StormChamber®

Installation Manual

Stormwater Retention, Detention, Reuse and Conveyance

••• www.stormchambers.com •••

Before Your StormChambers® Arrive

1. StormChambers® will arrive either on a flat bed trailer or in an enclosed van. If in an enclosed van, we will try our best to have the driver load the pallets at the tail of the van. However, be prepared with a long chain, metal cable, or strong rope or straps to drag a pallet from the nose of the van. A forklift is the easiest way to unload pallets of StormChambers®.

2. A full pallet of StormChambers® will weigh approximately 3,410 pounds (1,550 kg), will be about 5' (1,525 mm) wide, 8.5' (2,590 mm) long, and approximately 8.5' (2,590 mm) high.

Materials Needed

1. Wire cutters to remove the metal bands that secure the StormChambers® to their pallets.
2. 3" (75 mm) drywall screws to screw the overlaying bases of the StormChambers® together until the stone is placed around them.
3. 3/4"- 2" (20 mm-50 mm) crushed, washed, hard stone for the trench base and to backfill to minimum of 6" (150 mm) above the StormChambers®. Do not use limestone. Limestone gets pasty when wet and will tend to seal-off the bottom of the trench and reduce the void spaces in the stone.
4. 4' (1,200 mm) sections of 10" (250 mm) (unless otherwise specified), Schedule 40 or SDR 35 PVC pipe for the interconnections between rows of StormChambers® (check plans for number and location of interconnections).
5. 12" (300 mm) bell and gasket Schedule 40 or SDR 35 PVC pipe for inspection/clean out risers (check plans for number and location of risers).
6. Cleanout caps or tops for inspection/clean out risers.
7. One manhole cover frame and lid for each inspection/clean out riser in pavement (East Jordan V – 8450 or equivalent).
8. Concrete and related materials to form 3' x 3' (900 mm x 900 mm) reinforced pads to hold manhole cover frames and lids for inspection/ clean out risers.

Equipment Needed

1. Forklift or other type of equipment to unload StormChambers®.
2. Excavator to dig the trench and to place stone and soil backfill.
3. Two battery or power operated screw guns to connect bases of overlapping StormChambers®.
4. Sawzall, router bit on a drill, or key hole saw to cut open side and top portals in StormChambers®.
5. Light weight, tracked dozer, not exceeding 1,100 lbs (500 kg)/sf to grade backfill.
6. Hand – operated compactor, small roller, or tracked vehicle for fill compaction. Tracked vehicle must not exceed 1,100 lbs (500 kg)/sf; hand operated compactor or vibratory roller must not exceed a dynamic force of 20,000 lbs (9,000 kg).
7. Transit or laser.
8. Stone bucket.

PLEASE NOTE THAT ALL PHOTOGRAPHS AND ILLUSTRATIONS ARE FOR ILLUSTRATIVE PURPOSES ONLY. PLEASE RELY ON WHAT THE ENGINEER SPECIFIES.

When Your StormChambers® Arrive

1. UNLOADING – see “Before Your StormChambers® Arrive” above. As a last resort, the pallets can be dragged off of the trailer and dropped on the ground. This will not injure the StormChambers®.
2. Confirm the total number of StormChambers®, SedimenTraps™, light and heavy duty netting, filter fabric and any other items listed on your purchase order. Contact StormChamber® immediately if the count is incorrect.
3. Confirm the number of Start, Middle and End StormChambers®. Each pallet should be marked with the number of each.
4. Check all StormChambers® and SedimenTraps™ for damage and contact StormChamber® immediately if any sign of damage is present.
5. During periods of excessive and/or extended hot weather please take one chamber at a time off of a pallet, just before placing it in the trench. Do not allow chambers to be left on their backs, exposing the underlying black color to the sun. If possible, keep pallets of chamber and backfill stone in the shade. Try to resrict chamber installation to the cooler morning periods. Place stone and soil backfill on chambers as the are being installed.

Trench Preparation

1. Do not excavate trench until dry weather is forecast long enough to allow at least covering the StormChamber® system with filter fabric prior to raining to avoid soil filling void spaces in the stone.
2. Excavate to a width and length sufficient to accommodate the number of StormChambers® plus a minimum one foot border around the entire StormChamber® system. The bottom of the bed must be level.
3. If the StormChamber® system was designed for infiltration and heavy clays are encountered, the surface of the trench bottom must be scarified with the prongs of the excavator before placing the stone base.
4. Do not use heavy equipment on the excavated trench bed in order to avoid soil compaction.
5. If it is not possible to excavate the entire trench from outside the trench, have the excavator back up as it excavates in front of it in order to avoid compaction of underlying soils.
6. If use of heavy equipment on the excavated trench bed can not be avoided, scarify the trench bottom and break up soil clumps before adding the stone base.
7. Line trench walls with StormChamber® filter fabric. Overlap adjacent filter fabric by at least 2’ (600 mm). Do not place filter fabric under the StormChambers®. The filter fabric will clog, restricting the infiltration capability of the StormChamber® system.

Line trench walls, not trench bottom, with StormChamber® filter fabric.

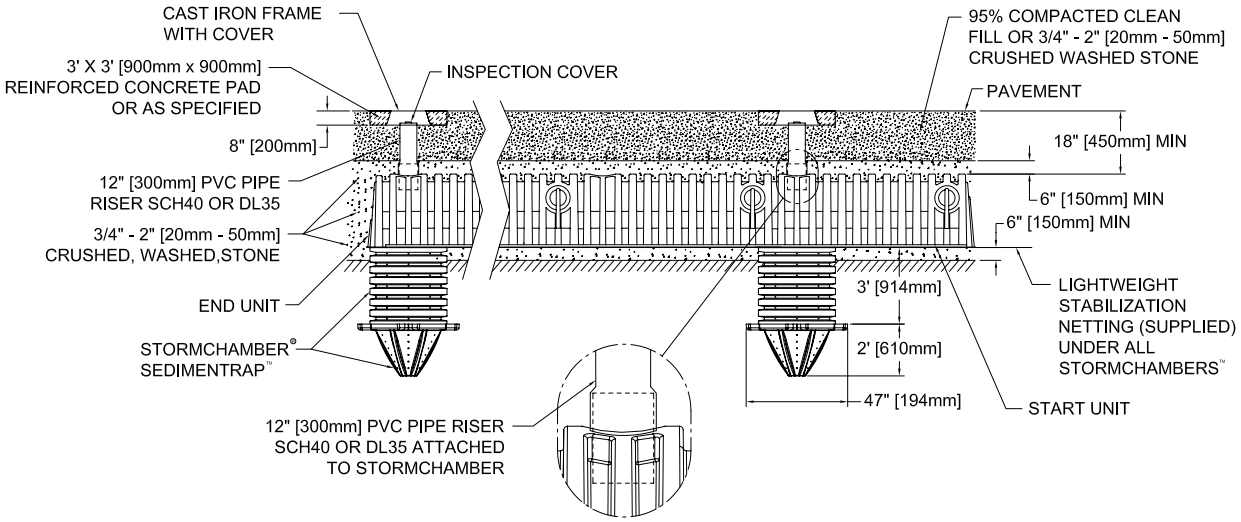
8. Unless otherwise specified, place 6” (150 mm) of crushed, washed, 3/4” to 2” (20 mm-50 mm) non-calcarious stone on the bottom of the trench.
9. If it becomes impractical to level the stone base by hand, use a low pressure, tracked dozer, not exceeding 1,100 lbs (500 kg)/sf, maintaining at least 6” (150 mm) of stone under the tracks at all times.
10. Do not use the excavated trench as a sedimentation trap or sediment basin during construction. The fine soil particles will accumulate at the soil boundary and restrict the infiltration capability of the system.

INSTALLING THE STORMCHAMBER® SEDIMENTRAP™

Most StormChamber® systems are specified with our SedimenTraps™. The SedimenTraps™ are used as a low cost and highly effective method to capture and facilitate removal of sediment.

1. StormChamber® systems typically incorporate SedimenTraps™ at the first and last chamber of the row(s) receiving the storm water inflow. StormChamber® systems are installed by placing all Start Models first, then building each row equally with Middle Models and finish building the rows with the End Models.
2. Working from the Start Models end of the StormChamber® system, identify the location for the first SedimenTrap™. The SedimenTrap™ must be located so that the bottom is aligned exactly under the 12" (300 mm) PVC riser pipe of the chamber over it.

STORMCHAMBER® WITH SEDIMENTRAP™



3. Excavate a hole deep enough so that the SedimenTrap™, when placed on about 6” (150 mm) of a crushed, washed 3/4" – 2” (20 mm-50 mm) non-calcarious stone base, only the top corrugation of the 30” (750 mm) HDPE pipe section will be exposed above the finished trench stone base (about 3" (75 mm)).
4. Fill around the SedimenTrap™ with the crushed, washed 3/4" - 2" (20 mm-50 mm) non-calcarious stone.

5. Cut the heavy weight stabilization netting to fit snuggly under the exposed corrugation of the SedimenTrap™.
6. Place the Start Model over the SedimenTrap™ and install the 12" (300 mm) PVC riser pipe as shown in the above drawing. Cut a hole in the top portal for a 12” (300 mm) SDR 35 or PVC Schedule 40 riser pipe along the indented circle. Attach about a 1' (300 mm) piece of the pipe into the bell and insert the short piece into the top portal, allowing the bell end to rest on the StormChamber® portion that surrounds the top portal hole. If the cut extends more than 0.5” (13 mm) beyond the cut out, place a piece of

the StormChamber® non-woven filter fabric over the hole, cut an X slightly shorter than the width of the opening, and insert the pipe. The purpose of the bell end is simply to support the pipe until the backfill is placed. Insert the bottom 1' (300 mm) of pipe into the top portal and backfill. Place a manhole cover frame and lid in a 3' x 3' (900 mm x 900 mm) reinforced concrete pad above, once all fill is placed, for risers in pavement.

PLACING THE STORMCHAMBERS®

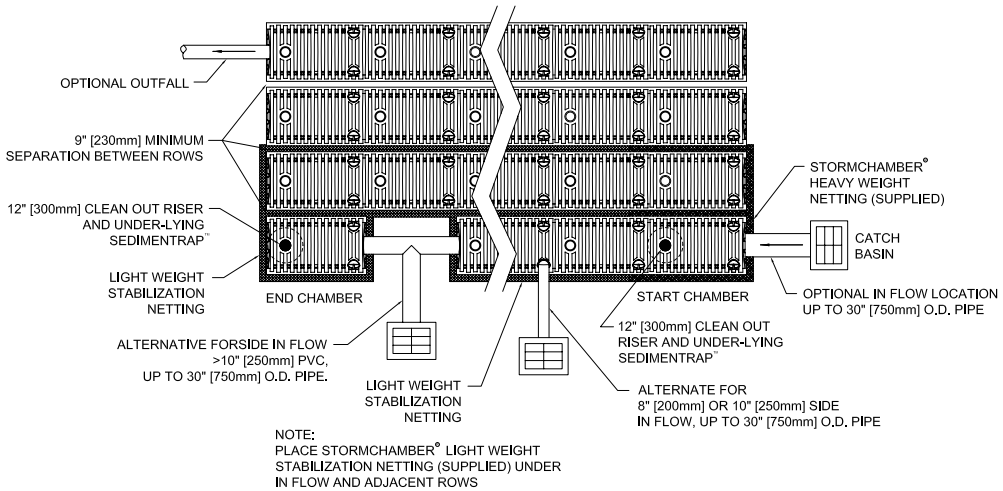
1. Start building the StormChamber® system with the Start Model StormChambers® at the inflow end of the StormChamber® system. The Start Models are completely closed at the end with the two side portals.

Row placement begins at inflow end of chamber system with Start Model StormChambers®.

2. Roll out a row of light weight stabilization netting underneath the entire row of StormChambers® that is receiving inlet storm drain pipes and the adjacent row(s).

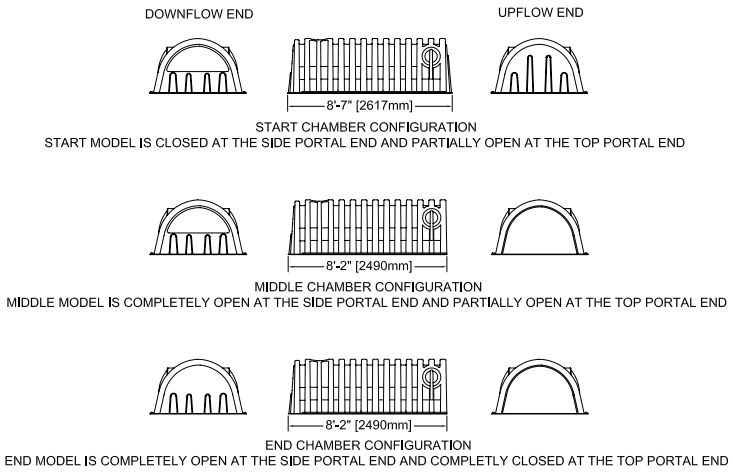
3. Place one piece of the StormChamber® heavy weight stabilization netting (provided with the StormChambers®) under each StormChamber® that will be receiving inlet storm drain pipes. Place on top of the light weight netting and extend beyond all edges of the StormChamber® as shown below. The purpose of the heavy weight stabilization netting is to function as a "splash pan," preventing scouring of the underlying stone and soil, while allowing infiltration to occur.

STORMCHAMBER® EXAMPLE CONFIGURATION



Place heavyweight stabilization netting under chambers receiving storm drain inflow, and light weight netting under row(s) receiving inflow and adjacent row(s).

4. Place the Start Model StormChambers® as shown above, (completely closed at the end with the two side portals), spaced a minimum of 5’ 9” (1,750 mm) apart at the center line of the end walls (9” (230 mm) apart at the base). Position the closed ends at least 1’ (300 mm) from the trench wall.



5. Cut open the side portals for the inflow storm drain pipes (size and location specified on the plans) and lateral connecting pipes between StormChamber® rows 10" (250 mm) Schedule 40 or SDR 35 PVC) with a reciprocating saw, router bit on a drill, or keyhole saw along the defined indented circle. If the inflow storm drain pipe is specified to enter the closed end wall, place a piece of the pipe against the end wall. Trace the diameter of the pipe on the end wall and cut out the circle.

Cut out side portals for PVC inflow pipe and row connecting pipes. Cut out indentation guides are provided for 10" (250 mm) PVC.

6. If a cut extends more than 0.5” (13 mm) beyond the intended diameter, place a piece of the StormChamber® non-woven filter fabric over the hole, cut an "X" just short of the width of the opening, and insert the pipe. The connection does not need to be water tight. 10” (250 mm) PVC pipe is the largest diameter pipe that can be inserted into the side portals. The end walls can accept up to a 30" (750 mm) O.D. pipe.

Insert PVC row connecting pipes.

7. Mark the midpoints of 10" (250 mm) PVC pipe (about 4' (1,300 mm)) and insert into the adjacent StormChambers® where specified so that the marked midpoint is centered between the two adjacent StormChambers®. Pipe length should be sufficient to extend 6” (150 mm) – 12” (300 mm) into both adjacent StormChambers®. In order to facilitate placement, install the lateral connecting pipes in the specified StormChambers® before attaching the next StormChamber® in the row.
8. If the locations of row – connecting pipes are not specified, add PVC pipes only between the inflow row and adjacent row(s).
9. Roll out additional StormChamber® light weight stabilization netting, over-laying the previous sheet by 1’ (300 mm) and place the first rib of a Middle Model (completely open at side portal end, partially open at top portal end) over the last rib of each of the Start Model

After placing all Start Models, build each row equally with Middle Models and finish building the rows with End Models.

Place first rib of a Middle Model, over last rib of each Start Model.

10. Screw the StormChambers® together near their base on both sides with regular 3" (75 mm) dry wall screws. One screw on each side is sufficient to temporarily hold the StormChambers® together until the stone is placed. The gap between the two StormChambers® near their base must be closed enough to prevent stone from migrating into them to prevent potential surface subsidence.

Screw StormChambers® together at base to prevent stone inflow.

11. Continue placing and screwing the rest of the StormChambers®, one at a time, inserting any additional lateral – connecting pipes as specified.

12. leaving at least 1' (300 mm) between the end of the End Model (completely open at the side portal end, completely closed at the top portal end) and the trench wall.

End each row with an End Model StormChamber® which is closed at the top portal end and open at the side portal end.

13. If inspection/clean out risers are specified without a SedimenTrap™, follow the instructions in #5 on page 5.

Place heavyweight stabilization netting under chambers with cleanout risers when SedimenTraps™ are not used.

14. Deposit 3/4" – 2" (20 mm-50 mm) crushed, washed, hard stone directly along the centerline of the StormChambers® to evenly flow down each side to keep the StormChambers® in proper alignment. DO NOT use limestone. Limestone gets pasty when wet and will tend to reduce the void spaces in the stone.

Deposit 3/4" – 2" (20 mm-50 mm) crushed, washed, hard stone directly along the centerline of the StormChambers®.

15. Level the stone cover with a vibratory compactor, not to exceed a dynamic force of 10,000 lbs (4,500 kg), or with a low pressure, tracked vehicle not exceeding 1,100 lbs (500 kg)/sf.

IMPORTANT: If a low pressure, tracked dozer is used, do not run the dozer on anything less than 6" (150 mm) of stone above the StormChambers®. Spread stone in small piles to prevent movement of the StormChambers®. Caution must be exercised when placing stone on top of the StormChambers® so that excessive pressure is not applied directly on the StormChambers® by equipment "buckets".

16. Cover the stone with StormChamber® filter fabric. Overlap adjacent sheets by at least 2' (600 mm).

BACKFILLING

1. Backfill soil must be free from large stones and large organic material (e.g. tree limbs and root stumps), and must be capable of being compacted to at least 95% of the Standard Proctor Test (AASHTO Method T – 99). If not, crusher run or other suitable backfill material must be used. The same type of stone surrounding the StormChambers® can also be extended up to the pavement sub grade, if desired.
2. Compaction of the soil backfill must be done in lifts 6" – 8" (150 mm-200 mm) high. Grading of lifts should start in one corner of the system with a low pressure tracked dozer, with a pressure not exceeding 1,100 lbs (500 kg)/sf, keeping at least 1'(300 mm) of fill in front of the blade at all times. Compact lifts to at least 95% Standard Proctor with tracked vehicles not exceeding 1,100 lbs (500 kg)/sf, or with a hand operated compactor or vibratory roller not exceeding a dynamic force of 20,000 lbs (9,000 kg).
3. Restrict wheeled vehicles to a maximum axle load of 8,000 pounds (3600 kg) with 6" (150 mm) of fill over the StormChambers® and 16,000 pounds (7200 kg) with 12" (300 mm) of fill.
4. Keep the StormChamber® system closed or protected from receiving sediment until the site is completely stabilized.

IMPORTANT: After compaction of backfill and setting of final grade, avoid parking on or traversing over the StormChamber® installation with heavily loaded trucks and heavy equipment until paved.

IMPORTANT: These instructions assume accepted construction procedures and loaded trucks that do not exceed specified DOT load limits. Uncustomary loads or improper load distributions in vehicles may require additional cover. Contact StormChamber® for installation under abnormal conditions. Installations not in compliance with these instructions will void the warranty.

Contact StormChamber® for technical assistance at 1.877.426.9128 or email us at info@stormchambers.com.

Contact Information

(877) 426-9128 (Toll-Free)

info@stormchambers.com (Email Us)

www.stormchambers.com

StormChamber® Limited Warranty

StormChamber® will warranty the structural integrity of each system in accordance with the installation instructions and is warranted to the original purchaser against defective materials and workmanship for one year from the date of purchase. It is the responsibility of the purchaser to inspect the StormChamber® units prior to installation and to inform StormChamber® of any defect prior to installation. StormChamber® will only be responsible for supplying replacement StormChamber® unit(s). StormChamber® liability specifically excludes the cost of removal and/or installation of the units.

There are no other warranties with respect to the units, including no warranties of merchantability or fitness for a particular purpose. This warranty does not extend to incidental, consequential, special, or indirect damages. The company shall not be liable for penalties or liquidated damages, including loss of production and profits, labor and materials, overhead costs, or other loss or expense incurred by buyer. Specifically excluded from warranty coverage is damage to the units due to ordinary wear and tear, alteration, accident, misuse, abuse or neglect of the units, improper construction protocols, installation of the units not consistent with StormChamber® installation instructions, placement by buyer of improper materials into buyer's system, or any other event not caused by the company. StormChamber® shall not be responsible for any loss or damage to the buyer, the units, or any third party resulting from its installation or shipment. Buyer shall be solely responsible for ensuring that installation of the system is completed in accordance with StormChamber® installation instructions and with all applicable laws, codes, rules and regulations.

Inspect all shipments within 5 days of receipt of StormChambers®. Failure to advise StormChamber® of defects on shipments within this period will constitute acceptance of the shipment.

This warranty shall not apply to any party other than the original buyer. Furthermore, no company representative has the authority to modify or change this warranty in any manner.

The StormChamber® is protected by the following U.S. Patents: 6,612,777; 469,187; 465,545; D469,187; D465,545; 6,719,490; 6,994,490. Canadian Patents: 2,356,592; 2,491,126. Other U.S. foreign and Canadian Patents Pending.