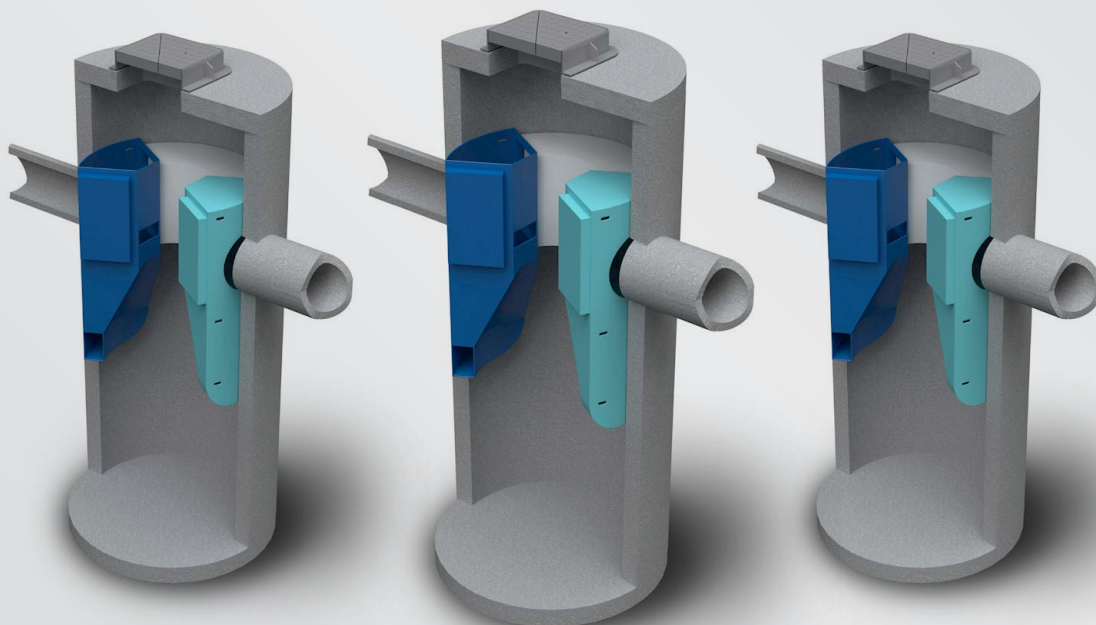


# First Defense<sup>®</sup>

(Stormwater Treatment)

Technical Guide SW 21

Capture and retain stormwater sediment, litter and floatables in a unit that saves site space and adapts to smaller or logistically difficult site locations.



08.24 | STORMWATER | SW21 FIRST DEFENSE

## Applications

Roads, carparks, commercial properties  
Ports, airports, construction sites  
Industrial and commercial facilities  
Offline and online treatment of existing  
stormwater reticulation

## Product Attributes

Design based on removal efficiencies  
exceeding 80% with  $d_{50}$  of 230 micron  
(based on F-60 silica blend)  
Low head requirements at treatment  
flow rate  
Easy to maintain

## Approvals/Standards

NZS3109, Concrete Construction

## Quality

ISO 9001:2008 Quality  
Management Standard

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

**HYNDS**  
STORMWATER

The First Defense® is an economical hydrodynamic vortex separator for effective removal of sediment, litter and oil from surface water run off. Captured pollutants are kept safely within the device, keeping public areas free from pollutants.

## Design and Sizing

**TABLE 1** Design and sizing

Model Dia (m)	Typical Treatment Flow Rate (L/s)	Maximum online Flow Rate (L/s)	Inlet / Outlet Pipe Dia (mm)	Oil Storage Capacity (L)	Sediment Storage (m³)
1.2	34	170	450	681	0.76
1.8	108	708	750	1590	2.7

- Treatment flow rates based on 80% removal of F-60, medium-fine sand. Sizing based on removal of finer or coarser sediment ranges or for free oil removal can be provided if required.
- Maximum flow rate that can pass through the chamber without surcharge to the upstream network. Based on a single bypass chute. A secondary bypass chute can be added to increase the hydraulic capacity.
- Headloss is dependent on the number and size of pipe connections, but is typically below 250 mm at the treatment flow rate.
- Additional pollutant storage capacity can be built into the chamber to extend maintenance intervals if required.

## Installation

Manufactured to relevant national standards for the construction of the precast concrete chamber system and kitted out ready for loading and unloading into the contractor's prepared excavation.



**FIG. 1** First Defense®

## Maintenance

Maintenance of the First Defense® is simple, safe and cost-effective. Maintenance is carried out from the surface using a standard vacuum tanker and personnel are not required to enter the device.

With a large capacity to store sediments and oils and with a proven ability to prevent wash out, maintenance intervals can be years rather than months - depending on site conditions.

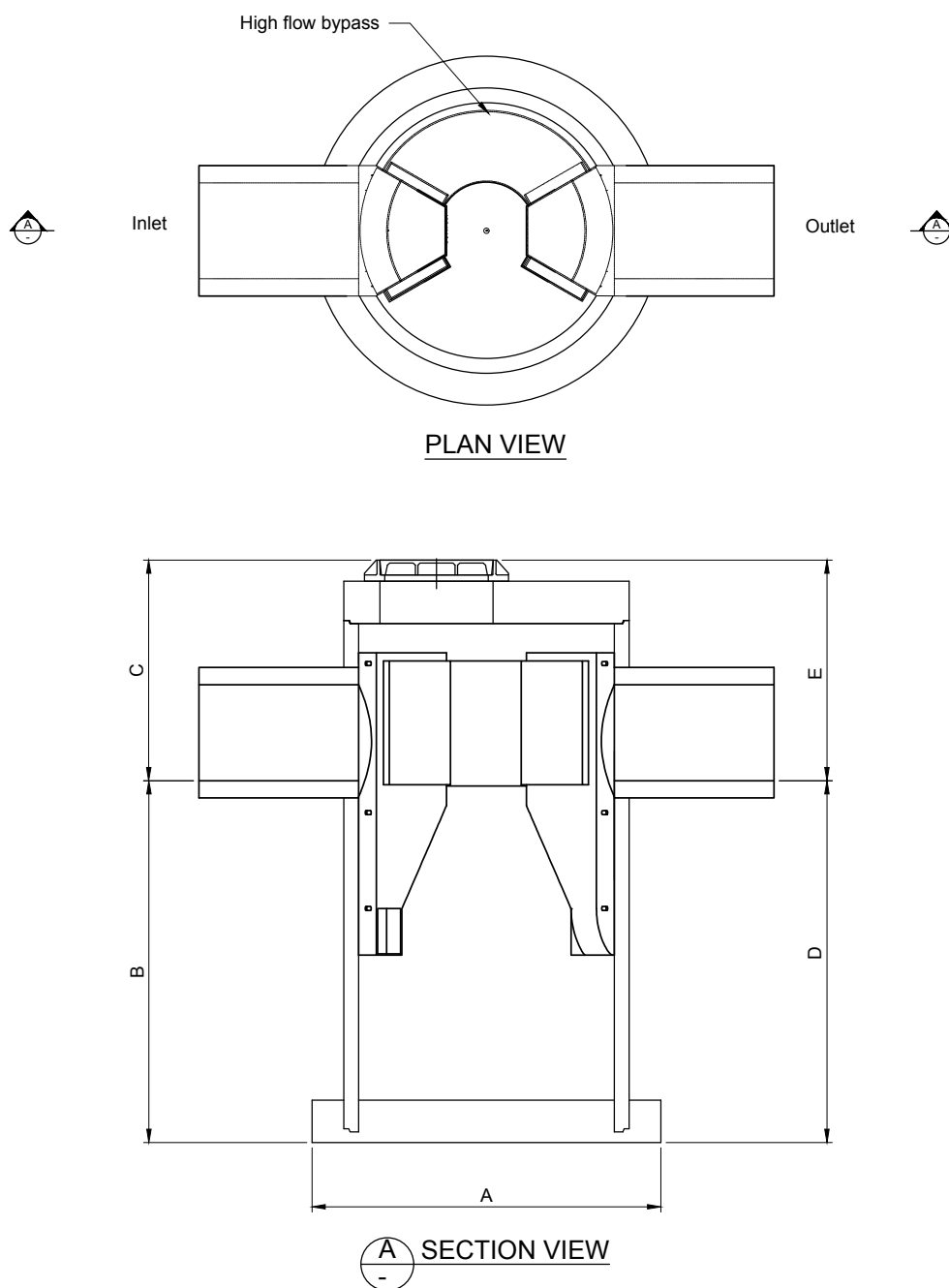
## Adaptable

The First Defense® has been specifically designed to be adaptable to site conditions, whilst also delivering effective treatment of surface water runoff.

For maximum flexibility, First Defense® inlet, outlet and internal bypass arrangements are available in several configurations.

**TABLE 2** First Defense® dimensions

Product	Chamber size (mm)	Lid Openings	Lid Thickness (mm)	Dimension (mm)					Mass Total (T)	Shipped from
				A	B	C	D	E		
First Defence 1200	1200	1	200	1647	1709	1041	1709	1401	3.2	Auck / Chch
First Defence 1800	1800	1	200	2307	2030	1320	2030	1320	6.4	Auck / Chch



**FIG. 2** General arrangement drawing

## Lifting and Handling

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

Hynds Pipe Systems has designed and manufactured First Defense® 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 First Defense® 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 0800 93 7473

**Disclaimer:** While every effort has been made to ensure that the information in this document is correct and accurate, users of Hynds product 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.