

ChamberMaxx[®] Retention Installation Guide



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The ChamberMaxx system requires adherence to the following installation procedure for the structural integrity of the system to be maintained.

All illustrations and photographs are examples of typical situations. Each individual site will vary, so it is important to follow the engineering project drawings as designed and sealed by a registered Professional Engineer.

Prior to installation of the ChamberMaxx system a pre-construction meeting shall be conducted. Those required to attend are the supplier of the system, the general contractor, sub-contractors and the project Engineer of record.



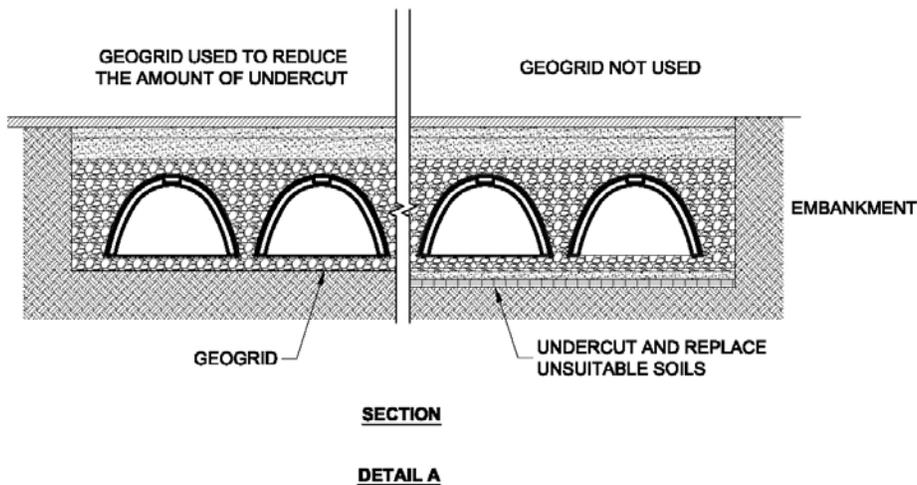
Foundation

Construct a foundation that can support the design loading applied by the chambers and adjacent backfill weight as well as maintain its integrity during construction. A minimum of an extra foot of perimeter excavation is required for proper fit and adequate compaction. Excavation must be free of standing water. Dewater if present.

If soft or unsuitable soils are encountered, remove unsuitable material and bring back to grade with fill material as approved by the Engineer of record. See Detail A. The structural fill material gradation should not allow the migration of fines, which can

cause settlement of the chamber system and possibly the above pavement, and occlusion of the void space in the bedding. If the structural fill material is not compatible with the underlying soils a Contech C-40, non-woven 4 oz separation geotextile, should be used as a separator.

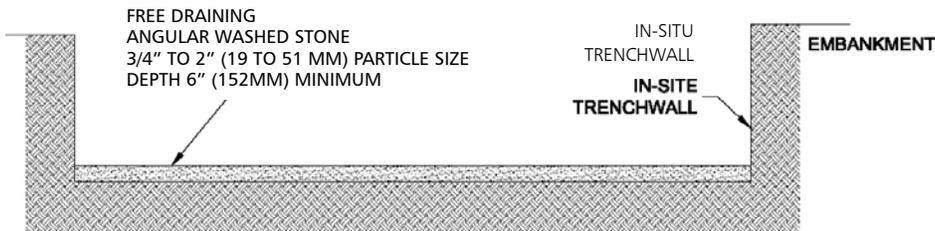
Grade the foundation subgrade to a uniform and stable grade. If the subgrade is clay or relatively non-porous and the construction sequence will last for an extended period of time, it is best to slope the grade to one end of the system. This will allow excess water to drain quickly, preventing saturation of the subgrade.



Bedding

A 6-inch (152 mm) minimum thickness, well-graded, free-draining angular washed stone 3/4 to 2-inch (19 to 51 mm) particle size is the required chamber bedding. Refer to project engineering plans for subgrade soil preparation and required stone foundation thickness. If the construction equipment will operate for an extended period of time on the bedding, use an engineering fabric or a geogrid to ensure the base material maintains its integrity. Bedding material is to be compacted to 90% AASHTO T99 standard proctor density. Do not use heavy equipment on bedding material to avoid excessive soil compaction. See Detail B.

Grade the base to a smooth, uniform grade to allow for the proper placement of chambers.



SECTION

DETAIL B

In-Situ Trench Wall

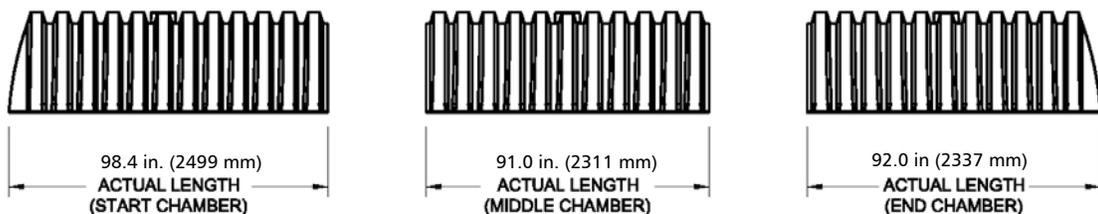
The trench wall must be capable of supporting the load that the chamber sheds as the system is loaded. If soils are not capable of supporting these loads, the integrity of the system can be compromised. Perform a simple soil pressure check using the applied loads to determine the limits of excavation beyond the edge of the outer most row of chambers. Wrap the walls with Contech C-40 non-woven geotextile to help prevent soil migration.

In most cases the requirements for a safe work environment and proper backfill placement and compaction take care of this concern.

ChamberMaxx Units

All systems are comprised of the Start, Mid and End chambers. The Start and End chambers are marked accordingly with a label on each end.

The maximum weight of a single chamber is 83 lbs. (37.65 kg) which allows the chamber to be hand carried. See Detail C.



ELEVATION VIEW

DETAIL C

Layout of the Manifold System

Temporarily layout the manifold system per the project engineering plans. Place the Start chamber of each row in your system. Standard spacing between rows is 5.6", with a minimum of 5" required between each row.. Use a reciprocating saw to cut the inlet pipe diameter hole out from the Start chamber at the correct inlet height. Insert the inlet pipe from the assembled manifold system into each Start chamber. Cover any open void spaces greater than 3/4-inch (19 mm) on the chambers with a non-woven geotextile to prevent infiltration of backfill material.



Layout of the Optional Containment Row

For ease of access during a maintenance operation, ChamberMaxx retention systems may have an optional Containment Row to allow for containment and settlement of sediments and associated pollutants during the initial flows of storm events. This row of chambers is set on top of a 2 layers of AASHTO M288 Class 1 woven geotextile a minimum of 53" wide with no overlaps.

1. Install diversion manhole per site plan.
2. Rollout the 12.5 ft (150 inch) wide woven geotextile and cut to the required length of the containment row while leaving 3-ft (.19m) overlap at each end of the chamber row. Fold the geotextile lengthwise creating 2 layers of 75" wide woven geotextile. Center the 2 layers of geotextile on the location of the containment row. The 75" wide geotextile layers will overlap approximately 1 ft of width on each side of the containment row. It may be necessary to temporarily weigh down the edges of the geotextile material to prevent displacement from wind.
3. Lay chambers for the Containment Row on the 2 layers of woven geotextile per the plans starting at the Start chamber, see Setting Units for installation instructions. It may be necessary to mark position of chambers on geotextile to ensure proper location during placement of chambers.
4. Install inlet connector pipe in Start chamber wall from the diversion manhole per plans.
5. Confirms the width of woven geotextile leaves a minimum of 6" around chamber along the sides. See Detail D.

6. Wrap the sides of the woven geotextile around the sides of the containment row and pin it to ensure that it does not unwrap during backfill
7. Fold overlapping ends of woven geotextile at the ends of the containment row so that they are flat against the end walls and fully wrapped around the inlet pipe of the containment row. Attach with construction tape as needed to keep the geotextile from moving during backfill.
8. Layout remaining chambers of retention system and header manifold per plans. See page 6.

Laying Out Scour Protection Netting

To insure the bedding is not disrupted as flows enter the system, rollout the Scour Protection Netting material perpendicular to the inlet chambers. In the area of the inlet chambers, lay the material with a one foot overlap towards the manifold system and footprint area. Tension material as needed to provide intimate contact with the bedding stone. When the inlet chamber is installed, this will "pin" the netting material in place. Inspect to insure netting is flat with no wrinkles and has intimate contact with the bedding stone. See Detail D.



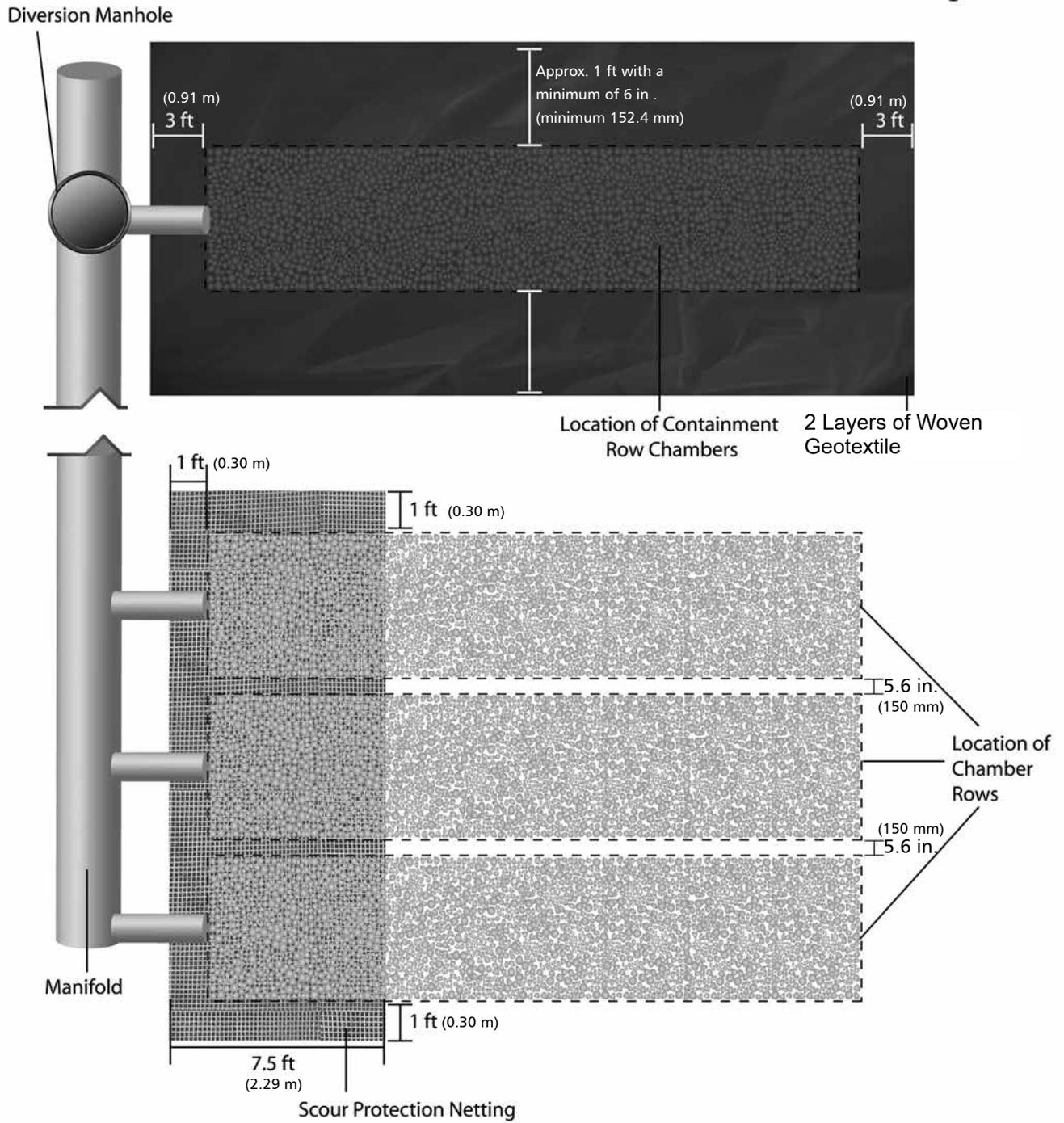
Setting Units

Overlap the Mid chamber corrugation over the end of the Start chamber. Standard spacing between rows is 5.6", with a minimum of 5" required between each row. Always refer to the engineering plans for chamber arrangement. The End chamber will be the final chamber in each row.

Inspection Viewports

Where identified on the engineering project plans cut a 4-inch (102 mm) diameter hole in the reinforced circular port on the top of the chamber. Build an inspection port from PVC Schedule 40 pipe. Cut pipe to an oversized length, screw three small angle irons approximately 1-inch (25 mm) from the end of pipe. Anchor the riser in place on the chamber to keep secured during the backfill process. Install ring and cover on top of the riser pipe. After backfill, place an access casting in a concrete collar. To avoid crushing the inspection port riser, be sure concrete does not attach to riser pipe.

Installation Schematic for Containment Row Liner and Scour Protection Netting



DETAIL D

Backfill Material

The chamber System incorporates two types of backfill material.

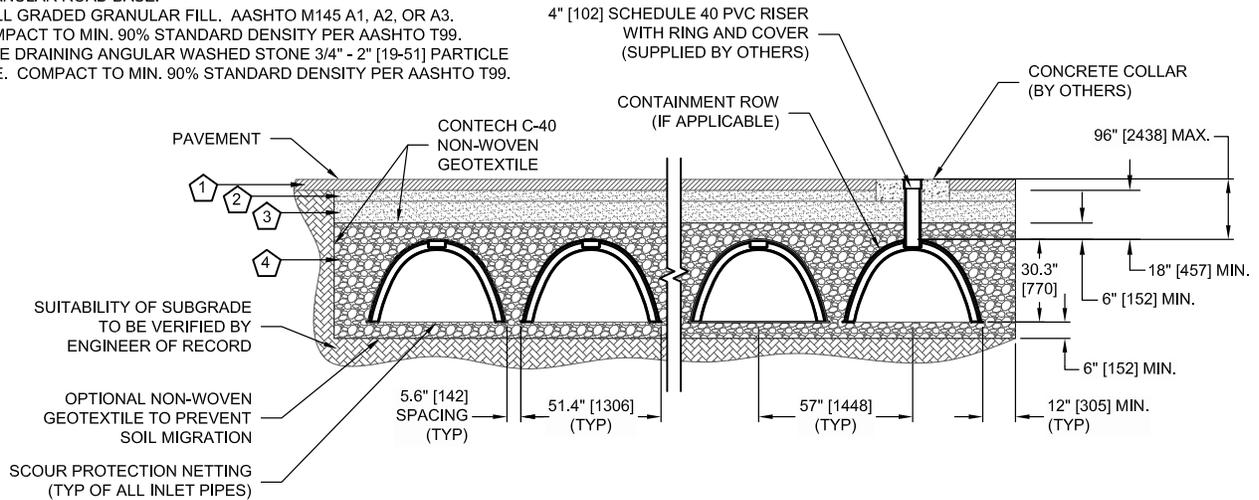
Free draining angular washed stone 3/4 to 2-inch (19 to 152 mm) particle size compacted to 90% AASHTO T99 is used around the chambers. This material is used around the chambers and within

a minimum of 6-inches (152 mm) below and 6-inches (152 mm) above the chambers. The remaining space should be filled with an angular, well-graded granular fill meeting the requirements of AASHTO M145 A1, A2 or A3, compacted to 90% AASHTO T99.

Contech C-40 Non-Woven Geotextile should be used between the two layers of backfill material. See Detail E.

KEY

1. RIGID OR FLEXIBLE PAVEMENT.
2. GRANULAR ROAD BASE.
3. WELL GRADED GRANULAR FILL. AASHTO M145 A1, A2, OR A3. COMPACT TO MIN. 90% STANDARD DENSITY PER AASHTO T99.
4. FREE DRAINING ANGULAR WASHED STONE 3/4" - 2" [19-51] PARTICLE SIZE. COMPACT TO MIN. 90% STANDARD DENSITY PER AASHTO T99.



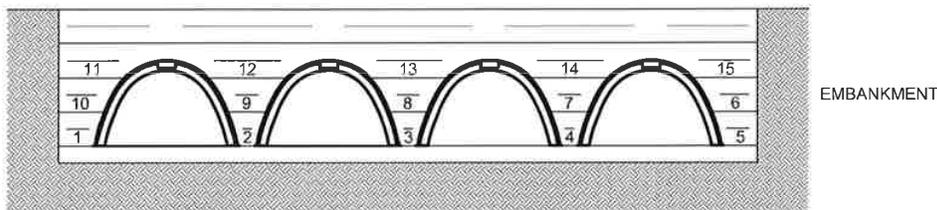
DETAIL E

Backfill Placement

Place backfill material in 6 to 8-inch (152 to 203 mm) loose lifts and compact to 90% AASHTO T99. Use mechanical hand tampers or approved compacting equipment to compact all backfill and embankment immediately adjacent to each side of the installation and over top of the installation to a minimum depth of 18-inches (457 mm). Place backfill so there is no more than a two lift differential between any of the chambers at anytime during the backfilling process. Advance the backfill along the length of the chamber system at the same rate to avoid differential loading on the chambers. Backfilling at differential heights from one side of the chamber to the other in excess of 16-inches (407 mm) can cause chamber distortion or potential collapse. Advance balanced lifts across the width of the system evenly along the length of the chambers as you backfill. See Detail F.

Use only lightweight tracked dozers (D-4 dozer or smaller) not exceeding 1,100 lbs/sf (0.54 kg/cm²) ground pressure to spread backfill lifts over top of the chamber system. Maintain a minimum of 6-inch (152 mm) cover on top of chambers for the initial lifts.

For large systems use conveyor systems, backhoes with long reaches or draglines with stone buckets may be used to place backfill. Once minimum cover for construction loading across the entire width of the system is reached, advance the equipment to the end of the recently placed fill, and begin the sequence again until the system is completely backfilled. This type of construction sequence provides room for stockpiled backfill directly behind the backhoe, as well as the movement of construction traffic. Material stockpiles on top of the backfilled chamber system should be limited to six feet in total high above the structure and must provide balanced loading across all chambers. To determine the proper cover over the chambers to allow the movement of construction equipment, contact your local Contech Representative.



DETAIL F - TYPICAL BACKFILL SEQUENCE

Construction Loading

Typically, the minimum cover specified for a project assumes HS-20 or HS-25 live load. Because construction loads often exceed design live loads, increased temporary minimum cover requirements are necessary. Since construction equipment varies from job to job, it is best to address equipment specification and minimum cover requirements with our local Contech representative during the pre-construction meeting.

Equipment Restriction	
BACKFILL LEVEL*	ALLOWABLE CONSTRUCTION EQUIPMENT**
4 – Bedding	<i>No restrictions.</i>
4 – Back to Top of Chambers	<i>No equipment js permitted on or nearby the chambers. conveyors or excavators located such that their loads do not influence the chambers should be used to place the backfill stone. Stone should be worked between the chambers by hand.</i>
4 – Backfill Over the Top of the Chambers	<i>no wheel loads should be applied over the system. once 6" of stone has been placed over the crown of the chambers, lightweight tracked dozers with a maximum ground pressure of 1,100 psf are permitted over the structure. dozers must spread stone working in a direction parallel with the chamber rows; not working across the chamber rows. also, only small, walk behind compaction equipment can be used over the chambers until a minimum of 12" of cover is over the chambers.</i>
2 or 3 Select Fill Over the Chambers	<i>once 18" of compacted material is over the chambers, highway vehicles with axle loads of 32,000 pounds or less can be operated over the structures. front end loaders can be operated over the structures as long as the maximum wheel load does not exceed 16,000 pounds. compaction equipment can be operated over the structures as long as the dynamic force from the drum does not exceed 20,000 pounds and the gross vehicle weight does not exceed 12,000 pounds.</i>
* Please reference Detail E on page 7.	
** Contact your local Contech Representative for questions on the use of specific pieces of construction equipment.	

Contractor Tool Checklist

- Wire cutters
- Stone bucket
- Transit or laser level
- Forklift or other type of equipment to unload chambers
- Reciprocating saw or router (to custom cut the end walls and inspection ports)
- Approved compaction equipment
- Excavator to dig trench and place stone and soil backfill
- Stone conveyor/light weight tracked dozer not exceeding 1,100 lbs/sf (0.54 kg/cm²) to grade backfill

Material Checklist

Start, Mid and End ChamberMaxx chambers	Supplied by Contech
Manifold System	Supplied by Contech
Scour Protection Netting	Supplied by Contech
Contech C-40 Non-woven geotextile	Supplied by Contech
Containment Row Diversion Manhole (if required)	Supplied by Contech
Containment Row AASHTO M288 Class 1 Woven Geotextile	Supplied by Contech
Free draining angular washed stone 3/4"-2" (.019 to .05 m) backfill material	Supplied by Contractor
Well graded granular backfill material	Supplied by Contractor
Construction Tape / Adhesive	Supplied by Contractor
Inspection port materials	Supplied by Contractor

ChamberMaxx Pre-Construction Checklist

Contech Field Contact and Phone: _____

Contech Plant Contact and Phone: _____

Contractor Contact and Phone: _____

Project Name: _____

Site Address: _____

Precon Attendees: _____

Topics to Review:

- Truck access and chamber storage availability/expectation
- Chamber unloading and handling safety, equipment and procedures
- System layout and fabrication drawing review
- Shipping schedule and installation sequence
- Scour protection netting layout
- Configuration and assembly
- Backfill material selection and placement procedure
- Backfill sequence, lift thickness and balanced loading
- Compaction requirement (90%) and equipment
- Additional Containment Row™ construction/liner material layout
- Inspection port installation

Notes: _____

CHAMBERMaxx



SUPPORT

- Drawings and specifications are available at ContechES.com.
- Site-specific design support is available from Contech Engineered Solutions.

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