

TRITON

STORMWATER SOLUTIONS



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Triton Stormwater Solutions Main Header Row™ O&M Manual

Introduction

An important component of any Stormwater Pollution Prevention Plan is inspection and maintenance. The Triton Main Header Row™ is a patent pending technique to inexpensively

enhance Total Suspended Solids (TSS) removal and provide easy access for inspection and maintenance.

The Main Header Row™

The Main Header Row is comprised of a row of any Triton chambers that sit upon the interconnecting sediment floors that are connected to a closely located manhole for easy access. At the end of the Main Header Row there can be an optional Sump Basin Assembly (Shown as item 3 in figure 2) to help collect and contain any sediment that will be flushed out of the Main Header Row during a rain event or during a maintenance cleaning. The sump basin assembly can then be accessed from above via a manhole or up to a 33" diameter stand pipe. The Main Header Row feeds the distribution rows (shown as item 4 in figure 2) via a feed or distribution pipe. The Feed pipe is at an elevated invert height so the water in the Main Header Row has to rise to this invert height before flowing into the distribution rows thus capturing the sediments in the Main Header Row. The Main Header Row is then protecting the distribution chamber row storage areas of any sediment accumulation. This allows for preserving the

infiltration rate of the area where the distribution rows are installed thus allowing the system to perform at the rate that the system was designed for.

The sediment floors are designed to prevent scouring of the underlying stone and to collect sediments from infiltrating into the ground under the Main Header Row. The sediment floors lock together and mate with the chambers so they will remain intact during very high flow events and during high pressure cleaning.

The Main Header Row is typically designed to capture the "first flush" and offers the versatility to be sized on a volume basis or flow-rate basis. An up-stream manhole not only provides access to the Main Header Row but typically includes a high flow outlet such that stormwater flow rates or volumes that exceed the capacity of the Main Header Row can overflow into the surrounding stone and or discharge

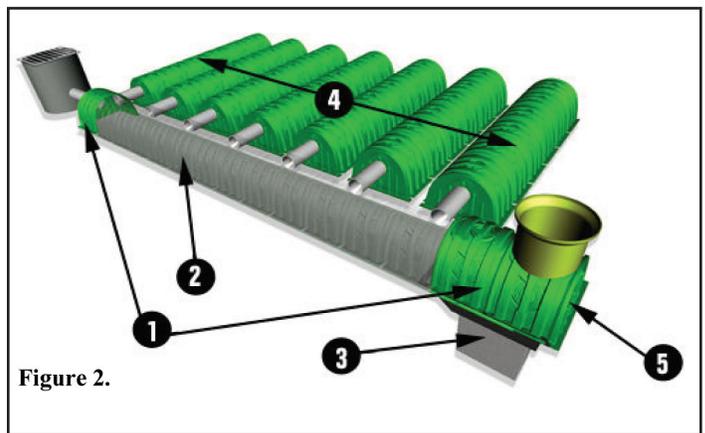


Figure 2.

through a manifold to the other chambers. The Main Header Row may also be part of a treatment train. By treating stormwater prior to entry into the Main Header Row system, the service life can be extended and pollutants such as hydrocarbons can be captured. Pre-treatment best management practices can be as simple as deep sump catch basins, oil-water separators or can be innovative storm water treatment devices. The design of the treatment train and selection of pretreatment devices by the design engineer are often driven by regulatory requirements. Whether pre-treatment is used or not, the Main Header Row is recommended by Triton as an effective means to minimize maintenance requirements and maintenance costs.

Treatment Train Inspection and Maintenance

The Triton SWS recommended treatment train inlet system has three tiers of treatment upstream of the Triton SWS chambers. It is recommended that inspection and maintenance (I&M) be initiated at the furthest upstream treatment tier and continue downstream as necessary. The following I&M procedures follow this approach providing I&M information in the following order:

Tier 1 - Pre-treatment (BMP);

Tier 2 - Triton SWS Main Header Row

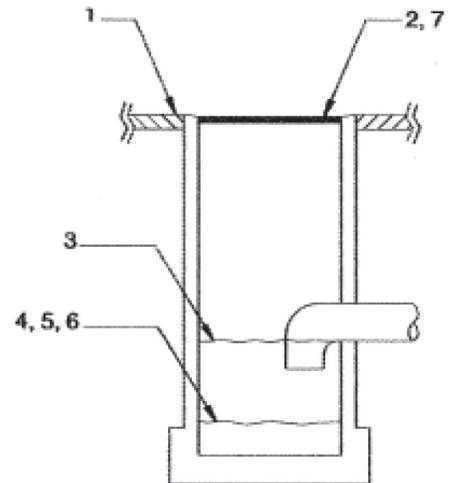
Tier 3 - Eccentric Pipe Header System – This option is not needed when using the Triton system because the Main Header Row eliminates the need for a pipe header system.

Catch Basin/Manholes I&M

Typically a stormwater system will have catch basins and manholes upstream of the detention/retention system. In some cases these may be the only pre-treatment devices. Regular I&M of catch basins and manholes should be scheduled and performed as part of a site's routine maintenance plan.

Step-by-Step Maintenance Procedures

- 1). Inspect catch basins and manholes upstream of Triton SWS chambers for sediment
- 2). Remove grate or cover
- 3). Skim off oils and floatables
- 4). Using a stadia rod, measure the depth of sediment
- 5). If sediment is at a depth greater than 8" proceed to step 6. If not proceed to step 7.
- 6). Vacuum or manually remove sediment
- 7). Replace grate
- 8). Record depth & date and schedule next inspection



Pre-Treatment Device I&M

Manufacturer's I&M procedures should be followed for proprietary pretreatment devices such as baffle boxes, swirl concentrators, oil-water separators, and filtration units. Table below provides some general guidelines but is not a substitute for a manufacturer's specific instructions.

SEDIMENT CONTROL INSPECTION	INSPECTION*	MAINTENANCE**
Triton Main Header Row	Annually	JetVac-Culvert Cleaning Nozzle or High-Pressure Hose
Sediment Basin	Bi-Annually or after large storm event	Excavate sediment
Catch Basin Sump	Bi-Annually	Excavate, pump or vacuum
Sediment Structure	Bi-Annually	Excavate, pump or vacuum
Catch Basin Filter Bags	After all storm events	Clean and/or replace filter bags
Porous Pavement	Quarterly	Sweep Pavement
Pipe Header Design	Quarterly	Excavate, pump or vacuum
Water Quality Inlet	Quarterly	Excavate, pump or vacuum
Triton Filter Pucks	Bi-Annually	Clean and/or replace filter media in pucks

Main Header Row™ Inspection

The frequency of Inspection and maintenance varies by location. A routine inspection schedule needs to be established for each individual location based upon site specific variables. The type of land use (i.e. industrial, commercial, residential), anticipated pollutant load, percent imperviousness, climate, etc., all play a critical role in determining the actual frequency of inspection and maintenance practices.

At a minimum, Triton recommends annual inspections. The Main Header Row should be inspected every 6 months for the first year of operation. For subsequent years, the inspection should be adjusted based upon previous observation of sediment deposition.

The Main Header Row incorporates a combination of standard manhole(s) and strategically located inspection ports (as needed). The inspection ports allow for easy access to the system from the surface, eliminating the need to perform a confined space entry for inspection purposes.

If upon visual inspection it is found that sediment has accumulated, a stadia rod should be inserted to determine the depth of sediment. When the average depth of sediment exceeds 8" inches in the bottom of the Sump Basin and or if there is 3" throughout the length of the Main Header Row, clean-out of the Sump Basin and Main Header Row should be performed.



Main Header Row™ Maintenance

The Main Header Row was designed to reduce the cost of periodic maintenance. By confining sediments to just one row, costs are dramatically reduced by eliminating the need to clean out each row of the entire storage bed. If inspection indicates the potential need for maintenance, access is provided via a manhole(s) located on the end(s) of the Main Header Row for cleanout. If entry into the manhole is required, please follow local and OSHA rules for a confined-space entries. The inside dimensions of the Triton Main Header Row Chambers are 34" tall by 48" wide.



Maintenance is accomplished by removing the sediment that has built up in the Sump Basin by using a standard vacuum truck as shown to the right. The Triton Main Header Row system was designed to allow for easy access to the Sump Basin via a manhole/inspection port up to a 33" diameter pipe. There is no need for a special process to clean out the Sump Basin

and the Main Header Row but they can be cleaned using a JetVac process or can be cleaned by using a water tank truck or fire truck equipped with a hose to flush the sediment to the Sump Basin if so desired. To use a water tanker or fire truck simply insert the hose into the upstream catch basin structure and flush the sediment to the end of the main header row where the Sump Basin is located. If the Sump Basin is located close to the inlet, then vacuum out the sediment first and then back flush the Main Header Row back into the Sump Basin.

NOTE: The JetVac or high-pressure hose process shall only be performed on the Main Header Row where the Triton Sediment Floor System has been installed and only if there is 3" of sediment throughout the length of the Main Header Row.



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Main Header Row™ Step-by-Step Maintenance Procedures

Step 1. Inspect Sump Basin and Main Header Row for sediment

A. Inspection ports (if present)

- i. Remove lid from floor box frame
- ii. Remove cap from inspection riser
- iii. Using a flashlight and stadia rod, measure depth of sediment in the Sump Basin and record results on maintenance log.
- iv. If sediment is at or above 11-inch depth, proceed to Step 2. If not, proceed to step 3.

B. All Main Header Rows

- i. Remove cover from manhole at upstream end of Main Header Row
- ii. Using a flashlight, inspect the Main Header Row through outlet pipe and through each distribution pipe that is connected in between the Main Header Row and the distribution row of chambers
- iii. If sediment is at or above the 11" mark in the sump bin, proceed to Step 2

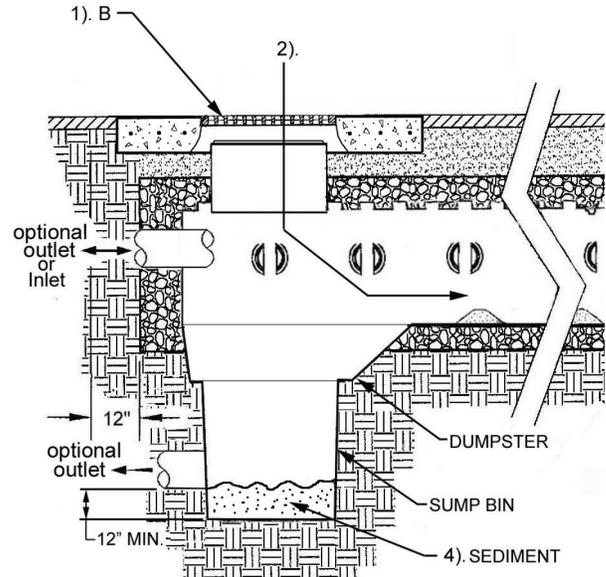
1. Be sure to have proper footing when entering into Main Header Row.
2. Follow OSHA regulations for confined space entry if entering Main Header Row.
If not, proceed to Step 3

Step 2. Clean out the Sump Basin with a vacuum truck

- A. Remove any secondary filtration media that may be installed in the sump basin
- B. Vacuum Sump Basin as required

Step 3. Replace all caps, lids, and covers. Record observations and actions

Step 4. Inspect & clean catch basins and manholes upstream of the Triton system



Sample Maintenance Log

Date	Stadia Rod Readings		Sediment Depth (1)-(2)	Observations/Actions	Inspector
	Fixed point to chamber bottom (1)	Fixed point to chamber top (2)			
4/11/2007	9.7 ft.	None		New installation. Fixed point is J1 frame at grade	KET
10/21/2007		9.6	0.1 ft.	Very little sediment in system - No maintenance required	GKT
4/11/2008		9.4	0.3 ft.	Very little sediment in system - No maintenance required	CMM
7/25/2009		9.1	0.6 ft.	Some debris/sediment is visible in sump basin assembly but not interfering with outlet	LEJ
7/20/2010		8.7	1.0 ft.	Some debris/sediment is visible in sump basin assembly - maintenance is due	DLC
8/20/2010	9.7 ft.		0	System has cleaned and vacuumed - very easy system to clean	NAT



LIFETIME SYSTEM WARRANTY

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