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STORMCLEANSER ™

Operation and Maintenance Manual

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INTRODUCTION

This document serves as a comprehensive insight in to the operation as well as a guide to efficient maintenance of the StormCleanser™ Hydrodynamic Vortex Separator, once installed on site. The details and instructions provided are to be followed as mentioned, any deviation could potentially affect the performance of the StormCleanser™. The maintenance guide reflects the frequency based on nominal rainfall conditions and may alter based on regional differences or anomalous rainfall events.

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PLEASE, CONTACT LOCAL YOUR FP MCCANN SPECIALIST ENGINEER OR OUR HEAD OFFICE ON 028 7964 2558 IN CASE OF ANY DOUBT OR OPERATION & MAINTENANCE RELATED ISSUES.

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PRODUCT DESCRIPTION

StormCleanser™ provides a cost-effective solution for designers, engineers and contractors involved in the provision of Sustainable Drainage Systems (SuDS). This unit has no moving parts, requires no power, and is constructed within standard precast concrete chambers.
The units come factory fitted in precast chambers and could also be installed on-site as required. The modular stainless steel built assembly is designed to provide installation simplicity. The separator internal assembly is fabricated out of stainless steel (304L/316L), per BSI BS EN 10088-2-2014. Stainless Steel material grade and composition, provides exceptional longevity due to high corrosion resistance. The lifespan of the internal assembly outlasts the lifespan of a typical precast concrete structure (100+ years).

Figure 1 - StormCleanser™ Assembly and Exploded View

WORKING PRINCIPLE

The StormCleanser™ is specifically designed to remove suspended solids, hydrocarbons, and floatable debris from the stormwater run-off.

Water and pollutants enter the system via the inlet pipe, where the internal geometry enables low energy forced vortex flow patterns. This allows the floatables to gather and solids to settle to the bottom of the treatment chamber for subsequent removal.

Settled sediment is retained within the sump storage of the unit, allowing easy access for suction cleaning. Re-suspension of the solids is minimised by the provision of a baffle plate (Catch Skirt), positioned above the sediment storage sump. A central core allows for convenient suction hose entry down to the sump for cleaning and maintenance. If there is a stormwater surge in excess of maximum treatment flow rate, it overflows a weir, bypasses the treatment zone and directly discharges through the outlet pipe. This helps to minimize the effects of scour within the treatment region and prevents wash out of retained sediment downstream.

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The generic configuration of the StormCleanser™ consists of the following main components:

- Inlet Sub-Assembly
- Core Sub-Assembly
- Catch Skirt
- Sump Unit

INLET SUB-ASSEMBLY:

The internal assembly comprises of the main components diverting the flow tangentially, at an angular velocity designed to be most conducive to separation of sediment particles. The inlet assembly also enables the StormCleanser™ to be configured for different inlet angles with respect to the outlet pipe, ranging from 90° – 270°. Moreover, multiple inlet sub-assemblies could also be stacked to form a multiple inlet configuration of StormCleanser™.

CORE SUB-ASSEMBLY:

The sub-assembly consists of a circular core that provides annular separation zone as well as an outlet channel that discharges the cleaner water out of the system. It also consists of the structural mounting surfaces to enable steadfast and safe installation.

CATCH SKIRT:

The Catch Skirt, also known as sump tray or baffle plate, minimizes the resuspension as well as escape of the captured sediment. The Catch Skirt also hydrodynamically directs the flow vortices towards the sump region.

SUMP UNIT:

The sump or catchment zone is the solids or denser sediment storage region. The separated particles are retained in the sump until cleaned during the maintenance process.

The combination of the discharge rate from surface runoff and the target pollutant load are the key variables governing the diameter of the separator and the height of the base unit respectively. These two values are determined by the designer as per the individual site requirements.

MODELS

The table below provides the maximum treatment flow rates and sediment/oil storage capacities for standard StormCleanser™ units.

Table 1 - StormCleanser™ Performance Table

MODEL	TANK DIAMETER	MAX TREATMENT FLOW RATE	PIPE SIZE	MIN. SEDIMENT STORAGE CAPACITY	MIN. OIL STORAGE CAPACITY	MAX. HEAD LOSS AT TREATMENT FLOW RATE
	(mm)	(L/s)	(mm)	(m^3)	(L)	(mm)
PRE-SC900	900	25	150	0.28	150	120
PRE-SC1050	1050	33	225	0.39	238	180
PRE-SC1200	1200	43	300	0.50	320	240
PRE-SC1500	1500	67	375	0.82	630	300
PRE-SC1800	1800	96	450	1.23	1085	360
PRE-SC2100	2100	131	525	1.75	1725	420
PRE-SC2400	2400	172	600	2.38	2575	480
PRE-SC2700	2700	217	675	3.13	3670	540
PRE-SC3000	3000	268	750	4.01	5035	600
PRE-SC3600	3600	387	900	6.20	8703	720
PRE-SC4000	4000	477	900	8.00	11938	800

Notes: Sediment storage capacity could be extended as required, per the desired maintenance frequency

OPERATION

StormCleanser™ operates without any external power or moving parts, hence seamless and effective operation is a function of hydrodynamics as well as the material and structure. The inlet flow openings are designed to permit passage of large floatable objects, which gather in the region above the main separation zone. The hydraulic losses are minimized by smooth channelling of flow through the annular region, at the specific design velocity. A StormCleanser™ unit consisting of multiple inlets, uniquely, provides flow direction selection to allow the longer unencumbered flow path to be taken and thus avoid any clogging of floatables.

Figure 2 demonstrates the two different separation mechanisms during normal operation. The hydrocarbons and floatables gather at the top by virtue of lower density, and could be accessed and removed first. The solid suspended sediment undergoes vortex separation phenomena and is captured in the sump region, to be extracted conveniently through the central cylindrical opening.

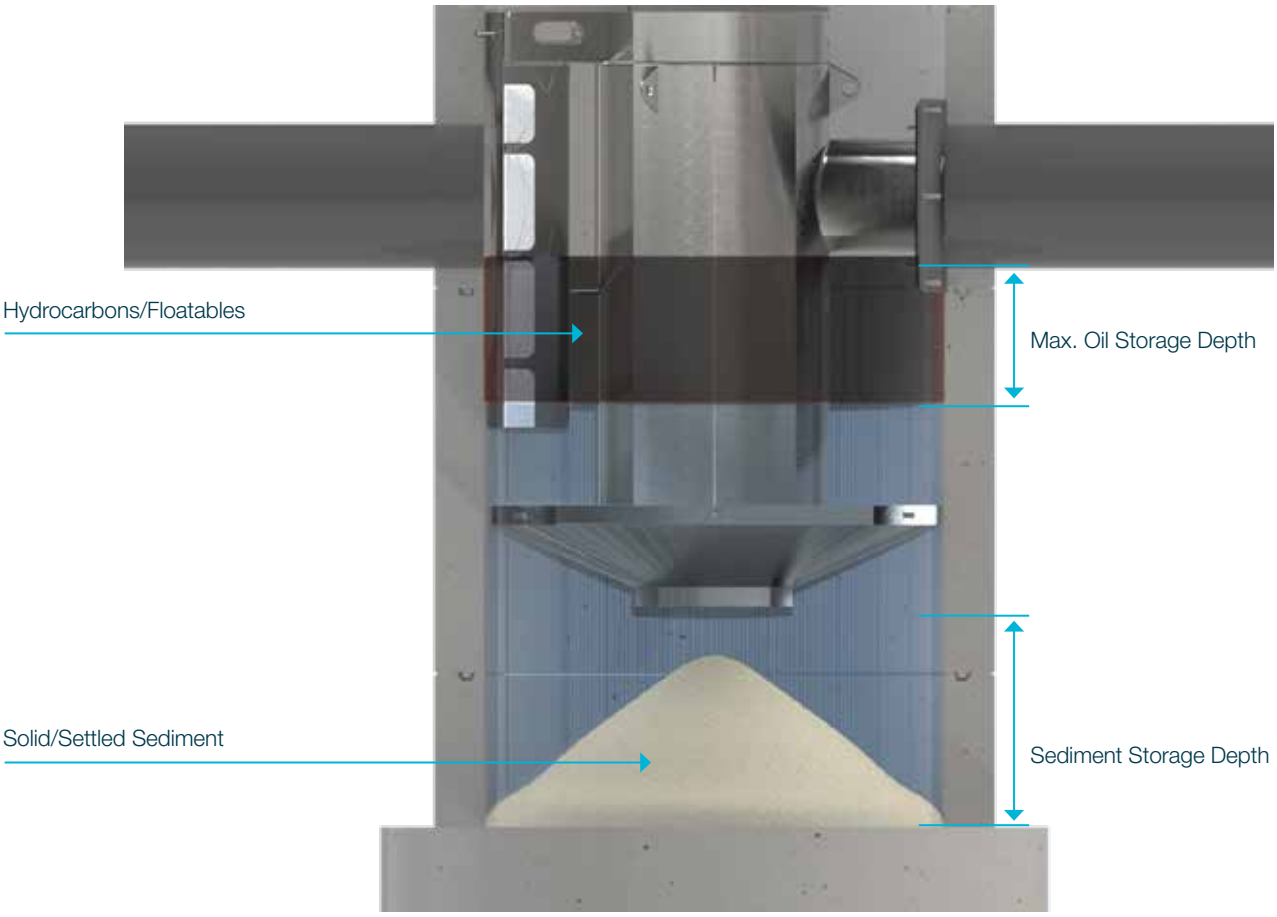

Figure 2 - StormCleanser™ sediment categorization during operation

MAINTENANCE

Periodic checks and removal of stored sediments, floatables, and hydrocarbons is essential to the effective functioning of the StormCleanser™. Failure to provide adequate regular maintenance may limit the performance of the installed unit.

**** Maintenance does not require removal or re-installation of any part in the existing StormCleanser™ assembly. If a part appears damaged, please contact regional FP McCann office.**

MAINTENANCE FREQUENCY

- During installation, the sump unit should be cleaned for any existing mud and debris, collected during storage/pre-installation period
- At the time of installation, the unit should be checked against the installation sheet and information should be logged
- First regular maintenance check is advised between 6-12 months after installation, serving as a preventive check and sets respective periods of maintenance accordingly
- The amount of sediment, floatables, and hydrocarbons for each site is highly variable and could be gauged upon first few maintenance intervals

REQUIRED EQUIPMENT

- There is no confined space entry necessary for inspection or maintenance
- Access slab/lid hardware and tooling
- Vacuum truck with suction hose and tanker for foul water removal
- Pressure wash or cleaning equipment (if required)

**** Safe and environmentally responsible disposal of pollutants is the responsibility of the maintenance contractor**

MAINTENANCE INSTRUCTIONS

1. Lower down the suction hose and extract floatables and hydrocarbons via the annulus region of the separator tank

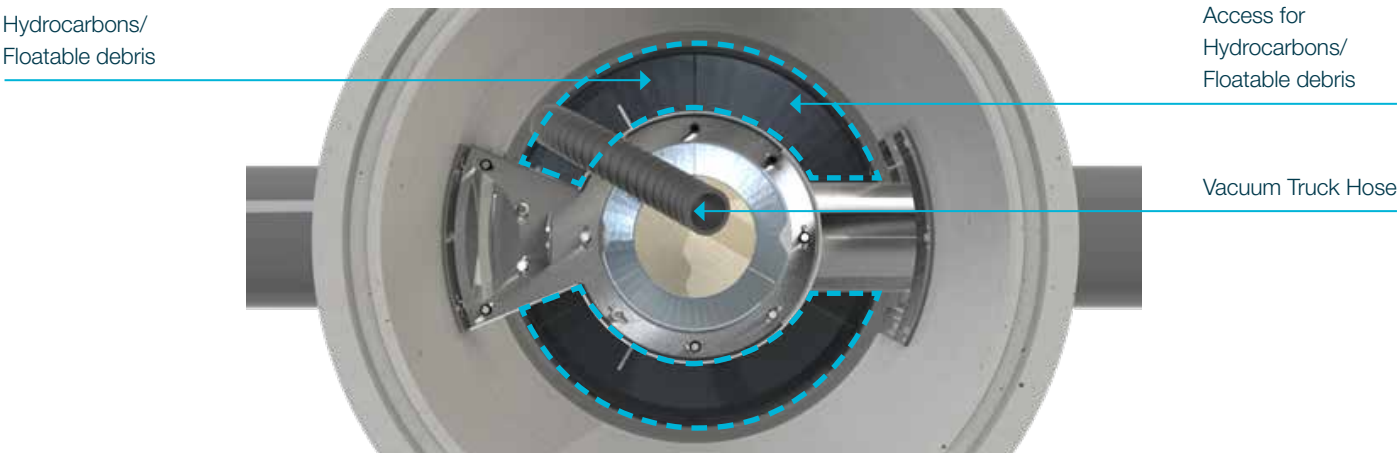

Figure 3 - Vacuum truck access region and cleaning of hydrocarbons and floatable debris

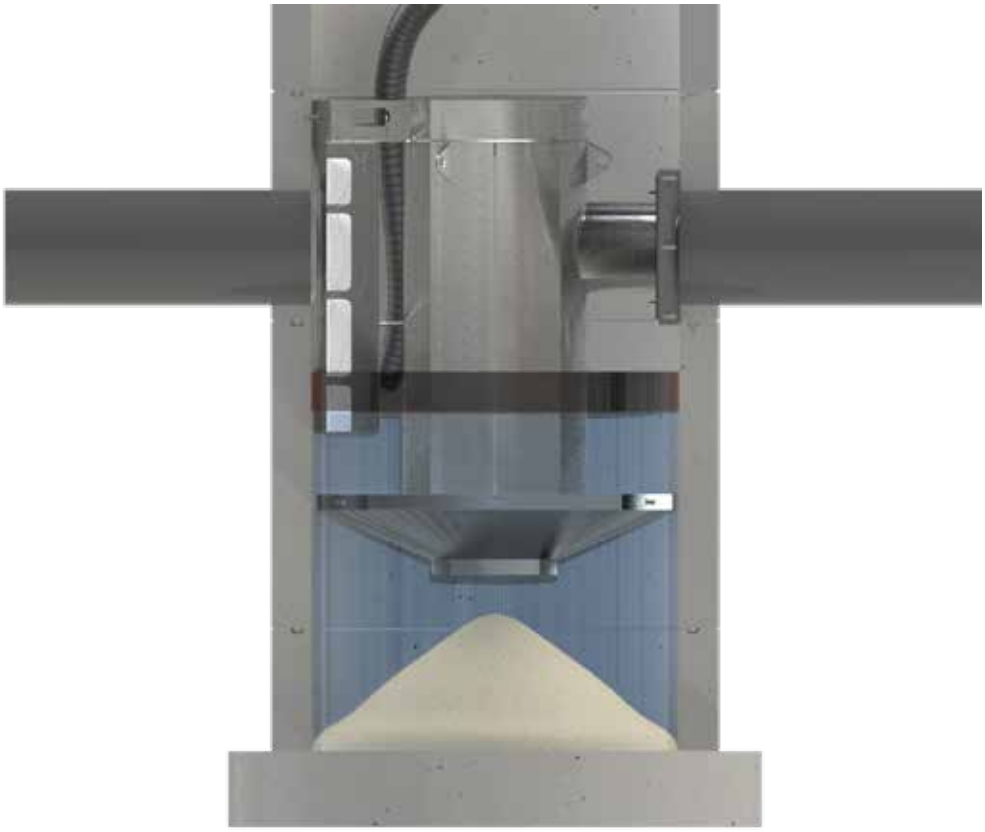

Figure 4 - Section view of vacuum suction hose, during hydrocarbons and floatable debris cleaning (Internal Assembly rendered transparent for visualization)

2. Suction hose should be placed beside the closed end of the inlet assembly to adequately capture all floatable debris and hydrocarbons
3. Once water level reduced down to the Catch Skirt level then lower the suction hose down to the sump region to suck the solid sediment out of the system
4. Continue lowering down the hose as it sucks the sediment until it hits the base of the sump

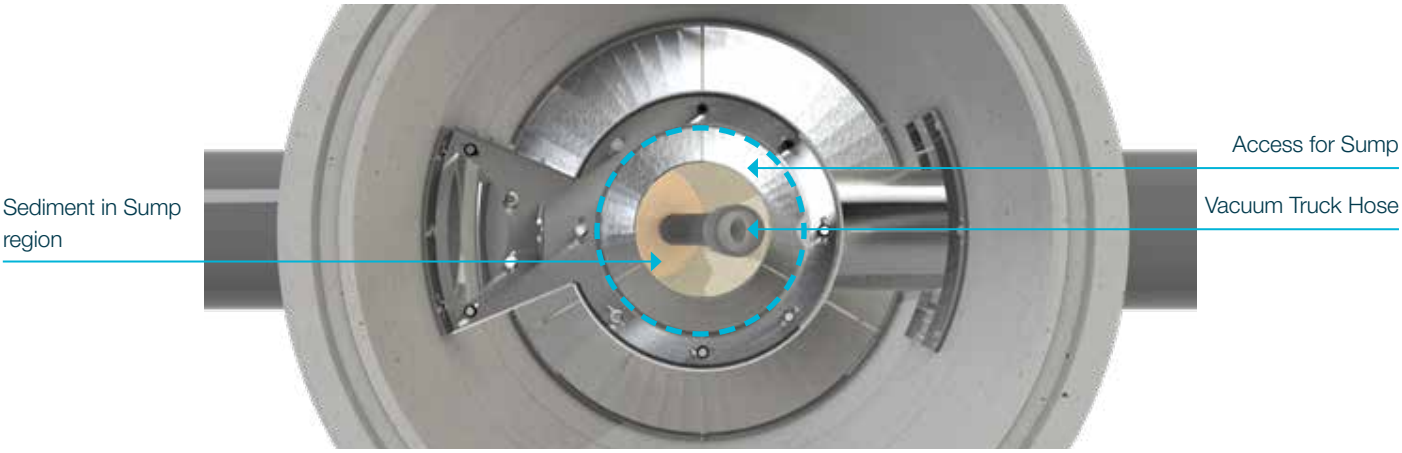

Figure 5 - Vacuum truck access region and cleaning of sediment stored in sump unit

Figure 6 - Vacuum Truck hose in the settled sediment sump region (Internal Assembly rendered transparent for visualization)

5. The sump region would ideally need frequent rotational repositioning of the suction hose against the base, to access the far ends
6. Retrieve the suction hose and check for any anomalies
7. Lastly, securely close the lid of the tank

It is recommended that the units are regularly checked after any unexpected stormwater run-off surges or chemically hazardous spills.

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STORMCLEANSER™ INSTALLATION RECORD

Model Ref#	
Installation Date	
Project Ref	
Installation Site	
Location	

Model	Check
PRE-SC1200	☐
PRE-SC1500	☐
PRE-SC1800	☐
PRE-SC2100	☐
PRE-SC2400	☐
PRE-SC2700	☐
PRE-SC3000	☐
PRE-SC3600	☐
PRE-SC4000	☐

CLIENT DETAILS

Company Name	
Contact Person	
Address	
Telephone	
Fax	

CONTRACTOR DETAILS

Company Name	
Contact Person	
Address	
Telephone	
Fax	

**Above record sheet is a only a reference template and not a controlled FP McCann document*

STORMCLEANSER™ MAINTENANCE RECORD SHEET

MODEL REF#		INSTALLATION DATE		LOCATION	
DATE	NAME	COMPANY	SEDIMENT MASS (KG)	COMMENTS/REMARKS	

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AGRICULTURE
Lydney 01594 847500 Grantham 01476 562277

ARCHITECTURAL PRECAST
London 020 3905 7640

BOX CULVERTS
Weston Underwood 01335 361269

BUILDING PRODUCTS
Cadeby 01455 290780

DOCK LEVELLER PITS
Weston Underwood 01335 361269

DRAINAGE
Ellistown 01530 240000 (England/Wales) Magherafelt 028 7954 9026 (Scotland/NI)

FENCING
Cadeby 01455 290780

FILTER BED SYSTEMS
Littleport 01353 861416

FLOORING
Weston Underwood 01335 361269 Uddingston 01698 803300 Magherafelt 028 7954 9026 (NI)

POWER & INFRASTRUCTURE
Littleport 01353 861416

RAIL
Littleport 01353 861416

SPECIALIST PRECAST
Littleport 01353 861416

STRUCTURAL PRECAST
Byley 01606 843500 Grantham 01476 562277

STORMTANK™ - TANKS & CHAMBERS
Weston Underwood 01335 361269

TUNNELS & SHAFTS
Cadeby 01455 290780

WALLING
Grantham 01476 562277 Lydney 01594 847500
Uddingston 01698 803 300 (Scotland) Magherafelt 028 7954 9026 (NI)

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