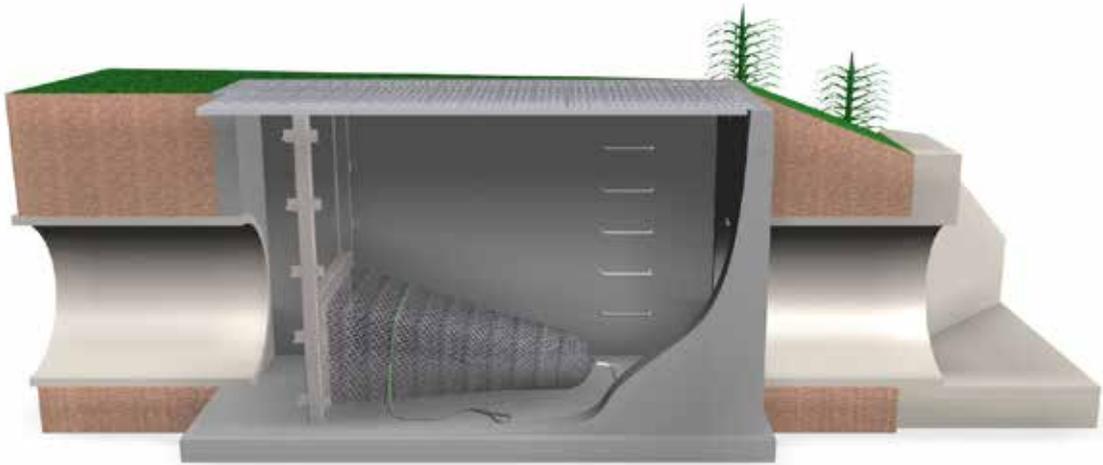


# Ecosol™ Net Guard Technical Specification



environmentally engineered  
for a better future

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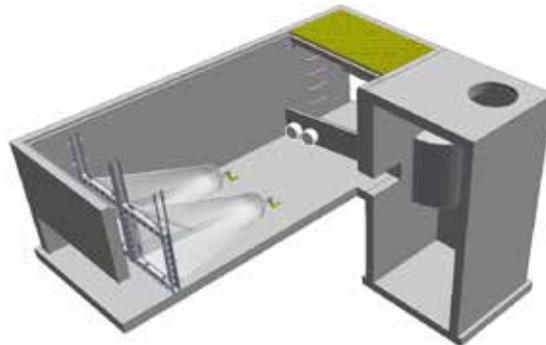
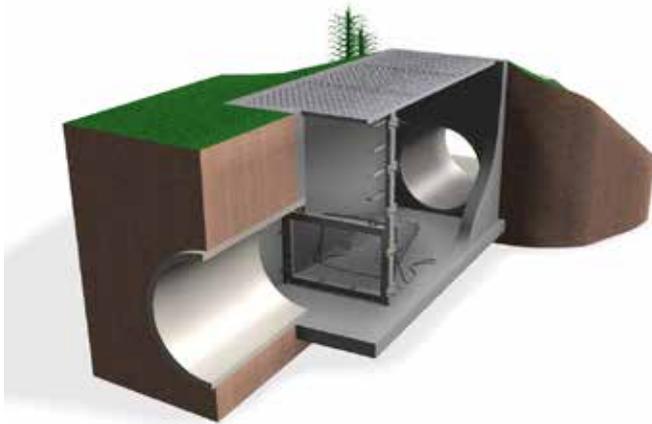
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## 1.0 Introduction

Increasingly stringent environmental best management practice requires planners and developers to apply a fit-for-purpose treatment train approach to stormwater treatment to achieve today's water quality objectives (WQO's). An integral element to any good WSUD is primary treatment or pre-screening of stormwater flows to remove coarse sediment and gross pollutants prior to downstream secondary or tertiary treatment systems such as wetlands.

The Ecosol™ Net Guard provides effective primary treatment of stormwater flows thereby significantly enhancing the operational life of downstream secondary and tertiary treatment systems.



The system has been designed to provide a robust and durable cost effective in-line primary treatment system that captures and retains solid pollutants conveyed in stormwater conduits.

In developing this innovative stormwater treatment system careful consideration has been given to durability, longevity, cost, and maintainability. Key commercial technical features include:

- low visual impact and energy footprint;
- designed hydraulics with proven performance and longevity;
- scalable design; and
- cost effective maintenance regime.

This technical manual describes the operation and performance characteristics of the system.

## 1.1 How and Why the Ecosol™ Net Guard Works

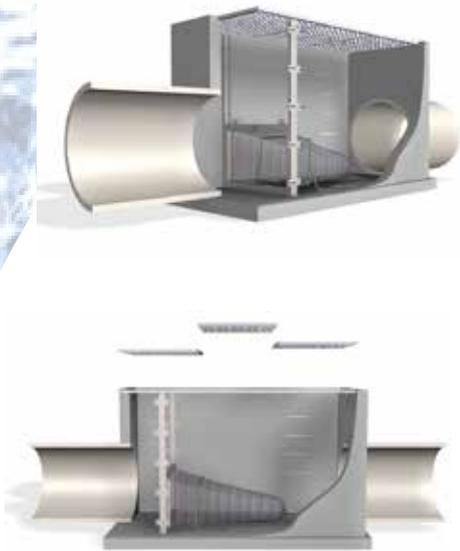
The objective of stormwater treatment is to achieve a real, visible, and sustainable improvement in water quality. Pollution control measures, including Gross Pollutant Traps (GPT's), such as the Ecosol™ Net Guard, litter baskets, sediment basins, grass swales, infiltration systems, and sand filters reduce the level and concentration of a variety of pollutants, thereby enhancing water quality.

The Ecosol™ Net Guard is a compact primary filtration system that removes pollutants from stormwater flows. It consists of a pre-cast concrete pit that houses a strong stainless-steel frame with a removable heavy-duty UV-stabilised polyethylene filtration net for gross pollutant capture and retention. The filtration net is similar to that used in the highly-successful and widely-sold Ecosol™ Net Tech.

Once installed, under any flow, the unit will start capturing and retaining pollutants. The filtered stormwater passes through the net and downstream to the receiving waterway or to a secondary treatment system, after pre-screening by the Ecosol™ Net Guard. It will continue to capture and retain gross pollutants until the filtration net reaches its designed holding capacity, or in the event of a major rain event, when excess flows will simply over top the system, as designed. This by-pass facility helps eliminate any adverse hydraulic impact or potential for flooding during peak flow storm events. After the rain event subsides the net should be inspected and if full, it should be emptied and re-secured.

The unit requires little, or no, structural change to the existing stormwater system, thereby reducing capital costs and minimising disruption to the general public during installation. One of the unit's key advantages is its ability to operate effectively in both partially submerged and tidal environments where it will continue to operate effectively without any remobilisation of pollutants larger than the net apertures.

Images of a standard Ecosol™ Net Guard



For additional (secondary) pollutant treatment a diversion weir can be constructed into the pit down stream of the filtration net thereby diverting finer particulates conveyed in stormwater runoff to a secondary pre-cast concrete sump that utilises hydrodynamic and gravitational separation to capture and retain sediment and hydrocarbons entrained in stormwater runoff. This additional treatment capability effectively provides a primary and secondary treatment train system significantly enhancing water quality

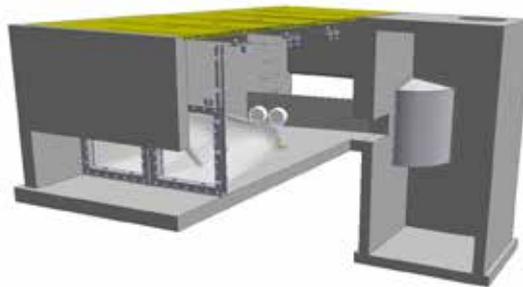


Image of the Ecosol™ Net Guard incorporating a downstream diversion weir and secondary treatment sump attachment for enhanced stormwater pollutant capture.

## 2.0 Ecosol™ Net Guard Credentials and Case Studies

The Ecosol™ Net Guard is designed specifically to provide essential pre-screening of stormwater runoff.

### Urban Water Resources Centre – University of South Australia - Product Performance Testing

In August 2002 the University of South Australia (UniSA), was commissioned to undertake a series of tests on the widely-used Ecosol™ Net Tech to confirm that product's performance. The Ecosol™ Net Guard uses a similar net to this product. The tests measured the filtration net's capture performance in on-grade situations for a range of flows containing full size, real-life gross pollutants. The testing confirmed the unit's ability to capture significant amounts of litter smaller than the netting perforations including coarse sediment at low to medium flows. At high flows it demonstrated its ability to capture and retain 93% of gross pollutants larger than the netting perforations (generally 50mm)

Avocet Consulting CFD Modelling to determine Pollutant Trapping Performance and fluid hydraulic characteristics under varying flow conditions.

In September 2011 the Ecosol™ Net Guard was tested by Avocet Consulting to assess its hydraulic impact on the drainage network. The tests found that the unit had little or no hydraulic impact and that the over topping design feature effectively eliminated the potential for flooding.



### LabSA Field Particle Size Distribution Analysis

Field testing, and analysis of results obtained from cleaning the Ecosol™ Net Guard enables Urban Asset Solutions Pty Ltd to confirm not only its performance but also has provided a better understanding of typical pollutant loadings for a wide range of catchments. This enables us to determine the most appropriate solution for a particular site and the required cleaning regime. It has also enabled the compilation of a comprehensive database that is then used in further product development. Antworks Engineering Structural Design Analysis of Guide Frame and Net Frame Assemblies

In July 2011, given that most generic trash racks fail when subjected to large flows, Ecosol engaged Antworks Engineering to model the Ecosol™ Net Guard under a range of high flows to enable it to be designed to withstand critical peak flows under full net conditions.

The School of Civil, Environmental and Mining Engineering (EngTest) – The University of Adelaide – Performance Review of the Ecosol™ Net Guard Stormwater Filter.

In 2012 the University of Adelaide (Engtest Civil, Environmental and Mining) completed extensive testing and measurements of the products capture efficiency, hydraulic performance and durability at varying flow rates and compiled a comprehensive product performance report (Performance Review of the Ecosol™ Net Guard) reviewing both past and present field and laboratory testing data.



### 3.0 Warranty and Life Expectancy

The Ecosol™ Net Guard has a one-year warranty covering all components and workmanship. Urban Asset Solutions Pty Ltd will rectify any defects that fall within the warranty period. The warranty does not cover damage caused by vandalism and may be invalidated by inappropriate cleaning procedures or where the unit is not cleaned within the recommended frequency. The Ecosol™ Net Guard is designed to meet strict engineering guidelines and manufacturers guarantees and is one of the most durable in-line treatment systems available. All concrete components have a life expectancy of 50 years and the stainless steel components have a life expectancy of 15 years while the filtration net has a life expectancy of 5 years providing appropriate maintenance practices are employed.



### 4.0 Safety Considerations

The simple, yet effective design of the Ecosol™ Net Guard reduces OH&S risks as most of the work is undertaken in a controlled factory environment. The unit arrives to site complete and ready for installation reducing significantly on-site time, an important factor given the costs associated with delays that can be caused by inclement weather.

### 5.0 Environmental Impact

Urban Asset Solutions Pty Ltd is accredited to ISO 14001 (Environment) and undertakes all manufacturing and construction within the requirements of this Standard. Hence, its carbon impact is limited and as the Ecosol™ Net Guard is housed in a pre-cast pit and is located underground, it has little or no impact on the environment with the access lids designed to blend in with the surrounds of the site.



## 6.0 Key Features and Benefits

The Ecosol™ Net Guard is a robust and modern primary treatment stormwater filtration system for use where there are cost or space constraints, or specialised cleaning equipment is not available. The unit captures and retains more than 93% of solid pollutants larger than the netting apertures, although, in practice, it has been found to collect much smaller particles, including fine sediments.

Easily installed, the unit's simple design overcomes any adverse hydraulic impact traditionally encountered with direct screening trash racks. It can be installed at almost any pipe outlet discharging to beaches, rivers, and creeks and also in-line. Installed underground in its own compact pre-cast concrete pit it is visually unobtrusive and safe from tampering or vandalism unlike many above-ground trash rack systems.

The Ecosol™ Net Guard consists of a pre-cast pit that houses a stainless-steel frame and a removable heavy-duty UV stabilised polyethylene filtration net that can be easily lifted out for cleaning and maintenance using a small crane truck.

Key Features	Benefits
Hydraulics	<ul style="list-style-type: none"> <li>• Minimal head/hydraulic loss</li> <li>• 100% treatable flow rate up to the designed TFR</li> <li>• Over-topping design feature eliminates the risk of flooding</li> </ul>
Pollutant Capture and Retention	<ul style="list-style-type: none"> <li>• Filtration net available in 50mm and 115mm aperture size</li> <li>• Captures and retains more than 93% of Gross Pollutants</li> <li>• No remobilisation of captured pollutants larger than the filtration net apertures</li> </ul>
Design and Construction	<ul style="list-style-type: none"> <li>• Operates in dry, tidal, and partially submerged environments</li> <li>• Ideal for locations with limited access or where there are significant cost constraints</li> <li>• Unit comes complete to site making installation easy</li> <li>• Simple design with durable, corrosive-resistant materials</li> <li>• Fits pipes up to 1050mm diameter and box culverts up to 900mm x 1200mm</li> <li>• Can be retrofitted to almost any existing stormwater systems</li> <li>• Fully self-contained underground safe from tampering or vandalism</li> <li>• Product is made in-house thereby reducing lead times significantly</li> </ul>
Cleaning and Maintenance	<ul style="list-style-type: none"> <li>• Can be inspected from the surface without removing the access lids or entering the unit</li> <li>• Easily cleaned using small crane truck</li> <li>• Removable filtration net makes access easy for cleaning and maintenance</li> <li>• Pollutants do not need to be handled during cleaning</li> </ul>
Environmental Impact	<ul style="list-style-type: none"> <li>• Effective pre-screening as part of a treatment train to achieve water quality objectives</li> <li>• Positive effect on natural ecosystem by improving water quality</li> <li>• Unit is housed in its own pit with minimal impact on the site aesthetics</li> </ul>
Tried and Tested	<ul style="list-style-type: none"> <li>• Independently tested</li> <li>• Meets all relevant industry standards and guidelines</li> </ul>

Table 1 – Ecosol™ Net Guard Key Features and Benefits

## 7.0 Key Dimensions

The Ecosol™ Net Guard is able to be custom designed to suit most applications however the below tables provide a general guide on typical unit configurations for cylindrical and box culvert pipe applications.



Unit Description	Cylindrical Pipe Units			
	Maximum Pipe Diameter	Approximate Unit Dimensions (L x W x D from surface to invert level)	Approximate Unit Weight	Approximate Maximum Pollutant Holding Capacity
	(mm)	(mm)	(t)	(m <sup>3</sup> )
Single Module Net Guard	1050	3600 x 1650 x 2000	10	1.181
Double Module Net Guard	1650	6450 x 2250 x 2500	16	4.000

Table 2 – Typical unit configurations for cylindrical pipes

Unit Description	Box Culvert Units			
	Maximum Culvert Diameter	Approximate Unit Dimensions (L x W x D from surface to invert level)	Approximate Unit Weight	Approximate Maximum Pollutant Holding Capacity
	(mm)	(mm)	(t)	(m <sup>3</sup> )
Single Module Net Guard	900 x 900	3600 x 1650 x 2000	10	1.013
Double Module Net Guard	1800 x 1200	6450 x 2250 x 2500	16	3.500



Table 3 – Typical unit configurations for Box Culvert applications

## 8.0 Collection and Removal Efficiencies

In order to determine a meaningful characterisation of the products collection efficiency, an extensive verification phase was undertaken by Avocet Consulting Pty Ltd, Ecosol and EngTest (The University of Adelaide).

Particulate Size (micron)	Capture Efficiency
2000 - 6000	20%
6000 - 16000	48%
>16000	90%

Table 4 – Particle Size Distribution Data

ECOSOL NET GUARD CAPTURE EFFICIENCY PERFORMANCE SUMMARY		
Pollutant	Capture Efficiency	Details
Gross Pollutants (GP)	93%	Capture efficiency of gross pollutants by volume (larger than the filtration netting apertures). Standard Netting consists of 50mm or 115mm apertures.

Table 5 – Mean average pollutant percentage reductions

The optimal collection efficiency for the Ecosol™ Net Guard is at approximately 30 – 60% full. Accordingly, the removal of the constituents is dependent on the composition of the particles, and the bonding of the chemical constituents to the surface of the particles. Additionally the particle filtration performance of Ecosol™ Net Guard is dependent on the body of pollutant forming a media already captured by the filter, therefore conservative capture efficiency ranges have been provided.

Quoted Capture Efficiency (CE) values are intended as a general guide only, please consult with your Urban Asset Solutions Pty Ltd representative for site specific product sizing and modelling.

## 9.0 MUSIC Modelling Guidelines

These guidelines provide instruction to the creation and application of a treatment node for the Ecosol™ Net Guard for the Model for Urban Stormwater Improvement Conceptualisation (MUSIC). The Ecosol™ Net Guard can be modelled in MUSIC using the Gross Pollutant Trap Treatment node to represent the results derived from independent laboratory testing and field testing by the University of South Australia and the University of Adelaide (ENGTEST The school of civil, environmental and mining engineering). The guidelines apply to the creation of the treatment node within MUSIC v6.1.0.

Insert a GPT treatment node into your model by selecting “GPT” under the treatment nodes menu. When the node is created the node properties dialog is displayed. There are several changes that need to be made in this dialog.

- Adjust the text in the Location box to read "Ecosol™ Net Guard" plus any other relevant information (50mm or 115mm Aperture netting etc.)
- Adjust the low flow bypass to reflect any flow (m<sup>3</sup>/sec) diverted away from the unit before treatment (usually zero).
- Adjust the high flow bypass to reflect the treatable flow rate (TFR values are detailed in tables 7 and 8) (m<sup>3</sup>/sec) any higher flows will bypass treatment

NOTES: Can be used to describe assumptions or location of reduction values for authority approvals.

Adjust the transfer function for each pollutant selecting the pollutant and editing (right click on the function point) the input and output values on the graph below to reflect the capture efficiencies (ce) of the treatment device. Table 6 provides the input and output values for the Ecosol™ Net Guard.



Pollutant	Removal Rate (%)	Entered Input Value	Entered Output Value
Gross Pollutants (>16000µm)	93	1000	70

Table 6 - Ecosol™ Net Guard – input and output values.

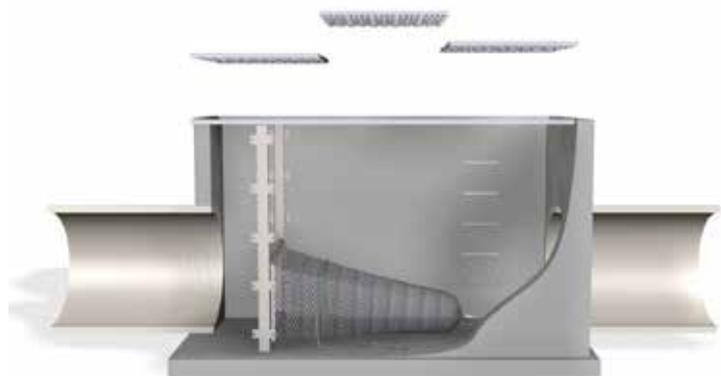
## 9.0 MUSIC Modelling Guidelines continued

Outlet Pipe Diameters (mm)	Designed Treatable Flow Rates (L/s) Pipe Outlets
375	65
450	103
525	151
600	211
750	369
825	468
900	582
1050	855

Table 7 - Ecosol™ Net Guard – Treatable Flow Rates ,Cylindrical pipes

Box Culvert Dimensions (mm)	Designed Treatable Flow Rates (L/s) Box Culvert (600mm wide)	Designed Treatable Flow Rates (L/s) Box Culvert (900mm wide)
375 x 375	228	342
450 x 450	299	449
525 x 525	377	566
600 x 600	461	691
750 x 750	644	966
825 x 825	743	1115
900 x 900	845	1267

Table 8 - Ecosol™ Net Guard – Treatable Flow Rates ,Box Culverts



## 10.0 Hydraulic Specification

Ecosol has always sought to validate its products performance and in September 2011 engaged the services of Avocet Consulting Pty Ltd to verify the hydraulic characteristics of the system under varying flow Conditions

### 10.1.1 Treatable Flow Rates

Tables 7 and 8 on page 10 provide an indicative guide of the products treatable flow rate relevant to pipe sizes and gradient. With an empty filtration net the resistance is negligible and therefore the treatable flow rate is higher. However when the filtration net is full of pollutants and impervious the treatable flow rate of the unit approaches zero and the unit starts to operate in by-pass as designed.

### 10.1.2 By-pass Capacity

The unit has been designed to cater for full pipe flow by-pass. That is worst-case scenario with the filtration net full and impervious and with a maximum head-loss (k factor) of 1.3. The product must be installed as a straight through pit. The bypass capacity of the unit is determined by the depth of the pit and the outlet pipe diameter/size and gradient. For the purpose of providing some guidance figures we have used conservative figures and assumed no backwater effect downstream of the unit.

#### By-Pass Capacity Based on a Depth to Invert of 2.0m

Outlet Pipe Diameters	Designed By-Pass Capacity (L/Sec)				
	0.5%	1%	2%	5%	10%
mm					
375	126	179	253	400	547
450	205	290	410	648	769
525	308	436	616	975	1021
600	438	620	877	1299	1299
750	790	1118	1581	1918	1918
825	1016	1437	2033	2253	2253
900	1277	1808	2557	2596	2596
1050	1917	2713	3290	3290	3290

Table 9 – System Treatable flow Rates at 2.0m depth to pipe invert level

## 10.1.2 By-Pass Capacity continued

By-pass capacity based on a depth to invert of 1.75m					
Outlet Pipe Diameters	Designed by-pass capacity (L/sec)				
mm	0.5%	1%	2%	5%	10%
375	126	179	253	400	503
450	205	290	410	648	704
525	308	436	616	931	931
600	438	620	877	1177	1177
750	790	1118	1581	1718	1718
825	1016	1437	2002	2002	2002
900	1277	1808	2288	2288	2288
1050	1917	2713	2854	2854	2854

Table 10 - System Treatable flow Rates at 1.75m depth to pipe invert level

By-pass capacity based on a 600mm wide culvert with a depth to invert of 2.0m					
Culvert Height	Designed by-pass capacity (L/sec)				
mm	0.5%	1%	2%	5%	10%
375	126	179	253	400	547
450	205	290	410	648	769
525	308	436	616	975	1021
600	438	620	877	1299	1299
750	790	1118	1581	1918	1918
825	1016	1437	2033	2253	2253
900	1277	1808	2557	2596	2596

Table 11 – By-pass capacity flow Rates at 2.0m depth to culvert invert level.

## 10.1.2 By-Pass Capacity continued

By-pass capacity based on a 900mm wide culvert with a depth to invert of 1.75m

Culvert Height mm	Designed by-pass capacity (L/sec)				
	0.5%	1%	2%	5%	10%
375	596	843	1193	1887	2669
450	760	1075	1521	2406	3404
525	929	1315	1861	2943	4163
600	1103	1561	2208	3493	4940
750	1460	2065	2922	4621	5290
825	1641	2322	3285	5196	5290
900	1825	2528	3652	5290	5290

Table 12- By-pass capacity flow rates at 1.75m depth to culvert invert level.

### 10.1.3 Head-loss (K Factor)

Head-loss is defined as the hydraulic energy loss (embodied by the pressure reduction) experienced by the flow through the unit as a function of the flow rate through the unit. The head-loss is typically characterised by the minor loss K factor (which is the multiplier for the velocity head to determine the actual headloss).

Outlet Pipe Dimensions mm	Headloss (k Factor) <i>k</i>
375	1.3
450	1.3
525	1.3
600	1.3
675	1.3
750	1.3
825	1.3
900	1.3
1050	1.3

Table 13 – System Headloss (k factor) for cylindrical pipe applications

### 10.1.3 Headloss (*k* Factor) continued

Box Culvert Dimensions	Headloss ( <i>k</i> Factor)
mm	<i>k</i>
375 x 375	1.3
450 x 450	1.3
600 x 600	1.3
750 x 750	1.3
900 x 900	1.3

Table 14 – System Headloss (*k* factor) for box culvert applications

## 11.0 Cleaning and Maintenance

As with all filtration systems, the Ecosol™ Net Guard should be cleaned regularly. The cleaning frequency and the cost depend heavily on the surrounding environment, the unit's proximity to a waste facility, the number of units, their location, and the type of pollution collected. The figures in the table adjacent give a broad guideline about the optimal catchment size and the number of cleans required annually based on typical expected pollutant loads.

Ecosol Net Guard Product Code	Maximum Pipe Diameter	Approximate Unit Dimensions (L x W x D from surface to invert level)	Approximate Unit Weight	Approximate Maximum Pollutant Holding Capacity
	mm	m <sup>3</sup>	Ha	Per Annum
Single Module Net Guard Cylindrical Pipe	1050 RCP	1.181	4.20	1
Double Module Net Guard Cylindrical Pipe	1650 RCP	4.000	14.0	1
Single Module Net Guard Box Culvert	900 X 900 RCBC	1.013	3.60	1
Double Module Net Guard Box Culvert	1800 X 1200 RCBC	3.500	10.80	1

Table 15 – Indicative Cleaning Frequencies

## 11.0 Cleaning and Maintenance continued

Cleaning frequencies are based on typical pollution loads of 0.280m<sup>3</sup>/ha/year for gross pollutants on a typical fully developed urban catchment. For larger catchments or during extended dry weather periods additional system cleaning may be required.

One of the key advantages of the Ecosol™ Net Guard is that a small crane truck can easily lift the filtration net for cleaning thereby eliminating any manual handling risks and the need for specialised cleaning equipment. As the unit is a dry system there is a reduced likelihood of captured contaminants causing any significant adverse environmental impact or nuisance (eg. odours and putrefaction).

A key benefit of this primary treatment device is its low capital cost along with its low ongoing cleaning and maintenance cost.

Please note: It is recommended that the unit be cleaned every 6 - 12 months or when it is 60 – 70% full, (whichever occurs first). Failure to regularly clean your Ecosol™ Net Guard may invalidate the warranty and may reduce its performance efficiency. Should the Ecosol™ Net Guard unit require any remedial works please contact your nearest Urban Asset Solutions Pty Ltd office.



## 12.0 Monitoring

Under normal weather and operating conditions, your Ecosol™ Net Guard should be checked, minimum every six months depending on quality and quantity of the inflow to the unit. Initially, Urban Asset Solutions Pty Ltd recommends that monitoring is undertaken monthly or immediately after a major rain event. As the unit requires only visual inspection from the surface to determine its percentage of fill this is a relatively cost and time efficient process. Once the unit has been in operation for an extended period of time (say, 12 months) then the monitoring schedule can be adjusted to reflect the actual operating conditions specific to the catchment.

Under normal operating conditions the unit would normally require cleaning approximately every 6 - 12 months.

## 13.0 Monitoring, Cleaning, and Maintenance Services

Urban Asset Solutions Pty Ltd has a very competitive cleaning service using a crane truck for the removal of all captured pollutants. After each clean we provide a full report detailing the volume and type of pollutants removed. We believe that it is in your best interests for Urban Asset Solutions Pty Ltd staff to clean and maintain the unit, not only because we are specialists, but also because proper monitoring and maintenance enhances the unit life significantly.



## 14.0 Applications and Configurations

The Ecosol™ Net Guard is usually installed in-line on single stormwater pipes or box culvert ranging in size from 300mm to 1200mm, although is suitable for larger pipes and box culverts in a multi-unit configuration. Available to suit pedestrian and trafficable loadings.

The Ecosol™ Net Guard is an effective primary pre-screening system that removes larger solids from stormwater, thereby extending the life of secondary and tertiary treatment systems, such as wetlands and vegetated swales, which would otherwise become clogged with gross pollutants.

The Ecosol™ Net Guard is able to be custom designed specific to your application. We can vary the loading class, pit depth and accommodate varying pipe types and sizes.



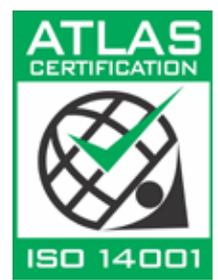
Typical end of - line application providing essential primary treatment of Stormwater prior to discharging to a wetland.

## 15.0 Turnkey Services

Urban Asset Solutions Pty Ltd design and estimating staff provide a dedicated management approach towards your project. In addition all staff are capable of liaising with the client, the consulting engineer, the contractor, and all other interested third parties to achieve a successful outcome.

## 16.0 Accreditation

Urban Asset Solutions Pty Ltd is accredited to AS/NZS ISO 14001 (Environment) and AS/NZS 9001 (Quality). Our commitment to continuously improving our products and services is demonstrated by our ongoing accreditation for Quality and Environmental Management. Urban Asset Solutions Pty Ltd is also committed to a safe environment for its employees. We are fully third-party accredited to AS/NZS 4801:2001 and OHSAS 18001.



## 17.0 Supplier and Technical Product Contact Details

For any maintenance or technical product enquiries please contact:

Urban Asset Solutions Pty Ltd

Tel: 1300 706 624

Fax: 1300 706 634

Email: [info@urbanassetsolutions.com.au](mailto:info@urbanassetsolutions.com.au)

## Appendix 1

### Ecosol™ Net Guard Essential Information Form

To ensure your system is appropriately designed for its intended application and meets local water quality objectives it is essential that the following minimum information is provided:

Customer Details	
Contact Person:	
Company Name:	
Phone:	
Fax:	
Email:	
Project and Site Information	
Project Name:	
Project Address:	
Type of Development/Catchment Type	
Pollutant Removal Targets (%): Site Water Quality Objectives (WQO's)	Gross Pollutants
	Total Suspended Solids (20 – 2000µm)
	Total Phosphorus
	Total Nitrogen
	Heavy Metals
	Total Petroleum/ Hydrocarbon
	Other
Local Authority:	
Device Location:	
Designed Discharge (Peak ARI Flow Rate) L/s:	
Treatable Flow Rate (L/s):	
Tidal or submerged (inundated) system	
Preferred access cover type and loading (Grated or solid top) (Class A, B or D)	
Other essential design or site relevant information	

Please forward the above information for your next project to your local Urban Asset Solutions Pty Ltd representative. On receipt Urban Asset Solutions Pty Ltd will model and design the most appropriately sized system to suit your application to assist you achieve the project Water Sensitive Urban design objectives. Email: [info@urbanassetsolutions.com.au](mailto:info@urbanassetsolutions.com.au) - Fax: 1300 706 634

## Appendix 2

### References

Dr.A. Zecchin, Dr.M Lambert (2013) - Performance Review of the Ecosol Net Guard Stormwater Filter - School of Civil Environmental and Mining Engineering, The University of Adelaide.

Dr. A Wallace (2012) Technical Report Experimental Determination of collection efficiency of Ecosol Net Guard Stormwater Filter - Avocet Consulting Pty Ltd

A Macklin (2012) Ecosol Net Guard Treatable Flow rate versus Percentage of Fill Test Report - Ecosol

Dr. A Wallace (2012) Technical Report Net Guard Solid Pollutant Filter review and recommendations for technical specifications- Avocet Consulting Pty Ltd

A Macklin (2012) Ecosol Net Guard Water Quality Testing – Filtration Net Capture Efficiency Report - Ecosol

A Murphy (2010) Ecosol Net Guard Structural Design Analysis of guide and frame net assemblies – Antworks Engineering Pty Ltd

A Macklin (2012) Hadspen Stormwater Outfall Stormwater Quality Initiative – Meander Valley Council & Ecosol

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