

PIPE-R

Reservoir

OPERATION & MAINTENANCE GUIDE



Environmental Conservation Solutions, LLC.



Rethinking Water Management Systems

PIPE-R™ Operation and Maintenance Guide

Water is our most precious resource and a fundamental building block for life on this planet. Today, the way we work with water is changing and challenging both business and our environment. But *we believe we can do better*. Using natural products and recycled materials, we are pioneering a new way to approach water treatment and management with systems that are sustainable for our clients' bottom line and the world around us. In short, *water is life – our life*. We live it every day and are excited to build a custom solution which allows you to work with water in the best way – one that preserves and protects this natural resource for the future generations.

Introduction

To ensure proper performance of PIPE-R™ reservoir system, it is recommended to provide sediment and gross debris control measures, upstream of the system, to minimize or eliminate deposition into the reservoir system. Adequate overall system performance can be achieved by the application of proactive maintenance programs using upstream control structures and inspection/maintenance ports within the reservoir system. The manufacturer recommends that designers/clients should focus on pretreatment as the best approach to maintenance of the PIPE-R™ reservoir system. Pretreatment options are manifold/header pipes connected to manhole with sump to collect sediments, baffle boxes, inlet protection device, inlet box screens, trash guards, or any other as design by engineer and approved by local regulatory agency.

Suspended solids that enter an underground system can limit the transport of stormwater from entering the system which may result in water backing up; and/or seal the opening of the geotextile wrap which will in turn impede exfiltration and reduce the storage capacity of the system. For an effective operation and maintenance of PIPE-R™ Reservoir System the manufacturer recommends a two-pronged approach to prevent suspended solids from entering the system; and maintenance approach to clean up, in the event of sediment deposition in the system. Sediment prevention and removal can be accomplished at three sections of a PIPE-R™ Reservoir System.

System Operations

PIPE-R™ reservoir system setup shall comprise of manifold/header pipe connected to a manhole with sumps, inlet and outlet pipes, PIPE-R reservoir chambers, equalizer pipes, geotextile, inspection/maintenance ports, fill materials, and optional outlet collection pipe/header for controlled discharge. If additional pretreatment is required, ECS recommends that the initial sediment control can be accomplished by installation of these pretreatment BMPs, baffle box - the Nutrient Separating Baffle Box (NSBB), grate or curb inlet filters with fine screens or trash guards, inlet protections, or any other pretreatment product approved by regulatory authority. ECS would readily recommend the NSBB as a pretreatment option because it is extremely effective at removing TSS and has been tested by NJCAT to show good removal efficiency. The results are available upon request from the manufacturer.

Following the pretreatment filter is a manifold/header pipe connected to manhole with sump, that distributes the inflow stormwater into the PIPE-R™ Reservoir System and offers a secondary sedimentation collection area in the sump. Sediment collection systems are easily accessible through manholes and inspection ports for the inspection of collected and accumulated sediments, and perform maintenance by extracting the accumulated sediments, as necessary.

If required, install additional inspection ports, rising to the top with covers that can withstand the H-20 loading, is connected to equalizer pipes at predetermined sections of the PIPE-R™ Reservoir System, as a third cleaning option. The inspection ports provide access to the bottom of the reservoir system to measure the depth of accumulated sediments, which is an indication of the amount of sediment in the chambers. If maintenance is required because of the accumulation of fine sediments, water can be introduced through the ports to agitate the sediments and make the fine sediments re-suspend, which then can be vacuumed and collected from same ports into a vacuum truck for safe and acceptable means of disposal.

It is recommended to perform installation of PIPE-R™ reservoir system as designed by engineer per the PIPE-R™ reservoir system manufacturer's Design and Installation guides. Other related accessories required for proper installation including fill materials, geotextiles, geogrids, pipe connections with pipe liner boots. The installation of the accessories shall be as recommended by the manufacturers to ensure proper installations and operations. Use only skilled workers with the requisite record of performance for underground reservoir construction, bulk earthwork, pipe connections, and other accessories to perform all installations.

Prior and during the installation of a PIPE-R™ reservoir system, coordinate all site construction activities to prevent impact to the integrity of the system. These actions shall include but not limited to the prevention of loads greater than the design loads on the system; proper placement of excavated material away from the location of the system; dewatering of the location, if required; prevention of sediments from entering any pretreatment devices and the reservoir system prior to commencement of operations; and application of only recommended compaction practices on embedment fill and backfill placements.

Maintenance Program

Inspection

The frequency of inspections and maintenance PIPE-R™ reservoir system varies by location, and may be increased per the design engineer, city, county, or state where the system is located. However, we recommend minimum inspection frequency in the life of the system. This guide acts as a recommendation and professional judgement should be used to meet the needs of each specific site per anticipated sediment load, contributing area, climate, and land use. Follow the guidelines set forth in the Operation, Maintenance, Inspection, and Cleaning Manuals for the respective pretreatment device used in the project. Request copy from the respective manufacture for the device.

An initial inspection of the manifold and inspection ports should be completed thirty days after installation to assess sediment buildup. Inspect the manifold and inspection ports quarterly

after the initial inspection. If a sediment buildup is seen in the manifold upon inspection of one inch or greater, the system should be cleaned up of sediments.

STEP BY STEP MAINTENANCE PROCEDURES FOR THE PIPE-R™ RESERVOIR SYSTEM

- I. Inspect the pretreatment Box for sediment
 - a. Follow the O&M requirements set forth by manufacturer in their Operation, Maintenance, Inspection, and Cleaning Manual for the pretreatment device.
- II. Inspect the PIPE-R™ Reservoir System manifold for sediment
 - a. Open the manhole and inspection port covers in the manifold where applicable (Be sure to follow OSHA standards for confined space entry if entering a manhole).
 - b. Utilize a flashlight to look for sediment accumulation in the manifold.
 - c. Use deep stick to measure elevation difference between new install (or rejuvenated system – after maintenance) depth and depth at specified inspection intervals for sediment accumulation
 - d. If sediment has accumulated to a level of one inch or more, proceed to section IV. If not, please proceed to section VI.
- III. Inspect the PIPE-R™ Reservoir System for sediment
 - a. Open the inspection port covers throughout the system where applicable (Be sure to follow OSHA standards for confined space entry if entering a manhole).
 - b. Utilize a flashlight to look for sediment accumulation in the system.
 - c. If sediment has accumulated to a level of one inch or more, proceed to section V. If not, please proceed to section VI.
- IV. Cleaning the PIPE-R™ Reservoir System manifold
 - a. Utilize a standard culvert cleaning nozzle to move sediment into the sump at the end of the manifold.
 - b. Vacuum the sump as required to remove water and sediment. Proceed to section VI.
- V. Cleaning the PIPE-R™ Reservoir System
 - a. Introduce water into the PIPE-R™ Reservoir System through the inspection port. A high-pressure hose can be used for this process. This will suspend any sediment in the system. Remove the hose once when the water level covers the sediment being removed from the system.
 - b. Vacuum the water out of the system to remove the sediment. Proceed to section VI.
- VI. Replace the manhole and inspection port covers.
- VII. Inspect and clean and manholes and catch basins upstream from the PIPE-R™ Reservoir System.