and sets out an implementation strategy.

Stormwater System, comprises all components of stormwater infrastructure, both artificial and natural, whether that be above ground or below ground (e.g. pipes, overland flow paths, culverts, roadways).

Swale, shallow gently sloping grass lined channel.

Total Catchment Management (TCM), coordinated and sustainable use of land, water, vegetation and other natural resources on a catchment basis, so as to balance resource utilisation and conservation of resources for future generations. Catchment management optimises economic, environmental and social benefit to the entire community.

Trash Rack, structure designed to screen out large items of litter and debris from stormwater flows (see also Gross Pollutant Trap).

Velocity, measure of how fast water is flowing in m/sec.

Water Balance, the balance of water entering a catchment in the form of precipitation with water leaving the catchment in the form of evapo-transpiration, surface runoff and base flow.

Water Sensitive Urban Design (WSUD), management of stormwater on-site through minimisation, retention, reuse, on-site treatment and disposal. WSUD is a fundamental component of Ecologically Sustainable Development.

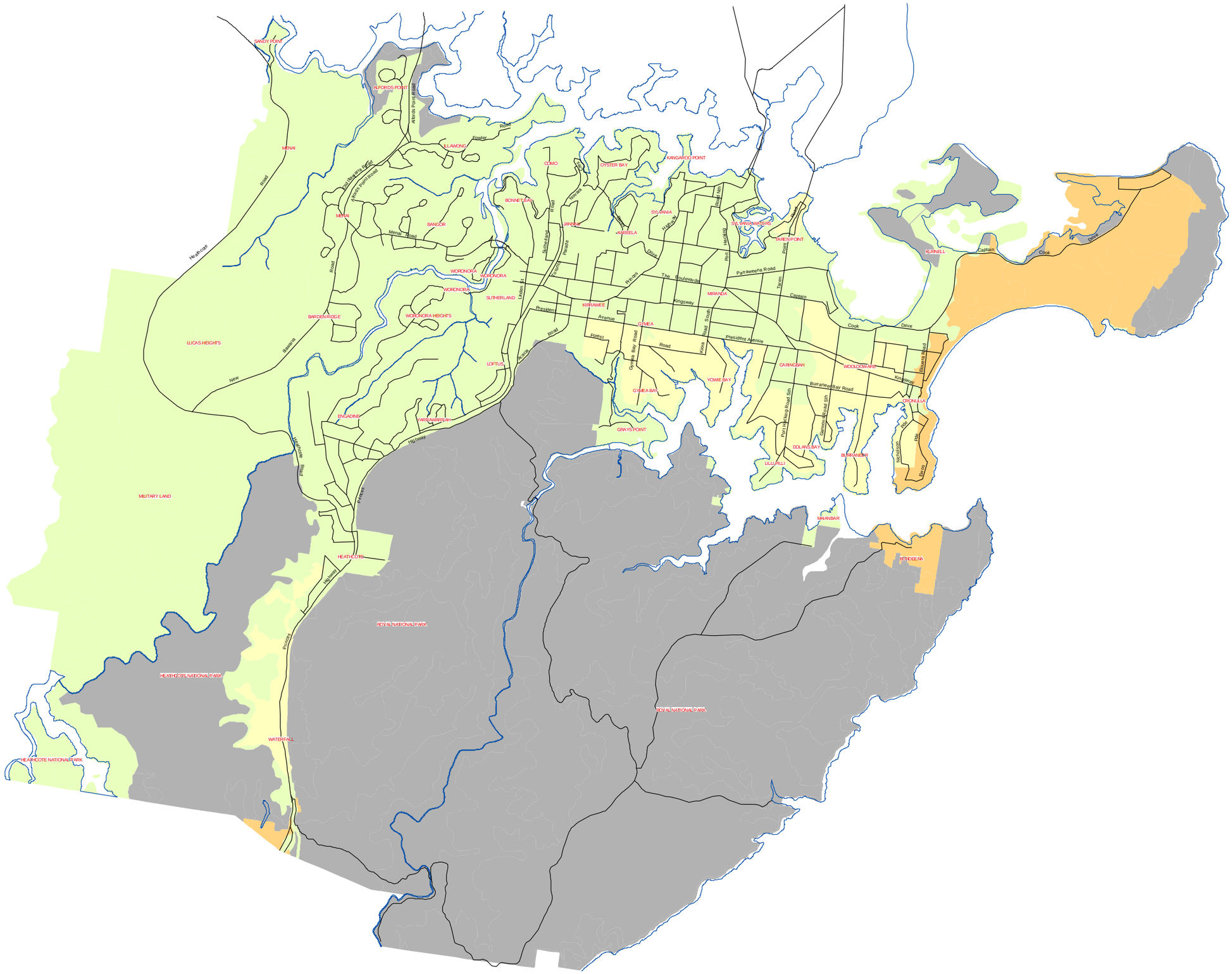
Water Quality Control Pond (WQCP), permanent stormwater collection pond usually with emergent and non-emergent macrophytes for uptake of nutrients, a sediment deposition area and an open area for die off of bacteria. They may additionally have a detention component for the control of peak flows.

Wet Retention Basin, simply a basin that retains water. Since macrophytes will establish themselves in areas that retain water, they become a Water Quality Control Pond and are often referred to as such.

APPENDIX B – WATER QUALITY OBJECTIVES AS REQUIRED BY CLAUSE 6.1 OF THIS POLICY

Pollutant	Goal (Long-term)	Treatment Objective (Short-term)
Post Construction Phase		
(a) Existing Development		
Suspended solids (SS)	Suspended solids load to achieve natural dry and wet weather concentrations for the catchment	70% retention of the SS average annual load
Total Phosphorus (TP)	The load of phosphorus from the catchment meets ANZECC guidelines for aquatic ecosystems	20% retention of the TP average annual load
Total Nitrogen (TN)	The load of nitrogen from the catchment meets ANZECC guidelines for aquatic ecosystems	35% retention of the TN average annual load
Faecal coliforms	The load of faecal coliforms in catchment waterways meets with ANZECC guidelines for consumption of seafood	90% retention of the Faecal coliform average annual load
Litter	No anthropogenic litter in waterways. Organic litter occurring at natural levels of the catchment	Retention of litter greater than 50mm is to the maximum extent possible for storm events of up to 1 in 3 month ARI
Oil and Grease	No visible oils and grease in waterways	Retention of oil and grease are to the maximum extent possible for storm events of up to 1 in 3 month ARI
Toxicants	No toxicants entering waterways	Limit the application, generation and migration of toxic substances to the maximum extent possible

(b) New Development (or Redevelopment)		
Suspended solids (SS)	Suspended solids load to achieve natural dry and wet weather concentrations for the catchment	Areas with more than 50% imperviousness, an 80% retention of the SS average annual load
Total Phosphorus (TP)	The load of phosphorus from the catchment meets ANZECC guidelines for aquatic ecosystems	Areas with more than 50% imperviousness, a 40% retention of the TP average annual load
Total Nitrogen (TN)	The load of nitrogen from the catchment meets ANZECC guidelines for aquatic ecosystems	Areas with more than 50% imperviousness, a 40% retention of the TN average annual load
Faecal coliforms	The load of faecal coliforms in catchment waterways meets with ANZECC guidelines for consumption of seafood	Areas with more than 50% imperviousness, a 90% retention of the faecal coliform average annual load
Litter	No anthropogenic litter in waterways. Organic litter occurring at natural levels of the catchment	Total retention of litter greater than 50mm for storm events of up to 1 in 3 month ARI
Oil and Grease	No visible oils and grease in waterways	Total retention of oil and grease for storm events of up to 1 in 3 month ARI
Construction Phase		
Suspended solids (SS)	Suspended solids load from site does not exceed natural levels	70% retention of the SS average annual load leaving site. Refer to Table 5.1a below for more details for sizing of sediment retention basins.
Coarse Sediment	No coarse sediment leaves the site in addition to natural loads	Retention of sediment larger than 0.125 mm for storm events of up to 1 in 3 month ARI at the site
Oil and Grease	No visible oils and grease enter waterways from site	Total retention of oil and grease for storm events of up to 1 in 3 month ARI
Toxicants	No export of toxicants from site	Limit the application, generation and migration of toxic substances to the maximum extent possible



Legend

Soil Infiltration Potential

- High
- Low
- Medium
- Not Applicable
- Road Hierarchy
- Coastline

The drainage network is indicative only and should be verified by the user. Please assist us to improve the data quality by advising the Land Information Unit of any discrepancies.

5

Scale: 1:90,000 at A3

Date Printed: 06/01/05

SUTHERLAND SHIRE COUNCIL

Produced by the Land Information Unit

Soil Infiltration Potential