



Rocla

Water Quality

***DOWNSTREAM
DEFENDER****



Oil & Sediment Separator

DOWNSTREAM DEFENDER*

Simple, effective and economical

- Removes settleable solids, grit, sand and silt
- Excellent fine particle removal at high flow rates
- Retains floatables
- Intercepts oils and grease
- No moving parts
- Highly efficient with minimal headloss
- Designed to operate over a wide range of flows
- Small footprint
- Quick and easy to install
- Low maintenance
- Easily retrofitted
- Concrete structure, LMDPE inner and stainless steel supports



The cost-effective



Downstream Defender* oil and sediment separator captures settleable solids, floatables, oils and grease from stormwater runoff. **Created by Hydro International it is available from Rocla under exclusive license in Australia.**

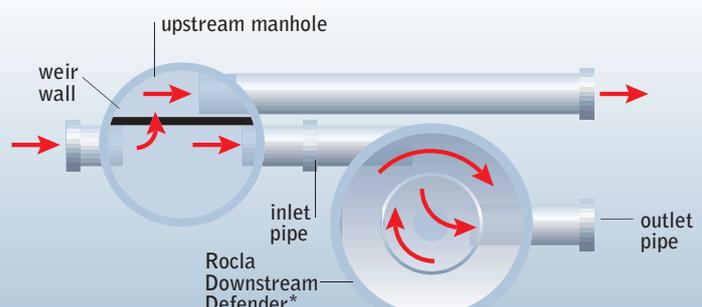
More versatile than conventional stormwater treatment systems, Downstream Defender* separators use only a fraction of the land area of storage tanks and detention ponds.

The flow-modifying internal componentry was developed using extensive full-scale testing and CFD modelling and is based on more than 30 years' experience of hydrodynamic separation in wastewater and stormwater applications.

Advanced separation technology

The Downstream Defender* separator is an advanced hydrodynamic vortex separator. Rotary and shear forces are generated to augment gravitational forces and remove settleable solids using a much smaller area than sedimentation basins. An oil and floatables trap within the vessel provides a compact solution for non point source pollution.

Typical installation layouts for the Downstream Defender



Alternative alternative for treating stormw

Applications

The small footprint of the **Downstream Defender*** separator makes it the ideal choice for installations such as:

New developments
Construction sites
Streets and roadways
Large car parks

Industrial sites
Service stations
Mine sites
Shopping centres

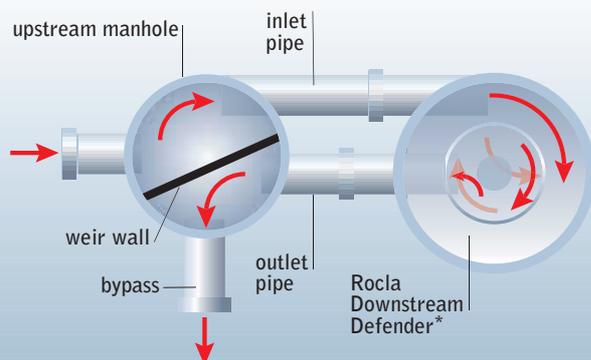
The **Downstream Defender*** separator is also ideal as a pre-treatment device for detention systems, swales, filters or other polishing systems, or for treating agricultural runoff and mitigating wetlands.

High capture rates

Runoff from trafficable areas such as roads, car parks and industrial lots can contain significant quantities of heavy metals. These heavy metals will generally associate themselves with fine particles (less than 100 microns). Testing at Coventry University (UK) has indicated that the **Downstream Defender*** separator can remove 68% to 99% of settleable solids, including large proportions of fine particles (less than 100 microns) and 80% to 97% of free oils.

Controlling road runoff

With the addition of a spill tank, the **Downstream Defender*** separator provides an effective spill control system as well as removing sediments, fines and litter. This is an ideal solution for major road projects where there is a requirement to control potential hydrocarbon spills.



Easy installation

Installing a **Downstream Defender*** separator is as simple as installing a standard access chamber. Typically, less excavation is required than for other flow-through systems. The **Downstream Defender*** separator is delivered to site completely fabricated, ready to be installed in the excavated hole and connected to the drainage system.

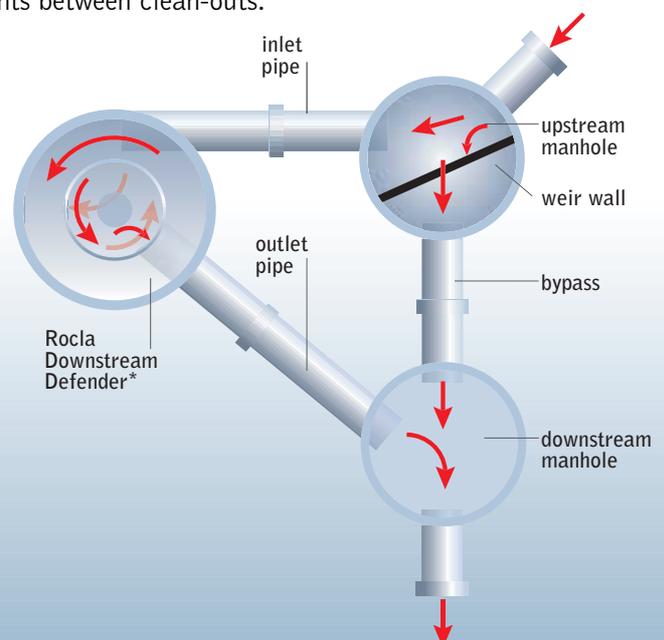
Low headloss

The **Downstream Defender*** separator has large, clear openings and no internal restrictions. Because there are no internal orifice plates or weirs, hydraulic losses are minimised.

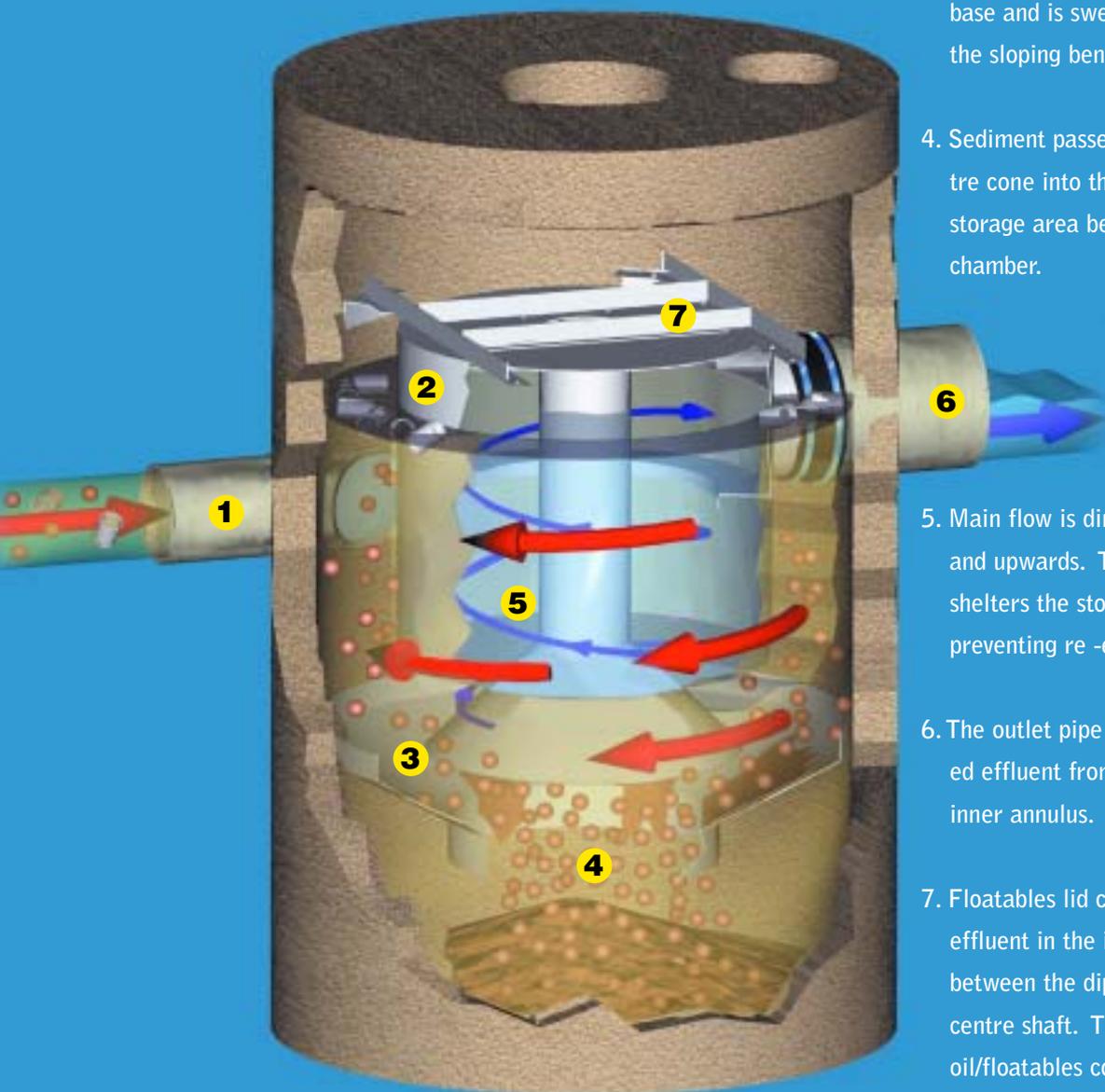
No pollutant re-entrainment

The internal components of the **Downstream Defender*** separator create isolated zones for pollutant capture and storage. Separate oil and sediment storage areas are established outside the main treatment flow path.

By isolating the storage zones, the **Downstream Defender*** separator maintains both treatment capacity and removal efficiency, preventing the re-entrainment of pollutants between clean-outs.



Simple, effective separation



1. Tangential inlet pipe generates rotational flow.

2. Dip plate cylinder acts as an oil/floatables baffle.

3. Sediment settles towards the base and is swept downward by the sloping benching skirt.

4. Sediment passes under the centre cone into the motionless storage area beneath the vortex chamber.

5. Main flow is directed inwards and upwards. The centre cone shelters the stored sediment, preventing re-entrainment.

6. The outlet pipe discharges treated effluent from the inner annulus.

7. Floatables lid covers the treated effluent in the inner annulus between the dip plate and the centre shaft. The lid isolates the oil/floatables collection zone between the dip plate and the wall of the vessel.



DOWNSTREAM DEFENDER*

Meeting the stormwater challenge

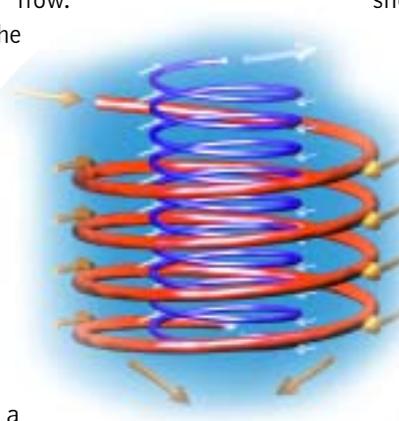
The highly variable nature of storm events generates a wide range of flow rates, carrying a wide range of pollutants. This variability makes it difficult for environmental engineers to define the design criteria.

The Downstream Defender* separator meets the stormwater challenge by maintaining higher removal efficiencies over a wider range of flow rates compared with other stormwater treatment options.

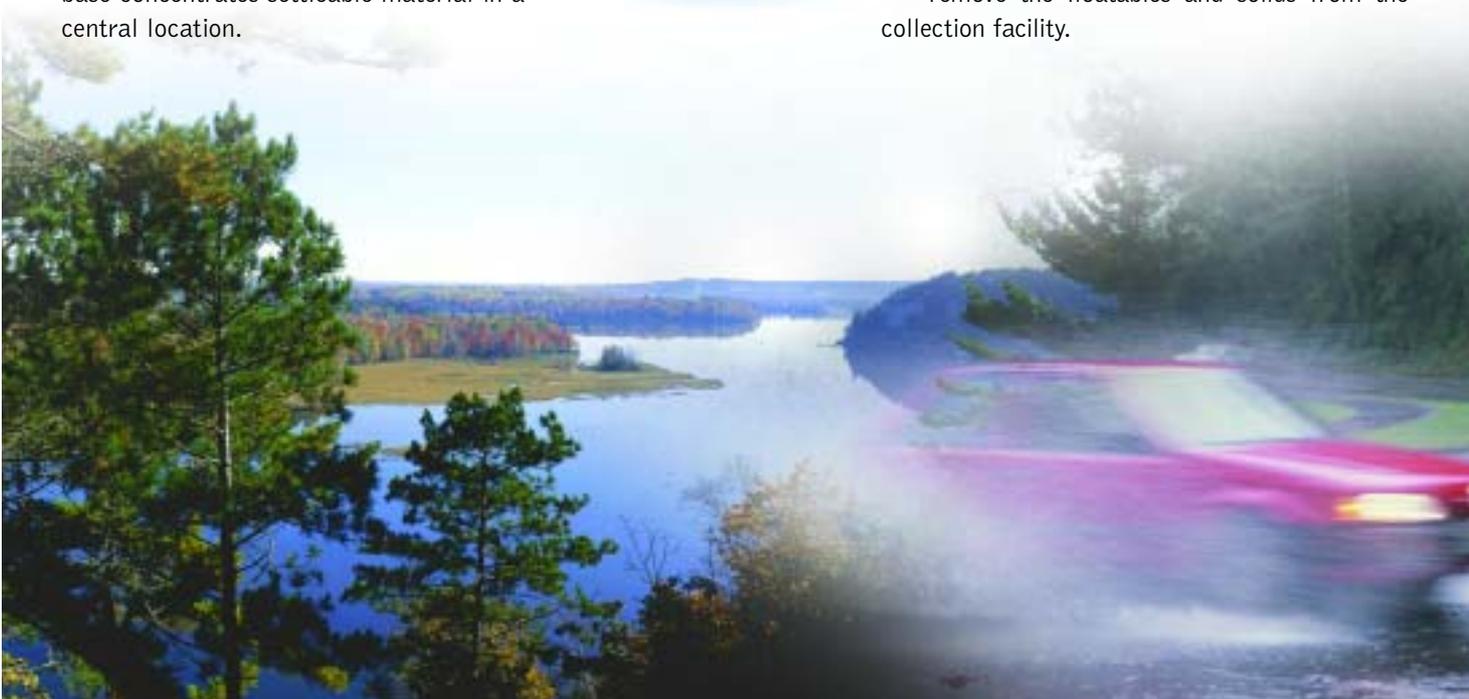
Maximised performance

Two principal mechanisms work to increase the level of performance of the Downstream Defender* separator:

ROTARY FORCE The flow enters the cylindrical vessel at a tangent, generating rotational flow. The flow spirals around and down the perimeter, then inward and upward through the centre in a continuous spiralling motion. The single central discharge at the top of the vessel forces each fluid element to pass through a long spiral path before it can be released, increasing the time for solids to settle and for floatables to rise. In addition, a centrally directed sweeping action at the base concentrates settleable material in a central location.



SHEAR FORCE The dip plate cylinder locates the shear zone, the interface between the outer downward circulation and the inner upward circulation, where a marked difference in velocity encourages solids to separate. The dip plate also establishes a zone between itself and the outer wall for the capture of floatables, oil and grease. By the time the flow reaches the top of the vessel, it is virtually free of solids and is discharged through the outlet pipe. A simple sump vacuum procedure is used to periodically remove the floatables and solids from the collection facility.





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