



ROSCOE MOSS COMPANY

4360 Worth Street

Los Angeles, California 90063, U.S.A.

Phone: (323) 263-4111, Fax: (323) 263-4497

March 30, 2021

Ms. Mary Boyd
State Water Board Statewide Municipal Stormwater Program Manager
State Water Resources Control Board

RE: Trash Treatment Control Device Certification and Fact Sheet Update

Dear Ms. Boyd,

I am submitting the following information in response to the State Board's request to have our Storm Flo Screen linear radial gross solids removal device (GSRD) be reviewed and upon approval, be included on the updated Certified Full Capture Systems List. This information is also being furnished to the Mosquito Vector Control Association for review and verification that the Storm Flo Screen is readily accessible for observation and treatment of vectors. The information is provided in the order outlined on the Board's Trash Treatment Control Device Certification and Fact Sheet Update Requirements - updated December 2020.

a. Product name and general description

The Storm Flo Screen, also referred to as the linear radial gross solids removal device (GSRD), is a stainless steel louvered pipe that is designed to capture gross solids transported by stormwater. The screens are installed at locations where they can intercept flowing stormwater which is directed to the interior of the screen body. The screen has 5 mm louver openings that allows the passage of water through the screen while capturing the solids that are 5 mm and larger.

b. Device owner

The Storm Flo Screen is exclusively manufactured by the Roscoe Moss Company.
Location : 4360 Worth Street, Los Angeles, CA 90063
President : Timothy D. Lynch
Contact address : 4360 Worth Street, Los Angeles, CA 90063
Contact email : TLynch@roscoemoss.com
Contact phone : (323) 263-4111

Authorized representative:

Chief Hydrogeologist & Director Stormwater Treatment : Kevin B. McGillicuddy, P.G.

Contact address : 4360 Worth Street, Los Angeles, CA 90063

Contact email : KMc@roscoemoss.com

Contact phone : (323) 263-4111

- c. Manufacturer's Website : www.roscoemoss.com
Storm Flo webpage : www.roscoemoss.com/products/storm-flo-screen
- d. Location of device manufacturing site

The Storm Flo Screen device is manufactured at the Roscoe Moss Company facility located at 4360 Worth St. Los Angeles, CA

- e. Summary of field/lab testing results

The initial field study to prove the efficacy of the louvered screen design on which Storm Flo Screen is based was conducted by the California Department of Transportation (Caltrans). The results of that study were included in the Caltrans Phase 1 Gross Solids Removal Devices Pilot Study: 2000-2002 published in October 2003. In this study the linear radial device with the louvered screen was found to have 100% capture efficiency of material 5mm and larger and vector monitoring revealed no breeding activity was detected and the device drained within 72 hours.

Caltrans sponsored an additional study to determine the hydraulic characteristics and trash capture capacity of the screen by subjecting a full size linear radial louvered screen device to hydrodynamic testing and analysis. The study was conducted by researchers at University of California Davis using a flume model capable of generating flows up to 30 cubic feet per second. The description, findings, and conclusions of the study that included the linear radial screen were documented in Laboratory Testing of Gross Solids Removal Devices published by U.C. Davis in 2005. The results of the hydraulic testing found that the louvered screen had a very high gross solids capture efficiency and total screen length of a device could be established in order to treat a design flow rate and expected trash volume for a given installation site.

- f. Summary of device limitations, and operational, sizing, and maintenance considerations

The Storm Flo Screen is designed as a modular treatment device such that sections of screen can be combined in a variety of configurations to provide treatment of the required flow rate and estimated trash capture volume. As such the screen diameter and overall length can be sized to accommodate a very wide range of flow conditions. Due to the size and configuration options available the screens themselves are not a limiting factor but sites where the screen is employed should be properly reviewed. The installation site must be accessible for initial installation as well as for future cleaning and maintenance. If installed in an underground vault, proper access and confined space safety issues must be accounted for. It is recommended for the screen to be cleaned when the interior space is one-half full with captured debris. Best cleaning methods have employed a combination of pressure washing the screen and vacuum removal systems commonly found on trucks used for cleaning stormwater conveyance facilities.

- g. Linear radial screens have been installed on numerous Caltrans projects in Los Angeles, Orange, San Diego, and San Bernardino, and San Mateo counties. Some examples of California cities and agencies that have installed the linear radial screens include Antioch, Oakland, Richmond, Milpitas, Millbrae, Pittsburg, Brentwood, Tulare, El Segundo, Long Beach, Glendale, Oceanside and San Diego. Outside California the screens have been installed in Beaverton, OR, Houston, TX, Orlando, FL, Myrtle Beach SC, Winston-Salem, NC and New London NC.

Contact information for a sampling of these installations:

1. County of Alameda Public Works, CA: Sharon Goselin; sharon@acpwa.org
2. City of Millbrae, CA: Michael Killgrew: MKillgrew@ci.millbrae.ca.us
3. City of Beaverton, OR: Mark Boguslawski: mboguslawskii@beavertonoregon.gov

h. Certification Statement:

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.

Please feel free to contact me if you have any question regarding the information contained in this application.

Very best regards,



Kevin McGillicuddy, P.G.
Roscoe Moss Company

Kevin B. McGillicuddy, P.G.
Roscoe Moss Company

2. Table of Contents

3. Physical Description	page 6
4. Installation Guidance	page 12
5. Operation and Maintenance Information	page 13
6. Vector Control Accessibility	page 14
7. Reliability Information	page 16
8. Field/Lab Testing Information and Analysis	page 16
9. Additional Supporting Documentation	page 17

3. Physical Description

a. Trash Capture

The Storm Flo Screen is designed as a full capture system and effectively removes gross solids from stormwater. The screen captures gross solids which remain inside the device while the filtered water exits the 5mm slot openings. The slots are located on the entire outer perimeter including the base of the screen which permits drainage and reduces opportunity for standing water within the screen. Access for inspection and cleaning of the screen is provided by the top hatches and end door of the device.

b. Peak Flows/Trash Volumes

Storm Flo Screen devices are sized for peak flow rates and expected trash volume after evaluating factors such as drainage area, design flow, and anticipated litter volume. As an example, Caltrans-sponsored hydraulic studies ⁽²⁾ have shown that a 5-ft long section of 24-in diameter screen will treat up to 3.5 cfs when the trash load occupies up to 50% of the screen's interior.

c. Hydraulic Capacity

The protocol for sizing a screen involves determination of the required treated flow for a given installation location. Using the formula $Q = C I A$, where Q = flow (cfs), C = runoff coefficient (%), I = rainfall intensity (in/hr), A = drainage area contributing to the installation location (acres). Once the design flow is determined, the diameter and length of screen is selected that is capable of treating that flow while allowing for accumulated debris in the screen body. The screen diameter is typically chosen to match the pipe or outfall diameter that may be present at the installation location. In cases of open channels the screen diameter is selected based on the height of the weir to which the screen is attached. The weir height is carefully designed so as to direct low flow and initial flows meeting discharge requirements to the screens while allowing bypass of higher flows exceeding the discharge treatment rates in order to avoid flooding.

Additional consideration is given to the intended cleaning frequency of the owner. Information provided by the owner will be used to size the device to meet anticipated trash capture volumes in addition to meeting the intended flow rate specified for discharge permit requirements. The table in the following section provides the treated flow and trash capture volume data to be used for sizing a particular screen device with a specific diameter.

d. Hydraulic Capacity / Comparison Table

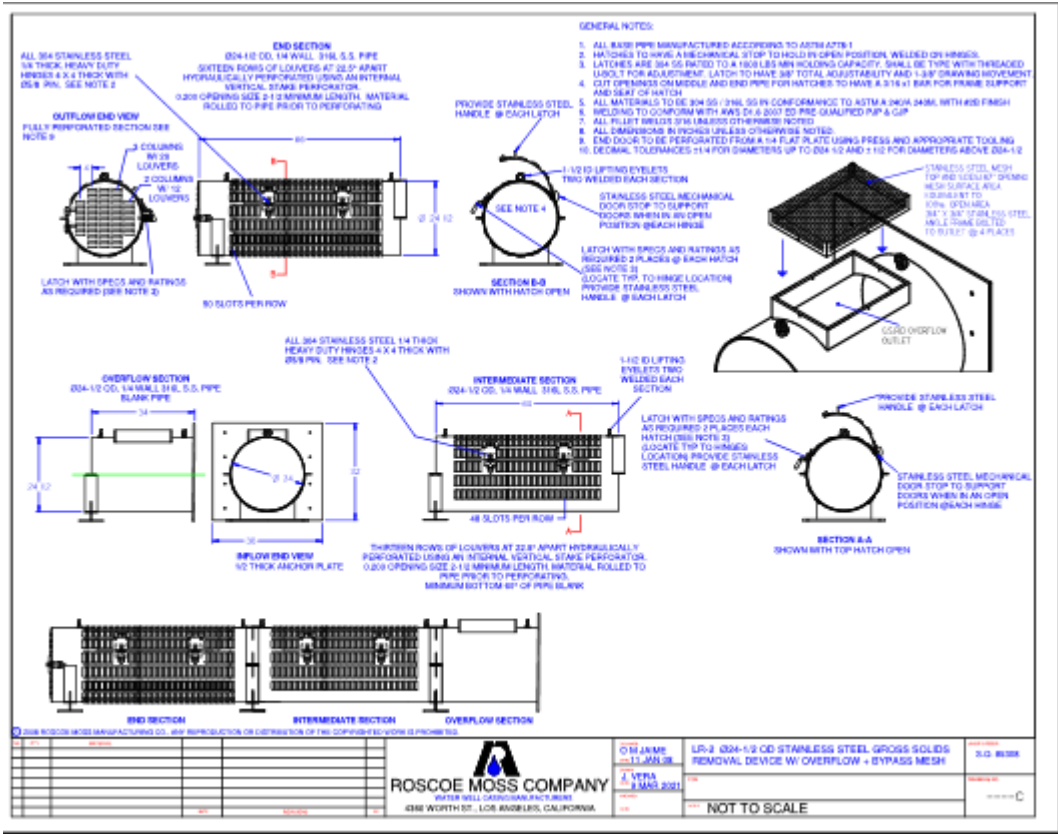
Screen Diameter (inches)	Estimated Flow per 10 ft screen ⁽¹⁾				Litter Capture ⁽²⁾
	Empty (cfs)	25% full (cfs)	50% full (cfs)	75% full (cfs)	Volume (ft ³)
18	11.8	8.8	6.0	3.0	17.6
24	14.0	10.6	7.0	3.6	31.4
30	18.2	13.6	9.0	4.6	49.0
36	22.4	16.8	11.2	5.6	70.6
42	26.6	20.0	13.4	6.6	96.2
48	31.0	23.2	15.6	7.8	125.6
54	36.4	27.2	18.2	9.0	159.0
60	40.2	30.2	20.2	10.0	196.2
66	45.6	34.2	22.8	11.4	237.4
72	50.4	37.8	25.2	12.6	282.6

(1) Flow estimates have been extrapolated from actual results of hydraulic testing performed on 24-in diameter screen.

(2) Captured litter volume when screen 100% full

e. Design Drawings

Below is a typical design for a 24" Storm Flo Screen device (also included as separate attachment)



f. Alternative Configurations

The screens can be installed in a single or in multiple parallel units to achieve the required total length of screens necessary to meet the required treatment flow rate. The parallel configuration is recommended when long screen lengths are determined to be needed but space may be limited. By placing the units in a parallel configuration the installation and maintenance efforts can be concentrated in a smaller area. Below is an example of a parallel screen configuration installed in Winston-Salem NC.



No additional design considerations are required for the parallel configurations and the maintenance intervals and methods would be the same as for a single length screen. It is recommended to place a minimum of 18 inches between screens to allow access for maintenance work and for cleaning between and below the screens.

g. Internal Bypass

The Storm Flo Screen does not have an internal bypass system. Should the flow entering the screen exceed the treatment capacity, the excess flow will exit through a bypass window located on the upper portion of the screen entrance section. Under design flow conditions the captured material will remain inside the screen body during the storm event.

h. Previously Trapped Trash

Occurrences of release of previously trapped trash have not been brought to our attention. However, we are able to install a secondary 5mm or smaller mesh over the bypass window to limit the escape of previously trapped material. See design drawing on page 8.

i. Calibration Feature

The screens do not have a calibration feature

j. Installation Photos

Oceanside, CA





Antioch, CA





k. Material Type

The screens are manufactured using American Iron and Steel Compliant as well as NSF61 Certified Stainless Steel in Types 304L or 316L.

l. Design Life

The estimated service life of the device is 80 years.

4. Installation Guidance

a. Installation procedures

The screens are commonly installed on an open pad at outfalls or in a concrete vault for underground pipelines. Installation configurations include end-of-pipe for outfalls, detention, and retention ponds. Underground configurations include in-line or off-line installations for new pipelines or as a retrofit on existing pipelines. The screens can be installed in single or multiple units. The diameter of the screen typically matches the diameter of the pipeline outfall opening. The length of the device is determined utilizing site specific criteria such as estimated flow rate, litter loading, and maintenance frequency.

The modular screen units are furnished in a ready to install condition. Installation of the screens involves setting in place using anchor bolts on the base plate and anchor plates. Individual screen units are fabricated in 5 or 10 ft lengths and are bolted together to provide the required device length.

b. Installation Limitations

Since the screens are modular and can be fabricated in a wide range of diameters, the main limiting factor is the site access and available space for the installation. We recommend installing the screens in a location that facilitates the initial installation as well as future maintenance activities performed on the device.

c. Diagnosing and Correcting Installation Errors

Since the screens are modular that can be easily interchanged or replaced if necessary or they become damaged.

5. Operation and Maintenance Information

a. It is recommended that the device be inspected following major storm events during the rain season and monthly during the dry season where low flow conditions may still persist. Inspection of the screen interior is accomplished by opening the top hatches located on top of the screen sections. The hatchways are sized to expose the full interior length of each screen section.

b. The screens should be cleaned when the captured material occupies one-third to one-half of the screen interior. This recommendation follows the design protocols used when the diameter and length of the screen device was initially established using hydraulic design criteria included in the table in section 3.d.

c. Maintenance and cleaning is best accomplished using truck mounted vacuum equipment. The screen slots are effectively cleaned using a pressure hose and the captured debris is removed using a vacuum system such as those found on the vacuum trucks used to clean curbside inlets and other stormwater conveyance facilities.

d. Essential Equipment

Owners are advised to use vacuum equipment and pressure hoses to clean the screens. Other basic equipment can include shovels and brooms to clean the area around and below the screen.

e. Effects of Deferred Maintenance

Delaying regular cleanings can result in the reduced flow capacity of the screen and the ability to capture the intended trash volume from subsequent storm events. Consolidation of the captured debris may increase time required for removal. Odors have not been noted when personal inspection of the linear radial screens has been conducted even with captured trash within the screen.

f. Repair procedures for structural and screening components

Due to the solid stainless steel materials used in the manufacture of the screens there is minimal risk of damage to the screen under typical operating conditions. However, should a screen section become damaged it could be repaired in the field utilizing basic welding methods and replacement components. In severe cases the damaged screen(s) can be unbolted, removed, repaired remotely or replaced if necessary.

6. Vector Control Accessibility

- a. The application for vector control accessibility design verification was sent via email to the Mosquito and Vector Control Association of California (MVCAC) on February 15, 2021 coincident with this application. The MVCAC response letter affirming the accessibility for visual inspection is attached on page 15.
- b. Storm Flo Screens are installed at-grade where they can be easily approached for visual inspection and vector assessment. The interior of the screens can be inspected by opening the top hatches which are installed every few feet along the entire screen device. See photo below. For some applications the screen have been installed below grade within concrete vaults. Roscoe Moss Company does not design nor install these vaults. They typically have some grade to permit drainage. Observation of the screen and vault can be made from surface hatchways. If specified, a sampling pipe can be installed that extends from ground surface to the interior of the screen device.



The linear radial screen sections are designed with louver openings on the bottom and are set a few inches above grade so that the water can drain leaving behind only captured solid matter. The screens do not retain water because of the louvered openings around the entire circumference which allows the water to drain. The ability of the screens to drain following storm events reduces vector breeding opportunities and facilitates estimation of captured trash volume for performance assessment records.

The efficacy of the linear screen's ability to deter vector breeding was examined in Caltrans field studies and the results were included in Phase I Gross Solids Removal Devices Pilot Study: 2000 – 2002, published in 2003. Three linear radial screen devices were included in the study and in each case no vector breeding activity was observed. A copy of this report is attached. Refer to Section 4.4. of the report.



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

Roscoe Moss Company
4360 Worth Street
Los Angeles, CA 90063

March 11, 2021

Dear Mr. McGillicuddy,

Thank you for the submission of the Roscoe Moss Storm Flo Screen Linear Radial Gross Solids Removal Device (GSRD) 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 Storm Flo Screen GSRD and verifies that provisions have been included in the design that allow for full visual access to all areas for presence of standing water, and when necessary, allows for treatments of mosquitoes.

While this verification letter confirms that inspection and treatment for the purpose of minimizing mosquito production should be possible with the Storm Flo Screen GSRD 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

7. Reliability Information

The estimated design life of the Storm Flo linear radial screen is 80 years. The screen bodies and all related components are made of stainless steel and will withstand atmospheric and periodic wetted conditions without loss of metal or function of the screen. The device is not sensitive to any trash or debris that is typically carried in a stormwater stream.

Warranty on workmanship shall apply up to point of delivery and acceptance of the buyer. Any purchaser is welcome to contact Roscoe Moss Company at any time during the working life of the screen to discuss issues associated with the performance of the screen and we will assist the owner to resolve those issues. Damage due to theft or vandalism will not be covered by Roscoe Moss Company. Past and future customers should be aware that Roscoe Moss Company has been in existence nearly 100 years as a manufacturer of water well casing, screen and water transmission pipe.

Customer support is available via email: info@roscoemoss.com or phone (323) 263-4111

8. Field and Laboratory Testing Information and Analysis

a. The following reports describe both the field and laboratory studies that were conducted in order to determine the operating parameters of the screens including trash capture efficiency, treatment flow limits, and vector breeding activity.

1. Caltrans, *Phase I Gross Solids Removal Devices Pilot Study: 2000-2002*, October 2003

<http://www.dot.ca.gov/env/stormwater/docs/ctsw-rt-03-072.pdf>

Roscoe Moss Company was initially contacted by consultants working on behalf of Caltrans over twenty years ago to assist with the development of a trash capture screen design that was simple to install and maintain along narrow rights-of-way typical of their freeway systems. One of the designs involved in Caltrans' first pilot studies was a modified louvered well screen that was mounted horizontally as a retrofit on a stormwater pipeline. The results of that study were included in the Caltrans Phase 1 Gross Solids Removal Devices Pilot Study: 2000-2002 published in October 2003. In this study the linear radial device with the louvered screen was found to have 100% capture efficiency and vector monitoring revealed no breeding activity was detected and the device drained within 72 hours.

2. Caltrans, University of California Davis: *Laboratory Testing of Gross Solids Removal Devices*, May 2005.

<http://www.dot.ca.gov/env/stormwater/docs/ctsw-rt-05-073-18-1.pdf>

Having proven effective under actual field conditions, Caltrans sponsored additional hydrodynamic testing of the louvered screen device at UC Davis. There, University

researchers subjected a full scale screen device measuring 24 inches in diameter x 35 feet long to a range of flow and litter loading conditions in order to quantify the hydraulic characteristics and trash capture capacity of the screen. The description, findings, and conclusions of the study that included the linear radial screen were documented in Laboratory Testing of Gross Solids Removal Devices published by U.C. Davis in 2005. The results of the hydraulic testing found that the louvered screen had a very high gross solids capture efficiency and treated flow capacity could be established in order to determine the screen dimensions required to treat a given flow rate with captured solids occupying the interior. These findings led to Caltrans design standard of 3.5 cubic ft/second for each 5 ft long section of 24 inch diameter louvered screen. Using the hydraulic flow and trash capture parameters identified in the laboratory, calculations were made for sizing larger diameter linear radial screens.

9. Additional Supporting Documentation

1. Full Capture Certification Letter from Los Angeles page 18
Regional Water Quality Control Board, 2004
2. Letter from Caltrans confirming that device manufactured..... page 22
by Roscoe Moss Company meets Full Capture requirements
3. Technical Brochure for Storm Flo Screen with Application, page 23
Design, and Maintenance information including photos of
Installation Configurations
4. Standard Drawing of Linear Radial screen GSRD for Caltrans page 27
5. Before and After Installation Photos pgs 28 - 29
6. Maintenance Photos pgs 30 - 31



California Regional Water Quality Control Board

Los Angeles Region



Terry Tamminen
Secretary for
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Protection

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<http://www.swrcb.ca.gov/rwqcb4>

Arnold Schwarzenegger
Governor

October 7, 2004

Jai Paul Thakur, Chief
Department of Transportation
District 7, Office of Engineering Services
120 South Spring Street, MS13
Los Angeles, CA 90012

SUBJECT: CERTIFICATION OF THE GROSS SOLIDS REMOVAL DEVICES AS FULL CAPTURE SYSTEMS

Dear Mr. Thakur:

We have reviewed your request for certification on two trash capture devices, Linear Radial – Configuration 1 (LR1 I-10) and Inclined Screen – Configuration 1 (IS1 SR-170) as full capture systems in your January 13, 2004 letter and at your presentation to the Los Angeles Regional Water Quality Control Board staff on September 1, 2004. The Linear Radial Gross Solids Removal Device (GSRD) – Configuration 1 and Inclined Screen GSRD – Configuration 1 were installed by Interstate I-10 at Rosemead and along State Route 170 at North Hollywood, respectively in an effort to comply with the Ballona Creek and Los Angeles River Trash TMDLs.

Based on your *Phase I Gross Solids Removal Devices Pilot Study: 2000-2002 Final Report, October 2003* (Phase I Report), the above GSRDs met the performance criteria for certification as listed below:

1. Particle Capture – The device or system must capture all particles retained by a 5 mm mesh screen from all runoff generated from a one-year, one-hour storm.
2. Clogging – The device or system must be designed to prevent plugging or blockage of the screening module.
3. Hydraulic Capacity – The device or system must pass the 25-year peak flow.
4. Drainage – The device or system must drain within 72 hours to avoid vector breeding.
5. Gross Solids Storage Capacity – The device or system will hold the estimated annual load of gross solids, so that it requires only one cleaning per year.
6. Maintenance Requirements – The device or system will not require any maintenance other than inspections throughout the storm season.

California Environmental Protection Agency



As you are probably aware, the definition of "full capture system" for the Ballona Creek Trash TMDL was amended per Resolution No. 04-023 adopted on March 4, 2004 by the Los Angeles Regional Water Quality Control Board. It is likely that this definition will be applicable in future revisions of the Los Angeles River Trash TMDL. As a result, the Regional Board staff has also analyzed the GSRD installations for compliance with the Ballona Creek Trash TMDL's full capture system definition. This analysis will eliminate any uncertainty in the event the Los Angeles River Trash TMDL's definition is subsequently modified.

The definition of a "full capture system" as defined in the Resolution No. 04-023 is as follows:

" A full capture system is any single device or series of devices that traps all particles retained by a 5 mm mesh screen and has a design treatment capacity of not less than the peak flow rate (Q) resulting from a one-year, one-hour, storm in the subdrainage area. Rational equation is used to compute the peak flow rate: $Q = C \times I \times A$, where Q = design flow rate (cubic feet per second, cfs); C = runoff coefficient (dimensionless); I = design rainfall intensity (inches per hour, as determined per the rainfall isohyetal map in Figure A), and A = subdrainage area (acres)."

Based on your Phase I Report, both LR1 I-10 and IS1 SR-170 have a 5 mm mesh screen and meet the particle capture criteria for a full capture system. Since these GSRDs are designed for 24-year peak flow, it also satisfies 1-year, 1-hour design criteria. Based on information from your handouts at the September 1, 2004 presentation, the flow capacity for LR1 I-10 and IS1 SR-170 are 11.9 and 9.1 ft³/sec, respectively. The peak flow rates resulting from a one-year, one-hour storm for these GSRDs are as follows:

For LR1 I-10,

C = 0.9 (assuming impermeable surface)

I = 0.38 in/hr (from attached Figure A, showing 1-year, 1-hour rainfall intensity)

A = 3.7 acres (from Phase I Report)

$$Q = 0.9 \times 0.38 \text{ in/hr} \times 3.7 \text{ acres} \times [(1.008 \text{ ft}^3/\text{sec}) / (\text{in/hr acres})] = 1.28 \text{ ft}^3/\text{sec}$$

Since design flow capacity is much greater than estimate flow rate, LR1 I-10 meets the design criteria for a full capture system.

Similarly, design flow capacity is much greater than estimated peak flow rate for ISI SR-170 as shown below:

For ISI SR-170,

C = 0.9 (assuming impermeable surface)

I = 0.36 in/hr (from attached Figure A, showing 1-year, 1-hour rainfall intensity)

A = 2.5 acres (from Phase I Report)

$$Q = 0.9 \times 0.36 \text{ in/hr} \times 2.5 \text{ acres} \times [(1.008 \text{ ft}^3/\text{sec}) / (\text{in/hr acres})] = 0.82 \text{ ft}^3/\text{sec}$$

The drainage criterion is not part of the definition for a full capture system. However, it is important for the system to drain within 72 hours to avoid vector issues. These GSRDs met this requirement.

The Gross Solids Storage Capacity ranged from 0.13 to 0.93 m³/ha/yr during 2000 to 2002 Pilot Study. The estimated annual gross solids loading rate used for the design was 0.7 m³/ha/yr. Some GSRDs required cleaning more than once a year.

Based on the above information, the Linear Radial Gross Solids Removal Device (GSRD) – Configuration 1 and Inclined Screen GSRD – Configuration 1 meet the definition of full capture system and can be certified as a full capture system under the following conditions:

- Adequate Pipe Sizing: The pipes carrying the flows from the subdrainage area should be able to handle peak flows.
- Adequate Drainage: The GSRDs must drain within 72 hours to avoid vector issues.
- Regular Inspections: The GSRDs should be checked at minimum, three times during the rainy season.
- Regular Maintenance: Adequate number of employees will be used to clean out the GSRDs. The GSRDs will be cleaned when ¾ full.

The determination that the Linear Radial Gross Solids Removal Device (GSRD) – Configuration 1 and Inclined Screen GSRD – Configuration 1 satisfy the full capture definition of the trash TMDL will allow the systems to be used elsewhere in the region. Dischargers will have an on-going obligation to demonstrate that the installation of a particular system is appropriately sized. Likewise, dischargers will be responsible for on-going maintenance to ensure the systems perform to design specifications. The Regional Board will review and consider performance data on a continuing basis. In the event data demonstrate that the systems are not performing to the full capture design standard established by the trash TMDL, then the Regional Board reserves the ability to rescind the certification for subsequent installations.

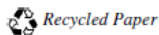
Please contact Dr. Xavier Swamikannu at 213/620-2094, if you have any further questions.

Sincerely,

ORIGINAL SIGNED BY
Jonathan Bishop, P.E.
Executive Officer

Attachment

California Environmental Protection Agency



Mr. Jai Paul Thakur
Chief

- 4 -

October 7, 2004

cc: Michael Lauffer, Office of Chief Counsel, State Water Resources Control Board
Terry Fleming, Water Division, U.S. Environmental Protection Agency, Region 9
Bill Depoto, Los Angeles County Department of Public Works
Robert Wu, Department of Transportation, District 7

DEPARTMENT OF TRANSPORTATION
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*Flex your power!
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January 26, 2010

Mr. Kevin McGillicuddy, P.G.
Director Stormwater Treatment Division
Roscoe Moss Company
4360 Worth Street
Los Angeles, CA 90063

Dear Mr. McGillicuddy:

As requested, this letter identifies Linear Radial (LR) Gross Solid Removal Device (GSRD) that Caltrans currently uses on projects in our Right of Way.

The LR GSRD primary function is to remove gross solids (litter and vegetative material) from stormwater runoff. One configuration used with Caltrans projects includes a modular well casing with 5 mm x 64 mm louvers to serve as the screen. The LR GSRD is sized to hold solids deposited during a one-year period while concurrently passing the design flow. Periodic inspection is required to ensure that the device is functional.

The LR GSRD that was manufactured by Roscoe Moss Company and included in field and hydraulic laboratory tests has been found to meet the definition of full capture system. The LR device complies with the requirements for full capture certification provided the device has been sized to handle the design flow, drains within 72 hours, is inspected regularly and cleaned when 3/4 full.

Specific information regarding this device can be found in the following Caltrans' reports:
CTSW-RT-08-167.02.02, Treatment BMP Technology Report, Appendix D
CTSW-RT-03-072.31.22, Gross Solids Removal Devices, Phase I Pilot Study:
2000-2002, Final Report, Oct. 2003.

If additional information is needed, please contact me or Karl Dreher at 916-653-3352.

A handwritten signature in blue ink, appearing to read "Scott G. McGowen".

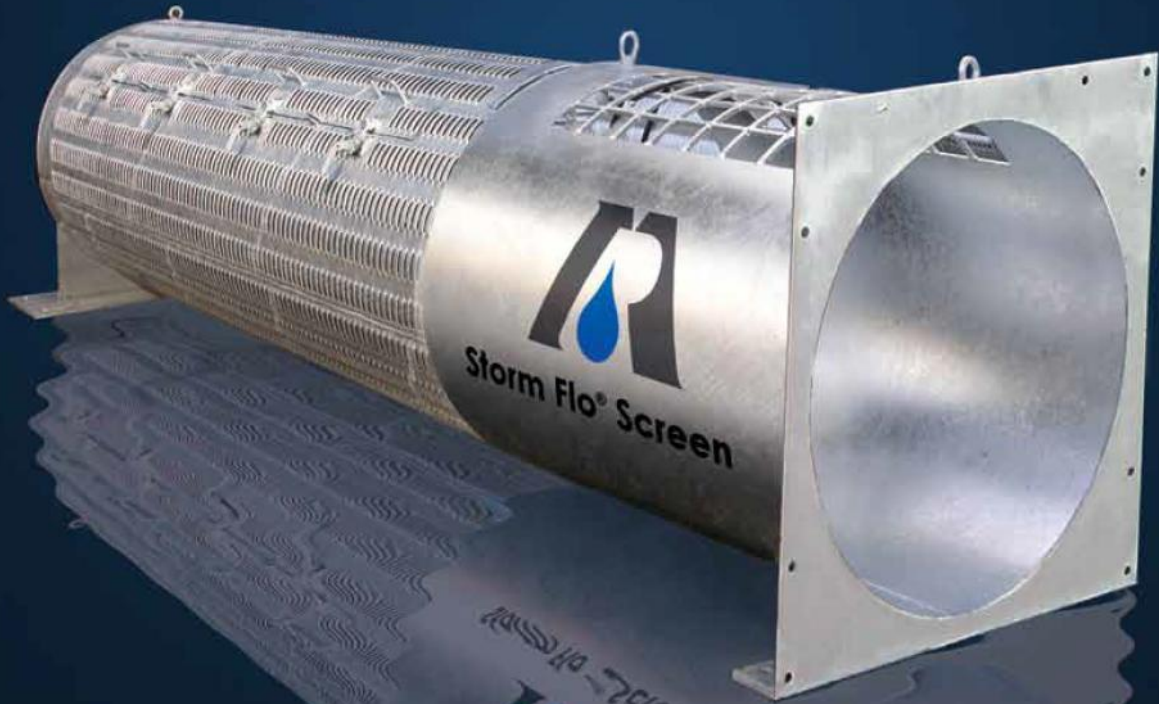
SCOTT G. MCGOWEN
Chief Engineer
Environmental Engineering

KDreher:rk

"Caltrans improves mobility across California"

Storm Flo® Screen

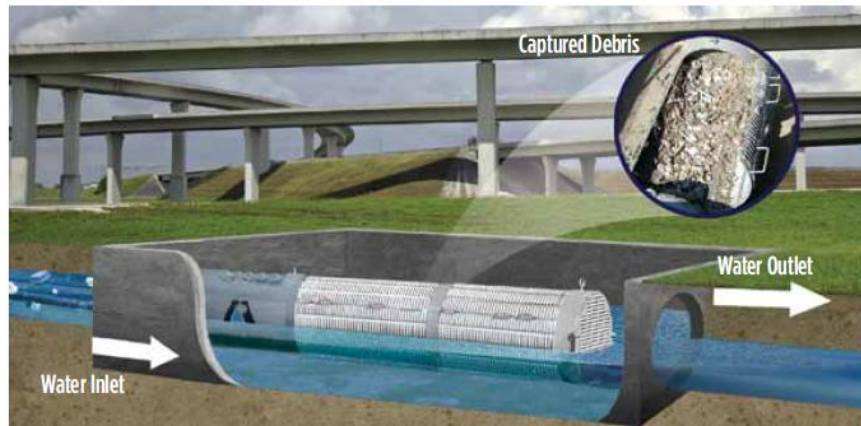
Full Capture Solids Removal Device





Storm Flo® Screen

Roscoe Moss Company's Storm Flo® Screen is a proven technology for removing solids from stormwater. In addition to its **Full Capture Certified** design, Storm Flo® Screen combines four important criteria for a successful stormwater treatment system; **simple design, durable construction, effective performance, and ease of maintenance.**



As stormwater enters the device, solids are collected inside the screen while the flow passes outward through the louvered openings.

Applications

Storm Flo® Screens are used for a wide variety of situations where litter and trash capture is required. Storm Flo® Screen configurations include end-of-pipe installations for outfalls, detention and retention ponds, below ground for pipelines, and stormwater pump stations. Storm Flo® Screens can be installed in single or multiple units. Semi-circular and flat louver panel configurations are also available.



End of pipe installation for detention ponds.



Multiple screen configuration for higher flows.



Channel installation with combination of linear, semi-circular and louver panel screens.



Pump station with array of louver panel screens.



Design

Storm Flo® Screens are designed to operate under a wide range of head and gradient conditions. Louver openings are sized to capture the targeted constituents and can range in width from 0.05 to 0.25 inches. Diameter of the screen typically matches the diameter of the pipeline outfall opening. The length of the device is determined utilizing site specific criteria such as estimated flow rate, litter loading, and maintenance frequency.

The following table summarizes criteria that can be used to determine a Storm Flo® Screen design for a given pipe diameter and treated discharge rate.

Storm Flo® Screen Design Criteria

Screen Diameter (inches)	Estimated Flow per 10 ft screen ⁽¹⁾				Litter Capture ⁽²⁾
	Empty (cfs)	25% full (cfs)	50% full (cfs)	75% full (cfs)	Volume (ft ³)
18	11.8	8.8	6.0	3.0	17.6
24	14.0	10.6	7.0	3.6	31.4
30	18.2	13.6	9.0	4.6	49.0
36	22.4	16.8	11.2	5.6	70.6
42	26.6	20.0	13.4	6.6	96.2
48	31.0	23.2	15.6	7.8	125.6
54	36.4	27.2	18.2	9.0	159.0
60	40.2	30.2	20.2	10.0	196.2
66	45.6	34.2	22.8	11.4	237.4
72	50.4	37.8	25.2	12.6	282.6

(1) Flow estimates have been calculated using a 1-foot per second exit velocity and from actual results of hydraulic testing performed on 24-in diameter screen.
 (2) Captured litter volume when screen 100% full

Specifications

The following language is recommended for specifying Storm Flo® Screen:

Storm Flo® Screen shall be fabricated from pipe manufactured in accordance with ASTM Standard A 778 using Stainless Steel Type 304 or 316L.

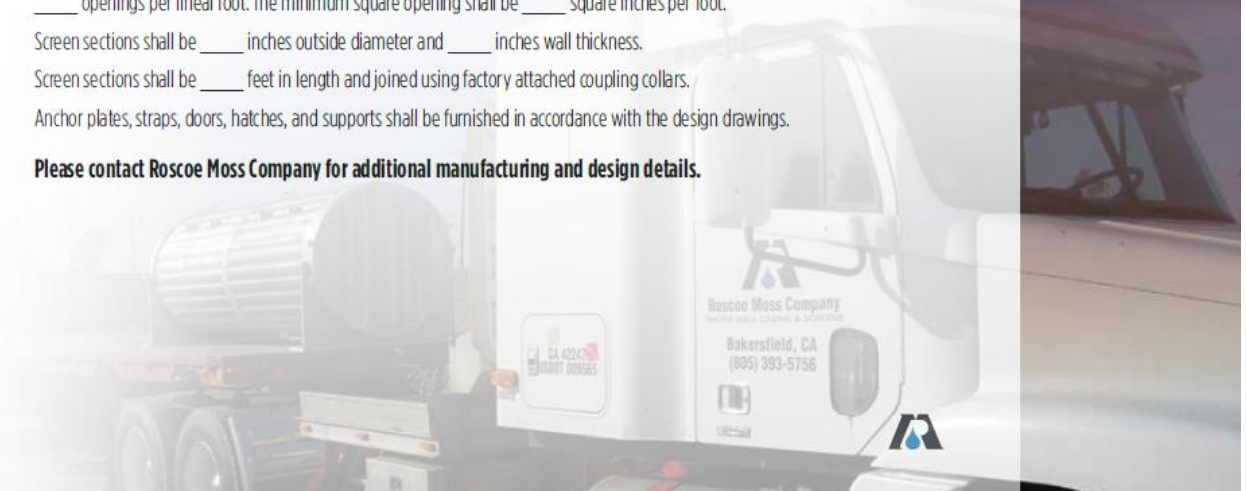
Screen openings shall be machine made, horizontal to the screen axis and of a louver form. The aperture size shall be ____ inch with ____ openings per lineal foot. The minimum square opening shall be ____ square inches per foot.

Screen sections shall be ____ inches outside diameter and ____ inches wall thickness.

Screen sections shall be ____ feet in length and joined using factory attached coupling collars.

Anchor plates, straps, doors, hatches, and supports shall be furnished in accordance with the design drawings.

Please contact Roscoe Moss Company for additional manufacturing and design details.



Maintenance

Storm Flo® Screens are designed to capture 100% of litter and debris sized 5 mm (0.2 in) and larger during a specified storm event. For cleaning, the accumulated debris is accessed through hatchways installed on each screen section and is quickly removed utilizing vacuum equipment.



Screens are quickly and effectively cleaned with combined use of a high pressure hose and vacuum equipment.



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City of Antioch, CA Before (above) After (below)





City of Pittsburg, CA Before (above) After (below)



Maintenance – examples



