

# Stormwater

## Aim of Credit

To reward projects that minimise peak storm water flows and reduce pollutants entering public sewer infrastructure.

## Credit Criteria

Up to two points are available.

<b>1</b>	<b>Reduced Peak Discharge to Sewer</b>	1 point is awarded where the post-development peak 2 year Average Recurrence Interval (ARI) event discharge from the site does not exceed the pre-development peak 2 year ARI event discharge
<b>2</b>	<b>Reduced Pollution Targets</b>	1 one additional point, the first point must be awarded and all stormwater discharged from site meets the Pollution Reduction Targets in Column A of Table 1;

## Compliance Requirements

### The Site & Date of Site Purchase

The 'site' is defined by the scope of Green Star assessment. If a development consists of several buildings, the site must be defined for each registered building.

Where indicated, the requirements of this credit are to be applied to the state of the site that existed at the date of site purchase. In cases where the site has been owned by the current owner for more than five years (from the project's Green Star registration date), they are to be applied to the state of the site that existed at least five (but not more than ten years) prior to the project's Green Star registration date.

### 1. Reduced Peak Discharge to Sewer

In order to achieve the points in this credit, a combination of detention, treatment, and use on site may be employed. However, any stormwater discharged from site, must be treated to achieve the relevant Pollution Reduction Targets prior to discharge. In all cases where discharge occurs, the post-development peak 2 year Average Recurrence Interval (ARI) event discharge from the site must not exceed the pre-development peak 2 year ARI event discharge.

Stormwater impacts from a site result from runoff from impervious and semi-pervious surfaces. Runoff from a site has impacts on both water quality and flow rates occurring offsite. Techniques which can reduce these offsite impacts include volume management, which slows runoff rates and/ or reduces the total volume of water that impacts on waterways, and pollutant management, which treats a range of pollutants in stormwater runoff.

To reduce the offsite impacts from stormwater runoff, pollutant management and flow management techniques can be considered individually or in combination to achieve the desired offsite impacts. In order to demonstrate compliance with the credit criteria, techniques which have sufficient levels of resolution to take into account localised climatic sequences, water balances and treatment train operation must be used.

The final stormwater management strategy should be chosen to suit site constraints, and has the potential to affect other Green Star credits, such as those in the Water Category.

In circumstances where this credit specifies levels or targets that are less stringent than those specified in relevant local legislation/regulations, the local legislation/regulations shall take precedence.

Should the ARI be increased to account for more extreme weather events? What would be an appropriate recurrence interval?

## 2. Pollution Reduction Targets

Currently, the use of biological treatment systems is generally considered the only method of achieving compliance with the Pollution Reduction Targets contained in column C of Table 1.

Where a treatment train that does not contain biological treatment is being used to achieve the Pollution Reduction Targets in column C of Table Emi-5.1, independently verified performance certification is required to show that the equipment is capable of achieving those targets.

Pollutant	Reduction Target (% of the typical urban annual load).		
	A	B	C
<b>Total Suspended Solids (TSS)<sup>1</sup></b>	80%	80%	90%
<b>Gross Pollutants</b>	85%	90%	95%
<b>Total Nitrogen (TN)<sup>2</sup></b>	30%	45%	60%
<b>Total Phosphorus (TP)<sup>2</sup></b>	30%	60%	70%
<b>Total Petroleum Hydrocarbons<sup>3</sup></b>	60%	90%	90%
<b>Free Oils<sup>3</sup></b>	90%	90%	98%

Table 1 Pollution Reduction Targets.

1 Load based on the following particulate size distribution (by mass): 20% <20 µm; 20% 20-60 µm; 20% 60-150 µm; 20% 150-400 µm; 20% 400-2000 µm.

2 Load includes particulate and dissolved fraction.

3 This requirement is not applicable where the site contains less than a total of 200m<sup>2</sup> of uncovered areas where vehicles are likely to transit and/or park e.g. roads, loading docks, refuelling bays, car parking etc.

## **Aquifers**

Discharging stormwater to groundwater systems (aquifer recharge) either directly or indirectly is a legitimate means of achieving compliance with the credit criteria, however it must be ensured that the stormwater being discharged meets the relevant Pollution Reduction Targets, and that pollutants are not contaminating groundwater supplies.

## **Free Oils and Hydrocarbons**

Where the modelling program being used cannot model the levels of free oils and hydrocarbons in stormwater discharge, an alternative method of showing that the pollution reduction targets have been achieved for these pollutants must be used.

## **Rainfall Data for Modelling Programs Using Continuous Simulation**

The following approach to rainfall simulation should be adopted:

- Continuous simulation of a minimum of 10 years; and
- A six (6) minute time step (intervals).

## **Innovation Opportunities**

### **Exceeding Green Star Benchmarks – Stormwater Pollution Targets**

Additional points may be awarded where projects can demonstrate achieving Pollution Reduction Targets from column B or C of the Pollution Reduction Target Table

### **Water Sustainable Urban Design**

Additional points may be awarded where project can demonstrate that the criteria of the credit have been exceeded by employing Water Sustainable Urban Design principles.

## **Guidance**

### **Definitions**

#### **Average Recurrence Interval (ARI)**

The average, or expected value of the periods between exceedances of a given rainfall total accumulated over a given duration. Data can be obtained from the Bureau of Meteorology (BOM), or sources such as Australian Rainfall & Runoff, Engineers Australia (1999), National Committee for Water Engineering.

### **Modelling**

Pollutant export modelling using computer programs such as MUSIC, STORM etc. predict the discharge pollutant loads from a given area. The results of the simulation must show a comparison against the relevant reduction targets for the specified treatment system/train.

### **Pre-development**

The conditions of the site at the date of site purchase, or five years prior to the project's Green Star registration date (whichever is most recent).

## Stormwater

For the purposes of this credit, all rainwater falling on the site is stormwater. Rainwater hitting the roof of a structure and running into the stormwater system (either directly or indirectly) is stormwater, and must comply with the credit criteria. For stormwater that is captured, used on site, and not discharged to the stormwater system, there is no requirement to treat the pollutants in that stormwater beyond those required under the relevant legislation. Rainwater hitting the roof of a structure, being captured, and then used in a system that discharges or overflows to the stormwater system, must be treated in accordance with the credit criteria prior to discharge.

## Typical Urban Annual Load

Typical urban annual loads can be estimated using continuous simulation modelling such as MUSIC. Where available, relevant guidelines values for pollutant concentrations for the catchment land use and surface type should be used. In areas where there are no specific guidelines reference can be made to sources such as Australian Runoff Quality (ARQ, 2006).

## Documentation Requirements

### 'Design Review' Submission (Optional)

Project teams are to submit information/documentation marked with an asterisk\* for 'design review'

### As Built Submission

All project teams are to submit the following documentation:

#### Submission Template\*

- Date of development approval
- Description of the site before development
- Summary of the initiatives in place to:
  - reduce peak flows
  - reduced pollution
- Pre development peak 2 year ARI
- Post development peak 2 year ARI
- Pollution reduction achieved

Project teams are required to provide documentation supporting credit compliance. The following documents may be used to demonstrate credit compliance.

- **Calculation Report** by a civil engineer, hydraulic engineer or other qualified professional. The report should describe:
  - Software or calculation methods used
  - Pollutant export modelling results
  - Data sets and tables that were applied.

- Stating the post-development peak 2 year Average Recurrence Interval (ARI) event discharge, and pre-development peak 2 year ARI event discharge, and showing that it is not exceeded by:
  - Describing the proposed strategy for addressing the stormwater.
  - Quantity of stormwater captured and used on site (annually);
  - Water balance and total storage capacity of any systems that use stormwater on site;
  - Quantity of stormwater discharge to be addressed by each stormwater treatment system (annually);
  - Sizing of all stormwater treatment systems installed.
  - Summarising how the Pollution Reduction Targets are achieved by comparing the results of the pollutant export modelling/calculations with the Pollution Reduction Targets in the relevant column of Table Emi-5.1.
  - Stating the total area (m<sup>2</sup>) of uncovered areas where vehicles are likely to transit and/or park e.g. roads, loading docks, refuelling bays, car parking etc. and where applicable, summarising how hydrocarbons and free oils have been addressed.
- **Civil / Hydraulics drawings** showing the stormwater collection, storage and treatment facilities and detailing their functional elements
  - **Hydraulics drawings** showing all the capture, storage, piping and discharge routes;
  - **Site plans** showing the total areas of uncovered areas where vehicles are likely to transit and/or park e.g. roads, loading docks, refuelling bays, and car parking, etc.

**Independently verified performance certification** for each manufactured stormwater treatment device, proving its ability to achieve the Pollution Reduction Targets nominated in Table Emi-5.1 Column C.

**Please provide feedback on the technical content of this credit:**