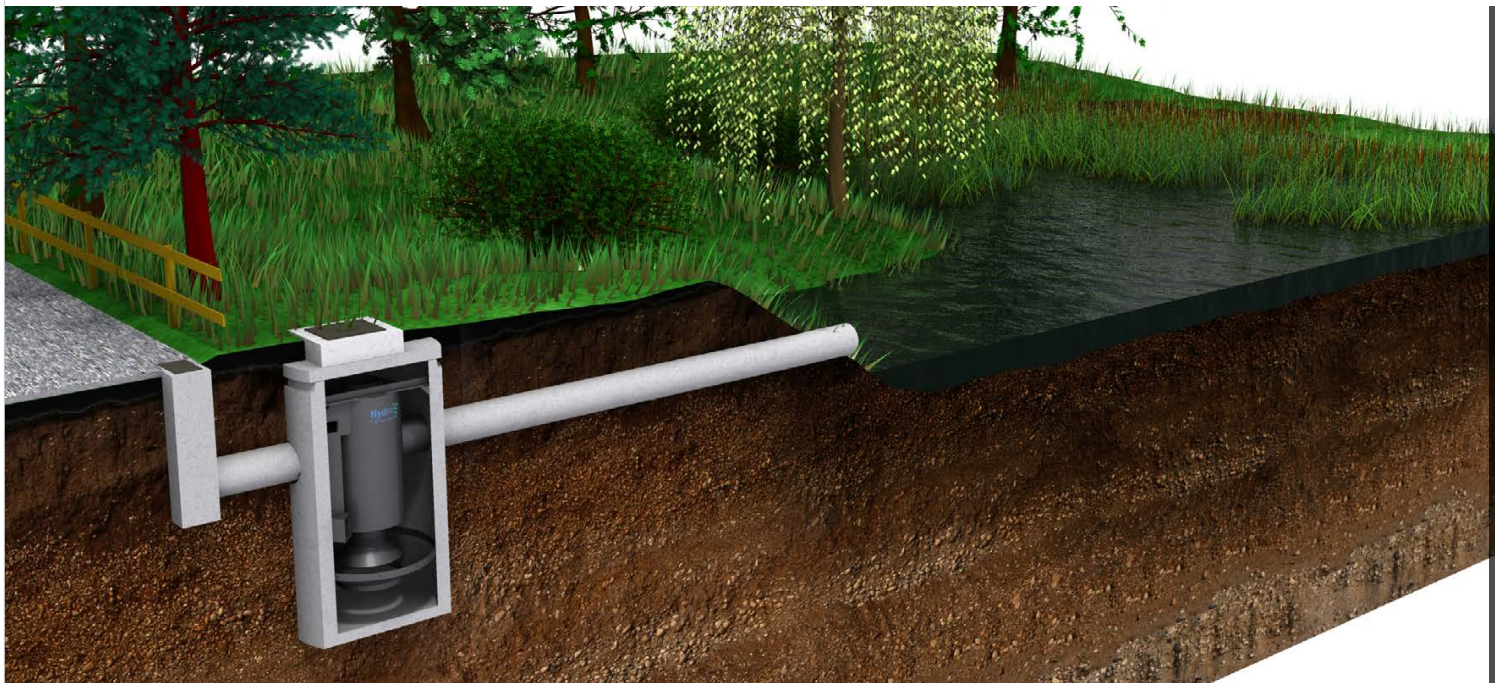


# Downstream Defender<sup>®</sup>

(Stormwater Treatment)

Technical Guide SW 13

Downstream defender provides a high removal efficiency of settleable solids and floatable material over a wide range of flow rates



11.22 | STORMWATER | SW13 DOWNSTREAM DEFENDER

## Applications

Roads, carparks, commercial properties

Ports, airport, construction sites

Industrial and commercial facilities

Control of silting upstream of wetlands, ponds and basins

Offline and online treatment of existing stormwater reticulation

## Product Attributes

Removes up to 60-90% total suspended solids ( TSS ) with a mean particle size of 150 microns.

Removes sediments, floatables, oils and grease.

No re-entrainment of previously captured pollutants

Small footprint

## Approvals/Standards

NJCAT

NZS3109, Concrete Construction

ISO 9001:2008 Quality Management Standard

*We are the supply partner of choice for New Zealand's stormwater management and treatment solutions.*

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## The Hynds Downstream Defender is an advanced hydrodynamic vortex separator designed to meet most stormwater regulations.

It provides highly effective and reliable removals of fine and coarse particles, hydrocarbons and other floatable debris from stormwater runoff, delivering high levels of treatment over a wide range of flow rates in a much smaller footprint. It is the perfect choice for any catchment likely to convey high quantities of contamination.

### Design and Sizing

The Downstream defender is available in a range of sizes and can function as either a pretreatment device or as a stand alone device. The Hynds Downstream Defender is sized to treat either a specified catchment area or a design flow rate to meet the water quality design for first flush treatment. Downstream Defender of Ø1200 and Ø1800 comes with an internal bypass with the inlet and outlet at the same level. The Downstream Defender of Ø2550 and Ø3000 have an inlet with an S bend and no internal bypass.

### Benefits

- A smaller footprint ensures an easier installation and saves space and money
- Can be used in conjunction with other treatment types to create a treatment train effect.
- Easy to clean
- Can be used in back water environments
- Carefully designed internal components isolate the pollution storage areas ensuring what is captured is retained, even during high flows.

### Targetted Pollutants

The Hynds Downstream Defender removes an assortment of pollutants such as:

- Fine particles
- Floatable Debris
- Liquid and sediment bound hydrocarbons
- Sediment bound heavy metals
- Sediment bound nutrients



## Installation

Treatment components are installed in a standard precast concrete manhole manufactured to AS/NZS and NZBC requirements. The internals, inlet pipe and outlet pipe are installed at the factory. The device is plug and play and the installation is similar to any other manhole installation on site, with placement in the prepared excavation direct from a hiab.

*Note: Large Diameter Downstream Defenders may require an onsite crane to lift into the prepared excavation - refer to table 1 for indicative weight*

**TABLE 1 Downstream Defender® variants**

Diameter	Description	Weight of manhole with internal (Excluding lid) (T)	Weight of lid and cast iron and frame (T)
1200	Ø1200 x 2400mmH Flanged based manhole	2.55	0.742
1800	Ø1800 x 3600mmH Flanged based manhole	9.241	1.876
2550	Ø2550 x 3900 mmH Flanged based manhole	18.5	3.3
3000	Ø3000 x 4200mmH Flanged based manhole	23.5	4.7

**TABLE 2 Key parameters**

Unit Size (mm)	Design Flow (L/s)	Capacity Flow (max) (L/s)	Inlet Pipe Diameter (mm)	Outlet Pipe Diameter (mm)	Head-loss at Design Flow (mm)	Head-loss at Capacity (mm)	Sediment Storage (m <sup>3</sup> )
1200	42	120	300	300	150	500	0.7
1800	96	270	450	450	225	500	1.7
2550	200	425	600	600	71.8	324.2	3.56
3000	370	700	750	750	100.6	360.3	6.65

**TABLE 3 Downstream Defender® variants**

Unit Size (mm)	Emergency spill containment (L)	Oil Cleanout Depth (cm)
1200	270	< 41
1800	1350	< 58
2550	2044	< 84
3000	3975	< 107

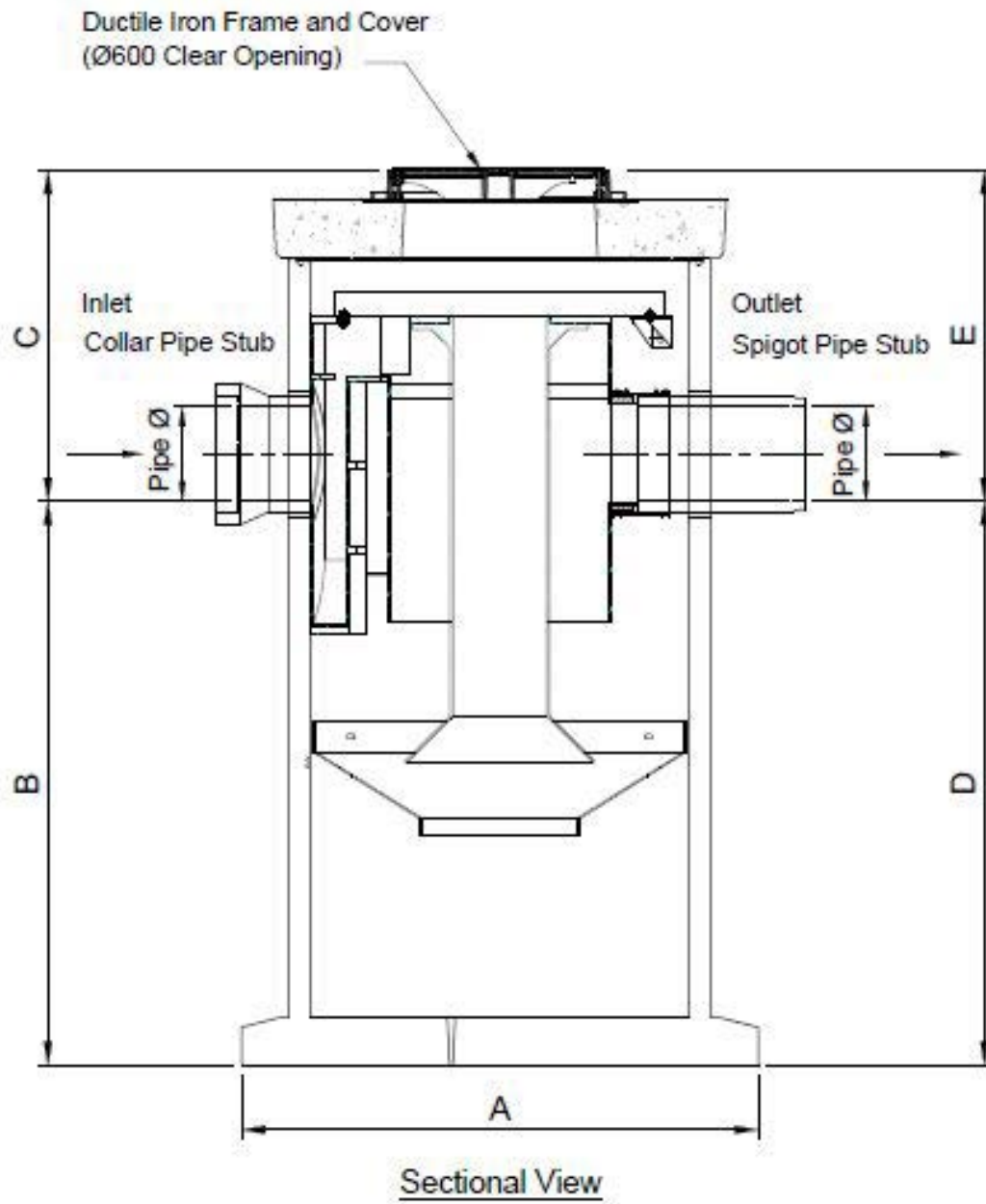


FIG. 1

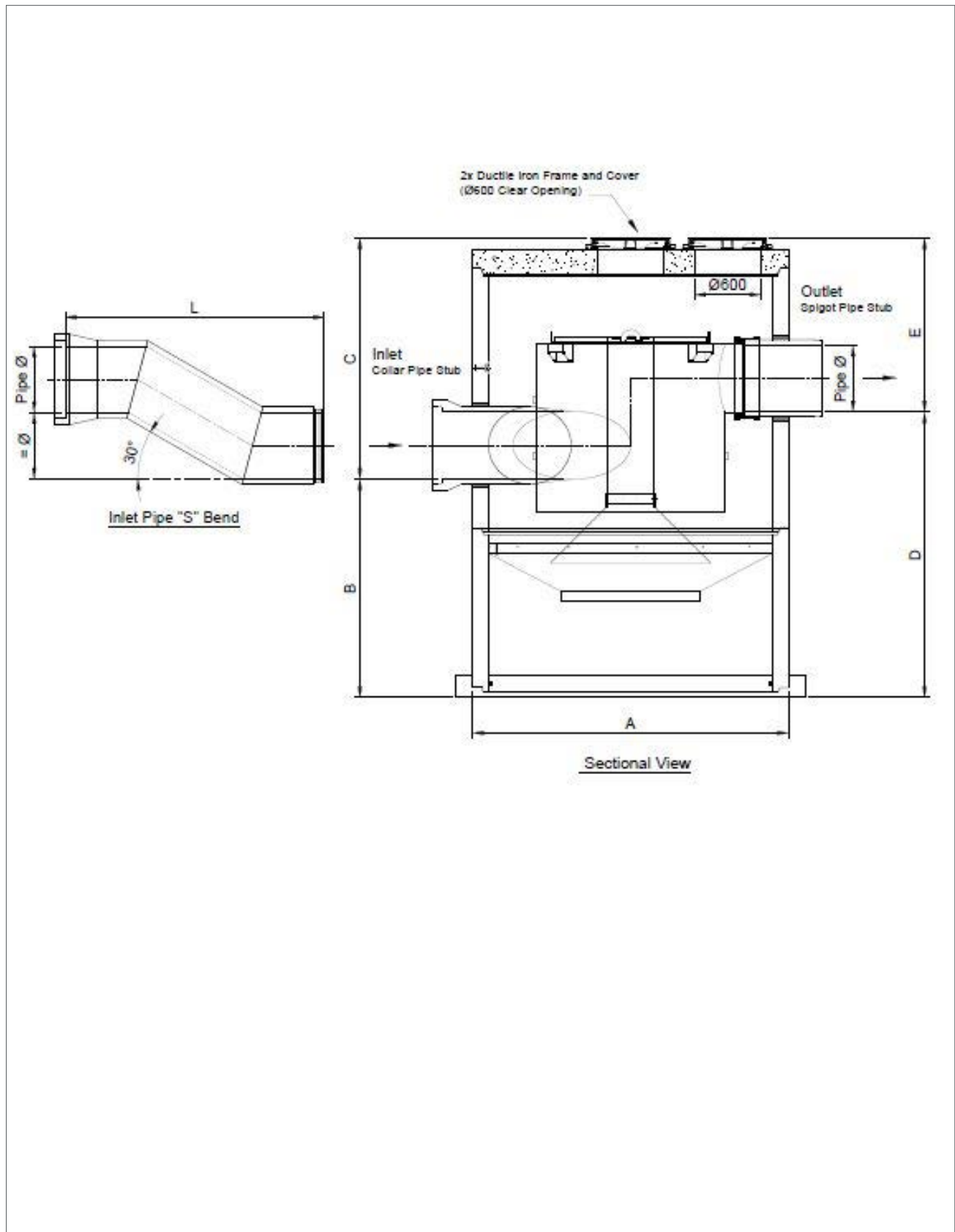


FIG. 2

**TABLE 4 Downstream Defender Dimensions**

Product Code	Lid Openings	Dimension					S Bend Dimension		Mass Total (T)	Figure reference
		A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	Diameter (mm)	Total Length, L (mm)		
DD3.1200KIT	1	1640	1790	1060	1790	1060	-	-	3.29	Figure 1
DD3.1800KIT	1	2431	2757	1498	2757	1498	-	-	11.12	
DD2550KIT	2	3150	2000	2175	2600	1575	600	2335	21.80	Figure 2
DD3000KIT	3	3608	2371	2186	3122	1435	750	2394	28.20	

**Note:**

- Each chamber comes complete with a concrete lid, ductile iron cover and frame
- Suggested invert level is indicative only and may vary depending on inlet/outlet invert to finish floor levels. Prices may vary depending on your location
- DD2550KIT and DD3000KIT come with an S bend. Please note that the S bend is connected to the chamber, the inlet invert depth will match the outlet invert depth.

### Maintenance / Servicing

The Frequency of clean out is determined in the field after installation. During the first year of operation, the unit should be inspected every six months to determine the rate of sediment and floatables accumulation. A simple probe such as a Sludge-Judge can be used to determine the level of accumulated solids stored in the sump.

Activity	Indicative frequency for mid level catchment area
Inspection	Regularly during the first year of installation.
	Every 6 months after the first year of installation
Oil and Floatables removal	Once per year, with sediment removal
	Following a spill in the drainage area
Sediment Removal	Once per year or as needed
	Following a spill in the drainage area

## Lifting and Handling

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All Downstream Defenders® incorporate Swiftlift lifting anchors for safe lifting and must be used with the correct lifting clutch.

Hynds Pipe Systems has designed and manufactured Downstream Defenders® with a minimum dynamic factor of 1.2. This dynamic factor requires that all the following conditions are observed when lifting, moving or placing the units:

1. Lifting with mobile plant (*such as an excavator or similar*) where equipment is specifically exempt from the requirements of the PECPR Regulations 1999, subject to the conditions outlined in the New Zealand Gazette, No. 104, September 2015 and
2. Lifting, travelling and placing over rough or uneven ground where anchor failure is not anticipated to cause harm or injury, by adopting procedures such as:
  - a. Transporting the element as close as practical to ground level (300mm recommended)
  - b. Establishing and maintaining exclusion zones
  - c. Transporting only precast concrete elements that are unlikely to topple if they were to hit the ground
  - d. Inspecting lifting anchors both after transportation and before final lifting into place

Refer to “Safe work with precast concrete - Handling, transportation and erection of precast concrete elements” published by Worksafe New Zealand (October 2018)

Shock loads resulting from travelling with suspended Downstream Defenders® over rough terrain and uneven ground may exceed design, dynamic and safety factors of the lifting systems. It is essential that care is taken during lifting and transporting as additional stresses could result in anchor failure.

Branches Nationwide Support Office & Technical Services 09 274 0316

**Disclaimer:** While every effort has been made to ensure that the information in this document is correct and accurate, users of Hynds products or information within this document must make their own assessment of suitability for their particular application. Product dimensions are nominal only, and should be verified if critical to a particular installation. No warranty is either expressed, implied, or statutory made by Hynds unless expressly stated in any sale and purchase agreement entered into between Hynds and the user.

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