September 10, 2020

Mr. Jaime Favila
California State Water Resources Control Board Division of Water Quality
P.O. Box 100
Sacramento, CA 95814-100

Re: REVISED: Application for Trash Treatment Control Device – Enviropod® LittaTrap ™ FC FULL CAPTURE DEVICE for Grated Inlet Catch Basins, Curb Inlet Catch Basin, Combination Inlet Catch Basins, and Manhole Catch Basins

Dear Mr. Favila

Enviropod is pleased to submit this revised application for the Enviropod® LittaTrap™ FC full capture device for four various catch basin installation types. Documentation for this revised application is being submitted in accordance with the California State Water Resources Control Board Trash Treatment Control Device Application Requirements document that includes the following minimum requisite sections:

- Cover Letter
- Table of Contents
- Physical Description
- Installation Information
- Operation and Maintenance Information
- Vector Control Accessibility
- Reliability Information
- Field/Lab Testing Information and Analysis

Please contact Michael Hannah, Technical Director of Enviropod Canada Limited, and the Stormwater360 Group if any additional information is required.

Regards,

Michael Hannah
Technical Director
Enviropod Canada Limited: A Stormwater360 Group Company

1.0 COVER LETTER

1.A A general description of the Device;

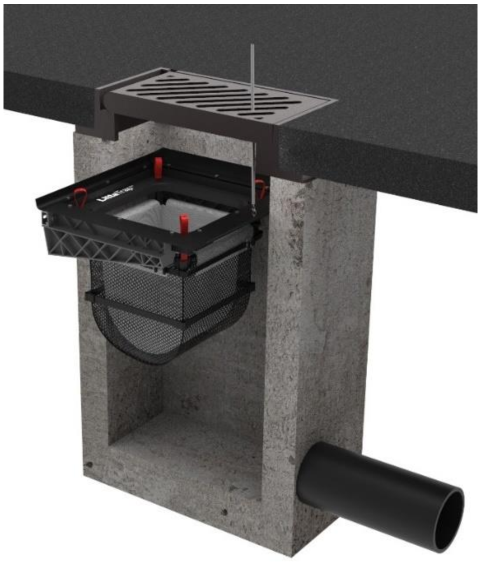
Enviropod is specialized stormwater catch basin technology company innovating since 1996

The Enviropod® LittaTrap™ FC is an innovative catch basin filter insert designed to be easily retrofitted into new and existing stormwater catch basins to capture trash. The Enviropod® LittaTrap™ FC can be installed in grated inlet, curb inlet, combination inlet, or manhole catch basins. Figure 1: Enviropod® LittaTrap™ FC example catch basin applications shows these types of installations.Figure 1: Enviropod® LittaTrap™ FC example catch basin applications The Enviropod® LittaTrap™ FC maintains catch basin hydraulic capacity and allows for easy maintenance when completely full of trash and debris. The Enviropod® LittaTrap™ FC comes in a range of standard sizes, as well as custom, non-standard sizes that can be designed and manufactured upon request

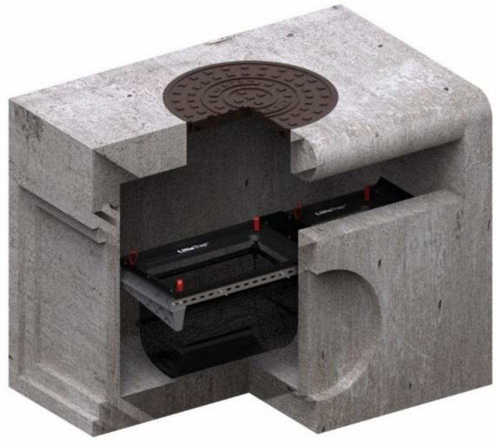
The Enviropod® LittaTrap™ FC is fitted with a 4.8 mm x 3.9mm liner screen that meets the requirements of the California Water Resources Control Boards Trash Provisions. Use of any other size liner is not addressed in this application and does not meet the full capture certification requirements of the California Water Resources Control Board.

The liner fits within a patented 4.9mm x 5.5mm batten basket which provides structural integrity to the liner and prevents budging allowing the basket and liner to be easily removed in times of maintenance. The basket design also allows a larger basket providing a higher surface area and storage volume than other non-battened “bag type” catch basin inserts. The batten basket also ensures a secondary flow path for bypass flows around the basket (and liner). Confined space entry is not required to maintain the Enviropod® LittaTrap™ FC.

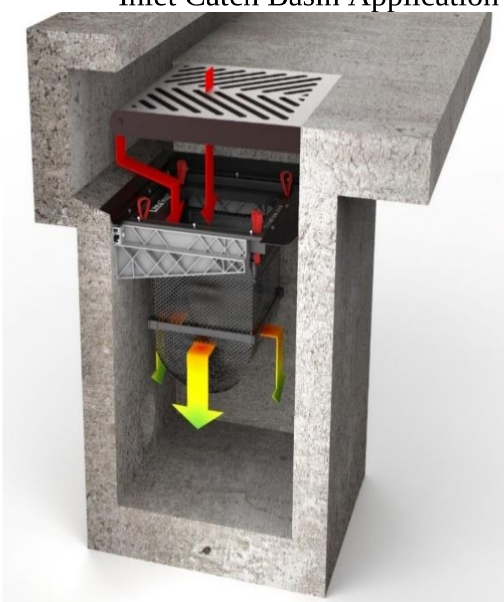
The Enviropod® LittaTrap™ FC include a hinged vector port seal (HVPS) when installed in a grated inlet or combination inlet catch basin. The HVPS allows visual inspection under the basket for access by Mosquito Vector Control Association of California (MVCAC) field personnel. The design of the HPVS has been approved by the MVCAC.



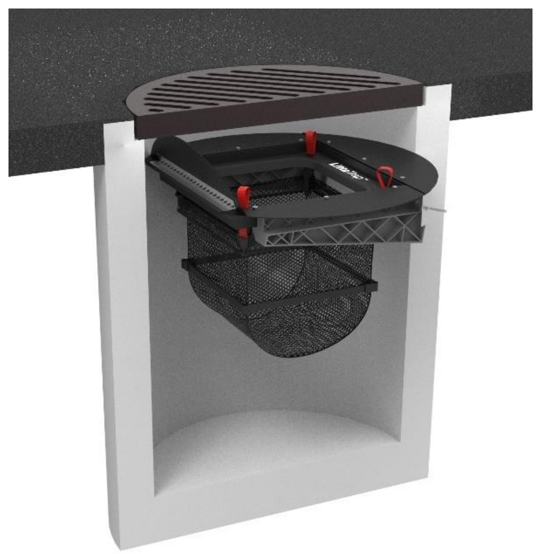
Enviropod® LittaTrap™ FC Grate Inlet Catch Basin Application



Enviropod® LittaTrap™ FC Curb Inlet Catch Basin Application



Enviropod® LittaTrap™ FC Combination Inlet Catch Basin Application



Enviropod® LittaTrap™ FC Manhole Catch Basin Application

Figure 1: Enviropod® LittaTrap™ FC example catch basin applications

1.B The devices owners and owners' representatives contact information;

Device Owner
Stormwater360 Group Ltd
7c Piermark Drive,
Rosedale,

Auckland 0632
New Zealand

Device Owners Authorized California representative:

William Harris
34428 Yucaipa Blvd., #E-344
Yucaipa, CA 92399
(909) 499-7298
willharrisjr@gmail.com

Device Owner Authorized Corporate Representative:

Mike Hannah
Technical Director
Enviropod Canada Ltd.
7c Piermark Drive,
Rosedale,
Auckland 0632
New Zealand
+64 21 422 398
Mike@enviropod.com

1.C The devices' manufacturing location;

The Enviropod® LittaTrap™ FC is manufactured by the Stormwater360 Group, a specialist stormwater management provider, which distributes its technology in New Zealand, Australia, Canada, and the USA. Enviropod Canada Limited is part of the Stormwater360 group. https://www.stormwater360.com

The unique flat-pack, efficient, and flexible design allows the Enviropod® LittaTrap™ FC to be mass-produced, significantly reducing the delivery cost of the system while maintaining its hydraulic and structural properties. Because of the global application of the technology, the Enviropod® LittaTrap™ FC is manufactured in Shenzhen, China, and warehoused in California for distribution throughout the United States.

1.D A brief summary of any field/lab testing results that demonstrates the device functions as described within the application;

Enviropod has commissioned a 3rd party laboratory to test the Enviropod® LittaTrap™ FC liner as well as other liners not subject to this application but used for other types of pollutants.8.0Field/Lab Testing Information and Analysis. The laboratory report details (see APPENDIX D – Lab Testing Information) hydraulic testing of a range of the Enviropod® LittaTrap™ FC liners.

The hydraulic laboratory testing data has been used to develop empirical relationships between head loss and flow through the liner which is used in each Enviropod® LittaTrap™ FC. Hydraulic analyses show that an empty Enviropod® LittaTrap™ FC for a 2ft x 2ft catch basin (LT6060) can convey 413 l/sec (14.6 CFS) without bypass. Further analysis shows that the Enviropod® LittaTrap™ FC can convey 96 l/sec (3.4 CFS) through the liner when the basket is 1/2 full without bypass. The maximum bypass flow for an Enviropod® LittaTrap™ FC (2ft x 2ft) is 93 l/sec (3.3 CFS) when installed in accordance with the manufacture's recommendation. An example of the hydraulic calculations is included in APPENDIX G – Example Hydraulic Calculations.

Enviropod® LittaTrap™ FC with standard basket (screen size 4.9mm – 5.5mm) and no liner has undergone full size laboratory trash capture testing. No formal "Full Capture" test protocol has been provided by the California State Water Board Trash Implementation Program. As such, a test protocol based on the Stormwater Equipment Manufacturers Association (SWEMA) and the California Department of Transportation (Caltrans) full capture testing was developed. The testing demonstrated 100% capture of particles 5 mm or larger in size and 99.6% total capture of solids at 15 l/sec for a unit of a 2ft x 2ft catch basin when 85% full. This information has been included to demonstrate the ability (as a whole) to intercept and capture trash 5mm and larger even without the required liner. It should be noted that this application is for the Enviropod® LittaTrap™ FC which has a full capture liner of (4.8mm x 3.9mm) has slightly reduced hydraulic conductivity because of the 4.8x 3.9 liner.

1.E A brief summary of the device limitations, and operational, sizing, and maintenance considerations;

The Enviropod® LittaTrap™ FC is a catch basin filter insert device designed to specifically trap trash 5 mm or larger in size and meets the California State Water Resources Control Board Trash Provisions. Conformance with engineering plans, specifications, and manufacturer's recommendations are essential to proper operation and function of this device.

The primary treatment mechanism employed by the Enviropod® LittaTrap™ FC to trap trash is the 4.7mm x 3.9mm liner in combination with the basket. Enviropod® LittaTrap™ FC is manufactured with a low head loss basket and comes with a bypass mechanism to meet peak flows entering the catch basin. Enviropod® LittaTrap™ FC has a range of sizes. Each Enviropod® LittaTrap™ FC size has a design flow rate as well as a design bypass flow rate.

The Enviropod® LittaTrap™ FC is manufactured from durable plastics and has a life expectancy of a minimum of 20 years for all static parts. The basket system is specifically designed to be lightweight yet durable. The unique patented design of the basket allows hand maintenance when full, significantly lowering the operational cost of each model size. As the basket is frequently removed, it undergoes more stress and strain through this operation. As such, the expectancy of the basket is a minimum of five years and can be easily replaced, if required, in routine maintenance.

The design flow rate for trapping trash has been derived from the available head and headloss properties of the basket and liner when the basket is 50% full. Treatment flow rate calculations assume that the maximum driving head is he top of the basket (bypass level). The maximum bypass flow rate has been calculated through orifice calculations assuming the maximum driving head is the surface level or the top of the grate.

Design treatment flow and peak flow are to be calculated by the consulting engineer in accordance with relevant local and regional stormwater guidance documents and should not exceed the Enviropod® LittaTrap™ FC model size design maximum capacity. Failure to do so can cause adverse hydraulic conditions. Additionally, non-conformance with the model size design limits may cause non- compliance with the water quality objectives and requirements.

Adherence to the manufacture's installation guidance is essential for hydraulic and trash capture operation. The unique modular components allow the Enviropod® LittaTrap™ FC to be fitted into any catch basin curb entry, grate inlet, rectangular, and manhole catch basins. It is important that the Enviropod® LittaTrap™ FC is sized according to the catchment area and flows draining to the device using the local engineering guidance.

Enviropod® LittaTrap™ FC is constructed from non-leaching and non-corroding materials and durable engineered plastics. All components are UV stable and designed to withstand temperatures between -20C and 40 degrees C.

Shallow catch basins less than 2ft from surface level may result in limited storage capacity and lower treatable flow rates. Shallow units may require custom baskets. Catch basins with less than 18 inches in depth to the invert of the outlet pipe may not be suitable for the installation of an Enviropod® LittaTrap™ FC.

All stormwater Best Management Practices require routine and scheduled inspection and maintenance. Inspection of the Enviropod® LittaTrap™ FC can be undertaken from the surface level. Maintenance can be performed with a vactor truck from the surface level for curb entry and grated inlet installations. Non confined space hand maintenance of grate inlet Enviropod® LittaTrap™ FCs can be performed from the surface level.

1.F A description or list of locations, if any, where the Device has been

installed. Include the name and contact information of as many as three municipality(s) purchasing the Device,

There are no installations of an Enviropod® LittaTrap™ FC model currently in California.

However, there are other non-certified Enviropod Model installations. in California. 10 non-certified Enviropod Model 400 units with 400-micron liners and oil absorbent pads were installed in 2019 at the Illumina Corporate Parking Lot, Foster City, 200 Lincoln Center Drive, Foster City, CA 94404

Please contact the project manager and EnviroPod California representative, Will Harris, for more information or to organize a site visit.

Further installations of the Enviropod LittaTrap Models in California are pending SWRCB Certification. For further information on other non-State Board certified Enviropod LittaTrap models, please visit the Enviropod website at www.enviropod.com or contact EnviroPod

1.G The certification below:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons that manage the system or those persons directly responsible for gathering the information, to the best of my knowledge and belief, the information submitted is, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Mike Hannah
Technical Director
Enviropod Canada Ltd
Device Owner Authorized Corporate Representative: Date: 09/10/2020

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2.0 TABLE OF CONTENTS

Contents

3.0 PHYSICAL DESCRIPTION

3.A Trash Capture:

In a storm event, stormwater runoff flows enter a catch basin through a grate inlet, curb inlet, combination inlet or manhole type application. The downward flow is intercepted and captured by the Enviropod® LittaTrap™ FC for these catch basin applications. Once flow enters the Enviropod® LittaTrap™ FC, the Enviropod® LittaTrap™ FC seals and basket collar direct the flow over the bypass slots and into the basket and liner. The seals are adjustable to ensure all particles 5 mm or larger are diverted into the basket and liner without "short-circuiting" or causing bypass.

The filter box sits on a support bracket that cantilevers off a single wall of the catch basin. The support bracket is located approximately 8 inches below the surface level creating a driving head to increase the maximum bypass flow rate without causing surface ponding. The support bracket has been structurally designed (Finite Element Analysis) to take the load of the basket full of sediment, which is heavier than a combination of trash, vegetation/sediment, while the peak bypass flow is conveyed into the catch basin.

The unique patented Enviropod® LittaTrap™ FC has a 4.8mm x 3.9mm liner that meets the requirement of the California Trash Treatment Control Device Certification. The liner fits within a basket manufactured from a lightweight, durable marine-grade plastic netting with an opening size of 4.9 – 5.5 mm and a high percentage of open area to reduce head loss across the screen. A photo of the liner fabric is included in Appendix F - Enviropod® LittaTrap™ FC Liner Photo A APPENDIX E – LittaTrap Full Capture Liner Photo. The basket incorporates a structural batten that has three functions:

1. Constrains the basket preventing the expansion or "bulging" so the basket can be easily removed when full of material;
2. Maintains a secondary flow path around the basket for bypass flows; and
3. Maximizes the screen area and material storage volume of the basket.

3.B Peak Flows / Trash Volumes:

The Enviropod LittaTrap FC comes in various model sizes. Figure 1: Enviropod® LittaTrap™ FC example catch basin applications details the components of the Enviropod® LittaTrap™ FC. The treatable flow rates for each model size are calculated from the head loss across the liner and basket, available liner area, and the available head in the basket. Treatment flows rates calculation assume that the maximum driving head is at the top of the basket (bypass level). The maximum bypass flow rate has been calculated through orifice calculations assuming the maximum driving head is height of surface level or the top of the grate. Laboratory testing information is provided in APPENDIX D – Lab Testing Information. An example set of calculations are provided in APPENDIX G – Example Hydraulic Calculations.

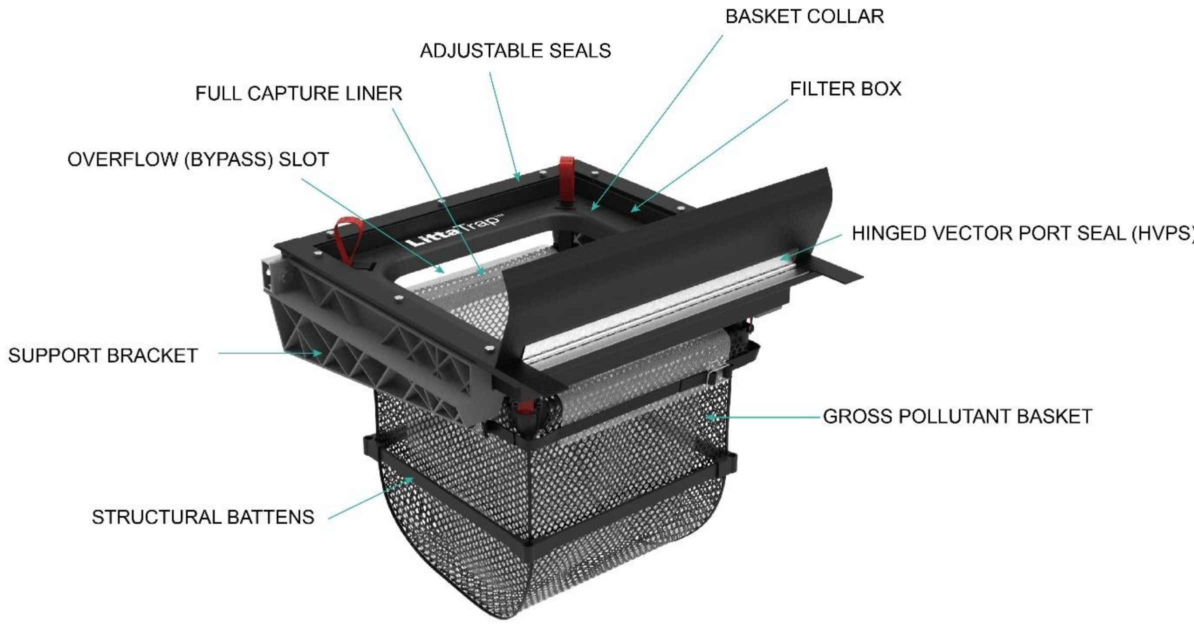


Figure 2: Enviropod® LittaTrap™ FC with HVPS Components

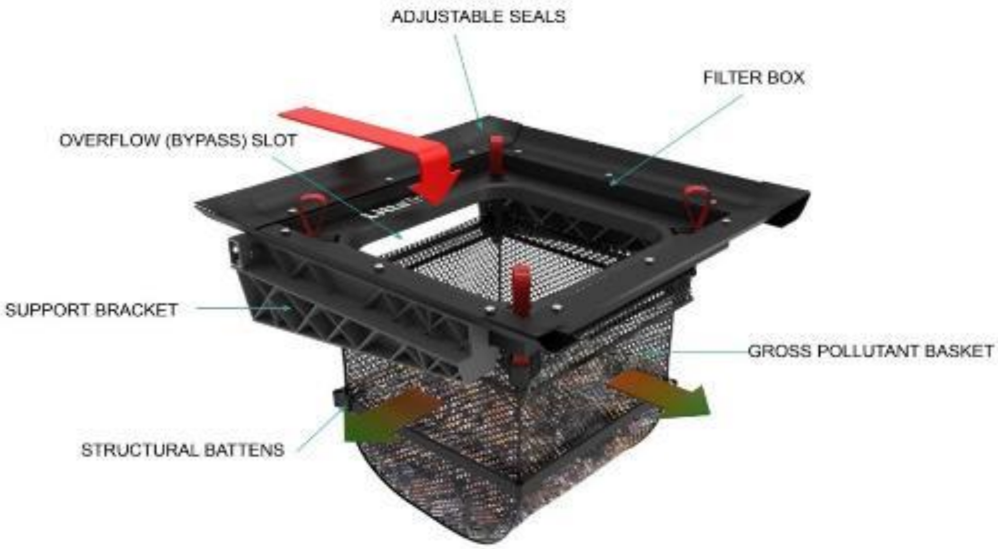


Figure 3: Enviropod® LittaTrap™ FC Operation

Figure 4: Enviropod® LittaTrap™ FC Bypass Operation

Grate Inlet Combination Inlet or Manhole Catch basins: Selection & Configuration

The appropriate Enviropod® LittaTrap™ FC size is selected from the dimensions of the catch basin and catch basin grate. The table below details the maximum and minimum dimensions for the filter box and basket. The designer must ensure the filter box fit the sides of the catch basin, and the basket can fit through the clear opening of the grate. Seal extensions are available for irregular catch basins and manhole catch basins. Required flow rates are calculated by the design engineer in accordance with the trash control permit provisions.

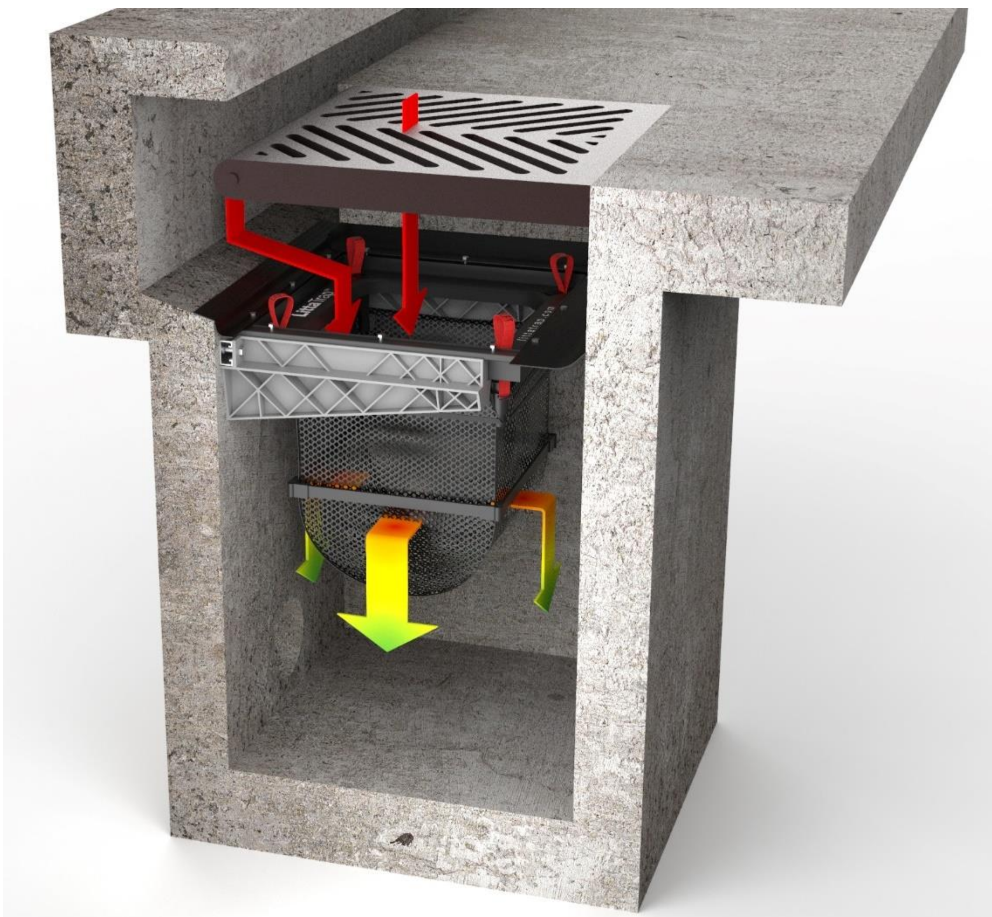


Figure 5: Enviropod® LittaTrap™ FC Combination Inlet Operation

Enviropod® LittaTrap™ FC Size	Nominal Catch Basin Size	Bracket Width	Min Filter Box Size (without seals)		Max Filter Box Size (With Seals)		Basket Collar Size		Basket
	inch	Inch	Length Inch	Width Inch	Length Inch	Width Inch	Length Inch	Width Inch	Depth Inch
LTFC4545	18 x 18	17.1	15.4	15.4	20.6	20.6	12.0	12.0	15.7
LTFC6060	24 x24	22.4	20.2	20.2	25.3	25.3	17.3	17.3	15.7
LTFC9060	36 x 24	34.3	32.0	17.6	37.1	22.7	29.1	17.3	15.7

Table 1: Standard Enviropod LittaTrap Model Dimension

Please note the for the 36" x 18" catch basin 2 x LT4545 Enviropod® LittaTrap™ FC s (18" x 18") are used. Likewise, for a 48" x 48" catch basin 4 x LT6060 are used. For a 36" x 36" catch basin a LT9060 is used with a seal extension kit. Additional nonstandard sizes are available on request.

Curb Inlet Filter Selection, Configuration, and Operation

For curb entry catch basins the operation is the same as a grated inlet. A selection of Enviropod® LittaTrap™ FC's are selected to fit the entire length of the curb opening to ensure all flow is intercepted.

In the example below a 60-inch curb inlet, catch basin is fitted with 2 Enviropod® LittaTrap™ FC's. 1 x LTFC9060 and 1 x LTFC6060. The cantilever support brackets are installed in series along the curb opening wall, positioning the filter box below the inlet. The positioning of the inlet allows unrestricted flow in bypass conditions. In curb inlets an additional bypass provision, is provided by allowing flow to pass over the back of the filter box.

The seal extension kits are available from Enviropod for irregular-sized catch basins. The design flow rate is calculated by adding the design flow rate for each Enviropod® LittaTrap™ FC used in the curb entry design. The maximum storage capacity is calculated by adding the storage capacity for each unit used in the curb entry design. Hydraulic and storage capacities for standard sizes are listed below in Table 3: Enviropod® LittaTrap™ FC Hydraulic Capacity and Table 2: Enviropod® LittaTrap™ FC Storage Capacity

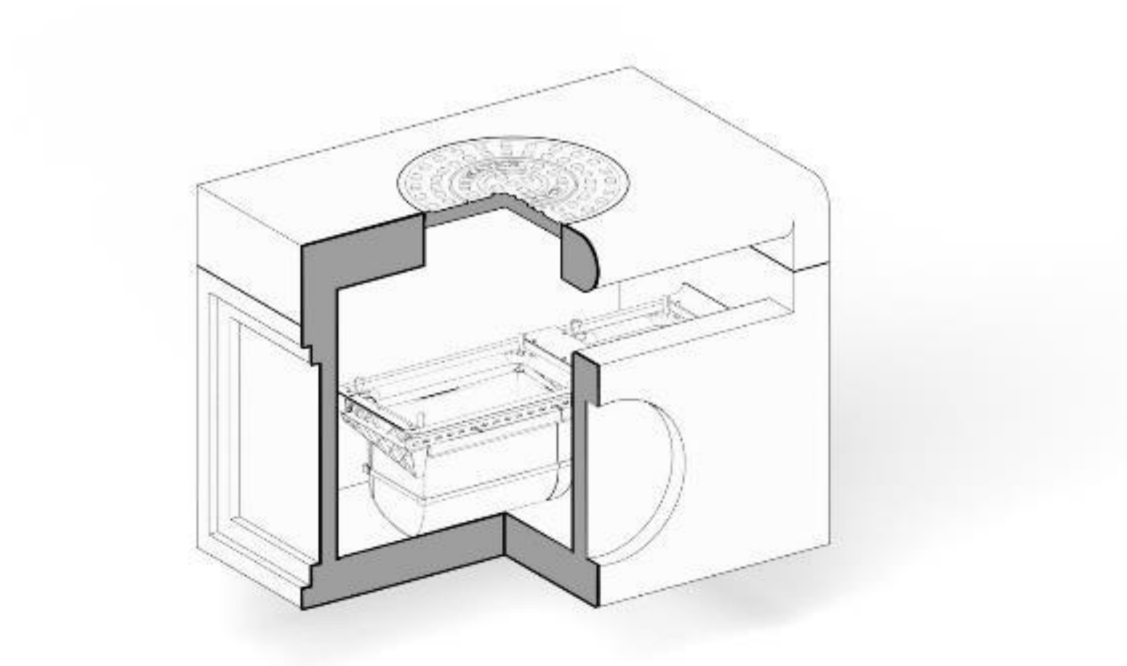


Figure 6: Curb Inlet Catch basin fitted with Enviropod® LittaTrap™ FC

Figure 7: Installation of LTFC9060 LittaTrap FC and bracket for LTFC6060 in Curb Entry Catch basin

Figure 8: Plan view of a LTFC9060 and LTFC6060 installed on 60-inch curb entry catch basin

3.C Hydraulic Capacity.

Hydraulic and storage capacities for standard model sizes are listed below in Table 3: Enviropod® LittaTrap™ FC Hydraulic Capacity and Table 2: Enviropod® LittaTrap™ FC Storage Capacity.

The treatable flow rates for each size are calculated from the head loss across the basket material and liner. available screen area, and the available head in the basket. Treatment flow rate calculations assume that the maximum driving head is at the top of the basket (bypass level). Treatment flow calculations assume zero flow through the base of the basket. The maximum bypass flow rate has been calculated through orifice calculations assuming the maximum driving head is the surface level or the top of the grate. Laboratory testing information is provided in APPENDIX G – Example Hydraulic Calculations.

3.D Comparison Table:

Basin Size Inches	Enviropod ® LittaTrap™ FC Size	Screen Area in^2	Maximum Trash Capture Volume (MTCV) ft^3
18 x 18	LTFC4545	601	0.7
24 x24	LTFC6060	969	1.6
36 x 18	2 x LTFC4545*	1203	1.4
36 x 24	LTFC9060	1473	3.0
36 x 36	LTFC9060 + Seal Extension Kit.	1473	3.0
48 x 48	4 x LTFC6060	3875	6.5

Table 2: Enviropod® LittaTrap™ FC Storage Capacity

Basin Size	Enviropod® LittaTrap™ FC Size	Flow Rate 0% MTCV CFS	Flow Rate 25% MTCV CFS	Design Flow Rate 50% MTCV CFS	Flow Rate 75% MTCV CFS	Standard Bypass Flow* CFS
18 x 18	LTFC4545	8.2	5.2	2.1	0.4	2.1
24 x24	LTFC6060	13.0	7.7	3.2	0.7	3.3
36 x 18	2 x LTFC454	16.5	10.4	4.2	0.9	4.2
36 x 24	LTFC9060	20.2	11.3	4.8	1.1	4.5
36 x 36	LTFC9060 + Seal Extension Kit	20.2	11.3	4.8	1.1	4.5
48 x 48	4 x LTFC6060	51.9	30.7	12.9	2.8	13.1

Table 3: Enviropod® LittaTrap™ FC Hydraulic Capacity

* Flow rates listed are for a factory set bypass. Please contact Enviropod for specific bypass requirements

3.E Design drawings:

Generic design drawings for all standard Enviropod® LittaTrap™ FC model sizes, including dimensions, are included in APPENDIX A – Generic Drawings.

The Enviropod® LittaTrap™ FC has adjustable elements to fit most sizes, styles, and models of the catch basin. Seal extension and manhole adaptor kits are available for nonstandard or manhole catch basins.

3.F Alternative Configurations.

The Enviropod® LittaTrap™ FC has the following optional components.

- Seal extension kits: For irregular sized catch basins.
- Manhole adaptor kit: For manhole catch basins
- Hinged Vector Port Seal (HVPS): To provide access to potential standing water in grated inlets. HVPS is mandatory for grated inlets.

These optional extras have no impact on the installation or overall performance with regards to meeting the California Water Resources Control Board Trash Provisions.

3.G Internal Bypass.

The internal bypass is shown in Figure 4: Enviropod® LittaTrap™ FC Bypass Operation . In a storm event, the flow enters the catch basin through a grate, curb inlet, or both. The downward flow is intercepted by the Enviropod® LittaTrap™ FC. Once flow enters the Enviropod® LittaTrap™ FC, the Enviropod® LittaTrap™ FC seals and basket collar direct the flow over the bypass slots into the liner and basket. Inflow cannot directly pass through the bypass slots as it is initially directed into the basket.

As flow enters the liner and basket, it builds up a driving head to push the flow through the clear (unobstructed) area of the Enviropod® LittaTrap™ FC liner and basket. As the material is trapped, this material is stored in the base of the basket. As more material is captured, less clear basket and liner area is available to pass the flow.

The system is designed to allow the design flow to pass through the basket when it is half full. If flows greater than the design storm enters the system when the basket is half full, the driving head will rise to the bypass height, pushing additional flow through the bypass slots and into the catch basin as shown in the figures.

For curb entry systems, the Enviropod® LittaTrap™ FC is located below the inlet to the catch basin allowing bypass over the back of the filter box as well as the bypass slots giving the system additional bypass capacity.

3.H Previously Trapped Trash.

The Enviropod® LittaTrap™ FC has been designed to trap and retain all trash and debris that is 5 mm in size or larger, that enters. Conditions under which the Enviropod® LittaTrap™ FC may re-introduce previously trapped trash are listed below:

- If the Enviropod® LittaTrap™ FC is not properly maintained and trash and debris can accumulate beyond Enviropod® LittaTrap™ FC the prescribed maximum allowed; and/or
- A damaged gross pollutant basket or liner may allow the loss of trapped material.

3.I Calibration Feature.

The Enviropod® LittaTrap™ FC model does not have a calibration feature.

3.J Photos.

The photos of the installation process are below. Post-installation photos are included in the case studies in the appendices.

Figure 9: Installation Process Part 1

Figure 10: Installation Process Part 2

Figure 11: Post Installation Operation

Figure 12: Example of Post Installation and Maintenance

3.K Material Types:

The table below lists all materials used in the Enviropod® LittaTrap™ FC. All materials are UV stabilized and have been designed and tested to take the loads encountered in a catch basin.

Components	Material
Basket Mesh	Polyethylene
Basket Strapping	Polyethylene
Labels	Nylon
Strap	Polyester
Batten and Basket Corners	Nylon PA6 + Glass Fiber
Overflow Spacer	Polyethylene
Top Batten	Glass Fiber Pultrusion Rod
Basket Collar (frame)	PVC
Filter Box	PVC
Seals	HDPE + LDPE
Hinged Vector Port Seal	HDPE + Nitrile Rubber
Filter Box Screws	Galvanized Steel
Support Bracket Unistrut	Galvanized Steel
Support Bracket Unistrut Nut and bolt	Galvanized Steel
Support Bracket Mounting Arm	Nylon PA66 + Glass Fiber
Anchor Bolts	Galvanized Steel
Full Capture Liner	Polyester + PVC

3.L Design Life.

The Enviropod® LittaTrap™ FC Filter box and support bracket components have a minimum 20-year life expectancy. The gross pollutant basket has a 5-year life expectancy. The system comes with an 8-year limited warranty on static parts. Replacement parts are available from Enviropod. The design life is dependent on the correct operation in accordance with the manufacturer's recommendations.

4.0 INSTALLATION GUIDENCE.

4.A Standard device installation procedures including calibration instructions;

A detailed installation manual for the Enviropod® LittaTrap™ FC is attached in the APPENDIX B – Installation Manuals. An installation video is at the following link. https://www.enviropod.com/products/littatrap?gclid=CjwKCAjwmZbpBRAGEiwADrmVXt#Installation

4.B Description of device installation limitations and/or non-standard device installation procedures

The Enviropod® LittaTrap™ FC has the following optional components. These optional components address specific installation challenges as detailed in the bullet points below.

- Seal extension kits: For irregular sized catch basins.
- Manhole adaptor kit: For manhole catch basins
- Hinge Vector Port control access port seal kit: For grated inlets

4.C Methods for diagnosing and correcting installation errors

A pre-installation and installation checklist are provided in the installation manual APPENDIX B – Installation Manuals. The installation checklist ensures correct installation is undertaken and includes the following items:

1. The catch basin is clean and free of trash and debris.
2. The support bracket is installed 200 mm (7 7/8") below surface and level and below any curb entries.
3. Anchor bolts are tightened secure and firmly support the bracket.
4. Filter box positioned so the gross pollutant basket can easily be removed.
5. Basket is the correct size for the clear opening of the catch basin grate.
6. Seals are securely fastened to filter box and support bracket (if appropriate).
7. Seals extend to walls of catch basin have fall across the profile.
8. Basket and liner is placed in the filter box.
9. Check for gaps greater than 5 mm.
10. Take photos of the installed unit with GPS location services on.
11. All materials cleared from installation
12. Grate closed.

Enviropod has a process of quality assurance (QA) to ensure all designed and manufactured products are free from defects or errors. The process includes checks of all 3rd party parts as well as all manufactured parts at the manufacturer's facilities.

QA procedures include load and temperature testing of randomly selected units at the manufacturer's facilities. After each production run and after delivery to our warehouse facility, random quality assurance checks are performed.

5.0 OPERATION AND MAINTENANCE INFORMATION.

5.A Inspection procedures and frequency considerations;

Health and safety:

Enviropod recommends that owners check and utilize any applicable State and local regulatory requirements for applying a Site-Specific Safety Plan before undertaking any installation, inspection, or maintenance service. Personal Protection Equipment (PPE) is required when installing, inspecting, or maintaining a Enviropod® LittaTrap™ FC . Field personnel shall utilize personal protection equipment (PPE) as required, including gloves, long sleeve shirts or outwear, long pants, Hi-Viz clothing as well as steel toe shoes. For additional advice on the relevant health and safety requirements, we recommend that you consult the local health and safety regulator.

Inspections

All trash capture treatment control devices require maintenance to remove trapped contaminants and to minimize bypass. Due to the variable nature of stormwater pollution and localized site pollutant loadings, maintenance frequencies vary for different sites and different rainfall characteristics.

It is recommended to inspect the LittaTrap Enviropod® LittaTrap™ FC at least four times per year during the first year of operation to determine seasonal and annual maintenance requirements. Initial inspection frequency is suggested every three months. However, if there is a presence of a high loading activity in the upstream, catchment inspection frequency should be revised. High loading activity in the upstream catchment includes the following:

- A high number of trees or vegetation;
- Construction activity;
- Unsealed roads

Additional inspections are recommended after extreme rainfall events. The LittaTrap FC should be inspected at every maintenance to check for any unforeseen damage or evidence of illicit discharge.

5.B Description of maintenance frequency considerations related to the device's hydraulic capacity at various levels of trash capture volumes.

Maintenance of the Enviropod® LittaTrap™ FC is recommended when more than 75% of the maximum trash capture volume of the model size installed. Maintenance frequency is typically 1 or 2 times per a year. Maintenance should be undertaken as per municipal stormwater permit.

5.C Maintenance procedures, including procedures to clean the trash capture screen;

The Enviropod® LittaTrap™ FC maintenance service involves two activities. These activities are as follows:

1. Routine removal and emptying of the gross pollutant basket and liner; and
2. The periodic vacuum of oils and sediment residuals from the catch basin sump if required.

The suggested maintenance of grate or combination catch basin is by "hand" to reduce operational cost. Enviropod® LittaTrap™ FC basket is fitted with lifting handles at the top and bottom of the basket, so no personal contact with retained pollutants is required.

Enviropod recommends the use of a vacuum induction truck for the maintenance of curb entry catch basin LittaTraps.

Enviropod® LittaTrap™ FC Hand Maintenance

It is recommended that the Enviropod® LittaTrap™ FC basket and liner be emptied when 75% Full. To empty the Enviropod® LittaTrap™ FC, it is a simple one-minute exercise "Lift, Tip, Replace". The following steps detail hand maintenance:

1. Establish a safe working area per typical catch basin service activity.
2. Remove grate/access cover.
3. Remove the basket and liner with two lifting hooks or lift by hand through the loops on the top of the basket. Excess debris should be scooped out first if the basket is over half full.
4. Pour contents of the basket and liner into a disposal container.
5. Replace grate.

Enviropod also provides detailed maintenance instructional videos on its website, and YouTube page links to these are below

Hand Maintenance. https://www.youtube.com/watch?v=zyTtUS-tHEo&t=2s
"J" Hook Maintenance https://www.youtube.com/watch?v=Su7Epduk6OA
Vacuum Induction Maintenance https://www.youtube.com/watch?v=JztUeiJRGgk

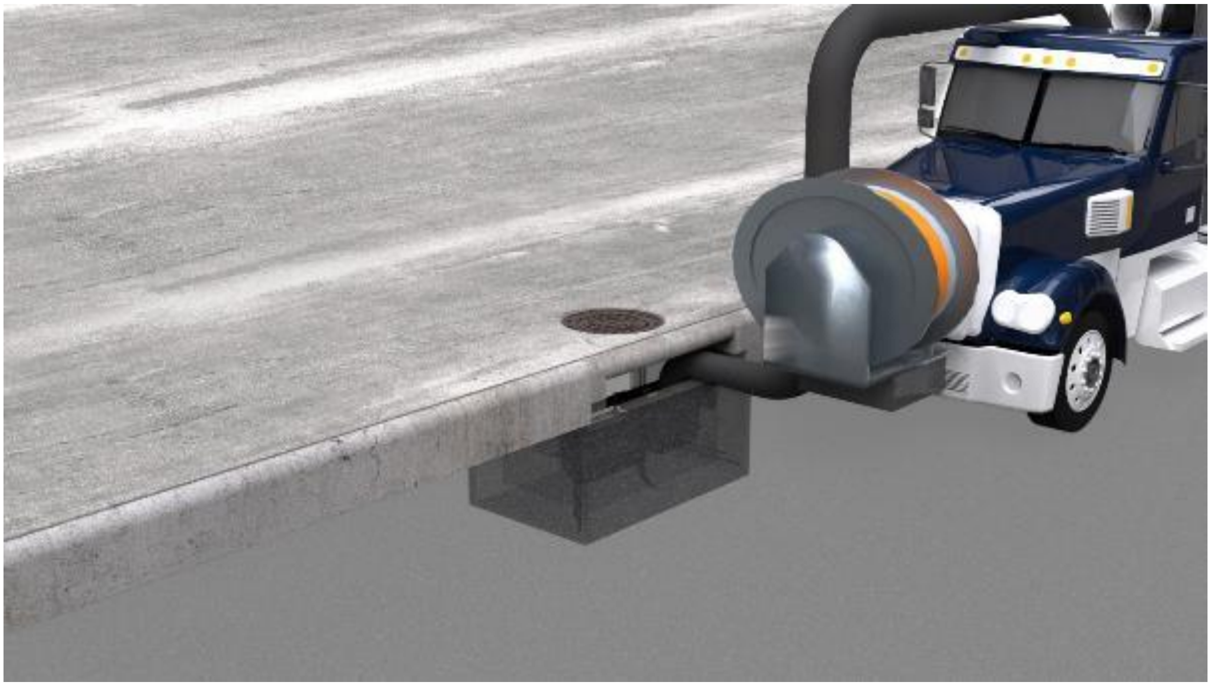
The following video shows the hand maintenance of The Enviropod® LittaTrap™ FC when the device is 100% full, and all material is removed from the basket without physically touching any debris.
https://www.youtube.com/watch?v=hmspyuV0HfI

The steps for induction maintenance are detailed below:

1. Establish a safe working area per typical catch pit service activity.
2. Remove grate/access cover.
3. Vacuum accumulated debris from the basket.
4. Vacuum contents from the base of the catch basin (if required).
5. Inspect basket, filter box, and seals for any damage.
6. Replace grate/access cover.

The following link below is a maintenance video of the Enviropod® LittaTrap™ FC and wet sump catch basin with an induction vactor truck. The video shows how all material is easily removed from the Enviropod® LittaTrap™ FC gross pollutant basket without the removal of the basket.
https://www.youtube.com/watch?v=hu280_muSZM&t=7s

For curb entry catch basins, the geometry of the Enviropod® LittaTrap™ FC basket allows a vactor hose to enter the basket through the curb opening, as shown in the figure below.



Enviropod LittaTrap basket and Full Capture Liner cleaning.

Material trapped in the Enviropod® LittaTrap™ FC basket and liner is easily removed by shaking the basket or tapping the basket against a hard surface.

Record-Keeping Maintenance Procedures

- Following maintenance and/or inspection, the maintenance contractor shall prepare a maintenance/inspection record. The record shall include any maintenance activities performed, amount and description of debris collected, and condition of the system and its various filter mechanisms.
- The owner shall retain the maintenance/inspection records in accordance with local and/or state requirements.

5.D Essential equipment and materials for proper maintenance activities;

The following equipment is helpful when conducting Enviropod® LittaTrap™ FC Grate Inlet and Curb Inlet inspections and maintenance:

- Recording device (pen and paper form, voice recorder, iPad, etc.)
- Personal protection equipment (protective footwear, gloves, hardhat, safety glasses, high visibility clothing, etc.)
- Traffic control equipment (cones, barricades, signage, flagging, etc.)
- Manhole hook or pry bar
- Flashlight
- Tape measure
- Vacuum truck (optional)
- Pressure washer (optional)
- Replacement oil absorbent pouches (Optional)

5.E Description of the effects of deferred maintenance on device structural integrity, performance, odors, etc.; and

Delayed or deferred maintenance may reduce the trash capture capacity of the Enviropod® LittaTrap™ FC system and therefore impact water quality. Long term neglect of maintenance may affect the inlet capacity of the catch basin. To address this, the Enviropod® LittaTrap™ FC basket is designed to be easily removed when full or over capacity.

5.F Repair procedures for the device's structural and screening components.

In the unlikely event of an Enviropod® LittaTrap™ FC structural component requiring repair, the system can be easily uninstalled by reversing the installation procedure. Once uninstalled any faulty part or component can be replaced.

6.0 VECTOR CONTROL ACCESSIBILITY

6.A. The date the device application was submitted for vector control accessibility design verification via email to the Mosquito Vector Control Association of California.

This revised application has been submitted to the Mosquito Vector Control Association of California's (MVCAC) review for design verification on the 1st of July 2020. Attached in the APPENDIX F – MCVAC Approval Letter dated 20th of July 2020. Included in the submission are videos that demonstrate the operation of the vector inspection seal with the grate inlet on and off.

Vector Port Video 1:
https://www.youtube.com/watch?v=73hDSJ7Z5Nc&feature=youtu.be
Vector Port Video2:
https://www.youtube.com/watch?v=Dq0Pw2lp3So&feature=youtu.be

6, B. Description and/or video that demonstrates how mosquito vector control personnel can readily access the bottom of the storm water vault and/or Device for visual observation and mosquito treatment;

The Enviropod® LittaTrap™ FC device utilizes a basket and "Full Capture" liner with a screen size 4.8mm X 3.8 mm which is suspended above the floor of the catch basin. This functionality greatly reduces the possibility of standing water in the system. Therefore, vector hazards are not anticipated as a result of the operation of the catch basin insert. The Enviropod® LittaTrap™ FC basket and liner design also allow easy hand removal giving clear access and visibility to the base or sump of the catch basin during maintenance activities.

All Enviropod® LittaTrap™ FC grated inlet installations in California will be installed with a “Hinged Vector Port Seal” (HVPS) that will allow full visual access of the catch basin floor or other internal areas below the Enviropod® LittaTrap™ FC. The HVPS will also allow personnel to take samples or apply treatment, if required.

The HVPS takes the form of a spring-loaded hinged HDPE and nitrile rubber seal. The inspection seal is easily lifted to 90 degrees with a J hook inserted into the lifting eye attached to the seal. This action provides a clear opening for inspection across the front face of the catch basin. Upon release the hinged seal automatically closes ensuring no gaps of 5mm or larger exist between the seal and the catch basin wall. The hinged vector port seal can be opened with the catch basin grate closed with the use of a J Hook as shown in Figure 13.

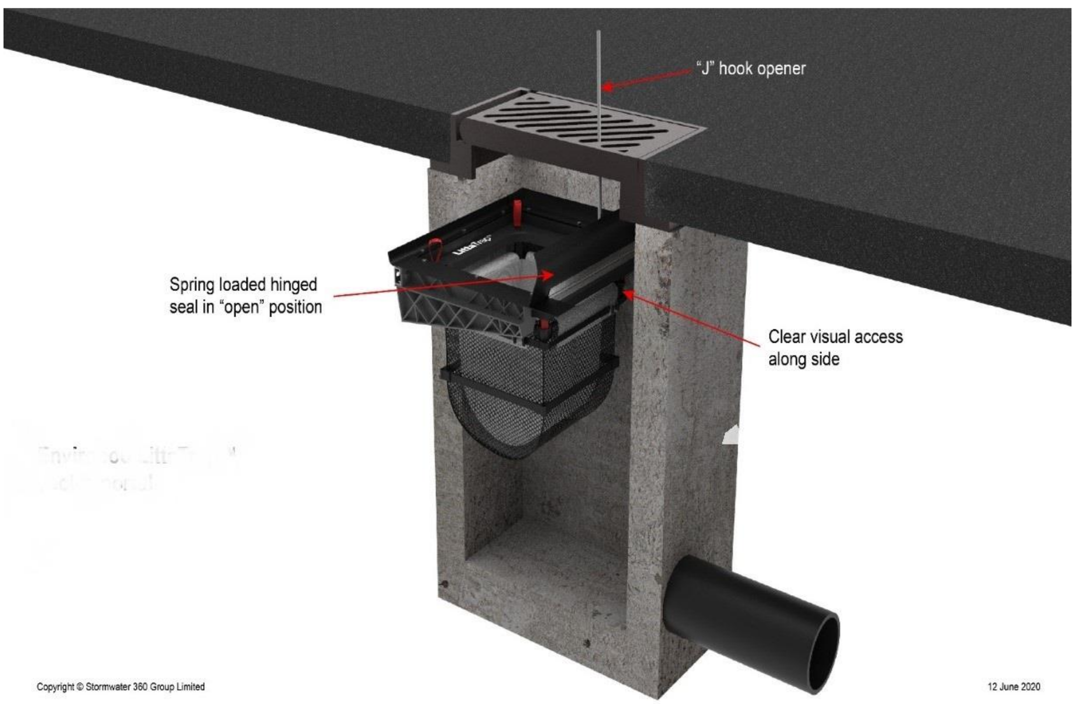


Figure 13: Vector Control Inspection

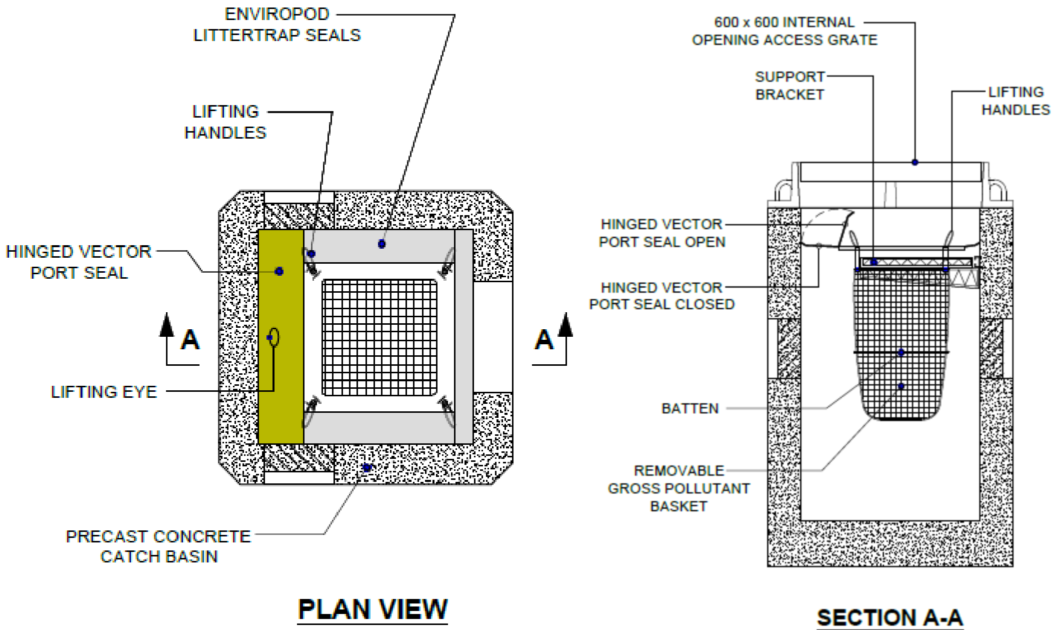


Figure 14: Vector Portal location for Grated Inlet

Figure 15 and Figure 16 show photos of the hinged vector port seal in a closed and open position. Dimensions of the clear opening vary with the size of unit provided. The vector port size will vary with the size of the catch basin and Enviropod® LittaTrap™ FC size used. Table 4 details the vector port size for each model of Enviropod® LittaTrap™ FC

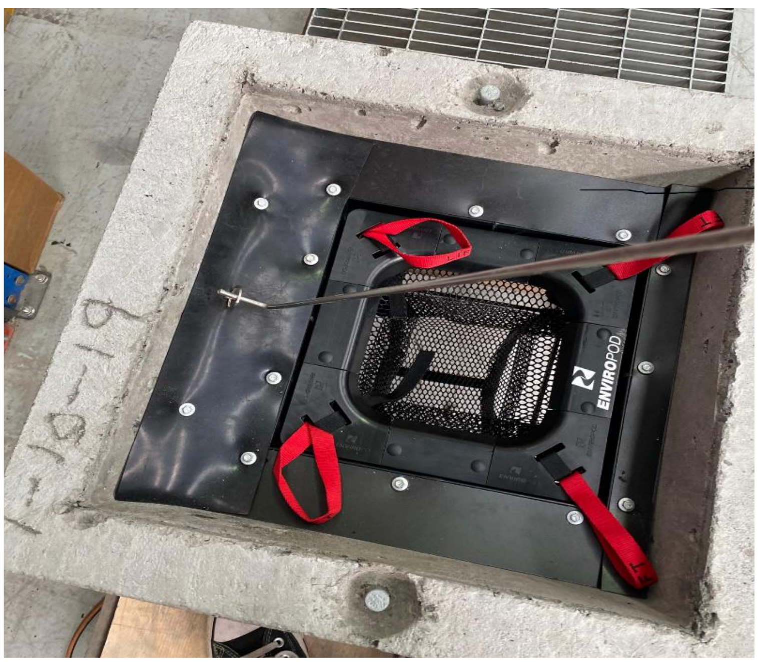


Figure 15: Enviropod® LittaTrap™ FC with Vector Inspection seal in closed position.

Figure 16: Enviropod® LittaTrap™ with Vector Inspection in open position.

Catch Basin Size	Enviropod® LittaTrap™ Size	Vector Port Size.
18" x 18"	LTFC4545	3" x 18"
24" x 24"	LTFC6060	3 1/2" x 24"
36" x 24"	LTFC9060	3 1/2" x 36"
36" x 36"	LTFC9060 + Seal Extension Kit	3 1/2" x 36"
48" x 48"	4 x LT6060	3 1/2" x 48"

Table 4: Vector Port Opening Size for Different Enviropod® LittaTrap™ FC Size

6.C MVCAC Approval Letter

Attached in the Appendix G is the MVCAC approval letter dated July 20, 2020. This letter verifies that the Enviropod® LittaTrap™ FC design allows full visual access for presence of standing water and treatment of mosquitoes when necessary.

7.0 RELIABILITY INFORMATION.

7.A Estimated design life of Device components before major overhaul;

The Enviropod® LittaTrap™ FC Filter box and support bracket components have a minimum 20-year life expectancy. The basket and "Full Capture" liner has a 5-year life expectancy. Replacement parts are available from Enviropod. The design life is dependent on correct operation in accordance with the manufacturer's recommendations.

7.B Warranty Information; and

Enviropod provides an 8-year limited warranty on all static parts. The basket and liner have a one-year limited warranty for manufacturing defects.

7.C Customer support information.

Enviropod Canada Limited is a New Zealand based company with area representatives in California and in Ontario Canada.

California Contact:
William Harris
34428 Yucaipa Blvd., #344
Yucaipa, CA 92399
willharrisjr@gmail.com
Ph (909) 499-7298

Corporate Office:
Stormwater360 Group
7C Piermark Drive
Rosedale 0632
North Shore
Auckland New Zealand
Ph +64 9 4765 586

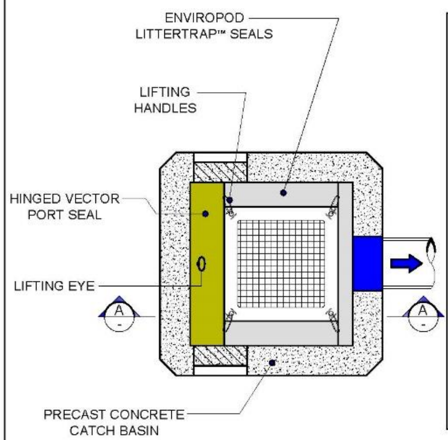
8.0 Field/Lab Testing Information and Analysis.

Enviropod has commissioned 3rd party laboratory testing on the screening elements as well as the system. Two laboratory testing reports are included in APPENDIX D – Lab Testing Information.

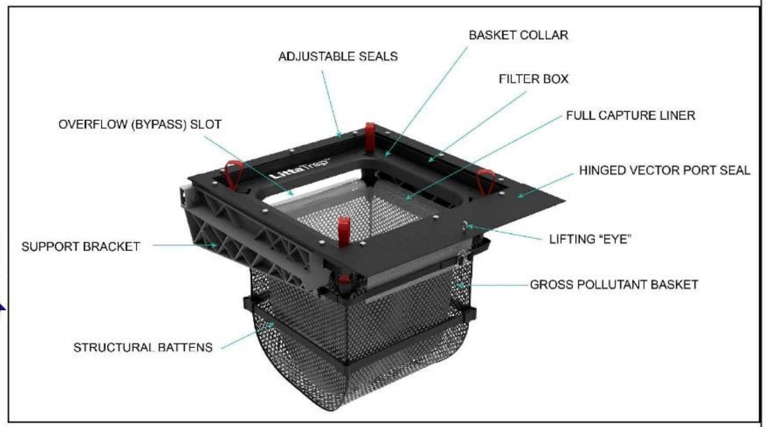
The hydraulic laboratory testing data has been used to develop empirical relationships between head loss and flow through the screens which are used in the design of each The Enviropod® LittaTrap™ FC model size. Hydraulic analyses show that an empty The Enviropod® LittaTrap™ FC for a 2ft x 2ft catch basin (LT6060) can convey 413 l/sec (14.6 CFS) without bypass. Further analysis shows a conveyance of 96 l/sec (3.4 CFS) through the liner when the basket is 1/2 full without bypass. The maximum bypass flow for a The Enviropod® LittaTrap™ FC (2ft x 2ft) is 93 l/sec (3.3 CFS) when installed in accordance with the manufacture's recommendation. An Example of the hydraulic calculations are included in APPENDIX G – Example Hydraulic Calculations.

A version of the Enviropod® LittaTrap™ FC with basket (screen size 4.9mm – 5.5mm) and no mandatory liner has undergone full size laboratory trash capture testing. No formal "Full Capture" test protocol has been provided by the California State Water Board Trash Implementation Program. As such, a test protocol based on the Stormwater Equipment Manufacturers Association (SWEMA) and the California Department of Transportation (Caltrans) full capture testing was developed. The testing demonstrated 100% capture of particles 5 mm or larger in size and 99.6% total capture of solids at 15 l/sec for a unit of a 2ft x 2ft catch basin when 85% full. This information has been included to demonstrate the technologies ability (as a whole) to intercept and capture trash 5mm and larger. It should be noted that this application is for the Enviropod® LittaTrap™ FC which has a full capture liner with a screen size of (4.8mm x 3.9mm). The Enviropod® LittaTrap™ FC has a higher capture rate and reduced hydraulic conductivity because of the finer screen size of the Full Capture liner. Flow rates and design parameters in the application are for the Enviropod® LittaTrap™ FC.

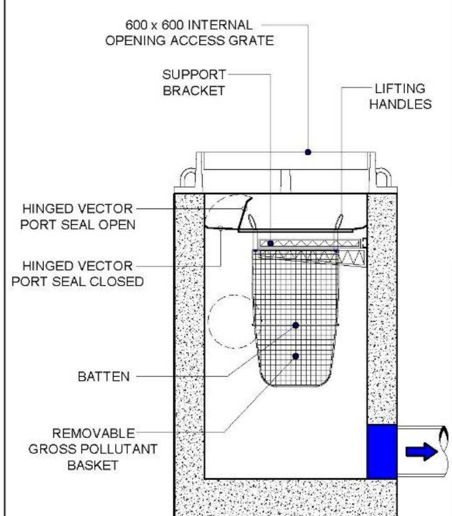
APPENDIX A – Generic Drawings



PLAN VIEW



ENVIROPOD LITTATRAP™ FC COMPONENTS



SECTION A-A

ENVIROPOD LittaTrap™ FC MODELS AND SIZES

Nominal Catch Basin Size (inch)	LittaTrap FC Model Size	Bracket Width (inch)	Min Filter Box Size (Without Seals)		Max Filter Box Size (With Seals)		Basket Collar Size		Basket Depth (inch)
			Length (inch)	Width (inch)	Length (inch)	Width (inch)	Length (inch)	Width (inch)	
18 x 18	LTFC4545	17.1	15.4	15.4	20.6	20.6	12.0	12.0	15.7
24 x 24	LTFC6060	22.4	20.2	20.2	25.3	25.3	17.3	17.3	15.7
36 x 24	LTFC9060	34.3	32.0	17.6	37.1	22.7	29.1	17.3	15.7

ENVIROPOD LittaTrap™ FC FLOW AND STORAGE SPECIFICATION

Basin Size (Inch)	LittaTrap FC Model SIZE	Screen Area in²	Maximum Trash Capture Volume (MCTV) ft³	Design Flow Rate 50% MCTV CFS	Standard Bypass Flow CFS
18 x18	LTFC4545	601	0.7	2.1	2.1
24 x 24	LTFC6060	969	1.6	3.2	3.3
36 x18	2 x LTFC4545 *	1203	1.4	4.2	4.2
36 x 24	LTFC9060	1473	3.0	4.8	4.5
36 x 36	LTFC9060 + Seal Extension Kit **	1473	3.0	4.8	4.5
48 x 48	4 x LTFC6060 ***	3875	6.5	12.9	13.2

The Enviropod LittaTrap™ has an adjustable bypass. Flow rates listed are for a factor set bypass. Please contact Enviropod for specific bypass requirements.

For curb entry catch basins a series of standard LittaTrap™ models and seal extension kits are used to extend across the length of the curb entry.

The "EnviroPod LittaTrap™" may be protected by one of the following Canadian, USA or International patent numbers and has other patents pending : 2,810,974, 13/824,376, 15/459,964, 2011302712, 588049

PATENT No.

ENVIROPOD

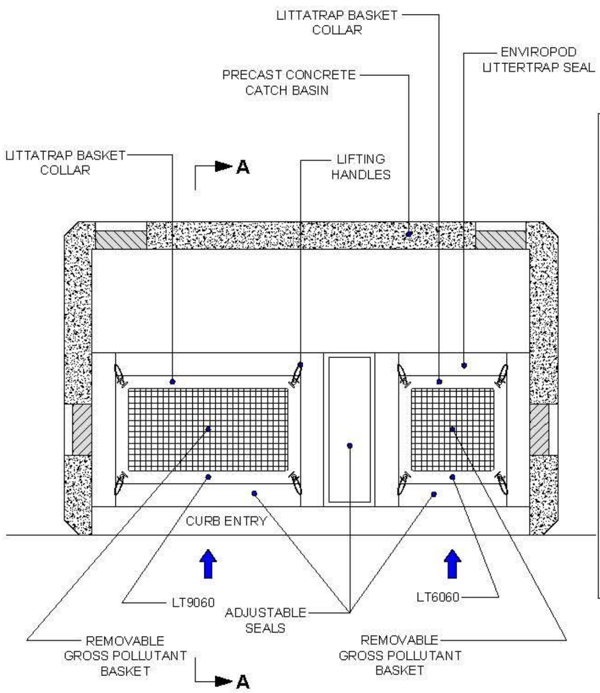
www.enviropod.com

ENVIROPOD LittaTrap™ FC
WITH VECTOR INSPECTION PORT
SPECIFICATION DRAWING
(IMPERIAL UNITS)

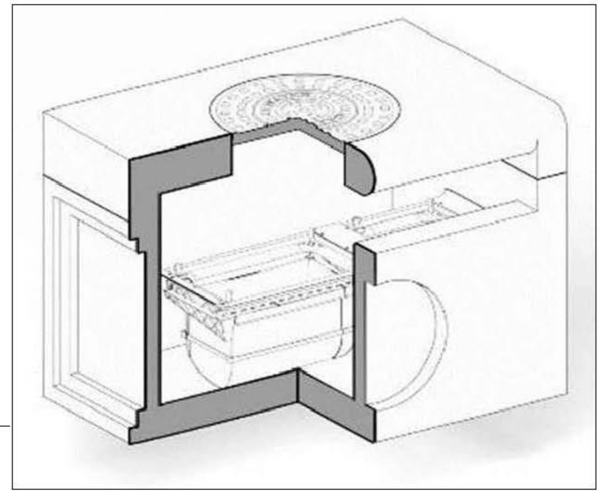
REV #	DATE	REVISION DESCRIPTION	BY
B	10.04.20	FULL CAPTURE LINER	R.P.
C	21.04.20	VECTOR PORT UPDATE	R.P.
D	29.06.20	VECTOR INSPECTION PORT	R.P.
E	30.07.20	TABLE REVISED	R.P.
F	09.09.20	TABLE REVISED	R.P.

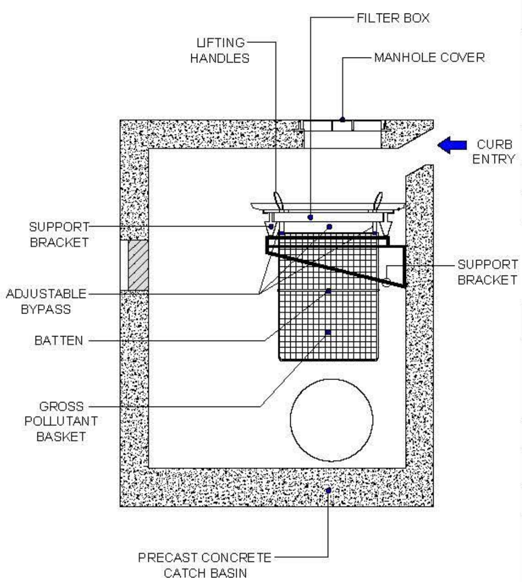
SHEET NUMBER 1 OF 1

DATE : 13.07.19 | SCALE : NTS | DRAWN : R.P. | CHECKED : M.H. | PROJECT No : | REV : F



PLAN VIEW





SECTION A-A

ENVIROPOD LittaTrap™ FC MODELS AND SIZES

Nominal Catch Basin Size (inch)	LittaTrap FC Model Size	Bracket Width (inch)	Min Filter Box Size (Without Seals)		Max Filter Box Size (With Seals)		Basket Collar Size		Basket Depth (inch)
			Length (inch)	Width (inch)	Length (inch)	Width (inch)	Length (inch)	Width (inch)	
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For curb entry catch basins a series of standard LittaTrap™ models and seal extension kits are used to extend across the length of the curb entry.

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Enviropod LittaTrap™ FC
CURB ENTRY
GENERIC DRAWING
(IMPERIAL UNITS)

REV #	DATE	REVISION DESCRIPTION	BY
A	13.07.19	FIRST ISSUE	R.P.
B	10.04.20	TABLE REVISED	R.P.
C	21.04.20	VECTOR PORT UPDATE	R.P.
D	30.07.20	TABLES REVISED	R.P.
E	09.09.20	TABLES REVISED	R.P.

SHEET NUMBER 1 OF 1

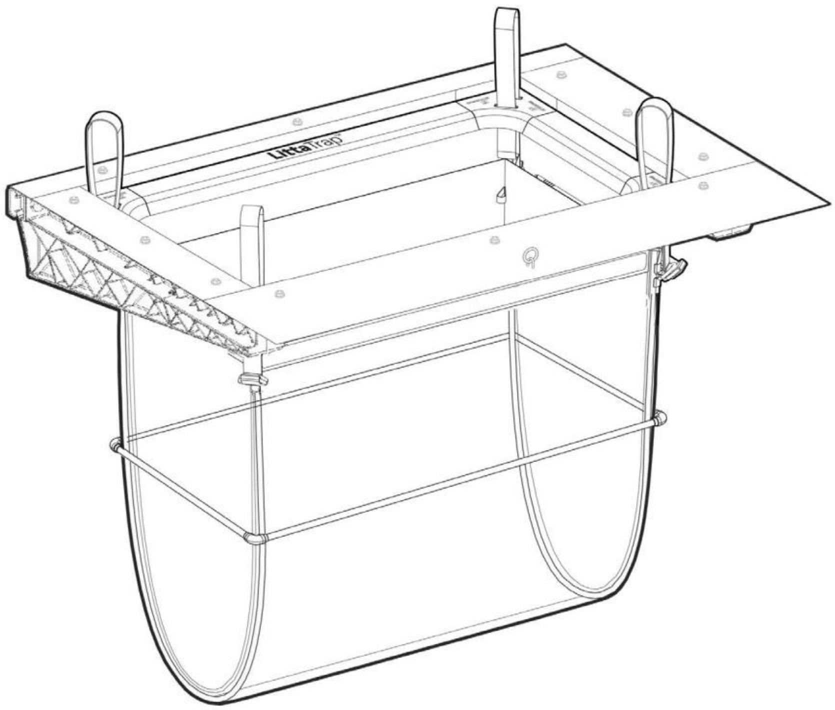
DATE : 13.07.19 | SCALE : NTS | DRAWN : R.P. | CHECKED : M.H. | PROJECT No : | REV : E

APPENDIX B – Installation Manuals

LittaTrap™

CATCH BASIN INSERT FOR FULL CAPTURE OF TRASH AND GROSS POLLUTANTS

Enviropod LittaTrap™ FC
For Grated Inlet Catch Basins



For installation you will need:

- Measuring Tape
- Box Knife
- Rotary Hammer Drill and 3/8″ (10mm) Masonry Bit
- Socket Set with 1/2″ (13mm) & 11/16″ (17mm) Sockets
- Battery Drill/Driver & 5/16″ (8mm) Socket Bit

ENVIROPOD.COM

ENVIROPOD™

The "EnviroPod LittaTrap" may be protected by one of the following Canadian, USA or International patent numbers and has other patents pending : 2,810,974 , 13/824,376 , 15/459 ,964 , 2011302712, 588049

WARNING

It is essential to follow any local or national Occupational Health and Safety Laws when installing or maintaining LittaTrap™ filters. Ensure all required Personal Protection Equipment (PPE) is worn at all times and Traffic Management rules are adhered to.

When maintaining the LittaTrap™ follow all local or national guidelines for manual lifting whenever hand maintenance is actioned.

SITE SAFETY

We recommend checking your local website for a Site Specific Safety Plan before undertaking any installation.

HEALTH AND SAFETY

Personal Protection Equipment (PPE) is required when installing or maintaining a LittaTrap™. This will mean long sleeves, long pants, Hi-Viz, and closed shoes.

We also recommend the use of gloves when maintaining the LittaTrap™.

When maintaining the LittaTrap™ by hand it is essential to identify and assess the weight of the captured material before lifting, as weights can vary depending on the filter contents.

For additional advice on the relevant Health and Safety requirements we recommend that you consult your local website.

MAINTENANCE

All treatment devices require maintenance to remove trapped contaminants and prevent overflow bypass or flooding. Due to the variable nature of stormwater pollution and localised site pollutant loadings, maintenance frequencies vary for different sites and different rainfall characteristics. It is recommended to inspect your LittaTrap™ frequently over the first year of operation to determine seasonal and annual maintenance requirements.

The LittaTrap™ filter should be maintained when it is approximately 2/3 filled with pollutants or if the filter fabric becomes blocked from hydrocarbons, organics or sediment.

Maintenance is carried out by lifting the filter insert out of the frame assembly using 'J' hooks and emptying into a suitable vessel or trailer to be taken away from the site and disposed of appropriately for the contaminants. Please ensure that all care is taken when disposing of litter as the rubbish caught could contain sharp and dangerous objects.

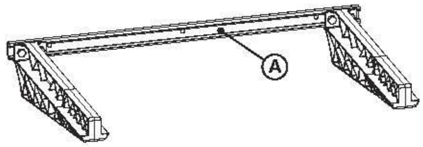
If there are no "J" hooks the bag can be lifted out by the pulling the Filterbag handles. If the filter fabric is clogged, it should be water blasted into a contained vessel prior being fitted back into the frame assembly.

When carrying out maintenance of the LittaTrap™, it is essential to inspect the overflow bypass slots at the top of the filter insert to ensure no pollutants have been caught and may restrict the flow.

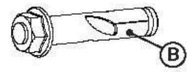
If the LittaTrap™ insert is too heavy to lift by hand, it will need to be maintained using a vacuum inductor truck. When cleaning using a vacuum inductor truck it is essential to take care to not damage the bag from the induction boom. Sediment and pollutants should be vacuum inducted until approx 3/4 empty, and then the remainder lifted and emptied by hand.

SUPPLIED COMPONENTS

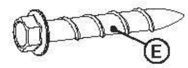
Part A – x1
Bracket



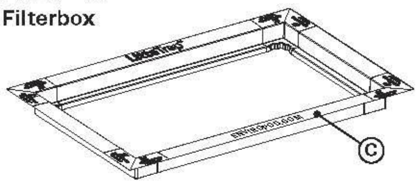
Part B
Masonry Anchor Bolts



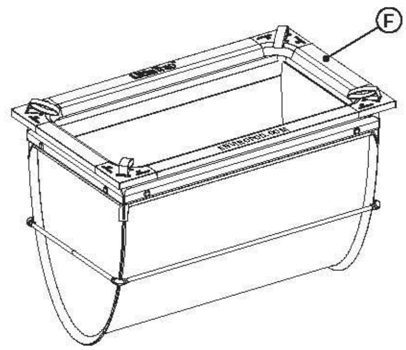
Part E
Self Drilling Hexhead Screws



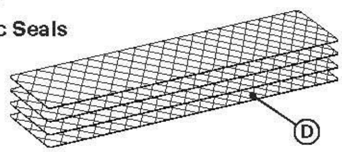
Part C – x1
Filterbox



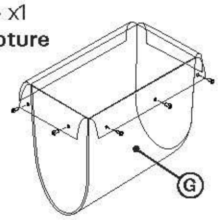
Part F – x1
Filterbag



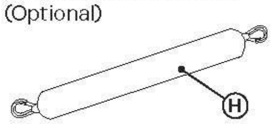
Part D
Plastic Seals



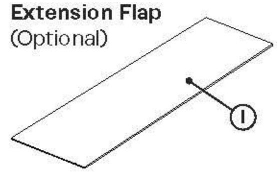
Part G - x1
Full Capture Liner



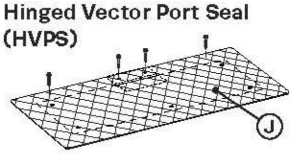
Part H - x1
Oil Absorbant Pouches
(Optional)



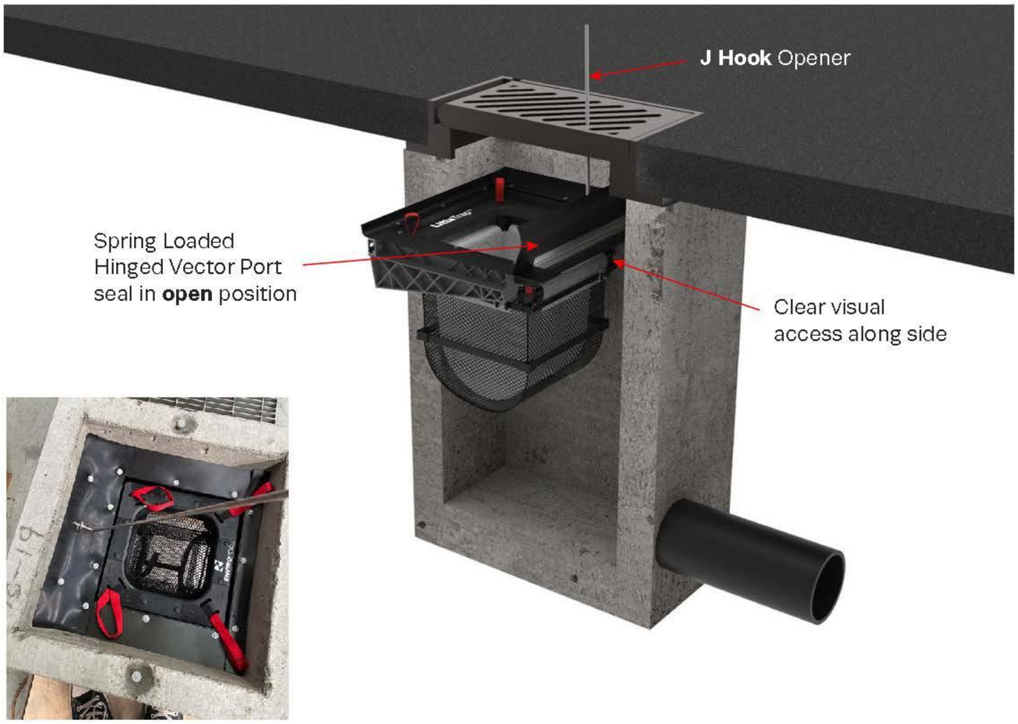
Part I - x1
Extension Flap
(Optional)



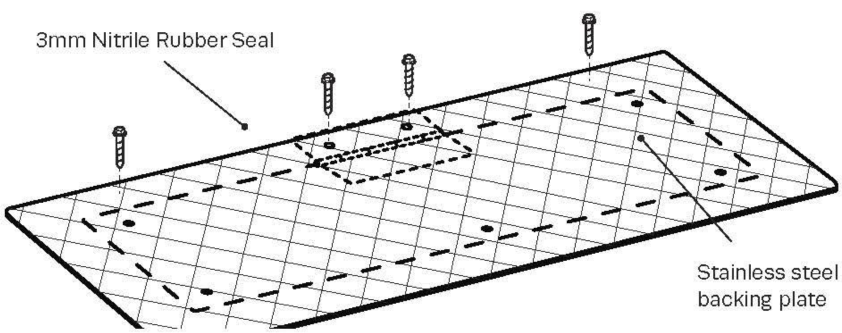
Part J - x1
Hinged Vector Port Seal (HVPS)



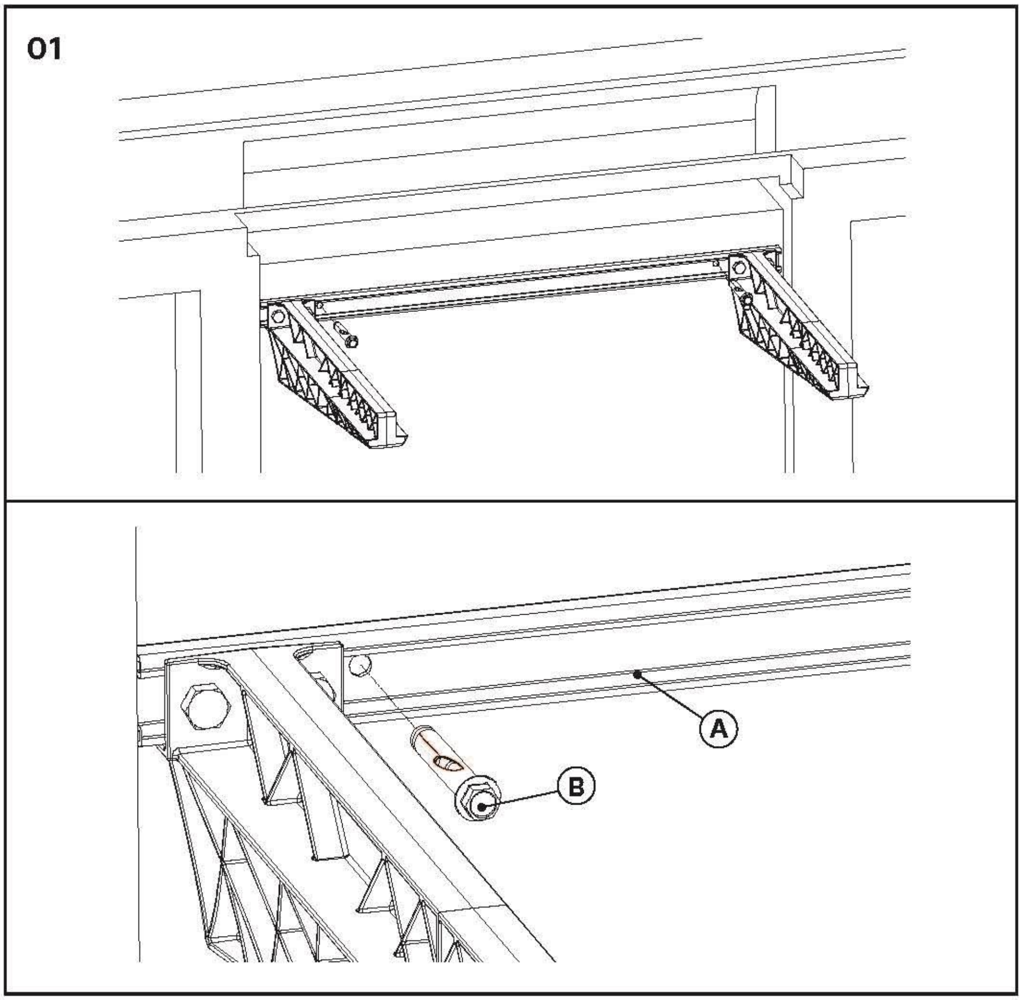
Hinged Vector Port Seal (HVPS)



Part J – x1
Hinged Vector Port Seal (HVPS)



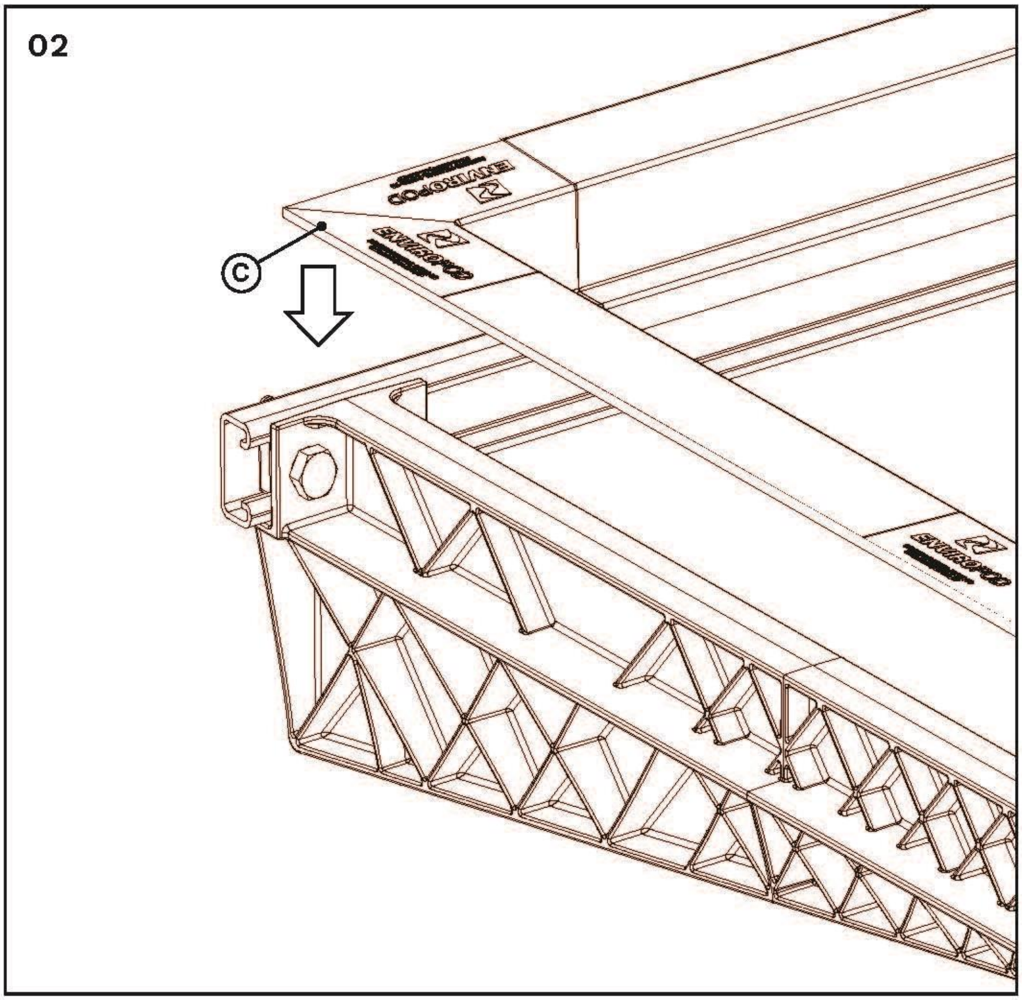
BRACKET INSTALLATION



STEP 01

Place the **Bracket** support at approximately 8" below the grate or low enough to intercept any kerb entry inlet and ensure it is level. Using the **Masonry Drill**, drill holes into the pit wall using the **Bracket** holes as guidelines.

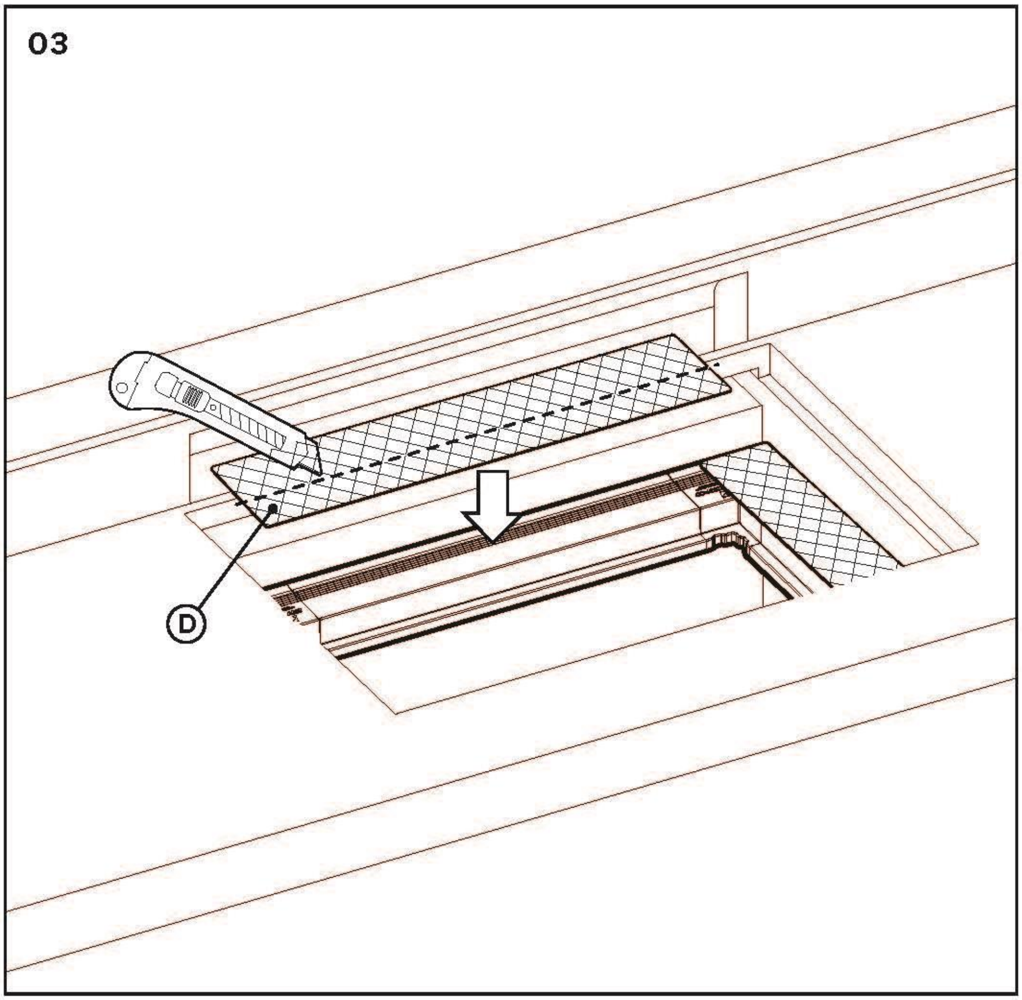
Insert the **Anchor Bolts** and using the **1/2" (13mm) socket**, secure through the bracket into the wall and tighten to secure.



STEP 02

Place **Filterbox** onto the bracket & position hard against bracket assembly to allow maximum opening for the Hinged Vector Port Seal on the opposite side of the Filterbox.

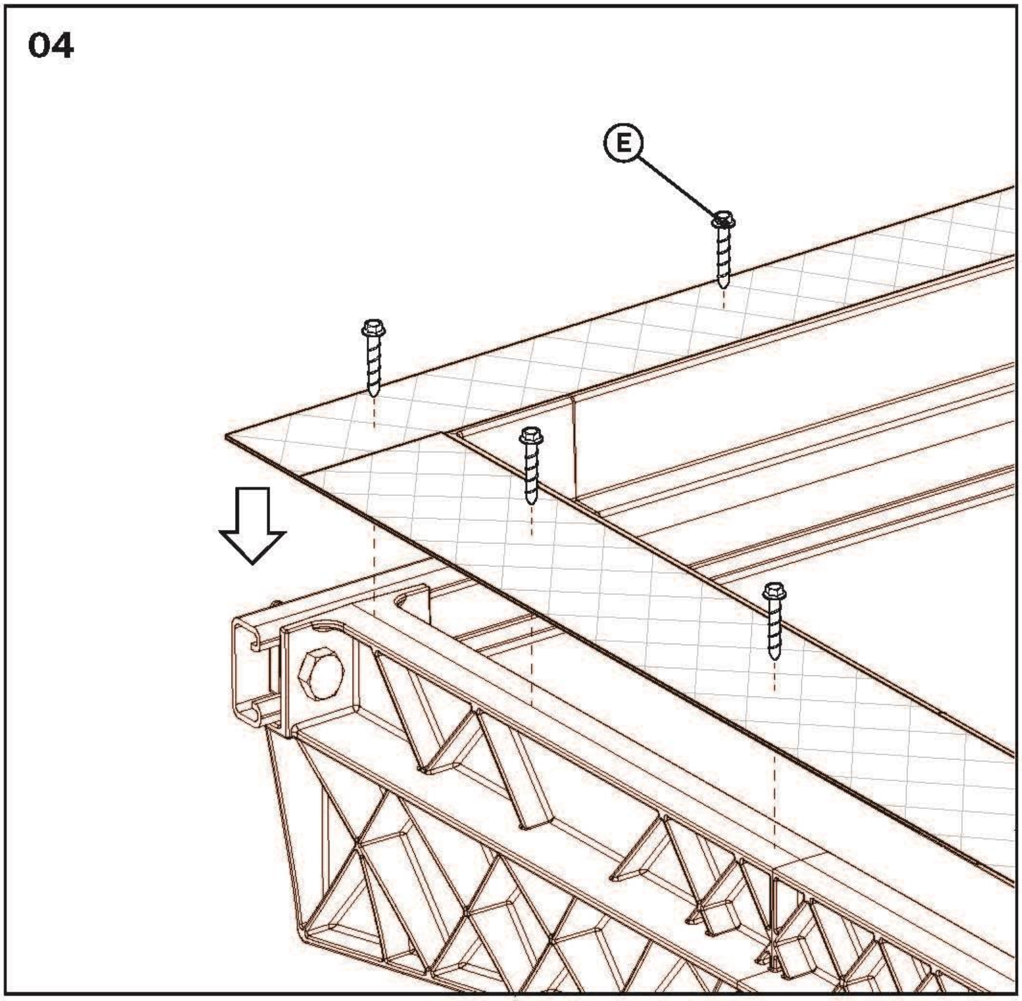
FILTERBOX INSTALLATION



STEP 03

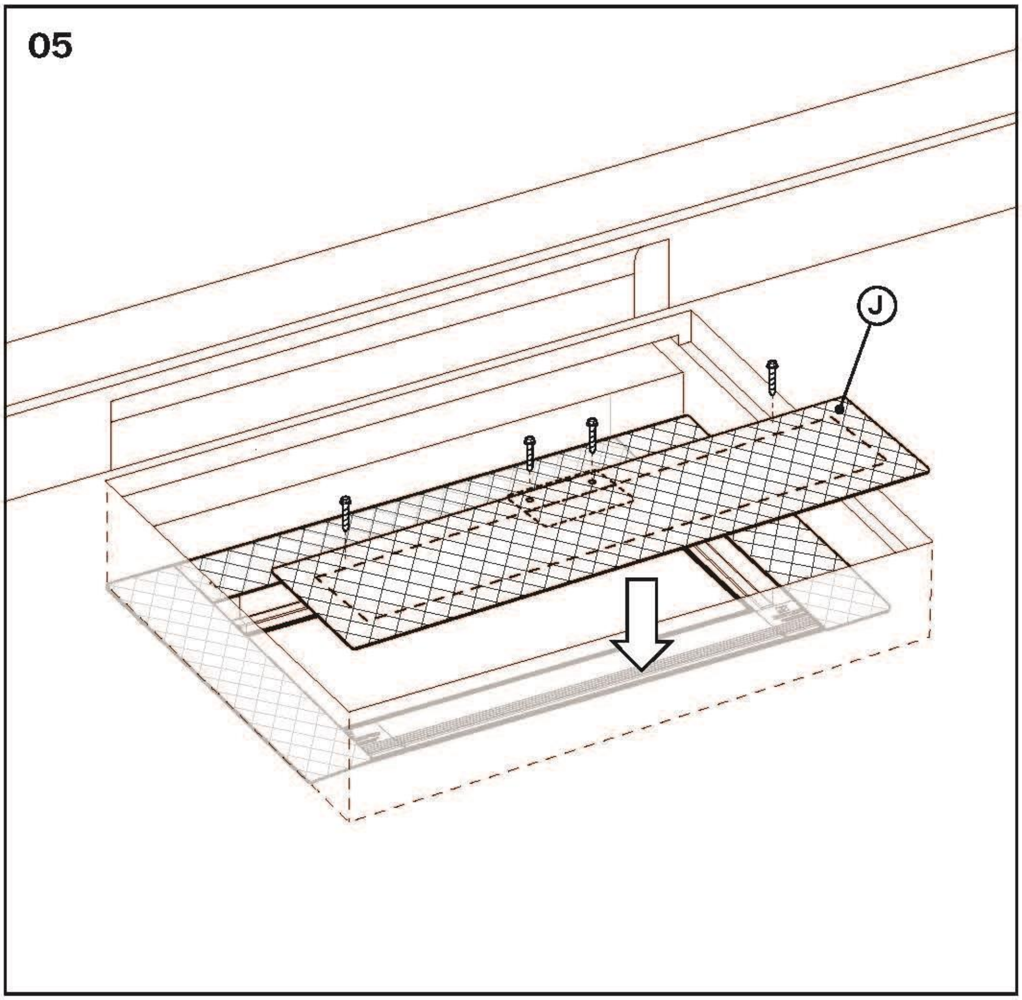
Measure & trim **Plastic Seals** to size with **Box Knife** to seal gaps between **Filterbox** & pit wall.

Make sure the **Plastic Seals** are flush with the **Filterbox** inside edge and do not overlap the inside face.



STEP 04

Secure the unit using the **Battery Drill** to screw the **Self Drilling Screws** through the **Plastic Seals** into the **Filterbox** and into **Bracket**.
Complete on bracket assembly edge and adjust sides.



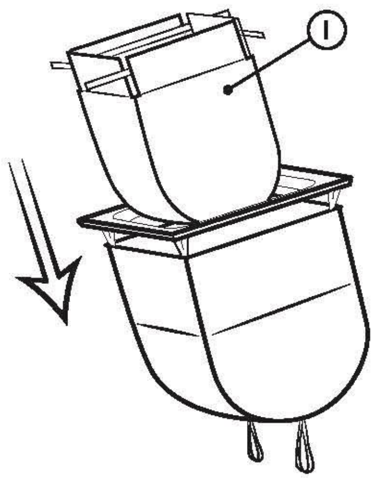
STEP 05

Screw the **Hinged Vector Portal Seal (HVPS)** to the front face of **Filterbox** and **Bracket** to seal gaps.

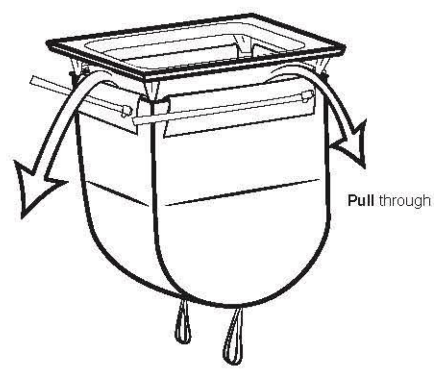
LINERBAG INSTALLATION GUIDE – ALL MODELS

06

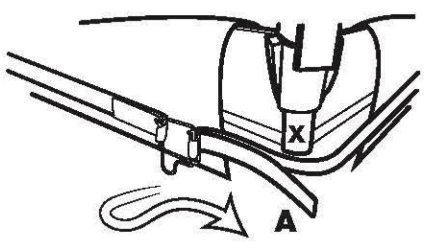
6.1 Insert Full Capture LinerBag
Check LittaTrap & LinerBag **size** match



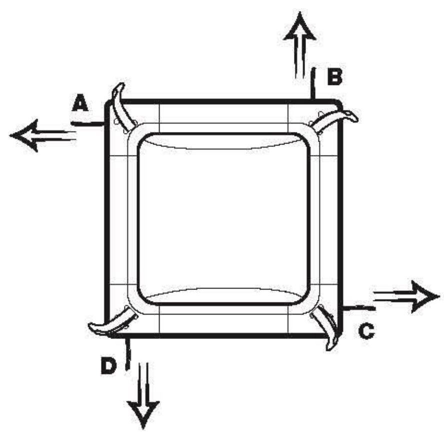
6.2 Pull LinerBag flaps through gap
Check LinerBag is **not stressed** in corners and no gaps



6.3 Thread strap 'A' through buckle (all corners)
Arrange straps **below** plastic corner **peg 'X'**



6.4 Pull LinerBag straps tight all corners
Check straps are **below** plastic corner **pegs (fig 3)**



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1562 V1.0

The Enviropod® LittaTrap Installation Check List

The following installation checklist ensures correct installation of the Enviropod® LittaTrap™ FC. Please complete each step with each installation of the Enviropod® LittaTrap™ FC

Activity	Complete (Y/N)
1. The catch basin is clean and free of trash and debris.	
2. The support bracket is installed 200 mm (7 7/8") below surface and level and below any curb entries.	
3. Anchor bolts are tightened secure and firmly support the bracket.	
4. Filter box positioned so the gross pollutant basket can easily be removed.	
5. Basket is the correct size for the clear opening of the catch basin grate.	
6. Seals are securely fastened to filter box and support bracket (if appropriate).	
7. Seals extend to walls of catch basin have fall across the profile.	
8. Basket and liner is placed in the filter box.	
9. Check for gaps greater than 5 mm.	
10. Take photos of the installed unit with GPS location services on.	
11. All materials cleared from installation	
12. Grate closed.	

APPENDIX C – Case Studies

LittaTrap™

Beresford Street Trial

PROJECT UPDATE 25/03/15

The Beresford Street Trial is a pilot study of the use of the Gross Pollutant LittaTrap under the supervision of Stormwater360. A single catchpit insert was installed on the corner of Beresford Street and Hopetoun Street, Auckland. The aim of the trial is to provide quantitative and qualitative data on the gross pollutants captured by the LittaTrap in a typical inner city Auckland catchment.

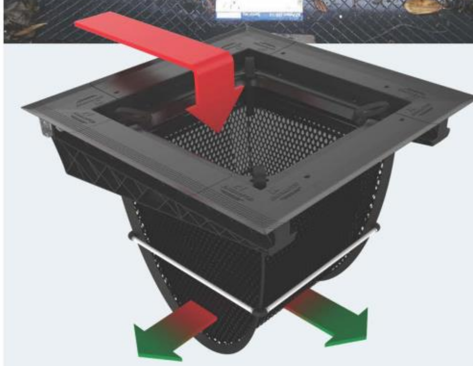

Figure 2. Beresford Street site. Approximate catchment area shaded.

CATCHMENT

The Beresford Street catchment is part of a steeply sloping street in Auckland's Karangahape Road district. The catchment area is nominally ca. 300 m2 (see Figure 2), however in periods of high flow it probably receives runoff from a substantially larger area, due to bypass of the uphill catchments on the steep slope.

The catchment has relatively low vehicle traffic loads, but receives substantial foot traffic. It is adjacent to several high density apartment developments and has both on-street and off-street car parking. The uphill end of Beresford Street has several bars and cafes. It attracts substantial night-life and the associated phenomenon of outdoor cigarette smoking.

The LittaTrap is a versatile catchpit insert system. It is readily installed in new or existing catchpits and may be configured to capture sediment or gross pollutants. For this trial the LittaTrap had a 1000 micron burnproof liner installed. By capturing the bulk of gross pollutants in its removable insert it allows fast hand maintenance and significantly reduces the frequency of costly suction maintenance of each catchpit. In addition it significantly improves the capture of positively and neutrally buoyant materials which are typically washed through the system, particularly in periods of high flow.

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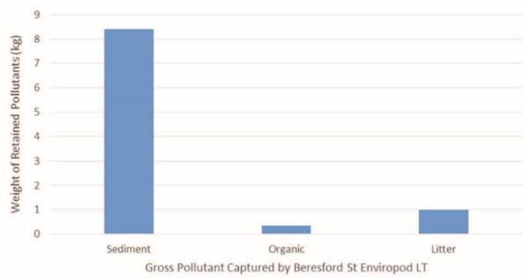
RESULTS

The LittaTrap was first installed June 2012 and the content was emptied 3 times for analysis purposes on March, April, and May 2013. In approximately 11 months of service, the LittaTrap captured 10.72 kg (wet, drained weight) of gross pollutants (see Figure 3).

GROSS POLLUTANT CAPTURED



ACCUMULATED WEIGHT

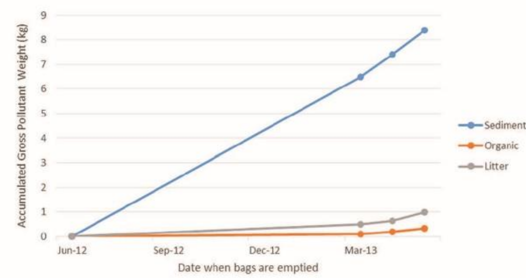
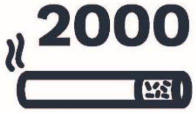


Figure 3: Accumulated Gross Pollutant Weight

Figure 4: Thousands of cigarette butts captured by the LittaTrap

Figure 5: Other gross pollutants captured by LittaTrap

2000



CIGARETTE BUTTS
in 10.72 kg of debris

Gross pollutants captured by the system were a mixture of predominantly negatively buoyant road sediments, neutrally buoyant organic material and positively buoyant trash and debris. Most notably the number of cigarette butts found in 10.72 kg of debris was estimated at 2000. In addition, a considerable amount of debris, such as cans and plastic and glass shards were found. These gain entry to the catchpit via the large kerb entry slot, rather than the grate. Also found in the captured material were wrappers, straws, wine corks and bottle caps.

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LittaTrap™

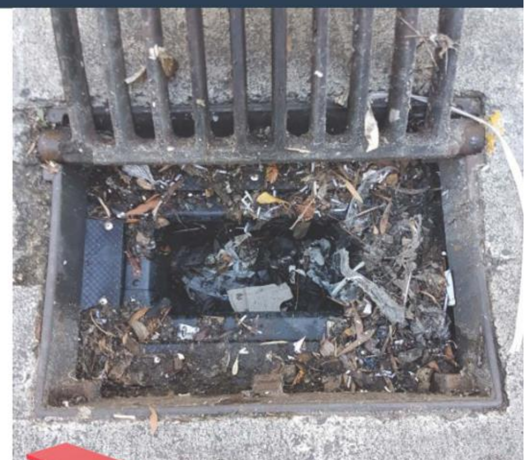
Farro Fresh Supermarket, Mairangi Bay, Auckland

LITTER HOT SPOT – LOADING ZONE

Last year Stormwater360 approached Farro Fresh to install a trial LittaTrap in a loading zone storm drain to monitor how much plastic and litter could be stopped from entering the stormwater system.

The LittaTrap was installed at the Mairangi Bay store, and was maintained and monitored over six months.

The LittaTrap is a solution for companies that have a commitment to our environment.
Those companies that want to take a proactive approach to stopping plastic from their site entering the stormwater system and making its way to the ocean.



The LittaTrap is a storm drain insert system. It is readily installed in new or existing storm drains and may be configured to capture a variety of pollutants. The LittaTrap is hand maintainable, allowing for low cost and frequent maintenance.

By installing a LittaTrap there is a significant improvement of capturing plastic and other litter which are washed down a storm drain when it rains.

CATCHMENT

The LittaTrap was placed outside the service entrance to the supermarket where goods are received and dispatched. The catchment area was approx. 500 sq metres.

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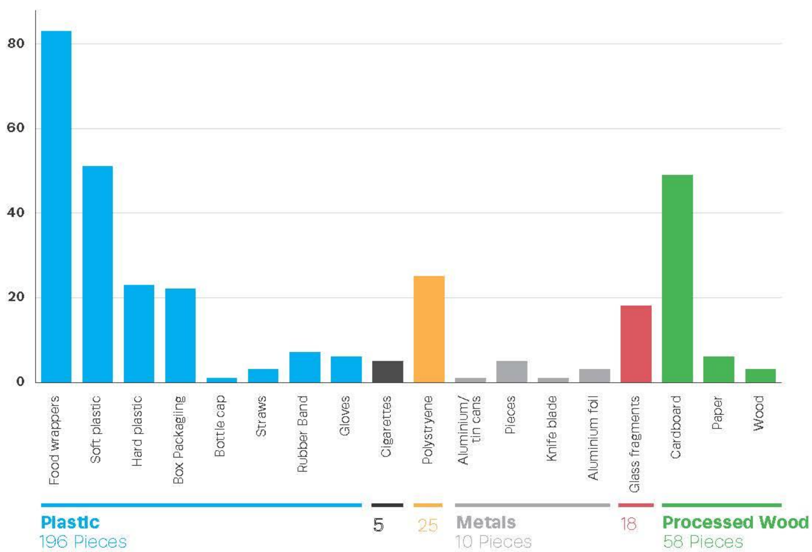
RESULTS

The final results yielded a total of 312 pieces of rubbish captured. The litter counted was typical of the environment in which the LittaTrap was installed, including soft and hard plastics, glass, cigarettes, metals and woods.

The largest type of pollutant counted was plastic food wrapping (83 pieces), followed by soft and hard plastic, and polystyrene. Without the LittaTrap installed, these pieces of litter would flow straight into the stormwater system and out to sea.

The LittaTrap also captured over 12kgs of organic matter, mainly consisting of leaves and food waste. Organic matter that makes it into our waterways leaches nitrogen and phosphorus – both harmful nutrients to our waterways.



CONCLUSION

The LittaTrap installed captured over 300 pieces of detrimental litter that would have otherwise ended up in our oceans. This was only one LittaTrap, in one location, for a short period of time.

There are over 3000 supermarkets in New Zealand, this means that we could be stopping over one and half million pieces of plastic every year if every loading zone had a LittaTrap installed.

OVER **300** pieces of litter trapped

1 SITE / 6 MONTHS

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LittaTrap™

EDUCATION

Kaitiaki Stormwater Action Project : Wilford School

In 2016 students from Wilford School took part in the Experiencing Marine Reserves programme, which takes groups of school children snorkelling to experience their marine environment. After snorkelling in Taputeranga Marine Reserve and comparing this to their local rocky shore snorkelling spot at Lowry Bay, students identified litter washing up on local beaches as the problem they wanted to tackle.

A small group of students decided targeting the source of the marine pollution problem through education and raising awareness about where it was coming from would be the best way to achieve positive change. They wanted to capture and monitor the litter travelling down roadside stormwater drains, which all lead to the ocean without being treated, and then share this with their local community.

THE MONITORING PROGRAMME

Stormwater360 donated two LittaTraps™ to the school to assist the children in their monitoring. LittaTraps™ are designed to capture litter and other solid pollutants heading into the stormwater drains and prevent them from reaching the ocean.

The students had one installed in the heart of Jackson Street's busy shopping area, and the other installed in amongst the housing area. This allowed them to compare pollutants found from the commercial and residential ends of Jackson Street.

The LittaTrap™ is a versatile catchpit insert system. It is easily installed in new or existing catchpits and may be configured to capture sediment or gross pollutants. The LittaTrap™ is hand maintainable, allowing for low cost and frequent maintenance. By installing a LittaTrap™ there is a significant improvement of capturing both positive and neutrally buoyant materials which are typically washed down a storm drain, particularly in periods of heavy rain.

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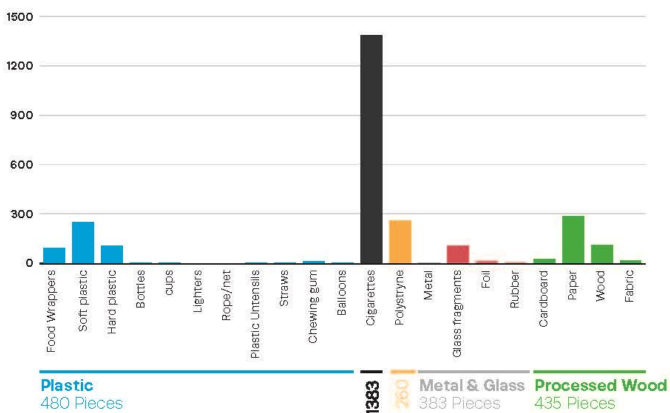
RESULTS

In the twelve weeks of monitoring, the students collected 2,680 pieces of litter from two drains. That meant 2,680 pieces of litter that didn't end up in the sea.

Half of these pieces (50 percent) were cigarette butts. The other litter included plastic, aluminium cans, polystyrene, wood, broken glass, straws, soft drink bottles, parking tickets, library receipts, food wrappers, cardboard, and fabric. The stormwater drain outside the cafes and restaurants collected much more litter than the drain outside the houses.



The two drains that the students investigated collected 2,680 pieces of litter over 12 weeks.

This meant that one drain would have sent about 1,340 pieces of litter to the sea in 12 weeks. And each week, one drain would have sent about 110 pieces of litter to the sea.

To work out how much litter this is over one year (52 weeks), the students multiplied 110 by 52.

There are 93 stormwater drains in and around Jackson Street, all leading to the sea. If one drain sends about 5,720 pieces of litter, then 93 drains could send 531,960 pieces of litter into Lowry Bay every year.

That's over half a million pieces of litter.

SUMMARY

The students presented their findings to community members. They had kept all the rubbish collected so this could be revealed to those attending. Parents, community members and local councillors were shocked to see just what the students had found and supported their message of needing change to happen.

In many ways the realisation that there is a lot of litter going down our drains and that we need to do something about it is easier for children. Children's views and actions are not restricted. Children do not think of reasons not to do things.

This study has shown how children experiencing plastic and litter in their local marine environment can drive change. It also demonstrates how learning about the sources of these pollutants and how they make their way to the ocean, can influence a community.

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Brampton Maintenance Yard, Ontario, Canada

Enviropod Canada in conjunction with their partners **Imbrium Systems** approached the Brampton Public Works team to trial the Enviropod technologies: the **Enviropod™ Filter** – a high performing catch basin insert and the **LittaTrap™** – a low cost, hand maintainable catch basin insert. Both technologies are highly engineered for high performance and high flows.

Two trial units were installed and monitored for 18 months to understand suitability across all weather conditions. The trial involved retrofitting the technology into existing catch basins at Sandalwood Works Yard and required no construction or disturbance to the existing infrastructure.

After 18 months of testing these new technologies, the City has retrofitted the remaining thirteen (13) of the fifteen (15) catch basins in the Yard with six (6) additional Enviropod Filters and seven (7) LittaTraps.

Different technologies were installed in different parts of the yard. The LittaTrap is a simple tool for managing plastics, gross solids and sediment in stormwater runoff. These were installed in lower contaminant generating areas.

The Enviropod is a high performing catch basin insert capable of capturing fine sediments and associated pollutants such as heavy metals. The Enviropod Filters were installed in areas that were subject to higher loadings of finer sediment from the snow melting operation. (Independent testing has shown the system removes over 90% of particles greater than 100 microns in size.)

OUTCOME

William Guy, Manager, Contracts with the City of Brampton Public Works Department says of the solutions, "The Enviropod technologies are a cost effective, easily maintained approach to managing pollutants and debris washing off our Yard from our snow melting and general road maintenance operations. By installing both LittaTraps and Enviropods we have found a simple, practical and effective solution to filter runoff and reduce the debris making its way into the stormwater system.

Another key reason for choosing and installing the Enviropod units is there are no expensive filters to be replaced every couple of months. Maintenance can be easily performed by staff at the Yard by simply pulling the LittaTrap or Enviropod baskets up by hand, emptying them and putting them back in. Cold weather and frozen filters are no longer an issue, and that, for our purposes, is a winning design."

LittaTrap™

FoodStuffs Trial

FINAL REPORT & ANALYSIS

Plastic pollution is a major global problem with an estimated 80% of marine debris coming from land. Enviropod developed the LittaTrap in response to this.

The LittaTrap is an innovative catch basin insert that is fitted into new and existing stormwater drains to capture plastic and other pollutants before they would be washed into the drain and out to the waterways.

In the development of the product, we have identified industries which can be litter "hot spots." Industries such as supermarkets which have a high pedestrian foot count and busy loading zones can have increased litter loading.

Wishing to collect data on supermarket litter loading Enviropod approached Foodstuffs in 2016 to conduct a trial of the LittaTrap to measure the type and quantity of pollutants that would enter the stormwater system via the stormwater drains on their busy sites.

TRIAL SITES

Two trial sites were identified, and an audit was conducted to determine the most appropriate catch basins on each site. The catch basins on each site were chosen to be representative of all the basins on sites; some were picked for high loading (loading zones), and the others chosen for low loading rates. The loading rate is anticipated to vary from basin to basin, and clean to clean. These rates can be influenced by climate, environmental and physical influences, such as rain, wind and traffic volumes.

Pit 1 – Special Parking Zone

Pit 2 – Parking Area

Pit 3 – Front of Store

Trial site one: New World Browns Bay

Browns Bay New World is situated 400m from the ocean. The existing infrastructure is old and does not have any stormwater treatment and any plastic and pollutants that reach the stormwater system are discharged untreated to Taiaotea Creek.

Three catch basins were identified as appropriate for the trial. The catch basins were chosen to give a represented litter loading and have good access for installation and maintenance.

Pit 1 – Carpark

Pit 2- Tradewaste(not monitored)

Pit 3 – Loading Zone

Trial site two: New World New Lynn

Stormwater from the New Lynn site flows untreated into the stormwater system to the headwaters of the Whau River where it is finally discharged.

Two catch basins on this site were identified as appropriate for the trial – the first situated in the carpark and the other downstream of the loading zone. A third trap was installed to capture trade waste as requested by the owner of the store as the Oil and Grease Trap installed downstream was consistently getting blocked. This catch basin was outside the butcher and continually received a lot of organic material adding to the blockages downstream. This LittaTrap was NOT monitored for this trial.

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RESULTS

A total of 1203 pieces of plastic and other gross pollutants were captured and retained in the trial LittaTraps. These pollutants were stopped from entering the stormwater system and making their way to the Waitamata Harbour. The total caught averages to 523 pieces of litter per catch basin per year.

75% of the litter collected was plastic. (Soft Plastic, Hard Plastic, Food Wrappers, Butts or Polystyrene).

The biggest single source of pollutant was cigarette filters. Cigarettes made up 20% of the total litter caught (243 butts.)

Figure 1 shows the breakdown of the litter caught. 73% was plastic including hard & soft plastic, polystyrene, and cigarette butts. Cigarette butts are the most common form of plastic litter in the world. Globally more than 4.5 trillion cigarette butts make their way into the environment every year. Almost all of them contain a filter made of fibres of cellulose acetate.

Figure 2 shows the composition of the plastic caught. Soft plastic and cigarette butts the top pollutants. We defined soft plastic in this study as soft or flexible plastic. It included fragments of plastic bags and packaging material. Soft plastic is particularly hazardous in the marine environment as UV easily breaks down this plastic into smaller and smaller pieces. Small pieces of plastic are easily ingested by marine animals mistaking the plastic as food. The fragmentation of soft plastic makes them almost impossible to remove once they are in the ocean

These small pieces were predominately found in the catch basins close to the loading zones. In busy loading zones where inward and outward goods are managed accidental littering of packaging can happen. Interesting to note – there were no complete plastic bags caught in any of the LittaTraps.

The data shows there is plastic reaching all the drains regardless of the location and on these two sites, all drains are discharged into a waterway.

FIGURE 1 – Litter Composition

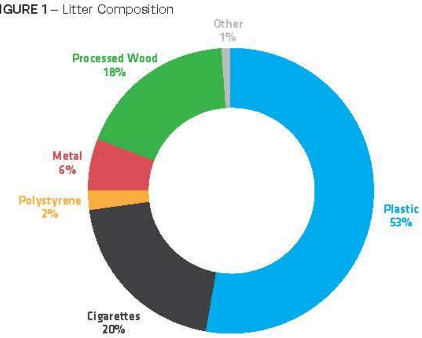
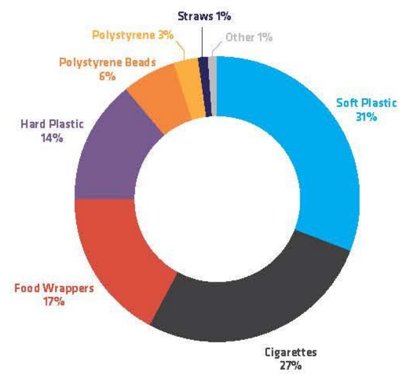


FIGURE 2 – Plastic Composition



NEW WORLD BROWNS BAY RESULTS

Browns Bay had a 33% higher litter loading than the New Lynn site. We assume this could be from the weekend market and higher pedestrian use.

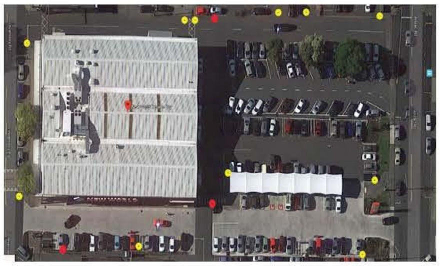
The special carpark had the highest loading with a total of 355 pieces counted. Mainly cigarette butts were found here; possibly this is a smoking area for staff.

NEW WORLD NEW LYNN RESULTS

The loading between the two catch basins was quite similar. The loading zone did have a much higher incidence of plastic wrapping, which is expected in this location.

OBSERVATIONS

The catch basins monitored were only a small percentage of catch basins on each site.



NEW WORLD BROWNS BAY

Browns Bay has a total of 14 catch basins with three being monitored

- Yellow Stormwater drains on site
- Red LittaTrap installed

If all stormwater drains at Browns Bay had a LittaTrap installed, a total of **7322 pieces of plastic and other litter could be retained over a 12-month period**

NEW WORLD NEW LYNN

New Lynn has a total of 13 catch basins with two being monitored.

- Yellow Stormwater drains on site
- Red LittaTrap installed

If all stormwater drains at New Lynn had a LittaTrap installed a total of **6799 pieces of plastic and other litter could be retained over a 12-month period**

NW NEW WORLD   PAK'nSAVE OUR POLICY: NZ'S LOWEST FOOD PRICES   LIQUORLAND   4 FOUR SQUARE

900,000
pieces of plastic & litter

Foodstuffs has 421 retail outlets across the North Island. These include New Worlds, PaknSaves, Liquorlands and Four Squares. If 4 x LittaTaps were installed at each store, **Foodstuffs could stop approximately 900,000 pieces of plastic & litter a year from entering the marine environment via the storm drains.**

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APPENDIX D – Lab Testing Information

Test Report

2596 Dunwin Drive
Mississauga ON L5L 1J5
Phone: 905.696.7276
Fax: 647.496.1565

Customer:	Stormwater360 7C Piermark Drive Rosedale 0632 North Shore	**Project Number:** PN 20-001
Report Date: April 09, 2020		
Date(s) Analysis Performed: Feb. 13 - 14; Mar. 12 - 13; Mar. 17, 2020		
Data Reference: Notebook A005, pp. 104 - 118.		

Good Harbour Laboratories was asked to determine the head loss that occurred as water passed through a number of fabrics that were supplied by Stormwater360. The fabrics, either singly or in pairs, could potentially be used as part of their catch basin inserts.

The test fabric(s) were mounted in a wooden frame (Figure 1) that exposed a screen face 557 mm wide and 222 mm high. The frame was mounted in a trough and water was passed through the partially-submerged screen. The difference in water height before and after the screen was used to determine head loss. The test set-up is illustrated in Figure 2 and the frame installation is shown in Figure 3.

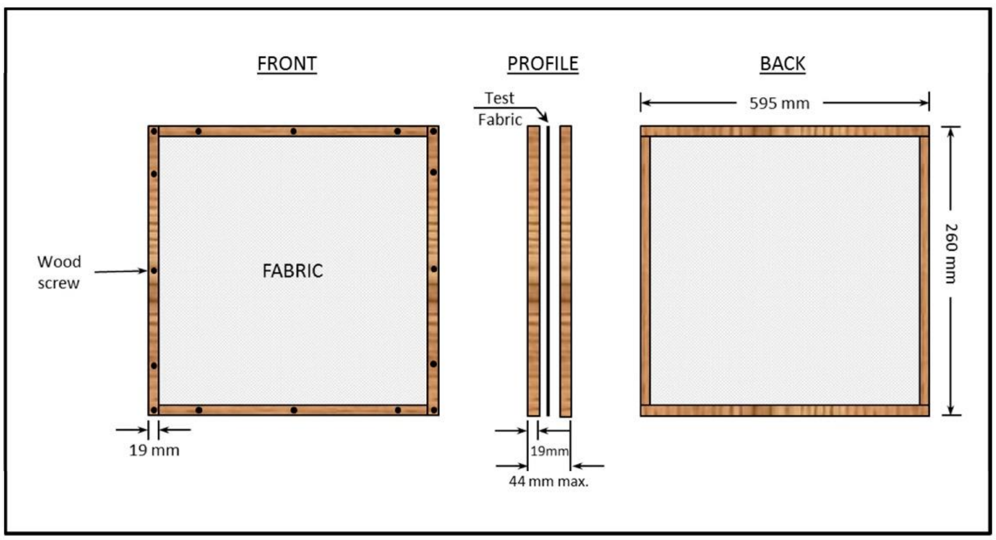

Figure 1: Fabric Test Frame

2596 Dunwin Drive
Mississauga ON L5L 1J5
Phone: 905.696.7276
Fax: 647.496.1565

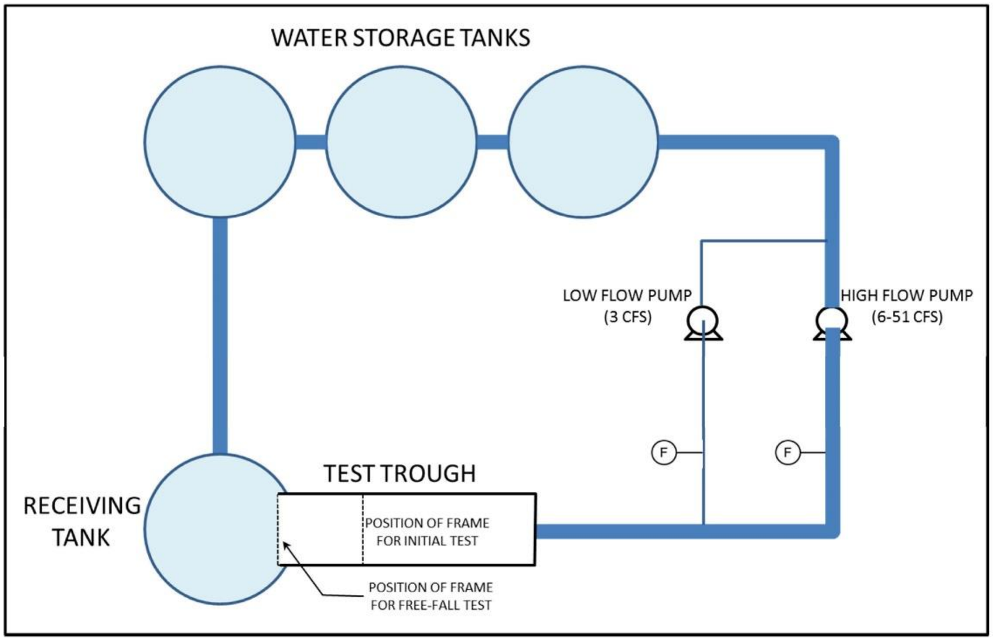

Figure 2: Test Set-up

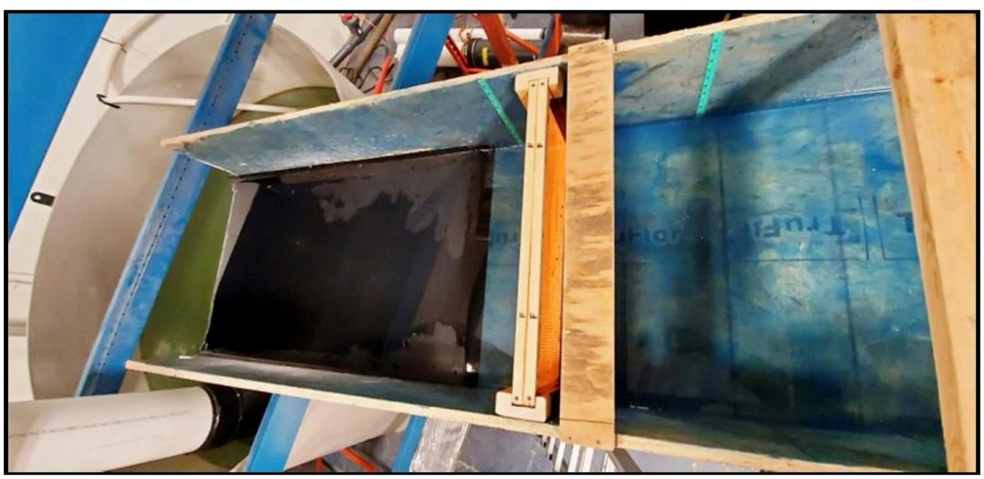

Figure 3: Test Frame Installation for Partially-Submerged Screen

2596 Dunwin Drive
Mississauga ON L5L 1J5
Phone: 905.696.7276
Fax: 647.496.1565

The following fabrics were submitted for testing:

Table 1: Test Fabrics

Code	Mesh	Opening	Description
Fabric F	4x4	4.75 x 4.75mm	Orange 4x4 fibreglass mesh
Fabric G	8x4	2.36 x 4.75mm	White Arlyn 4x4 fibreglass mesh
Fabric H	8x8	2.36 x 2.36mm	White Arlyn 4x4 fibreglass mesh
Fabric I	5mm	approx. 4.7mm	Black Polyester 5x5mm mesh
Fabric J	5mm	approx. 5.0mm	Black PVC coated Polyester 5x5mm mesh
Fabric K	3.175mm	3.175 x 3.173mm	Black Polyethylene mesh
LTF	-	-	Current LittaTrap fabric

Following the testing described above, a second set of tests were conducted with a modified configuration, the effluent side of the screen was allowed to free-fall into the receiving tank and the water height on the inlet side of the grating was recorded. This test setup is shown in Figure 4.

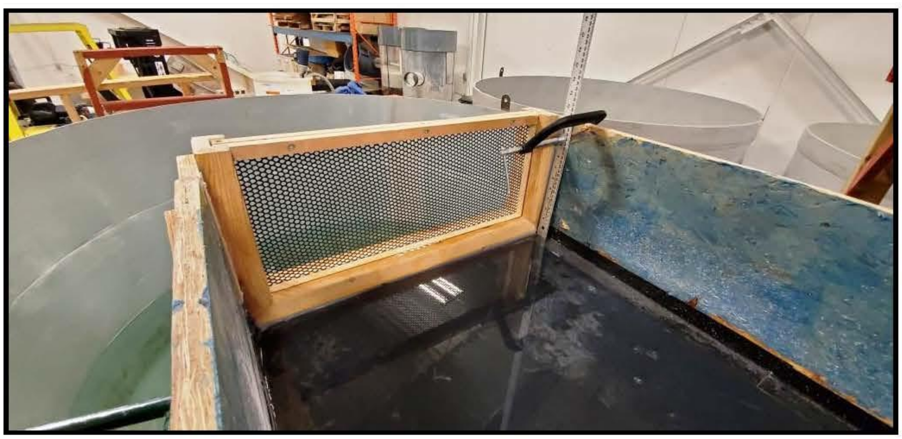

Figure 4: Free-fall Test Frame Installation

Good Harbour Laboratories
2596 Dunwin Drive
Mississauga ON L5L 1J5
Phone: 905.696.7276
Fax: 647.496.1565

TEST RESULTS:

Water flow to the test lop was initiated and allowed to stabilize. The following measurements were made:

Table 2: Submerged-Screen Head Loss

Fabric	Flow Rate (GPM)	Flow Rate (LPS)	Upstream Height (MM)	Downstream Height (MM)
Control (No Fabric)	50.1	3.2	33	10
	99	6.2	38	15
	200	12.6	43	22
	299	18.9	60	38
	399	25.2	85	50
LTF	50.1	3.2	36	8
	99	6.2	40	25
	201	12.7	53	39
	300	18.9	83	45
	399	25.2	105	55
F	49.5	3.1	44	5
	102	6.4	50	13
	201	12.7	65	30
	300	18.9	90	38
	400	25.2	105	50
I	50.6	3.2	49	8
	101	6.4	48	26
	201	12.7	65	38
	299	18.9	98	40
	400	25.2	110	55
J	50.1	3.2	45	7
	101	6.4	53	12
	201	12.7	54	33
	301	19.0	85	40
	400	25.2	105	50
K	50.0	3.2	38	3
	101	6.4	33	13
	199	12.6	50	25
	300	18.9	77	34
	400	25.2	95	45

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Table 2 (Cont'd)

Fabric	Flow Rate		Upstream Height	Downstream Height
	(GPM)	(LPS)	(MM)	(MM)
F + LTF	50.0	3.2	45	3
	102	6.4	38	20
	201	12.7	60	35
	301	19.0	105	35
	400	25.2	130	48
G + LTF	49.9	3.1	45	10
	101	6.4	52	23
	200	12.6	63	37
	299	18.9	100	45
	400	25.2	115	55
H + LTF	50.5	3.2	52	10
	102	6.4	57	24
	202	12.7	76	35
	301	19.0	113	40
	399	25.2	130	49
I + LTF	50.3	3.2	32	5
	102	6.4	37	18
	202	12.7	58	35
	300	18.9	105	33
	400	25.2	130	48
J + LTF	50.1	3.2	30	5
	99	6.2	38	20
	202	12.7	55	35
	301	19.0	110	35
	402	25.4	130	47
K + LTF	50.2	3.2	38	3
	101	6.4	34	15
	199	12.6	53	32
	302	19.1	108	33
	401	25.3	125	45

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Table 3: Free-Fall Head Loss

Fabric	Flow Rate		Upstream Height
	(GPM)	(LPS)	(MM)
Control	50.0	3.2	61
	100	6.3	73
	200	12.6	93
	299	18.9	105
	400	25.2	115
	500	31.5	135
	600	37.9	147
	701	44.2	157
	802	50.6	165
LTF	50.5	3.2	69
	99	6.2	82
	198	12.5	105
	299	18.9	124
	399	25.2	138
	500	31.5	154
	602	38.0	171
	700	44.2	184
	800	50.5	192
F	50.0	3.2	67
	99	6.2	79
	200	12.6	102
	300	18.9	116
	399	25.2	128
	502	31.7	148
	600	37.9	165
	700	44.2	175
	800	50.5	187
J	50.3	3.2	69
	99	6.2	81
	201	12.7	106
	300	18.9	123
	399	25.2	138
	500	31.5	158
	602	38.0	175
	700	44.2	188
	802	50.6	193

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Table 3 (Cont'd)

Fabric	Flow Rate (GPM)	Flow Rate (LPS)	Upstream Height (MM)
K	50.0	3.2	70
	99	6.2	83
	199	12.6	100
	299	18.9	122
	398	25.1	137
	500	31.5	152
	600	37.9	169
	700	44.2	182
	800	50.5	190
F + LTF	49.9	3.1	73
	101	6.4	89
	199	12.6	111
	300	18.9	135
	400	25.2	156
	500	31.5	170
	600	37.9	180
	700	44.2	202
	802	50.6	222
G + LTF	49.9	3.1	72
	100	6.3	85
	199	12.6	108
	300	18.9	126
	399	25.2	145
	500	31.5	157
	600	37.9	175
	700	44.2	187
	800	50.5	195
J + LTF	50.1	3.2	74
	99	6.2	90
	201	12.7	116
	300	18.9	138
	399	25.2	156
	500	31.5	164
	600	37.9	180
	701	44.2	200
	800	50.5	217

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Table 3 (Cont'd)

Fabric	Flow Rate (GPM)	Flow Rate (LPS)	Upstream Height (MM)
K + LTF	50.1	3.2	74
	101	6.4	90
	200	12.6	116
	299	18.9	134
	401	25.3	153
	500	31.5	165
	600	37.9	184
	700	44.2	204
	802	50.6	220

Released By:	Joe Costa	[signature]	April 15, 2020
	Name	Signature	Date
	Senior Scientist & Quality Manager		
	Title		

PERFORMANCE TESTING OF A
LITTATRAP CATCH BASIN FILTER

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Report ID: TR-JC20180305-02

Revision Table

Revision Number	Reason for Revision
01	Initial document revision
02	Revised wording around gross pollutant capture for more clarity.

Approvals

Author(s) Review: I confirm that the information in this technical report is accurate, appropriately referenced, and scientifically sound

Oct. 30, 2019

Joe Costa
Senior Scientist & Quality Manager

Date

Technical Review: I confirm that sufficient information and detail have been reported in this technical report, that it is scientifically sound, and that appropriate conclusions have been included.

Oct 30, 2019

De Wu Zhang
Research Scientist

Date

Stormwater360:

Oct 31, 2019

Mike Hannah
Managing Director

Date

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Abbreviations and Definitions

Abbreviation/Term	Definition
COV	Coefficient of Variation
ETV	Environmental Technology Verification Program
LOQ	Limit of Quantitation
NJDEP	New Jersey Department of Environmental Protection
PSD	Particle Size Distribution
SLR	Surface Loading Rate
SSC	Suspended Sediment Concentration

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[2] GHL Notebooks A019, pg. 88-89, 131-133 and 152-160; A018, pg. 1-46.

[3] Proposal PN 17-007

[4] Canadian Environmental Technology Verification Program (CETV) *Procedure for Laboratory Testing of Oil-Grit Separators*, June 6, 2014 – Version 3.0

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[7] NJDEP 2013, *New Jersey Department of Environmental Protection Laboratory Protocol to Assess Total Suspended Solids Removal by a Hydrodynamic Sedimentation Manufactured Treatment Device*; January 25, 2013.

[8] California Department of Transportation District 7 Litter Management Pilot Study, CALTRANS Document No. CT-SW-RT-00-013; June 26, 2000. http://www.dot.ca.gov/hq/env/stormwater/pdf/CTSW-RT-00-013.pdf

[9] WWW.envriopod.com

1. Introduction

The purpose of this study was to evaluate the performance of the LittaTrap™ catch basin insert. The insert was evaluated on three performance criteria: (i) Removal Efficiency testing to determine the amount of sediment that could be removed from stormwater run-off, (ii) Scour Testing to measure the amount of re-suspension and washout of previously captured sediment within the catch basin, and (iii) Gross Pollutant testing to measure the insert's ability to capture Gross Pollutant.

The Removal Efficiency and Scour tests were based on the Canadian Environmental Technology Verification Program (ETV) and the New Jersey Department of Environmental Protection (NJDEP) test protocols while the Gross Pollutant testing was based on a protocol currently under development by the Stormwater Equipment Manufacturers' Asscoaition (SWEMA). The SWEMA protocol is based on a series of studies conducted by the California Department of Transportation (CALTRANS) in the early 2000s.

2. Experimental

2.1 Sediment Removal Efficiency Test

The performance of the LittaTrap™ catch basin insert was assessed by determining the removal efficiency of suspended sediment in the influent water. The insert was tested both with and without a liner. The test apparatus consisted of a simulated catch basin that was constructed out of wood. The catch basin was 600 mm X 600 mm and was 1.8 m deep with a false floor installed 254 mm (10 inches) below the invert of the effluent pipe to simulate a catch basin that contained sediment. The catch basin is illustrated in Figure 1.

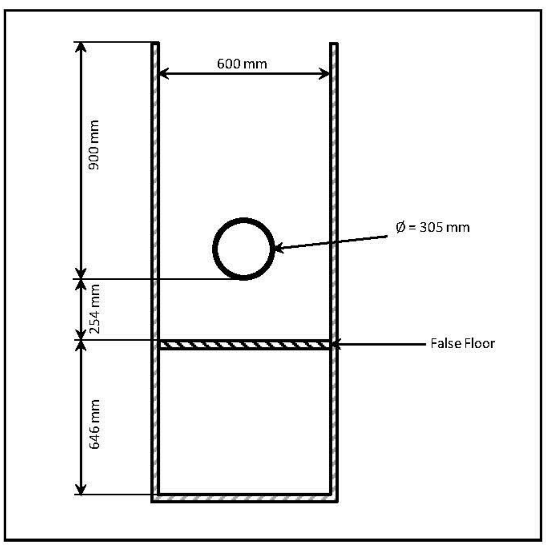


Figure 1: Simulated Catch Basin Dimensions

To simulate the sheet flow of water observed as stormwater runoff enters a catch basin, this study pumped water on to a simulated “streetscape”, a plywood sheet 2.4 m long and 0.6 m wide, that directed the water flow to the catch basin grate. The streetscape was sloped towards the catch basin with a 1.5% slope. The test sediment was dropped onto the streetscape by means of an auger feeder (Auger Feeders Model VF-1 volumetric screw feeder). The setup is illustrated in Figure 2. The streetscape was painted with a waterproofing resin to prevent water leaks. To ensure that any sediment added onto the streetscape flowed into the catch basin, the floor of the streetscape underneath the sediment addition point was lined with a smooth polyethylene sheet.

The sediment removal performance testing was based on a Technology Specific Test Plan (TSTP) that combined elements of the Canadian ETV and NJDEP test protocols. Water was introduced onto the catch basin with a target influent sediment concentration of 200 mg/L. Removal efficiency was determined by measuring the suspended sediment concentration (SSC) of the effluent and calculating the amount captured by the insert and catch basin. Testing was completed at four different target flow rates, 1, 4, 8 and 12 L/s. To better approximate the typical operating conditions, the LittaTrap™ was loaded to 20% capacity with gross solids (leaves) prior to starting the performance testing (Figure 3).

Inlet End of Streetscape

Catch Basin End of Streetscape

Figure 2: Catch Basin Streetscape

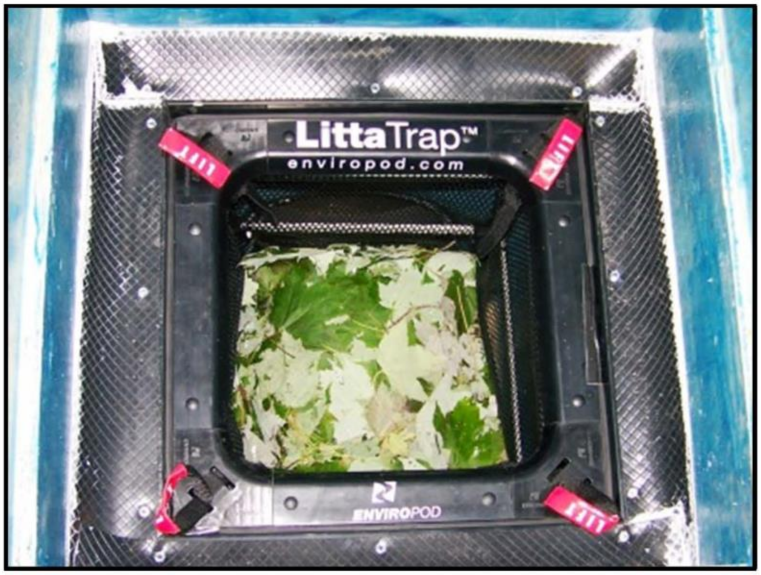


Figure 3: LittaTrap™ Pre-loaded with Leaves

Flow measurement was done using a mag-type flow meter and a MadgeTech Process 101A data logger. The data logger was configured to record a flow measurement once every 30 s. The duration of each test run was 15 minutes, with sampling occurring as specified in Table 1. For the 1 L/s run however, the run time was increased to 25 minutes to ensure a minimum of 3 detention times elapsed between the start of sediment addition and the taking of effluent grab samples. For the 1 L/s run, sampling occurred at 00:00, 06:00, 12:00, 18:00, 24:00 and 25:00 minutes. The average influent suspended sediment concentration for the run was determined using the amount of water that flowed through the catch basin during the test and the average sediment feed rate. The feed water for the test was filtered using a Fil-Trek model ELPA30-1012-8F-150 filter, where it passed through 0.5 µm (absolute) pleated bag filters to remove background particulate. Past experience with this system has shown that the background particulate concentration using this filtration system is typically below the SSC method limit of quantitation (LOQ) of 2.3 mg/L and therefore the contribution of SSC from the feed water was omitted for this study.

Replicate effluent grab samples were taken at the catch basin effluent pipe stub which drained freely into a receiving tank. When possible, the entire effluent flow stream was sampled, otherwise, the effluent sample was taken by sweeping a 1L wide-mouth jar through the entire effluent flow stream such that the sample jar was full after a single pass.

Table 1: Removal Efficiency Sampling Schedule

Run Time (min:sec)	Effluent Sample	Sediment Calibration Sample
00:00		X
05:00	X	X
08:00	X	X
11:00	X	X
14:00	X	X
15:00	END OF TESTING	

2.2 Scour Test

The objective of this test was to quantify and characterize the amount of previously captured sediment that was re-suspended and washed out during periods of high flow. Sediment scour and re-suspension was assessed at five separate SLRs, as specified in Table 2. Replicate effluent grab samples for the Scour Test were again taken at the catch basin effluent pipe stub; the sampling frequency is detailed in Table 3. As with the removal efficiency testing, no background water samples we taken.

Table 2: Scour Test Surface Loading Rates

Surface Loading Rate (LPS/m^2)	Test Flow Rate (LPS)	Run Time (Minutes)
3.3	1.2	5
13	4.8	5
23	8.4	5
33	12.0	5
43	15.6	5

Table 3: Scour Testing Effluent Sampling Frequency

Run Time (min.)												
0	**1**	**2**	**3**	**4**	**5**	**6**	**7***	**8**	**9**	**10**	**11**	**12**
Set Flow		X		X		X		X		X		X
13*	**14**	**15**	**16**	**17**	**18**	**19***	**20**	**21**	**22**	**23**	**24**	**25***
	X		X		X		X		X		X	
26	**27**	**28**	**29**	**30**								
X		X		X								

* Increase in system flow

In preparation for the scour testing, the false floor remained set at an elevation of 254 mm below the invert of the effluent pipe and the sump of the catch basin was pre-loaded with the same test sediment used for the Removal Efficiency testing. When levelled, the sediment formed a layer 102 mm thick (Figure 4). After sediment pre-loading, the catch basin was reassembled and filled with water. The water was added in such a way as to avoid disturbing the sediment bed. The test setup was allowed to sit for approximately 16 hours before commencing the Scour Test.

The ETV protocols allows for the test device to sit for up to 96 hours following the loading to allow for all the of the test sediment to settle before the test. Since this scour test was run only 16 hours after loading, some particles were still in suspension.

Figure 4: Sediment Pre-loading of Sump

To better approximate the typical operating conditions, the LittaTrap™ was loaded to 20% capacity with Gross Pollutant prior to starting the Scour test (Figure 5).

Figure 5: LittaTrap™ Scour Test Preload

2.3 Test Sediment

The test sediment used for Removal Efficiency and Scour testing was a silica blend supplied by AGSCO Corporation, lot # 040617. The sediment particle size distribution (PSD) was determined by GHL using the methodology of ASTM method D422-63 (2007) e1, *Standard Test Method for Particle-Size Analysis of Soils*. The test results are summarized in Table 4 and shown graphically in Figure 6.

Table 4: PSD of Silica Test Sediment

ETV Specification		LOT # 040617	Deviation from Specification	Allowed ETV Deviation
Particle Size, µm	% Passing	% Passing	% (absolute)	
1000	100	100	0	± 6%
500	95	95	0	
250	90	89	-1	
150	75	74	-1	
100	60	54	-6	
75	50	50	0	
50	45	41	-4	
20	35	29	-6	
8	20	15	-5	
5	10	10	-0	
2	5	4	-1	
d_{50}, um	75	75		

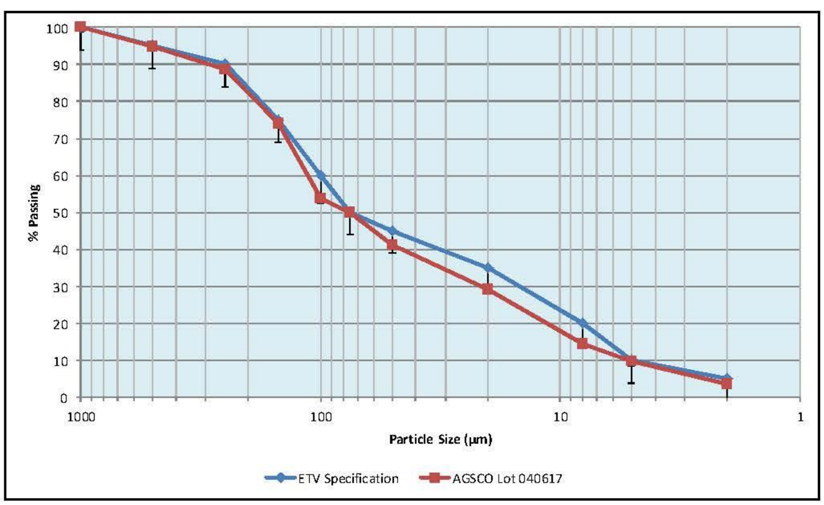


Figure 6: PSD of Silica Test Sediment

2.4 Gross Pollutant Test

This performance test assessed the LittaTrap's™ ability to remove gross pollutants from stormwater runoff and was based on work reported in the Caltrans document "*Laboratory Testing of Gross Solids Removal Devices*" - CTSW-RT-05-73-18.1. The composition of the Gross Pollutant used is summarized in

Table 5. The Gross Pollutant test was conducted at 3 flow rates, 5, 10 and 15 L/s. To better assesses the performance of the LittaTrap™, a control run was performed on the catch basin alone at 5 and 15 L/s.

For this test, 10 L (approximately 193 g) of gross solids were added at the target flow rate over a 5 minute period. This was completed manually by dropping a handful of solids onto the "Streetscape" and allowing the solids to be washed into the catch basin. To ensure that the Gross Pollutants were washed into the catch basin, the grate was removed from the opening (Figure 7). Following the Gross Pollutant addition, the grate was replaced and water was allowed to flow into the catch basin at the target flow rate for at least an additional 10 minutes. In the case of the 15 L/s run, the water flow rate was sustained for an additional 55 minutes following the solids addition.

For the control test, 256 g of solids was added to the catch basin over a 5 minute period. The grate was replaced on top of the catch basin and the water flow continued for an additional 10 minutes. The flow was then increased to 15 L/s and held for an additional 15 minutes (no further trash addition at the higher flow). Since it was observed that most of the solids had escaped from the catch basin, there was no need to maintain the flow any longer than 15 minutes.

Table 5: Gross Pollutant Composition

Component	Description	Dimensions	% by Mass
Cigarette Filter	OCB regular cigarette filters 9.15 g/100 filters Bulk density = 900 filters/1L	7 mm diameter x 15 mm	14
Newspaper	Standard news print sheet cut in strips	28 cm x 5 cm	17
Wood	Popsicle sticks	11 cm x 0.95 cm x 0.2 cm	11
Plastic-Moldable	10 oz. PETE plastic cup cut in strips	9 cm x 2.5 cm	23
Plastic-Film	Plastic shopping bag split in half and cut in strips	40 cm x 8 cm	8
Cardboard/Chipboard	Cardboard box cut in strips	23 cm x 2.5 cm	10
Cloth	Cotton linen fabric cut in strips	35 cm x 5 cm	6
Metal – Foil, Molded	Aluminum drink can cut in strips	10 cm x 2.5 cm	7
Styrofoam	Standard "S"-shaped peanut packing material	3 mm x 3.5 mm x 1.5 mm	4

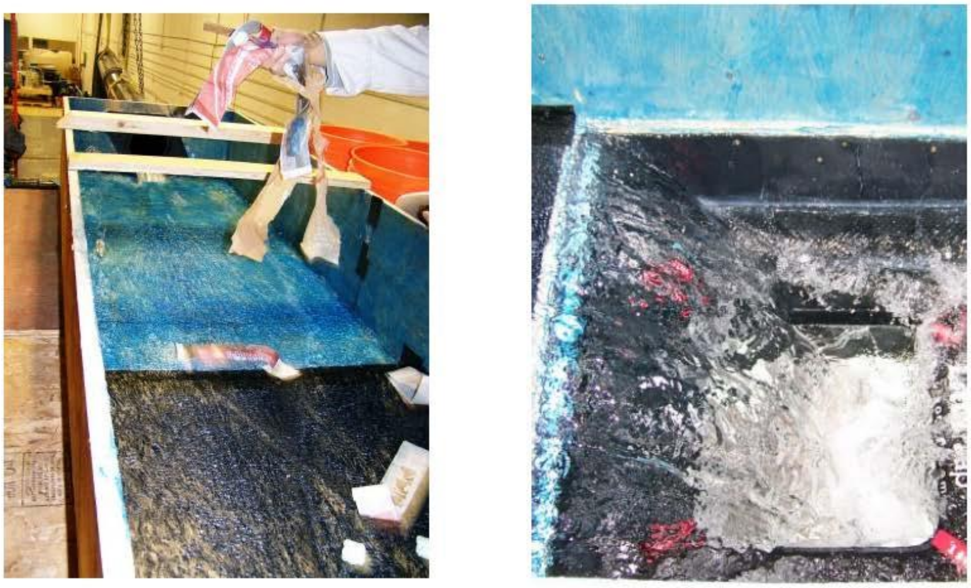


Figure 7: Gross Pollutant Addition to Streetscape

3. Results & Discussion

3.1 Sediment Removal Efficiency

For each removal efficiency test run, the average influent sediment concentration was determined from the average sediment feed rate, determined from the five sediment feed calibration samples, and the average flow rate for the run. The water and sediment feed rates have been summarized in Table 6 and the calculated removal efficiencies in Table 7.

Removal efficiency was determined by comparing the average effluent concentration of the grab samples to the average influent sediment concentration during the run:

$$Removal\ Efficiency\ (\%) = \frac{SSC_I - SSC_E}{SSC_I} \times 100\%$$

where:

SSC_I = the average influent sediment concentration for the run

SSC_E = the average sediment concentration of the effluent grab samples

Table 6: Flow Rate and Sediment Concentration

Run Number	Average Sediment Feed Rate (g/min)	Average Run Flow Rate (L/s)	Influent Sediment Concentration (mg/L)
1	13.84	0.98	236.4
2	47.20	3.99	197.0
3	104.3	7.98	217.8
4	143.5	11.99	199.5

Table 7: LittaTrap™ Removal Efficiency

Run Number	Influent Sediment Concentration (mg/L)	Effluent Concentration (mg/L)	Removal Efficiency (%)
1	236.4	90.0	61.9
2	197.0	94.9	51.8
3	217.8	139.8	35.8
4	199.5	132.0	33.8

As expected, as flow rate increases the removal efficiency decreases. The LittaTrap™ performance is summarized in Figure 8. The data has been fitted with a logarithmic function to allow for comparison to competitors' products.

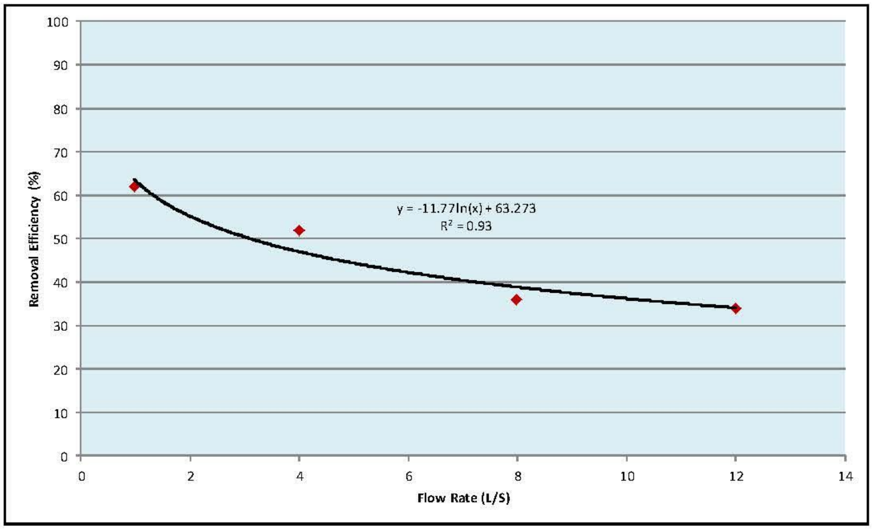


Figure 8: LittaTrap™ Removal Efficiency vs. Flow Rate

3.2 Scour Test

For the Scour test, a single pump was used for the first four flow rates, however for the final flow rate, a switch was made to a larger pump to be able to accommodate the higher flow. The change-over from one pump to the next was managed without stopping water flow to the system and was completed within 60 seconds. The flow rates for SLRs 1-4 were recorded using a data logger, while SLR # 5 was recorded manually, directly from the flow meter. For all runs the recording interval was 30 seconds. The flow data is summarized in Table 8.

Table 8: Scour Testing Water Flow Rates

Surface Loading Rate	Target Flow Rate	Flow (gpm)			COV
LPS/m^2	Lpm	Min	Max	Average	
3	1.2	1.19	1.22	1.20	0.009
13	4.8	4.78	4.88	4.80	0.005
23	8.4	8.35	8.44	8.39	0.003
33	12.0	11.84	12.01	11.96	0.004
43	15.6	15.17	15.99	15.55	0.017

The coefficient of variation (COV) for all SLRs was below 0.04, the specification for the ETV test protocol. The test results are summarized in Table 9. In cases where the SSC result was below the analytical method LOQ of 2.3 mg/L, a result of 2 mg/L was reported for calculation purposes.

Table 9: Scour Test Results

Target Flow Rate (L/S)	Sample Run Time (min)	Suspended Sediment Concentration (mg/L)	
		Effluent Sample	Cumulative Average
1.2	2	41.5	-
	4	4.9	23
	6	2*	16
4.8	8	7.2	14
	10	3.6	12
	12	2*	10
8.4	14	3.7	9.3
	16	5.7	8.8
	18	8.2	8.8
12.0	20	9.8	8.9
	22	3.4	8.4
	24	6.5	8.2
15.6	26	6.8	8.1
	28	4.9	7.9
	30	6.8	7.8

*Result < LOQ

The overall average SSC concentration for the scour test was 7.8 mg/L. Since the catch basin only sat for 16 hours following the sediment preload, it is possible that the average SSC result for the scour test could have been even lower if it sat for the full allowable 96 hours, particularly for the first sample taken at 2 minutes. It should be noted that since the suspended sediment concentration of the test influent water was not measured, the Scour test results are uncorrected for background concentration. Typically for a scour test the background SSC is subtracted from the effluent SSC value, so if anything these values are higher than actual.

Some regulatory agencies, the New Jersey Department of Environmental Protection (NJDEP) for example, have a maximum limit on average SSC of 20 mg/L for their scour test that involves a similar methodology.

3.3 Gross Pollutant Removal

The solids for the Gross Pollutant test were divided into four batches, one for each run (Figure 9). During the tests, any solids that escaped the catch basin were captured in a net, air-dried and weighed. The test results have been tabulated in Table 10 and Table 11.

Figure 9: Gross Pollutant Test Solids

Table 10: LittaTrap Gross Pollutant Test Results

Test Item	Flow Rate (LPS)	Mass of Escaped Solids (g)	Description of Escaped Solids	Estimated Gross Solids Capture Efficiency (%)
LittaTrap™	5	0.0275	Newspaper (fragments), fabric (fragments)	100 [1]
LittaTrap™	10	0.1546	Newspaper (fragments), fabric (fragments)	99.9 [1]
LittaTrap™	15 [2]	1.47	Styrofoam pieces, Newspaper (fragments)	99.2 [1]

[1] Based on an added mass of 193 g

[2] Flow held for 55 min. following the addition of solids

Table 11: Catch Basin (control) Gross Pollutant Test Results

Test Item	Flow Rate (LPS)	Mass of Escaped Solids (g)	Description of Escaped Solids	Estimated Gross Solids Capture Efficiency (%)
Catch Basin (Control)	5	221.99	All components	13.4 [1]
Catch Basin (Control)	15	234.97 [2]	Popsicle sticks, metal strips, plastic strips	8.3 [1]

[1] Based on an added mass of 256 g

[2] Includes the mas of escaped solids at 5 LPS (above)

A small volume of fragmented newspaper and fabric where observed to bypass through the LittaTrap™ basket during the 5 and 10 L/s test runs. These articles were less than 5mm in diameter, the nominal screen size of the trap and were a result of the paper and fabric strips breaking down during the test.

At 15 L/s the water level inside the LittaTrap™ basket was at the crest of the internal bypass, causing some bypass. During the 55 minute sustained flow some Styrofoam pieces were lost through the bypass channel. At the end of the test the LittaTrap™ contained the captured wet gross solids (Figure 11). In total, only 0.8% (mass basis) of the solids escaped the LittaTrap™ during the test at 15 L/s.

Figure 10: Escaped Solids – LittaTrap™ at 15 L/s

Figure 11: Retained Solids – LittaTrap™ at 15 L/s

For the Catch Basin, 87% of the solids escaped at 5 L/s and 92% escaped once the flow was increased to 15 L/s (Figure 12and Figure 13).

Figure 12: Escaped Solids – Control at 15 L/s

5 L/s **15 L/s**

Figure 13: Retained Solids – Control at 5 and 15 L/S

3.4 Experimental Design Errors

For this study, the catch basin, grating and streetscape were fabricated from plywood as it was impractical to use concrete in a laboratory setting. To prevent leaks and stop the wood from absorbing water, surfaces were painted with a rubberized coating. It was discovered that from the continual lifting and dropping of the grate on the catch basin, some of the coating was removed and showed up in the effluent in the form of small fibers. A micrograph of some of the larger fibers is shown in Figure 14.

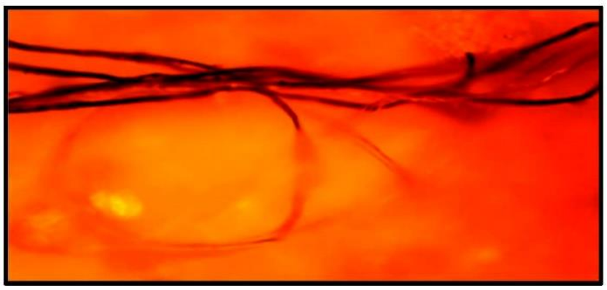


Figure 14: Rubber Coating Fibers

To estimate the impact these fibers had on the data, the fibers were removed from one of the recovered sediment sample dishes and the sample was reweighed. The mass of the fibers was found to be only 0.2 mg. Therefore, it is unlikely that the presence of the fibers had a significant impact on the results. In any future testing, the grating, and any surface it sits on at the top of the catch basin, should be replaced or lined with PVC, polyethylene or other similar material.

APPENDIX E – LittaTrap Full Capture Liner Photo

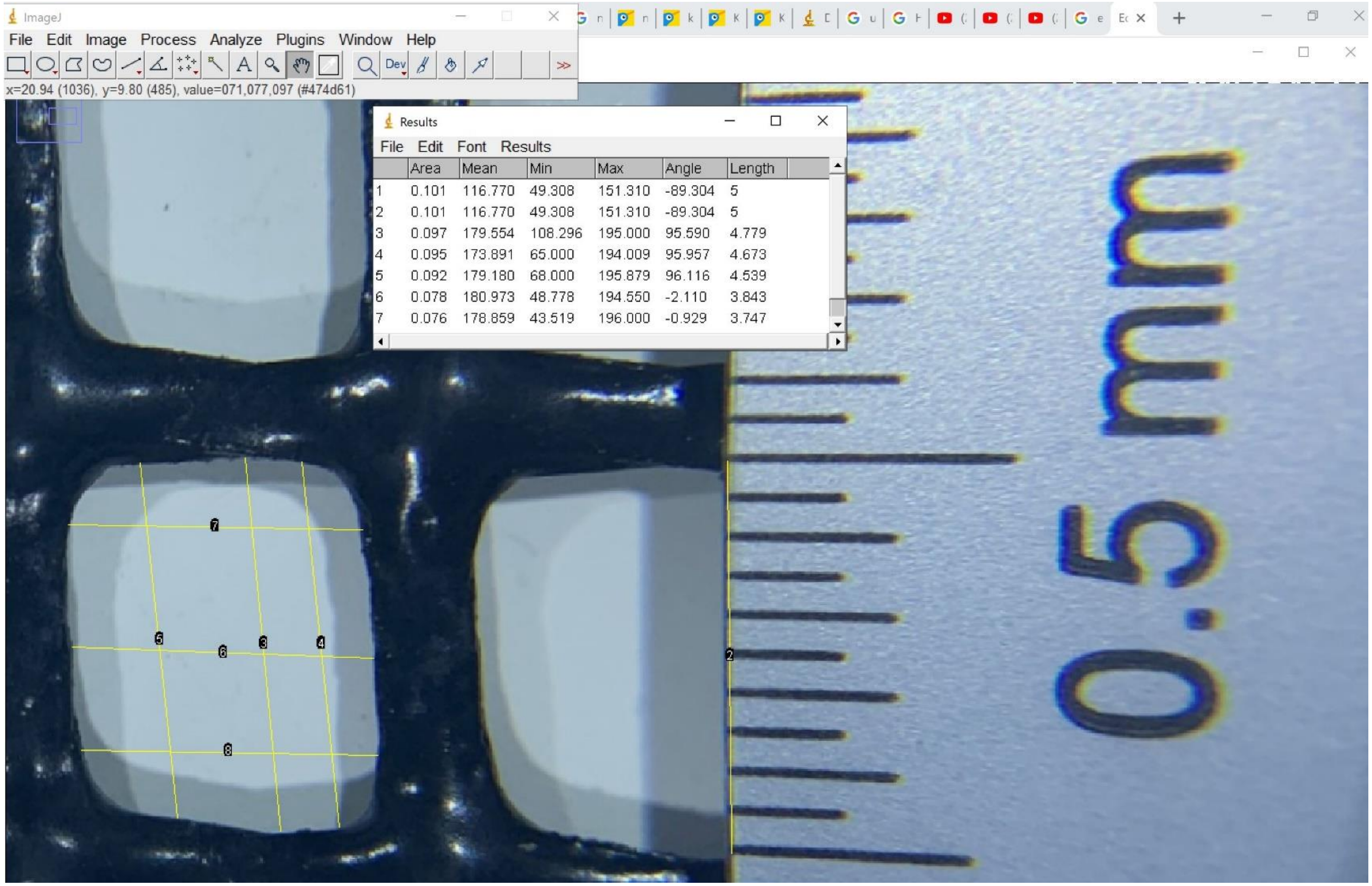

ImageJ
File Edit Image Process Analyze Plugins Window Help
x=20.94 (1036), y=9.80 (485), value=071,077,097 (#474d61)
Results
File Edit Font Results
Area Mean Min Max Angle Length
1 0.101 116.770 49.308 151.310 -89.304 5
2 0.101 116.770 49.308 151.310 -89.304 5
3 0.097 179.554 108.296 195.000 95.590 4.779
4 0.095 173.891 65.000 194.009 95.957 4.673
5 0.092 179.180 68.000 195.879 96.116 4.539
6 0.078 180.973 48.778 194.550 -2.110 3.843
7 0.076 178.859 43.519 196.000 -0.929 3.747
0.5 mm

Photo A

APPENDIX F – MCVAC Approval Letter

MVCAC
Mosquito and Vector Control Association of California
One Capitol Mall, Suite 800 • Sacramento, CA 95814 • p: (916) 440-0826 • f: (916) 444-7462 • e: mvcac@mvcac.org

Enviropod
34428 Yucaipa Blvd
Yucaipa, CA 92399

July 20, 2020

Dear Mr. Harris and Mr. Hannah,

Thank you for the submission of the Enviropod® LittaTrap™ FC Full Capture Device for grated inlet catch basins, curb inlet catch basins, combination inlet catch basins and manhole catch basins for review by the Mosquito and Vector Control Association of California pursuant to the SWRCB Trash Treatment Control Device Application Requirements. The Association has reviewed the conceptual drawings for the LittaTrap and verifies that provisions have been included in the design that allow for full visual access to all areas for presence of standing water, and when necessary, allows for treatments of mosquitoes.

While this verification letter confirms that inspection and treatment for the purpose of minimizing mosquito production should be possible with the Enviropod® LittaTrap™ FC Full Capture Device for grated inlet catch basins, curb inlet catch basins, combination inlet catch basins and manhole catch basins as presented, it does not affect the local mosquito control agency's rights and remedies under the State Mosquito Abatement and Vector Control District Law. For example, if the installed device or the associated stormwater system infrastructure becomes a mosquito breeding source, it may be determined by a local mosquito control agency to be a public nuisance in accordance with California Health and Safety Code sections 2060-2067.

"Public nuisance" means any of the following:

1. Any property, excluding water that has been artificially altered from its natural condition so that it now supports the development, attraction, or harborage of vectors. The presence of vectors in their developmental stages on a property is prima facie evidence that the property is a public nuisance.
2. Any water that is a breeding place for vectors. The presence of vectors in their developmental stages in the water is prima facie evidence that the water is a public nuisance.
3. Any activity that supports the development, attraction, or harborage of vectors, or that facilitates the introduction or spread of vectors. (Heal. & Saf. Code § 2002 (j).)

Declaration of a facility or property as a public nuisance may result in penalties as provided under the Health and Safety Code. Municipalities and the vendors they work with are encouraged to discuss the design, installation, and maintenance of stormwater trash capture devices with their local mosquito control agency to reduce the potential for disease transmission and public nuisance associated with mosquito production.

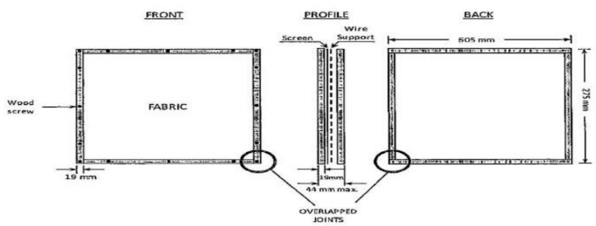
Sincerely,

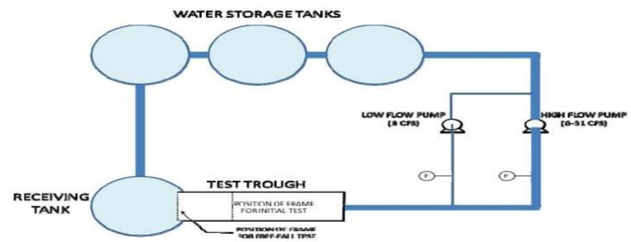
Bob Achermann,
MVCAC Executive Director

APPENDIX G – Example Hydraulic Calculations.

Empirical Test Data

These calculations are based on the test data from the Enviropod Fabric hydraulic report April 9 2020
These calculations used the results for the fabric combination of J + LTF
The follow table details the water surface elevation required to pass flow at a given flow rate through the screen in a free discharge situation.
The water surface elevation is the height of water,
The specific flow rate is calculated by dividing the flow rate by the length of the test fabric at that height of water
The test fabric is a rectangle of the following dimensions

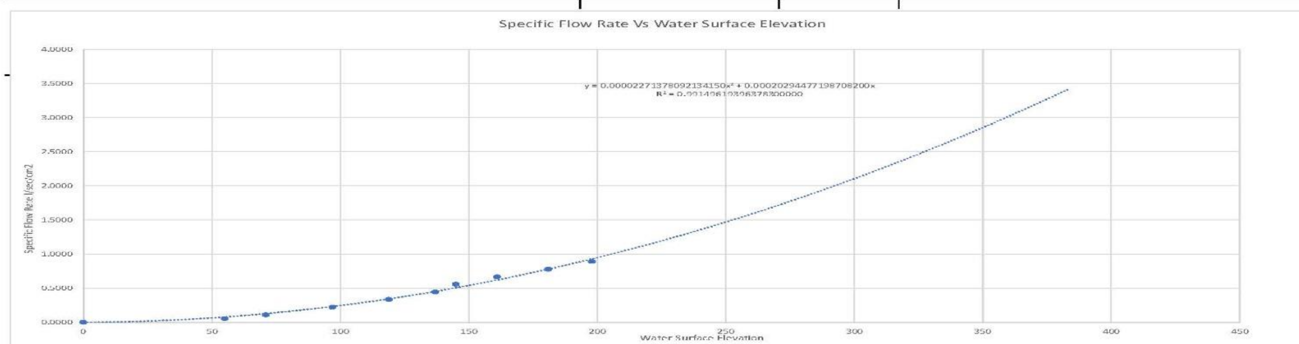




Test Fabric Width 567 mm

y = 0.00002271378092134150x2 + 0.00020294477198708200x

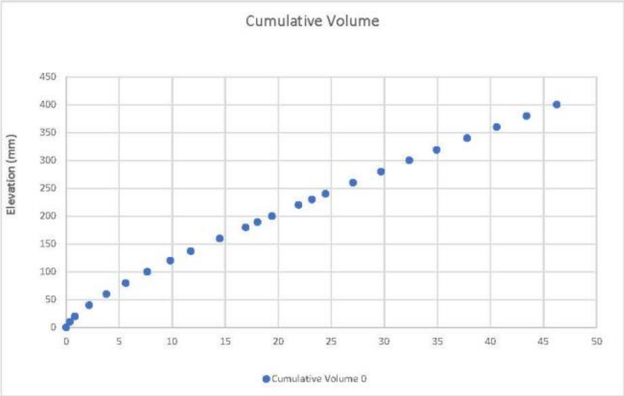
Fabric	Flow Rate (GPM)	Flow Rate (LPS)	Water Surface Elevation	Submerged Screen Area (cm2)	Specific Flow Rate l/sec/cm	Model Output Check (Specfic Q)
	0	0	0	0	0	0
J + LTF	50	3.2	55	312	0.056	0.058
	99	6.2	71	403	0.110	0.100
	201	12.7	97	550	0.224	0.194
	300	18.9	119	675	0.334	0.297
	399	25.2	137	777	0.444	0.399
	500	31.5	145	822	0.556	0.448
	600	37.9	161	913	0.668	0.556
	701	44.2	181	1026	0.780	0.707
	800	50.5	198	1123	0.890	0.850

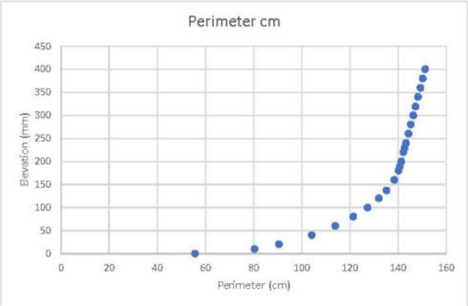


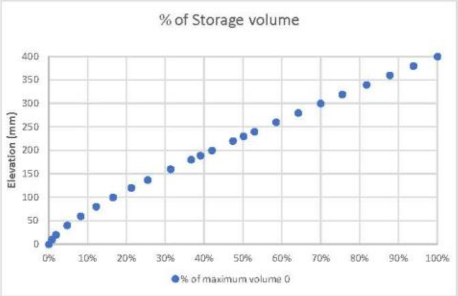
Enviropod Littatrap FC Stage Storage.

Elevation from base mm	Perimeter cm	Cross Sectional Area cm2	Volume per elevation section	Cumulative Volume	% of maximum volume
400	151	1429	2.9	46	100%
380	150	1410	2.8	43	94%
360	149	1391	2.8	41	88%
340	148	1372	2.9	38	82%
319	147	1352	2.6	35	75%
300	146	1334	2.7	32	70%
280	145	1315	2.6	30	64%
260	144	1297	2.6	27	58%
240	143	1278	1.3	24	53%
230	143	1268	1.3	23	50%
220	142	1259	2.5	22	47%
200	141	1240	1.4	19	42%
189	141	1229	1.1	18	39%
180	140	1220	2.4	17	37%
160	138	1188	2.7	14	31%
137	135	1135	1.9	12	25%
120	132	1084	2.2	10	21%
100	127	1010	2.0	8	17%
80	121	920	1.8	6	12%
60	114	809	1.6	4	8%
40	104	670	1.3	2	5%
20	90	479	0.5	1	2%
10	80	340	0.3	0	1%
0	56	0	0.0	0	0%

Max Basket Volume 46.24 Litters







Stage Discharge Of a Partially Full Basket

The flow rate at each level of fullness is determined by the following process and is based on empirical test data for the fabric

Level Full from the base is the level of trash accumulation from the base of the basket.

The % full is the percentage of the maximum storage volume

Available free board is the screen hight above the level of the trash accumulation

Determine the Specific flow rate perimeter (l/sec/cm) at this flow rate with the following equation

y = 0.00002271378092134150x2 + 0.00020294477198708200x

where y = Specific flow rate l/sec/cm2 and X is the available free board or height

Determine the average perimeter of the free board area

Calculate the flow rate by multiplying Specific flow rate by the average perimeter length.

Level Full from basket mm	Perimeter cm	Cumulative Volume litters	% Full	Available Free board mm	Average Perimeter cm	Specific flow rate at Available free board	Flow Rate l/sec
400	151.20	46.24	100%	0	151.20	0.00	0
360	149.20	40.57	88%	40	150.20	0.03	4
340	148.20	37.78	82%	60	149.70	0.07	10
319	147.15	34.90	75%	81	149.18	0.13	20
300	146.20	32.33	70%	100	148.70	0.21	31
280	145.20	29.66	64%	120	148.20	0.30	45
260	144.20	27.03	58%	140	147.70	0.42	62
240	143.20	24.44	53%	160	147.20	0.55	81
230	142.70	23.16	50%	170	146.95	0.62	91
220	142.20	21.89	47%	180	146.70	0.70	103
200	141.20	19.38	42%	200	146.20	0.87	127
189	140.65	18.01	39%	211	145.93	0.97	141
180	140.11	16.91	37%	220	145.66	1.05	154
160	138.30	14.47	31%	240	144.75	1.26	182
137	135.13	11.74	25%	263	143.17	1.52	217
120	131.98	9.81	21%	280	141.59	1.72	244
100	127.29	7.64	17%	300	139.25	1.98	276
80	121.36	5.62	12%	320	136.28	2.26	308
60	113.85	3.78	8%	340	132.53	2.56	339
40	104.11	2.16	5%	360	127.66	2.87	366
0	55.60	0.00	0%	400	103.40	3.55	367

Bypass flow Rate

The bypass flow is determined by modelling the bypass as 4 orifice controls
The flow though each orifice is calculated as a rectangular orifice
The LittaTrap is installed with the bypass centre 200mm below surface level.
The driving head is therefore 200mm
With width of the bypass is 50mm and the length is the length of the basket side.

LT6060

Long Side Orifices			Long Side Orifices		
h=	0.2	m	h=	0.2	m
L=	0.38	m	L=	0.38	m
W=	0.05	m	W=	0.05	m
Area=	0.019	m2	Area=	0.019	m2
n=	1		n=	1	
2*9.81*h=	3.924		2*9.81*h=	3.92	
% unblocked	100%		% unblocked	100%	
Q=m3	0.02	m3	Q=m3	0.02	m3
Q=l/sec	23	l/sec	Q=l/sec	23	l/sec
No Openings	2		No Openings	2	
Total Q_{out}	47	l/sec	Total Q_{out}	47	l/sec

Overall Q_{out}	93	l/sec
	3.3	CFS