Best practice design & management of the OceanSave GPT

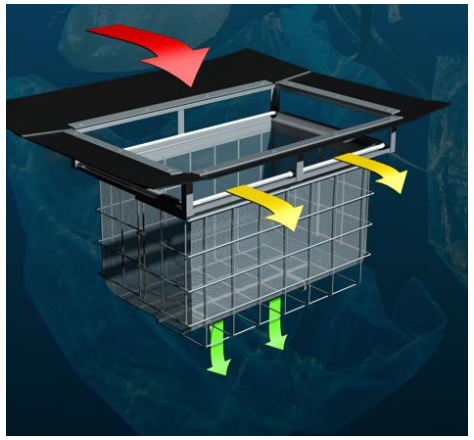
Ocean Protect Webinar
30 September 2021

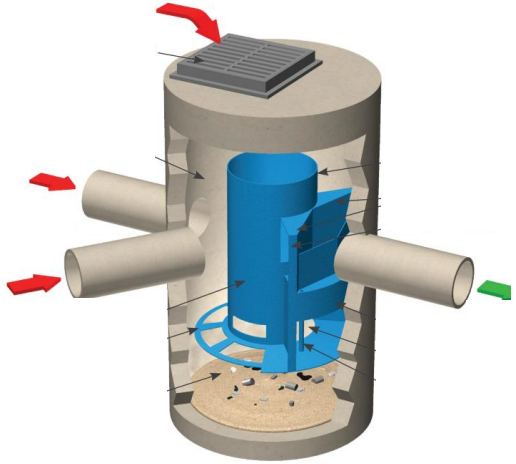
Damien Egan & Daniel Page

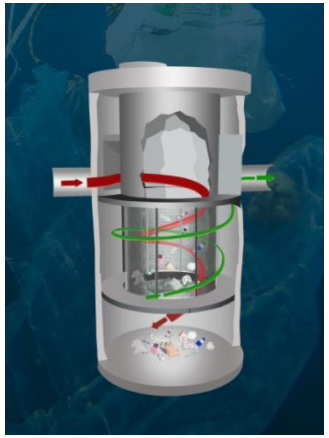
OCEAN PROTECT

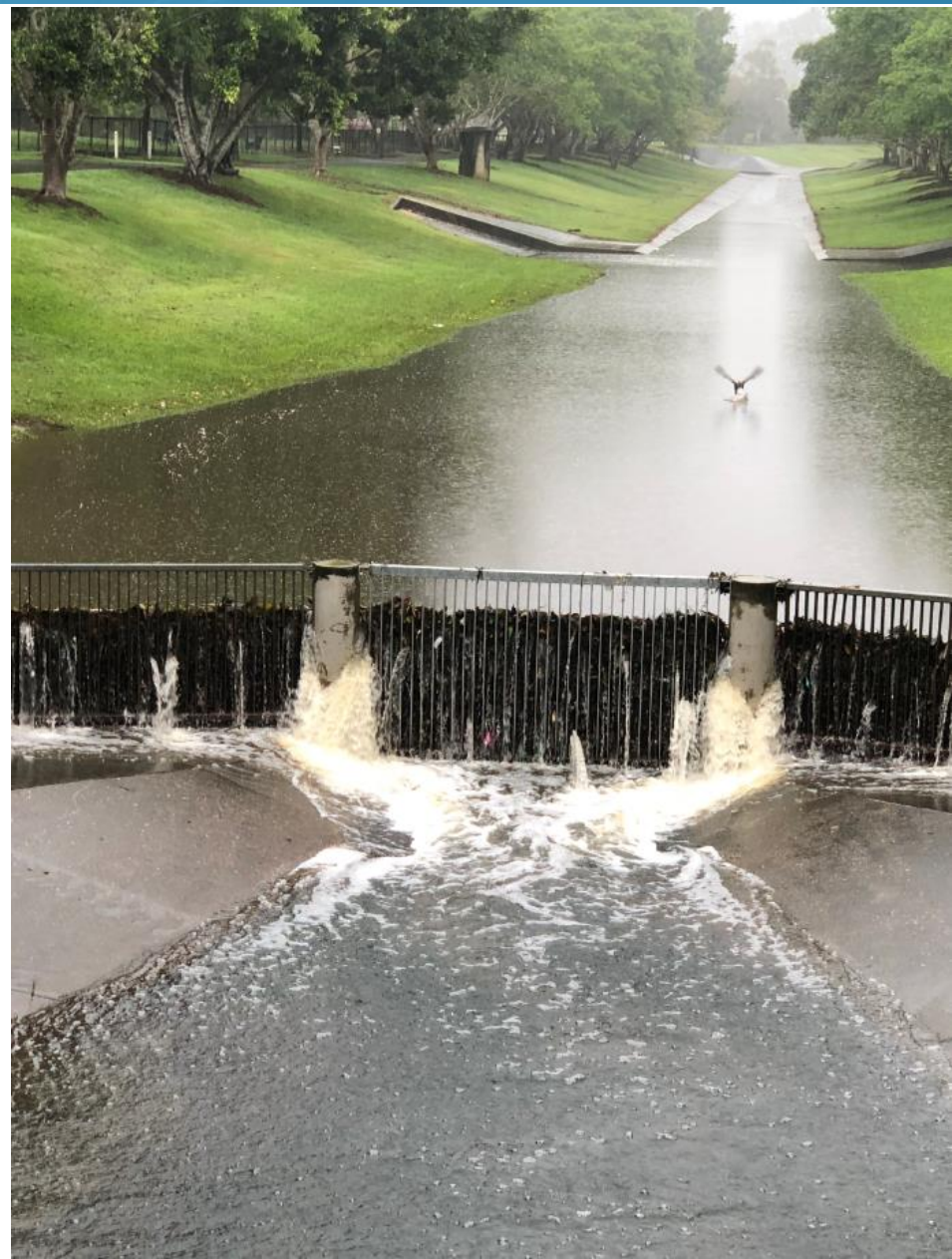
Previous (November 2020) webinar:

- History of GPTs
- Types of GPTs
- Performance
- Key design considerations









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How is the OceanSave different to other GPTs?

Oils ain’t Oils ?

GPTs ain’t GPTs.

There is Five GPT categories

2010 Stormwater Industry Association

- Gravity Separators
- Direct Screens
- Hydrodynamic Separators
- Indirect Screens
- Others or Combinations

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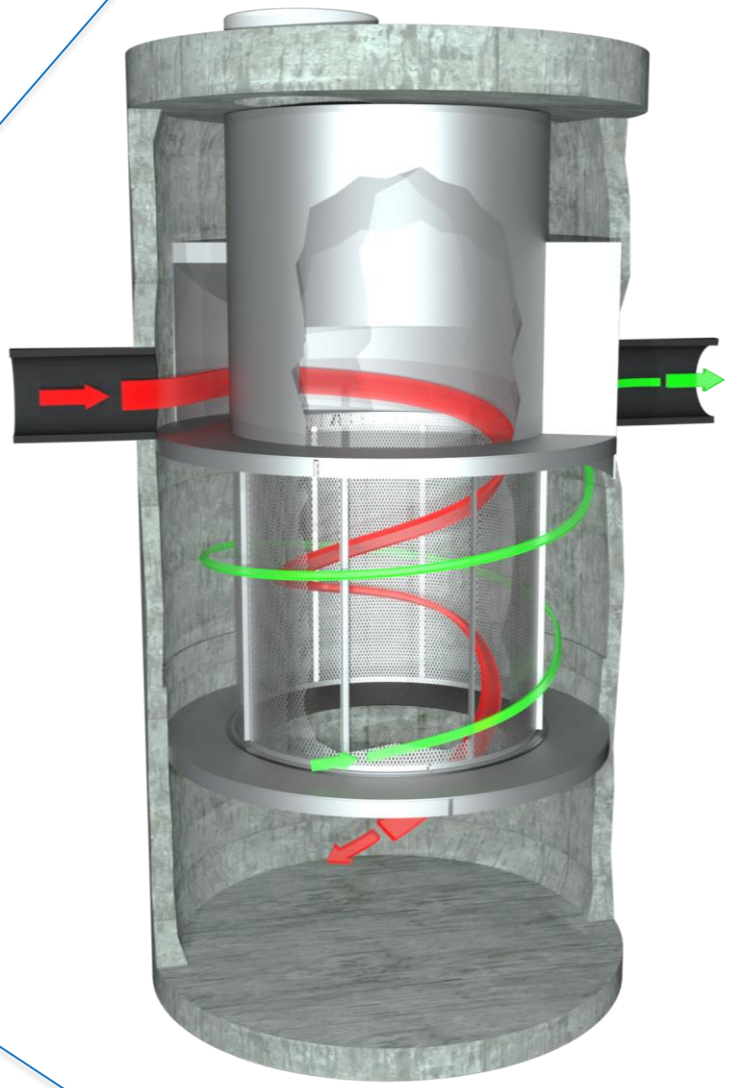
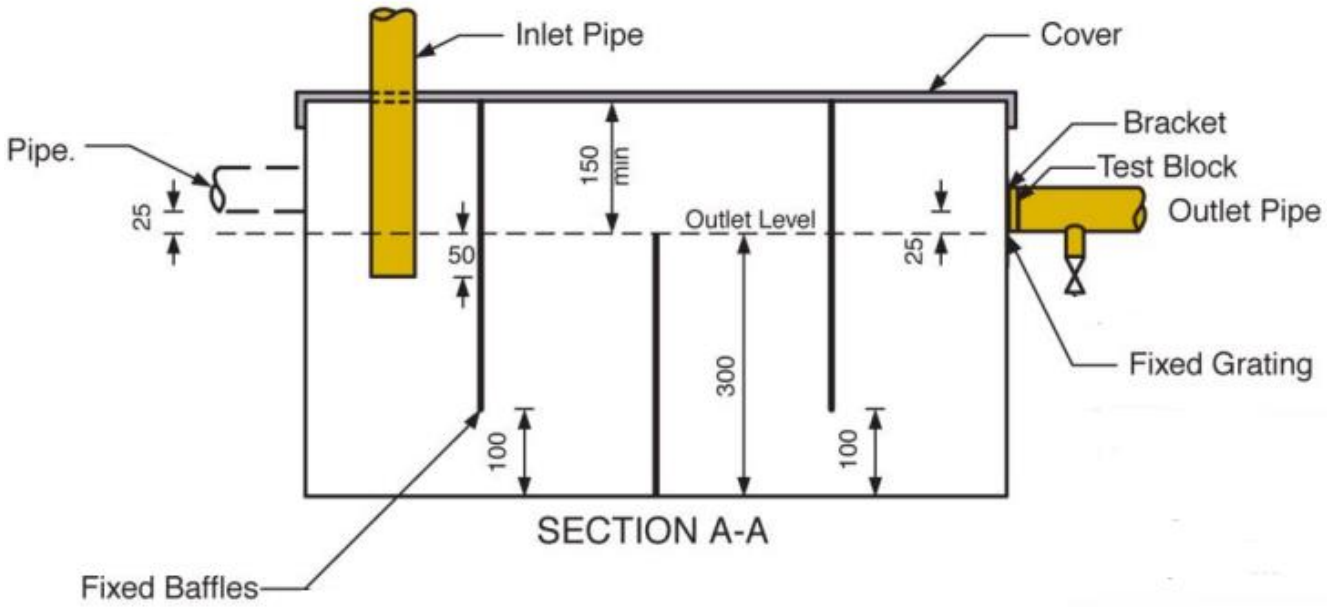


GPTs ain’t GPTs.

Gravity Separators



Source: Victorian Building Authority 2014

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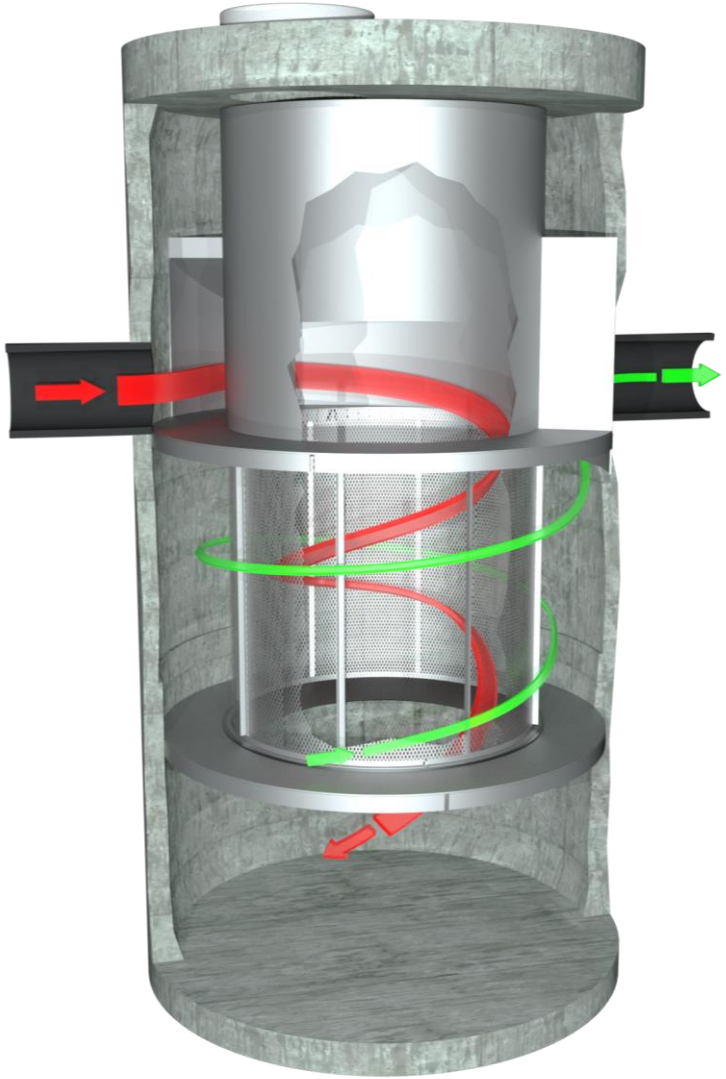

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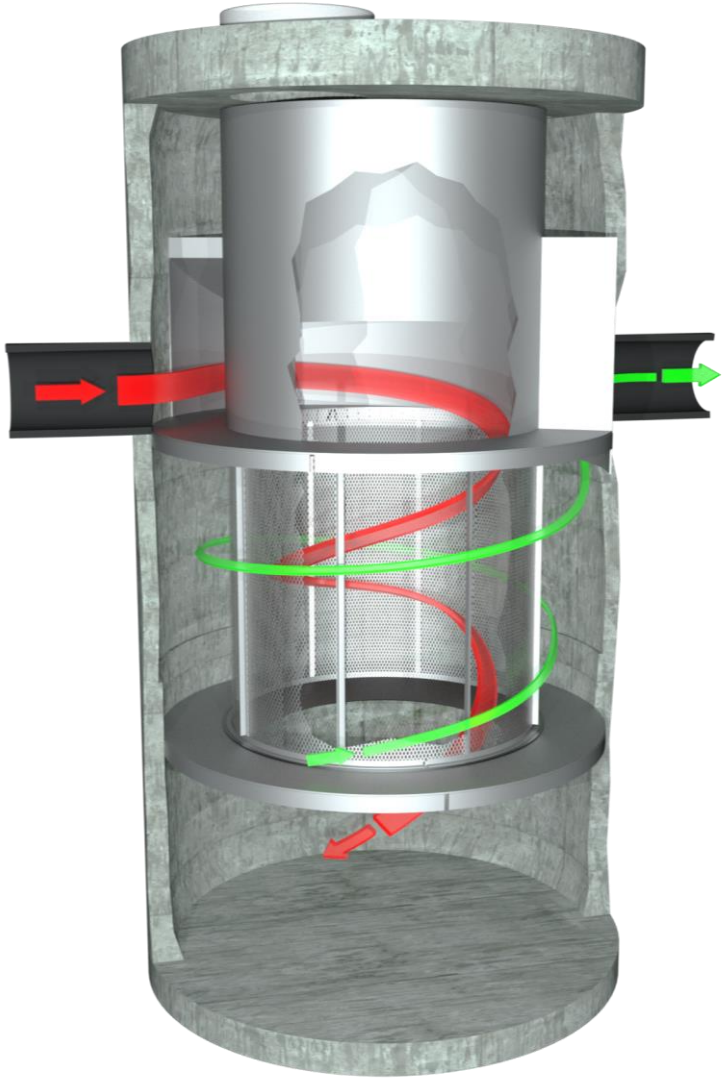

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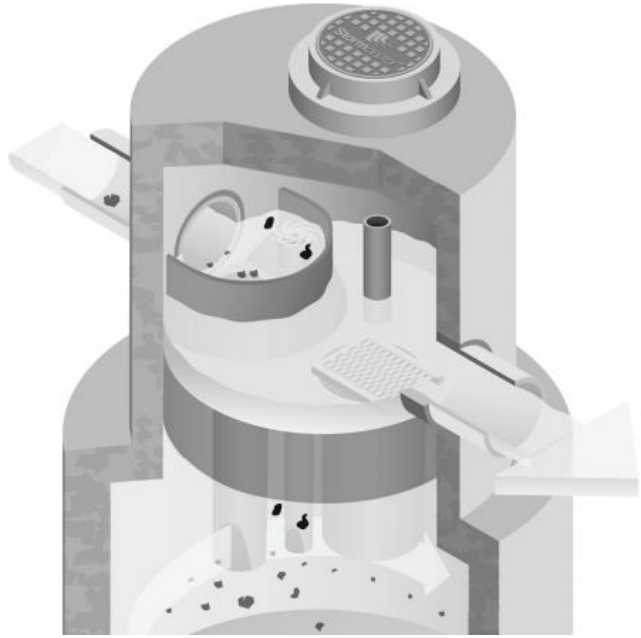
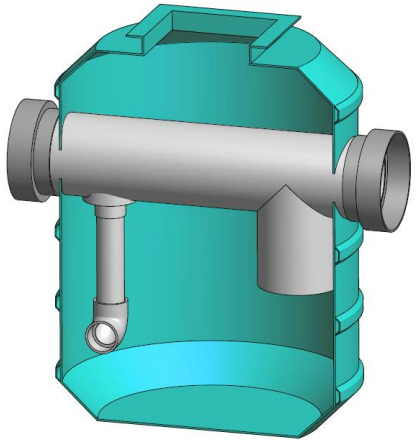
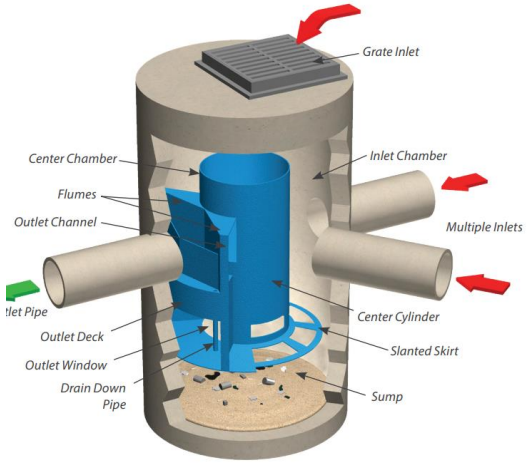


Hydrodynamic separators



Source: SP11-10200 SPEL



Source: Contech USA

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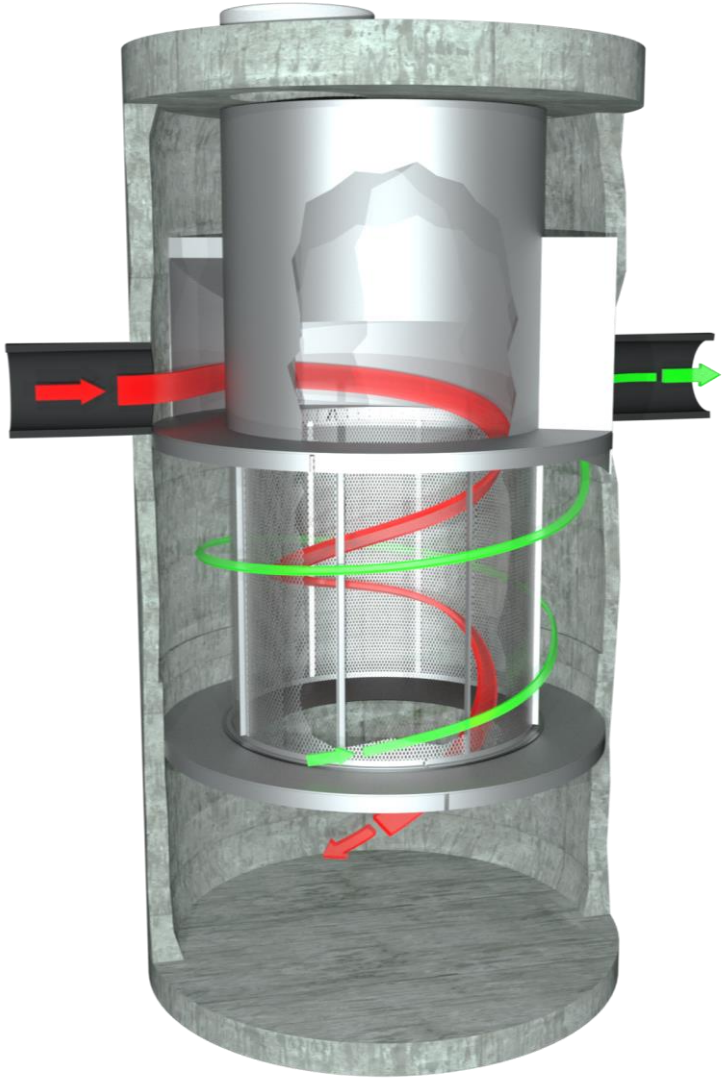

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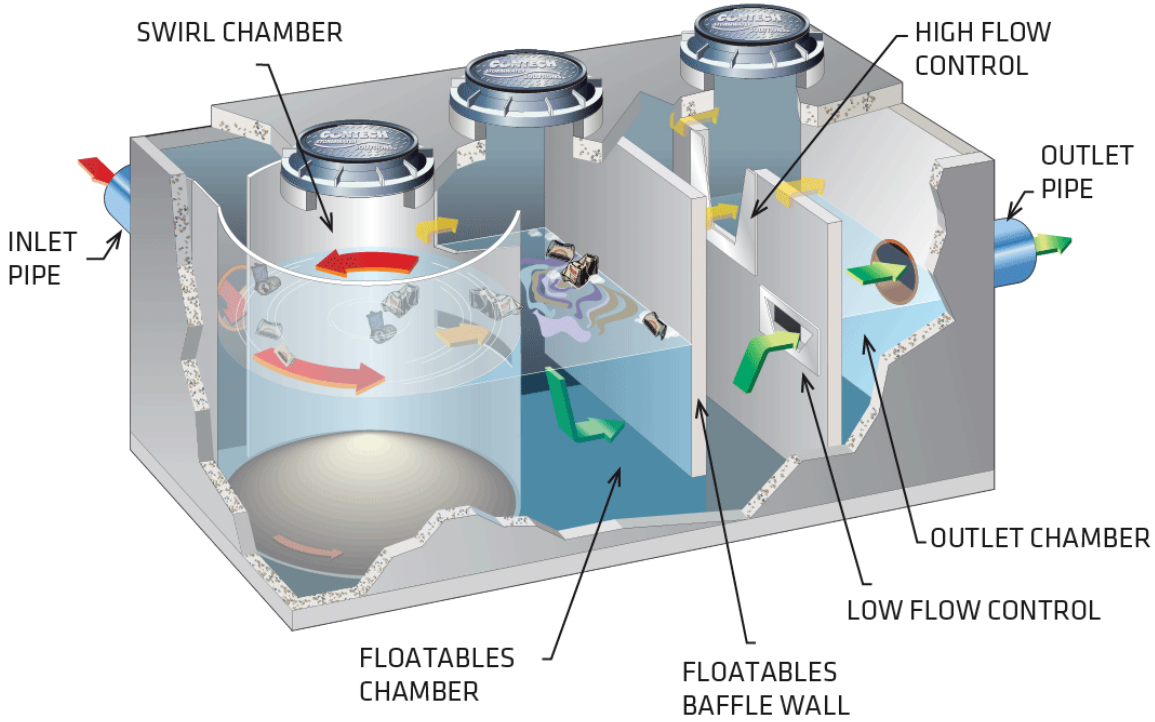
Others or Combinations



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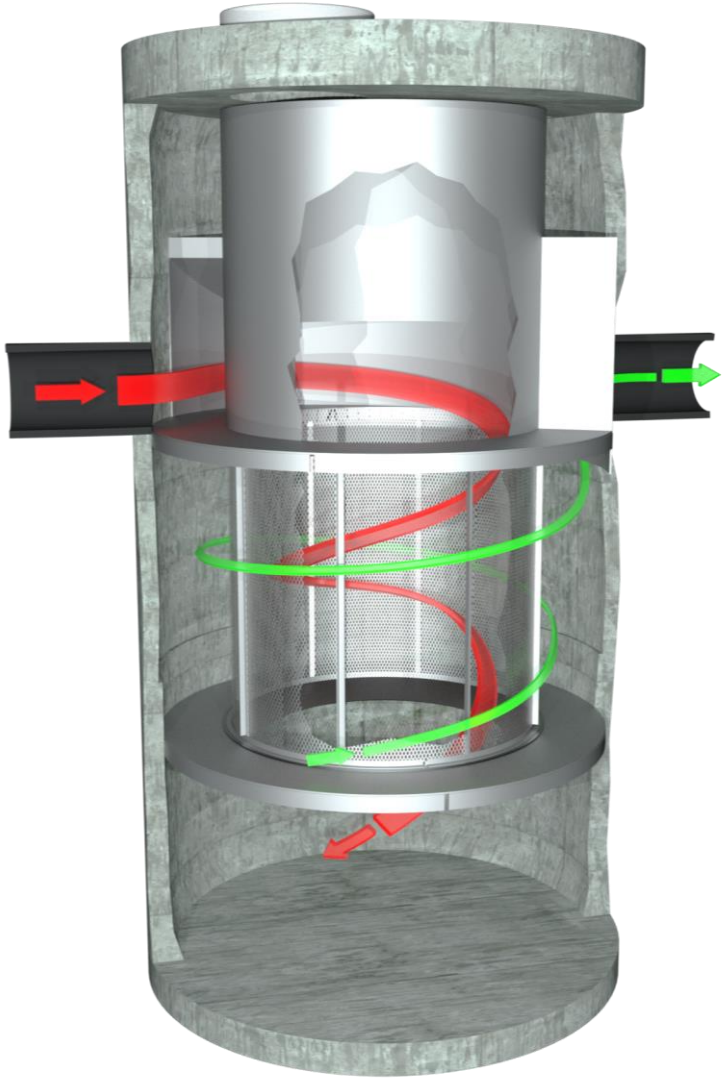

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Continuous deflective separation (devices that combine a vortex/hydrodynamic separation with a non-blocking screening system)

Equivalence

Indirect Screens

Continuous deflective separation (devices that combine a vortex/hydrodynamic separation with a non-blocking screening system)


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A review of the application of OceanSave® in Australia

Date: June 2021

Appendix A Letter describing equivalence of OceanSave® relative to the CDS® Unit

This appendix provides a letter from Lars Herngren, (19 June 2020) describing the equivalence of OceanSave® technology to the CDS® unit.

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Shell Cove on

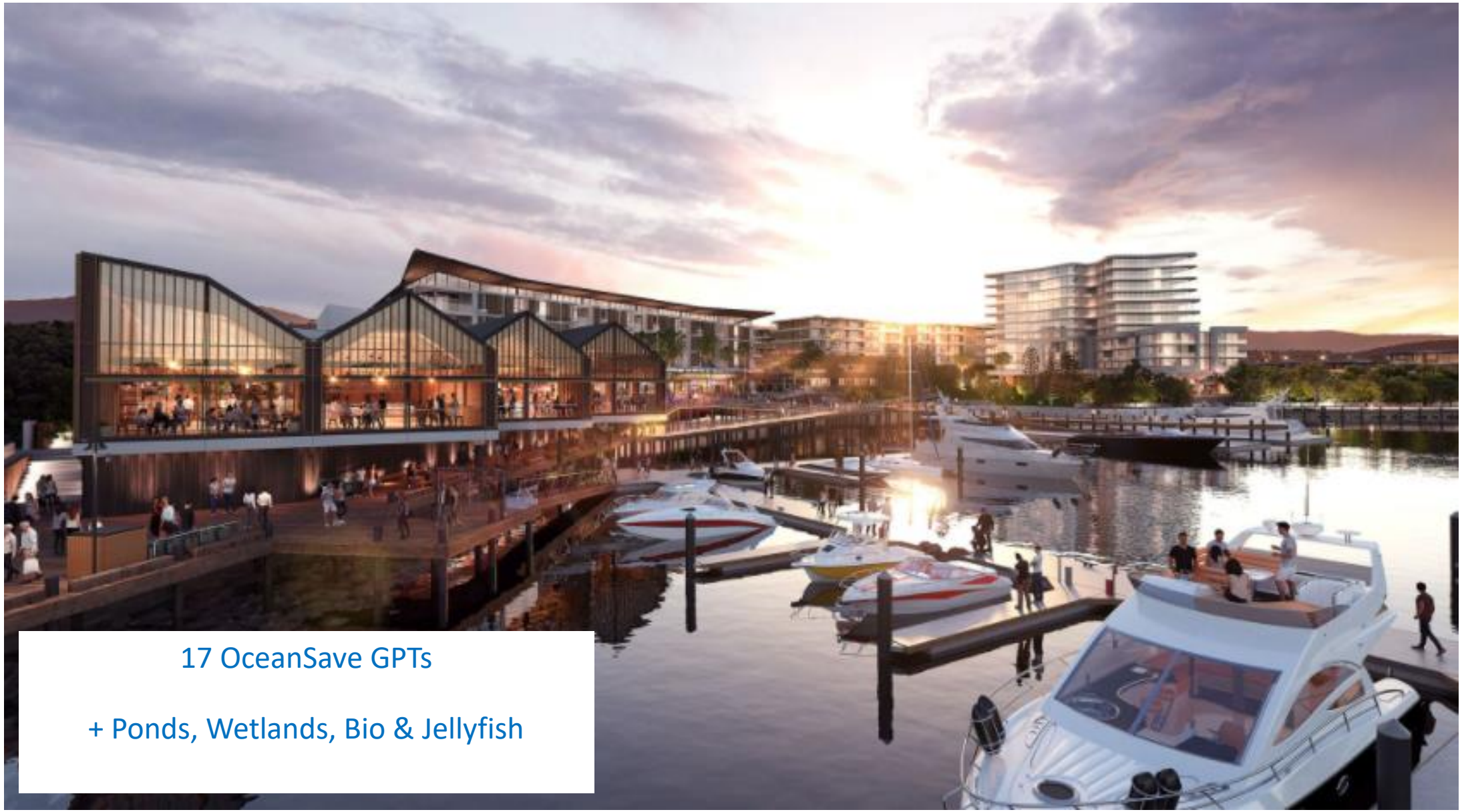
THE WATERFRONT
SHELL COVE

Shellharbour CITY COUNCIL

FRASERS PROPERTY

OCEAN PROTECT

OCEAN PROTECT



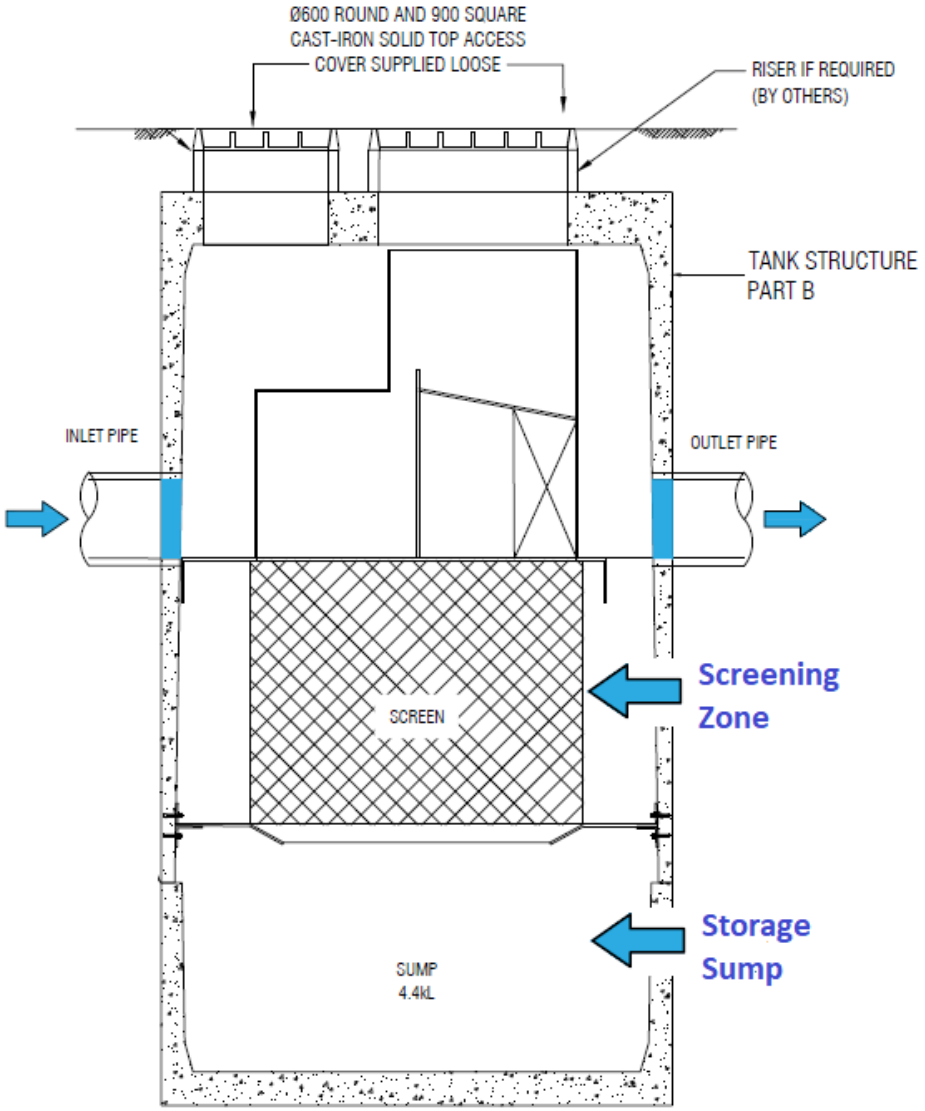
17 OceanSave GPTs

+ Ponds, Wetlands, Bio & Jellyfish

What is an OceanSave GPT ?

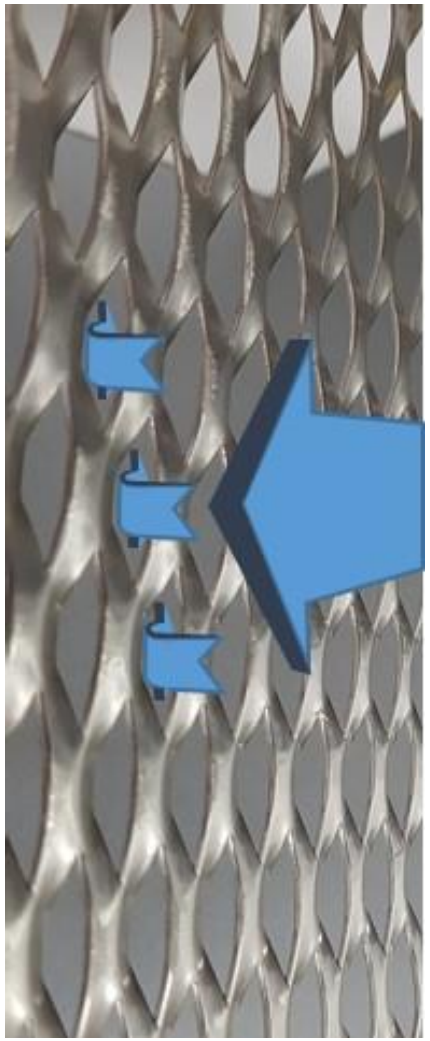
Overview

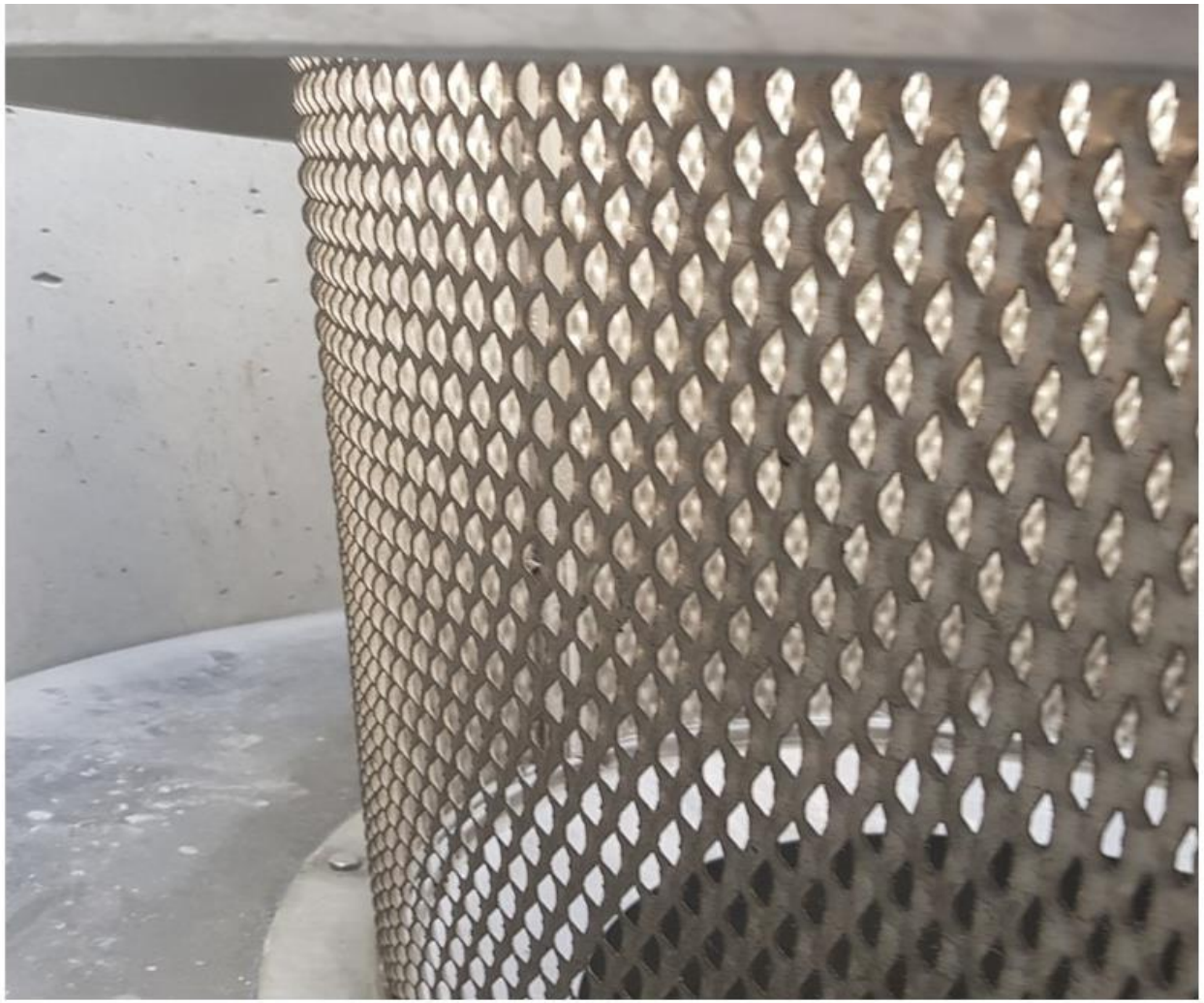
- A durable & strong concrete cylindrical tank
- A special cylindrical screen and inlet flume
- A separate screening zone
- A separate pollution storage sump
- A high performance GPT
- An easy to clean GPT
- Designed to protect the environment



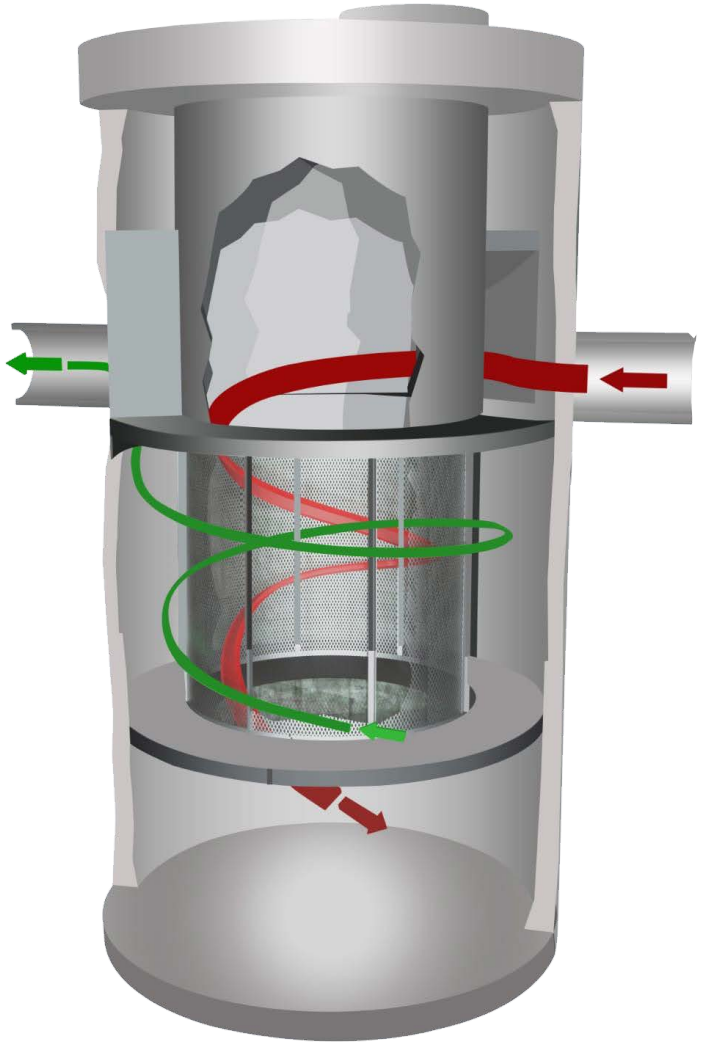
OCEANSAVE SECTION

The Screen

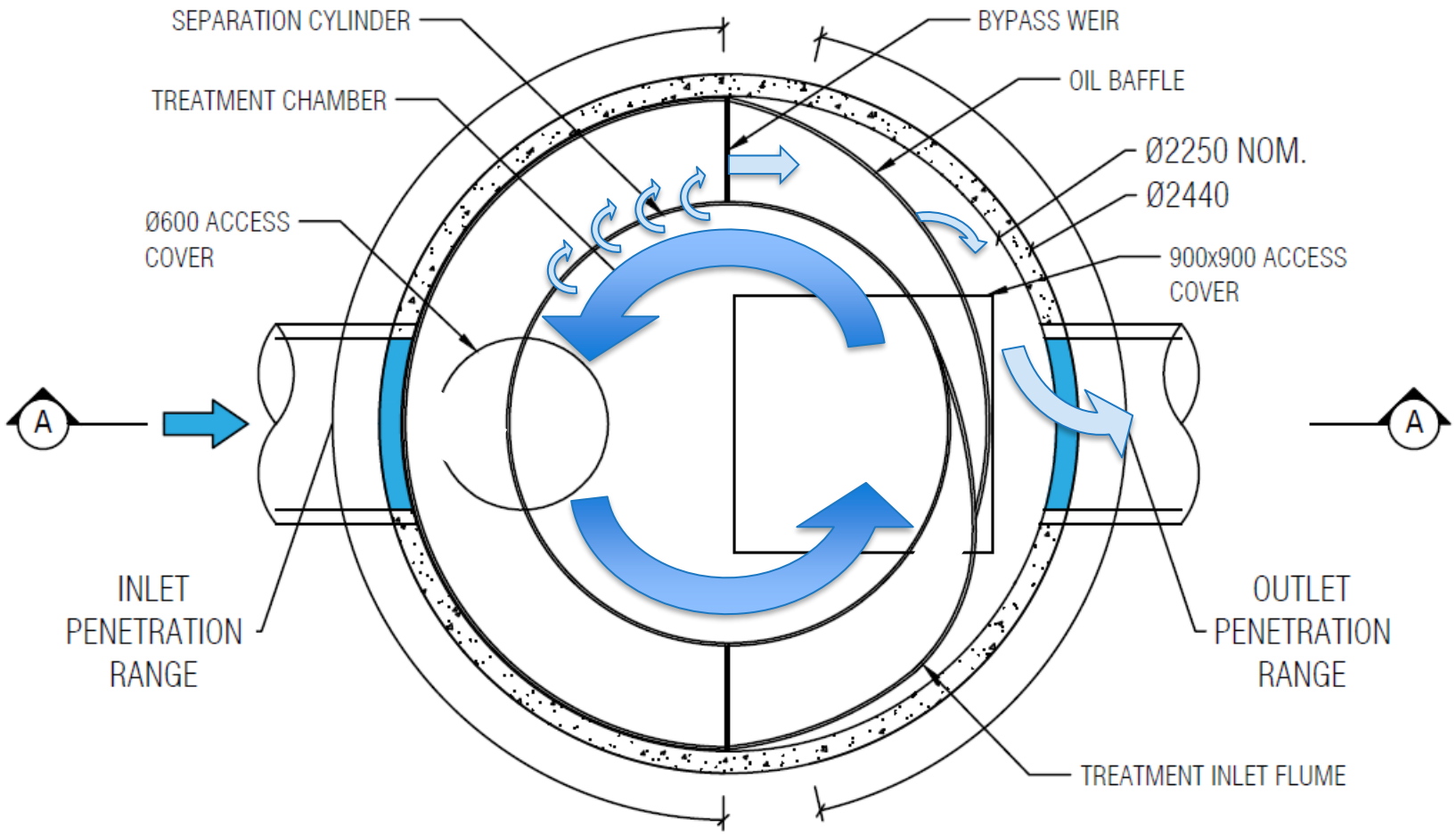




Indirect screening technology



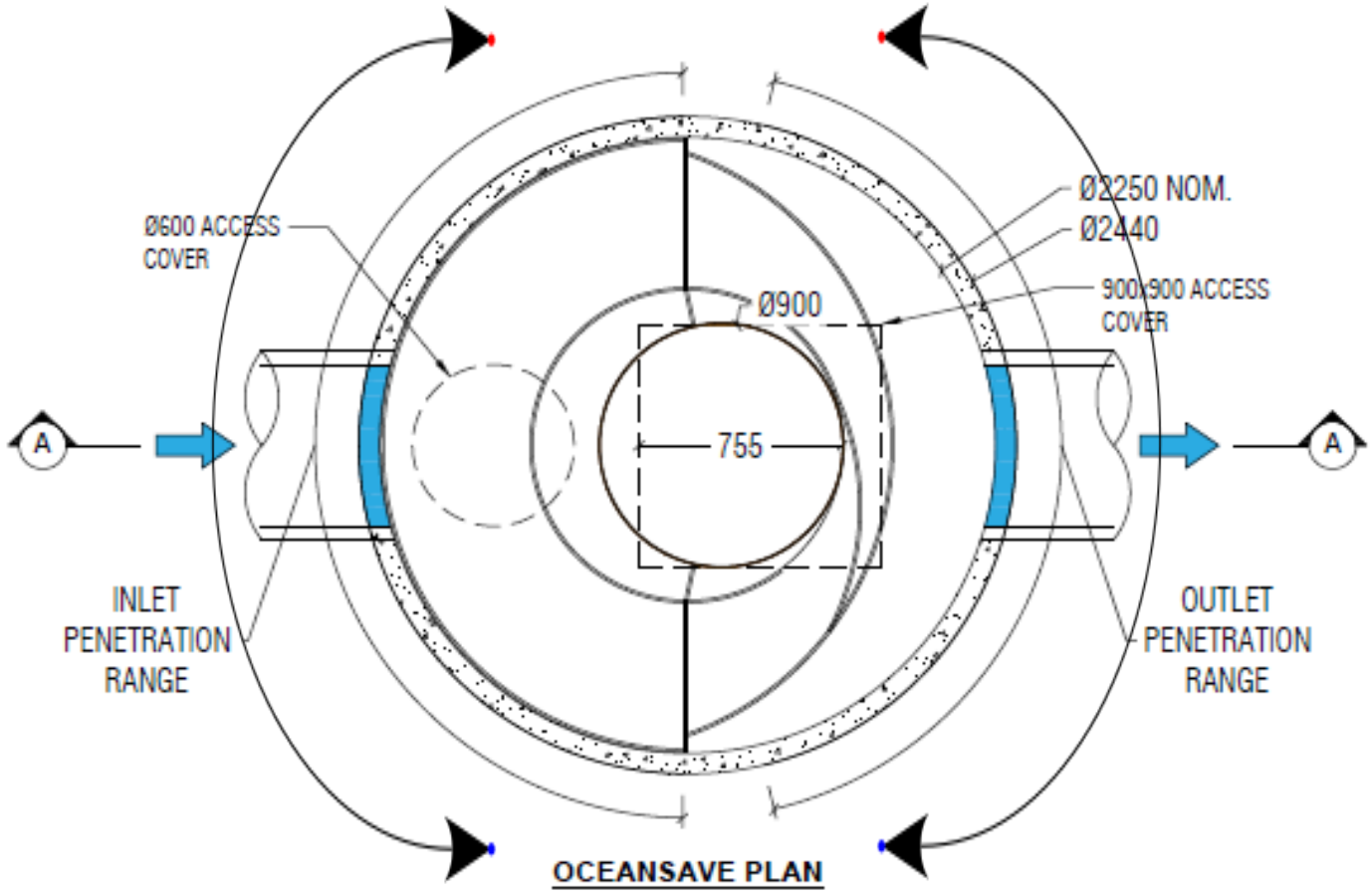
Multiple Inlets or Outlets, at Varying Heights



OCEANSAVE PLAN

Unique advantages

- Flow splitting
- Can be used as a junction pit



Unique advantages

- On-line or Off-line available for each model

Online – all models

Unique advantages

- Minimal number of components

Unique advantages

Unique advantages

- Minimal number of components

Unique advantages

- Minimal number of components

Performance

Performance

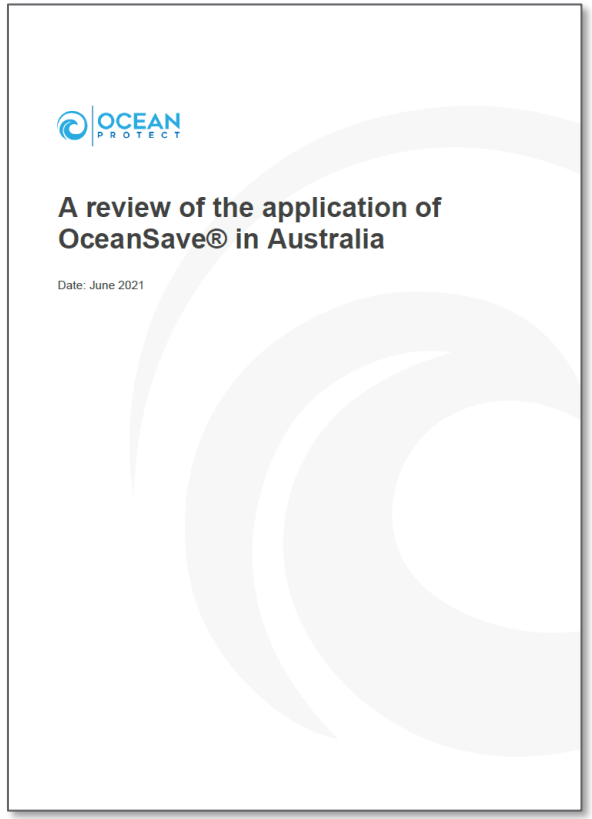


Table 3-1 OceanSave® Treatment Performance Accepted by Majority of Councils within Australia

Pollutant	Predicted removal efficiency (%)[1]	References[2]
Gross pollutants	• 100%	• Based on Allison et al (1998), Walker et al (1999) and high rates of sediment removal observed in other studies.
Total suspended solids	• 70%	• Based on Walker et al (1999), noting MUSIC modelling guidelines (Water by Design 2010, BMT WBM 2015, eWater 2016) recommend applying a storm event mean concentration of 269 to 270mg/L.
Total phosphorus	• 30%	• Based on Walker et al (1999)
Total nitrogen	• 0%	• Based on Walker et al (1999) and Birch et al (2009)

1: Removal up to design flow rate (refer to Technical Design Guide in Appendix B). All flows greater than this flow rate are assumed to be receive zero pollutant removal.

2: References are summarised in Table 2-1 and Table 2-2.

Key design considerations

Literature Review on Performance Testing Approaches for Gross Pollutant Traps

Luis Neumann and Ashok Sharma

Report to Stormwater Industry Association

2010

The performance, operation and maintenance requirements of Gross Pollutant Traps (GPTs) are determined by individual design characteristics, catchment characteristics and stormwater composition. Design, function and the degree of sophistication of GPTs varies widely, ranging from simpler capture baskets to highly engineered models. The selection of GPTs for a particular site takes several factors in consideration, such as (Wong *et al.* 2000; Engineers Australia 2006)

- Location and layout
- Design, bypass flow and operation at above design flow
- Pollutant removal efficiency
- Pollutant load
- Maintenance costs and life cycle assessment

Selecting and sizing a GPT in 2020 should not be based ONLY on the size of the stormwater pipe

Maintenance

Managing Urban Stormwater: Source Control

December 1998

All stormwater treatment measures (STM) require maintenance to ensure their pollutant removal efficiency does not reduce over time. The actual maintenance activities and frequency of maintenance will vary with the type of STM and the catchment characteristics. This is discussed further in *Managing Urban Stormwater: Treatment Techniques*. There are difficulties associated with predicting the frequency of maintenance, with a monitoring program being an appropriate method for designing a maintenance schedule.

Maintenance

STORMWATER NEW SOUTH WALES

HOME EVENTS NEWS RESOURCES

OPERATIONS AND MAINTENANCE MANUAL 2020

Home

Stormwater NSW Guidelines for Maintenance of Stormwater Treatment Measures

About the Guidelines

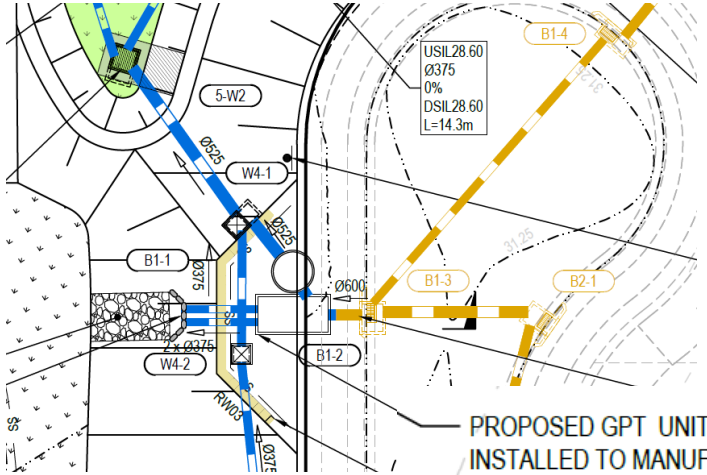
Stormwater quality improvement measures are an essential component of our stormwater infrastructure to protect environmental, recreational and economic values of our waterways.

The Guidelines will assist **Asset Managers** to plan, tender and implement routine maintenance for stormwater treatment measures.

It will also provide guidance to **Cleaning Contractors** on how to maintain each type of stormwater treatment measure. Concise explanations of maintenance tasks for each stormwater measure are provided.

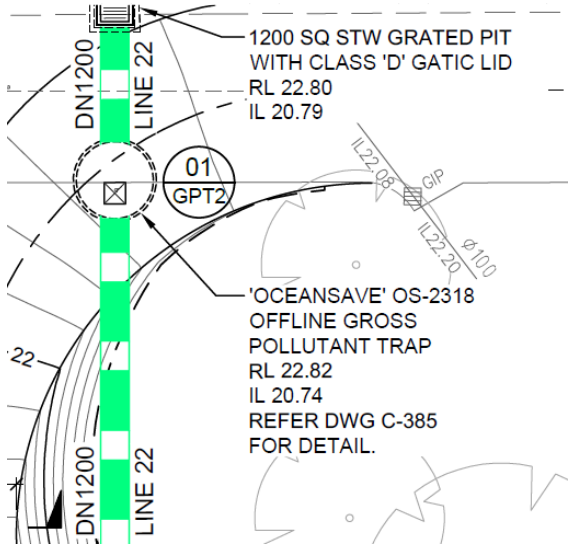
Model selection

- We are here to help - call us

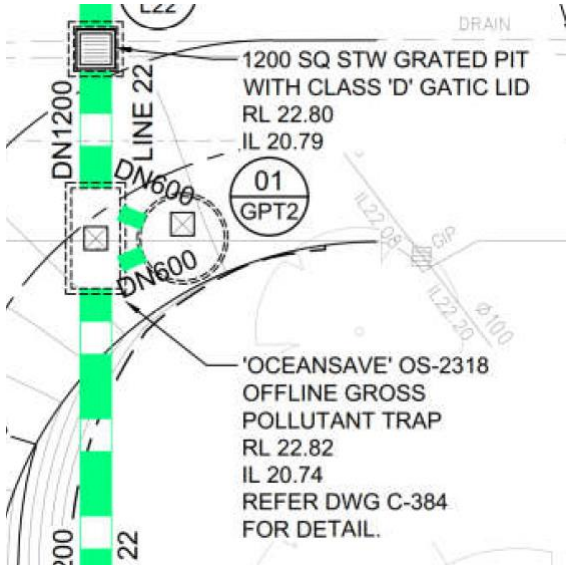


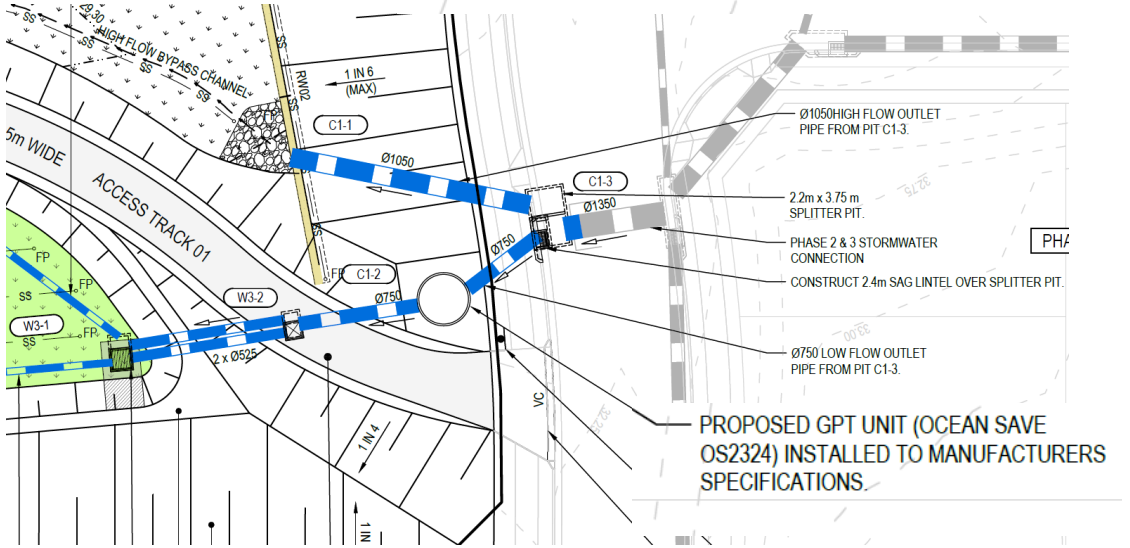
Flow split to Bio-retention

Inline



Offline





Summary

- Best practice GPT
- Captures a wide range of pollutants
- Indirect screening using self cleaning screens
- Flexibility in number, orientation & location of inlets and outlets
- On-line and off-line models
- Minimal components (& installation savings)

GPTs ain't GPTs.

Supplementary note on concrete

- The OceanSave GPT is manufactured from a precast concrete cylindrical tank to Australian Standards.
- At this webinar a question, was asked regarding the design durability life of precast concrete. There is literally a mountain of information regarding the most common building product in the world, so it is difficult to know where to start to describe the incredible history and longevity of concrete. We would refer any interested party to the reference organisations listed at the end of this section.
- Concrete is, quite literally, the foundation upon which our modern societies and economies are built. Without concrete and its constituent parts – sand, aggregate and cement – we would not have the roads, footpaths, bridges, schools, hospitals, homes and workplaces we take for granted. In fact, a life without concrete is unimaginable. Next to water, it is the most consumed substance on the planet.
- Over 24 billion cubic metres of concrete is used per annum Worldwide, first used in 5600 BC, with the first recorded modern use of concrete in 1700's and the first patent on Portland cement in 1824. Civil engineers all agree that Roman concrete and its 2000-year-old construction techniques continue to stand the test of time for durability and strength, structural design and ingenuity.
- In Australia 2008/09, the concrete industry supplied close to 24 million cubic metres of concrete – enough to build 293 Eureka Towers or three-quarters of a million house floor slabs. The industry directly and indirectly employs nearly 100,000 Australians. It contributes nearly $12 billion to Australia's GDP.
- In Australia, two of the earliest examples of concrete construction are the Lamington Bridge at Maryborough, Queensland, and a sewage aqueduct at Forest Lodge, NSW – both dating from 1896. Since then concrete has gone through many development phases, resulting in the product we know today.
- References (due to shear volume of organisations, research and references related to concrete we have listed only some here):
    - AS3600:2018
    - Cement Concrete & Aggregates Australia (CCAA), https://www.ccaa.com.au
    - Concrete Institute of Australia, https://www.concreteinstitute.com.au
    - Institute of Engineers Australia, https://www.engineersaustralia.org.au
    - The Institute of Public Works Engineering Australasia (IPWEA), https://www.ipwea.org/home
    - National Precast Concrete Association of Australia, https://nationalprecast.com.au
    - National Precast Concrete Association, https://precast.org
    - CSIRO, www.csiro.au
    - 'Australian Concrete Technology'
    - The Portland Cement Association, https://www.cement.org

Thankyou

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