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12 February 2025

Fairfield City Council
Attention: Development Assessment Team
86 Avoca Road
WAKELY NSW 2176

Re: 74-94 Newton Road, Wetherill Park
Council RFI- DA205.1/2024

This letter is provided in relation to the Development Application DA205.1/2024 and council request for information items pertaining to the stormwater quality system costing and maintenance, and flood risk items, including confirmation of Schedule 4 – Prescriptive Controls Matrix Chapter 11 – Flood Risk Management of the Fairfield Council Citywide DCP 2024.

This letter should be read in conjunction with the Costin Roe Consulting **Stormwater Management Report, CO15039.01-02d.rpt**, and associated engineering design drawings **CO15039.01-DA10, DA11, DA15, DA25, DA31, DA32, DA35 & DA36, DA40, DA41, DA42, DA44 to DA46, DA51, DA52, DA56 and DA57**.

Water Quality System Operation and Maintenance

Council has requested a capital and operation/ maintenance cost estimate of the stormwater quality measures shall be included in the stormwater quality management plan. Both typical annual maintenance costs and corrective maintenance or renewal/adaptation costs should be included.

The stormwater quality system proposes primary stormwater treatment via Oceanguard pit inserts and tertiary treatment by the Jellyfish treatment system. **Section 6.5** and **Appendix D** of the **Stormwater Management Report, CO15039.01-02d.rpt**, include the general maintenance requirements for the stormwater system. **Enclosures 2** and **3** include the respective operation and maintenance manuals for the Oceanguard and Jellyfish Systems.

Oceanprotect, the product manufacturer, has provided the following initial capital and ongoing maintenance cost estimates for the stormwater quality system:

- Initial cost: \$250,000+GST
- Ongoing Maintenance Cost: \$24,000+GST

Schedule 4 – Prescriptive Controls Matrix Chapter 11 – Flood Risk Management

Detailed flood modelling and flood assessments have been included in **Section 7** of our Stormwater Management report. The flood modelling has been completed by Catchment Simulation Solutions, and assessments relating to impact and flood risk has been completed by Costin Roe Consulting.

The property is noted to be generally flood free in the 1% AEP event, however is flanked by a trunk drainage line on the north, and low to medium risk overland flow within Newton Road.

The overall flood assessment shows acceptable outcomes, and outcomes of similar nature to that now approved under the SSDA for the multi-level facility of the same address.

We provide responses to the 2024 DCP Schedule 4 for the items outlined in **Figure 1**, for an industrial development in a medium risk flood zone. The responses have been included in **Enclosure 1** of this letter, and also added to **Section 7** of the CRC report.

Three Tributaries /Canley Corridor /Prospect Creek/Cabramatta Creek /Georges River/Other Floodplains									
Flood Risk Category	Land Use Risk Category	Planning Controls							
		Floor Level	Building Components	Structural Soundness	Flood Effects	Car Parking & Driveway Access	Evacuation	Management & Design	Fencing
Low Flood Risk	Critical Uses & Facilities								
	Sensitive and Hazardous Development	3	2	3	2	1, 3, 5, 6, 7	2, 3, 4	4, 5	
	Subdivision				2		5	1	
	Residential	2, 6, 7	1	2	2	1, 3, 5, 6, 7	2, 3		
	Commercial & Industrial	5, 6, 7	1	2	2	1, 3, 5, 6, 7	1 or 2, 3	2, 3, 5	
	Tourist Related Development	2, 6, 7	1	2	2	1, 3, 5, 6, 7	2, 3	2, 3, 5	
	Recreation & Non-Urban	1, 6	1	2	2	2, 3, 4, 6, 7	4, 3	2, 3, 5	
	Concessional Development	4, 7	1	2	2	6, 7, 8	2, 3	2, 3, 5	
Medium Flood Risk	Critical Uses & Facilities								
	Sensitive & Hazardous Development								
	Subdivision				1		5	1	1, 2, 3
	Residential	2, 6, 7	1	2	2	1, 3, 5, 6, 7	2, 3		1, 2, 3
	Commercial & Industrial	5, 6, 7	1	2	2	1, 3, 5, 6, 7	1, 3	2, 3, 5	1, 2, 3
	Tourist Related Development	2, 6, 7	1	2	2	1, 3, 5, 6, 7	2, 3	2, 3, 5	1, 2, 3
	Recreation & Non-Urban	1, 6	1	2	2	2, 3, 4, 6, 7	4, 3	2, 3, 5	1, 2, 3
	Concessional Development	4, 7	1	2	2	6, 7, 8	2, 3	2, 3, 5	1, 2, 3

Figure 1. Schedule 4 Prescriptive Planning Controls

Conclusion

Overall compliance with the relevant Council DCP items including stormwater management, flooding, levels and earthworks, remain consistent between the assessed development and proposed revised layout.

We trust the above advise meets your current needs. If you would like to discuss the above detail, please contact us at your convenience.

Yours faithfully,
COSTIN ROE CONSULTING PTY LTD



MARK WILSON MIEAust CPEng NER
Director

- Encl. 1. Schedule 4 Responses
2. Jellyfish Operation and Maintenance Manual
3. Oceanguard Operation and Maintenance Manual

ENCLOSURE 1
SCHEDULE 4 OF CHAPTER 11 OF THE DCP

Table 1. Relevant DCP Control and Response

No.	Control	Response
Floor Level		
5	The level of habitable floor areas is to be equal to or greater than the 100 year flood level plus freeboard. If this level is impractical for a development in a E1, E2, MU1 or E3 zone, the floor level should be as high as possible.	<p>The flood planning level for the building is RL 45.0m AHD, based on the 1% AEP flood level within the trunk drainage system of RL 44.5m AHD plus 0.5m of freeboard.</p> <p>The proposed floor level of the warehouse and offices is RL 47.1m (i.e. 2.1m above the flood planning level).</p> <p>The proposed flood level achieves the requirements of Control 5.</p>
6	Non-habitable floor levels to be equal to or greater than the 100 year flood level plus freeboard where possible, or otherwise no lower than the 20 year flood level unless justified by a site specific assessment.	<p>The flood planning level for the building is RL 45.0m AHD, based on the 1% AEP flood level within the trunk drainage system of RL 44.5m AHD plus 0.5m of freeboard.</p> <p>The proposed floor level of the warehouse and offices is RL 47.1m (i.e. 2.1m above the flood planning level).</p> <p>The proposed flood level achieves the requirements of Control 6.</p>
7	A restriction is to be placed on the title of the land, pursuant to S.88B of the Conveyancing Act, where the lowest habitable floor area is elevated more than 1.5m above finished ground level, confirming that the undercroft area is not to be enclosed.	There are no parts of the building that are elevated more than 1.5m above the finished ground level. This control is not applicable to the development.
Building Component		
1	All structures to have <i>flood compatible building components</i> below the 1% AEP flood level plus freeboard.	<p>No buildings or other structures are proposed below the flood planning level, as such there are no requirement for the use of flood compatible building components on the development.</p> <p>Refer to Sections 6, 7, 8 and 13 on CRC drawing CO15039.01-DA56 for confirmation of the 1% AEP flood level</p>

No.	Control	Response
		in relation to the development and the development hardstand.
Structural Soundness		
2	Applicant to demonstrate that the structure can withstand the forces of floodwater, debris and buoyancy up to and including a 100 year flood plus freeboard, or a PMF if required to satisfy evacuation criteria (see below). An engineer's report may be required.	<p>No buildings or other structures are proposed below the flood planning level, as such no requirement for the provision of an engineer's report or certification relating to forces of water is required.</p> <p>Refer to Sections 6, 7, 8 and 13 on CRC drawing CO15039.01-DA56 for confirmation of the 1% AEP flood level in relation to the development and the development hardstand.</p>
Flood Effects		
2	<p>The flood impact of the development is to be considered to ensure that the development will not increase flood effects elsewhere, having regard to:</p> <ul style="list-style-type: none"> (i) loss of flood storage; (ii) changes in flood levels and velocities caused by alterations to the flood conveyance; and (iii) the cumulative impact of multiple potential developments in the floodplain. An engineer's report may be required. 	<p>A detailed flood impact and risk assessment has been included in Section 7 of the CRC report. Section 7.5 specifically discusses impact in regard to the development. Noting the development does not encroach the 1% AEP flood extent, the assessment shows that in the 1% AEP event there is no loss of flood storage, minor offsite changes in flood levels result (less than or equal to 10mm) and there is no cumulative impact due to the development (noting also that the development is within a fully urbanised area).</p>
Carparks, Access and Driveways		
1	The minimum surface level of open car parking spaces or carports shall be as high as practical, and not below: (i) the 20 year flood level; or (ii) the level of the crest of the road at the location where the site has access: (which ever is the lower). In the case of garages, the minimum surface level shall be as high as practical, but no lower than the 20 year flood level.	The level of the proposed car parking areas are all noted to be above the 1% AEP and generally above the PMF level. Given the carpark levels are all higher than the 1% AEP event, the requirement of Control 1 have been achieved.

No.	Control	Response
3	Garages capable of accommodating more than 3 motor vehicles on land zoned for urban purposes, or enclosed car parking, must be protected from inundation by floods equal to or greater than the 100 year flood.	There are no proposed garages as part of the application. This control is not application to the application, however we note that (as outlined in Control 1 above) the parking areas are all above the 1% AEP event, hence the requirements of this control have been achieved.
5	Where the level of the driveway providing access between the road and parking space is lower than 0.3m below the 100 year flood, the following condition must be satisfied: <ul style="list-style-type: none"> The depth of inundation on the driveway during a 100 year flood shall not be greater than the larger of: (i) the depth at the road; and (ii) the depth at the car parking space. A lesser standard may be accepted for single detached dwelling houses where it can be demonstrated that the risk to human life would not be compromised. 	The levels of all driveways are noted to be higher than 0.3m above the 1% AEP flood event. The requirement of this control have been achieved.
6	Enclosed car parking and car parking areas accommodating more than 3 vehicles (other than on Rural zoned land), with a floor level below the 20 year flood level or more than 0.8m below the 100 year flood level, shall have adequate warning systems, signage and exits.	There are no proposed basements or enclosed parking areas. This control is not application to the application.
7	Restraints or vehicle barriers to be provided to prevent floating vehicles leaving a site during a 100 year flood.	The parking areas are all above the 1% AEP water level, as such this requirement is not applicable to the application.
Evacuation		
1	Reliable access for pedestrians or vehicles required during a 100 year flood	Access to and from the site remains consistent with the existing industrial use on the land. Reliable access is available to pedestrians and vehicles (during a 1% AEP event) via Newton Road toward the south-west. Access is also noted to be available to the north-east of the site (also in Newton Road), however this part of Newton

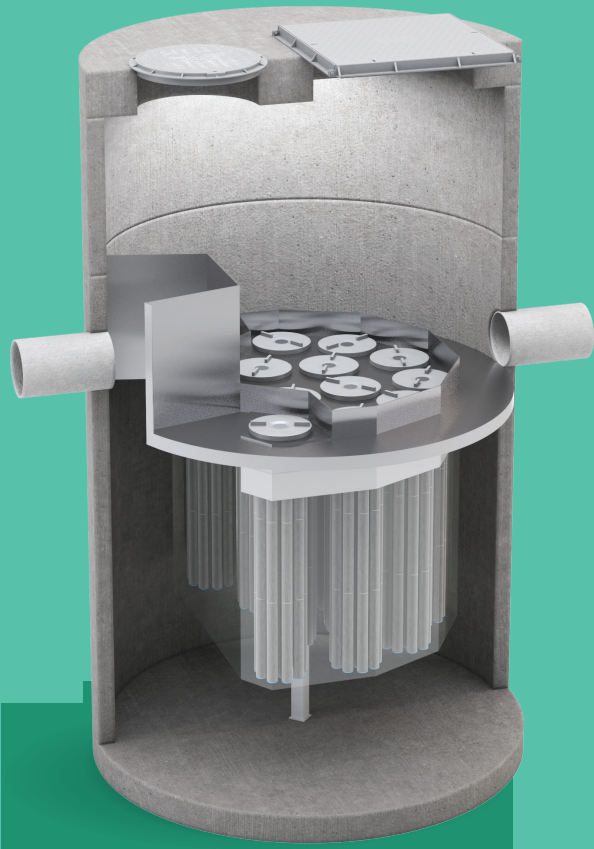
No.	Control	Response
		Road is noted to have low hazard (H1) overland flow affectation.
3	The development is to be consistent with any relevant flood evacuation strategy or similar plan.	The application will result in similar flood risks to current conditions on the property, and evacuation would be available consistent with Fairfield City Council and SES flood response plans.
Management and Design		
2	Site Emergency Response Flood Plan required where floor levels are below the design floor level, (except for single dwelling-houses).	No floor levels are proposed below the design floor level. A site emergency response plan would not be required based on the requirements of this control.
3	Applicant to demonstrate that area is available to store goods above the 1% AEP flood level plus 500mm freeboard.	<p>The building floor level (where storage of goods is proposed) is noted to be 2.1m above the 1% AEP flood level plus 0.5m freeboard.</p> <p>Refer to Sections 6, 7, 8 and 13 on CRC drawing CO15039.01-DA56 for confirmation of the 1% AEP flood level in relation to the development and the development hardstand.</p>
5	No storage of materials below the design floor level which may cause pollution or be potentially hazardous during any flood.	As noted for Control 3, storage of goods will be within an area which is 2.1m above the flood planning level. The PMF level (RL46.1m AHD) within the trunk drainage channel is also noted to be below the building and storage floor level. Based on storage being undertaken within the building then the requirements of this condition have been met.
Fencing		
1	Fencing within a High Flood Risk area, Boundary of Significant Flow or floodway will not be permitted except for permeable open type fences.	No fencing is proposed within high-risk areas or significant flow or floodway zones.
2	Fencing is to be constructed in a manner that does not obstruct the flow of floodwaters so as to have an adverse impact on flooding.	Fencing will typically comprise chain mesh or similar open construction that will not have adverse impact on flooding.

No.	Control	Response
3	Fencing shall be constructed to withstand the forces of floodwaters or collapse in a controlled manner so as not to obstruct the flow of water, become unsafe during times of flood or become moving debris.	Fencing will be permeable, open type fences that can withstand floodwater if required. We note that fencing would generally be higher than the 1% AEP flood level with a 0.5m freeboard allowance.

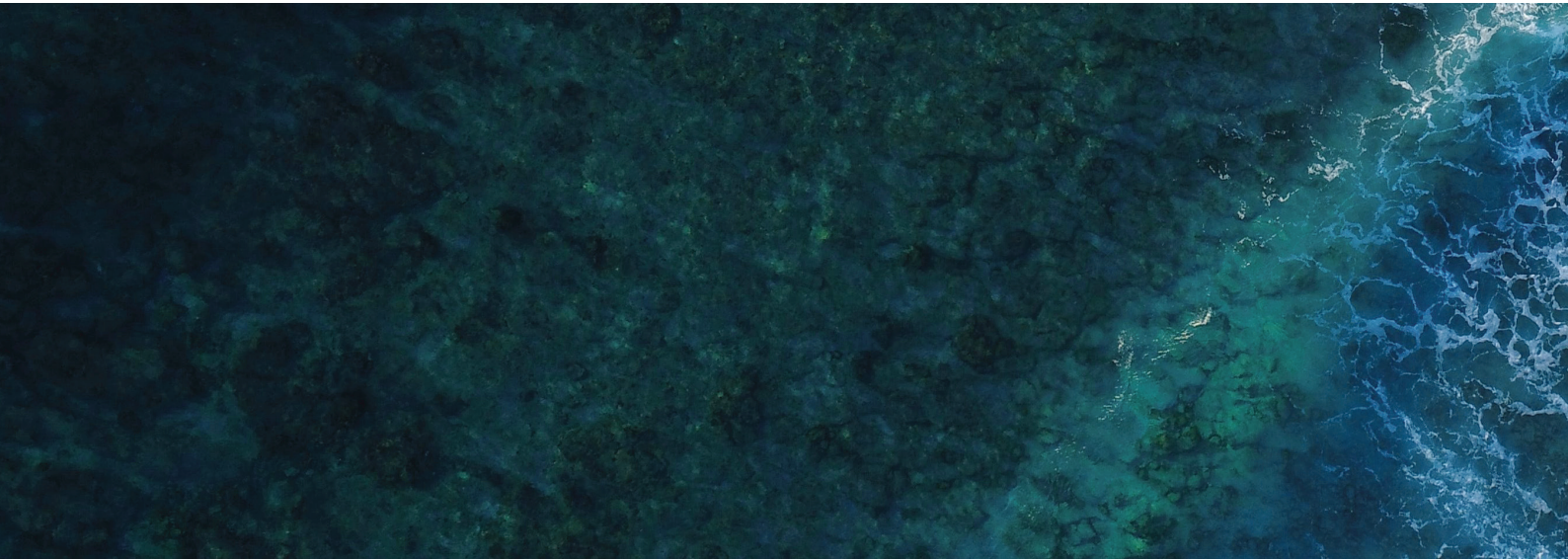
ENCLOSURE 2
JELLYFISH OPERATION AND MAINTENANCE MANUAL

Jellyfish[®] Filter

Operations & Maintenance Manual



Stopping Pollution Entering Waterways



www.oceanprotect.com.au

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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.

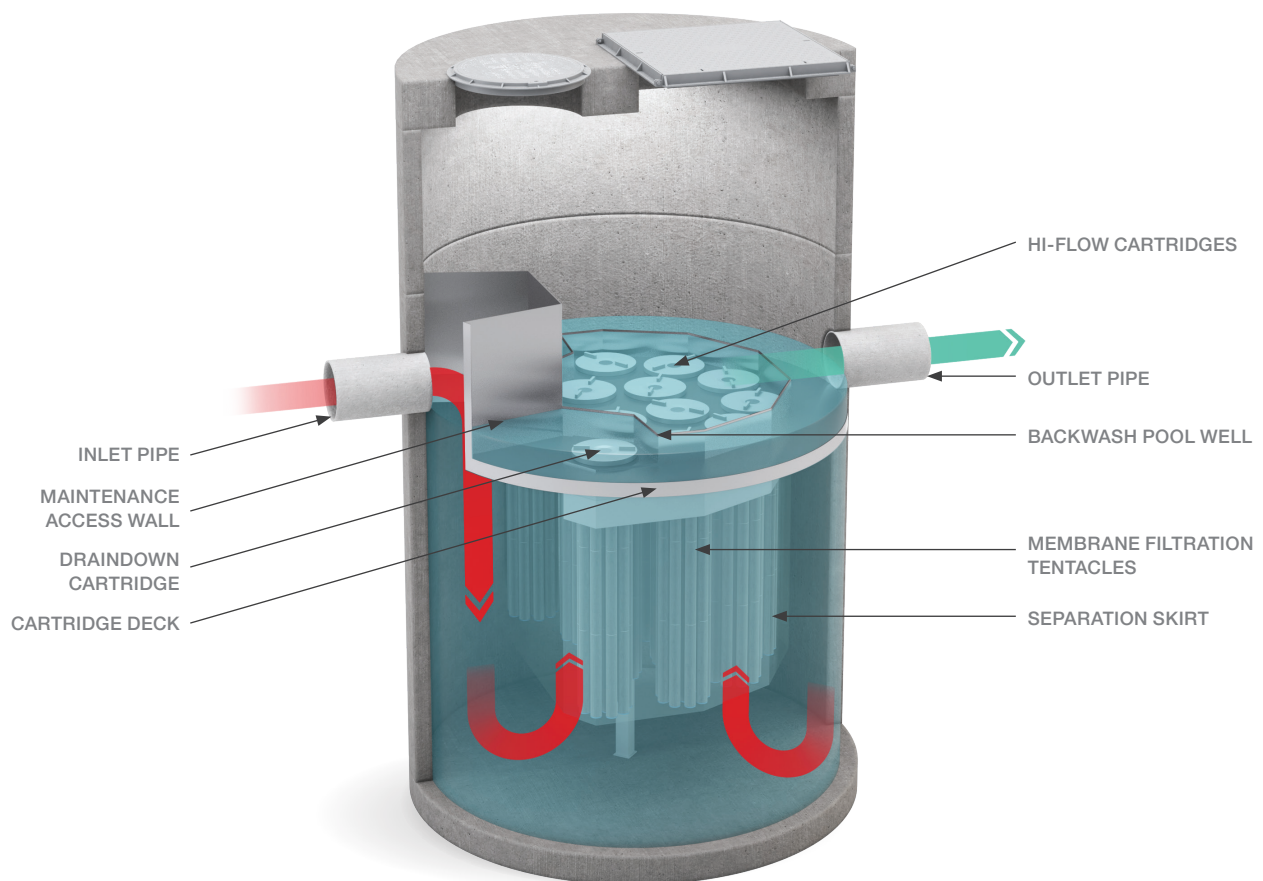


Figure 1: Jellyfish® operation

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.

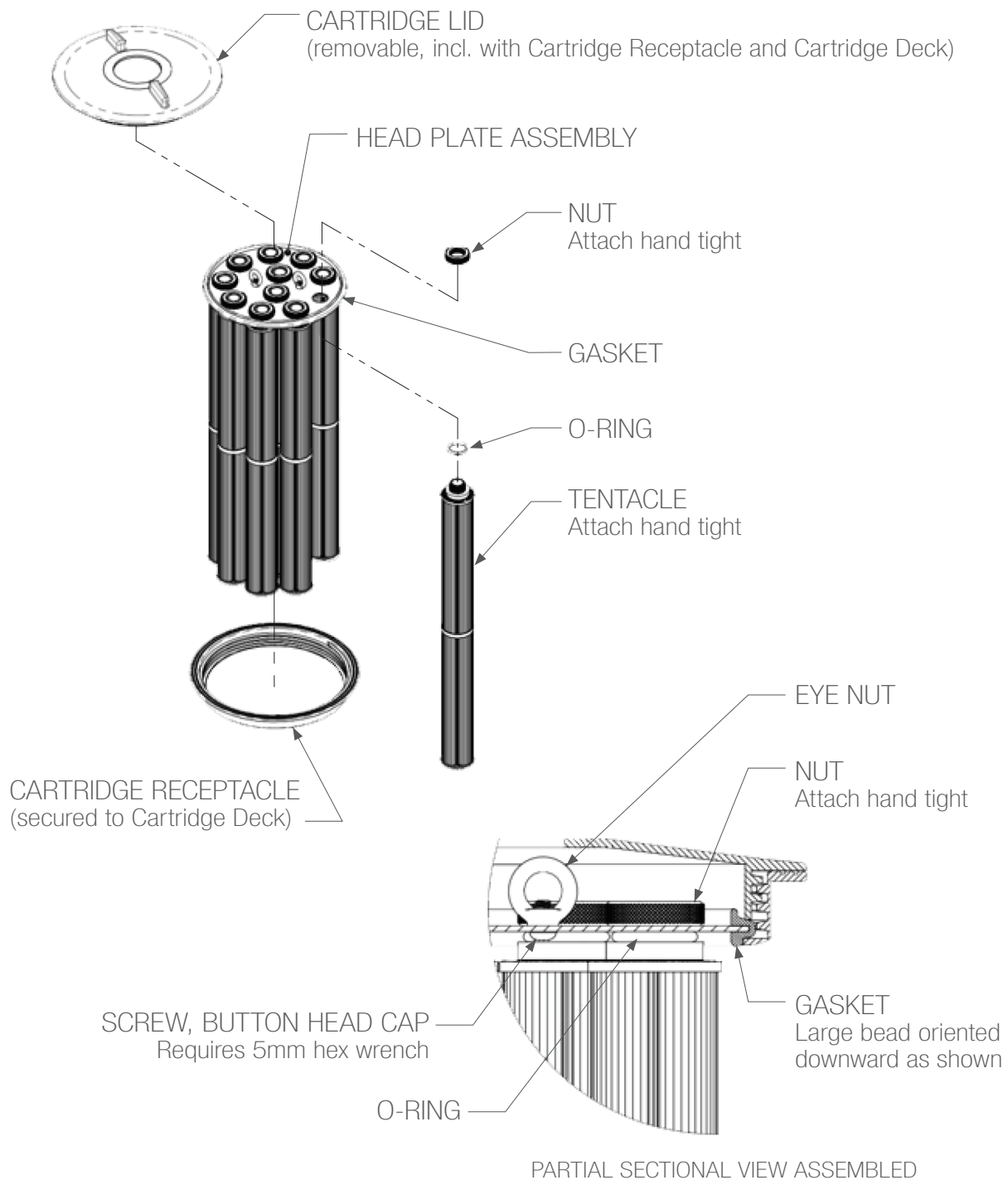
Maintenance Services

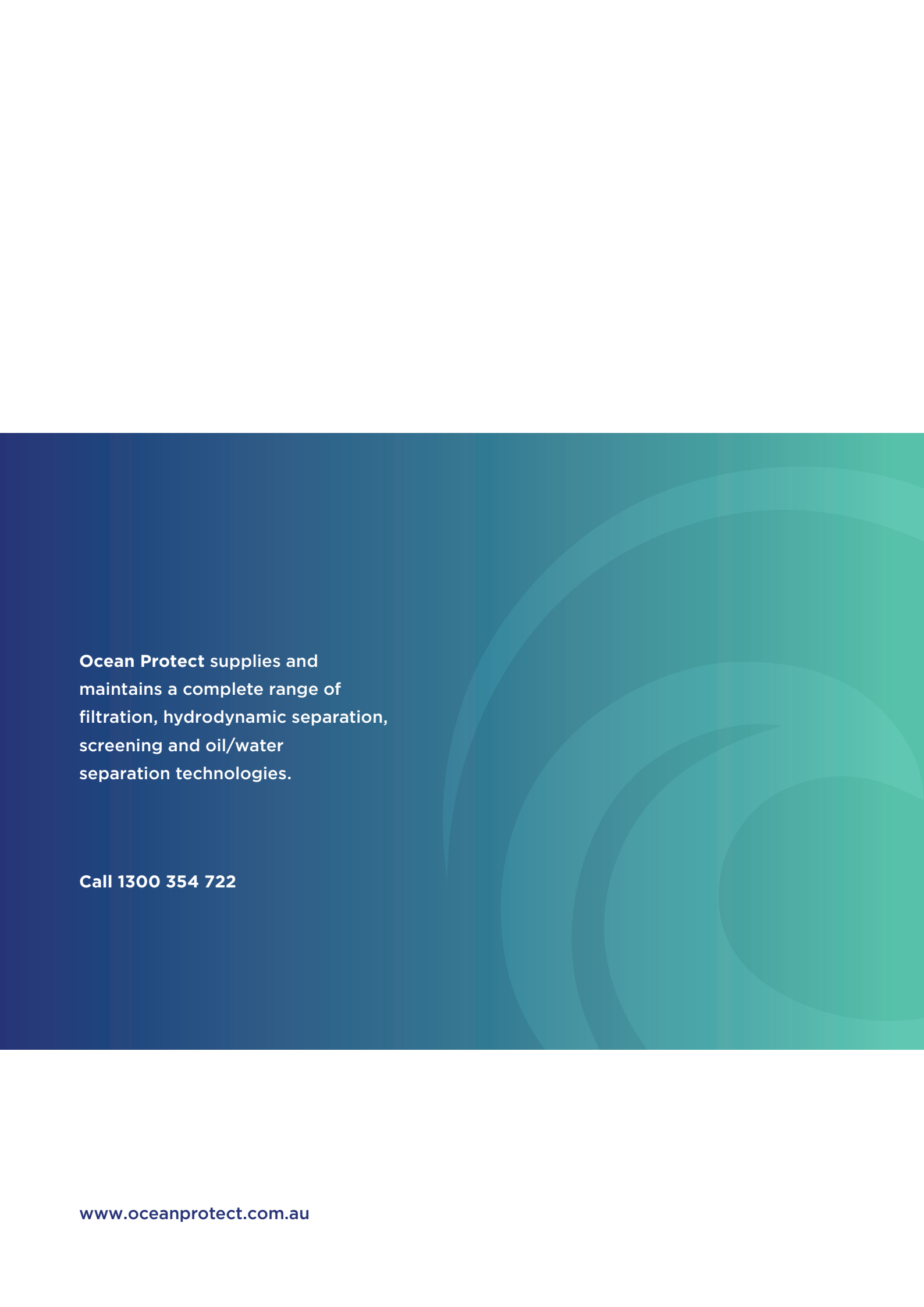
With over a decade and a half of maintenance experience, Ocean Protect has developed a systematic approach to inspecting, cleaning and maintaining a wide variety of stormwater treatment devices. Our fully trained and professional staff are familiar with the characteristics of each type of system, and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





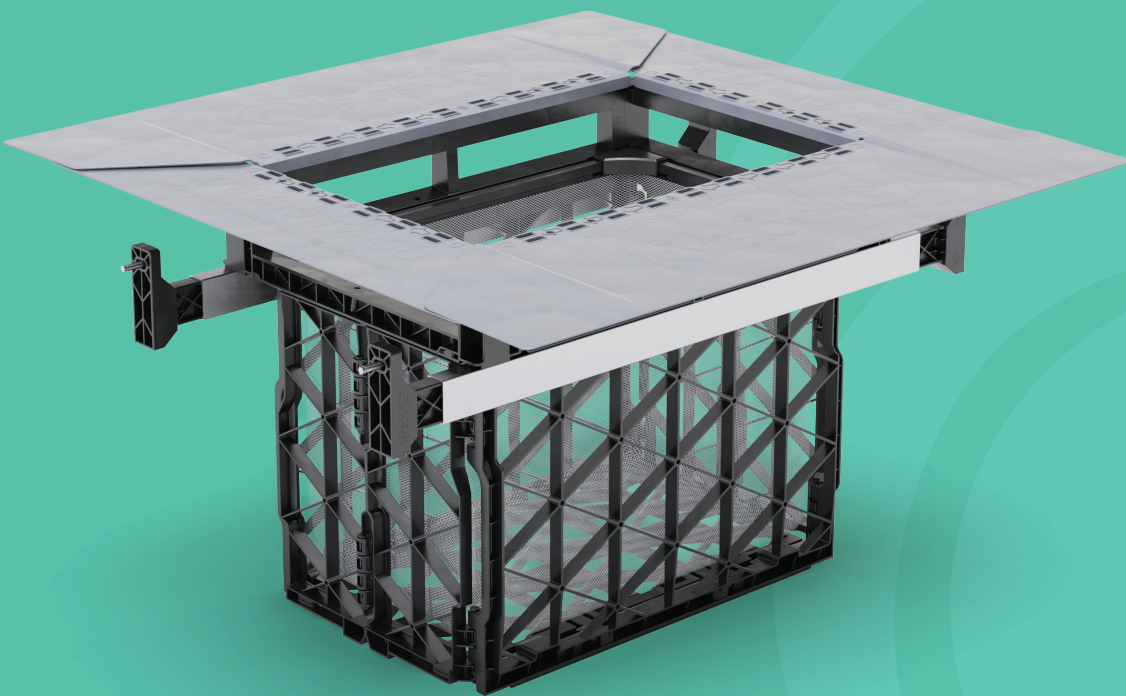
Ocean Protect supplies and maintains a complete range of filtration, hydrodynamic separation, screening and oil/water separation technologies.

Call 1300 354 722

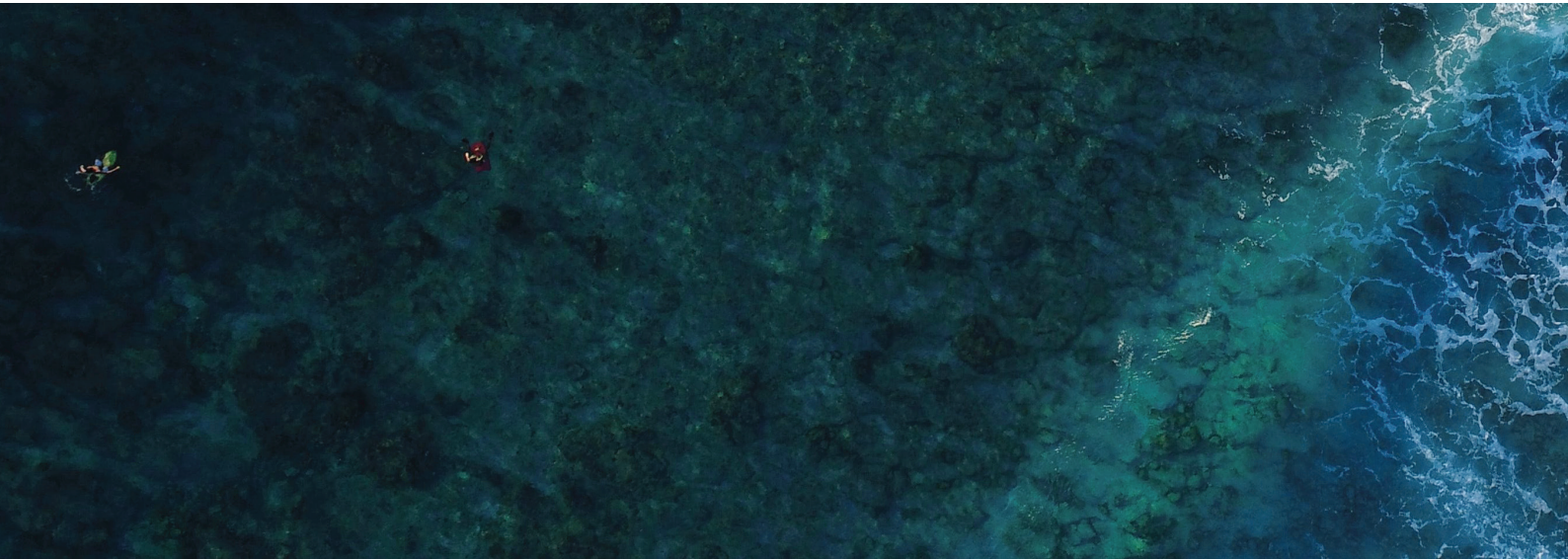
ENCLOSURE 3
OCEANGUARD OPERATION AND MAINTENANCE MANUAL

OceanGuard®

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 OceanGuard® as recommended by the manufacturer (Ocean Protect).

The OceanGuard® technology is a gully pit basket designed to fit within new and existing gully pits to remove pollution from stormwater runoff. The system has a choice of filtration liners, designed to remove gross pollutants, solids, and other attached pollutants as either a standalone technology or as part of a 'treatment train' (e.g. with StormFilter®, Jellyfish® or biofiltration). OceanGuards are highly effective, easy to install and simple to maintain.

Stormwater professionals should note that Ocean Protect is not permitted to supply OceanGuard® technologies to provide pre-treatment to proprietary stormwater treatment assets that are not provided by Ocean Protect.

Why do I need to perform maintenance?

Adhering to the inspection and maintenance schedule of any stormwater treatment device is essential to ensuring that it functions 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 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 OceanGuard®.

Health and Safety

Access to pits containing an OceanGuard® typically requires removing (heavy) access covers/grates, but typically it is not necessary to enter into a confined space. Pollutants collected by the OceanGuard® 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 sharp objects such as broken glass and syringes. For these reasons, there should be no primary contact with the waste collect and all aspects of maintaining and cleaning your OceanGuard® 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 OceanGuard®, 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.

The OceanGuard® is designed to be maintained from surface level, without the need to enter the pit. However depending on the installation configuration, location and site specific maintenance requirements it may be necessary to enter a confined space occasionally. 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.

How does it work?

OceanGuard® is designed to intercept stormwater as it enters the stormwater pits throughout a site. The OceanGuard® has diversion panels that sit flush with the pit walls, this ensures that as stormwater enters at the top of the pit it is directed to the middle of the insert where the Filtration bag is situated. The filtration bag allows for screening to occur removing 100% of pollutants greater than the opening of the filtration material (200micron, 1600micron bags available).

During larger rain events the large flows overflow slots in the flow diverter of the OceanGuard® ensure that the conveyance of stormwater is not impeded thus eliminating the potential for surface flooding. As the flow subsides, the captured pollutants are held in the OceanGuard® filtration bag. The waste then starts to dry which reduces the magnitude of organic material decomposition transitioning between maintenance intervals.

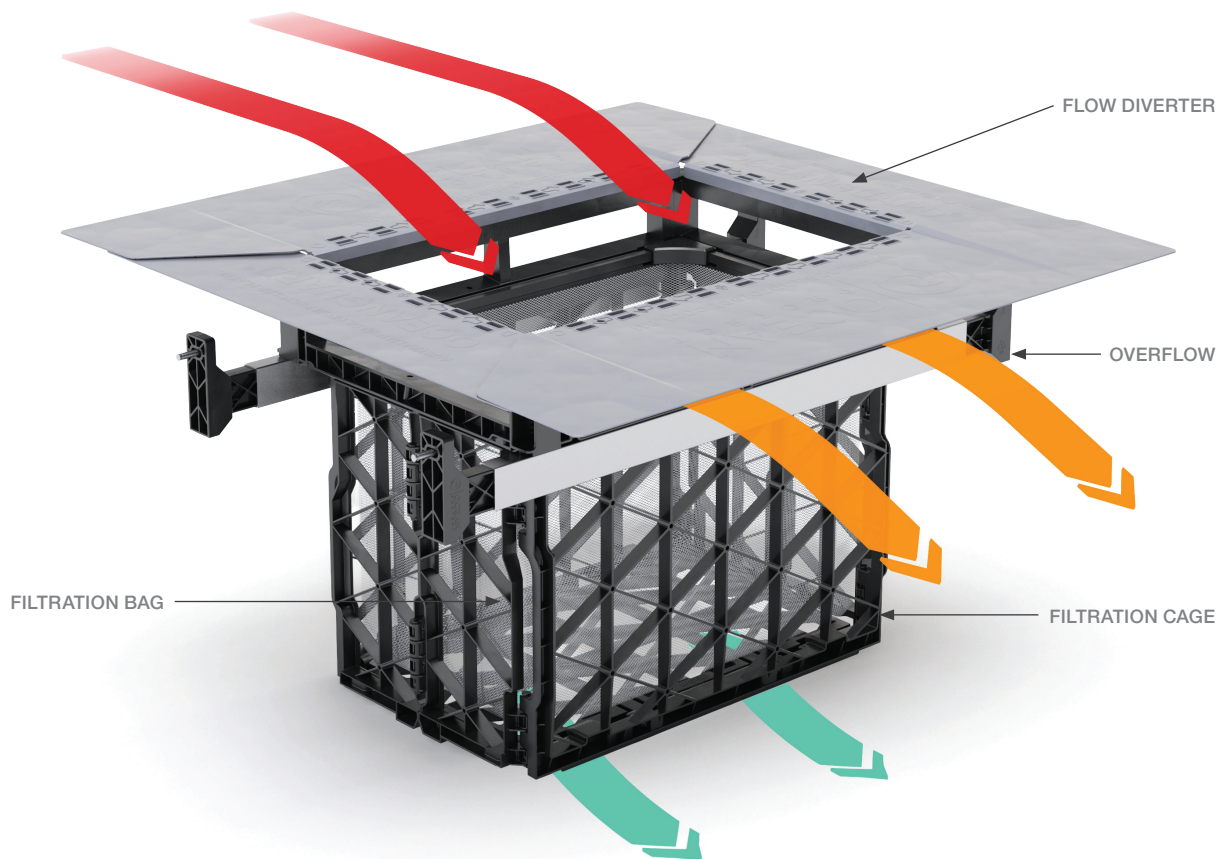


Figure 1: OceanGuard® components

Maintenance Procedures

To ensure that each OceanGuard® achieves optimal performance, it is advisable that regular maintenance is performed. The OceanGuard® requires 1-6 minor services annually (3 to 4 typical). Pending the outcome of these inspections, additional maintenance servicing may be required.

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 OceanGuard®.

Service Type	Description of Typical Activities	Frequency
Minor Service	Filter bag inspection and evaluation Removal of capture pollutants Disposal of material	1-6 Times Annually
Major Service	Filter Bag Replacement Support frame rectification	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 return the OceanGuard® back to optimal operating performance. This type of service can be undertaken either by hand or with the assistance of a Vacuum unit.

Hand Maintenance

- 1 Establish a safe working area around the OceanGuard®
- 2 Remove access cover/grate
- 3 Use two lifting hooks to remove the filtration bag
- 4 Empty the contents of the filtration bag into a disposal container
- 5 Inspect and evaluate the filtration bag
- 6 Inspect and evaluate remaining OceanGuard® components (i.e. flow diverter, filtration cage and supporting frame)
- 7 Rejuvenate filtration bag by removing pollutant build up with a stiff brush, additionally the filtration bag can be washed using high pressure water
- 8 Re-install filtration bag and replace access cover/grate

Vacuum Maintenance

- 1 Establish a safe working area around the OceanGuard®
- 2 Remove access cover/grate
- 3 Vacuum captured pollutants from the filtration bag
- 4 Remove filtration bag
- 5 Inspect and evaluate the filtration bag
- 6 Inspect and evaluate remaining OceanGuard® components (i.e. flow diverter, filtration cage and supporting frame)
- 7 Rejuvenate filtration bag by removing pollutant build up with a stiff brush, additionally the filtration bag can be washed using high pressure water
- 8 Re-install filtration bag and replace access cover/grate

Major Service (Filter Bag Replacement)

For the OceanGuard®, a major service is a reactionary process based on the outcomes from the minor service.

Trigger Event from Minor Service	Maintenance Action
Filtration bag inspection reveals damage	Replace the filtration bag ^[1]
Component inspection reveals damage	Perform rectification works and if necessary replace components ^[1]

^[1] Replacement filtration bags and components are available for purchase from Ocean Protect

Additional Types of Maintenance

Occasionally, 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, all OceanGuard® pits that potentially received flow should be inspected and cleaned. Specifically, all captured pollutants from within the filtration bag should be removed and disposed in accordance with any additional requirements that may relate to the type of spill event. All filtration bags should be rejuvenated (replaced if required) and re-installed.

Blockages

The OceanGuard's internal high flow bypass functionality is designed to minimise the potential of blockages/flooding and this configuration has been field proven for over twenty years. Flooding caused by an OceanGuard® style of pit basket is extremely rare and in the unlikely event that flooding occurs around the stormwater pit the following steps should be undertaken to assist in diagnosing the issue and implementing the appropriate response.

- 1 Inspect the OceanGuard® flow diverter, ensuring that they are free of debris and pollutants
- 2 Perform a minor service on the OceanGuard®
- 3 Remove the OceanGuard® to access the pit and inspect both the inlet and outlet pipes, ensuring they are free of debris and pollutants

Major Storms and Flooding

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

Disposal of Waste Materials

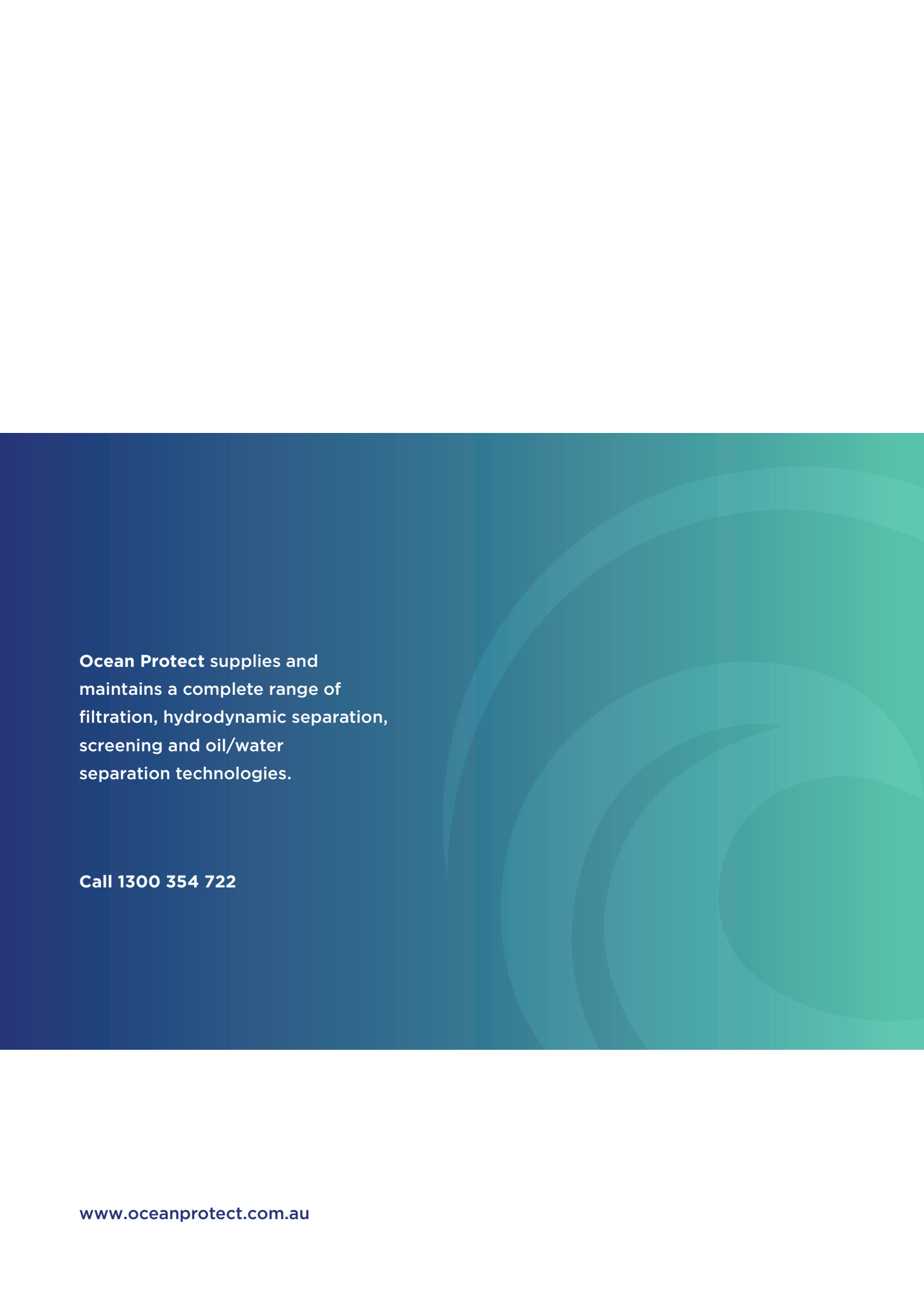
The accumulated pollutants found in the OceanGuard® must be handled and disposed of in a manner that is in accordance with all applicable waste disposal regulations. When scheduling maintenance, consideration must be made for the disposal of solid and liquid wastes. If the filtration bag has been contaminated 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 OceanGuard®, we offer long term pay-as-you-go contracts, pre-paid once off servicing and replacement filter bags.

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



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

Call 1300 354 722