



Chamber Installation Manual

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1. INTRODUCTION

This manual is for professionals responsible for the planning and installation of chamber stormwater management systems. The products in this manual are the products formerly branded (and the same specifications as) Triton Stormwater Solutions products.

Chambers and components are installed into excavated areas, connected to storm sewer infrastructure, and backfilled to provide underground storage of runoff. These instructions ensure standardized installation. Systems must be installed in accordance with this manual for warranty coverage.

Xerxes offers complementary installation consultations. To schedule a preinstallation consultation, email your sales representative or stormwater.support@mattr.com at least 10 days before the planned installation date.

Visit the Resource Library at xerxes.com for standard details, manuals and more.



Visit www.xerxes.com for the latest version of this guide and other resources.

Contact your sales representative or the Xerxes engineering team for support: stormwater.support@mattr.com.

2. GENERAL REQUIREMENTS

Installation must conform to the project's construction documents. This manual provides general guidance and is not project-specific.

System configuration, layout, details and specifications are different for each project. Figures, illustrations and photographs in this manual are provided for reference only, and do not represent all site conditions.

Xerxes standard details are developed based on design loads consistent with AASHTO and EN 1991. Project-specific design requirements may differ and must be verified by the project's Engineer of Record.

Systems must be designed and certified by a licensed professional engineer following local regulations and standards.

The Engineer of Record is the licensed Professional Engineer who is responsible for the design of the stormwater management infrastructure and for ensuring compliance with the relevant codes, standards, and project requirements.

The terms "contractor" and "installer" are used interchangeably to describe the organizations and individuals responsible for performing the work covered in this document. Contractors must read and understand the latest version of this manual at the time of installation. Following these instructions is essential for the successful completion and operation of the system.

Before starting work:

- Installation area must be filled and compacted to rough grade before the system is excavated and installed.
- Notify the Engineer of Record if there are discrepancies between the installation manual and construction plans.
- Obtain all necessary permits.
- Installer must contact the necessary agencies, and have them locate and mark underground utilities before excavation begins.
- Ensure that upstream stormwater infrastructure is not connected until the system is activated.
- Protect the installation area from sediment and compaction. Systems designed to infiltrate water into the ground may be compromised if the native soil is compacted during construction.

- Protect all system components including chambers, end caps, pipes, and fabric.
- Coordinate installation with other site activities.
- Prevent noninstallation-related traffic and loading of the system. Install temporary fencing and warning signs to prevent unauthorized traffic from entering the installation area.
- Restrict loads in the construction area following the table in Section 16, Maximum Allowable Vehicle Loads.
- Ensure that the chambers, end caps, and other materials are available and in good condition.

If required, consult with the electrical contractor and confirm that adequate spacing for excavation of light pole foundations is provided within the system's footprint.

IMPORTANT: Leaving the system incomplete increases the risk of a faulty installation. As soon as possible once excavation starts, the contractor should complete the installation steps through top stone placement and fabric wrap.

3. DELIVERY, STORAGE & HANDLING

This section provides guidelines for the delivery, storage, and handling of the materials to prevent damage.

The contractor is responsible for offloading the materials from the delivery vehicles. The materials are delivered on pallets. Ensure that the materials remain upright during offloading and storage, and that they are lifted and moved by the pallet, not the chambers themselves.



3.1. Inspect Materials at Delivery

Remove packaging and inspect the materials before accepting the delivery.

The contractor must confirm that the received quantities match the quantities specified in the construction plans.

IMPORTANT: Do not install damaged components. If damaged components are identified, contact Xerxes for support.

3.2. Store Materials Properly

Protect the materials from UV exposure if the time between the delivery and installation exceeds one month.

Store the materials on level, clean and dry surfaces. The materials should be kept clean throughout the installation process.

Use appropriate equipment for handling materials and for site conditions. Examples of appropriate equipment include forklifts and telehandlers.

In cold weather below 40°F (5°C), handle the material with care. Do not assemble or install materials that are covered with ice or frost.

4. EXCAVATION

This section outlines the procedures for excavating the installation area, including site preparation and conditions to address before installing the system.

4.1. Excavate & Level Bottom

Ensure that the excavation area has been surveyed and marked for underground utilities.

Provide a minimum of 12 inches (300 mm) of space between the chambers and the edge of the excavation for installing embedment stone.

The bottom of the excavation must be smooth, level, firm, and free of debris and soft native soil.

Excavate as necessary to provide adequate working space for installing the chambers, end caps, and pipe connections.

Immediately notify the Engineer of Record when unsuitable soils or unexpected conditions are encountered. It is critical to identify and address unsuitable soils to ensure the safety and success of the installation.

Examples of unsuitable soils include:

- Frozen, wet, saturated, muddy conditions
- Expansive clays
- Highly compressive and organic soils, for example fine-grained silts, clays and soils classified as CH, ML, MH, OH, OL and PT.
- Loose or poorly compacted soil
- Contaminated soil

4.2. Protect Excavation Area

Keep the excavation free of standing water and maintain positive drainage away from the work area.

If groundwater is observed during excavation, consult the Engineer of Record before proceeding with the installation.

Protect partially completed installations from construction traffic using high visibility tape, fencing, and barricades.

5. NATIVE SOIL REQUIREMENTS

This section outlines the procedures for preparing the native soil, including verifying soil suitability before installing the system. Prepare native soil following the construction plans.

NOTE: Compaction of the native soil is normally prohibited for infiltration systems.

5.1 Check Native Soil Suitability

Address unsuitable native soil areas with the Engineer of Record and take appropriate mitigation, such as removing the unsuitable soils. Verify that the allowable native soil bearing capacity meets the required minimum value specified in the construction plans.

The Engineer of Record is responsible for approving the native soil prior to installation. Do not proceed with installation until the Engineer of Record has approved the native soil conditions.

CAUTION: Systems must not be installed on native soil with an allowable bearing capacity less than 2,000 lb/ft² (95 kPa).

6. FOUNDATION STONE & GEOTEXTILE INSTALLATION

This section outlines procedures for installing the foundation stone, geotextile and, if present, a liner.

6.1. Install Geotextile per Manufacturer's Guidelines

Cover the bottom and sides of the excavation with the non-woven geotextile fabric, or as shown in construction plans.

Overlap the nonwoven geotextile seams following the manufacturer's guidelines.

Provide excess material to complete wrapping the sides and top of the system.

IMPORTANT: Do not puncture the geotextile fabric. Repair or replace damaged geotextile per the manufacturer's guidelines.



6.2. Install Liner, if Applicable

If a liner is specified in the construction plans, it is a best practice to protect it by placing it between two layers of non-woven geotextile fabric. Liners are typically used to prevent stormwater infiltration and groundwater intrusion.

Liners must be installed per the manufacturer's guidelines and the construction plans.

IMPORTANT: Do not puncture the liner. Repair or replace damaged sections per the manufacturer's guidelines.

6.3. Install Underdrain Pipes, if Specified

Underdrain pipes are typically placed on the nonwoven geotextile before the foundation stone is installed.

Install the perforated underdrain pipe outlets as shown on the construction plans.

6.4. Place Foundation Stone

The Foundation stone must meet the requirements of Section 15, Standard Fill Materials. Verify the stone material with the Engineer of Record before placement.



Refer to the construction plans for the foundation stone thickness.



6.5. Level & Compact Stone

Level and compact the foundation stone to achieve a flat surface.

IMPORTANT: The surface must be flat and level. The maximum allowable slope is 1.0%. The surface regularity must measure less than +/- 1/4 inch (+/- 6 mm) with a 10-foot (3-m) straight edge placed anywhere on the surface.



7. SYSTEM INSTALLATION

This section outlines the procedures for installing the chambers in the excavated area after the foundation stone and geotextile have been placed. Ensure that all the chamber materials are available onsite. Refer to the materials list on the construction plans.

7.1. Outline System Footprint

Prepare for placing chambers by marking the system footprint on the foundation stone. Verify that a minimum of 12 inches (300 mm) of space between the chambers and the edge of the excavation is provided for placing the embedment stone.

Identify key information on the plans to prepare for chamber installation, such as:

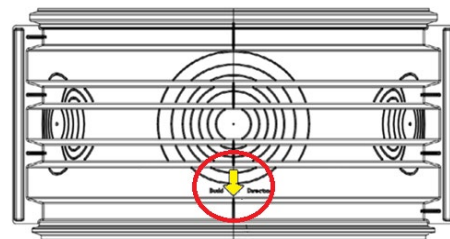
- Chamber installation direction
- System outlet location
- System inlets and Main Header Row locations
- Connection pipe locations
- Inspection port locations

It is a best practice to place structures to be connected to the chamber system (such as manholes and vaults) before placing the chambers.

7.2. Place Chambers

Begin installation by placing the first chamber. It is a common practice to begin chamber placement at the system outlet.

Continue installation of chamber sections in the build direction indicated by arrows on top of each chamber.



IMPORTANT: Depending on the project, chambers and end caps may be precut for cross-connection pipes. If not precut, field cutting of openings will be required. See Section 8 for detailed instructions.

Connect chambers by following the build direction and overlapping the end corrugation (top) of one chamber onto the

end of the previously placed chamber (bottom). The bottom corrugation is identifiable by the narrow end corrugation. The connecting chambers should be tight and without gaps.



IMPORTANT: The chamber feet must sit on the foundation stone to ensure that the foundation stone fully supports the chambers during and after installation.

Place the chambers in rows as shown on the construction plans. Ensure that the required chamber row spacing is maintained per construction plans. Install the end caps at the end of each chamber row.



The end caps are placed either under or over the end corrugation, depending on the chamber model. The bottom of the end cap must sit on the foundation stone. The end cap should fit tightly to the chamber with no gaps.



7.3. Install Main Header Row

The Main Header Row is typically located at the system inlets. Main Header Rows have additional installation requirements.

The Main Header Row consists of a layer of woven geotextile fabric below the chambers and cross-connection pipes that connect the Main Header Row to adjacent rows.

Refer to the construction plans for the location of the Main Header Row and geotextile protection fabric.



7.4. Place Woven Fabric

Place the woven geotextile fabric on the foundation stone where the Main Header Row will be installed.

IMPORTANT: Do not puncture the geotextile fabric. Repair or replace damaged geotextile per manufacturer's guidelines.

Place woven fabric beneath the chambers with cross-connection pipes from the Main Header Row and the surrounding chambers to prevent scour of the foundation stone.

The geotextile for the Main Header Row and anti-scour protection must be a single continuous piece of fabric that extends beyond the chamber feet.

IMPORTANT: Woven geotextile seams in the Main Header Row are prohibited.

7.5. Install Chambers

Begin installing the Main Header Row.

Make note of the cross-connection pipe locations and install the precut chambers in the correct direction. The precut chambers are designated as either precut LEFT or precut RIGHT. Refer to Section 8 for installation requirements.

After the inlet and cross-connection pipes are installed, place geotextile fabric around the pipe connection to prevent fill material intrusion.

8. PIPES & CONNECTIONS

This section outlines the procedures for connecting pipes into the chamber system: (1) using precut chambers, or (2) cutting chambers and end caps at the installation site.

8.1. Precut Chambers

Precut chambers are designated “LEFT” or “RIGHT” based on the build direction. LEFT and RIGHT chamber locations should be identified on the construction plans. Precut chambers are placed like standard chambers. Ensure that the holes align with the adjacent chamber row pipe connection per the construction plans.

8.2. Field Cutting Chambers

Review the construction plans and identify the location and size of pipe connections. Chamber cutting details can be found in the construction plans and on the Xerxes website. Supplemental instructions for field-cutting procedures are available via a QR code on the detail drawings that links to Xerxes installation videos.

Review the cutting details in the product detail drawing set for the cutting locations, maximum hole sizes, and tolerances. Cuts must follow the profile of the pipe. No cut should be placed within 1 inch (25 mm) of the bottom of the chamber or end cap.

IMPORTANT: Do not cut through the bottom of the chamber or end cap.

Cuts on the sides of corrugations must be made parallel to the incoming pipe to minimize gaps.



Chambers should have no more than one hole cut for connecting pipes.

Place uncut chambers on each side of the chamber that has been cut for piping.

8.3. Connect Pipes to System

Identify the pipes to be connected to the system. Ensure that the inside and outside of the pipe is clean. Ensure that water and sediment do not enter the system during installation.

Connect the inlet and outlet pipes to the system as shown on the construction plans.



The pipe should extend into the chamber a distance equal to half the diameter of the pipe. For example, a 12-inch (300-mm) pipe must extend 6 inches (150-mm) into the chamber.

Install geotextile fabric around the pipe connection to prevent fill material intrusion.

9. INSPECTION PORTS

This section provides guidelines for the installation and support of inspection ports. Inspection port details can be found in the construction plans and on the Xerxes website.

An inspection port consists of an internal coupler and a riser pipe.

The riser pipe must extend into a reinforced concrete top slab when located in traffic areas. Ensure that riser pipes are detached from the slab to isolate the pipes from traffic loads.

Install inspection ports as shown on the construction plans. Inspection ports must extend to the finished grade.

10. EMBEDMENT STONE INSTALLATION

This section outlines the instructions for installing the embedment stone around the system, including construction equipment, stone specifications, and compaction requirements to ensure proper placement and stability.

IMPORTANT: Do not operate equipment over the system at this stage of the installation.

Inspect the geotextile to ensure that there is no damage that could allow sediment to enter the chamber system. If there is a liner, inspect that for damage. If damaged, follow manufacturer's instructions to repair or replace it.

Secure the geotextile and liner (if one is present) to prevent movement during embedment stone placement.

IMPORTANT: Do not puncture the geotextile fabric. Repair or replace damaged geotextile per the manufacturer's guidelines.

The embedment stone must meet the requirements of Section 15, Standard Fill Materials. Verify the stone material with the Engineer of Record before placement.

10.1. Anchor Chambers with Stone

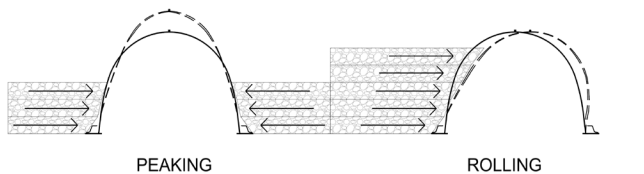
Anchor the chambers by placing stone directly over the centerline of the rows from a maximum drop height of 4 feet (1200 mm). Evenly place the stone on each side of the rows to prevent chamber movement.

IMPORTANT: Stone slingers (truck-mounted conveyors or gravel shooters) must not be used to place embedment stone around or over the chambers.



10.2. Install Embedment Stone Evenly

Uneven fill material may cause chamber movement as shown in the image below.



The embedment stone must be installed evenly across the rows to prevent rolling, peaking, and detrimental deflection of the chambers. The difference in stone height between chamber rows must be less than 12 inches (300 mm).

Place embedment stone around pipes to secure them in place and prevent movement.



Ensure that the geotextile and liner (if present) is installed between the stone and the excavation sides.

IMPORTANT: To prevent damage to the chambers, do not drop stone a distance greater than 4 feet (1200 mm).

It is a best practice to complete embedment stone installation before placing top stone.

11. TOP STONE INSTALLATION

This section provides guidelines for the installation of top stone over the system, including stone placement and compaction.

Inspect the geotextile to ensure that there is no damage that could allow sediment to enter the chamber system.

If there is a liner, inspect it for damage.

Secure the geotextile and liner (if one is present) during top stone placement.

IMPORTANT: Do not puncture the geotextile fabric. Repair or replace damaged geotextile per the manufacturer's guidelines.

11.1. Place Top Stone

The top stone must meet the requirements of Section 15, Standard Fill Materials. Verify the stone material with the Engineer of Record before placement.

Refer to the construction plans for the top stone thickness.

Use appropriate equipment for placing stone such as an excavator or conveyor. Carefully place the top stone over the system to avoid displacement and damage.

IMPORTANT: To prevent damage to the chambers, do not drop stone a distance greater than 4 feet (1200 mm).

Compact each lift with a walk-behind vibratory plate compactor or equipment following Section 16, Maximum Allowable Vehicle Loads.

Place and compact the top stone in 6-inch (150-mm) maximum lifts



Ensure that the inspection ports are protected and supported to prevent damage during construction.

Only operate vehicles as permitted in Section 16, Maximum Allowable Vehicle Loads.

11.2. Cover System with Geotextile

The final top stone lift must be flat and level.

Inspect the geotextile and liner (if one is present) for damage that could allow sediment to enter the system. Repair damaged areas according to the manufacturer's guidelines.

Place the nonwoven geotextile according to the construction plans and manufacturer's guidelines.

If a liner is present, wrap the top of the system with the liner according to the construction plans and the manufacturer's guidelines.

12. FILL MATERIAL

This section outlines the process for backfilling above the top-stone layer, including material specifications, equipment, and precautions.

For the purposes of this section, the fill material includes all permanent material placed above the top stone, including pavement and pavement base courses.



12.1. Place Fill Material per Plans

Place the fill material following the construction plans, material specifications and compaction requirements.

Refer to Section 15, Standard Fill Materials for fill material specifications. Verify the material with the Engineer of Record before placement.

Refer to the construction plans for fill material depth.

CAUTION: Ensure that equipment loads over the system are below the allowable load based on the cover depth. Refer to Section 16, Maximum Allowable Vehicle Loads.

IMPORTANT: The minimum cover requirement over the chambers is based on an HL-93/H-20 load rating. Greater or lower cover depths may be specified based on the project requirements.

If a geogrid or geosynthetic reinforcement is specified on the construction plans, install it per the plans and the manufacturer's guidelines.

Install riser pipe extensions as needed. Protect and support the pipes to prevent damage while placing fill material.

Use appropriate equipment, such as an excavator or a conveyor, to place fill material. Carefully place fill material over the system to avoid damage to the system.

It is a best practice at this stage to install metallic tape around the perimeter of the system to allow for future utility detection.

Complete the installation of structures such as inspection ports, as shown in the construction plans.

13. PROTECTION OF SYSTEM DURING SITE CONSTRUCTION

This section outlines requirements to prevent unauthorized construction traffic and loading over the chamber system until commissioning.

IMPORTANT: Restrict construction loads over the chamber system in accordance with Section 16, Maximum Allowable Vehicle Loads.

IMPORTANT: Continue the installation process – top stone placement and fabric wrap – as soon as possible after embedment stone placement. This helps minimize the risk of damage or noncompliant installation.

Once the system is installed and until site construction is completed:

- Install high-visibility fencing around the chamber system footprint.
- Post signs that notify personnel that there is an underground stormwater system, and that unauthorized traffic, staging and piles of material are not allowed over the stormwater system site.

14. COMMISSIONING

Protect the chamber system from erosion and sediment until the project site is stabilized and the system is commissioned. Use inlet protection practices to prevent rainwater from entering the system before commissioning.

Perform inspection before bringing the system online.

Ensure that the system was installed in accordance with the construction plans and is free of defects and contaminants. If maintenance is required, refer to the Chamber Main Header Row Operation and Maintenance Manual.

IMPORTANT: Do not flush sediment and contaminants into the system.

Remove the inlet protection practices after construction is completed and no further sediment from construction activities is anticipated.

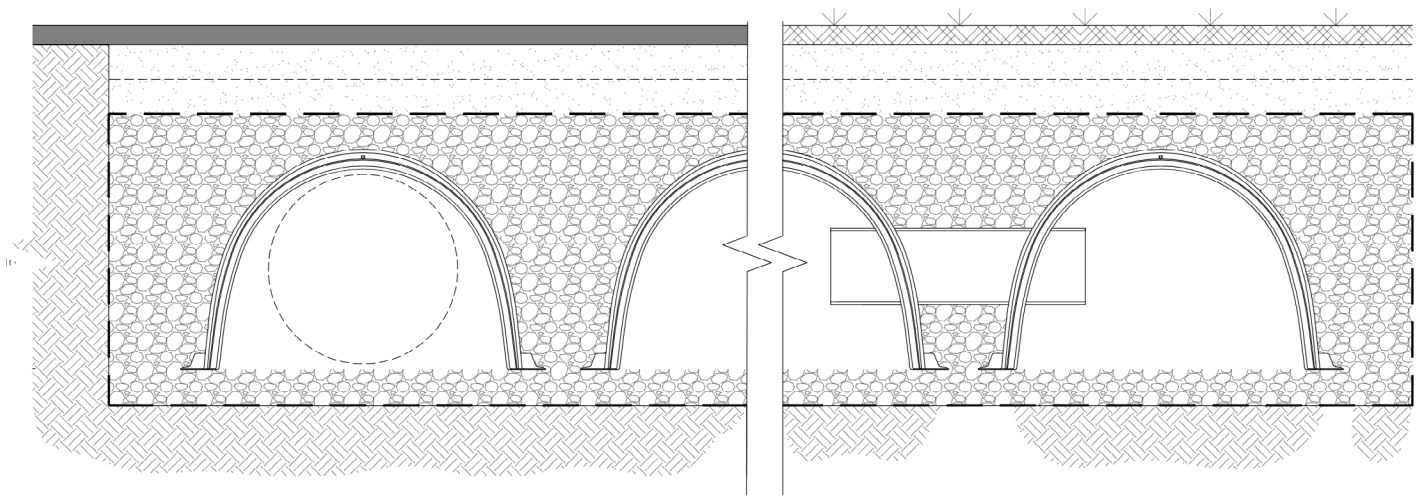
See next pages for the Standard Fill Materials and the Maximum Allowable Vehicle Loads sections.

15. STANDARD FILL MATERIALS

The AASHTO designations in the table below are for gradations only. The stone must be clean, crushed, hard, durable, and angular. As an alternate to proctor testing and field density measurements on open graded stone, compaction requirements are met when stone is placed and compacted in 6-inch (150-mm) maximum lifts using two full passes with a vibratory compactor.

Generally, stone that meets the requirements for base or subbase material in road construction projects will also satisfy the hardness and durability criteria for the chamber system. The quality of the stone is typically assessed using testing per ASTM C131 or C535, with a maximum wear of 45%.

Material Location		Description	AASHTO M43 Designation	Compact/Density Requirement
D	Fill material from 18" (450 mm) above chamber to grade	Per construction plans	Per construction plans	Per construction plans
C	Fill material for 6" (150 mm) to 18" (450 mm) above the chamber	Granular well-graded soil/ aggregate soil mixtures, < 35% fine particles. Most pavement base materials can be used in lieu of this layer.	3, 357, 4, 457, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10 M145: A-1, A-2, A-3	Compact to ≥ 95% standard density in max. 6" (150-mm) lifts. See notes above.
B	Embedment stone and top stone	3/8"-2" (9.5-50 mm) clean, crushed, angular stone.	3, 357, 4, 467, 5, 56, 57	Embedment stone: compaction not required to ≥ 95% standard density after 6" (150-mm), then in max. 6" (150-mm) lifts. See notes above.
A	Foundation stone	3/8"-2" (9.5-50 mm) clean, crushed, angular stone.	3, 357, 4, 467, 5, 56, 57	Compact to ≥ 95% standard density in max. 6" (150-mm) lifts. See notes above.



16. MAXIMUM ALLOWABLE VEHICLE LOADS

This table applies to fill over chambers compacted to at least 95% Standard Proctor Density. Verify compaction before allowing vehicular loads.

At all times, ensure that all equipment and vehicles around and above the system comply with the allowable loads in this table.											
Material Location	Height of Cover Over Chambers		Max. Axle Load for Trucks		Max. Wheel Load for Loaders		Max. Allowable Track Loads				Max. Allowable Compaction Equipment Loads
	in	mm	lbs	kN	lbs	kN	Weight		Ground Pressure		
							lbs	kN	psi	kPa	
Top Stone & Fill Material (including top stone and pavement)	36 and greater	900	32,000	142	16,000	71	43,000	191	6.9	47	GVW 38,000 lbf (169 kN)
	24-36	600-900	32,000	142	16,000	71	43,000	191	6.9	47	GVW 20,000 lbf (89 kN)
	18-24	450-600	32,000	142	16,000	71	22,500	100	6.9	47	GVW 12,000 lbf (53 kN) and 20,000 lbf (89 kN) max. vibration force
	12-18	300-450	16,000	71	Not Allowed		12,000	53	6.9	47	GVW 12,000 lbf (53 kN) and 20,000 lbf (89 kN) max. vibration force
	6-12	150-300	Not Allowed		Not Allowed		9,000	40	6.9	47	220 lb (100 kg) vibratory plate compactor and 2,700 lbf (12 kN) max. vibration force
	0-6	0-150	Not Allowed		Not Allowed		Not Allowed				Not Allowed
Embedment Stone	Not Allowed		Not Allowed		Not Allowed		Not Allowed				Not Allowed

IMPORTANT: Do not operate heavy construction equipment over the system to perform activities such as excavating, pushing stone, or loading materials and equipment.

Avoid stationary turning point loads, such as stationary semi-trailer truck (articulated lorry) or pantech truck wheel turns that could surpass the maximum allowable loads.

Avoid construction impact loads that could exceed the allowable loads.

Do not use the area over the system for construction staging, or for ingress or egress. Do not place or store vehicles, equipment, or piles of material over the system.

Do not operate padfoot compactors (sheepsfoot rollers) over or within 10 feet (3 m) of the system.





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details, manuals and more.



stormwater.support@mattr.com

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