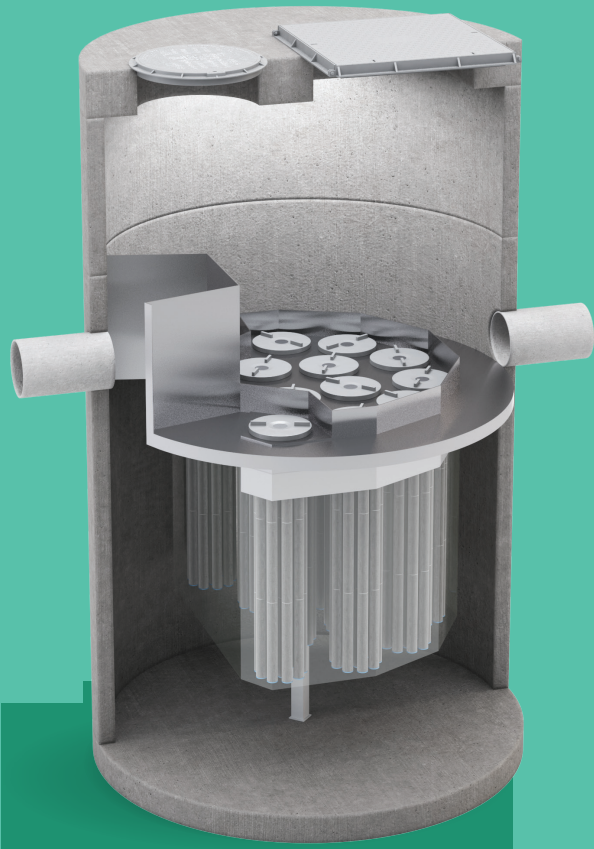
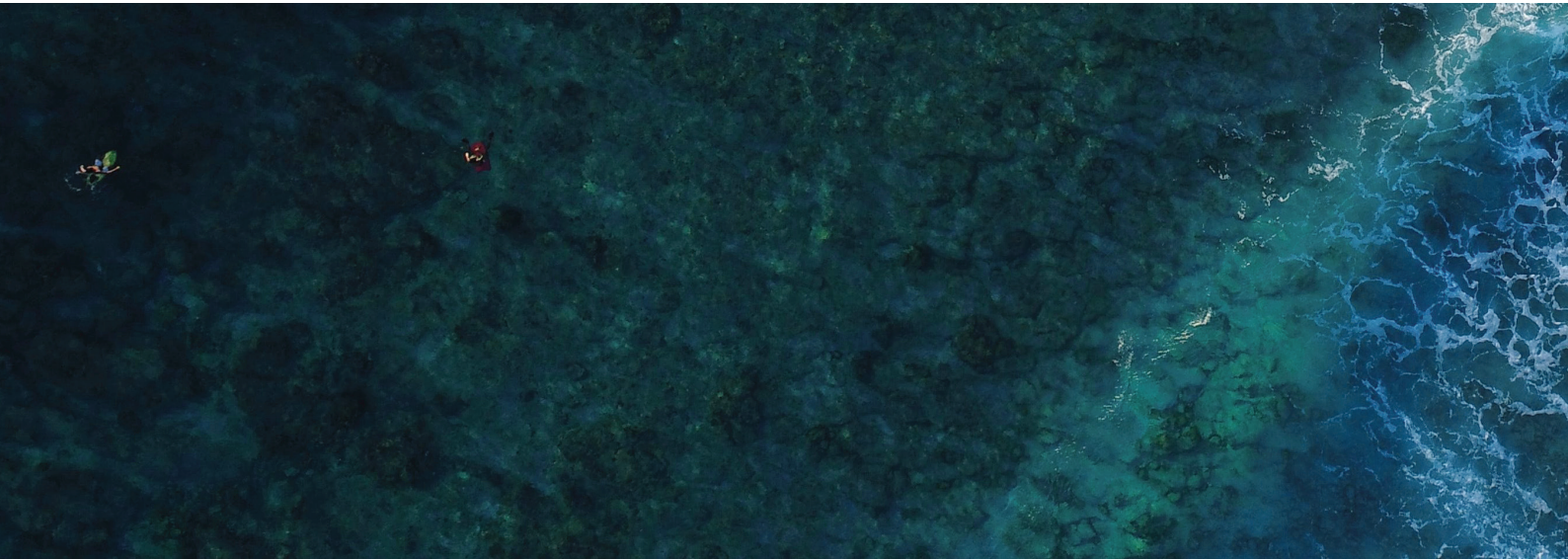


Jellyfish[®] Filter

Operations & Maintenance Manual



Stopping Pollution Entering Waterways



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Introduction

The primary purpose of stormwater treatment devices is to capture and prevent pollutants from entering waterways, maintenance is a critical component of ensuring the ongoing effectiveness of this process. The specific requirements and frequency for maintenance depends on the treatment device and pollutant load characteristics of each site. This manual has been designed to provide details on the cleaning and maintenance processes for the Jellyfish® Filter as recommended by the manufacturer (Ocean Protect).

The Jellyfish® Filter is a stormwater quality treatment technology featuring high surface area and high flow rate membrane filtration at low driving head. By incorporating pre-treatment with light-weight membrane filtration, the Jellyfish® Filter removes floatables, trash, oil, debris, TSS and a high percentage of particulate-bound pollutants; including phosphorus and nitrogen, metals and hydrocarbons.

Why do I need to perform maintenance?

Adhering to the maintenance schedule of any stormwater treatment device is essential to ensuring that it works properly throughout its design life.

During each inspection and clean, details of the mass, volume and type of material that has been collected by the device should be recorded. This data will assist with the revision of future management plans and help determine maintenance interval frequency. It is also essential that suitably qualified and experienced personnel carry out all maintenance (including inspections, recording and reporting) in a systematic manner.

Maintenance of your stormwater management system is essential to ensuring ongoing at-source control of stormwater pollution. Maintenance also helps prevent structural failures (e.g. prevents blocked outlets) and aesthetic failures (e.g. debris build up), but most importantly ensures the long term effective operation of the Jellyfish®.

Health and Safety

Access to a Jellyfish® unit requires removing heavy access covers/grates, and entry into a confined space. Pollutants collected by the Jellyfish® will vary depending on the nature of your site. There is potential for these materials to be harmful. For example, sediments may contain heavy metals, carcinogenic substances or objects such as broken glass and syringes. For these reasons, all aspects of maintaining and cleaning your Jellyfish® require careful adherence to Occupational Health and Safety (OH&S) guidelines.

It is important to note that the same level of care needs to be taken to ensure the safety of non-work personnel. As a result, it may be necessary to employ traffic/pedestrian control measures when the device is situated in, or near areas with high vehicular/pedestrian activity.

Personnel health and safety

Whilst performing maintenance on the VortCapture, precautions should be taken in order to minimise (or when possible prevent) contact with sediment and other captured pollutants by maintenance personnel. In order to achieve this the following personal protective equipment (PPE) is recommended:

- Puncture resistant gloves
- Steel capped safety boots
- Long sleeve clothing, overalls or similar skin protection
- Eye protection
- High visibility clothing or vest

During maintenance activities, it may be necessary to implement traffic control measures. Ocean Protect recommend that a separate site-specific traffic control plan is implemented as required to meet the relevant governing authority guidelines.

Whilst some aspects of Jellyfish® maintenance can be performed from surface level, there will be a need to enter the Jellyfish® pit (confined space) for both minor and major services. It is recommended that all maintenance personnel evaluate their own needs for confined space entry and compliance with relevant industry regulations and guidelines. Ocean Protect maintenance personnel are fully trained and carry certification for confined space entry applications.

How does it work?

Stormwater enters the Jellyfish® system through the inlet pipe where floatable pollutants are captured behind the maintenance access wall. As stormwater enters the treatment chamber, a separation skirt ensures the retention of oils whilst simultaneously protecting the filtration cartridges and allowing coarse particles to settle below on the chamber floor. Stormwater then passes through the Jellyfish® cartridges and onto the Jellyfish® deck, at this point the backwash pool will fill and overflow allowing treated stormwater to exit via the outlet pipe.

As the storm event subsides, the treated water held in the backwash pool passes back through the high flow cartridges into the treatment chamber. This passive backwash helps to clear the cartridge surface by dislodging sediment onto the chamber floor. The drain down cartridge(s) located outside the backwash pool enables water levels to balance, leaving the cartridge deck level free of standing water.

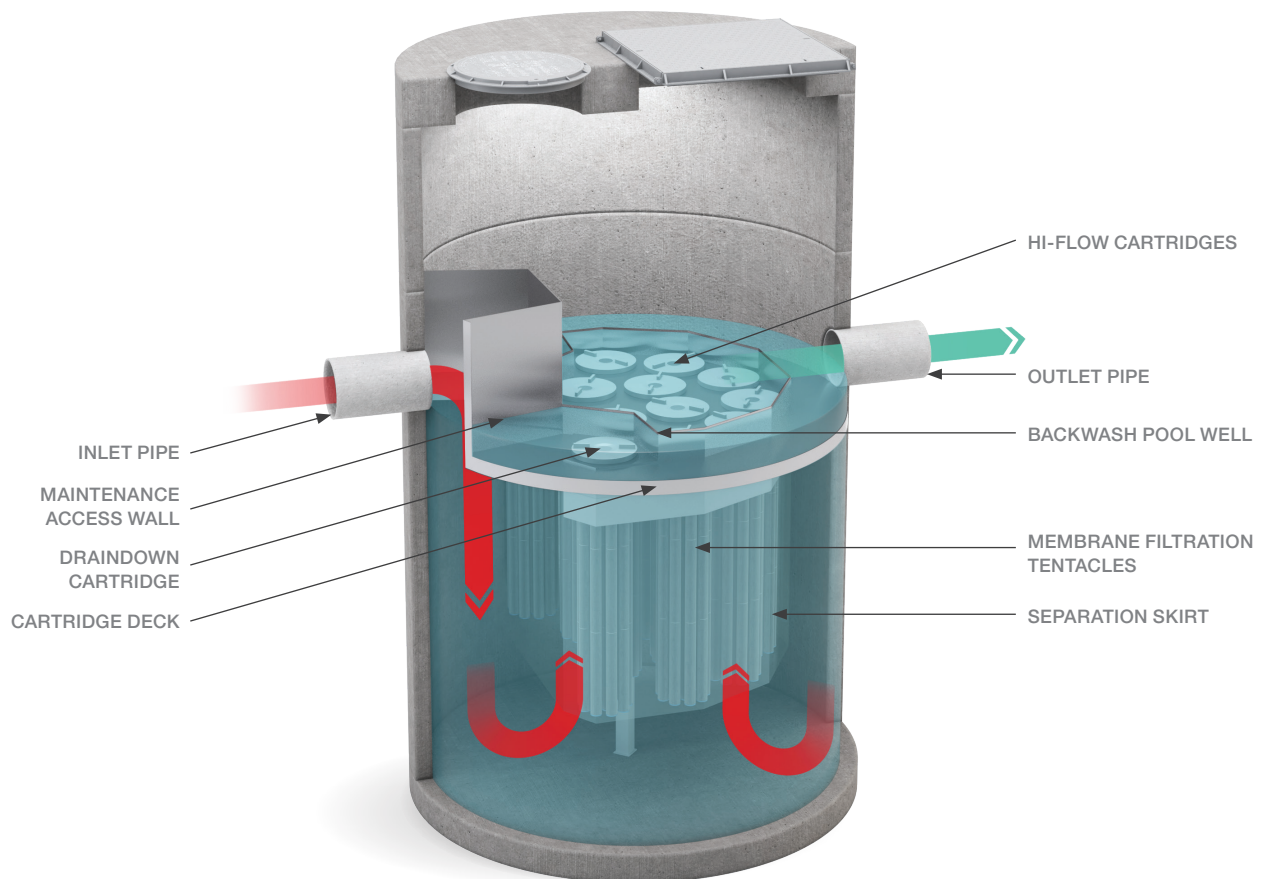


Figure 1: Jellyfish® operation

Maintenance Procedures

To ensure optimal performance, it is advisable that regular maintenance is performed. Typically the Jellyfish® requires a service every 6 months, additionally as the Jellyfish® cartridges capture pollutants they will need to be replaced (expected cartridge life is 2-5 years with a maximum cartridge life of 5 years).

Primary types of maintenance

The table below outlines the primary types of maintenance activities that typically take place as part of an ongoing maintenance schedule for the Jellyfish®.

Service Type	Description of Typical Activities	Frequency
Minor Service	Removal & rinsing of cartridges Wash down of deck level Removal of large floatable pollutants Removal of accumulated sediment (if required)	Every 6 Months
Major Service	Replacement of Jellyfish® cartridges	As required

Maintenance requirements and frequencies are dependent on the pollutant load characteristics of each site. The frequencies provided in this document represent what the manufacturer considers to be best practice to ensure the continuing operation of the device is in line with the original design specification.

Minor Service

This service is designed to assess the condition of the Jellyfish® cartridges and record necessary information that will establish whether a major service is required.

- 1 Establish a safe working area around the access point
- 2 Remove access covers
- 3 Using a vacuum unit or net remove any floatable gross pollutants contained behind the maintenance access wall
- 4 Using a vacuum unit decant the water until the level drops below the base of the cartridges
- 5 Remove Jellyfish® cartridges*
 - a. Remove cartridge lid
 - b. Remove cartridges vertically from chamber, lifting from eye nut lifting points only
 - c. Replace and secure cartridge lid back into deck to reduce trip hazards during maintenance
- 6 Unscrew all 11 tentacles from the cartridge head plate, keep all components for reassembly*
- 7 Rinse each tentacle individually – *NOTE: excessive water pressure may damage the tentacles*
 - a. Position tentacle in a container (to capture runoff) with the open end facing down
 - b. Rinse entire length of cartridge using only low pressure water source (e.g. garden hose)
 - c. Evaluate and note the condition of the tentacles
 - d. Ensure runoff is disposed appropriately
 - e. Re-assemble cartridges ready for reinstallation*
- 8 Wash down deck level to remove any built up sediment (if required)
- 9 Measure the level of accumulated sediment in the chamber if depth is greater than 300mm use vacuum unit to remove sediment
- 10 Re-install Jellyfish® cartridges
 - a. Remove cartridge lid
 - b. Lower cartridge into chamber, lifting from eye nut lifting points only
 - c. Insert cartridge vertically into cartridge receptacle, and secure cartridge lid back in place
- 11 Replace access covers

**Refer Appendix 1 for Jellyfish® Cartridge Schematic*

Major Service (Filter Cartridge Replacement)

For the Jellyfish® system a major service is a reactionary process based on the outcomes from the minor service.

Trigger Event from Minor Service	Maintenance Action
Rinsing does not remove accumulated sediment from the tentacles	Replace Jellyfish® tentacles ^[1]
Jellyfish® tentacles are damaged	Replace Jellyfish® tentacles ^[1]
Jellyfish® cartridges have been in operation for 5 years	Replace Jellyfish® tentacles ^[1]

^[1] Replacement filter tentacles and components are available for purchase from Ocean Protect

This service is designed to return the Jellyfish® device back to optimal operating performance.

- 1 Establish a safe working area around the access point
- 2 Remove access covers
- 3 Using a vacuum unit or net remove any floatable gross pollutants contained behind the maintenance access wall
- 4 Using a vacuum unit decant the water until the level drops below the base of the cartridges
- 5 Remove Jellyfish® cartridges*
 - a. Remove cartridge lid
 - b. Remove cartridges vertically from chamber, lifting from eye nut lifting points only
 - c. Replace and secure cartridge lid back into deck to reduce trip hazards during maintenance
- 6 Unscrew all 11 tentacles from the cartridge head plate for disposal, keep all components for fixing of new tentacles to existing head plate*
- 7 Wash down deck level to remove any built up sediment (if required)
- 8 Use vacuum unit to remove accumulated sediment and pollutants in the chamber
- 9 Install replacement tentacles into each head plate*
- 10 Install Jellyfish® cartridges
 - a. Remove cartridge lid
 - b. Lower cartridge into chamber, lifting from eye nut lifting points only
 - c. Insert cartridge vertically into cartridge receptacle, and secure cartridge lid back in place
- 11 Replace access covers

Additional Types of Maintenance

The standard maintenance approach is designed to work towards keeping the Jellyfish® system operational during normal conditions. From time to time, events on site can make it necessary to perform additional maintenance to ensure the continuing performance of the device.

Hazardous Material Spill

If there is a spill event on site, the Jellyfish® unit should be inspected and serviced accordingly. Specifically, all captured pollutants and liquids from within the unit should be removed and disposed in accordance with any additional requirements that may relate to the type of spill event. Additionally, it will be necessary to inspect the filter cartridges and assess their contamination, depending on the type of spill event it may be necessary to replace the filtration cartridges.

Blockages

The Jellyfish® treatment system is designed to operate in an offline arrangement, where an upstream high flow bypass structure is in used. In the unlikely event that flooding occurs upstream of the Jellyfish® system, the following steps should be undertaken to assist in diagnosing the issue and determining the appropriate response.

- 1 Inspect the upstream diversion structure to ensure that it is free of debris and pollutants
- 2 Inspect the Jellyfish® unit checking both the inlet and outlet pipes for obstructions (e.g. pollutant build-up, blockage), which if present, should be removed

Major Storms and Flooding

In addition to the scheduled activities, it is important to inspect the condition of the Jellyfish® after a major storm event. The focus is to inspect for damage and higher than normal sediment accumulation that may result from localised erosion. Where necessary, damaged components should be replaced and accumulated pollutants should be removed and disposed.

**Refer Appendix 1 for Jellyfish® Cartridge Schematic*

Disposal of Waste Materials

The accumulated pollutants found in the Jellyfish® must be handled and disposed of in a manner that is in accordance with all applicable waste disposal regulations. When scheduling maintenance, consideration must be made for the disposal of solid and liquid wastes. If the filter cartridges have been contaminated with any unusual substance, there may be additional special handling and disposal methods required to comply with relevant government/authority/industry regulations.

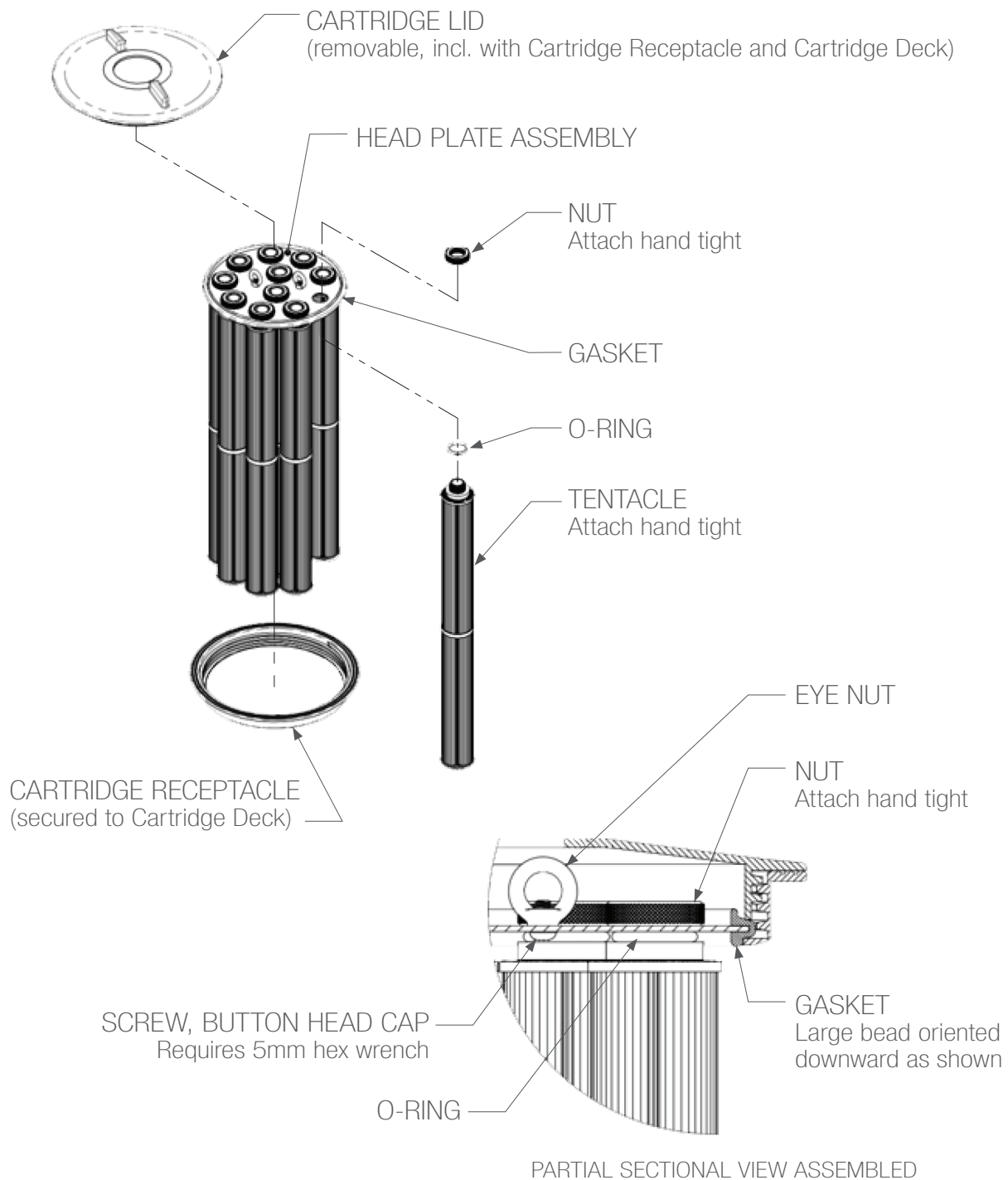
Maintenance Services

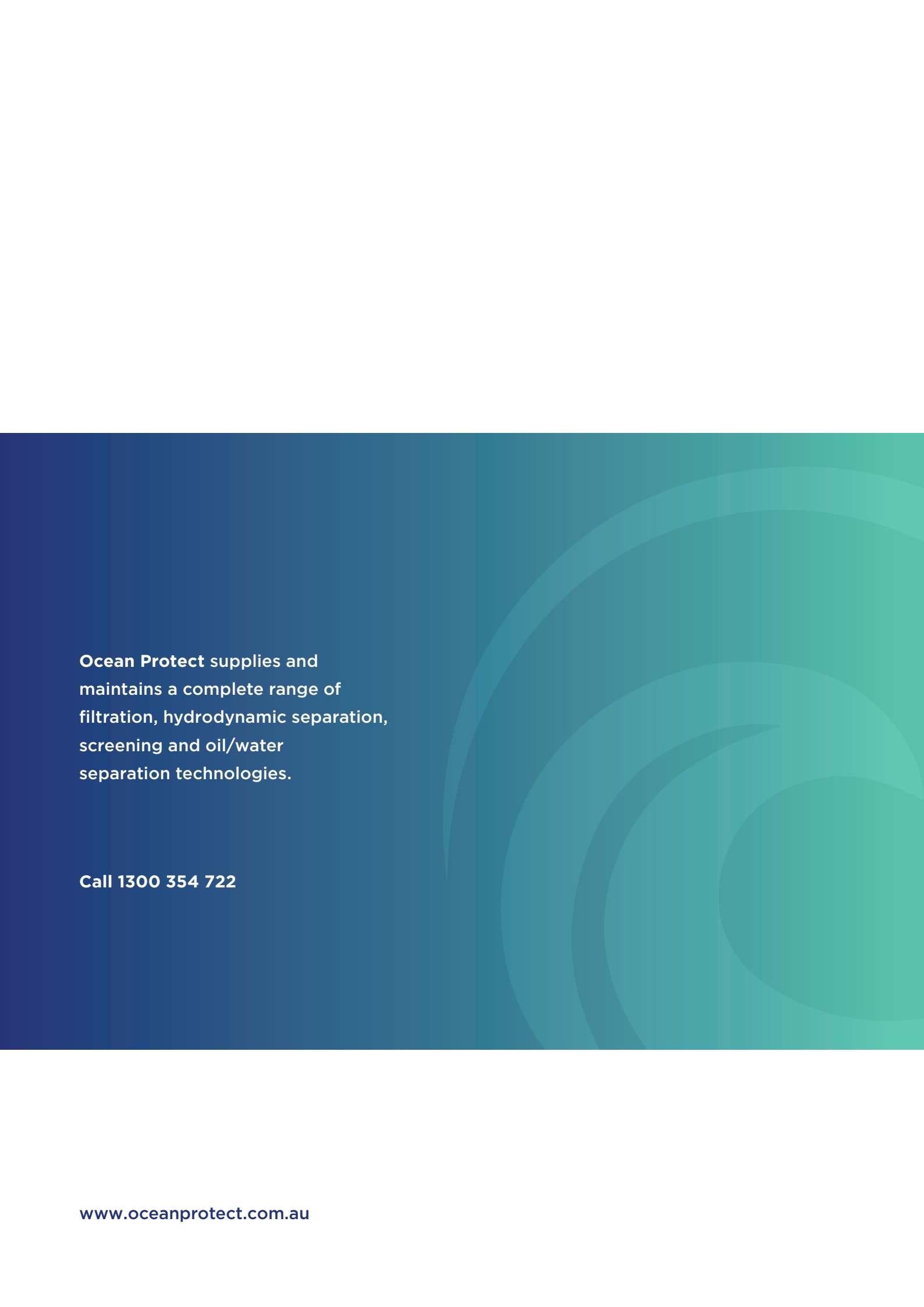
With over a decade and a half of maintenance experience, Ocean Protect has developed a systematic approach to inspecting, cleaning and maintaining a wide variety of stormwater treatment devices. Our fully trained and professional staff are familiar with the characteristics of each type of system, and the processes required to ensure its optimal performance.

Ocean Protect has several stormwater maintenance service options available to help ensure that your stormwater device functions properly throughout its design life. In the case of our Jellyfish® system we offer long term pay-as-you-go contracts, pre-paid once off servicing and replacement cartridges.

**For more information please visit
www.oceanprotect.com.au**

Appendix 1 – Jellyfish® Cartridge Schematic





Ocean Protect supplies and maintains a complete range of filtration, hydrodynamic separation, screening and oil/water separation technologies.

Call 1300 354 722