Stormwater360

ChamberMaxx™

Installation Guide

ChamberMaxx Detention Installation Guide

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

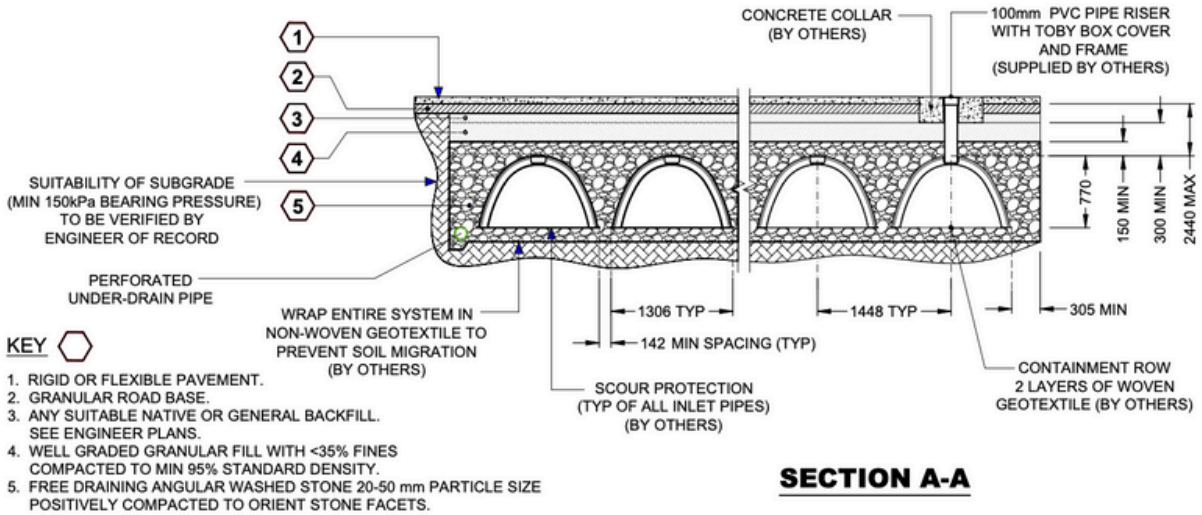
All illustrations and photographs are examples of typical situations. Each individual site will vary, so it is important to follow the engineering project drawings as designed and confirmed by a registered Professional Engineer.
Prior to installation of the ChamberMaxx system a pre-construction meeting 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 300mm 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, utilise a Tensar geogrid or 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 non-woven separation geotextile, should be used as a separator.

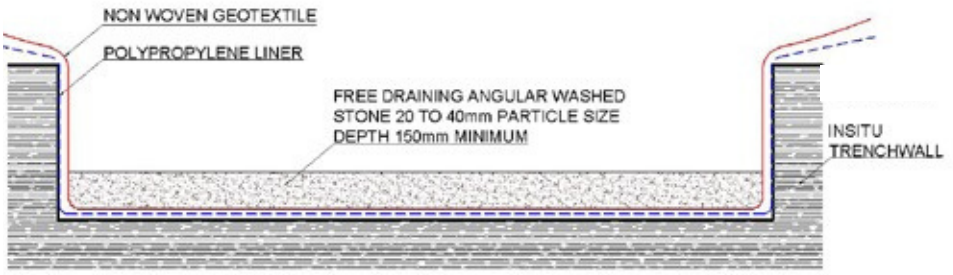
Grade the foundation subgrade to a uniform and stable grade. If the subgrade is clay or relatively non-porous and the construction sequence will last for an extended period of time, it is best to slope the grade to one end of the system. This will allow excess water to drain quickly, preventing saturation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



Installing Flexi Liner

Once the excavation is complete and there are no sharp rocks or protrusions, the 1 mm Polypropylene liner (Permaliner or similar equivalent) is layed out along the base and up the walls, taking care not to tear or puncture the liner. The Flexi liner is then joined at all joints by heat welding or approved sealing tape and pressure tested for leaks.

Lay out and place the non-woven geotextile (Syntex GNP C1 or similar approved equivalent) over the liner to protect the liner during placement of the stone allowing excess material for wrapping over the top of the chambers once covered by fill.
Place slotted drainpipe wrapped with a geotextile filter fabric around the perimeter of the excavation to drain into the outlet pit.

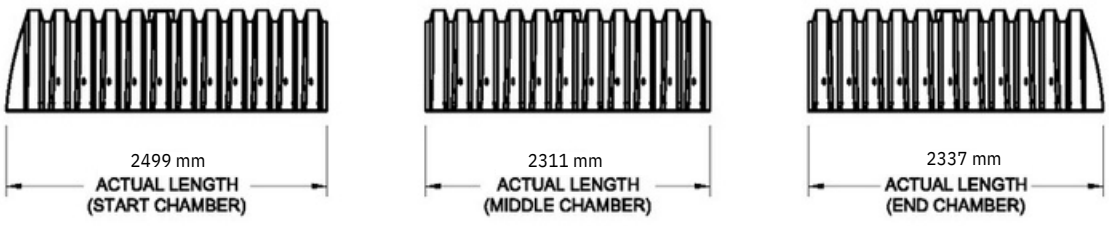


SECTION
DETAIL B

Bedding

A 150 mm minimum thickness, well-graded, free-draining angular washed stone 20 to 40 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 either an engineering fabric or a Tensar geogrid to ensure the base material maintains its integrity. The compaction standard shall conform to AS/NZS 2566:2002. 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.



ELEVATION VIEW

DETAIL C

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 outermost row of chambers. Wrap the walls with 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 38.5 kg which allows the chamber to be hand carried. See Detail C.

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 300 mm 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 ensure the netting is flat with no wrinkles and has intimate contact with the bedding stone. See Detail D.

Layout of the Manifold System

Temporarily lay out the manifold system per the project engineering plans. Place the Start chamber of each row in your system. A minimum of 130 mm is 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 19 mm on the chambers with a non-woven geotextile to prevent infiltration of backfill material.

Setting Units

Overlap the mid-chamber corrugation over the end of the start chamber. Be sure to maintain the 130mm space between the base foot of each row. Always refer to the engineering plans for chamber arrangement. The end chamber will be the final chamber in each row.

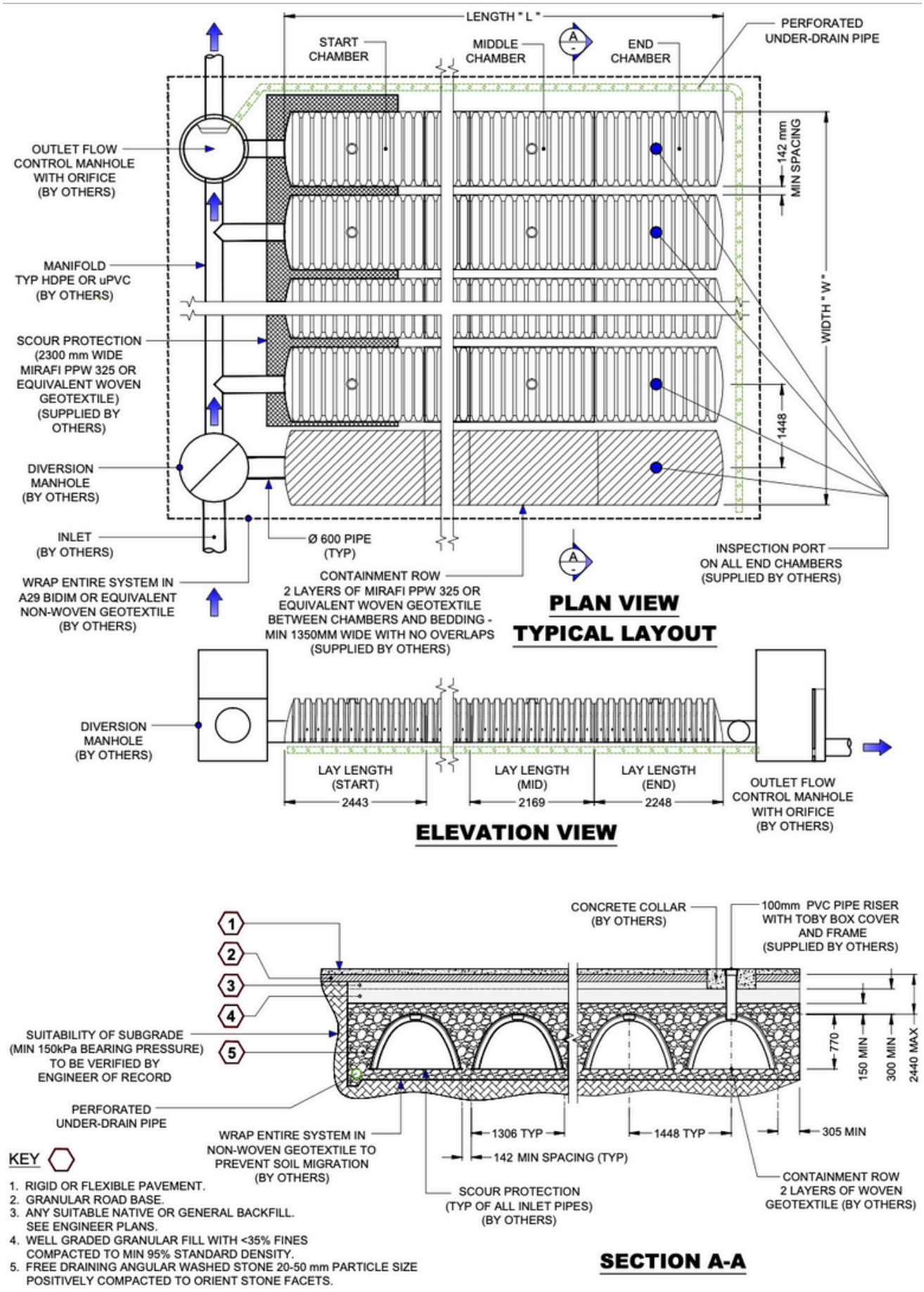
Inspection Viewports

Where identified on the engineering project plans cut a 100 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 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.

Backfill Material

The chamber System incorporates two types of backfill material. Free draining angular washed stone 20 mm to 40 mm particle size compacted to AS/NZS 2566:2002 is used to around the chambers. This material is used a minimum of 150 mm below and 150 mm above the chambers. The remaining space should be filled with an angular, well-graded granular fill meeting the requirements of AS/NZS 2566:2002.

Non-Woven Geotextile should be used between the two layers of backfill material. See Detail D.


LENGTH " L "
START CHAMBER
MIDDLE CHAMBER
END CHAMBER
A
A
PERFORATED UNDER-DRAIN PIPE
OUTLET FLOW CONTROL MANHOLE WITH ORIFICE (BY OTHERS)
MANIFOLD TYP HDPE OR uPVC (BY OTHERS)
SCOUR PROTECTION (2300 mm WIDE MIRAFI PPW 325 OR EQUIVALENT WOVEN GEOTEXTILE) (SUPPLIED BY OTHERS)
DIVERSION MANHOLE (BY OTHERS)
INLET (BY OTHERS)
WRAP ENTIRE SYSTEM IN A29 BIDIM OR EQUIVALENT NON-WOVEN GEOTEXTILE (BY OTHERS)
Ø 600 PIPE (TYP)
CONTAINMENT ROW 2 LAYERS OF MIRAFI PPW 325 OR EQUIVALENT WOVEN GEOTEXTILE BETWEEN CHAMBERS AND BEDDING - MIN 1350MM WIDE WITH NO OVERLAPS (SUPPLIED BY OTHERS)
142 mm MIN SPACING
WIDTH " W "
1448
INSPECTION PORT ON ALL END CHAMBERS (SUPPLIED BY OTHERS)
PLAN VIEW
TYPICAL LAYOUT
DIVERSION MANHOLE (BY OTHERS)
LAY LENGTH (START)
2443
LAY LENGTH (MID)
2169
LAY LENGTH (END)
2248
OUTLET FLOW CONTROL MANHOLE WITH ORIFICE (BY OTHERS)
ELEVATION VIEW
CONCRETE COLLAR (BY OTHERS)
100mm PVC PIPE RISER WITH TOBY BOX COVER AND FRAME (SUPPLIED BY OTHERS)
1
2
3
4
5
SUITABILITY OF SUBGRADE (MIN 150kPa BEARING PRESSURE) TO BE VERIFIED BY ENGINEER OF RECORD
PERFORATED UNDER-DRAIN PIPE
WRAP ENTIRE SYSTEM IN NON-WOVEN GEOTEXTILE TO PREVENT SOIL MIGRATION (BY OTHERS)
1306 TYP
142 MIN SPACING (TYP)
1448 TYP
305 MIN
770
150 MIN
300 MIN
2440 MAX
SCOUR PROTECTION (TYP OF ALL INLET PIPES) (BY OTHERS)
CONTAINMENT ROW 2 LAYERS OF WOVEN GEOTEXTILE (BY OTHERS)
KEY
1. RIGID OR FLEXIBLE PAVEMENT.
2. GRANULAR ROAD BASE.
3. ANY SUITABLE NATIVE OR GENERAL BACKFILL. SEE ENGINEER PLANS.
4. WELL GRADED GRANULAR FILL WITH <35% FINES COMPACTED TO MIN 95% STANDARD DENSITY.
5. FREE DRAINING ANGULAR WASHED STONE 20-50 mm PARTICLE SIZE POSITIVELY COMPACTED TO ORIENT STONE FACETS.
SECTION A-A

DETAIL D

Backfill Placement

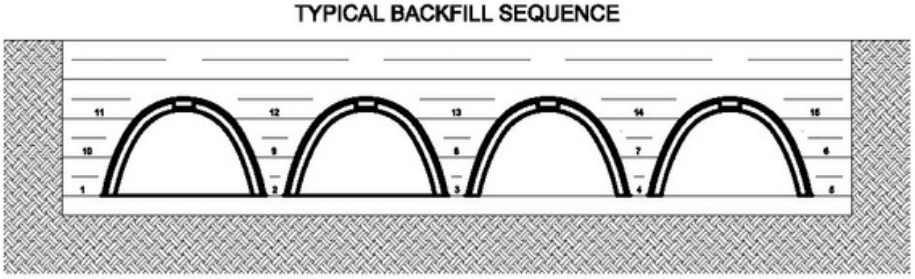
Place backfill material in 150 to 200mm loose lifts and compact to AS/NZS 2566:2002. Use mechanical hand tampers or approved compacting equipment to compact all backfill and embankment immediately adjacent to each side of the installation and over top of the installation to a minimum depth of 550mm. 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 400mm 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 E.

Use only lightweight tracked dozers (D-4 dozer or smaller) not exceeding 0.54 kg/cm2 ground pressure to spread backfill lifts over top of the chamber system. Maintain a minimum of 150 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 1.8 m in total height above the structure and must provide balanced loading across all chambers.

Sealing Liner

Once the backfill is compacted to a height of 150 mm over the top of the chambers, the non-woven geotextile is wrapped over the top of the backfilled chambersThe flexible liner is then wrapped over the top of the geotextile and sealed.



another layer of geotextile is recommended to ensure subsequent fill material does not puncture the liner. Place onsite fill material over the system to the specified finished level (minimum 400 mm cover). Landscaping, roading construction is then completed as detailed in the drawings.

Construction Loading

Typically, the minimum cover specified for a project assumes HN HO-72 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 Stormwater360 representative during the pre-construction meeting.

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 Stormwater360
Manifold System	Supplied by CONTRACTOR
Scour Protection Netting	Supplied by CONTRACTOR
Non-woven geotextile	Supplied by CONTRACTOR
Polypropylene Liner	Supplied by CONTRACTOR
Free draining angular washed stone 20 - 40 mm 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

SW360 Field Contact and Phone:_____

SW360 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
- ☐ Flexible liner set out and installation
- ☐ 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®

Stormwater360®

www.stormwater360.co.nz

Support

- **Drawings and specifications are available at www.stormwater360.co.nz.**
- **Site-specific design support is available from Stormwater360 Stormwater Design Engineers.**