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REM
www.remfilters.com

RE: Trash Treatment Control Device Application
For
REM Inc. Full Trash Capture TRITON CPS-FTC Device
(Crescent Pipe Screen)

April 16, 2018

Mr. Jaime Favila
California State Water Resources Control Board
Division of Water Quality
P.O. Box 100
Sacramento, CA. 95812

Dear Mr. Favila,

REM Inc. would like to thank you for taking this opportunity to review our application for a new FTC Device, the **TRITON CPS-FTC.** Throughout this application you will find the pertinent information requested from the TTCD Application Requirements, presented in the requested layout.

Currently, REM Inc. has the TRITON BFTG-FTC Insert as an approved FTC Device and we would like to incorporate our **TRITON CPS-FTC** onto the approved list of devices.

Again, we thank you for taking this time to review our application, and if any additional information is required or needed, please feel free to contact us when needed.

Daniel Fagan

Daniel Fagan
Operations Manager
Revel Environmental Manufacturing, Inc.
REM Inc.

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Section: 1

Cover Letter

1A: General Description

The TRITON CPS-FTC can be used as a stand-alone filtration device for capturing trash and debris inside of storm drain catch basins. With its intended design, it is capable of capturing pollutants as small as 4.8mm, exceeding the requirement of 5mm for Full Trash Capture Devices. It does this, while still maintaining excellent flow rates due to its 51% Open Area. The CPS-FTC device is intended to be mounted in front of the catch basins connector pipe and is designed for lateral and surface flow capturing applications.

1B: Contact and location information

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1C: Manufacturing Location

All REM TRITON products are manufactured and designed in the state of California. REM Inc. has specialized in providing storm drain filters/trash capture devices all over the country for 22+ years. *Address locations listed above.

1D: Brief summary of field/testing results to demonstrate device functions

The TRITON CPS-FTC has successfully been tested in capturing debris that is 5mm or greater in size, in a number of test basins located in the greater San Francisco Bay Area. Results and pictures from these tests can be found in Section 7.

1E: Brief summary of limitations, and operational, sizing, and maintenance considerations

The TRITON CPS-FTC units are extremely adaptable and customizable in terms of mounting and attaching to the front side of the connector pipe. REM has utilized that aspect of the units to install devices inside of catch basins that might otherwise be “passed up” on. The device comes in (3) standard radii with standard heights to increase usability in various sized structures. However, each of these units can be adjusted to fit custom layouts/structures. The proper unit is determined in part by the outgoing pipe size, and then the structure size is taken into account. The approximate installation time takes between 10-25 minutes, depending on the infrastructure layout. Maintenance on CPS units typically involves an industrial vacuum truck when the units are about 50% loaded or as required. Maintenance should be performed at least 3 times per year or as needed.

To note, this unit is designed to have an optional bypass deflector plate. The deflector plate is attached as needed and the bypass height can be adjusted to what the structure allows or is required. This in turn allows easy access to the inside of the majority of units that do not require a plate due to incoming flow location. This helps with line jetting and Vector control accessibility in the drains when needed.

This device is also able to house an absorbent media as well if ever required. No design modifications are needed, the media element is simply placed between the inner and outer layers of the 10 GA. stainless steel support housings while maintaining its FTC requirement.

1F: Device installation locations

REM Inc. has been installing CPS and Insert devices in multiple California locations as well as national sales across the U.S. Some installation areas of acknowledgement would be Santa Clara, Concord, Contra Costa County, and Hayward. Please feel free to ask for a more detailed reference list.

1G: 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.

Daniel Fagan

Daniel Fagan
Operations Manager
REM Inc.

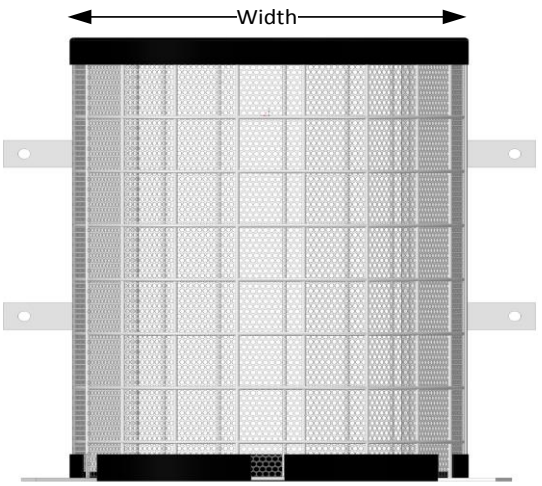
Section: 2

Table of Contents

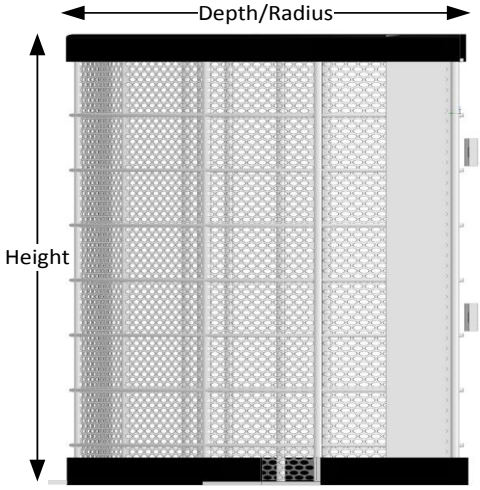
Section 3: Physical Description

3A: Design drawings for standard devices and alternative configurations

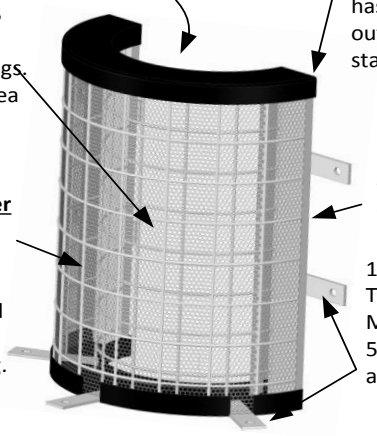
REM TRITON CPS-FTC Standard size dimensions

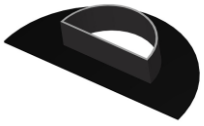


Front View

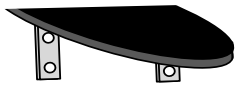


Side View



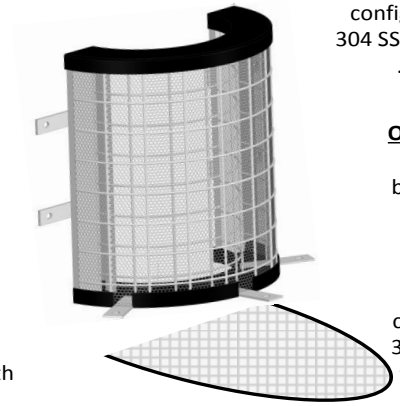


Optional Deflector Plate
For Vector control applications. Center opening with an elevated wall to prevent debris bypass.



Optional Deflector Plate
Simply anchor above CPS unit at the desired height.

Deflector plate can be configured using a Type 304 SS perforated sheet or .5" thick HDPE



Optional Contour Apron
Simply attach to the bottom of CPS unit with (3) bolts, before installation.

Contour Apron is configured using a Type 304 SS perforated sheet with 4.8mm openings.

**Anchor to floor where needed.*
For sloped and contoured floors.

Notes:

- Units are constructed using a 10 GA. Stainless Steel inner and outer housing support for added structural integrity.
- Perforated Stainless Steel is configured with a 51% Open Area.
- Custom sizes and configurations are available.
- Multiple units can be mounted vertically to increase capture capacity.
- CPS unit is capable of housing an absorbent media if ever required, with no retrofitting or modifications needed.
- CPS unit can also be elevated off the basin floor in "Sump" type basins.
- Unit can be configured with .5" thick HDPE back and bottom plates for added flexibility during installation.

Model:	*Width:*	*Height:*	*Depth/Radius:*	*Filtered Flow Rate:*	*Bypass Radius:*	*Bypass Flow Rate:*
TR20(12)CPS-FTC	**20"**	**12"**	**8"**	***4.27 (CFS)***	***6"***	***15.48 (CFS)***
TR24(16)CPS-FTC	**24"**	**16"**	**12"**	***7.59 (CFS)***	***10"***	***25.65 (CFS)***
TR40(18)CPS-FTC	**40"**	**18"**	**20"**	***14.23 (CFS)***	***18"***	***42.55 (CFS)***

3B: Description on how the Device captures all particles 5mm or greater in size and how it is sized for varying flow volumes

The TRITON CPS-FTC device utilizes a 51% Open Area perforated stainless steel screen. This screen is configured with 4.8mm circular openings to ensure all 5mm or greater particles are captured.

CPS-FTC devices are primarily sized in accordance with the catch basin exit pipe diameter/size. Selecting the correct size unit, comparative to the outgoing pipe size will ensure max flow/bypass rates are met. The catch basin structure size is next used as a determining factor for identifying the proper size unit. For example: a 3' X 3' catch basin would utilize a model TR24(16)CPS-FTC (24" wide unit) which allows enough spacing from the walls for incoming water flows and customized positioning based on infrastructure layout if needed.

3C: Device maximum trash capacity

Debris Holding Capacity *in gallons				
Model:	**CB Size: 3' X 3'**	**CB Size: 3' X 5'**	**CB Size: 3' X 7'**	**CB Size: 3' X 10'**
TR20(12)CPS-FTC	60.7	105.6	150.4	N/A
TR24(16)CPS-FTC	74	133.9	193.7	283.5
TR40(18)CPS-FTC	N/A	119.3	186.6	287.6

**Estimate using naturally compacted debris*

TRITON CPS-FTC devices can also be mounted vertically with multiple units to increase capture capacities where applicable. Listed above are the standard size CPS models, this does not include custom or modified units.

3D: Device hydraulic capacity (standard sizes)

Standard sized flow rates.

Model: CPS-FTC	TR20(12)CPS-FTC	TR24(16)CPS-FTC	TR40(18)CPS-FTC
Width:	20"	24"	40"
Height:	12"	16"	18"
Depth/Radius:	8"	12"	20"
Filtered Flow Rate:	*4.27 (CFS)*	*7.59 (CFS)*	*14.23 (CFS)*
Bypass Radius:	*6"*	*10"*	*18"*
Bypass Flow:	*15.48 (CFS)*	*25.65 (CFS)*	*42.55 (CFS)*

3E: Conditions under which the Device re-introduces previously trapped trash

With the design of the TRITON CPS-FTC, trash should only be re-introduced in a case where the device has reached 100% capacity during normal operating conditions. REM recommends that the devices are cleaned and maintained before or at 50% capacity to ensure proper functionality.

3F: Each material and material grade used to construct the Device

The design and construction of the TRITON CPS-FTC is comprised of two materials; Type 304 stainless steel and a 90% recycled content ABS plastic cap with UV Inhibitors. The main housing and structural support body is made up of an inner and outer wall of 10 GA. Type 304 stainless steel welded mesh with 2" X 2" square openings. These have a 20 GA. U-Channel on the right and left back side, welded to create a continuous support. Behind the outer wall of 10 GA. is the perforated screen which is 16 GA. Type 304 SS with 3/16" (4.8mm) 51% Open Area, punched holes on staggered centers.

The mounting tabs are also Type 304 SS, they are 1/16" thick, 1" wide, and extend 2" beyond the outer wall for anchor access. These have a 5/16" punched hole for anchoring. An optional apron for "trough or sloped" catch basin floors is also available and this is made from the same Type 304 SS 4.8mm perforated screen.

Optional deflector plates are also available and they are comprised of either the same Type 304 SS perforated sheet or .5" thick HDPE, depending on the requirement or customization needed. Deflector plates are anchored to wall at the required height using stainless steel corner brackets and anchors.

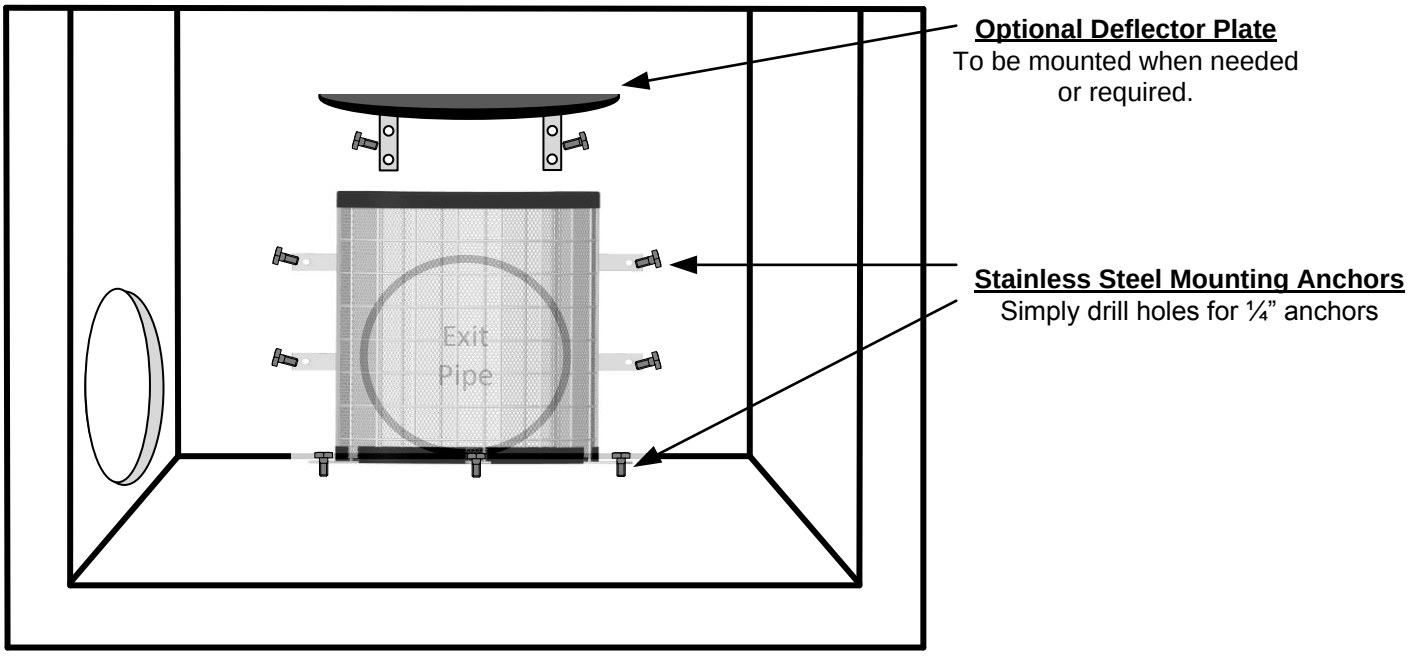
3G: Estimated design life of the Device

Under normal operations and with the impact of large storm events, the TRITON CPS-FTC has an estimated lifespan of 20+ years. Naturally occurring elements and mineral saturation do not have a resounding effect on either the stainless steel or ABS used in construction.

3H: Engineering plans/diagrams for a typical installation

Please see Section 4 to find a more detailed overview of device installation information.
Below is a standard installation layout.

Typical view of installation area



3I: Pre and Post installation photos

Pre-installation of TR24(16) CPS-FTC

Post-installation of TR24(16) CPS-FTC

3J: Internal Bypass

The TRITON CPS-FTC has a built in overflow bypass, this is breached only when the device has become inundated with an excessive amount of debris and the device has reached its debris holding capacity, or during a large storm event that exceeds the hydraulic capacity of the device. Essentially the device would need to be at 100% capacity for the bypass level to be reached.

It is ultimately the responsibility of the engineer and/or deciding party to determine that the correct unit size is appropriate for the selected basin and corresponding flow capacity.

Section 4: Installation Information

4A: Device installation procedures and considerations

Installation procedures for the TRITON FTC-CPS are a fairly simple set of steps:
1) Ensure basin floor is clear of debris and place correctly sized device in front of exit pipe, against wall.
2) Mark holes for mounting tabs and set device aside, then drill using a .25” drill bit and hammer drill.
3) Put device back in place and begin hammering .25” x 2.25” anchors into place, tighten with 7/16” socket when finished.
When needed, the TRITON FTC-CPS offers flexibility when it comes to in the field installation, with the ability to simply bolt on attachment plates when infrastructure may be chipped or offset. Or bolt on floor aprons when the bottom of the basin has a sloped or trough type shape. This helps the TRITON CPS-FTC capture trash in some of the more “infrastructural challenged” basins out there. Attachment plates are constructed using .5” thick HDPE.

The deflector plate is simply mounted above the device, at the proper/required height, with (2) anchors mounted in the stainless steel brackets attached to the plate.

4B: Diagnosing and correcting installation errors

A visual assessment can be done to determine if the device has not been installed correctly. If needed, the device can simply be removed by loosening the nuts on the anchors and removing the device. Proper
Re-installation can take place at that point.

Section 5: Operation and maintenance information

5A: Device inspection procedures and frequency considerations

Each device inspection can be done visually, remove the grate/manhole if needed and assess if the unit is damaged, at what capacity, or experienced a bypass event. REM recommends that devices not on a standard maintenance schedule be inspected 3 times per year or more if needed.

5B: Maintenance procedures, including necessary equipment and materials

The maintenance on the TRITON CPS-FTC is accomplished for the most part by using an industrial vacuum truck due to the large capture capacity of the devices. Simply remove the grate and begin to remove the captured debris. The device can be brushed or sprayed off if needed. Take note of the amount of debris collected along with the condition of the device.

5C: Maintenance frequency, and effects of delay

REM recommends that devices be maintained 3 times per year, or as outlined by the governing body. It is recommended that devices do not reach more than 50% capacity without a maintenance event. This frequency is dictated by the loading capacity at each particular drain as well. If not properly maintained, devices will reach 100% capacity and begin the bypass event for debris entering into the catch basin.

5D: Device maintenance and Vector control

The standard configuration of the REM TRITON CPS-FTC device has no real effect on Vector control procedures. There is clear and unobstructed access to the front and behind the unit. There is an optional deflector plate that has an elevated opening in the center to allow for Vector access with effectively zero need for hands on adjustments by Vector control technicians.

*Please see Vector Control Accessibility on the next page.

REM TRITON CPS – FTC

Crescent Pipe Screen

Vector Control Accessibility

Optional Vector Bypass Deflector

(For use when needed or required.)

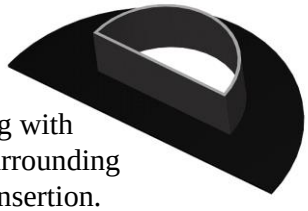
The REM CPS (Crescent Pipe Screen) comes standard, with no overhead deflector. This leaves the backside and front side of the units accessible at all times. When needed, REM has an optional deflector plate that allows for easy access to the center and backside of the device.

When a deflector plate is needed, we have an optional Vector Control specific design that allows access to the backside of the units through a center opening on the plate itself. The opening has elevated walls to continuously act as a guard to prevent trash and debris from bypassing the unit.

Simply insert the Vector application through the elevated center opening of the deflector plate.

This minimizes or eliminates the need for any technician adjustments of the device for the application of abatement control measures.

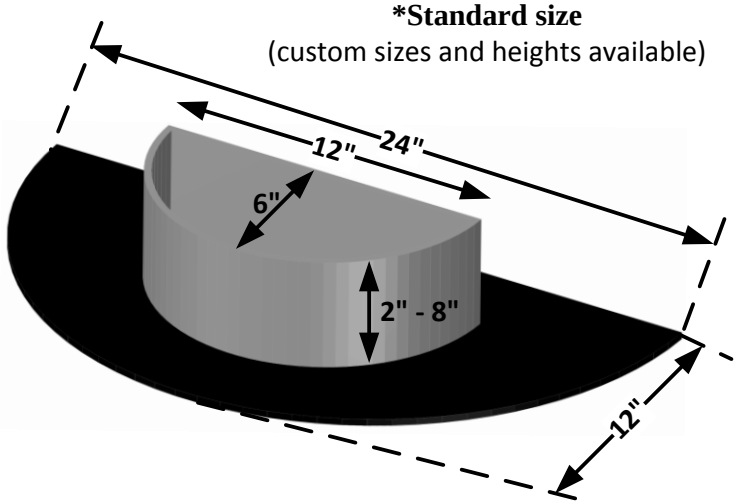
Standard REM CPS device installation (No deflector)



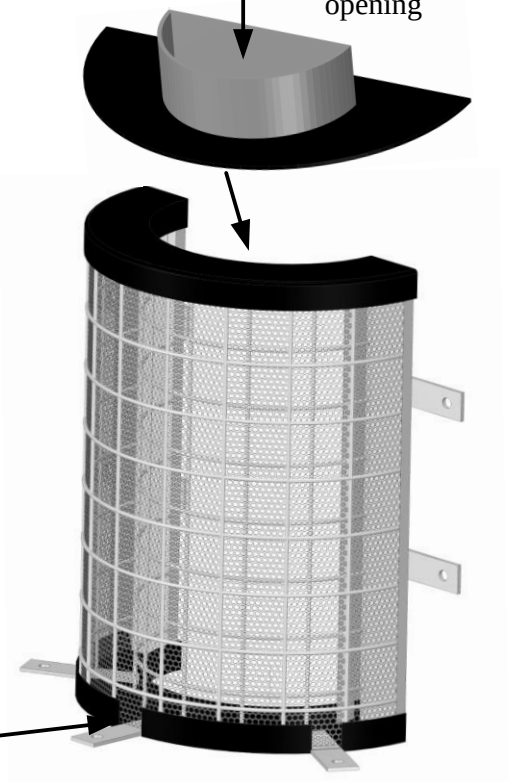
Clear opening with elevated walls surrounding for abatement insertion.

***Standard size**

(custom sizes and heights available)



Insert abatement application through opening



Notes:

- Deflector plates are constructed using .45" thick HDPE.
- Plates can also be constructed using Type 304 stainless steel with 4.8mm openings.
- Plates are attached to wall with stainless steel brackets at the required or most appropriate height.
- Elevated walls can be modified in height between 2" - 8" tall.
- Units come with floor level notches on the front and backside of the bottom cap to prevent standing water build up.

Section 6: Reliability information

6A: Device sensitivity to loadings other than trash

The TRITON CPS-FTC treats all non-liquid contaminants the same. If it is 4.8mm or greater in size it will be captured during normal device operating conditions. If there is a need for hydrocarbon or other pollutant removal there is an optional media insert that can be placed inside the 10 GA. stainless steel support housing.

6B: Warranty information

REM warrants the TRITON CPS-FTC device for 3 years after the installation date. This includes the device and material itself.

6C: Customer support

For general regional assistance please contact the following REM representatives:

Marcel Sloane
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960 Detroit Ave. Suite B
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Marcel@remfilters.com

Bob Marchant
Southern California General Manager
2110 S. Grand Ave.
Santa Ana, CA. 92705
(714) 557-2676
Bobm@remfilters.com

For technical and design information please contact:

Daniel Fagan
Northern California Operations Manager
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(925) 676-4736
Daniel@remfilters.com

Section 7: Field/Lab testing information and analysis

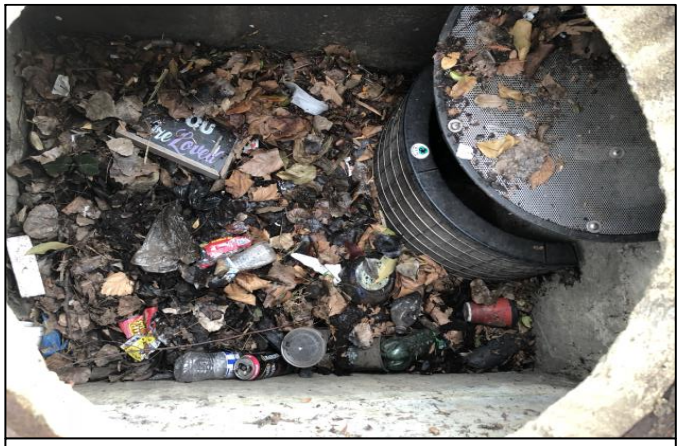
All Test units were placed in HIGH trash and debris areas within Contra Costa County. Below are results from initial inspections.

*Continued on next page.

Test Unit T3: TR24(16)-CPS
1 Week after installation

Test Unit T3: TR24(16)-CPS Rain Event
2 months after installation – 25% Capacity

Test Unit T3: TR24(16)-CPS @ 40% Capacity
3 Months after installation – 60% Organic 40% Trash



Test Unit T3: TR24(16)-CPS @ 40% Capacity
3 Months after installation – 60% Organic 40% Trash