



FROG CREEK PARTNERS, LLC

Device Application for Full Trash Capture Certification
of the Gutter Bin[®] Channel Filter System for trench
drains (CFS-TD) and the Mundus Bag[™] water filter



1. Cover Letter

June 20th, 2019

Ms. Eileen Sobeck
Executive Director
California State Water Resources Control Board
Division of Water Quality
P.O. Box 100
Sacramento, CA 95812-100

Re: Application for Trash Treatment Control Device – Gutter Bin® Channel Filtration System & Mundus Bag® water filter

Dear Ms. Sobeck:

Frog Creek Partners, LLC is pleased to submit this application for Certification as a Full Capture System - Trash Treatment Control Device for the Gutter Bin® Channel Filter System for Trench Drains. We submit this application in accordance with the California State Water Resources Control Board Trash Treatment Control Device Application Requirements and it includes the following minimum requisite sections:

1. Cover Letter
2. Table of Contents
3. Physical Description
4. Installation Information
5. Operation and Maintenance Information
6. Reliability Information
7. Field/Lab Testing Information and Analysis

I appreciate your review of our application and the work that you do to keep our watersheds clean. If you require additional information, please feel free to contact me at brian@frogcreek.partners or 307.439.9570.

With kind regards,



Brian Deurloo
President
Frog Creek Partners

1.A. General description of the Device.

The patent pending Gutter Bin® Channel Filter System for trench drains (“CFS-TD”) is a proven permanent or temporary stormwater filter for use in removing pollution from horizontal or sloped drainage systems within a defined trench drain. The adjustable CFS-TD frame is fastened to the bottom and/or sides of a trench drain and a removable and flexible Mundus Bag™ filter media is secured within the CFS-TD frame. The reusable or single-use Mundus Bag™ water filter, when used in conjunction with the CFS-TD, captures 100% of trash 5mm, or greater, in diameter because the Mundus Bag™ maximum orifice size is 4mm. The Mundus Bag™ slides into the CFS-TD frame and captures target pollutants while retaining pollution with an integrated backflow preventer. The rigid CFS-TD frame forces water to flow through the flexible Mundus Bag™ within confined drainage systems such as a trench drain.

The modular and scalable design of the CFS-TD allows it to fit within a variety of trench drain aspect ratios (sizes) and capture a wide range of pollutants including trash, gross pollutants, vegetative waste, sediment, hydrocarbons, and heavy metals. The CFS-TD is a passive, gravity flow device that can allow water to overflow/bypass the Mundus Bag™ in high flow events thereby minimizing flooding risks. The Gutter Bin CFS-TD can be used in a multitude of configurations such as in parallel (side by side), in series (back to back), or as a standalone unit. The CFS-TD requires routine maintenance to remove captured pollutants and/or replace filtration media on an as-needed basis.

The patent pending Mundus Bag™ (“MB”) is a customizable water filter media bag that is used in conjunction with Gutter Bin® stormwater filtration system products to remove 100% of trash from stormwater inlets and trenches. FCP offers a variety of sizes and filtering configurations to suit the customer’s and environment’s needs. Certain components of the MB are reusable where others are single use.

Additional filter media may be added or attached to the MB to provide additional filtration or vector control management including but not limited to:

- 1) Non-woven or woven geo-textile;
- 2) MYCELX hydrocarbon capture media;
- 3) Proprietary activated carbon-based filtration pillows for heavy metal removal; and/or
- 4) Perforated metal filter basket (with or without a releasable bottom closure);
- 5) Vector control devices.

Frog Creek Partners provides data collection capabilities with the FCP Field App for use on any mobile device. To help effectively manage stormwater decisions, the FCP Field App can be integrated with a customer’s GIS database to record important asset information such as date of last service, who performed the service, quantity of pollution captured, type of filtration media, average pollution captured over time, etc. The MB and Gutter Bin can be fitted with one or more radio frequency identification devices (RFIDs) where the mobile device (i.e. phone) can quickly communicate with the RFID and gather information about each Gutter Bin or Mundus Bag unit.

The customer (or designated service company) can collect the following information during site recon or installation:

1. **Infrastructure information:** measure and record dimensions of the catch basin or trench drain including length, width, depth, outlet size, inlet size, plus any other asset information important to the customer;
2. **Location:** geolocate the structure with latitude and longitude automatically recorded by the mobile device and FCP Field App;
3. **Site characteristics:** expected pollution type, traffic considerations, ease of maintenance, etc.;
4. **Pollution characteristics:** density, type, recyclables, sediment profile, etc.

1.B. The applicant's contact information and location.

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1.C. The Device's manufacturing location.

All Frog Creek Partners' products are designed and manufactured in the United States. FCP engages multiple manufacturing subcontractors to produce the metal and fabric components with strict QA/QC oversight by Frog Creek Partners. The Channel Filter Systems are assembled at our manufacturing facility in Casper, Wyoming.

1.D. A brief summary of any field/lab testing results that demonstrate the Device's functions as described within the application.

The Frog Creek Partners' Gutter Bin[®] stormwater filtration system and Mundus Bag[™] water filter successfully captured and retained 100% of trash in multiple tests in flows that exceeded a design one-year and one-hour storm event. Repeated test successfully captured cigarette butts, leaves and trash without resuspension given the MB's high storage capacity. The large screen openings (greater than 2mm and less than 5mm) of the MB allow ample flow through capacity and will not blind from sand and sediment loading from streets and parking lots.

The CFS-TD has proven to be successful at removing 100% of trash in multiple third party validated field and lab tests. The lab tests were conducted in FCP's headquarters with third-party professional engineer(s) present for all trash capture test verification. FCP used a "trash recipe" as recommended by Stormwater Environment Manufacturers Association (SWEMA). The CFS-TD captured 100% of the trash recipe in flowrates ranging from 15 GPM to 600 GPM. Two types of Mundus Bags[™] were lab tested to ensure that the both the TTC-MB (Total Trash Capture MB) and the TDS-MB (Trash, Debris & Sediment MB) performed to State Water Resource Control Board ("SWRCB") requirements for 100% trash capture.

An industrial marine terminal facility (MTF) located in Long Beach, California is a site where multiple successful field tests of the CFS-TD continue to be validated by a third party as part of a pilot project. The field pilot test is much more rigorous than just full trash capture because the CFS-TD and Mundus Bags[™] are configured at this location to remove not just trash but also sediment, heavy metals, and hydrocarbons for the customer's permit compliance. Through the use of multiple CFS-TD and other best management practices (BMPs), the MTF has routinely succeeded in complying with their Industrial General Permit (IGP) for the removal of contaminants comprising of total suspended solids, aluminum, copper, iron, lead, zinc, and hydrocarbons since August of 2018 in an efficient and economical manner.

100% trash capture test results = SUCCESSFUL - PASS TEST.

1.E. A brief summary of Device limits, and operational, sizing, and maintenance considerations.

Limitations

The device limitations are one of the CFS-TD's strongest attributes as the product has few limits. It can be placed in large, small, wide, narrow, deep, and shallow trench drains with variable expected flowrates and required overflow rates. The MB can be configured to capture sediment, heavy metals, hydrocarbons and 100% of trash. The CFS-TD is designed to work in defined trench drain systems with rigid walls. FCP offers a similar device that can be used in less defined channel systems such as drainage ditches, culverts, and planer drainages that will be submitted in a separate application.

The UV protected and industrial strength fabric used in the MB may need replacement every one (1) to two (2) years depending upon the fabric or filter media used. To combat fabric limitations, a metal mesh

of the anticorrosive type may be used to maximize filtration media life. The fabric style MB is preferred because of its ease of maintenance and flexible nature.

Operation

The CFS-TD does not have any moving parts and is a passive filtration device. Once installed, minimal operational oversight is required except during servicing. One can easily introduce vector controls in or around the CFS-TD. The vector control devices/media can be placed in one of many locations around the CFS-TD including; upstream of the CFS-TD, downstream of the CFS-TD, under the MB, and/or within the MB.

Sizing

The CFS-TD frame is determined by the width of the trench drain and the required hydraulic capacity prior to overflow. The profile of the trench drain and design storm drives the dimension of the CFS-TD and the MB size. Width and depth of the trench drain are required dimensions to successfully size a CFS-TD. Trench drain length and catch size are optional but helpful measurements. The CFS-TD is adjustable to fit a variety of different sizes of trench drain from six (6) inches wide to many feet wide. FCP can also build custom units to accommodate site specific environments.

Maintenance

The CFS-TD is the most easily maintained trench drain filter on the market. The CFS-TD, as all storm drain filter systems, has its own unique service interval requirements that depend upon local climate, pollution load, staffing, and network infrastructure. Low traffic area installations may only need to be inspected and/or serviced once per year. High traffic areas with frequent gatherings of people and sensitive discharge requirements may require Gutter Bin inspection and/or service once per month.

Maintenance frequency is determined by the local conditions, pollutant loads and targeted pollutants. Maintenance is performed by removing the channel drain covering, visual inspection of the CFS-TD, and removal/replacement of the MB and any additional filtration media. Depending on the composition of the MB, it may either be emptied of captured pollutants and reused, or disposed of and replaced with a new MB. Once serviced, the drain covering is replaced.

To ensure the Gutter Bin is maintained properly, the service activity can be recorded with the FCP Field App that can export data back to the customer's GIS database. Service and pollution information is automatically and manually recorded within an app for Android and iOS devices. See Appendix E for more information regarding the FCP Field Service App.

Gutter Bins and Mundus Bags™ fitted with a passive RFID can communicate service details such as time, service, and pollution details so staff can make better informed decisions regarding the operation of their stormwater system. This provides FCP customers with measurable and quantifiable results that can lead to better management of stormwater infrastructure. The Gutter Bin is an excellent tool for managers who want to achieve stormwater goals and measure their progress with quantifiable results.

1.F. Description or list of locations where Device has been installed.

An industrial marine terminal facility (MTF) located in Long Beach, California is the site of a very successful CFS-TD pilot test. The MTF employs multiple CFS-TD units with sediment, hydrocarbon, heavy metal, and trash Mundus Bags™ (SHHT-MB), plus other best management practices (BMPs). The MTF has routinely succeeded in complying with their Industrial General Permit (IGP) for the removal of contaminants comprising of trash, total suspended solids, aluminum, copper, iron, lead, zinc, and hydrocarbons since the August of 2018 installation of CFS-TD Gutter Bins. The MTF uses a third-party environmental service company to perform influent and effluent water quality testing to determine the filtration efficiency of the CFS-TD and Mundus Bag™. The MTF customer has requested anonymity for business reasons but has repeatedly expressed their satisfaction of Frog Creek Partners' products to remove problematic contaminants in an efficient and economical manner.

1.G. Certification Clause.

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.



Brian Deurloo
President
Frog Creek Partners, LLC

2. Table of Contents

1. Cover Letter	1
1.A. General description of the Device.	2
1.B. The applicant’s contact information and location.	3
1.C. The Device’s manufacturing location.	3
1.D. A brief summary of any field/lab testing results that demonstrate the Device’s functions as described within the application.	4
1.E. A brief summary of Device limits, and operational, sizing, and maintenance considerations.....	4
1.F. Description or list of locations where Device has been installed.	6
1.G. Certification Clause.....	6
2. Table of Contents	7
3. Physical Description	9
3.A. Description of how the Device works to trap all particles that are 5mm or greater in size and how it is sized for varying flow volumes.	9
3.B. Design drawings for all standard Device sizes including dimensions, and alternative configurations.	11
3.C. If the Device is designed with an internal bypass, explain how the bypass only operates for volumes greater than the design storm.	11
3.D. Engineering plans/diagrams for a typical installation.	11
3.E. Photographs, if any, of pre-and post-installation examples.	12
3.F. Device maximum trash capture capacity.	14
3.G. The Device hydraulic capacity (flow in CFS) at its maximum trash capture capacity for all standard Device sizes.	14
3.H. Each material and material grade used to construct the Device.	15
3.I. Conditions under which the Device re-introduces previously trapped trash.	16
3.J. Estimated design life of the Device.	17
3.K. If the Device is substantially similar to a currently listed Certified Device(s), name the Certified Device(s) and identify the substantial similarities and any minor changes in materials, material thickness, structural assembly, etc. Explain how these minor changes in your Device will impact performance as compared to the substantially similar Certified Device.....	17
3.L. Optional components.....	17
4. Installation Guidance	17

4.A. Device installation considerations.	17
Size & Placement Considerations.....	18
4.B. Device installation procedures.....	18
4.C. Methods for diagnosing and correcting installation errors.	20
4.D. Optional components guide: An explanation of the condition or circumstance that would necessitate the implementation of that component and render it no longer optional	21
5. Operation and Maintenance Information	21
5.A. Device inspection frequency considerations, and inspection procedures.	21
5.B. Maintenance frequency consideration, procedures, and a description of necessary equipment and materials.	22
5.C. Effects of delayed maintenance on Device structural integrity, performance, odors.	24
5.D. Device maintenance and vector control accessibility.	24
6.0 Reliability Information	25
6.A. Estimated design life of Device components before major overhaul.	25
6.B. Device sensitivity to loadings other than trash (i.e. leaves, sediment).	25
6.C. Warranty information.	26
6.D. Customer support information.	26
7. Field/Lab Testing Information and Analysis	26
7.A. Provide available field or lab testing information that demonstrates Device functionality and performance.	26
APPENDIX A - TEST RESULTS	29
APPENDIX B - CERTIFICATION OF FIELD TEST RESULTS	36
APPENDIX C - SPECIFICATION SHEETS & ENGINEERING DRAWINGS	37
APPENDIX D - VECTOR CONTROL APPLICATIONS.....	41
APPENDIX E - FCP FIELD APP.....	45

3. Physical Description

3.A. Description of how the Device works to trap all particles that are 5mm or greater in size and how it is sized for varying flow volumes.

The CFS-TD secures the MB within the trench drain and directs stormwater into the MB so pollutants can be filtered from the water as it flows through. CFS-TD inserts are sized to fit the trench drain they are being inserted into. As a result, their size is directly proportional to the size of the trench drain and performance characteristics generally scale with the increase flow-through capacity of a larger frame. CFS-TD inserts are adjusted horizontally to fit the full width of the trench drain floor. The vertical height of the CFS-TD is determined by the physical dimensions of the trench drain, its designed flow capacity, the design storm and predetermined height above the CFS-TD but below the channel drain's covering to act as a high flow bypass (overflow). The distance between the top of the CFS-TD and the top of the trench drain is the overflow.

Additionally, the CFS-TD and the MB incorporate the following design features to ensure full capture of all particles 5mm or greater:

- An adjustable backflow preventer at the mouth of the MB to prevent any resuspension or expulsion of captured pollutants in times of high precipitation or water flow
- Profile (cross-sectional) coverage of the trench drain by the CFS-TD to accommodate at least a one-year and one-hour design storm event for the region
- High flow and low differential pressure of the MB water filter allows trash to pack in the bottom of the MB

The Frog Creek Partners channel filter system ensures that, at a minimum, all particles and gross pollutants 5mm, or greater, are captured by the MB water filter. The filter media normally comprises of polypropylene netting material with a maximum aperture size of 4mm. An expandable and adjustable backflow preventer at the entrance to the filter media can expand to accept larger trash during high flow and can constrict at low flow, thereby capturing and retaining 100% trash. The bottom of the MB is fastened to prevent trash loss but can be opened during servicing to allow pollutants to drop out.

The net material has excellent wear resistance, UV protection, chemical resistant, and tear resistance that allows installation in a variety of environments because of its flexible nature. The net material normally comprises of polypropylene or propylene but can be substituted with any other suitable material(s). Frog Creek Partners can also offer a more rigid style filter media in the form of a perforated basket constructed of plastic, stainless steel, or other material that suits the environment and customer's needs. The rigid style basket offers greater longevity with the same 100% trash capture capabilities but, is less flexible in pollutant removal capabilities and shape.

The height of the frame is variable depending upon the environment's overflow requirements. For example, a trench drain that is 12" wide and 24" deep can be fitted with a CFS-TD that is 12" wide and 12" high. The CFS-TD can be fit into trench drains as narrow as 6" and up to several feet wide (this may

require parallel placement of multiple CFS-TD units). In special circumstance, multiple CFS-TD can be placed in series or in parallel to provide 100% trash capture for the system. Typical CFS-TD frames are adjustable to fit trench drains from 10" to 16" wide at varying depths. The catch size and trench drain hydraulic capacity are the key variables used to determine the CFS-TD height for overflow bypass.

A typical MB for CFS-TD applications comprises of:

- **Mundus Hoop ("MH"):** a reusable hoop that serves as a rigid connection mechanism between the MB and the CFS-TD frame. The MH can also be permanently integrated to the Mundus Bag™;
- **Anchor Wrap:** industrial grade fabric and expandable closure located at the top of the MB to fasten the MB to the MH. A strap attached to the anchor wrap allows for easy handling and weighing of the MB;
- **Backflow Preventer ("BFP"):** an adjustable and flexible device located at the inlet of the MB to prevent captured pollutants from escaping the filter;
- **Filter Media ("FM"):** a porous media incorporated to the MB that allows water to flow through while capturing target pollutants. A typical FM used with the trash capture MB is a chemical and UV resistant polypropylene netting with a 4mm maximum aperture size. Alternative filter media such as geofabric, MYCELX, and activated carbon can also be used to capture sediment, hydrocarbons, and heavy metals. Alternatively, a removeable perforated rigid basket can be used as a gross pollutant trap; and
- **Bag Tie:** a removable fastener attached to the end of the MB to provide closure. The bag tie can be removed so contents can be dumped from the bottom of the MB.
- *Any of the fabric components of a MB can be infused with MYCELX to safely capture and retain hydrocarbons from stormwater.*

The patent pending Mundus Bag™ has many advantages, including:

- 100% trash capture;
- Easily cleaned - pull, dump, replace;
- High quality; UV resistant, chemical resistant, tear resistant material;
- Flexible tubular shape – fits in more places than rigid baskets;
- Adjustable and expandable backflow preventer – opens/closes to accept large pollutants and prevents loss of captured pollutants;
- Adjustable height – for shallow and deep applications;
- Customizable filtration – target trash;
- Easily lifted – grab handle to lift and weigh bag;
- Reusable – the total trash capture (TTC) model is reusable;
- Disposable – The TTC-MB and TDS-MB can also be thrown away;
- Closure strap – the MB can be cinched up tight on both ends to encapsulate trash

- No vac truck needed – a vac truck requires a lot of maintenance, it's highly intensive to run, and the removed pollutants from other devices must be decanted, loaded and hauled to a dump;
- Cleaned by vac truck – simply suck out the contents
- Minimal waste handling – the MB and/or the trash only needs to be handled once. Where a vac truck requires the waste to be handled three times.

3.B. Design drawings for all standard Device sizes including dimensions, and alternative configurations.

Please refer to Appendix C for design drawings and specification sheet. The CFS-TD can be altered or configured to suit the customer's need and the environment in which it operates. The CFS-TD can be built to any width and height required by the Engineer. The alternative configurations comprise of:

1. A simple channel frame that is affixed to the floor and walls of the trench drain with or without a turnbuckle at the top of the frame to spread the top of the frame against the walls of the trench drain.
2. A frame with wings that extend upstream of the CFS-TD to more efficiently divert water into the Mundus Bag.
3. A frame with support braces that extend upstream so all anchor bolts can be drilled vertically for ease of installation.
4. The Mundus Bag can be in flexible or rigid format as described later in the application.
5. Alternative dimensions are discussed later in the application, but the CFS-TD can fit a variety of sized trench drains ranging from 6-inches wide and 6-inches deep to trench drains several feet in width and depth. The CFS-TD can be placed as a single unit or in series or parallel.

3.C. If the Device is designed with an internal bypass, explain how the bypass only operates for volumes greater than the design storm.

The CFS-TD does not have an internal bypass. It does employ the use of an external bypass if necessary. Conservatively, the maximum hydraulic capacity of a 12" x 12" CFS-TD is greater than 600 GPM. In FCP's experience, we have found that the best configuration for a CFS-TD in a trench drain is where the CFS-TD is fastened to and filters only the bottom half or bottom one-third cross-sectional area of most trench drain because a trench drain fills from the bottom up. This placement configuration provides means to capture/retain pollutants during the first flush of a storm and not less than the peak flow rate resulting from a one-year, one-hour storm event. Flows much greater than this can bypass the system by overflowing (bypassing) the CFS-TD thereby allowing water to drain the area to minimize flooding risks.

The Engineer is responsible for confirming that the flowrate and bypass capacity of the CFS-TD meet or exceed infrastructure and hydraulic capacity requirements.

3.D. Engineering plans/diagrams for a typical installation.

Typical installation configuration engineering plans may be found in Appendix C.

3.E. Photographs, if any, of pre-and post-installation examples.

Photographs showing the typical installation of the CFS-TD are found below. The particular CFS-TD model show below has wings; not all CFS-TD models have wings.



Figure 1 – Marine terminal install – looking downstream



Figure 2 - Marine terminal install – looking downstream



Figure 3 - Marine terminal install – looking downstream (top view)



Figure 4 - CFS-TD installed with no wings



Figure 5 - CFS-TD installed with no wings

3.F. Device maximum trash capture capacity.

Please refer to the Mundus Bag™ specification sheet in Appendix C for specific filter media capacities. The calculation for trash capacity is very simple with the formula of length x width x height. For example, a typical size CFS-TD frame of 12" x 12" with a 36" long MB will hold approximately three (3) cubic feet of trash and debris. The advantage of the MB is that it can be constructed to varying length or circumference to fit the environmental needs. The same sizing variances can be applied to the rigid style filter media for maximum trash capture and extended service intervals. Mundus Bags™ can be made to as long as 50 feet and hold 50 cu. ft. of trash. Field experience has shown that the 13" total trash capture model Mundus Bag™ (TTC-MB) can easily hold up to 70 pounds of trash and debris. The 13" total debris and sediment Mundus Bag™ (TDS-MB) can hold up to 159 pounds of sediment and trash.

3.G. The Device hydraulic capacity (flow in CFS) at its maximum trash capture capacity for all standard Device sizes.

Please refer to the Mundus Bag™ spec sheet in Appendix C for specific filter media hydraulic capacities.

Conservatively, the maximum hydraulic capacity of a 12" x 12" CFS-TD is greater than 600 GPM. In FCP's experience, we have found that the best configuration for a CFS-TD in a trench drain is where the CFS-TD is fastened to and filters only the bottom half or bottom one-third cross-sectional area of most trench drain. This placement configuration provides means to capture/retain pollutants during the first flush of

a storm and not less than the peak flowrate resulting from a one-year, one-hour storm event. Flows much greater than this can bypass the system by overflowing the CFS-TD thereby allowing water to drain the area to minimize flooding risks. Therefore, the hydraulic capacity of the CFS-TD at its maximum trash capture capacity is at least one-half of the hydraulic capacity of the trench drain prior installing the CFS-TD. Of course, the CFS-TD can be fitted to cover the whole the cross-sectional area of a trench drain to ensure total trash capture during all phases of a design storm.

The system experiences some hydraulic capacity loss as the filter media fills with trash until the trash in the filter media accumulates to a point where the filter media open area exceeds the cross-sectional area of the CFS-TD opening. At this point, water flow diverts up and over the CFS-TD thereby allowing drainage of the system. The differential pressure (dP) created by the CFS-TD and Mundus Bag™ is negligible when empty. The CFS-TD frame offers minimal flow resistance. The dP increases as the Mundus Bag™ accumulates trash but an extra-long Mundus Bag™ (i.e. >6' long) can be inserted into the CFS-TD which increases the service interval time and the time it takes for the Mundus Bag™ to reach maximum trash capture capacity.

As an example of the high flow capabilities of the CFS-TD, in a controlled test environment FCP introduced trash and 475 GPM of water to a 12"x12" CFS-TD placed in trench drain at a 2-3% slope. The device still maintained at least 3" of freeboard from the top of the device. Therefore, a properly sized CFS-TD can easily and effectively capture 100% of trash in a high flow environment and especially during the first flush.

The CFS-TD is also highly capable of catching 100% of gross pollutants 5mm, and greater, in diameter during non-stormwater discharge (aka dry weather runoff). All low flow water and pollution is funneled into the MB. The first flush of a rainstorm will push any pollutants into the MB that may be caught at the entrance of the CFS-TD because the dry weather runoff may have lacked the volume.

3.H. Each material and material grade used to construct the Device.

The CFS-TD and MB are constructed of durable, weather resistant, high strength materials to provide a long service life. The materials used in the construction of the CFS-TD and the MB are as follows:

- **CFS-TD Filter Frame:** 300 or 400 series stainless steel of varying gauge (weathering steel, plastic, or fiberglass may be used if allowed by local regulations);
- **CFS-TD Anchor Bolts:** 300 or 400 series stainless steel;
- **Mundus Bag™ Hoop:** 300 or 400 series stainless steel or plastic of varying diameter or gauge;
- **Mundus Bag™ Anchor Fabric:** marine grade, non-toxic material;
- **Mundus Bag™ Lifting Handle:** marine grade webbing;
- **Mundus Basket:** 300 or 400 series stainless steel of varying gauge (rigid alternative to Mundus Bag™);
- **Mundus Bag™ Netting Outer Shell:** polypropylene or propylene;
- **Mundus Bag™ Closure Fastener:** industrial grade zip tie with stainless steel lock (or other approved device);

- **Mundus Bag™ Sediment Liner***: nonwoven geofabric of varying thickness and sieve rating can be used as well as a number of other effective medias;
- **Mundus Bag™ Hydrocarbon Capture Media***: Mycelx hydrocarbon capture media;
- **Mundus Bag™ Proprietary Granulated Activated Carbon mixture for heavy metal removal***.

** denotes optional filtration media not required for full trash capture*

It is important to note that Mycelx has been proven to be an effective and safe hydrocarbon capture media that is used in sensitive areas around the world including the Galapagos Islands and in many port facilities in the form of a bilge tank water cleaner.

Frog Creek Partners manufactures the CFS-TD using stainless steel, weathering steel, plastic and/or other approved materials. California models are 100% stainless steel. These materials are used throughout the entire line of Gutter Bin models and are the most durable materials available for these products. FCP can also substitute certain hardware components with weathering steel, plastic, or fiberglass if allowed by government regulations. Adherence to installation and maintenance procedures are required to ensure the design service life of the Device is maintained.

3.I. Conditions under which the Device re-introduces previously trapped trash.

The CFS-TD is designed and engineered to capture and permanently retain all particles 5mm or larger. The backflow preventer (BFP) in the MB expands during high flow and restricts during low flow thereby capturing and retaining trash and pollution. The method in which the BFP captures and retains trash is similar to how a crab trap works - it is easy to enter but difficult to exit. That being said, conditions in which the CFS-TD and Mundus Bag™ might re-introduce previously trapped trash include:

- If the CFS-TD is not properly maintained and pollutants are allowed to accumulate beyond the specified allowable limit in the MB and the water filter becomes blinded, then water may accumulate above the CFS-TD in the channel drain to such an extent that it will overtop the CFS-TD and overflow, thus bypassing the CFS-TD;
- If the polypropylene netting of the MB is damaged or torn, it may cause a condition that would allow for the re-introduction of captured pollutants. The filter media should be replaced if it tears;
- The MB will not reintroduce previously captured trash unless there is a backflow in the storm conveyance system. If water enters the water filter normally through the upstream opening, then the previously captured trash will continually compact into the MB;
- Unusual weather events that exceed the flow capacity of the CFS-TD or the channel drain may cause a condition that would allow for the re-introduction of captured pollutants;
- As water flow subsides, there is a slight chance that trash may escape the MB BFP and settle in the trench drain upstream of the CFD-TD. The escaped pollutants will again be caught by the CFS-TD as long as the device is properly maintained.

It is important to note, that some installations of the CFS-TD are installed in series and thus a downstream CFS-TD (if in existence) will have the opportunity to re-capture any re-introduced pollutants during the next moisture event.

3.J. Estimated design life of the Device.

The CFS-TD has a minimum design life of 25 years assuming the proper installation, maintenance and service of the Device. The total trash capture (TTC model) Mundus Bags™ are reusable and have a service life of one (1) to two (2) years, depending upon site conditions. Trash, debris and sediment (TDS model) Mundus Bags™ with a geotextile liner are a single use filter and have a maximum service life of 12 to 18 months, depending upon site conditions.

3.K. If the Device is substantially similar to a currently listed Certified Device(s), name the Certified Device(s) and identify the substantial similarities and any minor changes in materials, material thickness, structural assembly, etc. Explain how these minor changes in your Device will impact performance as compared to the substantially similar Certified Device.

To FCP's knowledge and after reviewing the list of Certified Devices published by the California State Water Resources Control Board, there are no Certified Devices similar or substantially similar to the CFS-TD and Mundus Bag™.

3.L. Optional components.

FCP offers an optional overflow screen for the CFS-TD in states other than California. It is constructed of stainless steel (or other approved material like fiberglass, plastic, steel, etc.) The screen attaches to the top of the CFS-TD and will screen all particles 5mm or greater from bypassing the CFS-TD and MB. The top of the screen is sloped upstream so captured pollutants will drop from the screen and onto the floor of the trench drain as flows subside. A properly sized CFS-TD for a design storm should not need the optional overflow screen. If a customer in California requires the installation of an overflow screen, then FCP must obtain approval from the State Water Board prior to installation.

4. Installation Guidance

4.A. Device installation considerations.

Frog Creek Partners can provide detailed instructions in written format to the installer to ensure proper installation techniques. Further, FCP offers video instruction on our website and can also provide virtual reality videos to be used with the installers' VR headset (FCP can also provide the customer/installer a headset for instructional purposes).

The CFS-TD requires a broom, marker, handheld cordless hammer drill, concrete drill bit, concrete anchors, hammer, and wrench to install within a concrete trench drain (installs in five (5) to ten (10) minutes).

Size & Placement Considerations

The following instructions are the fitting procedures and considerations for the installation of the CFS-TD and MB:

1. **Measure & Quantify:** Determine the width and the height of the trench drain at the point of CFS-TD intended location. If the width of the trench drain varies along the vertical cross section, then measure the top, middle and bottom width of the trench drain. Determine the length of the trench drain downstream of the CFS-TD to determine if there are limiting factors for MB length. Another useful measurement (albeit optional) is to approximate the size of the drainage area (catch) and estimated pollutant load for MB selection. A trench drain with fairly uniform walls and floors works best with the CFS-TD, but irregular configurations can be accommodated with silicone;
2. **Sizing:** Select or engineer the appropriately sized CFS-TD based on the dimensions of the trench drain, its designed flow capacity and the design storm rating. FCP provides custom built and adjustable CFS-TD for varying width and/or height applications;
3. **Mundus Bag™ Selection:** Select the appropriate Mundus Bag™ based on the following considerations:
 - a. CFS-TD size;
 - b. Target pollutants;
 - c. Hydraulic capacity;
 - d. Desired maintenance frequency.
4. **Site Selection:** The size of the CFS-TD is determined by the following considerations:
 - a. Length of the Mundus Bag™ and any additional filtration media: this may be up to six (6) feet in overall length (or longer if the customer has special handling equipment);
 - b. Width and height of the trench drain;
 - c. The CFS-TD frame can be installed as a single unit, in series, or in parallel. The Device can be installed at any point along the trench drain, but generally the best location for install is just upstream of the outlet or discharge point to ensure maximum pollutant removal;
 - d. The Mundus Bag™ and any additional filtration media will extend downstream of the CFS-TD frame.

4.B. Device installation procedures

1. Site Preparation:

- a. Deploy safety equipment, ensure proper PPE is worn, and necessary permits are in place (if necessary);
- b. Remove the trench drain cover;
- c. Clean the trench drain of existing pollutants or debris.

2. CFS-TD Frame Installation:

- a. Required tools: marker, ¼" concrete drill bit, cordless hammer drill, hammer, 7/16" wrench, and silicone (optional);
- b. Fit the CFS-TD into the trench drain at the desired location. Mark the anchor bolt locations (2 or 4 depending upon model) with a marker. Slide the frame downstream far enough to expose the marks for drilling;
- c. Mark a ¼" concrete drill bit with tape to prevent over-drilling. Drill the vertical holes at required location and remove as much concrete dust as possible so the concrete anchors seat properly. Drill to a depth recommended by the anchor bolt manufacturer;
- d. Align the CFS-TD frame over the drill holes. Insert the anchor bolts through the CFS-TD anchor holes and into the drilled holes. Place a washer over the anchor bolt and spin the nut on just far enough so the bolt is exposed about 1/16";
- e. Carefully drive the anchor bolts vertically in with a hammer until they hit bottom. Place the CFS-TD frame over the anchor bolts at specified locations. Spin the nuts on by hand and tighten until snug with a wrench or deep socket (usually 7/16");
- f. Expand the CFS-TD frame to nest snugly against the walls of the trench by spinning the turnbuckle;
- g. **Optional:** fill any gaps that may be present between the trench walls and the CFS-TD frame with silicone or other approved environmentally safe sealant;
- h. **Optional:** Record location and serial number information into the FCP Field App on mobile device.

3. Mundus Bag™ Installation:

- a. Pull the top of the MB thru the inside of the MH a few inches and fold the elastic anchor over the top and outside of the MH. This secures the MB to the MH. (method is akin to pulling the top of a tube sock thru the inside of a bracelet and wrapping the top of the sock over the bracelet);
- b. Align the handles of the MB with the MH so the handle will be parallel with water flow when inserted into the CFS-TD. This allows the handle to be draped over the top of the CFS-TD so the handle does not impede water flow and the bag is easily removed during service;
- c. Grab the handle of the MB, step on the bottom of the MB and pull snugly away from each other. This equilaterally aligns the MB around the MH;
- d. Secure the bottom of the MB with the recommended fastener at a position based on the desire overall length of the MB. NOTE: for more confined spaces, the end of the MB may be trimmed to provide an overall shorter length;
- e. Adjust the backflow preventer to design aperture by pulling the cord and sliding the fastener into position (optional);

- f. Slide the MB with MH into the channel of the CFS-TD until the MH securely seats into the bottom of the CFS-TD channel. An optional lock may be present on the CFS-TD. If so, rotate the lock over the MH. Tug on the tail of the MB to confirm the whole unit is properly secured;
- g. Attach or place any additional filtration media inside or to the MB - *not required for full trash capture*;
- h. Deploy optional vector control.

4. **Installation Completion:** Replace the channel drain covering and remove safety equipment.

Total Installation Time: 5 to 15 minutes

4.C. [Methods for diagnosing and correcting installation errors.](#)

Frog Creek Partners maintains a rigorous quality assurance and quality control (QA/QC) process. Prior to the shipment of any CFS-TD or MB, each part is inspected and cross referenced with the field measurements and capacity considerations. A manifest of each component of the CFS-TD is delivered to the customer and we recommend each customer perform an inspection upon receipt to confirm conformity to the desired application of the CFS-TD. FCP offers standard sized configurations, however there are instances where the trench drain structure has been customized or varies from typical designs. This is not an issue as long as the dimensions are documented. FCP can build CFS-TD inserts for about any trench drain configuration.

Checklists are provided to assist each CFS-TD installation and maintenance visit:

Site Preparation and Selection:

- The channel drain has a uniform surface and plumb dimensions;
- There is sufficient space for the installation of the CFS-TD and MB;
- Prior to installation, the site should be clean and be free of sediment and debris;
- Locate device near the end of the catch to ensure maximum trash capture before stormwater exits the site.

Installation Error Considerations:

- The concrete of the trench drain should be in good condition and of sufficient thickness to receive the concrete anchor bolts. Thin or degraded concrete may not provide sufficient anchorage;
- The sides of the CFS-TD frame should nest snugly against the walls of the trench drain without any significant gaps. Gaps may be filled using a California approved marine grade sealant on the upstream side of the CFS-TD (i.e. 100% silicone);
- The bottom of the CFS-TD frame should sit flush with the bottom of the trench drain without any significant gaps. Gaps may be filled using a California approved marine grade sealant on the upstream side of the CFS-TD;

- The stainless-steel concrete anchor bolts must attach with enough force and friction to secure the CFS-TD in place;
- The downstream portion of the CFS-TD must be clear of any sharp edges or objects that might compromise the MB integrity;
- The MB hoop should fit snugly in the CFS-TD frame and locked (if the optional lock is present);
- The MB should be fully extended horizontally to ensure maximum water flow and trash capture capacity.

The CFS-TD is designed to meet site-specific water quality treatment requirements. Conformance with the Engineer's Plans and Specifications and proper installation is paramount to ensure proper operation.

4.D. [Optional components guide: An explanation of the condition or circumstance that would necessitate the implementation of that component and render it no longer optional.](#)

FCP offers an optional overflow screen in states other than California. A properly sized CFS-TD and MB will remove 100% of trash from a one-hour and one-year design storm. If for some reason the environmental conditions and infrastructure necessitate the implementation of the overflow screen, then FCP will work with the State Water Board to approve the optional overflow screen for the environmental condition or circumstance prior to installation.

5. Operation and Maintenance Information

5.A. [Device inspection frequency considerations, and inspection procedures.](#)

Upon inspection, the MB should be emptied if the water filter is more than half-filled with trash and debris, or as directed by the engineer, city, or contract. The MB can be 75% full and still work properly in most instances but allowing filtration capacity for future rain events is important.

During inspection, the following should be checked:

- Visually inspect the location for abnormal pooling of water upstream of the CFS-TD frame;
- Visually inspect the CFS-TD to check if any significant gaps exist between the frame and the trench drain walls/floor;
- Manually inspect the CFS-TD frame ensure that it is securely attached to the bottom of the trench drain;
- Inspect after first rain event greater than ¼";
- Inspect after every storm of ½" or greater;
- Inspect every one (1) to two (2) months during the first year than at least quarterly thereafter;
- See 5.C. for more information.

5.B. Maintenance frequency consideration, procedures, and a description of necessary equipment and materials.

Maintenance:

The Gutter Bin CFS-TD may be serviced in one of two simple ways:

1. **Manual maintenance:** Manually with hand tools and a one (1) or two (2) member crew;
2. **Vac truck maintenance:** With a vac truck and two (2) person crew;

To service a CFS-TD manually within three (3) to seven (7) minutes, follow these steps:

Equipment needed for manual maintenance: PPE, safety equipment, grate hook, broom, weight scale, FCP Field App mobile device, pliers, replacement media, disposal receptacle (trash bag, dumpster, etc.).

1. **Deploy safety equipment:** place cones around area and make sure it is safe to remove storm grate. Wear personal protective equipment (PPE);
2. **Remove covering:** Use grate puller or other device to remove the covering from the trench drain to expose the Gutter Bin;
3. **Stuff Mundus Bag™:** Push overflowing pollutions (if any) into the MB with hand tool or spray wand;
4. **Remove & record:** Remove MB by lifting handle or hoop. Record weight of MB and any other pollution data such as density, pollutant type, etc. Dispose of properly and in accordance with local laws;
5. **Dump and dispose:** The MB has the unique capability of being reused or replaced. To dump, remove fastener at the bottom of the MB. Dump contents into approved receptacle. Alternatively, one can dispose of the whole bag if filtration media is compromised;
6. **Replace MB & cover:** close the bottom of the MB with a zip tie or wire, replace the bag within the CFS-TD frame, and replace the grate;

It is important to note that this method is the most efficient way to perform maintenance on a low volume of Gutter Bins and in space restricted areas. Service can be done in conjunction with a service hand cart, 4-wheeler with trailer/bed, or a pickup truck.

To service a CFS-TD with a vac truck within eight (8) to fifteen (15) minutes, follow these steps:

Equipment needed for vac truck maintenance: PPE, safety equipment, vacuum truck, replacement media.

Prepare vac truck: deploy safety equipment (cones, lights, etc.) and vac truck for operation (turn on pumps, adjust valves, deploy boom, etc.).

1. **Remove covering:** Use hook or other device to remove the covering from the trench drain to expose the Gutter Bin;

2. **Remove & record:** Remove MB by lifting handle or hoop. Record weight of MB plus any other pollution data such as density, pollutant type, etc. Dispose of properly;
3. **Evacuate MB:** Vacuum contents out of MB. The bag may be sucked inside out so one may have to push the bag right side out and realign the MB within the CFS-TD. Be careful that the MB is not sucked into the vacuum;
4. **Replace MB & cover:** replace the MB within the CFS-TD frame and replace the covering.
5. **Prepare vac truck for relocation:** gather safety equipment, turn off pumps, close valves, deploy boom, etc.

It is important to note that the use of a vac truck can be highly inefficient due to its maintenance requirements, truck purchase costs, and the fact that it requires the waste removed by a vac truck to be handled at least three (3) times before it reaches the landfill (suck, decant, load, haul, dump).

As with any manufactured device, there may be product limits that need acceptance or correction. At times, it may be prudent to relocate or modify the CFD-TD within the same trench or move to another location as polluting behaviors and infrastructure changes.

Each CFS-TD installation is unique based on location conditions and targeted pollutants.

- The inspection frequency mainly depends upon climate events and pollutant load.
 - Inspect after the first and second rain event to ensure proper function (break-in period);
 - For construction sites, one should inspect the CFS-TD after each storm event greater than ½" of precipitation or heavy snow melt;
 - For post construction and permanent installations, one should inspect the CFS-TD three (3) to four (4) times per year or as directed by the Engineer.

Maintenance frequency considerations include:

- **Typical pollutant load:** areas with bulky trash and debris may require more frequent service intervals to ensure that pollutants don't bypass the MB through the CFS-TD overflow;
- **Local climate conditions:** areas with heavy rainfall or snowfall may require a more frequent maintenance cycle if pollutant load is high. High rainfall does not always equate to more frequent service visits;
- **Infrastructure constraints:** trench drains with large drainage areas and high pollutant loads may require more frequent service intervals. Smaller trench drains may require smaller diameter Mundus Bags™ thereby decreasing the pollutant capacity and shorten the service interval;
- **Type of MB being used:** Total Trash Capture (TTC-MB) model Mundus Bags™ typically have a longer service life than the Total Debris & Sediment (TDS-MB) model MB because the TTC allows anything smaller than 4mm to pass the filtration system. Replace or empty a MB if it is more than 75% full or if MB water filter has blinded and as directed by the Engineer.

It is important that the CFS-TD be maintained to ensure proper function, minimize any pollution bypass and mitigate flooding risks during extreme weather events.

5.C. Effects of delayed maintenance on Device structural integrity, performance, odors.

Delay in maintenance may cause the MB to become completely full of trash and debris thereby resulting in stormwater bypassing the filter system and the CFS-TD not performing as designed. It is unlikely that a completely full MB will affect the structural integrity of the CFS-TD because of its solid anchor system and configuration. The MB will drain between rainstorms but there may be trash within the bag that holds water and causes odors. Performance and odor problems can be solved by more frequent servicing of the CFS-TD.

Maintenance Troubleshooting:

- Excess pooling of water upstream of the CFS-TD frame is most likely indicative of:
 - A full MB that needs emptying or replacement;
 - A TDS-MB model with a sediment capture liner with too fine of filter or is clogging due to hydrocarbon loading. A coarser filter material can be substituted or Mycelx can be added to the filter chain to remove hydrocarbons before the foul the sediment liner. A sediment liner is not required for full trash capture.
 - It should be noted, based on the slope of the trench drain, some pooling of water is natural due to the relative lack of head pressure needed to push the water over the bottom of the CFS-TD frame and through the MB.
- Overtopping or bypassing of a CFS-TD is most likely indicative of a weather event in excess of the design storm or a full MB that needs emptying or replacement;
- A compromised MB is likely indicative that it has exceeded its specified service life;
- Physically grab or tap the CFS-TD to see if the frame has worked loose from the trench. This is unlikely, but if so, re-tighten the anchor bolt nuts. This may be caused from the bolts being set in deteriorated concrete or that the anchor bolts weren't set deep enough.

5.D. Device maintenance and vector control accessibility.

Based upon the mosquito vector control technician's judgment, the vector control device may be placed in several locations during installation or servicing: 1) upstream of the CFS-TD frame and Mundus Bag™ 2) inside the Mundus Bag™, 3) downstream of the CFS-TD frame but under the Mundus Bag™ and 4) downstream of the Mundus Bag™. In addition, the vector control device can be fastened to the CFS-TD frame or the Mundus Bag™. No special tools or equipment are required. The MB normally completely drains between storm events. A small amount of water pooling can occur upstream of the CFS-TD, but this is an easy area to control for vectors and should be highly visible to the Vector/Mosquito Control personnel.

It should be noted that some trench drains may be inadequately constructed and may be prone to retaining small amounts of water. This can be problematic for mosquito breeding. The trench drain deficiencies that allow standing water should be fixed to mitigate mosquito breeding. In the event that repair of the trench drain has not occurred prior to installation of the CFS-TD, it is important that the deficient areas be visible and accessible to the Vector/Mosquito Control personnel.

FCP submitted the vector control application to the Mosquito and Vector Control

Association of California on March 18th, 2019 and was approved on April 19th, 2019. A copy of the application and approval letter can be found in Appendix D.

Vector control placement for the CFS-TD & Mundus Bag™



Vector control placement areas: upstream, within, under or downstream of Mundus Bag™

6.0 Reliability Information

6.A. Estimated design life of Device components before major overhaul.

The CFS-TD has a minimum design life of 25 years assuming the proper installation, maintenance and service of the Device. The total trash capture (TTC-MB model) Mundus Bags™ are reusable and have a service life of one (1) to two (2) years, depending upon site conditions. Trash, debris and sediment (TDS model) Mundus Bags™ with a geotextile liner are a single use filter and have a maximum service life of 12 to 18 months, depending upon site conditions. Major overhauls of the CFS-TD are not expected and FCP provides a 7-year warranty.

6.B. Device sensitivity to loadings other than trash (i.e. leaves, sediment).

The CFS-TD has an excellent ability to capture vegetation (including leaves and grass clippings) with any MB model. The MB backflow preventer enter helps minimize or prevent loss of pollutants after capture. Typically, leaves and debris are quite bulky. Therefore, the maintenance frequency should be increased during seasonal leaf drop or after high wind events such as the Santa Ana winds. Advantageously, one can easily change the MB model between seasons. A TTC-MB can be used in the Fall, and a TDS-MB can be used during other parts of the year when hydrocarbon and sediment capture is required.

CFS-TD's equipped with geo-textile lined Mundus Bags™ (TDS-MB) will also capture significant amounts of sediment. Therefore, maintenance frequency should be increased after sediment runoff causing events such as intense heavy rainfall or nearby construction activity.

One can switch or alternate the types of MB throughout the year. If the customer requires finer filtration most of the year to capture sediment, then the TDS-MB is used. In the fall when leaves are

dropping, then one can temporarily replace the TDS-MB with the TTC-MB (total trash capture) to capture particles 5mm or larger. This temporary replacement will allow finer particles to bypass the system. Advantageously, if the captured particles are mainly vegetative waste, then the customer can compost the capture material.

6.C. Warranty information.

The CFS-TD frame material and product construction are warranted for seven (7) years from the date of purchase. CFS-TD replacement parts will be supplied at no charge to the end user provided the CFS-TD unit was installed properly for their intended use as a full trash capture device. The Mundus Bags™ have a warranty on workmanship for one (1) year from date of install.

The Gutter Bin® Channel Filter System for Trench Drains and Mundus Bag™ filter media are pre-engineered filtration systems designed to meet site-specific water quality treatment requirements. Conformance with the Engineer's Plans and Specifications and the Manufacturer's recommendations is essential to ensure proper operation and function of the device.

6.D. Customer support information.

Frog Creek Partners corporate and California offices are open during normal business hours. Customer support can be reached via telephone and/or email 24 hours per day and 7 days per week. Contact information:

Email: support@frogcreek.partners

Phone: 307-439-9570

Website: www.frogcreek.partners

Frog Creek Partners maintains a nationwide agreement with APEX Companies to provide installation and service. However, FCP, the city, customer, or approved local contractor can perform the install and maintenance as required by the Engineer or customer.

7. Field/Lab Testing Information and Analysis

7.A. Provide available field or lab testing information that demonstrates Device functionality and performance.

Appendix A contains the CFS-TD lab and field test results. Summary test results prove 100% trash capture and retention. Results = SUCCESSFUL TEST – PASS.

Please refer to Appendix B for third party certification of FCP's testing.

The CFS-TD has proven to be successful at removing 100% of trash in multiple third party validated lab tests. The lab tests were conducted in FCP's headquarters with a Manufacturing Works personnel present to verify the test results as a third-party professional engineer. FCP used a "trash recipe" as recommended by Stormwater Environment Manufacturers Association (SWEMA). The CFS-TD captured 100% of the trash recipe during sustained flowrates ranging from 15 GPM to 475 GPM. Up to 600 GPM

of water was flushed at the system during short intervals. Two types of Mundus Bags™ were tested with the CFS-TD to ensure that the both the Total Trash Capture (TTC-MB) Mundus Bag™ and Trash, Debris & Sediment (TDS-MB) Mundus Bag™ performed to State Water Resource Control Board (“SWRCB”) requirements.

Overview of test platform and testing procedure for the FCP CFS-TD and Mundus Bag™

A wooden trench drain test platform was constructed with the dimensions of approximately 16 feet long, 12 inches wide, and 18 inches tall. The test platform was painted with environmentally safe paint and all gaps were sealed with 100% silicone. The inlet side of the test platform was elevated to get a 2 to 3% slope in the trench drain to simulate a trench drain commonly found in the field.

The CFS-TD was inserted and affixed to the test platform at about the halfway point between inlet and outlet. The outlet of the test platform was covered with a screen that had orifices less than 5mm in size to capture trash if it escaped the CFS-TD and MB during the trash capture test.

FCP used a “trash recipe” as prescribed by SWEMA. The trash recipe comprised of:

- 30 cigarette filters
- Six (6) pieces of paper cut into 2” wide by 12” long strips
- 10 wood popsicle sticks
- Six (6) pieces of plastic cup cut into 2” wide by 5” long strips
- Six (6) pieces of plastic bag cut into 2” wide by 12” long strips
- Six (6) pieces of cardboard cut into 2” wide by 8” long strips
- Six (6) pieces of cloth cut into 2” wide by 12” long strips
- six (6) pieces of aluminum cans cut into 2” wide by 5” long strips
- 15 pieces of Styrofoam packing peanuts

FCP endeavored to re-use as many of trash recipe components from one test to the other to mimic weathering in the field. FCP found it necessary to replace some pieces of cardboard and paper between tests because of deterioration.

Prior to each test, the entire trash recipe was laid out on a table and organized by material type. Each piece was counted, and the trash recipe was photographed to get a “before picture”. The trash recipe was mixed with water in a 5-gallon bucket and set aside until introduced to the test platform. FCP kept detailed notes on individual data worksheets recording the trash count, water flow, device type, filter type, date, time, and any relevant notes from each test. Water was introduced into the trench drain in several ways to achieve the desired flowrate. A regular garden hose was used to represent low flow of about 13-15 GPM. In higher flow test, FCP used a water truck either with gravity flow or pressurized flow to gain larger flowrates. When the desired flowrate was steady, FCP personnel introduced the 5-gallon bucket with trash recipe into the test platform upstream of the CFS-TD and Mundus Bag. Multiple video cameras were used to capture visual data. One camera was placed directly above the CFS-TD looking downward for a top view of the device test. Another camera was placed near the inlet of the test

platform and pointed toward the outlet to capture a front view of the test. To simulate high flow, FCP ran the garden hose and pressurized water truck hose into the test platform and dumped many 5-gallon buckets of water into the test platform at once.

When each test was completed, FCP personnel removed the Mundus Bag from the CFS-TD from and dumped the captured trash onto a table. Each piece of trash was organized, counted and then photographed for an “after picture”. All trash was captured in the MB during each test.

FCP tested two types of Mundus Bags™ in the CFS-TD trash capture test. Both the Total Trash Capture Mundus Bag™ (TTC-MB) and the Trash, Debris & Sediment Mundus Bag™ (TDS-MB) performed perfectly and achieved 100% trash capture in every test. Both Mundus Bags™ also retained 100% of the trash even after the flow subsided to 0 GPM. Therefore, the CFS-TD and Mundus Bags™ achieved 100% trash capture and retention in all tests. A third-party professional engineer from Manufacturing Works was present for all test to independently verify that the Frog Creek Partners’ products did indeed pass the trash capture test as required by the California State Water Resources Control Board.

All tests of the CFS-TD and MB were filmed with at least one video camera. FCP can provide YouTube links to these videos upon request. Select pictures of the trash capture test and results can be found in Appendix A.

The Gutter Bin® stormwater filtration system and Mundus Bag™ water filter are patent pending. All pictures and content of this application are copyrighted by Frog Creek Partners 2019.

Ongoing Field Tests

Multiple CFS-TD units are currently being successfully field tested in a trench drain system at an industrial marine terminal facility (MTF) located in Long Beach, California. The test is much more rigorous than just full trash capture because the CFS-TD and Mundus Bags™ are configured at this location to remove not just trash but also sediment, heavy metals, and hydrocarbons for the customer’s Industrial General Permit (IGP) compliance. Through the use of multiple CFS-TD and other best management practices (BMPs), the MTF has routinely succeeded in complying with their IGP site specific requirements for the removal of contaminants comprising of total suspended solids, aluminum, copper, iron, lead, zinc, and hydrocarbons since the August of 2018 installation of CFS-TD Gutter Bins. The MTF uses a third-party environmental service company to perform the water quality testing upstream and downstream of the CFS-TD and MB. The MTF customer has requested anonymity for business reasons but has repeatedly expressed their satisfaction of Frog Creek Partners’ products to remove problematic contaminants in an efficient and economical manner.

APPENDIX A - TEST RESULTS

Data worksheet for Gutter Bin 100% trash capture test

Frog Creek Partners, LLC

Casper, Wyoming USA

Testing completed by: B.Deurloo (FCP) & T.Lane (Manufacturing Works)

Test #	1			
Device:	Gutter Bin® - Channel Filtrations System for Trench Drains (CFS-TD)			
Filter Media:	Mundus Bag™ - Total Trash Capture (TTC-12)			
Date:	4-Feb-2019			
Time:	2:15 PM			
Flow Rate (before test):	153 gpm	579 l/min	0.34 cfs	
Flow Rate (during test):	153 gpm	579 l/min	0.34 cfs	
Flow Rate (after test):	153 gpm	579 l/min	0.34 cfs	

Component	Pre-Test Count	Post-Test Count	Test Outcome
Cigarette Filter	30	no count	none
Newspaper	6	no count	none
Wood (popsicle stick)	10	no count	none
Plastic (Moldable)	6	no count	none
Plastic (Film)	6	no count	none
Cardboard	6	no count	none
Cloth	6	no count	none
Metal (folded foil)	6	no count	none
Styrofoam	15	no count	none

Comments: The pollution was inserted into the flow of water too far upstream. Several floating particles got caught in a back eddy and the test was ended early for re-fit of testing platform. Used a garden hose at 15gpm and a pressured water flow from a water truck at 138gpm.

Test #	2			
Device:	Gutter Bin® - Channel Filtrations System for Trench Drains (CFS-TD)			
Filter Media:	Mundus Bag™ - Total Trash Capture (TTC-12)			
Date:	4-Feb-2019			
Time:	4:05 PM			
Flow Rate (before test):	153 gpm	579 l/min	0.34 cfs	
Flow Rate (during test):	153 gpm	579 l/min	0.34 cfs	
Flow Rate (after test):	153 gpm	579 l/min	0.34 cfs	

Component	Pre-Test Count	Post-Test Count	Test Outcome
Cigarette Filter	30	30	PASS
Newspaper	6	6	PASS
Wood (popsicle stick)	10	10	PASS
Plastic (Moldable)	6	6	PASS
Plastic (Film)	6	6	PASS
Cardboard	6	6	PASS
Cloth	6	6	PASS
Metal (folded foil)	6	6	PASS
Styrofoam	15	15	PASS

Comments: Performed test in wood constructed trench drain 20 feet long, 12 in wide, 18 in high at an ~2-3% slope. Used a garden hose at 15gpm and a pressured water flow from a water truck at 138gpm. Water temp at 55F. Finished test by cutting all water off to see if we lost any pollution as water abated. Backflow preventer in Mundus Bag held pollution. 100% trash capture and retention. SUCCESSFUL TEST - PASS

Test #	3				
Device:	Gutter Bin® - Channel Filtrations System for Trench Drains (CFS-TD)				
Filter Media:	Mundus Bag™ - Total Trash Capture (TTC-12)				
Date:	4-Feb-2019				
Time:	4:20 PM				
Flow Rate (before test):	153	gpm	579	l/min	0.34 cfs
Flow Rate (during test):	153	gpm	579	l/min	0.34 cfs
Flow Rate (after test):	153	gpm	579	l/min	0.34 cfs

Component	Pre-Test Count	Post-Test Count	Test Outcome
Cigarette Filter	30	30	PASS
Newspaper	6	6	PASS
Wood (popsicle stick)	10	10	PASS
Plastic (Moldable)	6	6	PASS
Plastic (Film)	6	6	PASS
Cardboard	6	6	PASS
Cloth	6	6	PASS
Metal (folded foil)	6	6	PASS
Styrofoam	15	15	PASS

Comments: Used a garden hose at 15gpm and a pressured water flow from a water truck at 138gpm. Finished test by cutting all water off to see if we lost any pollution as water abated. 100% trash capture and retention. SUCCESSFUL TEST - PASS

Test #	4				
Device:	Gutter Bin® - Channel Filtrations System for Trench Drains (CFS-TD)				
Filter Media:	Mundus Bag™ - Total Trash Capture (TTC-12)				
Date:	4-Feb-2019				
Time:	4:50 PM				
Flow Rate (before test):	153	gpm	579	l/min	0.34 cfs
Flow Rate (during test):	153	gpm	579	l/min	0.34 cfs
Flow Rate (after test):	153	gpm	579	l/min	0.34 cfs

Component	Pre-Test Count	Post-Test Count	Test Outcome
Cigarette Filter	30	30	PASS
Newspaper	6	6	PASS
Wood (popsicle stick)	10	10	PASS
Plastic (Moldable)	6	6	PASS
Plastic (Film)	6	6	PASS
Cardboard	6	6	PASS
Cloth	6	6	PASS
Metal (folded foil)	6	6	PASS
Styrofoam	15	15	PASS

Comments: Used a garden hose at 15gpm and a pressured water flow from a water truck at 138gpm. Finished test by cutting all water off to see if we lost any pollution as water abated. 100% trash capture and retention. SUCCESSFUL TEST - PASS

Test #	5		
Device:	Gutter Bin® - Channel Filtrations System for Trench Drains (CFS-TD)		
Filter Media:	Mundus Bag™ - Total Trash Capture (TTC-12)		
Date:	4-Feb-2019		
Time:	5:10 PM		
Flow Rate (before test):	153 gpm	579 l/min	0.34 cfs
Flow Rate (during test):	375 gpm	1419 l/min	0.84 cfs
Flow Rate (after test):	153 gpm	579 l/min	0.34 cfs

Component	Pre-Test Count	Post-Test Count	Test Outcome
Cigarette Filter	30	30	PASS
Newspaper	6	6	PASS
Wood (popsicle stick)	10	10	PASS
Plastic (Moldable)	6	6	PASS
Plastic (Film)	6	6	PASS
Cardboard	6	6	PASS
Cloth	6	6	PASS
Metal (folded foil)	6	6	PASS
Styrofoam	15	15	PASS

Comments: Used a garden hose at 15gpm and a pressured water flow from a water truck at 138gpm. Tested with a big flush of water with 15 gallons being dumped in as quickly as possible followed by a 5 gal dump. Finished test by cutting all water off to see if we lost any pollution as water abated. 100% trash capture and retention. SUCCESSFUL TEST - PASS

Test #	6		
Device:	Gutter Bin® - Channel Filtrations System for Trench Drains (CFS-TD)		
Filter Media:	Mundus Bag™ - Trash, Debris & Sediment (TDS-12)		
Date:	4-Feb-2019		
Time:	5:21 PM		
Flow Rate (before test):	153 gpm	579 l/min	0.34 cfs
Flow Rate (during test):	475 gpm	1798 l/min	1.06 cfs
Flow Rate (after test):	153 gpm	579 l/min	0.34 cfs

Component	Pre-Test Count	Post-Test Count	Test Outcome
Cigarette Filter	30	30	PASS
Newspaper	6	6	PASS
Wood (popsicle stick)	10	10	PASS
Plastic (Moldable)	6	6	PASS
Plastic (Film)	6	6	PASS
Cardboard	6	6	PASS
Cloth	6	6	PASS
Metal (folded foil)	6	6	PASS
Styrofoam	15	15	PASS

Comments: Used a garden hose at 15gpm and a pressured water flow from a water truck at 138gpm. Tested with a big flush of water with 15 gallons being dumped in as quickly as possible followed by a 5 gal dump. Finished test by cutting all water off to see if we lost any pollution as water abated. 100% trash capture and retention. SUCCESSFUL TEST - PASS

Test #	7		
Device:	Gutter Bin® - Channel Filtrations System for Trench Drains (CFS-TD)		
Filter Media:	Mundus Bag™ - Trash, Debris & Sediment (TDS-12)		
Date:	4-Feb-2019		
Time:	5:37 PM		
Flow Rate (before test):	153 gpm	579 l/min	0.34 cfs
Flow Rate (during test):	475 gpm	1798 l/min	1.06 cfs
Flow Rate (after test):	153 gpm	579 l/min	0.34 cfs

Component	Pre-Test Count	Post-Test Count	Test Outcome
Cigarette Filter	30	30	PASS
Newspaper	6	6	PASS
Wood (popsicle stick)	10	10	PASS
Plastic (Moldable)	6	6	PASS
Plastic (Film)	6	6	PASS
Cardboard	6	7	PASS
Cloth	6	6	PASS
Metal (folded foil)	6	6	PASS
Styrofoam	15	15	PASS

Comments: Used a garden hose at 15gpm and a pressured water flow from a water truck at 138gpm. Tested with a big flush of water with 15 gallons being dumped in as quickly as possible followed by a 5 gal dump. Finished test by cutting all water off to see if we lost any pollution as water abated. Mundus Bag backflow preventer held trash in as water level dropped. 100% trash capture and retention. SUCCESSFUL TEST - PASS

Testing Photos



Image 1 - Picture of trash recipe taken prior to Test 6



Image 2 - Picture of trash recipe taken after to Test 6



Image 3 - Introduction of trash into CFS-TD test platform with ~153GPM of water flow



Image 4 - CFS-TD test platform with sustained water flow after trash recipe introduction



Image 5 - CFS-TD test platform looking upstream



Image 6 - Five-gallon bucket with "trash recipe"



Image 7 - Mundus Bag™ partially removed from CFS-TD frame by pulling upward



Image 8 - 153 GPM water flow with 100% trash capture in MB



Image 9 - View looking upstream with CFS-TD and MB in trench drain test platform and small orifice screen at outlet to capture any trash that might escape (which none did)

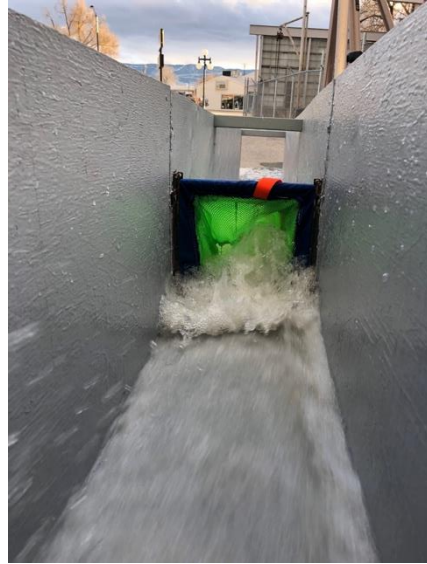


Image 10 - Looking downstream into MB with backflow preventer at ~153 GPM water flow

APPENDIX B - CERTIFICATION OF FIELD TEST RESULTS



406 S 21st Street
Laramie, WY 82070
<https://www.manufacturing-works.com>

To whom it may concern:

The Frog Creek Partners ("FCP") patent pending Gutter Bin® Channel Filter System (CFS) and patent pending Mundus Bag™ filter media were tested on February 4th, 2019.

It has been determined that following Stormwater Equipment Manufacturers Association (SWEMA) Laboratory Protocol to Assess Trash Removal (April 26, 2018) provides a strong baseline testing method and trash recipe to confirm 100% trash capture in accordance with and exceeding California State Water Board's current requirements. FCP's testing was based fundamentally on the SWEMA document following best reasonable practices where possible.

FCP engaged Manufacturing Works for observance of testing and to provide expert assistance. Manufacturing Works is a manufacturing consultancy located in Wyoming. Local Manufacturing Works project manager Terry Lane was in attendance for the testing. Terry has a distinguished career that includes systematic testing of emergency communications shelters, protocols, and equipment.

The CFS system passed all testing without any failures under water flow levels of 153 gallons per minute (GPM) to over 600 GPM with no simulated trash escaping the device per the SWEMA Laboratory Protocol.

In concurrence and observation with testing I can attest that the Frog Creek Partners Gutter Bin® CFS and Mundus Bag™ passed all testing protocols and procedures as outlined in this document without any failure.

Sincerely,


Terry Lane, MBA
Account & Project Manager
Manufacturing Works
307-259-9658

Channel Filter System (CFS)

Gutter Bin® Stormwater Filtration System

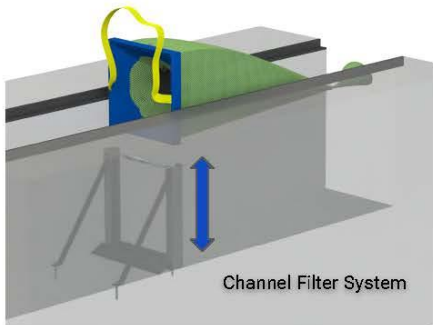


100% TRASH CAPTURE RATED

The patent pending Channel Filter System Gutter Bin model provides unparalleled protection for trench drains and accepts the full line of Mundus Bag™ filter media.

Product Highlights

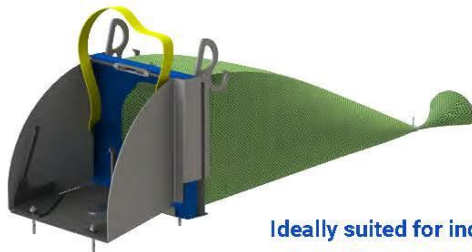
- Stainless steel, weathering steel, and/or plastic construction to meet local & federal regulations
- Easily removed for maintenance or relocation
- Variable depth and width configurations available for any size trench drain system
- Can be used in conjunction with customizable filtration Mundus Bag™ options
- Compatible with 9, 12, 14 & 16 inch Mundus Bag™
- Can be used in conjunction with connector pipe screens (CPS)
- Used as a pre-treatment solution for subterranean infiltration systems
- Backflow preventer retains pollution
- 7 year limited warranty



Channel Filter System

Installation and Servicing

- 10 minute install - **no** confined space entry
- Servicing performed in 2 minutes or less
- Service interval depends upon climate, pollutant load & infrastructure constraints
- To service: remove grate, remove and replace soiled Mundus Bag™, replace grate

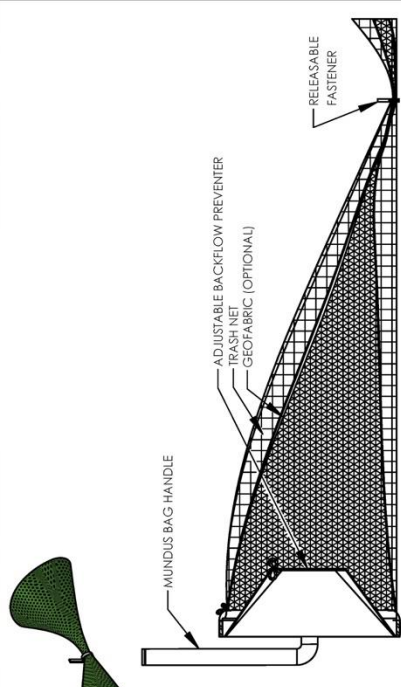
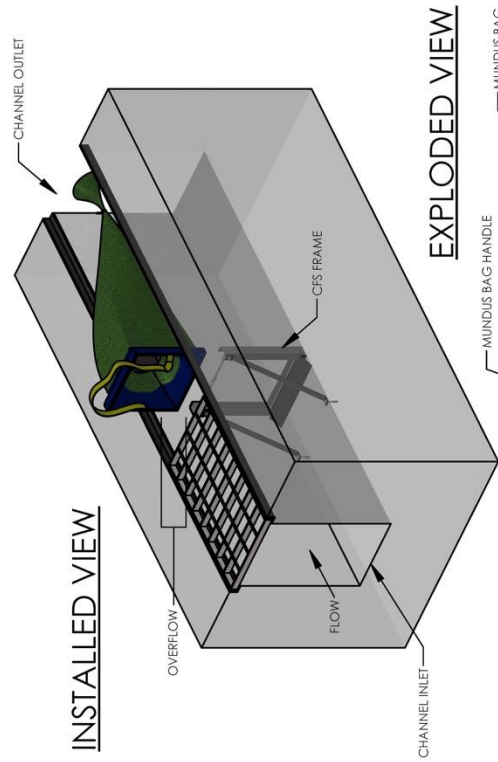
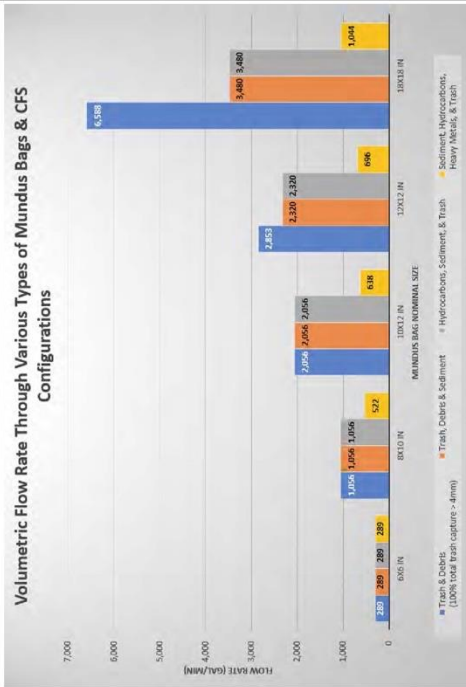


Ideally suited for industrial sites, shops and parking lots where hydrocarbons and heavy metal discharge is a problem



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SEE MUNDUS BAG SPEC SHEET FOR MORE INFO

REV	DATE	REVISIONS	INITIALS	NOTES

DESCRIPTION		MUNDUS BAG CHANNEL FILTER SYSTEM FOR TRENCH DRAINS (CFS-TD) FIELD ASSEMBLY	
PROJECT		5372.13 lbs.	
REVISIONS/TOLERANCES		DIMENSIONS ON DRAWING IN INCHES FRACTIONAL DIMENSIONS IN INCHES PROJECT REV 1.1.1	
DATE		PROJECT REV 1.1.1	
SCALE		SCALE 1:30	
SIZE		FONT SCALE DRAWING A	

COMPONENT	CONFIDENTIAL PATENT PENDING SHEET 02.01
DESCRIPTION	MUNDUS BAG CHANNEL FILTER SYSTEM FOR TRENCH DRAINS (CFS-TD) FIELD ASSEMBLY
PROJECT	5372.13 lbs.
DATE	PROJECT REV 1.1.1
SCALE	SCALE 1:30
SIZE	FONT SCALE DRAWING A

COMPONENT	CONFIDENTIAL PATENT PENDING SHEET 02.01
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DATE	PROJECT REV 1.1.1
SCALE	SCALE 1:30
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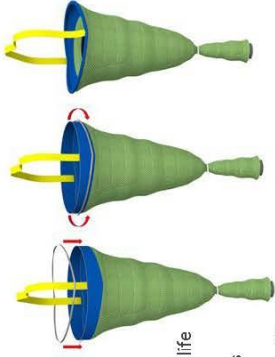
FROG CREEK PARTNERS
 FROG CREEK PARTNERS, LLC
 800 W Yellowstone Hwy
 Casper, WY 82601
 Ph: (307) 435-5570
 www.frogcreek.com
 brian@frogcreek.com

FORWARD TITLE
 GUTTER BIN® CHANNEL FILTER SYSTEM FOR TRENCH DRAINS (CFS-TD) DRAWING
ORDER BY
 TJS
CREATED BY
 5/6/2019
SCALE
 1:30
SIZE
 FONT SCALE DRAWING A

Mundus Bag™ Gutter Bin® Filtration Media

100% TRASH CAPTURE

The patent pending Mundus Bag™ water filter removes a broad spectrum of sediment, trash and hydrocarbons from stormwater. It integrates fully with the complete line of Gutter Bin stormwater filtration systems.



Product Specifications

- Adjustable backflow preventer
- Variable depth for deep or shallow catch basins
- Integrated lifting straps for quick removal
- UV resistant durable construction for extended field life
- Single use and reusable models available
- Easily weighed for measurable & quantifiable results
- Cleaned by dumping, vac truck or bag replacement
- To service: load Mundus Hoop, wrap anchor, ready to filter

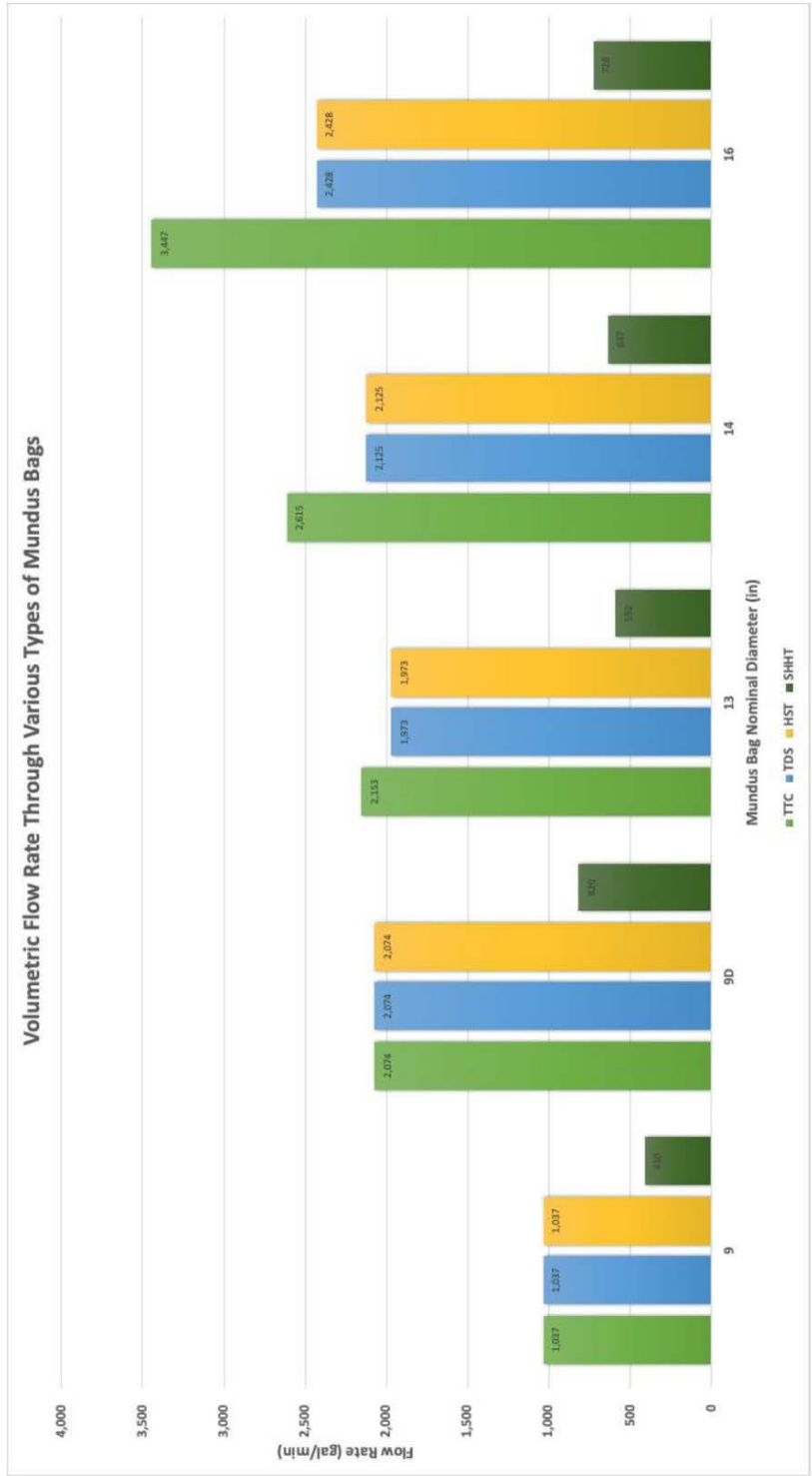


Targeted Pollution	Model	Filter Media
100% Total Trash Capture (Trash & debris > 4 mm)	TTC	polypropylene net
Trash, Debris & Sediment (80% TSS capture)	TDS	geofabric
Hydrocarbons, Sediment, & Trash	HST	Mycex, geofabric
Sediment, Hydrocarbons, Heavy Metals, & Trash	SHHT	Granulated activated carbon, adsorbent, Mycex, geofabric

Model	Bag dia (inches)	Max capacity (cu.ft)	Aperture size - particle retention (mm) (X 1000 for micron)	Min/Max length of filter (ft)	Max capture load (lbs)	Max load rating of filter bag (lbs)	Empty bag flow rate (gpm)	Reusable	Est. useful life (months)
TTC-9	9	1.77	3.5	12/48	33	291	1.037	Yes	6-18
TTC-9D*	9D	1.77	3.5	12/48	33	291	2.074	Yes	6-18
TTC-13	13	3.14	3.5	12/48	59	517	2.153	Yes	6-18
TTC-14	14	4.27	3.5	12/48	80	704	2.615	Yes	6-18
TTC-16	16	5.58	3.5	12/48	104	920	3.447	Yes	6-18
TDS-9	9	1.77	0.21	12/48	242	291	1.037	No	3-12
TDS-9D*	9D	1.77	0.21	12/48	242	291	2.074	No	3-12
TDS-13	13	3.14	0.21	12/48	431	517	1.935	No	3-12
TDS-14	14	4.27	0.21	12/48	587	704	2.125	No	3-12
TDS-16	16	5.58	0.21	12/48	766	920	2.428	No	3-12
HST-9	9	1.77	0.21	12/48	242	291	1.037	Partial	3-12
HST-9D*	9D	1.77	0.21	12/48	242	291	2.074	Partial	3-12
HST-13	13	3.14	0.21	12/48	431	517	1.935	Partial	3-12
HST-14	14	4.27	0.21	12/48	587	704	2.125	Partial	3-12
HST-16	16	5.58	0.21	12/48	766	920	2.428	Partial	3-12
SHHT-9	9	1.41	0.10	24/72	194	233	410	Partial	3-12
SHHT-9D*	9D	1.41	0.10	24/72	194	233	820	Partial	3-12
SHHT-13	13	2.51	0.10	24/72	242	581	637	Partial	3-12
SHHT-14	14	3.42	0.10	24/72	431	563	728	Partial	3-12
SHHT-16	16	4.47	0.10	24/72	587	736		Partial	3-12

* 9D: two 9 inch diameter Mundus Bags™ installed side by side in a single Gutter Bin

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Notes:

- Table data based on field trials, model data and vendor specifications
- Geofabric aperture size may be customized for customer requirements (i.e. 80% TSS removal)- may affect differential pressure
- Bags can be cut or secured to desired length for short install
- 9D: two 9" diameter Mundus Bags™ installed side by side in a single Gutter Blin
- Mundus Bag can be configured with an RFID for greater tracking abilities



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APPENDIX D - VECTOR CONTROL APPLICATIONS

The FCP CFS-TD was approved by the MVCAC on April 19, 2019. The application and subsequent approval letter are included below:

Frog Creek Partners, LLC
800 West Yellowstone Hwy
Casper, WY 82601
brian@frogcreekpartners.com
307-439-9570
<https://frogcreekpartners.com>

March 18th, 2019

Dear Chairwoman Henke and members of the committee,

We respectfully submit the Gutter Bin[®] Channel Filter System (CFS) for your review and approval. The patent pending CFS is a filter system for trench drains and channels. The Mundus Bag[™] is a removable and customizable filter media with a back flow preventer that work in conjunction with the CFS to remove trash, debris, sediment, hydrocarbons, and heavy metals. The CFS is already being used successfully in industrial applications in Long Beach, CA.

The CFS system is comprised of three (3) parts:

- 1) a permanently installed frame;
- 2) a Mundus Bag[™] filter; and
- 3) a rigid Mundus Hoop.



Removal of the Mundus Bag for maintenance or service

The CFS system is easily accessed for cleaning and maintenance due to its design. Simply remove the grate along the trench that is above the preferred vector placement location and drop it in; then replace the storm grate. If one wants to replace the Mundus Bag with a new bag, it's as easy as pulling the Mundus Hoop from the CFS frame, wrapping a new Mundus Bag around the Mundus Hoop and sliding both into the Gutter Bin CFS frame.

Based upon the mosquito vector control technician's judgment, the vector control device may be placed in one of many locations related to the CFS: 1) upstream of

the CFS frame and Mundus Bag[™] 2) inside the Mundus Bag[™], 3) downstream of the frame but under the Mundus Bag[™] and 4) downstream of the Mundus Bag[™]. In addition, the vector control device can be fastened the Mundus Bag[™]. No special tools or equipment are required.

Please let us know at your earliest convenience if and when the device is approved for California mosquito vector control access. We will be applying to the California State Water Boards for 100% stormwater trash treatment device approval soon.

Please give me a call or email if you have any questions. Thank you for your time and attention.



Looking downstream into the Mundus Bag™

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Brian Deurloo". The signature is written in a cursive style and is positioned above a horizontal line.

Brian Deurloo

Date: 18 MAR 2019

President & Founder Frog Creek Partners
Brian@FrogCreekPartners
307-439-9570



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

Frog Creek Partners, LLC
800 West Yellowstone Hwy
Casper, WY 82601
303.807.2022
cwtippie@frogcreek.partners

April 19th, 2019

Dear Mr Tippie,

Thank you for the submission of the Gutter Bin Channel Filtration System (CFS) 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 Gutter Bin CFS 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.

We continue to have concerns regarding how this device will be installed and with which storm water drain systems. We would strongly encourage you recommend to clients the need to consult with their local Mosquito and Vector Control District prior to installation to ensure no additional mosquito control costs will be added to your clients ongoing maintenance.

While this verification letter confirms that inspection and treatment for the purpose of minimizing mosquito production should be possible with the Gutter Bin CFS 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 E - FCP FIELD APP

The FCP Field App is a mobile app that can be used on any iOS or Android device. At its core, the FCP Field App functions as a central data store for a surveyed inlet locations, installed Gutter Bins and Mundus Bags™, and their related servicing visits. There are three (3) base data types: 1) Locations 2) Gutter Bins, and 3) Visits.

Locations are specific locations where a Gutter Bin is or will be installed. Key Location data points include: latitude/longitude, measurements/dimensions, observations/notes and photo uploads.

Gutter Bins are records regarding a specific Gutter Bin. Key Gutter Bin data points include: Location (tied back to a specific Location record), serial number, install date, Mundus Bag™ (number and size), observations/notes and photo uploads.

Visits are records regarding a specific visit to a location. Key Visit data points include: Location (tied back to a specific Location record), Gutter Bin (tied back to a specific Gutter Bin record), visit date, visit type (installation, inspection, servicing), pollution recovered, Mundus Bag™ type, personnel, observations/notes and photo uploads.

These three base records allow FCP personnel equipped with the Field App to quickly access the data of any Gutter Bin and its accompanying service records.

A customer version of the FCP Field App is available with the same functionality but limited only to customer-owned Gutter Bins.

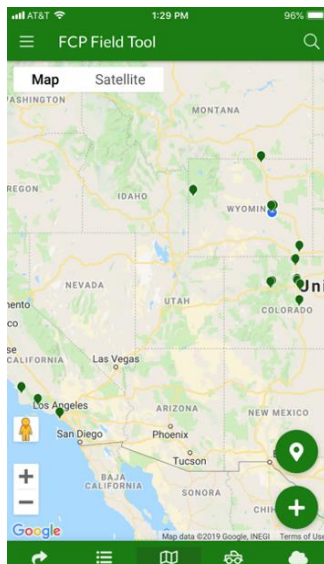


Image 1 - Geographic overview of locations

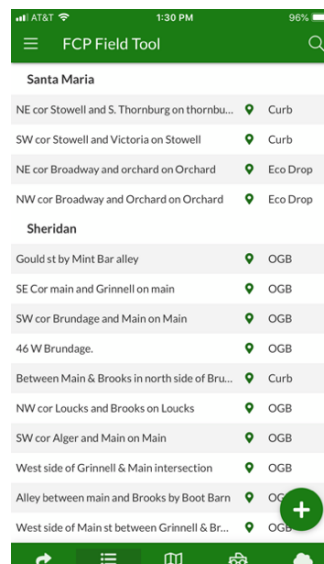


Image 2 - List of locations grouped by city

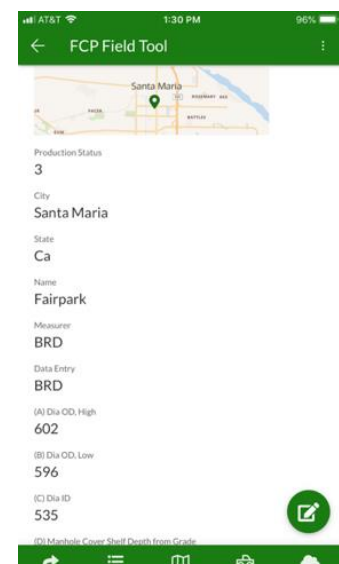


Image3 - Specific location in Santa Maria, CA