contents

Risi Stone Retaining Wall Systems
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1.800.626.WALL • info@risistone.com • www.risistone.com

Risi Stone Systems has attempted to ensure that all information contained in this guide is correct. However, there is the possibility that this guide may contain errors. Review all designs with your local sales representative prior to construction. Final determination of the suitability of any information or material is the sole responsibility of the user. Please check our website www.risistone.com, for the most up-to-date versions of the specification.

the StackStone & RomanStack system

In the StackStone system, the majority of the facing is constructed from a single mass-produced, modular unit. Because the units are solid, they can easily be modified by scoring and splitting. Specialized units are available to help speed the installation of wall features like coping and corners.

The StackStone system is used in landscape applications, where the primary purpose of retaining walls is aesthetic in nature. Some examples of StackStone landscape uses are edging on sidewalks and driveways, planters, tree wells, and smaller garden retaining walls.

The StackStone system is supported by the local maufacturers and Risi Stone Systems. Local manufacturers will make every attempt to answer your general questions and they will gladly provide customers with answers for site-specific applications. Each manufacturer has access to prepared information on the StackStone system and has plenty of experience installing it.

StackStone unit

RomanStack unit

features & advantages

The StackStone system has a number of features that make the system unique. Each of these features has been developed to give a StackStone retaining wall the advantages of increased beauty, simplified installation, and greater strength. These features benefit the owner by lowering the entire cost of the retaining wall, both during installation and well into the future.

Modular Retaining Wall System

Wall is flexible, yet retains its structural characteristics.

- The wall can absorb minor movements due to frost or settlement.
- Requires minimal embedment below grade.

A compacted granular base is all that is required.

- Reduces the cost by not requiring an expensive structural footing.

Solid Unit

Provides wall with greater durability.

- Manufactured from 35 MPa (5000 Psi) concrete.
- Less susceptible to freeze-thaw deterioration.
- Less likely to be broken by handling or in transit.

Solid units are easy to split and modify.

- Can easily create site-specific features using the modular units.

No hollows to be filled with gravel and compacted.

- Ensures maximum resistance to overturning forces.
- Saves time and money.

Tongue and Groove Interlock

Interlocking mechanism molded into the units so there are no separate pins or clips.

- No need to fiddle with multiple pieces; installation rates increase. Simple to install.
- Ensures maximum shear connection between units.

Units are dry-stacked.

- Lower costs because no mortar is used in the construction.
- Minimal training is required to achieve excellent installation results.

Units are self-aligning with an automatic setback.

- Once the first course is laid flat and levelled, there is no need for continual measuring and adjusting.

Creates a continuous interlock throughout the wall face.

- Makes a stronger, more damage-resistant wall.

Size and Weight

The 8 kg (18 lb) units are well-balanced and easy to handle.

- Units can be moved by a single person for quicker installation.

Manufacturing method ensures uniform dimensions for each unit.

- Courses remain at fixed elevations and should not require shimming.
- Units assemble quickly and easily.

block details

Due to local conditions and preferences, the licensed manufacturer may produce either the StackStone or the RomanStack system or both. RomanStack is manufactured by putting a typical StackStone unit through a specialized process that rounds off the edges and corners, and gouges the face. This gives the wall a worn cobble appearance that looks like real stone, not concrete.

The licensed manufacturer may produce the StackStone or RomanStack systems with one or more minor variances. These differences in no way affect the performance of the wall.

colours

Each manufacturer has selected a set of standard colours that they make and keep in stock. These colours will vary from manufacturer to manufacturer. Some have the ability to mix the base colours and create marbled colour blends. The possibility of custom colours may exist for larger orders.

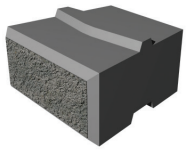
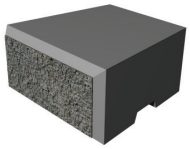
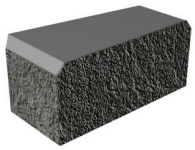
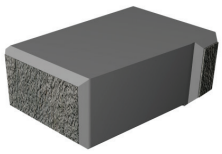
split 'n stack

Some manufacturers have opted not to split the units before delivery to the installation site (referred to as Split 'n Stack). This is not an option for the customer to choose. The units are either split by the manufacturer or they must be split by the installer.

corner units

StackStone manufacturers produce one of two 90˚ corner units, as shown in the chart below. Depending on the Risi Stone Systems manufacturer, either the Simple Corner Unit OR Advanced Corner Unit will be offered. This manual provides instructions for use with the Simple Corner Unit.

For the duration of this book, "StackStone" will be used to refer to both the StackStone and RomanStack systems unless otherwise specified.

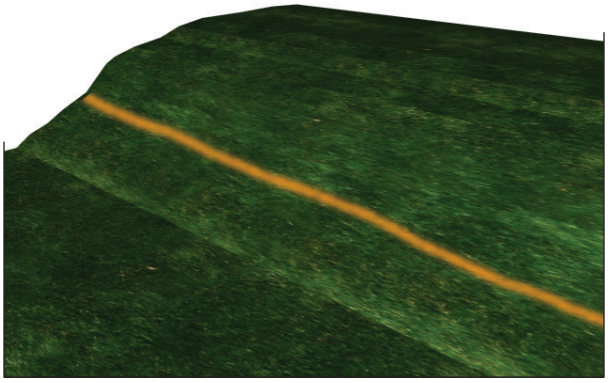
StackStone® & RomanStack® System Units	Face Width	Back Width	Height	Depth	Weight
 Standard Unit	8"	6"	4"	8"	18 lbs
	200 mm	150 mm	100 mm	200 mm	8.1 kg
 Coping Unit	8"	6"	4"	8"	18 lbs
	200 mm	150 mm	100 mm	200 mm	8.1 kg
 Simple Corner Unit	4"	3"	4"	8"	9 lbs
	100 mm	75 mm	100 mm	200 mm	4 kg
 Advanced Corner Unit	12"	11"	4"	8"	28 lbs
	300 mm	275 mm	100 mm	200 mm	12.5 kg

Notes
Certifying Engineer – Refers to the Professional Engineer retained to verify site conditions, inspect construction, and ultimately provide a letter to the owner certifying the design is compatible with the site and the wall was constructed according to the design. The Certifying Engineer may sub-contract out the soils testing and/or compaction testing to a Geotechnical Firm.

Drainage conditions – Varying groundwater/ soil conditions require different treatments to ensure proper drainage. The following steps illustrate a typical situation where no excessive groundwater flow is anticipated.0For other options, refer to Details - Drainage.

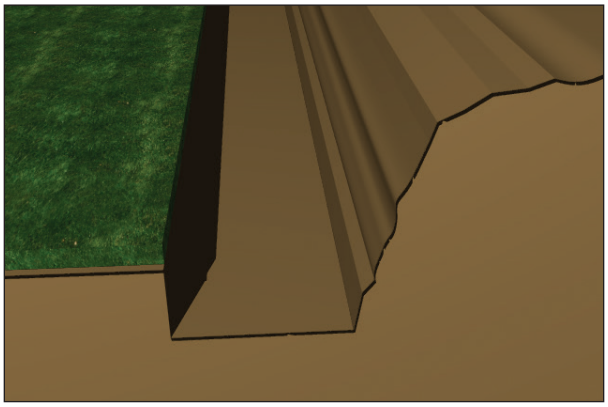
1Refer to Overview of a Successful Project before beginning.

2Plan
With your final design in hand and Certifying Engineer close by your side, begin to establish the wall location



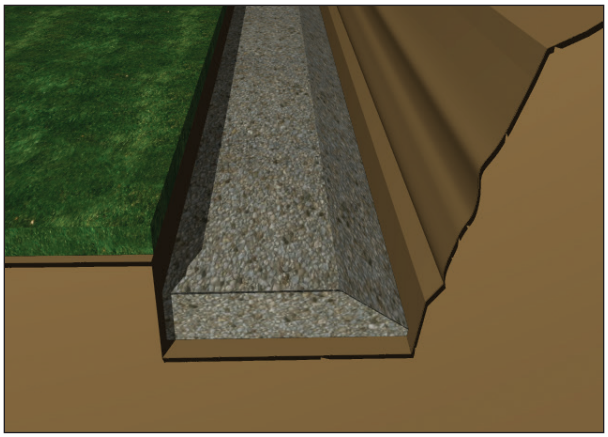
and proposed grades.
* Locate all utilities and contact local utility companies before digging.
* Mark a line where the front of the wall will be placed, keeping in mind the 19mm (3/4") setback per course.

3Excavate
* Excavate a trench down to the foundation grades specified in the design.
* The front of the trench should be 150mm (6") from the planned face of the block.
* The trench should be a minimum of 750mm (30") wide (front to back) and 300mm (12") deep. This depth assumes one unit is buried (unit height of



150mm [6"]) plus the compacted granular base minimum depth of 150mm (6"). As wall height increases, depth of embedment also increases, normally about 10% of the wall height. Greater embedment depths may be required to account for slopes more than 3H: 1V in front of the wall, scour protection in water applications, global stability, or as specified in the design.
* The rear 150mm (6") of the trench is excavated to account for the drainage layer.
* Excavations should be conducted in accordance with local codes under direction of the Certifying Engineer.

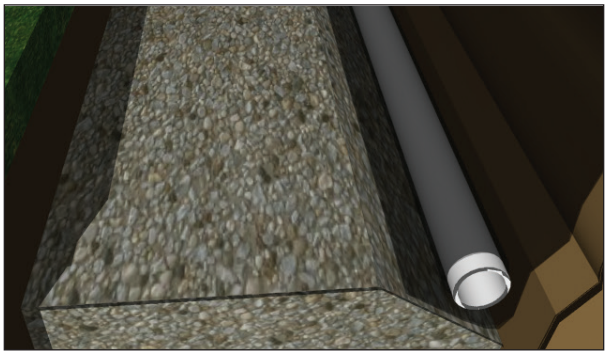
4Verify Foundation Subgrade
* Once the foundation trench has been excavated to the specified elevations, the native foundation soil must be checked by the Certifying Engineer. The foundation soil must have the required allowable bearing capacity specified in the design. See Special Considerations at the end of this section for dealing with poor foundation soils.



5Place Filter Cloth
* Lay the approved filter fabric (geotextile) along the bottom of the rear of the trench and extend up the exposed excavation to the proposed wall height. Leave adequate material at the top to fold back towards the wall (completely containing the drainage material).
* Stake the filter cloth against the slope during construction.

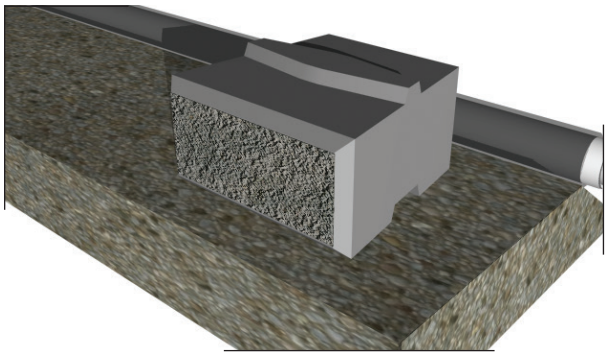
6Prepare the Compacted Granular Base
* The base should be started at the lowest elevation of the wall.
* The base should be composed of well-graded, free-draining (less than 8% fines), angular granular material, and compacted to a minimum of 98% SPD. The minimum base thickness is 150mm (6") or as required by the Certifying Engineer.
* A layer of unreinforced concrete (50mm [2"] thickness) may be placed on top of the of the granular

material to provide a durable leveling surface for the base course.
* Alternatively, the entire base may be poured as a non-reinforced concrete pad as some contractors find this a time-saving approach.
* The minimum base dimensions are 600mm (24") wide (front to back) and 150mm (6") deep. The additional 150mm (6") trench width allows for the



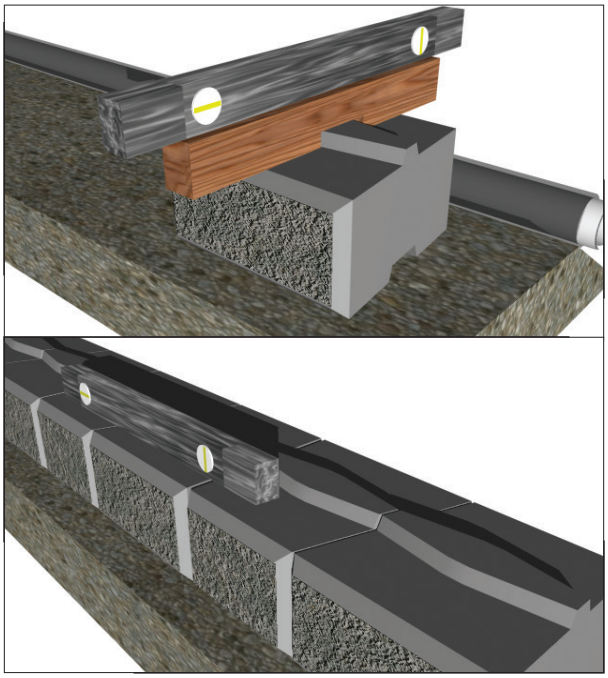
placement of the drain.

7Step the Base
* When the grade in front of the wall slopes up or down, the base must be stepped to compensate.
* Working out the stepped base as the wall steps up in elevation, the foundation steps must be located to ensure the minimum embedment is achieved.
* The height of each step is 150mm (6") - the height of 1 course.



* The 19mm (¾") offset must be accounted for at each step.

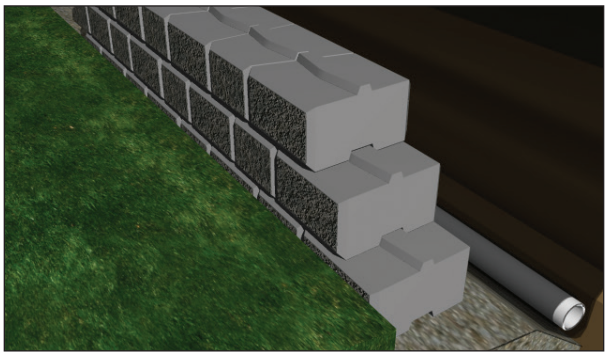
8Place the Drain
* Various options for drain placement may exist, depending on how the pipe is to be outlet (refer to Details - Drainage). The drain may be outlet through



the wall face or connected to a positive outlet (sewer). The drainage system is extremely important and outlets must be planned prior to construction.
* In the case of connecting to a positive outlet, the drain should be placed at the lowest possible elevation and sloped at a minimum of 2%.

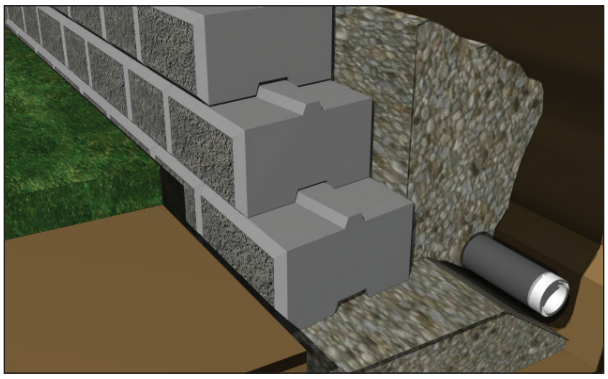
* At the rear of the base, allow the granular material to slope down on the sides towards the drain trench.
* In the 150mm (6") area behind the base, place the approved drain tile (perforated drain with filter sock) on top of the filter cloth and minimal granular coverage.

9Place the First Course
* Split units apart using a chisel and hammer if not already pre-split by manufacturer.
* Position a level string to mark location of first course (should be 150mm [6"] from the front edge of the granular base).
* Place the first course of Pisa2 units side-by-side



(touching) on the granular base.
* Ensure units are level front to back and left to right.
* Great care should be taken at this stage as it is critical for accurate alignment.

10Stack Units
* Sweep top of underlying course and stack next course in a running bond pattern so that the middle of the unit is above the joint between adjacent blocks

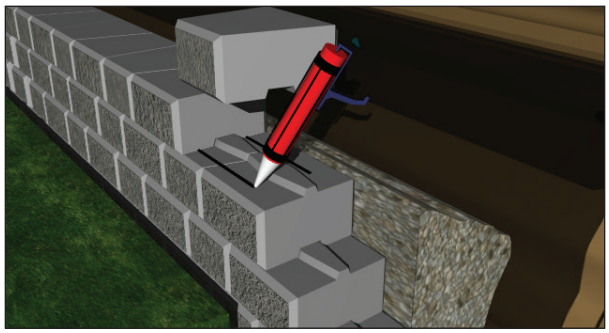


below.
* Continue stacking courses to a maximum of 4 courses (600mm [24"]) before backfilling.

11Backfill Drainage Material

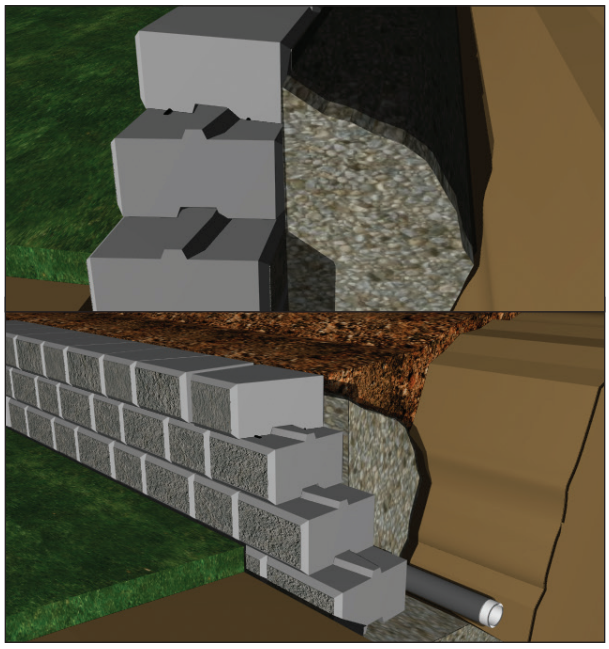
* A free-draining, ¾" clear stone drainage material is placed immediately behind the wall facing and compacted with a light manual tamper.
* The drainage layer must be a minimum of 300mm (12") thick and protected from the native material by the filter cloth.

12Continue Stacking and Backfilling
* Continue stacking units and backfilling as described in Steps 10 and 11 until the desired height is reached.



13Place Coping Unit
* Various coping units are available depending on the alignment of the wall and desired look. All coping units are 75mm (3") in height.
* A layer of concrete adhesive or butyl tape must be applied to the top course in order to fix the coping units in place.
* Place the coping unit firmly on top of the adhesive, ensuring both surfaces are free of debris, and apply pressure to secure.

14Encapsulate the Drainage Layer and Finish Grading



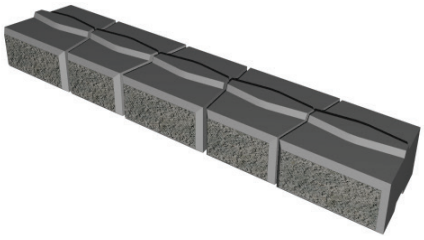
* Fold the excess filter fabric over the top of the

double-faced wall

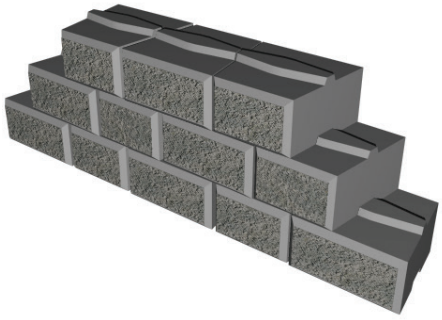
This method can be used to build either a retaining wall or a low, double-sided wall.

Use this method only if you plan to build a perfectly straight wall. If you require a wall with a slight curve, please refer to the instructions for building a single-faced wall.

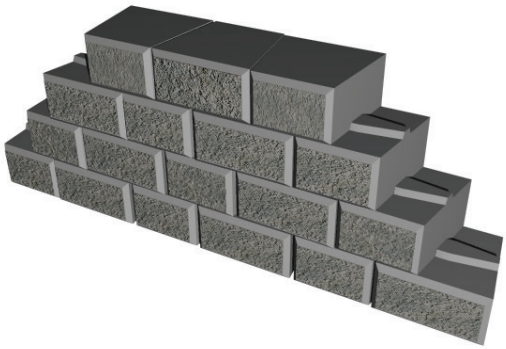
Place first course by rotating every second until 180°.



Maintain the running-bond pattern when placing successive courses.



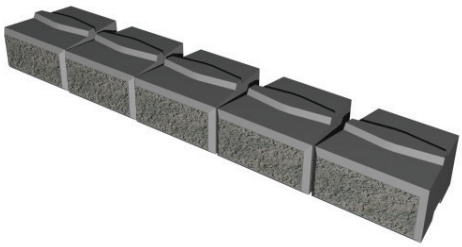
Finish the wall by placing the coping units, which must also be rotated by 180° every second unit.



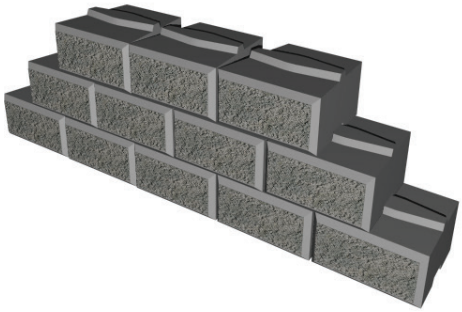
single-faced wall

This method should only be used in single-faced retaining wall applications.

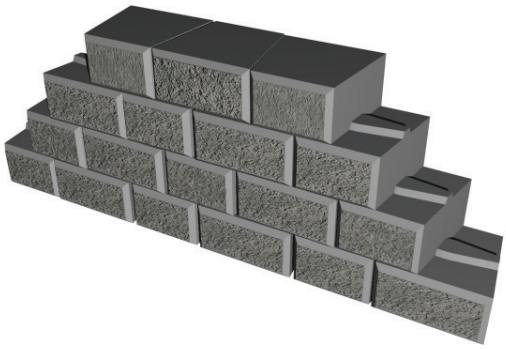
Place the first course with the tapered end of the unit facing towards the back. Free-draining backfill material should be placed in gaps at the rear.



Maintain the running-bond pattern when placing successive courses.



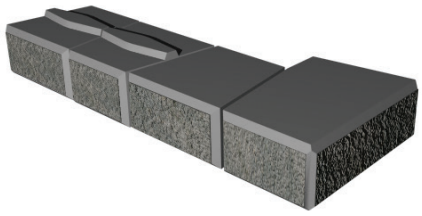
Finish the wall by placing the coping units, also with tapered ends facing the back of the wall.



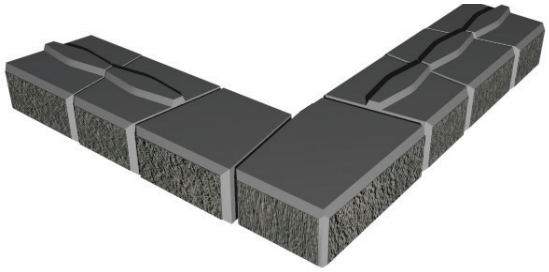
double-faced wall

90° Corner

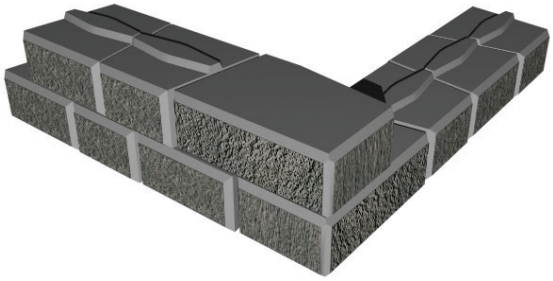
Place units on base course leading to the corner. Rotate blocks 180˚ every other block to achieve a solid wall.



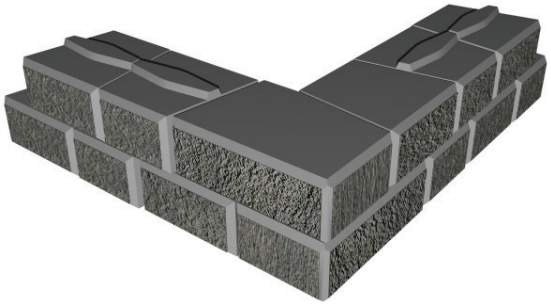
Continue placing base course units on adjacent wall.



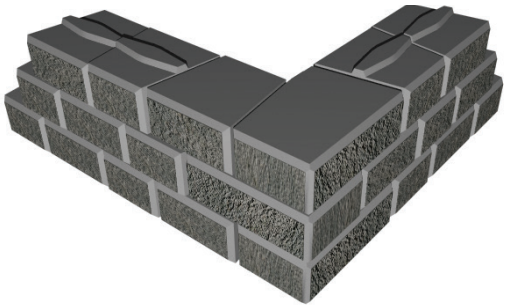
Place concrete adhesive on corner unit between each course. Commence second course by placing alternate corner unit.



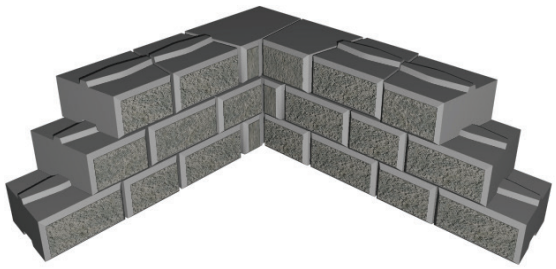
Place remaining units to complete course.



Repeat until desired height is achieved.



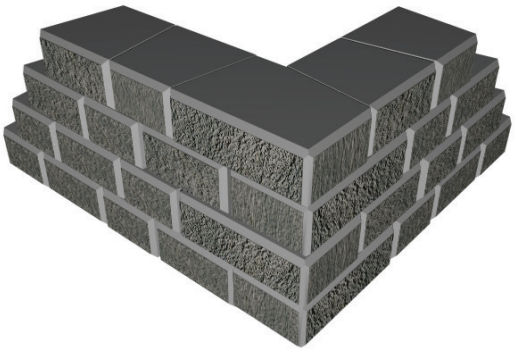
The above method can also be used to create an inside 90° corner.



Coping for Double-Faced Walls

Note: In all cases it is important to use an adhesive to secure the coping units to the top of the wall.

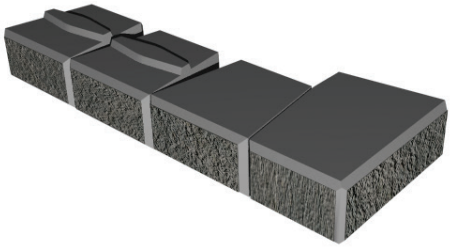
- Rotate coping unit 180° every block to achieve a solid course.
- A corner unit may be used as a coping stone at the corner to produce a finished edge.
- Abut the straight edge of corner unit against back of coping and continue pattern along the adjacent wall.
- It may be necessary to remove bumps and bulges from the rough faces in the corner to achieve a tight fit.



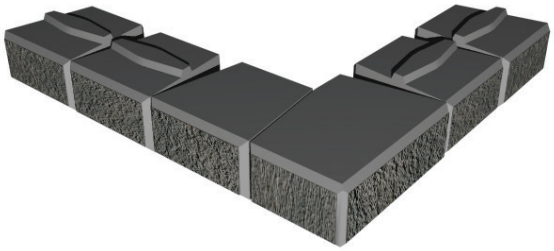
single-faced wall

90° Outside Corner

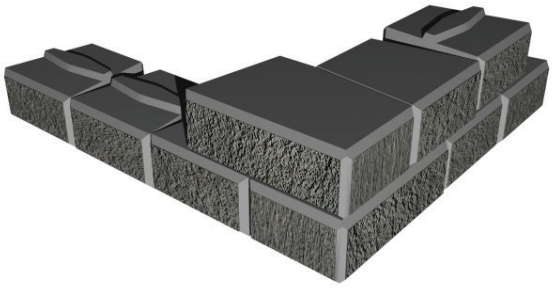
Place corner units with larger face outwards leading to the corner. Allow a gap at the back of the blocks to achieve a straight wall.



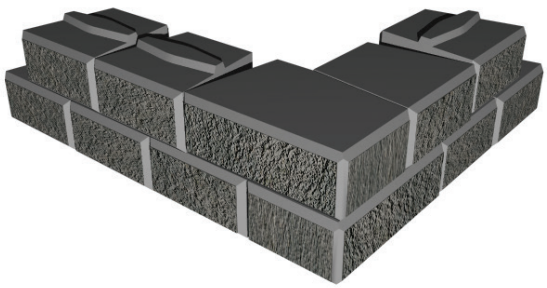
Continue placing standard units on adjacent wall to finish the course.



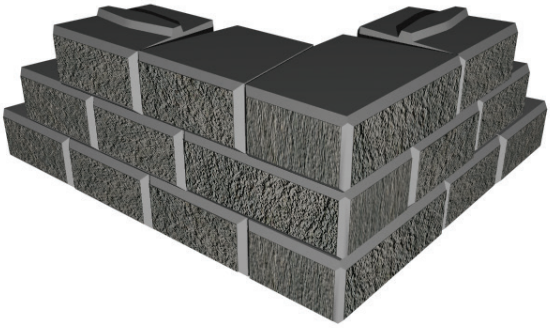
Place concrete adhesive on corner unit and adjacent standard unit between each course. Commence second course by placing alternate corner unit.



Place standard units to complete the course.



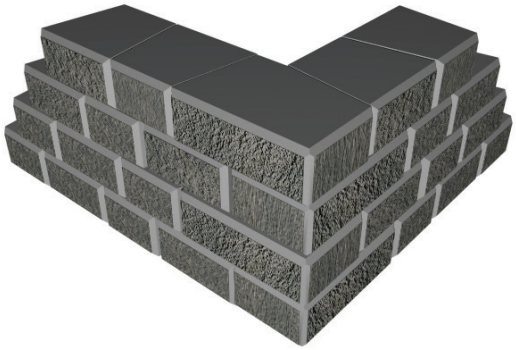
Repeat until desired wall height is achieved.



Coping for Single-Faced Walls

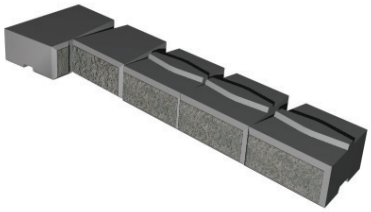
Note: In all cases it is important to use an adhesive to secure the coping units to the top of the wall.

- Place coping units with larger face outwards and tapered ends towards the back.
- A corner unit may be used as a coping stone at the corner to produce a finished edge.

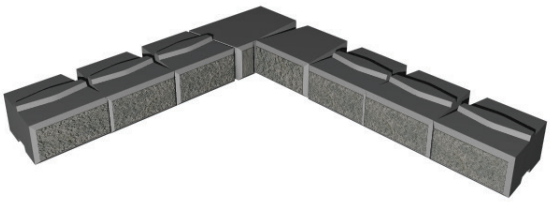


90° Inside Corner

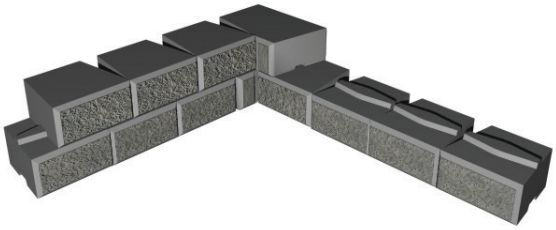
Place corner units with larger face outwards leading to the corner. Allow a gap at the back of the blocks to achieve a straight wall.



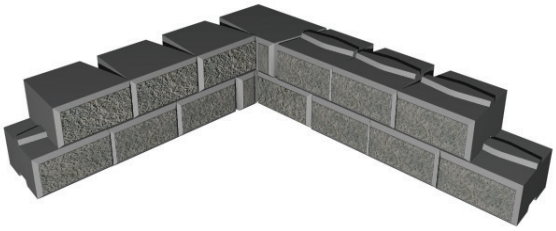
Place next unit so the edge touches the middle of the last unit. Continue placing standard units on adjacent wall to finish the course.



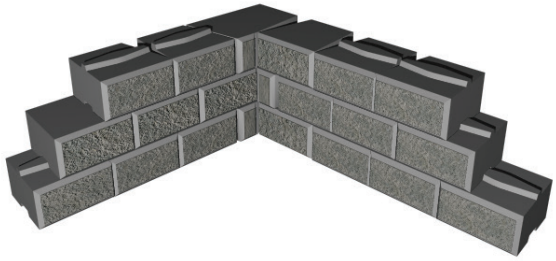
Commence second course by placing alternate corner unit so it touches the tongue of the course below. Place adhesive between all courses.



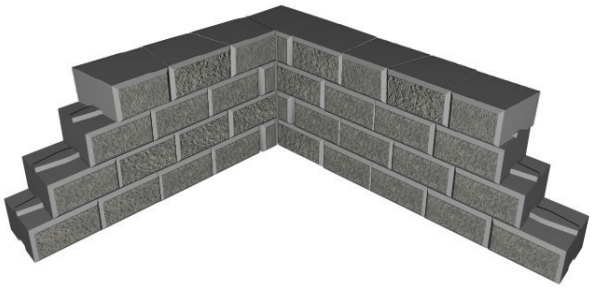
Place standard units to complete the course.



Repeat until desired wall height is achieved.



Refer to the previous page for instructions on placing coping units for a single-faced wall.

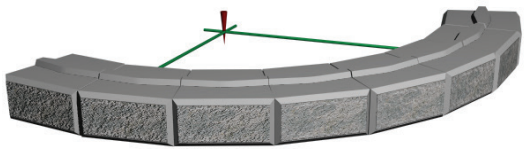


Convex Curve

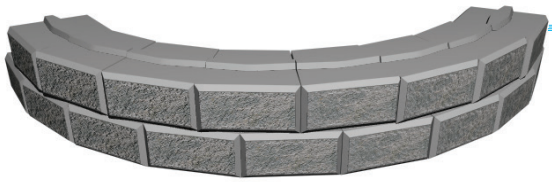
The StackStone system is able to create a perfect curve with an outside radius of 0.77 m (2.5 ft).

In order to prevent gapping in double face walls the curve must have an outside radius of 0.77m (2.5 ft).

Once the radius to be used is decided upon and the necessary curve for the base course is calculated, the base can be roughly outlined with spray paint. Upon completion of the base, the starting and ending points of the curve can be staked. The curve should be marked with paint to ensure the proper radius is established.



Place additional courses.



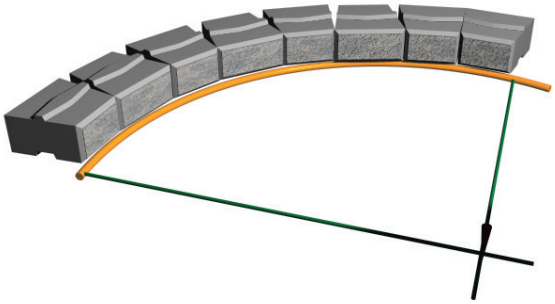
Secure coping units with adhesive.

Concave Curve

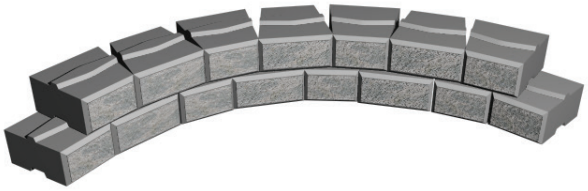
The StackStone system is able to create a perfect curve with an inside radius of 0.57 m (1.9 ft).

In order to prevent gapping in double face walls the curve must have an inside radius of 0.57m (1.9 ft).

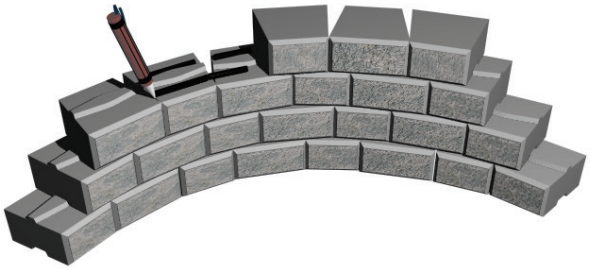
Once the radius to be used is decided upon and the necessary curve for the base course is calculated, the base can be roughly outlined with spray paint. Upon completion of the base, the starting and ending points of the curve can be staked. The curve should be marked with paint to ensure the proper radius is established.



Place additional courses.

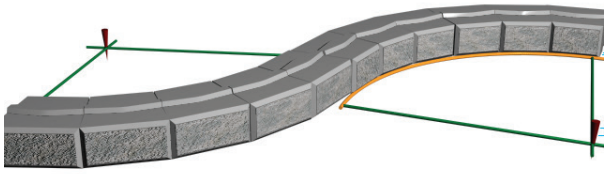


Secure coping units with adhesive.

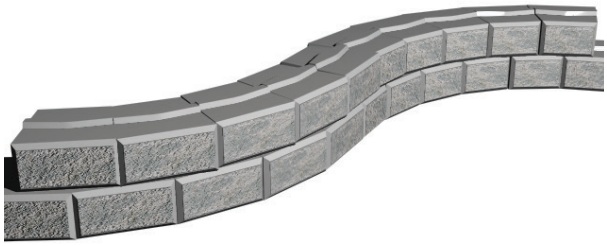


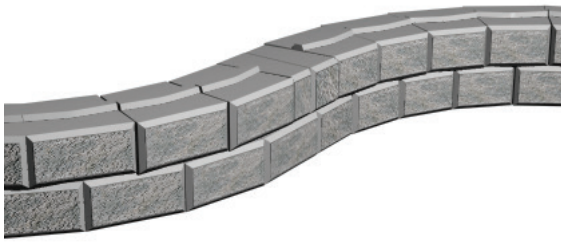
Alternating (Serpentine) Curve

Once the radius to be used is decided upon and the necessary curve for the base course is calculated, the base can be roughly outlined with spray paint. Upon completion of the base, the starting and ending points of the curve can be staked. The curve should be marked with paint to ensure the proper radius is established.



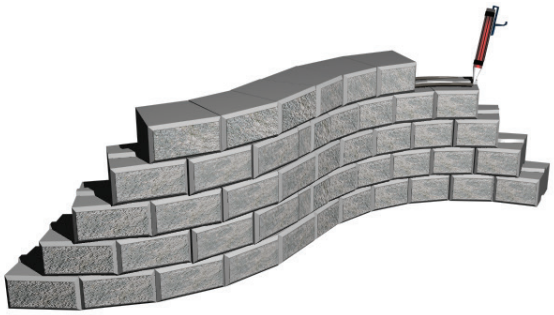
Place additional courses.





For double faced walls it will be nessesary to cut some units to size at the transition zone to prevent gapping.

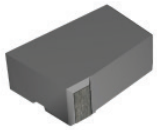
Secure coping units with adhesive.



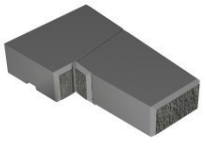
small pillars

Note: In areas where frost heave is a potential issue, increase the compacted granular base thickness.

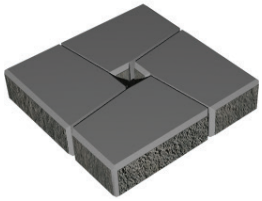
Place corner unit in desired pillar location.



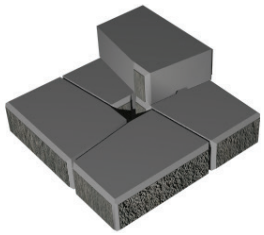
Abut same corner unit against smooth tapered edge as shown.



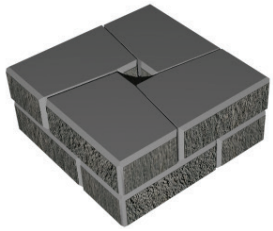
Complete first course by placing remaining corner units.



Place adhesive on top of all units. Commence second course by placing alternate corner unit.



Place remaining corner units to complete course.



Place adhesive on top of all units. Repeat until desired height is achieved.

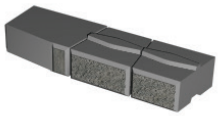
Cap with coping units or pre-cast cap.

large pillars

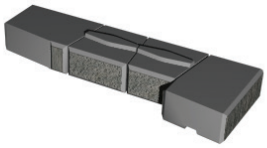
Note: In areas where frost heave is a potential issue, increase the compacted granular base thickness.

Infill large pillers with ¾ in clear-stone material for stability.

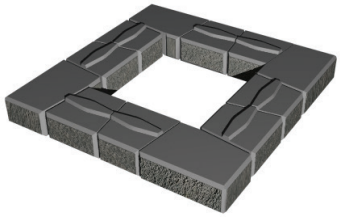
Place corner unit in desired pillar location. Abut standard unit against corner unit, rotated to fit flush. Place second unit rotated 180° from first unit.



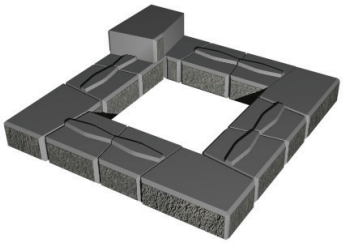
Abut identical corner unit against standard unit.



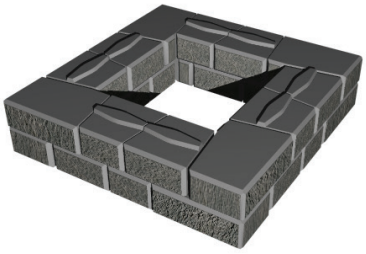
Continue placing units to complete the first course.



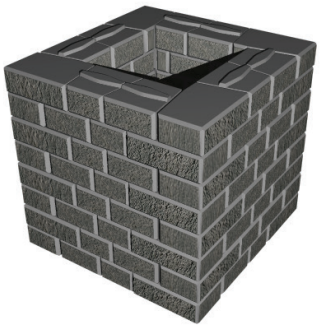
Commence second course by placing alternate corner unit.



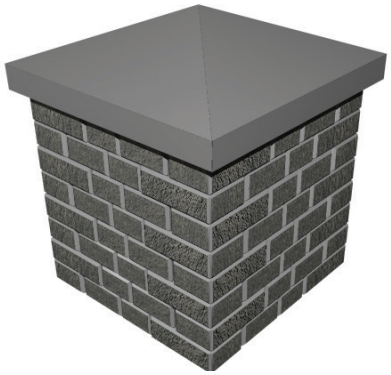
Place remaining units to complete course.



Repeat until desired height is achieved. The maximum height is 4 ft, but will depend on the site conditions.

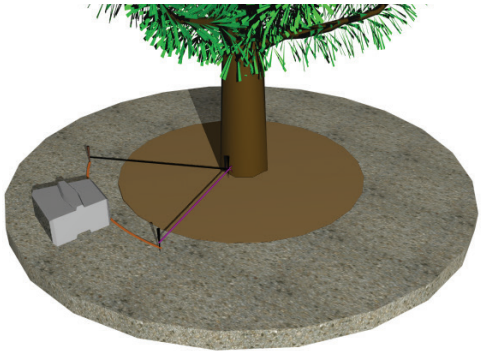


Finish with pre-cast cap.



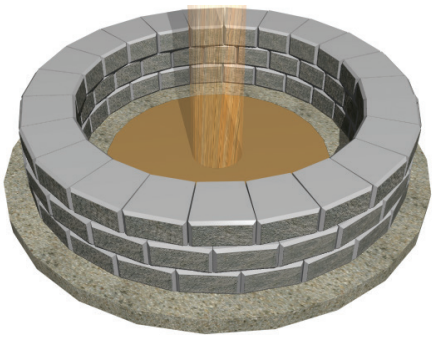
For convex curves, the StackStone standard units are able to create a minimum inside radius of 0.57 m (1.9 ft).

Once the radius to be used is decided upon and the necessary curve for the base course is calculated, the base can be roughly outlined with spray paint. Upon completion of the base, the starting and ending points of the curve can be staked. The curve should be marked with paint to ensure the proper radius is established.

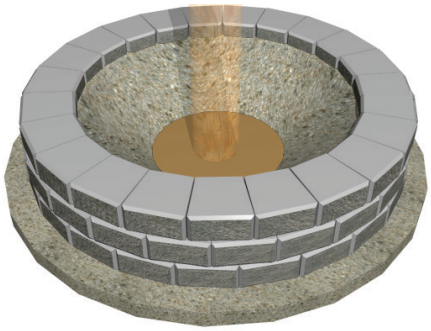


Place the units along the marked curve.

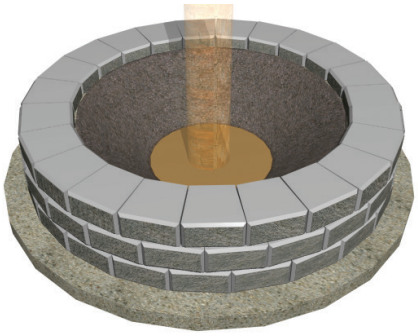
Repeat until desired height is achieved.



Angular clear stone should be placed behind the wall to ensure proper drainage. This material should slope from the top of the wall at a 1:1 slope towards the inside of the ring.



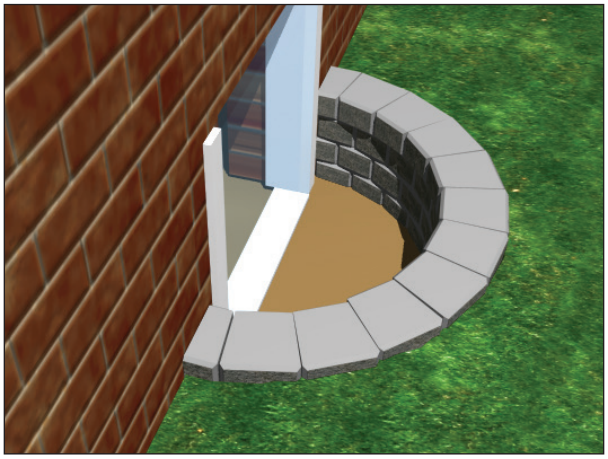
Filter cloth must be placed on top of the granular material and wrapped up the base of the tree to prevent soil from contaminating the drainage zone.



Place topsoil for planting.

window well

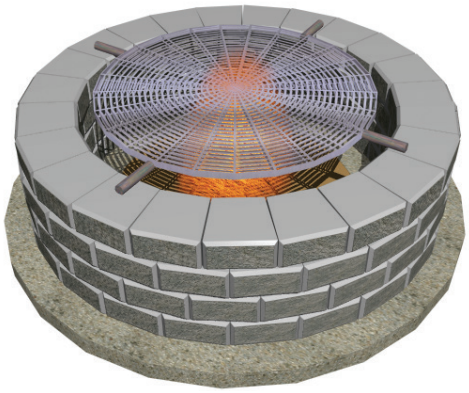
Window wells can be constructed to a maximum total height of 500 mm (20 in). The wall should abut the building with a 25 mm asphalt-impregnated fibre board.



Refer to Details – Curves for construction directions.

fire pit

Fire pits can be constructed below ground or above (as shown below). Various manufacturers sell fire pit kits that include a grill that can be placed on the pit.



Refer to Details – Curves for construction directions.

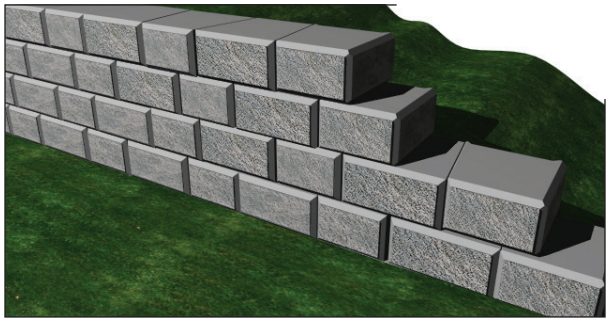
terminating the wall

The retaining wall must be terminated to prevent the washout of the granular infill placed behind the wall. This can be done by

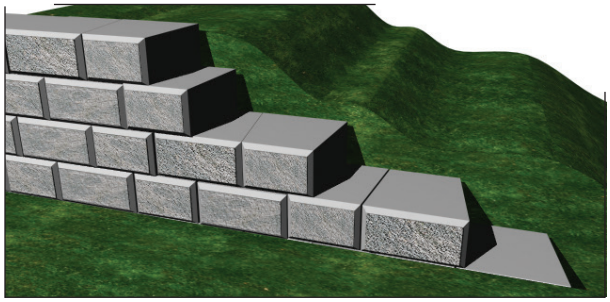
- Tapering down to grade (as shown below)

OR

- Returning into the slope with a curve or corner



With corner unit



Without corner unit

abutting into existing structure

The wall should abut the existing structure with a 25 mm asphalt-impregnated fibre board expansion joint. Cut standard units or simple corner units as required to maintain the running bond pattern.