ANCHOR™
BUILD SOMETHING BEAUTIFUL

FEATURING HIGHLAND STONE® PRODUCTS

Estimating & Installation Manual

ANCHORWALL.COM
1-877-295-5415

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BEFORE YOU BEGIN

Landscapes with character don't just happen. Today's property owners are willing to invest in exceptional outdoor living areas and look to their landscape contractor and/or designer for ideas on how to create the perfect outdoor living environment.

Outdoor areas of any size or shape can be transformed with Anchor Wall Systems products. Colors, shapes, patterns and textures of Anchor products blend with the environment and create attractive, usable landscape features where steep hillsides, gentle slopes or simply ordinary space had been. No matter what the project, Anchor retaining wall systems and free standing wall systems enhance landscapes and increase property value. According to an Anchor Wall Systems survey, 75 percent of consumers think retaining walls increase their property values as much as 15 percent.

Owners of commercial property often add purely aesthetic features to functional landscaping. Retaining walls are frequently necessary to develop buildable land space (e.g., eliminating a slope to create space for a building or parking). Free standing walls can be used for traffic separation or to create additional public seating. Landscaping is also used to create leisure and recreational space for hotels, schools and parks. A well-designed landscape also elevates the prestige of a commercial property.

HOW TO USE THIS MANUAL

This manual is designed to provide you with ideas as well as information on product use, estimating and installation procedures. Because actual project conditions vary, final wall design, including the incorporation of geosynthetic reinforcement, must be performed by a qualified engineer. While this manual provides general guidelines, installation contractors should refer to construction drawings provided by a qualified local engineer for final specifications.

Additional installation information is available online at www.anchorwall.com. Installation instructions are also available in video or DVD format for Diamond, Highland Stone and Diamond Pro. Information includes basic wall construction as well as other applications, including:

- inside and outside 90° corners
- inside and outside radii
- various steps
- cap placement
- terraced walls
- water applications
- fences
- guard rails

To obtain a copy of the installation video or DVD, contact your local Anchor Wall Systems dealer or manufacturer or contact Anchor Wall Systems at **1-877-295-5415.**

ESTIMATING FORMULAS

In the Product Details section for each product, there are formulas for estimating the wall and cap units as well as other materials needed to install a wall. Abbreviations for the information used in each formula are explained with the formula. There is also an example provided showing how each formula is used.

Abbreviations are explained in their first use.

Example: The total wall is 50 feet long and 4 feet high.
Length (L) of the wall x height (H) = square feet (SF).
50' x 4' = 200 SF.

To make the results of the formulas more obvious in each example, they have been underlined.

BEFORE INSTALLATION BEGINS

Advance planning and careful layout at the job site help ensure a successful retaining wall project.

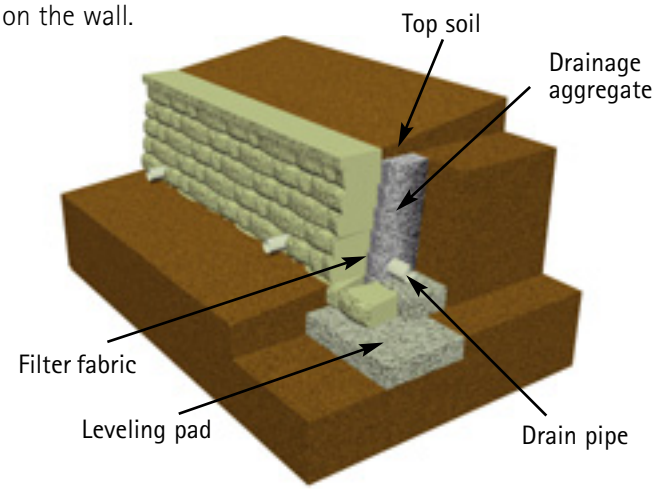
- Review the site plan to confirm lot lines, wall location, length and elevations.
- Understand on-site soils. Ideal soils are sand and gravel. For walls built in clay or poor soils, work with a local engineer to confirm the wall design and the required soil reinforcement. Black or organic soils should not be used as infill.
- Confirm the location of underground utilities.
- Seek all necessary building permits.
- Prepare a drawing of the site with the wall location, lengths and elevations.
- Plan drainage to avoid erosion or buildup of water behind the wall. Consider where the water will drain through the wall, where downspouts will expel and whether there's an underground sprinkler. For walls greater than three feet in height, a perforated drain pipe is recommended at the base of the aggregate to quickly remove large amounts of water. See page 28 for more information on water management.
- Check the block delivered to ensure it is the correct color. Check the geogrid to confirm that it's the strength and weight specified in the engineering plans.
- Be sure to use the right tools. Hand tools include a shovel, 4-foot level, dead blow hammer, 2- or 3-pound hammer, chisel, hand tamper, hydraulic splitter and string line. Power tools include a circular saw with a masonry blade and a compactor.
- Always wear protective eyewear.

RETAINING WALL BASICS

Segmental retaining walls typically fall into one of two categories.

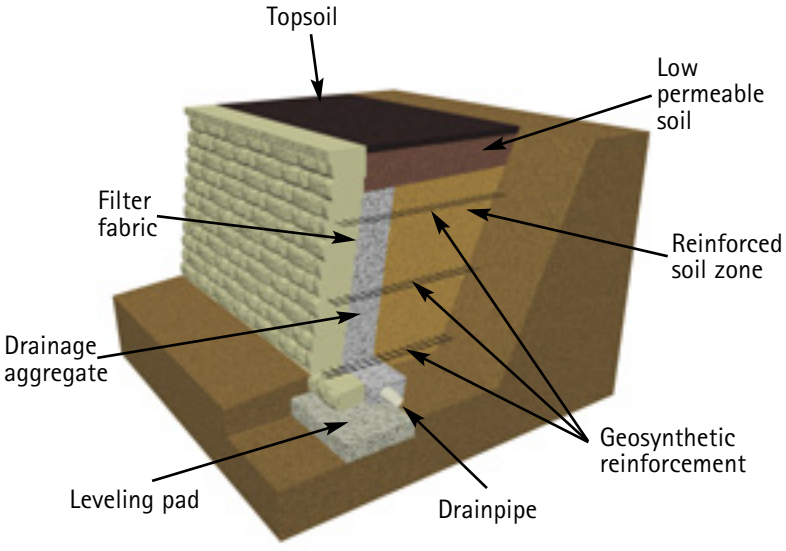
GRAVITY RETAINING WALL

The first category – a gravity wall – is a retaining wall that does not use soil reinforcement. A gravity wall has height limitations specific to each product. An advantage of this type of retaining wall is that it requires a smaller work area behind the wall. A gravity wall relies on the weight and setback of the block to resist the soil forces being exerted on the wall.



GEOSYNTHETIC-REINFORCED RETAINING WALL

The second category is a geosynthetic-reinforced wall, which needs to be designed by a qualified engineer. With a reinforced retaining wall there are (theoretically) no height limitations, and they are used in larger applications. They require more work area behind the structure. The block of soil is stabilized by introducing reinforcement layers into the soil mass behind the facing units. The larger the stabilized soil mass, the more soil can be retained or held back. The geosynthetic reinforcement in the soil extends past the theoretical failure plane and serves to create a large, rectangular mass of block and soil, restraining the retained soil.



4 TERMS USED IN THIS MANUAL

ACTIVE SOILS
The soil behind the wall that will theoretically move.

AT-REST SOILS
The soil behind the wall that will theoretically not move.

BACKFILL
The soil used to fill the excavated area behind the wall.

BASE COURSE
A full course of blocks which are buried so that the top is level with grade.

BATTER
The facing angle created by segmental retaining wall (SRW) unit setback, measured from a vertical line drawn from the toe of the wall, expressed in degrees. The batter on both Diamond® and Highland Stone® is 10.6°. The batter on Diamond Pro® is 7.3°.

BENCH CUT
A horizontal cut across a slope. Commonly used when building steps into an existing slope.

COLUMN
A vertical pillar, generally used as a support for a wall or other structure. Columns made of Highland Stone® Free Standing Wall units can be used independently or as a support for a free standing wall. In this manual, columns surround or end walls. See page 10 for construction details about columns.

COMPACTION
Compressing or densifying the soil material used for base and backfill. Use a manual or self-propelled compactor. See examples below.

CONNECTION STRENGTH TESTING
Testing establishing the relationship between a specific SRW unit and a specific type of geosynthetic reinforcement.

COURSE
The horizontal layers of blocks used to build a wall.

CREST SLOPE
Angle of the soil above the wall usually expressed as a ratio such as 3:1 (3 feet horizontal to 1 foot vertical).

DRAINAGE AGGREGATE
Drainage fill placed within and immediately behind the SRW units, and in other areas, for drainage.

FINES
The smaller particles of aggregate.

FOUNDATION SOIL
The soil that supports the leveling pad and the reinforced soil zone of a soil-reinforced SRW system.

FREE STANDING WALL (FSW)
A free standing wall, also called a double-sided wall, is a vertical wall which does not retain soil.

SINGLE-DIRECTION PLATE COMPACTOR

Suitable for compaction of mixed-granular soils in a very small area.

TAMPERS OR JUMPING JACKS

Designed for the compaction of granular and mixed soils. Their light-weight and compact design allows these machines to work in confined areas. They can only compact very small lifts of soil (3 to 4 inches).

REMOTE-CONTROL TRENCH COMPACTOR

Designed for the compaction of a wide range of soil types. This multipurpose compactor can be used for tasks like base preparation.

GEOGRID
A synthetic material formed into a grid-like structure for use in soil reinforcement. Usually comprised of polypropylene, polyester or polyethylene.

GEOSYNTHETIC
A generic term used to describe synthetic or plastic materials used in soil, such as fabrics, geogrids, drainage composites or erosion-control mats.

GEOTEXTILE
A textile-like material used in soil drainage and reinforcement applications. Usually comprised of polypropylene or polyester, it can be woven or non-woven.

GLOBAL STABILITY
Resistance to overall mass movement of the SRW system in a circular or sliding mode. May be a problem with tiered walls, walls with weak foundation soils, and walls with a slope at the top or bottom.

GRADE
Ground level.

GRAVITY WALL
A retaining wall that does not use soil reinforcement. A gravity wall relies on the weight and setback of the block to resist the soil forces that are being exerted on the wall.

LEVELING PAD AGGREGATE
A compactible, free-draining granular soil to facilitate compaction and drainage. We suggest using ¾-inch minus aggregate (with fines) as the pad or base material.

LEVELING PAD OR BASE
The level surface (gravel or concrete) used to distribute the weight of the dry-stacked column of SRW units over a wider foundation area and to provide a working surface during construction.

LOAD, DEAD
A permanent surcharge on a wall that can provide lateral pressure against the wall as well as vertical force downward on the wall mass.

LOAD, LIVE
A transient surcharge that can vary during the life of the structure. A live load is assumed to provide lateral pressure but not vertical pressure.

OVERTURNING
An external stability failure mechanism of a SRW whereby lateral external forces cause the entire reinforced soil mass to rotate about the base.

PERMEABLE SOIL
A soil that allows water to move through it at an appreciable rate.

PILLAR
A firm upright support for a superstructure.

PILASTER
An upright architectural member that projects from the wall. See page 11 for construction details about pilasters.

PROCTOR (DENSITY)
A method for determining the moisture-density relationship in soils subjected to compaction.

REINFORCED SOIL ZONE
The area of a soil-reinforced SRW which contains the soil reinforcement.

RETAINED SOIL ZONE
The area of a soil-reinforced SRW which is immediately behind the reinforced zone.

RUNNING BOND
A staggered vertical alignment used to create a consistent pattern. It may be necessary to use split or partial units to maintain a running bond.

SEGMENTAL RETAINING WALL (SRW)
A wall system built with modular blocks to retain soil.

SLIDING
An external and internal stability failure mechanism of an SRW whereby lateral external forces cause the entire soil mass to slide forward along its base or internally along a particular layer of soil reinforcement.

STEPPING UP THE WALL BASE
Method used to maintain a level wall on a slope. See page 29 for more information.

SURCHARGE
External load, usually applied at the top of a SRW. A roadway or building foundation can be a surcharge.

SWALE
A small ditch or depression formed on top and behind the SRW system to collect water and carry it away.

TERRACED WALLS
There are independent and dependent terraces. See page 36 for more information about building terraces.

THEORETICAL INTERNAL FAILURE PLANE
The line that separates active soils from the at-rest soils.

TOE SLOPE
Angle of the soil in front of the wall usually expressed as a ratio such as 3:1 (3 feet horizontal to 1 foot vertical).

6 HIGHLAND STONE® FREE STANDING WALL

PRODUCT DETAILS

- Available in three different face lengths for a random look
- Can be used for straight or curved walls
- Use as seating areas, borders and courtyards
- Can be used for walls up to 3 feet high, including buried course
- Columns or pilasters constructed with the pillar units can be built up to 6 feet high, including buried course
- Minimum radius using all three units: 3.75 feet
- Maximum straight wall length between design elements: 10 feet
- Structural design elements include jog, 90° corner, column, pilaster or 7-foot radius at least 11 feet long

Provide more seating in a small patio with a Highland Stone® Free Standing Wall. See page 13 for more information about capping a column.

6 INCH



	LARGE	MEDIUM	SMALL
Approximate Dimensions*	Front, 6" x 18" x 9" Back, 6" x 16" x 9"	Front, 6" x 12" x 9" Back, 6" x 10" x 9"	Front, 6" x 6" x 9" Back, 6" x 4" x 9"
Approximate Weight*	70 lbs.	45 lbs.	20 lbs.
Coverage	.71 sq. ft.	.46 sq. ft.	.21 sq. ft.

ACCESSORIES


	COLUMN	EXTRA LARGE CAP
Approximate Dimensions*	6" x 18" x 9"	Front, 3" x 18" x 13" Back, 3" x 12" x 13"
Approximate Weight*	75 lbs.	44 lbs.
Coverage		1.25 linear ft.

*Actual dimensions and weights may vary from these approximate dimensions and weights due to variations in manufacturing processes. Specifications may change without notice. See your Anchor representative for details, color options, block dimensions and additional information.

ESTIMATING FORMULAS

For project material estimating, use the formulas listed in each step.

1 WALL UNIT ESTIMATING

Straight Walls

Determine the square footage of the exposed wall. Exposed wall is length (L) x height (H) = square feet (SF). SF ÷ 1.4 = # units of each size for exposed wall.

SF ÷ 1.4 = # units of each size for exposed wall

Curved Walls

The buried course of a curve requires the same kind of blocks as used in the pattern above ground. The square footage of the inside radius is slightly less than the square footage of the outside radius. When estimating, measure the outside wall face. Square footage (SF), including base course, ÷ by 1.25. When estimating a curved wall, skip step 2.

SF ÷ 1.25 = # units of each size

2 BURIED BASE UNIT ESTIMATING

Use the large units for the buried base when building straight walls. Divide the wall length (L) by 1.4 to determine the number of large units needed for the base of a straight wall.

L ÷ 1.4 = # large units for buried base

3 COLUMN UNIT QUANTITY ESTIMATING

Estimate the quantity needed for a column by multiplying the height (H) in feet, including the buried course, x 8.

H x 8 = # units per column

4 CAP ESTIMATING

Convert wall length to inches. Wall length (L) x 12 = L in inches (LI). The cap factor (CF) = cap front inches + cap back inches ÷ 2.

LI ÷ CF = # caps for wall

For curved walls, add 10 percent. If you are using wall caps for the column, multiply the number of caps needed per column by the number of columns you are building.

5 WALL LEVELING PAD AGGREGATE ESTIMATING

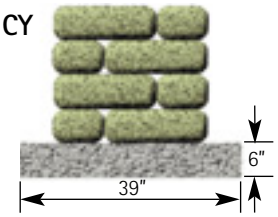
Leveling pad material is a compactible base material of ¾-inch minus (with fines). The leveling pad extends at least 6 inches in front of and behind the wall units and is at least 6 inches deep after compaction. [Wall length in feet (L) x leveling pad width in feet (W) x leveling pad depth in feet (D)] ÷ 27 x 1.1 = cubic yards (CY). CY x 1.6 = tons.

(L x W x D) ÷ 27 x 1.1 = CY
CY x 1.6 = tons

6 COLUMN OR PILASTER LEVELING PAD AGGREGATE ESTIMATING

Leveling pad material is a compactible base material of ¾-inch minus (with fines). The leveling pad for a 27- x 27-inch column or pilaster is 39 inches square and at least 6 inches deep after compaction.

(L x W x D) ÷ 27 x 1.1 = CY
CY x 1.6 = tons



PROJECT ESTIMATING EXAMPLE

The project is a 25-foot-long straight wall that is 2.5 feet high. There are three columns that are 3 feet high.

1 STRAIGHT EXPOSED WALL UNITS

25' L x 2' H = 50 SF ÷ 1.4 = 36 large, medium and small units for exposed wall

2 BURIED BASE UNITS

25' L ÷ 1.4 = 18 large units for buried base

TOTAL WALL UNITS NEEDED

Large:	
Buried base units	*18*
+ Exposed wall units	*36*
Total units	*54*

Medium	*36*
Small	*36*

3 COLUMN UNITS

3' x 8 = 24 column units per column

Total column units needed per column	*24*
x Number of columns	*3*
Total column units	*72*

4 CAP UNITS

LI example: 25' x 12 = 300
CF example: 18" + 12" = 30" ÷ 2 = 15
Project example: 300 ÷ 15 = 20 caps for wall

5 WALL LEVELING PAD AGGREGATE

25' L x 1.75' W x .5' D ÷ 27 x 1.1 = .9 CY
.9 CY x 1.6 = 1.5 tons

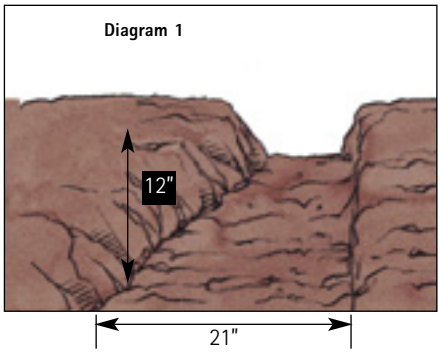
6 COLUMN/PILASTER LEVELING PAD AGGREGATE

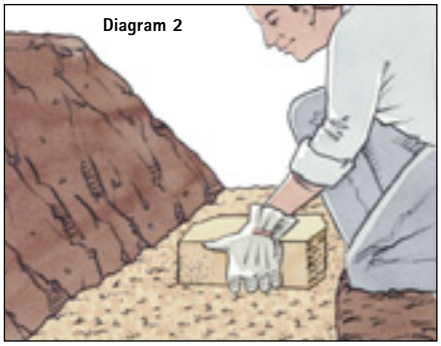
3.25' x 3.25' x .5' = 5.28 ÷ 27 x 1.1 = .22 CY aggregate per column. 1.6 x .22= .35 tons of leveling pad aggregate per column

Tons per column	*.35*
x Number of columns	*3*
Tons aggregate	*1.1*

HIGHLAND STONE® FREE STANDING WALL

INSTALLATION INSTRUCTIONS





PREPARE LEVELING PAD

Excavate for the leveling pad. The trench should be a minimum of 21 inches wide and should be 6 inches deeper than the block. *See Diagram 1.*

Create a leveling pad of compacted base material that extends a minimum of 6 inches in front of and 6 inches behind the wall units. This pad should also be at least 6 inches deep after compaction.

BASE COURSE

Once the pad is compact and level, begin placing the units. Center the units on the pad. The ends of the units should be in contact. The base course must be buried below grade and should be included when calculating total wall height. *See Diagram 2.*

Base Course
It's easiest to build the base course for a straight wall out of large Free Standing Wall units.

BUILDING THE WALL

Units can be placed in any order to form an aesthetically pleasing layout. The simplest is one that incorporates large, medium and small units. The units should be installed so the ends are in complete contact with each other. Remember to keep the wall on bond by placing units in a staggered relationship to the course beneath. Repeat this process to complete the wall. Remember to glue the top two courses and caps in place with a concrete adhesive.

Next Course

ENDING A WALL

Split a large unit into pieces sized as needed. Do not use pieces smaller than 6 inches wide. If needed, cut the second-to-last piece and make the last piece the appropriate size. Smaller pieces should be glued into place with a concrete adhesive. After splitting the end piece, use a hammer and chisel to create a rounded appearance to match the manufactured split blocks.

Wall End

CAPPING A WALL

See page 24 for details about capping a wall.

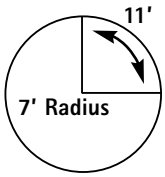
A Highland Stone® Free Standing Wall provides additional poolside seating when entertaining.

STRUCTURAL DESIGN ELEMENTS

Structural design elements must be used if a free standing wall is more than 10 feet long. Structural design elements include:

- 7-foot radius for 11 feet
- Jog
- 90° corner
- Column
- Pilaster

Construction details for columns and pilasters are on pages 10 through 13.



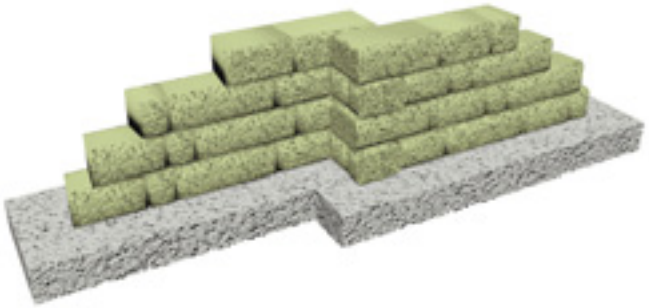
A radius of 7 feet or less is considered a design element if it is one quarter of the circumference of the circle which would be made by that radius (11 feet of a circle with a 7-foot radius).

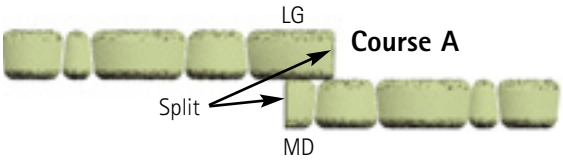
CURVED WALLS

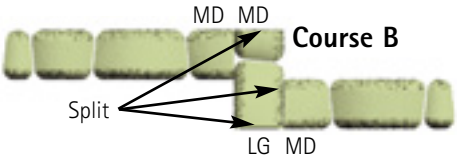
Add stability and a natural flow to walls with curves. While units can be turned somewhat, it may be necessary to make cuts with a concrete saw or splitter. As a rule, the smaller the units, the tighter the radius. Conversely, the larger the units, the larger the radius. Use approximately the same number of units for each course. The approximate minimum radius the system can turn, using all three pieces without cutting, is 3.75 feet measured to the outside face of the wall.

For a curved wall, use all three unit sizes.

FREE STANDING WALL JOG

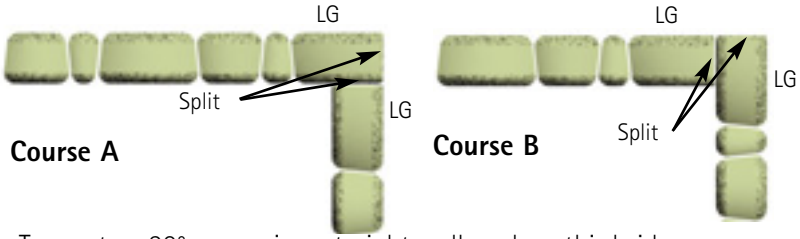


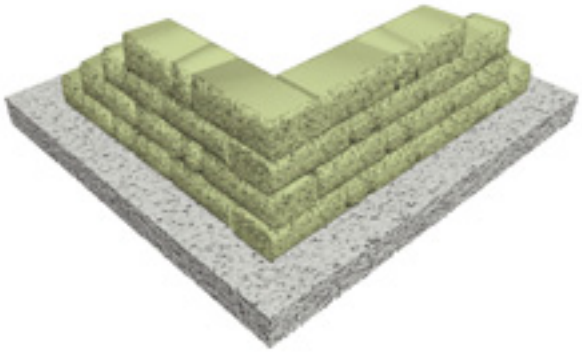




Jogs are used to break up straight lines and add stability to walls. Split units as needed. Use hammer and chisel to round split faces. Glue all courses of jog with a concrete adhesive.

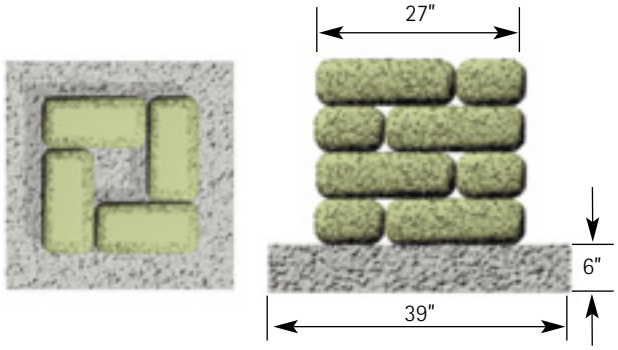
90° CORNER





To create a 90° corner in a straight wall, make a third side to a large unit by splitting it to the appropriate dimension. Use only large units to assure connecting units are on bond. Alternate the direction the units face with each course. Round the split ends with a hammer and chisel. Glue all corner courses with a concrete adhesive.

10 FREE STANDING WALL CONSTRUCTION DETAILS

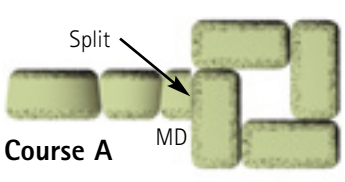


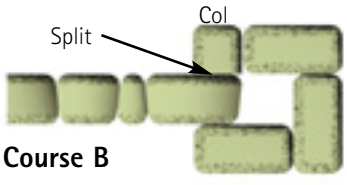
COLUMNS

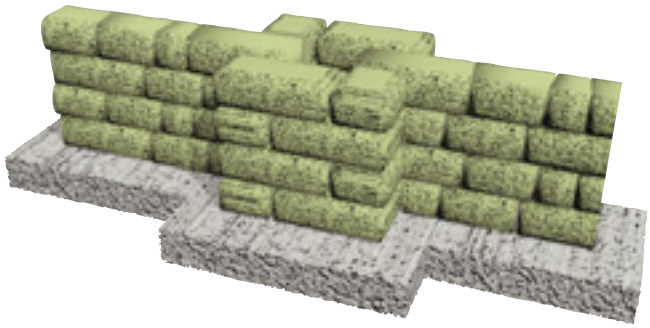
When used with a free standing wall, a column increases wall stability. Placing fixtures on columns is also a great way to incorporate lighting. Columns can be located in the middle or at the end of a wall. The open space in the center of a column permits reinforcement or electrical wiring if needed. The column leveling pad should extend 6 inches beyond each column edge and be at least 6 inches deep after compaction.

COLUMN AT END OF WALL

To build columns at the end of a wall, cut one column unit in half for the second, fourth and additional even-numbered courses. Stack column units in a rotating pattern for each course so that the bond is staggered. One column unit half is used every two courses. Glue each course of column units with a concrete adhesive. Integrate wall into column as shown to increase stability.

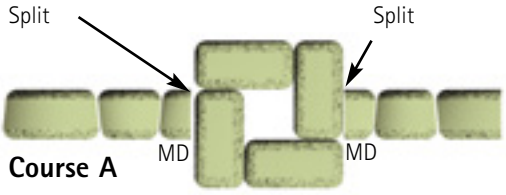


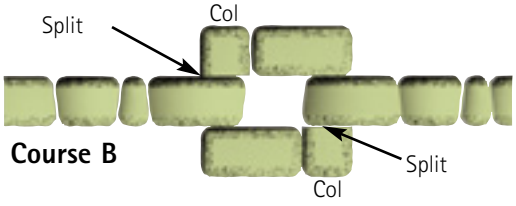




WALL THROUGH COLUMN

On the first course, use complete column units to start the column and cut the wall units to fit. On the second course, cut two column units in half to fill in the corners. Continue construction by alternating courses. Glue all column courses with a concrete adhesive.



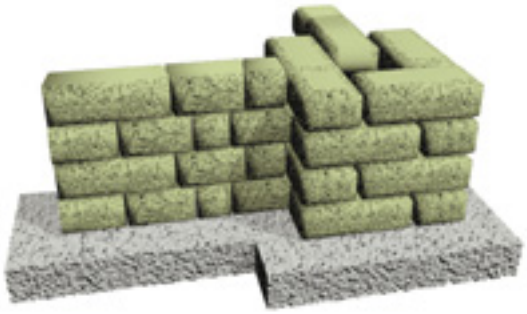


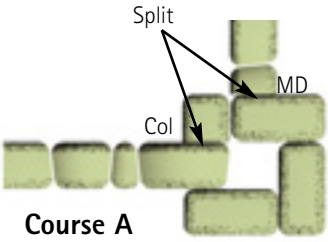
A Highland Stone® Free Standing Wall with columns is a great way to enclose an outdoor room and provide support for a privacy screen and pergola.

Separate parking from plantings with a Highland Stone® Free Standing Wall. Step a wall up or down at the column.

90° CORNER AT COLUMN

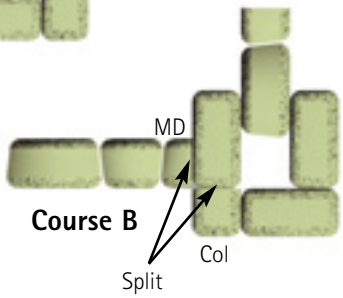
Frequently, a 90° turn is made at a column. To build this column, cut one column unit per course. Stack column units in a rotating pattern for each course. Glue each course of column units with a concrete adhesive.

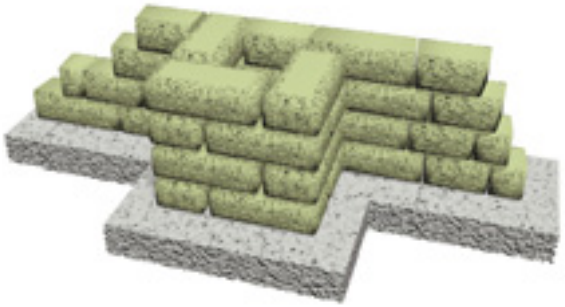




PILASTER IN RUNNING WALL

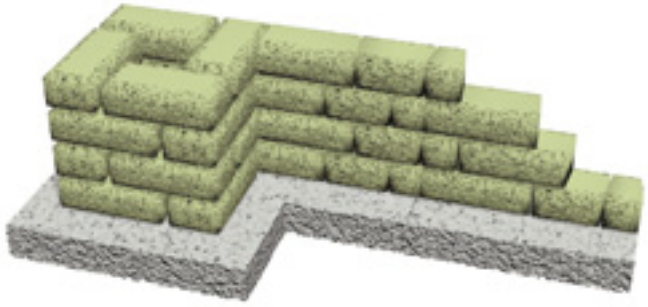
Pilasters add stability and elegance to a wall. They are located on one side of a wall. To build a pilaster, stack column units in a rotating pattern for each course. Cut wall units as indicated. Glue each course of units in the pilaster with a concrete adhesive.

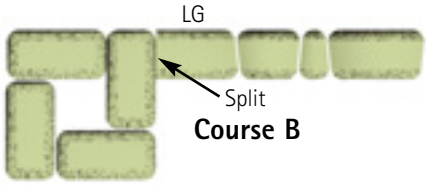




PILASTER AT END OF WALL

To build a pilaster at the end of a wall, stack three column units as shown for the base course. For the second course, use pillar units, stacking in a rotating pattern. Glue each course of units in the pilaster with concrete adhesive.

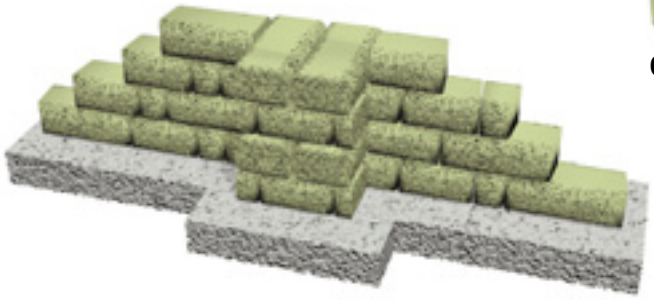


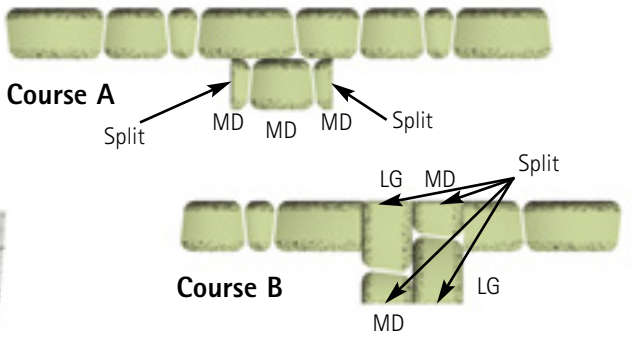


Tip: For information on capping a wall, see page 24.

SMALL PILASTER IN WALL

There are times when a pilaster of a different size is needed. To build a smaller pilaster in the running wall, you will need to split a medium unit for the first course. Split the unit so that the pieces, combined with another medium unit, equal 18 inches. Place the units parallel to the wall on the prepared leveling pad. For the second course, split a large and medium unit so that they equal 18 inches. Split a second set of large and medium units to make a second 18-inch section. Insert these units perpendicular to the wall as shown. Glue all courses. Round the split ends with a hammer and chisel.

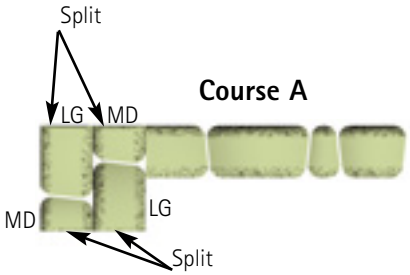


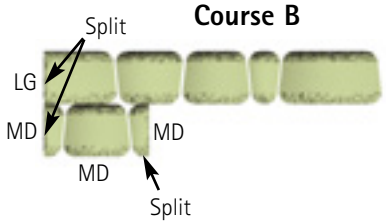


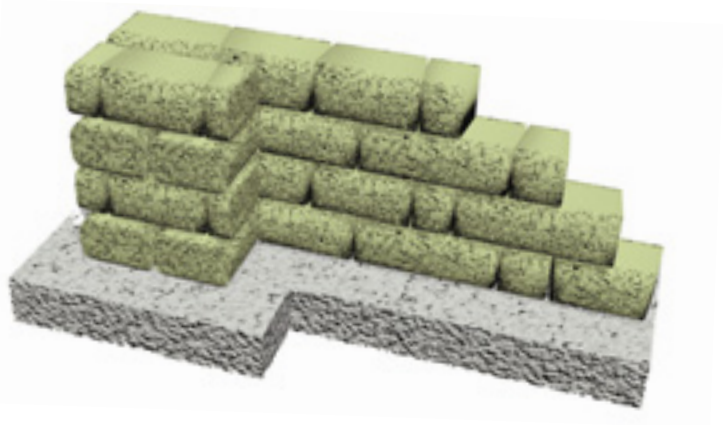
SMALL PILASTER AT END OF WALL

To build a smaller pilaster at the end of a running free standing wall, you will need to split 4 units for the first course. Split a large and small unit so they equal 18 inches. Split a second set of units to make a second 18-inch section. Insert the unit sets perpendicular to the wall on the prepared leveling pad.

For the second course, center a medium unit over the pilaster base units as shown. Split another unit so that the bond on the course below is staggered. Round the split ends with a hammer and chisel. Glue all pilaster units with a concrete adhesive.

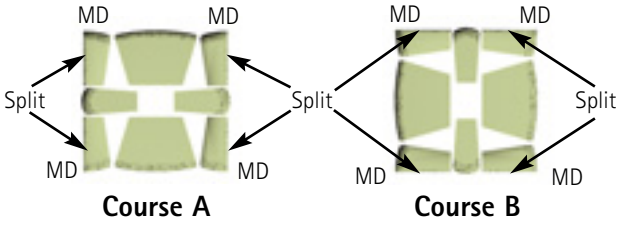






COLUMN WITH LARGE HIGHLAND STONE® RETAINING WALL UNITS

To build a 30-inch column, split two medium wall units in half. Stack column units in a rotating pattern for each course. Glue each course of units with a concrete adhesive. Round the split ends with a hammer and chisel. For more information about Highland Stone retaining wall products, see page 14.



CAPPING A COLUMN

There are numerous ways to cap a column. You can use cap units, single-piece units or natural stone. Here are some options.

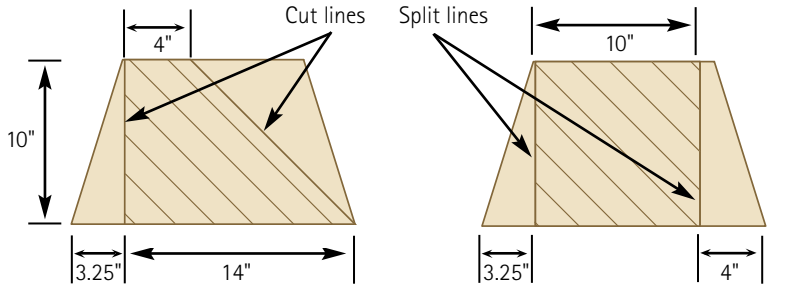
Using an Extra Large Cap

This capping treatment requires 8 extra large trapezoidal cap units. (For other cap dimensions, please contact your dealer for specific instructions.) Each unit is cut as shown. Top with the 5-inch square coupon. Use concrete adhesive to glue all pieces when cap is complete.

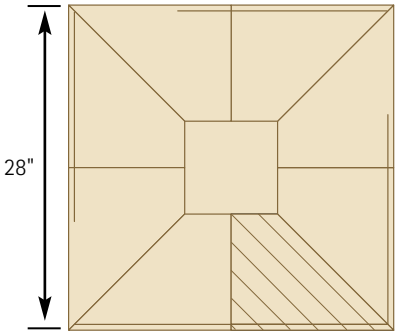
Using a Large Cap

This capping treatment requires 8 large trapezoidal cap units. Each unit is cut as shown. Top with the 10-inch square coupon. Use concrete adhesive to glue all pieces when cap is complete.

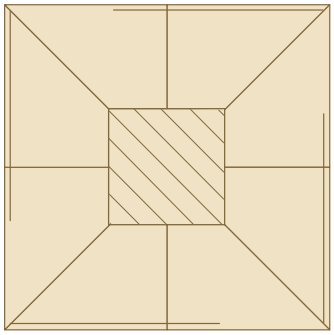
LARGE CAP



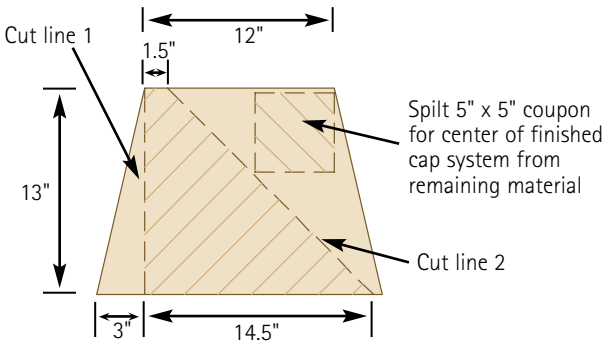
Cap Placement

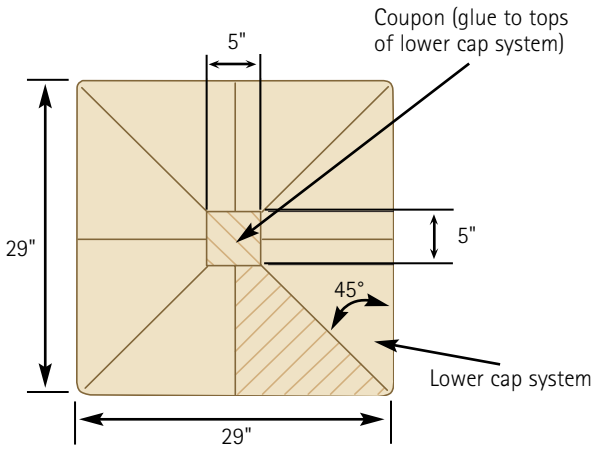


Coupon



EXTRA LARGE CAP





CAPPING A WALL

See page 24 for details about capping a wall.

Lights are the perfect way to top off a column. Drill a hole in the coupon and run wiring through the hollow column core.

PRODUCT DETAILS

- Available in two heights and three face lengths
- Can be used for gravity walls up to 4 feet high, including buried course
- Taller walls can be built with geosynthetic reinforcement when designed by a qualified engineer
- Minimum outside radius, measured on the top course to the back of the units: 4 feet*
- Minimum inside radius, measured on the base course to the front of the units: 8 feet*

NO PINS
NO MORTAR
NO MISALIGNMENTS

Our patented rear-lip technology makes installation efficient and accurate.

3 INCH



	LARGE	MEDIUM	SMALL
Approximate Dimensions**	3" x 18" x 11½"	3" x 12" x 11½"	3" x 6" x 11½"
Approximate Weight**	41 lbs.	28 lbs.	14 lbs.
Coverage	.375 sq. ft.	.25 sq. ft.	.125 sq. ft.
Setback/Batter	9/16" / 10.6°	9/16" / 10.6°	9/16" / 10.6°

6 INCH



	LARGE***	MEDIUM	SMALL
Approximate Dimensions**	6" x 18" x 12"	6" x 12" x 12"	6" x 6" x 12"
Approximate Weight**	73 lbs.	59 lbs.	30 lbs.
Coverage	.75 sq. ft.	.50 sq. ft.	.25 sq. ft.
Setback/Batter	1⅛" / 10.6°	1⅛" / 10.6°	1⅛" / 10.6°

ACCESSORIES****



	CAP	JUMPER	STEP
Approximate Dimensions**	Front, 3" x 18" x 13" Back, 3" x 12" x 13"	12" x 6" x 13¼"	6" x 16" x 12"
Approximate Weight**	44 lbs.	48 lbs.	85 lbs.
Coverage	1.25 linear ft.	.50 sq. ft.	
Setback/Batter		1⅛" / 10.6°	

*May vary depending on the installation pattern.
**Actual dimensions and weights may vary from these approximate dimensions and weights due to variations in manufacturing processes. Specifications may change without notice. See your Anchor representative for details, color options, block dimensions and additional information.
***Large unit features a partial core. Specifications may vary by region.
****Availability may vary by region.

ESTIMATING FORMULAS

For project material estimating, use the formulas listed in each step.

1 EXPOSED WALL UNIT ESTIMATING

Determine the square footage of the exposed wall: Exposed wall length (L) x height (H) = square feet (SF).

6-INCH UNITS USED ALONE
SF ÷ 1.5 = # units each size

3-INCH UNITS USED ALONE
SF ÷ .75 = # units each size

3- AND 6-INCH UNITS COMBINED
SF ÷ 2.25 = # units each size

2 BURIED BASE UNIT ESTIMATING

Build buried base course using 6-inch large units. Determine the length (L) of the base in feet.

L ÷ 1.5 = # 6-inch large units

3 CAP ESTIMATING

Convert wall length (L) to inches: L x 12 = L in inches (LI). Cap factor (CF) = cap front inches + cap back inches ÷ 2.
For curved wall, add 10%.

LI ÷ CF = # caps

4 FILTER FABRIC ESTIMATING

Non-woven, 4- to 6-ounce filter fabric. Determine the SF of total wall.

SF ÷ 9 = square yards fabric

5 LEVELING PAD AGGREGATE ESTIMATING

Leveling pad aggregate is a compactible base material of ¾-inch minus (with fines). The leveling pad is a minimum of 6 inches in front of and behind the wall units and 6 inches deep after compaction. Wall length (L) in feet ÷ 27 x 1.1 = cubic yards (CY). CY x 1.6 = tons.

L ÷ 27 x 1.1 = CY
CY x 1.6 = tons

6 DRAINAGE AGGREGATE ESTIMATING

Drainage aggregate is clear 1-inch crushed stone (with no fines). The drainage column extends 12 inches behind the wall units. Wall length (L) in feet x total wall height (H) in feet = SF ÷ 27 x 1.1 = cubic yards (CY). CY x 1.6 = tons.

SF ÷ 27 x 1.1 = CY
CY x 1.6 = tons

7 GEOSYNTHETIC REINFORCEMENT ESTIMATING

See reinforcement estimating charts on pages 39 to 41 for variations in soil and site conditions.

PROJECT ESTIMATING EXAMPLE

The wall is 50 feet long and 4 feet high, built with 3- and 6-inch units combined. There is no toe or crest slope, and the soils are clean sand and gravel.

1 EXPOSED WALL UNITS

50' L x 3.5' H = 175 SF ÷ 2.25 = 78 units of each size

2 BURIED BASE UNITS

50' L ÷ 1.5 = 34 6-inch-high large units

TOTAL UNITS REQUIRED

6-inch-high units

Large units	*Wall*	*78*
	Base	*34*
	Total	*112*
Medium units		*78*
Small units		*78*

3-inch-high units

Large, medium, small	*78*

3 CAP UNITS

LI example: 50' L x 12" = 600"
CF example: 18" + 12" = 30" ÷ 2 = 15
Project example: 600" ÷ 15 = 40 caps needed

4 FILTER FABRIC

50' L x 4' H = 200 SF ÷ 9 = 23 square yards fabric needed

5 LEVELING PAD AGGREGATE

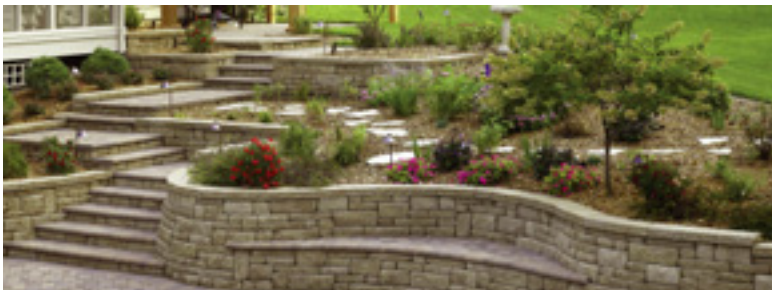
50' L ÷ 27 = 1.85 x 1.1 = 2.1 CY x 1.6 = 3.3 tons needed

6 DRAINAGE AGGREGATE

50' L x 4' H = 200 SF ÷ 27 x 1.1 = 8.15 CY x 1.6 = 13.1 tons needed

7 GEOSYNTHETIC REINFORCEMENT

See reinforcement estimating charts on pages 39 to 41 for variations in soil and site conditions.



The combination of Highland Stone® 3- and 6-inch units and the jumper unit provide a variety of design options. Turn to page 16 for new installation patterns.

16 HIGHLAND STONE® RETAINING WALL PATTERNS

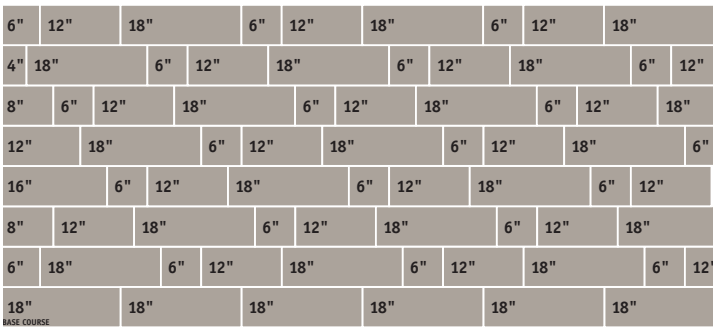
WHEN TO USE A PATTERN

You can install the Highland Stone® system in a random pattern using any combination of units. Just avoid vertical lines that span more than 1 foot in height.

If you are building a wall without geosynthetic reinforcement, use a pattern for inspiration or follow a pattern exactly. Pleasing random patterns can be built using an equal number of 3- and 6-inch-high blocks or using an equal square footage of blocks in each size. The estimating formulas on page 15 are based on using an equal number of blocks of each size in each height.

When building a wall that includes geosynthetic reinforcement, using a pattern at the appropriate spacing eliminates the need to cut the grid. When using a pattern, begin at one edge laying the blocks as indicated. Install at least one repeat of the pattern to establish the pattern before proceeding to the next course.

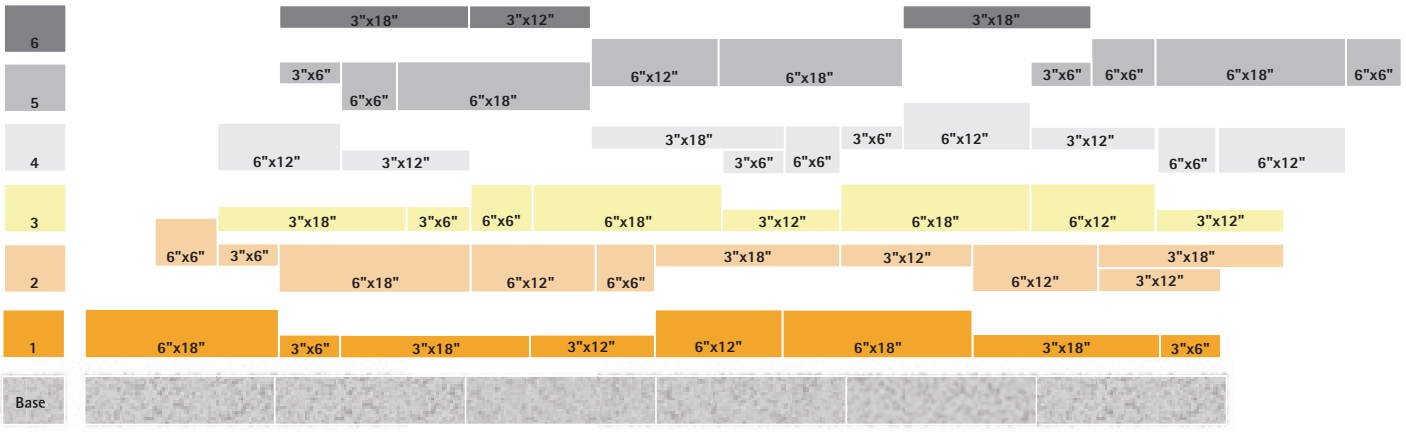
HIGHLAND STONE® 6-INCH BLOCK PATTERN

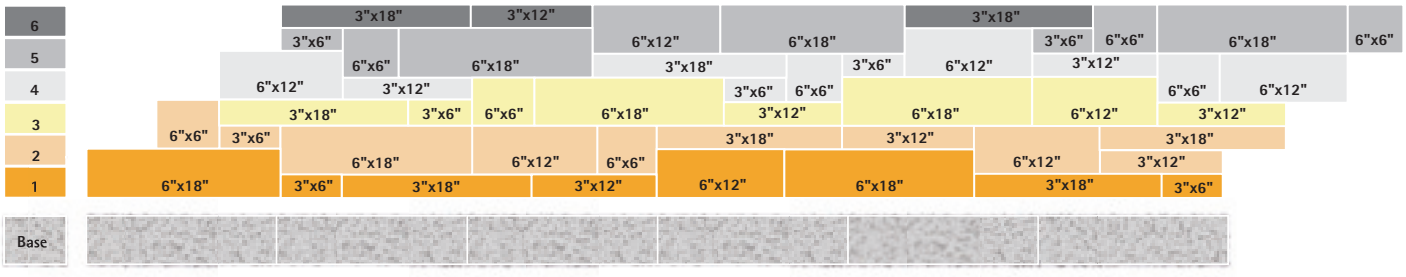


HIGHLAND STONE® 3- AND 6-INCH BLOCK COMBINATION PATTERNS

24-INCH BY 9-FOOT PATTERN

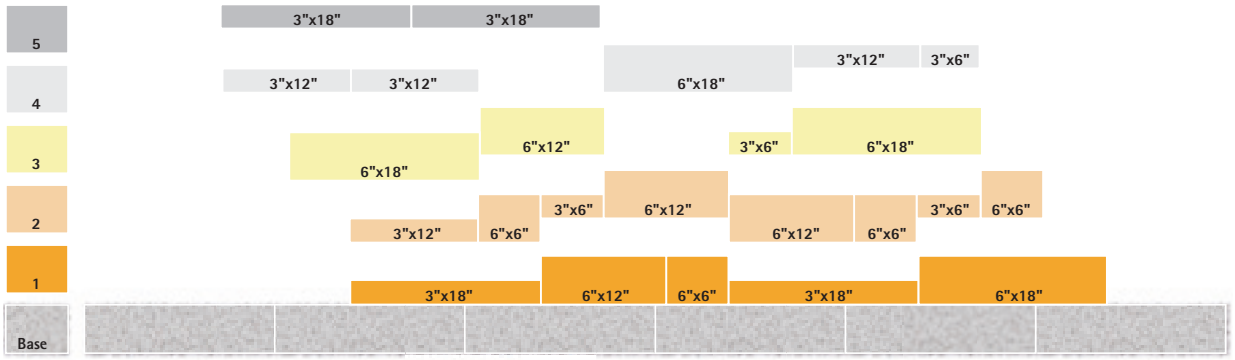
This illustrates a 24-inch-high by 9-foot-long repeating pattern. When your plan requires reinforcement, this pattern is ideal because it eliminates cutting.

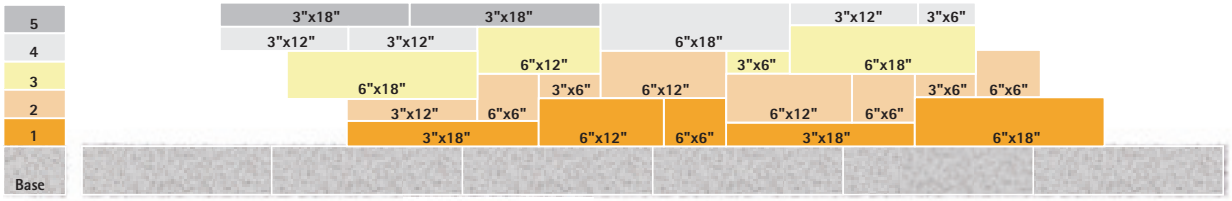




18-INCH BY 6-FOOT PATTERN

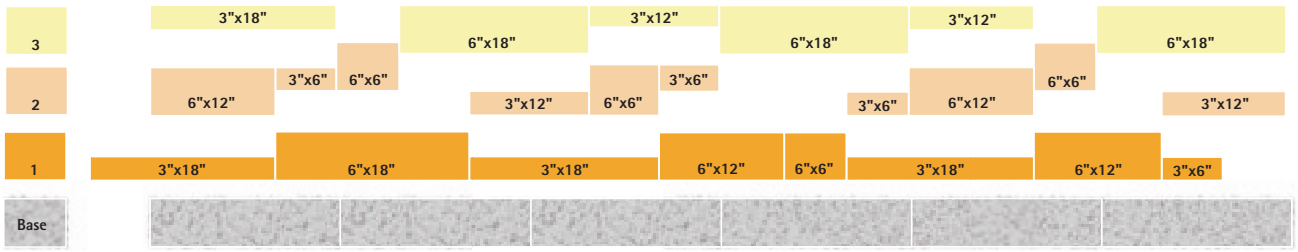
This illustrates an 18-inch-high by 6-foot-long repeating pattern. When your plan requires reinforcement, this pattern is ideal because it eliminates cutting.

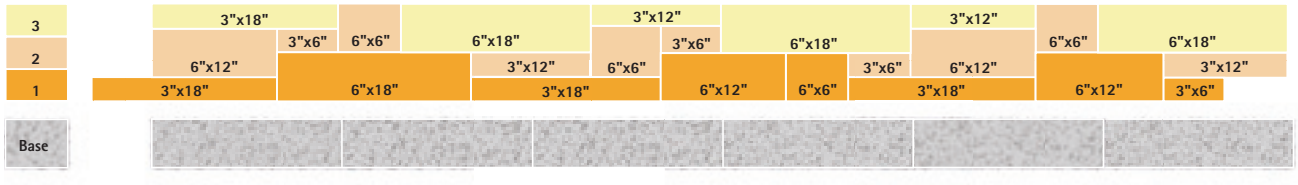




12-INCH BY 9-FOOT PATTERN

This illustrates a 12-inch-high by 9-foot-long repeating pattern. When your plan requires reinforcement, this pattern is ideal because it eliminates cutting.





CUTTING GRID

Grid can be cut if needed. See page 38 for more information about cutting grid.

PRODUCT DETAILS

- Available in casual- or formal-face styles, plus Diamond® straight- or beveled-face style products.
- Can be used for building gravity walls up to 4 feet high, including buried course
- Taller walls can be built with geosynthetic reinforcement when designed by a qualified engineer
- Minimum outside radius: Formal face, 4 feet; Casual face, 2.5 feet
- Minimum inside radius: Formal face, 8 feet; Casual face, 4 feet
- ICC-evaluated

NO PINS
NO MORTAR
NO MISALIGNMENTS

Our patented rear-lip technology makes installation efficient and accurate.

6 INCH

	CASUAL FACE*	FORMAL FACE*
Approximate Dimensions**	6" x 15⅞" x 12"	6" x 17⅜" x 12"
Approximate Weight**	69 lbs.	71 lbs.
Coverage	.67 sq. ft.	.72 sq. ft.
Setback/Batter	1⅛" / 10.6°	1⅛" / 10.6°

ACCESSORIES

	EXTRA LARGE CAP	STEP
Approximate Dimensions**	Front, 3" x 18" x 13" Back, 3" x 12" x 13"	6" x 16" x 12"
Approximate Weight**	44 lbs.	89 lbs.
Coverage	1.25 linear ft.	

*Unit has a partial core. Specifications may vary by region.

**Actual dimensions and weights may vary from these approximate dimensions and weights due to variations in manufacturing processes. Specifications may change without notice. See your Anchor representative for details, color options, block dimensions and additional information.

The rough-hewn appearance of the Diamond Stone Cut™ causal face helped create an inviting terraced garden. Diamond® products may also be available. Check with your dealer for availability.

ESTIMATING FORMULAS

For project material estimating, use the formulas listed in each step.

1 WALL UNIT ESTIMATING

Determine the square footage of the total wall, including buried base course. Wall square footage (SF) = length (L) x height (H).

Casual Face
SF x 1.5 = # units
Formal Face
SF x 1.4 = # units

2 CAP ESTIMATING

Convert wall length (L) to inches: L x 12 = L in inches (LI). Cap factor (CF) = cap front inches + cap back inches ÷ 2. (Additional caps will be needed for elevation changes and curves.)

LI ÷ CF = # caps

3 LEVELING PAD AGGREGATE ESTIMATING

Leveling pad aggregate is a compactible base material of ¾-inch minus (with fines). The leveling pad extends at least 6 inches in front of and behind the wall units and is at least 6 inches deep after compaction. Wall length in feet (L) ÷ 27 x 1.1 = cubic yards (CY). CY x 1.6 = tons.

L ÷ 27 x 1.1 = CY
CY x 1.6 = tons

4 DRAINAGE AGGREGATE ESTIMATING

Drainage aggregate is clear, 1-inch crushed stone (with no fines). The drainage column extends 12 inches behind the wall units. Wall length (L) x total wall height (H) = square feet (SF) ÷ 27 x 1.1 = cubic yards (CY). CY x 1.6 = tons.

SF ÷ 27 x 1.1 = CY
CY x 1.6 = tons

5 GEOSYNTHETIC REINFORCEMENT ESTIMATING

See pages 39 to 41. Choose the appropriate estimating chart based on your project conditions.

PROJECT ESTIMATING EXAMPLE

Total wall is 50 feet long and 4 feet high. The product is casual-face units. There is no toe or crest slope, and soils are clean sand and gravel.

1 TOTAL WALL UNITS

50' L x 4' H = 200 SF x 1.5 = 300 units

2 CAP UNITS

LI example: 50' L x 12" = 600
CF example: 17.25" + 12" = 29.25" ÷ 2 = 14.6
Project example: 600 ÷ 14.6 = 42 caps

3 LEVELING PAD AGGREGATE

50' L ÷ 27 = 1.85 x 1.1 = 2.1 CY x 1.6 = 3.4 tons needed

4 DRAINAGE AGGREGATE

50' L x 4' H = 200 SF ÷ 27 x 1.1 = 8.15 CY x 1.6 = 13 tons needed

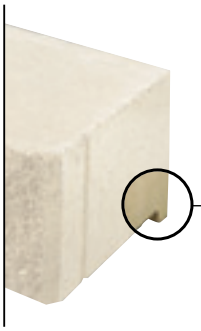
5 GEOSYNTHETIC REINFORCEMENT

See reinforcement estimating charts on pages 39 to 41 for variations in soil and site conditions.

The clean lines of the Diamond Stone Cut™ formal face echo the architecture of this office complex.

PRODUCT DETAILS

- Available in three face styles: Stone Cut,™ straight and beveled
- Stone Cut available in three face lengths
- Can be used to build gravity walls, including buried course, up to 3 feet, 4 inches high
- Taller walls can be built with geosynthetic reinforcement when designed by a qualified engineer
- Large unit ICC-evaluated



NO PINS
NO MORTAR
NO MISALIGNMENTS

Our patented rear-lip technology makes installation efficient and accurate.

8 INCH

STONE CUT™ FACE

	LARGE	MEDIUM	SMALL
Approximate Dimensions*	8" x 18" x 12"	8" x 11" x 12"	8" x 7" x 12"
Approximate Weight*	77 lbs.	45 lbs.	34 lbs.
Coverage	1.0 sq. ft.	.601 sq. ft.	.379 sq. ft.
Setback/Batter	1" / 7.13°	1" / 7.13°	1" / 7.13°
Minimum Radius	Varies depending on the block pattern used. Minimum inside radius 4'. Minimum outside radius 7'.		

BEVELED AND STRAIGHT FACE

	BEVELED FACE	STRAIGHT FACE
Approximate Dimensions*	8" x 18" x 12"	8" x 18" x 12"
Approximate Weight*	72 lbs.	74 lbs.
Coverage	1.0 sq. ft.	1.0 sq. ft.
Setback/Batter	1" / 7.13°	1" / 7.13°
Inside Radius	4'	6'
Outside Radius	4'	4'

ACCESSORIES

	CAP	CORNER
Approximate Dimensions*	Front, 4" x 17¼" x 10"	8" x 18" x 9"
	Back, 4" x 10" x 10"	8" x 18" x 9"
Approximate Weight*	40 lbs.	101 lbs.
Coverage	1.22 linear ft.	

*Actual dimensions and weights may vary from these approximate dimensions and weights due to the manufacturing process. Specifications may change without notice. See your Anchor representative for details, color options, block dimensions and additional information.

DIAMOND PRO® STONE CUT™ FACE INSTALLATION PATTERN

C	11	18	7	11	18	7
C	7	11	18	7	11	9**
C	18	11	7	18	11	7
C	11	7	18	11	7	9**

This is one of many random patterns that can be created with 3-piece Diamond Pro® Stone Cut.™ Virtually any configuration will work, provided you maintain a good running bond between courses.

**Partial unit. 'C' represents a corner unit.

ESTIMATING FORMULAS

For project material estimating, use the formulas listed in each step.

1 WALL UNIT ESTIMATING

Choose the wall unit formula based on the face style.

STRAIGHT AND BEVELED WALL UNIT ESTIMATING

Determine the square footage of the *total* wall, including buried course. Square footage (SF) of total wall is length (L) x height (H). If using straight or beveled, skip to step 3.

SF x 1 = # of units

EXPOSED WALL UNITS – ESTIMATING STONE CUT™ FACE

Determine the square footage of the *exposed* wall. Square footage (SF) of exposed wall is length (L) x height (H).

SF ÷ 2 = # units of each size

2 BURIED BASE UNIT ESTIMATING – STONE CUT FACE

Build buried base course using large units. Determine the length (L) of the base in feet.

L ÷ 1.5 = # large units for buried base

3 CAP ESTIMATING

Convert wall length (L) to inches: L x 12 = L in inches (LI). Cap factor (CF) = cap front inches + cap back inches ÷ 2.

LI ÷ CF = # caps

4 LEVELING PAD AGGREGATE ESTIMATING

Leveling pad material is a compactible base material of ¾-inch minus (with fines). The leveling pad extends at least 6 inches in front of and at least 6 inches behind the wall units and is at least 6 inches deep after compaction. Wall length in feet (L) ÷ 27 x 1.1 = cubic yards (CY). CY x 1.6 = tons.

L ÷ 27 x 1.1 = CY
CY x 1.6 = tons

5 DRAINAGE AGGREGATE ESTIMATING

Drainage aggregate is clear ¾- to 1-inch crushed stone (without fines). The drainage column extends a minimum of 12 inches behind the wall units. Wall length (L) x total wall height (H) = square feet (SF) ÷ 16.4 = tons.

SF ÷ 16.4 = tons

6 CORE FILL AGGREGATE ESTIMATING

Calculate the square feet (SF) of the total wall.

SF ÷ 35 = tons

7 GEOSYNTHETIC REINFORCEMENT ESTIMATING

See pages 42 to 44 for charts. Choose the appropriate estimating chart based on your project conditions.

PROJECT ESTIMATING EXAMPLE

The wall is 100 feet long and 8 feet high, including buried course. It is built using the Stone Cut 3-piece system. There is no toe or crest slope, and the soils are clean sand and gravel.

1 EXPOSED WALL UNITS

100' L x 7.33' H = 733 SF ÷ 2 = 367 large, medium and small Stone Cut units needed

2 BURIED BASE UNITS

100' L ÷ 1.5 = 67 large units for the buried course

TOTAL UNITS REQUIRED

Large units	*Wall*	*367*
	Base	*67*
	Total	*434*
Medium units		*367*
Small units		*367*

3 CAP UNITS

CF example: 17.25" + 10" = 27.25" ÷ 2 = 13.7
L example: 100' x 12" = 1,200
Project example: 1,200 ÷13.7 = 88 caps

4 LEVELING PAD AGGREGATE

100' L ÷ 27 x 1.1 = 4.1 CY x 1.6 = 6.6 tons

5 DRAINAGE AGGREGATE

800 SF ÷ 16.4 = 49 tons

6 CORE FILL AGGREGATE

800 SF ÷ 35 = 23 tons

7 GEOSYNTHETIC REINFORCEMENT ESTIMATING

See pages 42 to 44 for charts. Choose the appropriate estimating chart based on your project conditions.

22 RETAINING WALL INSTALLATION INSTRUCTIONS

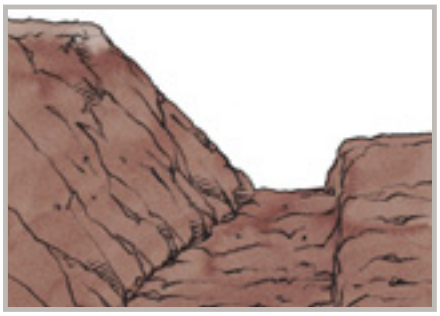
The following installation instructions apply to Anchor retaining wall products that feature a rear lip. Where there are variations, the appropriate information has been noted.

STAKE OUT THE WALL

- Have a surveyor stake out the wall's placement. Verify the locations with the project supervisor.

EXCAVATION

- Excavate for the leveling pad to the lines and grades shown on the approved plans and excavate enough soil behind the wall for the geosynthetic reinforcement material. The trench for the leveling pad should be at least 12 inches wider than the block you are installing and 6 inches deeper than the height of the block. *See Diagram 1.*



EXCAVATION Diagram 1

LEVELING PAD

- An aggregate leveling pad is made of compactible base material of ¾-inch minus (with fines).
- The pad must extend at least 6 inches in front of and behind the first course of block and be at least 6 inches deep after compaction.
- If the planned grade along the wall front will change elevation, the leveling pad may be stepped up in 6-inch increments to match the grade change. Start at the lowest level and work upward whenever possible. *(See page 29 for more information.)*
- Compact the aggregate and make sure it's level front to back and side to side. Mist lightly with water before compaction. *See Diagram 2.*

LEVELING PAD COMPACTION Diagram 2

BASE COURSE

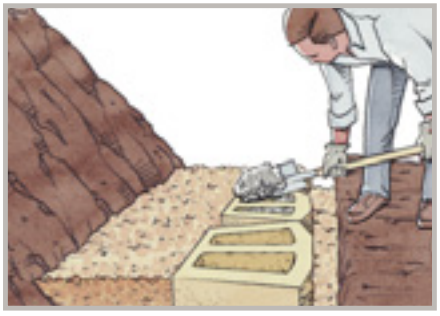
- This is the most important step in the installation process. Bury the base course of block.
- Begin laying block at the lowest elevation of the wall. Remove the rear lip of the block by hitting from the back so that it will lie flat on the leveling pad.
- Place first block level, front to back and side to side; lay subsequent blocks in same manner.
- Place the blocks side by side, flush against each other, and make sure the blocks are in full contact with the leveling pad.
- If the wall is on an incline, don't slope the blocks; step them up so they remain consistently level. *(See page 29 for more information.)*
- Use stringline along back edge of block to check for proper alignment.
- For multiple-piece products, use the largest unit, 18 inches wide, for the base course.

CONSTRUCTION OF THE NEXT COURSE

Diamond®, Diamond Stone Cut™ and Diamond Pro®

- Clean any debris off the top of the blocks.
- Place the second course of blocks on top of the base course. Maintain running bond. Pull each block forward as far as possible to ensure the correct setback. *See Diagram 3.*
- The casual face style of Diamond Stone Cut™ has a rough-hewn appearance and random shape which gives it a natural look. If the intent is to have a more traditional look and maintain a perfect bond, you may have to chip block edges. Pull each block forward as far as possible to ensure the correct setback. See Diagram 3.
- For best results with Diamond Stone Cut, use a filter fabric, which should be placed directly behind the wall extending from the bottom of the base course to the middle of the top course. This will minimize material coming through the rough-hewn face texture of these products. We recommend a non-woven, 4- to 6-ounce fabric. See Diagram 5.
- Backfill with drainage aggregate directly behind the block, adding 6 inches at a time followed by proper compaction.
- Add soil fill behind the aggregate. Compact before the next course is laid.
- Don't drive heavy equipment near the wall. Self-propelled compaction equipment should not be used within 4 feet of the wall.
- You'll need partial units to stay on bond. A circular saw with a masonry blade is recommended for cutting partial units. Use safety glasses and other protective equipment when cutting.
- If you are using a block with cores that should be filled, fill prior to laying the next course. *See Diagram 4.*

CONSTRUCTION OF THE NEXT COURSE Diagram 3



CORE FILL Diagram 4

Highland Stone® and Diamond Pro Stone Cut™

- Follow instructions as noted above.
- You can install these products using any combination of blocks.
- Keep the wall bond by placing units in a staggered relationship to the course beneath.
- See pages 16 and 17 for installation patterns for Highland Stone. *See page 20 for Diamond Pro Stone Cut™ installation pattern.*
- For best results, use a filter fabric, which should be placed directly behind the wall extending from the bottom of the base course to the middle of the top course. This will minimize material coming through the rough-hewn face texture of these products. We recommend a non-woven, 4- to 6-ounce fabric. *See Diagram 5.*

CAPPING

- See page 24 for more information about cap installation.

DRAINAGE DESIGN

- Each project is unique. The grades on your site will determine at what level to install the drain tile.
- Place the drain tile as low as possible behind the wall so water drains down and away from the wall into a storm drain or to an area lower than the wall. *See Diagram 6.*
- Fill in the area behind the blocks with drainage aggregate, at least 12 inches from the wall.
- You may need to place and backfill several courses to achieve the proper drainage level.
- Cover the drain tile with a geotextile sock which acts as a filter. The drain tile outlet pipes should be spaced not more than every 50 feet and at low points of the wall. In order for the drainage aggregate to function properly, it must keep clear of regular soil fill. *(See page 28 for more information.)*

COMPACTION

- Shovel the backfill soil behind the drainage aggregate and compact with a hand-operated compactor.
- Make sure the aggregate is level with or slightly below the top of the base course.
- Place soil in front of the base course and compact. Base course should be buried.
- Continue to fill and compact. *See Diagram 8.*

REINFORCEMENT (IF REQUIRED)

- Geosynthetic reinforcement is recommended for walls taller than 4 feet or walls situated in poor soils, supporting a driveway, etc. Consult a qualified engineer for design assistance.
- Check the wall construction plan for which courses will need reinforcement.
- Clean any debris off the top layer of blocks.
- Measure and cut the reinforcement to the design length in the plans.
- To cut grid when block heights are varied in a row, *see page 38.*
- The reinforcement has a design strength direction, which must be laid perpendicular to the wall.
- Place the front edge of the material on the top course, 2 inches from the face of the block.
- Apply the next course of blocks to secure it in place.
- To keep it from wrinkling, pull the reinforcement taut and pin the back edge in place with stakes or staples.
- Add drainage aggregate behind the blocks, then add the soil and compact it. *See Diagrams 7 and 8.*
- Remember — place the front edge of the reinforcement on top of the block, making sure it's within 2 inches of the face of the block. Correct placement ensures that you maximize the connection strength and keep the batter consistent.
- A minimum of 6 inches of backfill is required prior to operating vehicles on the reinforcement. Avoid sudden turning or braking. *See Diagram 8.*

FINISH GRADE AND SURFACE DRAINAGE

- Protect the wall with a finished grade at the top and bottom.
- To ensure proper water drainage away from the wall, use 6 inches of soil with low permeability. This will minimize water seeping into the soil and drainage aggregate behind the wall.

SITE CLEANING AND RESTORATION

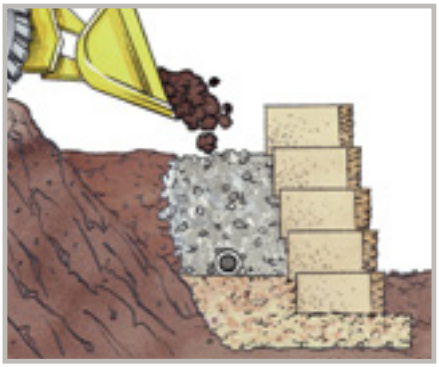
- Brush off the wall and pick up any debris left from the construction process.
- Notify the job superintendent in writing of the project's completion and that it is ready for final inspection and acceptance.
- Planting vegetation in front and on top of the wall will help reduce the chance of erosion.
- Following these Best Practices for construction will ensure the successful installation of Anchor Wall Systems products.

Jumper Installation Note: See page 38 for further details.

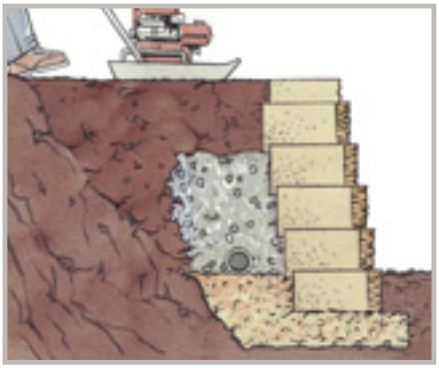
SAFETY NOTE: Always use appropriate equipment, including safety glasses or goggles and respirators, when splitting, cutting or hammering units.

FILTER FABRIC **Diagram 5**

DRAIN TILE **Diagram 6**



DRAINAGE AGGREGATE **Diagram 7**



COMPACTION **Diagram 8**

24 RETAINING WALL CONSTRUCTION DETAILS

RUNNING BOND

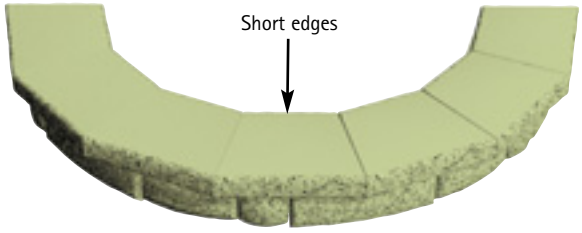
STRAIGHT WALL

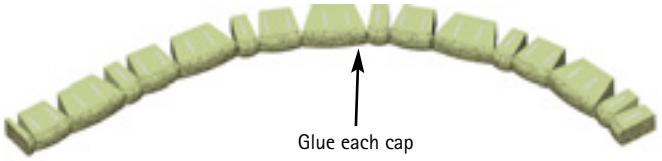
Proper installation of any Anchor retaining wall requires that running bond be maintained. Running bond occurs when the blocks are centered over the vertical joints of the previous course. This adds to wall stability and makes your wall system aesthetically beautiful.

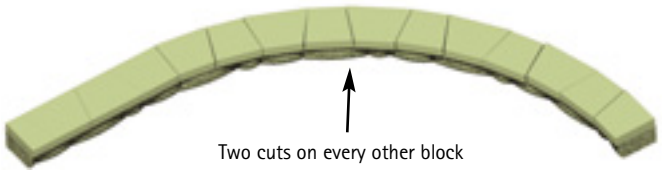
CURVED WALL

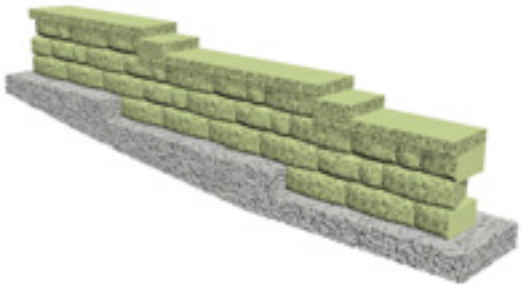
Any wall that is not perfectly straight will eventually run off bond when using Diamond® and Diamond Pro® When this happens, skip a block position and place the next block into the next place where it is back on bond. Measure the remaining gap and cut a block to fit.

Once the partial unit is in place, glue with a concrete adhesive. Partial units should not be less than 5 inches and should not be placed directly on top of each other. If the gap is larger than the length of one block, divide the measurement by two and put two partial units in place.









CAPPING A WALL

STRAIGHT WALL

Caps are trapezoidal and must be laid alternatively short and long cap faces for a straight line. Always start capping from the lowest elevation.

OUTSIDE CURVES

Lay out the cap units side by side and cut at least every other cap to produce a uniform look. Start with the long side of the cap facing out and adjust to the radius.

INSIDE CURVES

Lay cap units side by side with the short side facing out. In most circumstances, making two cuts on one cap and then not cutting the cap on either side produces the most pleasing look.

CORNERS

On a 90° corner wall, the corner caps need to be saw-cut to achieve a 45° mitered corner.

STEPPING UP CAPS

If a wall elevation changes, caps can be stacked where the wall steps up. Begin laying caps at the lowest elevation change and work your way back toward the previous step up. Split a cap unit to create a rough face on the exposed side. Place the half unit directly on top of the capped portion of the wall with all three split faces exposed.

FINISHING

After layout is complete and caps are saw-cut or split to size, carefully glue with a concrete adhesive.

STANDARD STEP

These construction drawings feature step units. Caps or pavers can be used for treads. Check local building codes for any tread depth standards.

Graceful curves enhance the appearance of a step area when Highland Stone® wall units and step units are combined.

BASE COURSE

Thoroughly compact the leveling pad. Lay out the base course according to the wall design. Place step units first, working from the center to each side. Remember, it is very important to backfill and compact behind and along the sides of each course of step units.

FIRST STEP COURSE

Place the first course of step units directly on top of the base course so there is no setback. Stagger them from the previous course and glue in place.

SECOND STEP COURSE

Add the second course of steps, staggering them from the previous course to maintain running bond. Overlap the previous course by 2 inches and glue to lower course.

SECOND WALL COURSE

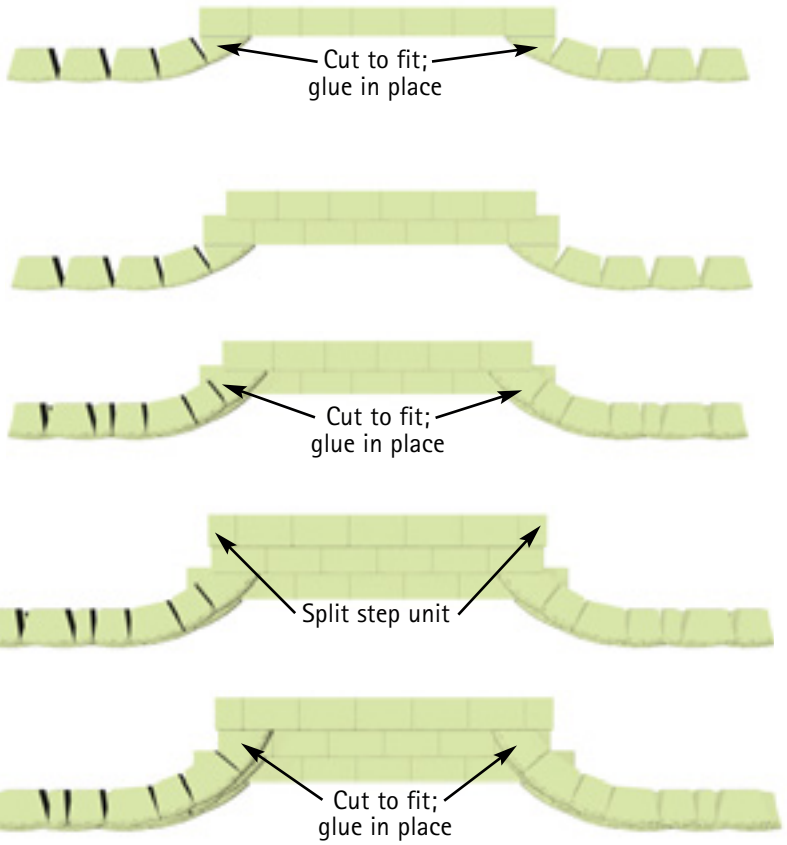
Build the second course of the wall.

THIRD STEP COURSE

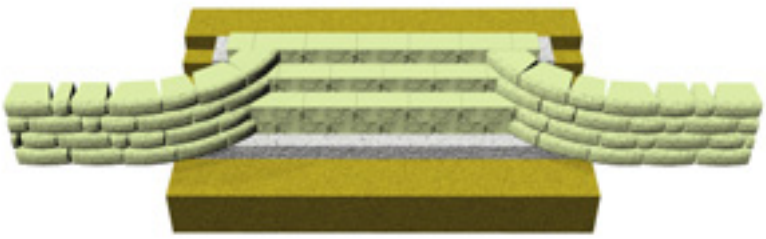
Beginning in the center, add the third course of steps, lining up the units with the first course. Overlap 2 inches and glue in place.

THIRD WALL COURSE

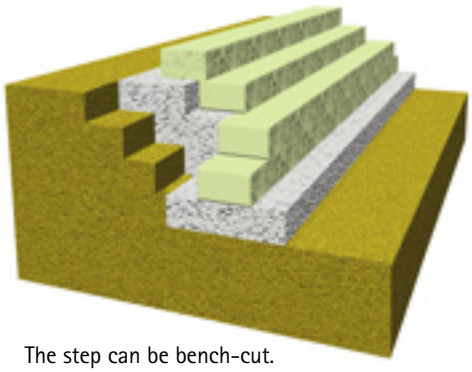
Build the third course of the wall. Repeat these steps until the wall is finished.



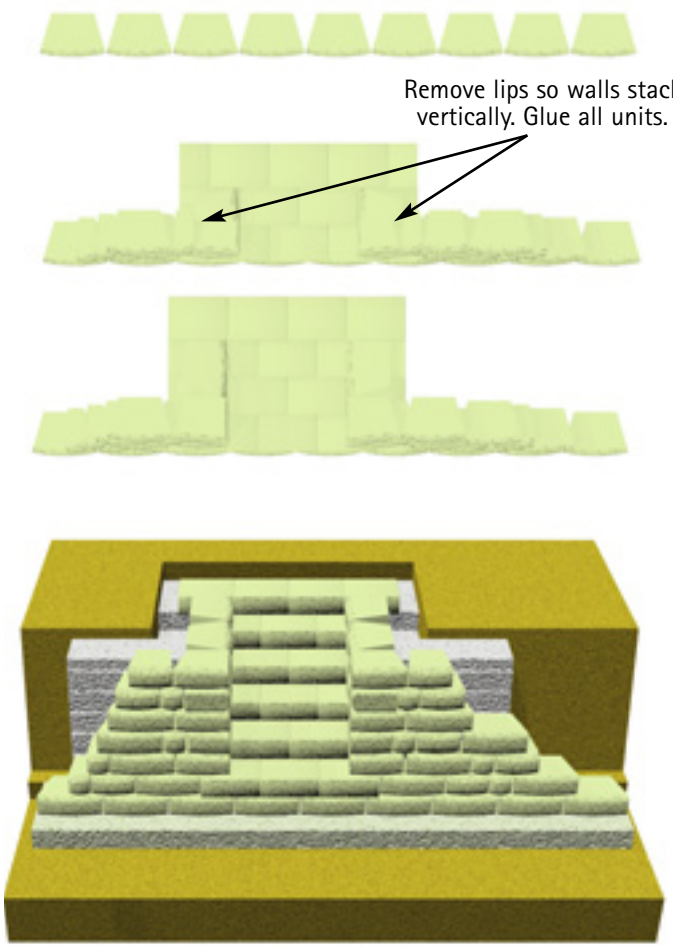
ELEVATION



Drainage Tip: Drain pipe can be placed behind the lowest step units at grade or behind each wall adjacent to the steps.



The step can be bench-cut.



STEP

These construction drawings feature step units. Caps or pavers can be used for treads. Check local building codes for any tread depth standards.

BASE COURSE

Thoroughly compact the leveling pad. Lay out the base course according to the wall design. Place step units first, working from the center to each side. Remember, it is very important to backfill and compact behind and along the sides of each course of step units.

FIRST STEP COURSE

Place the first course of step units directly on top of the base course so there is no setback. Stagger them from the previous course and glue in place.

SECOND STEP COURSE

Add the second course of steps, staggering them from the previous course to maintain running bond. Overlap the previous course by 2 inches and glue to lower course.

SECOND WALL COURSE

Build the second course of the wall.

THIRD STEP COURSE

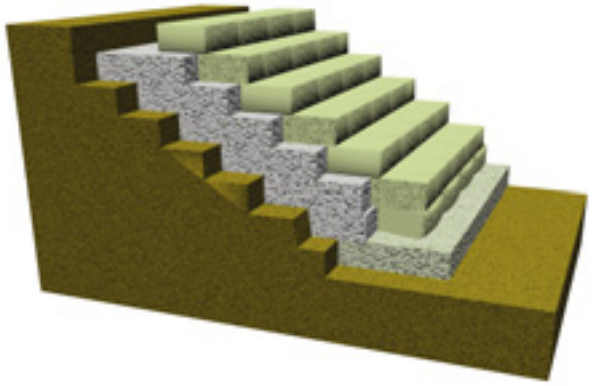
Beginning in the center, add the third course of steps, lining up the units with the first course. Overlap 2 inches and glue in place.

THIRD WALL COURSE

Build the third course of the wall. Repeat these steps until the wall is finished.

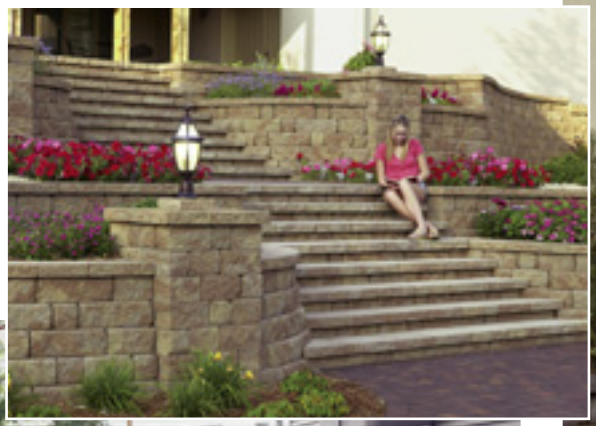
Drainage Tip: Drain pipe can be placed behind the lowest step units at grade or behind each wall adjacent to the steps.

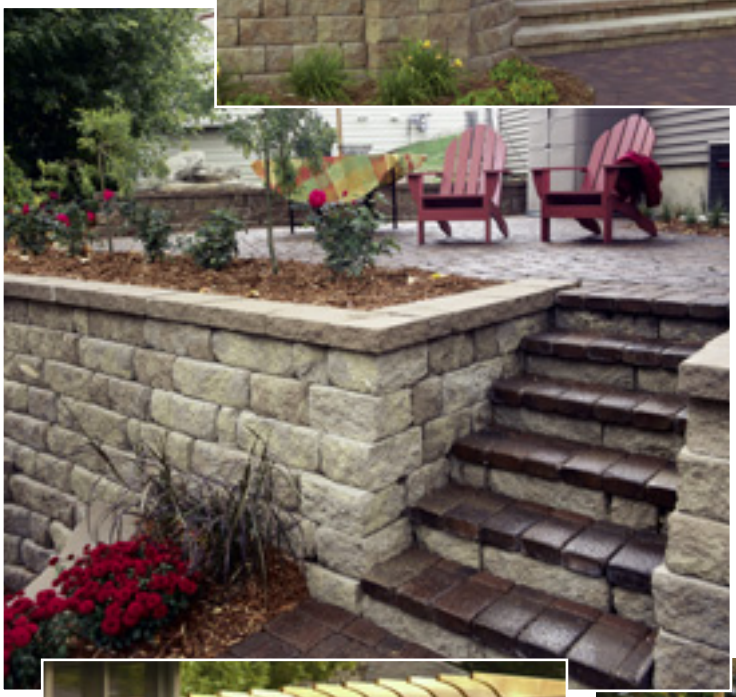
Squaring off the wall next to steps gives a tailored look.



STEP INSPIRATION

Cap units finish steps built with Highland Stone® wall units. Use the Standard Step Construction Details on page 25 but substitute 6-inch wall units for step units.





Bull-nosed pavers complete this step installation with Highland Stone step units. Use the Standard Step Construction Details on page 25.

Pavers complete this set of steps built with Highland Stone wall units. Follow the Step Construction Details on page 26 but substitute wall units for step units.

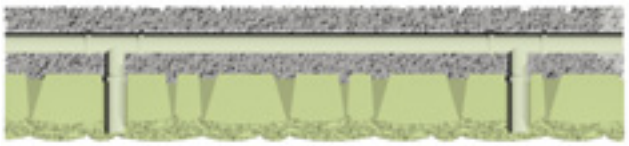
Sweeping steps stimulate interest in hardscapes. Use the Standard Step Construction Details on page 25 but substitute 6-inch Highland Stone wall units for step units.

Turn up the interest and explore steps that aren't straight from bottom to top. Use the Standard Step Construction Details on page 25 but substitute 6-inch Highland Stone wall units for step units. Continue the pattern established in the wall as the steps are incorporated.

DAYLIGHTING DRAINAGE

FIRST COURSE

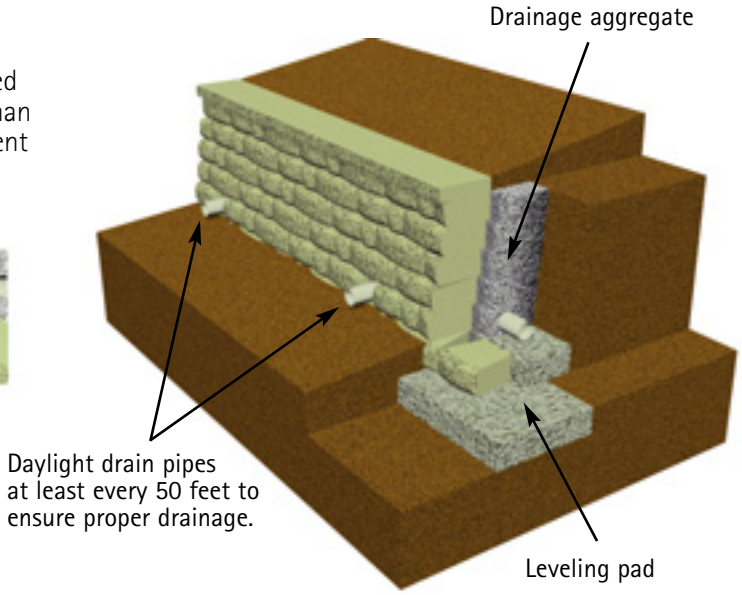
To daylight drain pipes through a wall face, place the drain pipes on compacted leveling pad aggregate placed behind the first course. Space these drains not more than 50 feet apart. Split 2 inches off the front of two adjacent large units to provide space for the drain pipe to exit through the face.



NEXT COURSE

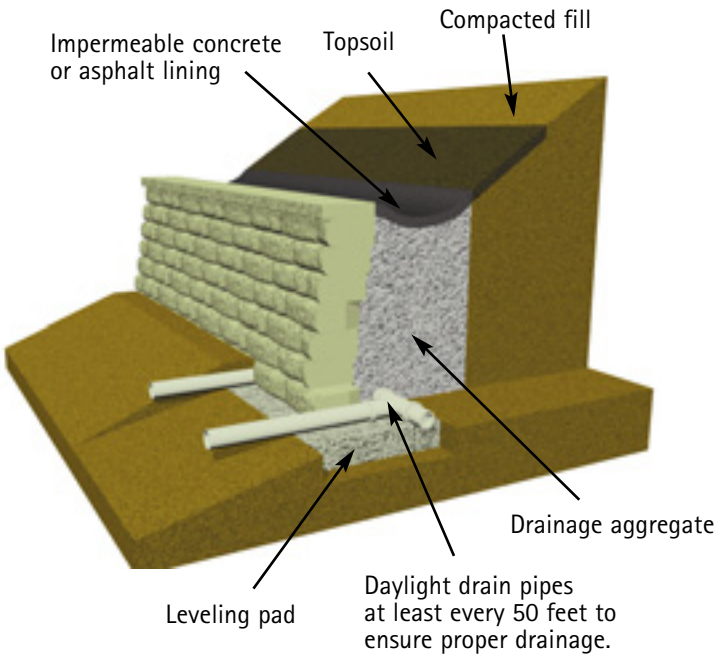
Build this and remaining courses using standard construction techniques.

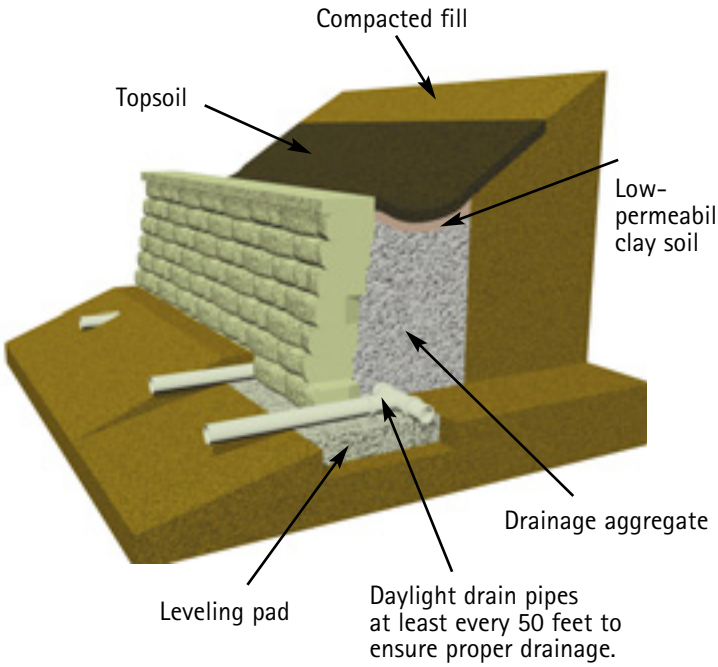
Tip: To daylight through slope, see Drainage Swales.



DRAINAGE SWALES

The design and performance of most retaining walls are based on keeping the reinforced zone relatively dry. Appropriate drainage swales to help control water should be designed in the wall construction plan.





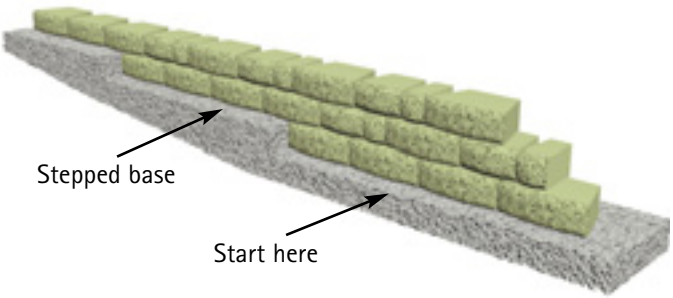
STEPPING UP THE BASE

LOWEST POINT

Walls built on a sloping grade require a stepped base. Begin excavation at the lowest point and dig a level trench into the slope until it is deep enough to accommodate the base material and one entire block.

STEP UP

At this point, step up the height of one block and begin a new section of base trench. Continue to step up as needed to top of slope. Always bury at least one full unit at each step.



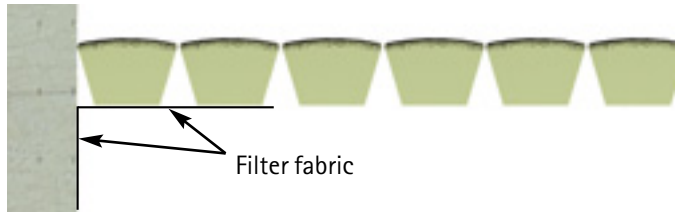
ABUTTING EXISTING STRUCTURE

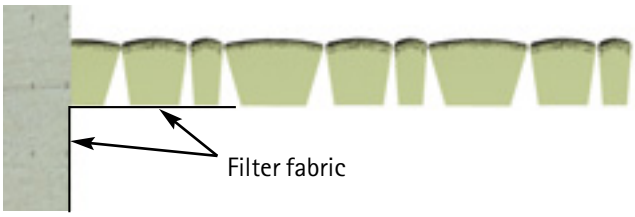
FIRST COURSE

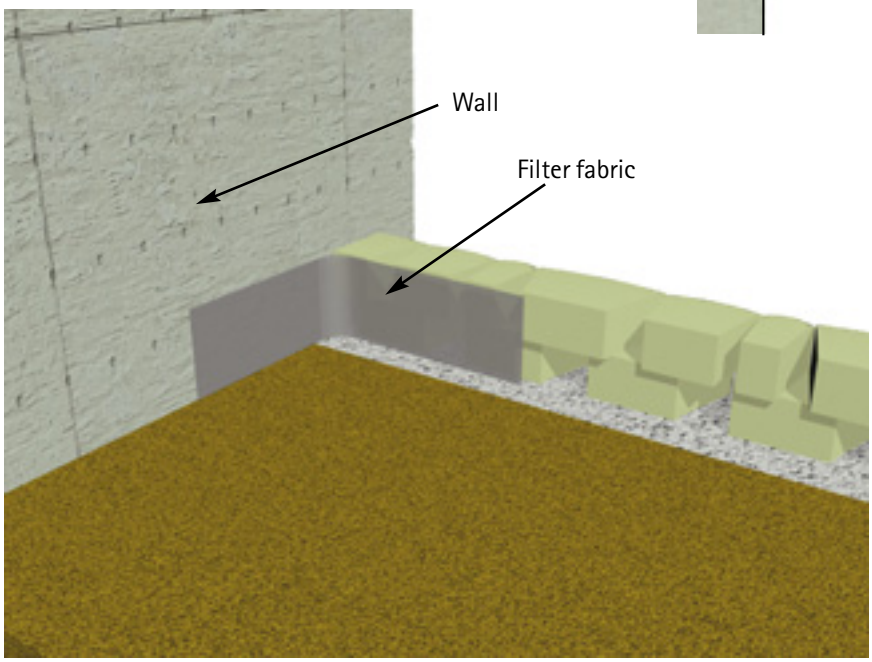
Begin with first block next to the wall and place first course. Place filter fabric behind the first two large units and extend it 2 feet along the existing structure.

SECOND COURSE

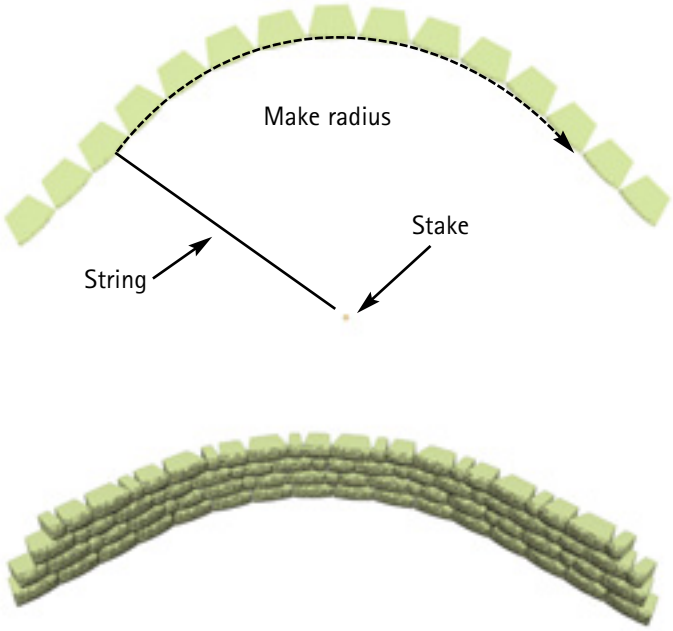
Build second course with standard installation techniques. A split unit is shown, but may not be necessary in every installation. Extend filter fabric to the top edge of the final course. A rubber membrane can be placed between the units and a non-concrete wall to prevent moisture damage to the structure.







INSIDE CURVES



CALCULATE THE RADIUS

Check the wall plan to determine the radius of the base course. This will be the smallest radius in the wall and must not be less than the minimum for the block system used.

BASE COURSE

Begin by driving a stake into the ground at the desired center of the curve. Attach a string and rotate it in a circle around the stake to mark the radius in the soil. Align each block face with the radius curve and ensure level placement from side to side and front to back.

ADDITIONAL COURSES

On each course, the lip of each block must be in contact with the back of the units below to ensure structural stability. The setback of the block will cause the radius of each course to gradually increase and eventually affect the running bond of the wall. To maintain proper running bond, use partial units as needed when installing Diamond® and Diamond Pro®. Once a split unit is cut to size, glue in place with a concrete adhesive.

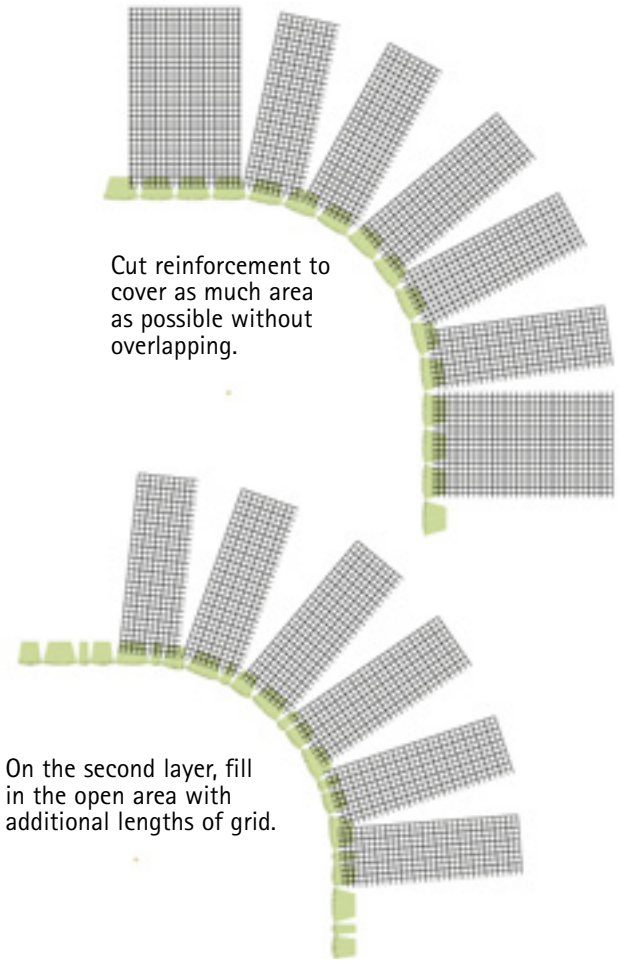
INSIDE CURVES WITH REINFORCEMENT

FIRST COURSE WITH REINFORCEMENT

Most retaining walls are designed assuming 100% coverage of the reinforcement. When building an inside curve, the back edges of the reinforcement will fan out slightly producing gaps. In order to ensure 100% coverage, additional lengths of reinforcement are used to fill those gaps on the next course of blocks. Don't overlap the grid on one course to avoid slippage.

Cut reinforcement to the lengths specified in the wall plan. Lay segments of reinforcement within 2 inches of the face of the wall, making sure that the strength direction of each section is perpendicular to the wall face.

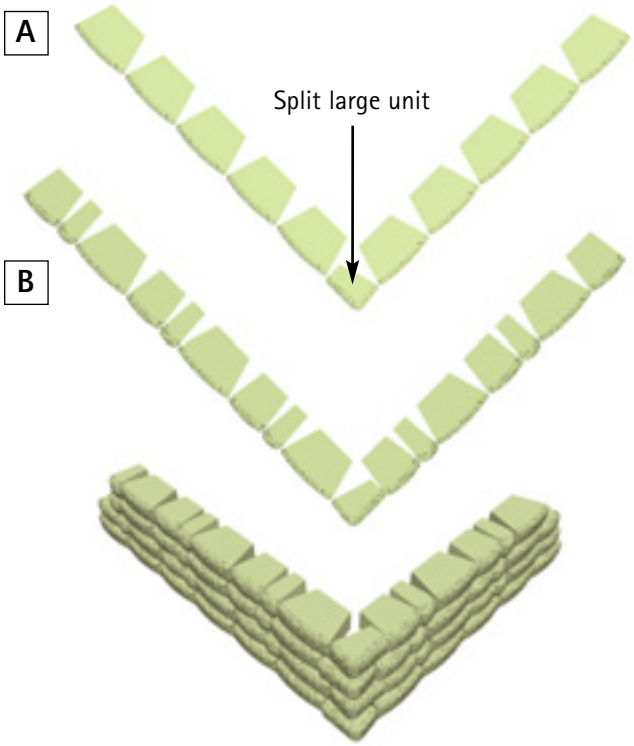
Place the next course of blocks, marking the backs of blocks to identify the middle of unreinforced areas. Backfill and compact. Center subsequent sections of reinforcement on the marked blocks to ensure full reinforcement coverage. Repeat this procedure throughout the construction of the radius curve when reinforcement is required.

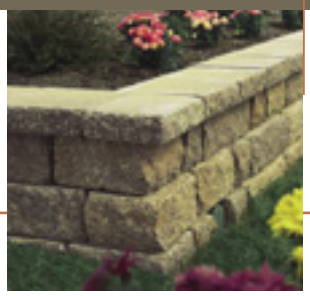


MINIMUM INSIDE RADIUS

Diamond Stone Cut™ Casual Face	4 feet
Diamond Stone Cut Formal Face	8 feet
Diamond® Beveled Face	4 feet
Diamond® Straight Face	8 feet
Diamond Pro®	6 feet
Diamond Pro Stone Cut™ (using all units)	6 feet
Highland Stone® (using all units)	8 feet

OUTSIDE 90° CORNERS





BASE COURSE

A To build an outside 90° corner, begin by splitting a large unit in half. Place this unit with both split faces out at the corner. Remove the lip so that the block lies flat. Then lay the rest of the base course working from the corner block out.

SECOND COURSE

B Begin the second course with the other half of the large unit. Place the second and third blocks on either side of the corner unit. Once the corner unit is in position, glue block in place with a concrete adhesive. Continue to alternate the corner unit orientation with each course and always use a concrete adhesive.

Use split units* as necessary to maintain running bond on Diamond® and Diamond Pro®.

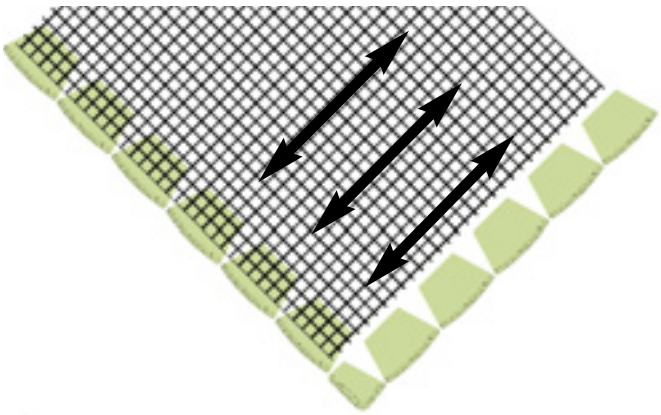
*To split a block, use a hydraulic splitter or split manually by using a hammer and chisel to score the block on all sides. Pound the chisel on the same line until the block splits. If partial unit sides are not exposed, use a circular cut-off saw with a masonry blade to achieve a tighter fit.

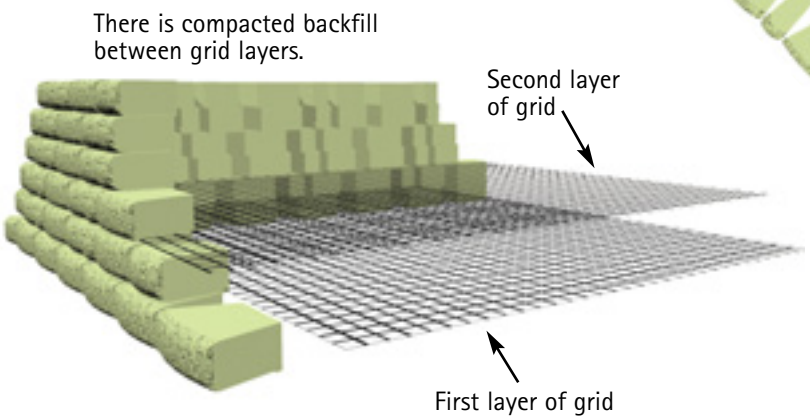
OUTSIDE 90° CORNERS WITH REINFORCEMENT

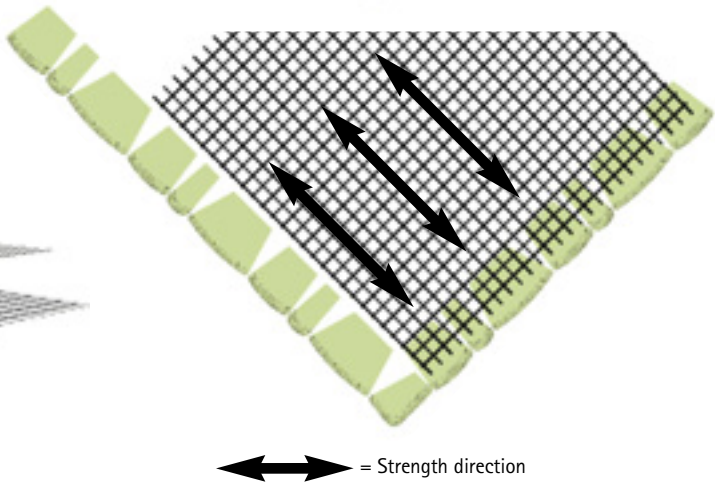
Begin by checking the wall plan to determine reinforcement lengths and elevations. Lay a section of reinforcement near the corner of the wall, ensuring that it's placed within 2 inches of the face of the block and running along the back of the adjoining wall.

Lay the next course of block, backfill and compact. When installing the next section of reinforcement, place within 2 inches of the face of the block and running along the back of the adjacent wall.

Tip: Use Diamond Pro® corner units or Highland Stone® column units for the corners.







OUTSIDE CURVES

Curving lines add grace and style to any project using Highland Stone.®
See page 24 for information about capping a curve.

CALCULATE THE RADIUS

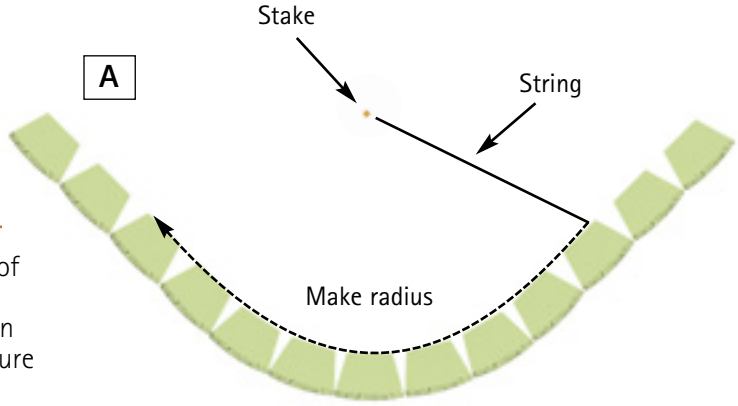
When building an outside radius curve, begin by calculating the radius of the top course. This will be the smallest radius in the wall and must not be less than the minimum radius for the block system used.

Here is a rule of thumb used to calculate the approximate radius of the top course: add ¼ inch to the setback of the block used. Multiply that amount by the number of courses in the finished wall. Then subtract the result from the radius of the base course. This number equals the calculated radius of the top course.

Example: The setback of Highland Stone® is 1⅛".
The wall is 8 courses high. The radius of the base course is 6 feet.
1⅛" + ¼" = 1⅜" x 8 courses = 11". 6' – 11" = 5'1" calculated radius of the top course.

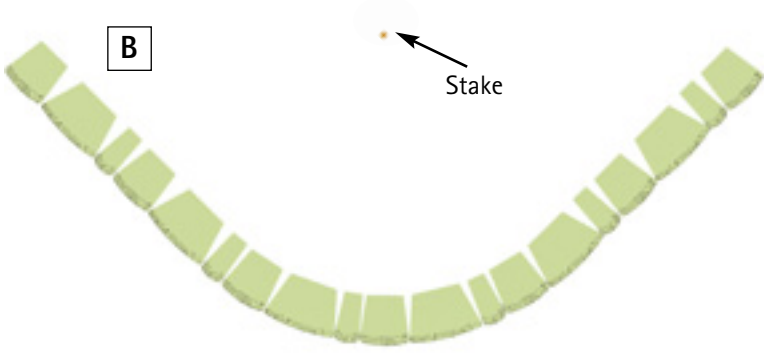
BASE COURSE

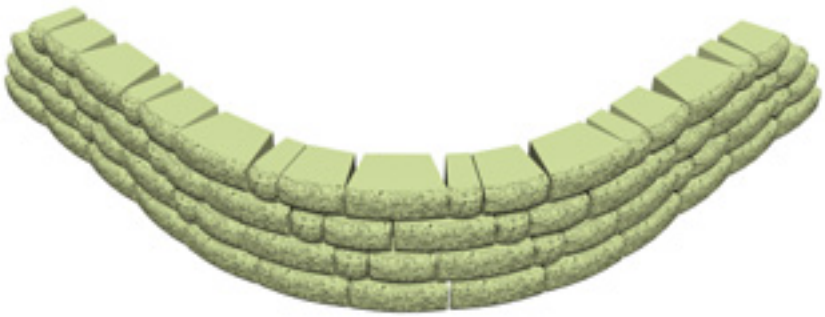
A Drive a stake into the ground at the desired center of the curve. Attach a string and rotate it in a circle around the stake to mark the radius in the soil. Align the back of the block with the radius curve and ensure level placement from side to side and front to back.



ADDITIONAL COURSES

B On each course, the lip of each block must be in contact with the back of the units below to ensure structural stability. The setback of the block will cause the radius of each course to gradually decrease and eventually affect the running bond of the wall. To maintain proper running bond, use partial units as needed when installing Diamond® and Diamond Pro® Once a split unit is cut to size, glue in place with a concrete adhesive.





OUTSIDE CURVES WITH REINFORCEMENT

FIRST COURSE WITH REINFORCEMENT

Most retaining walls are designed assuming 100% coverage of the reinforcement. When building an outside curve, the block edges of the reinforcement will have gaps so that the back edges don't overlap. In order to ensure 100% coverage, additional lengths of reinforcement are used to fill those gaps on the next course of blocks. Don't overlap the grid on one course to avoid slippage.

Cut reinforcement to the lengths specified in the wall plan. Lay sections of the reinforcement within 2 inches of the face of the wall with the strength direction perpendicular to the wall face. Avoid overlapping the reinforcement by separating each section. Place the next course of blocks, marking the backs of blocks to identify unreinforced areas. This step is important because when this course is backfilled, it's impossible to locate the unreinforced areas.

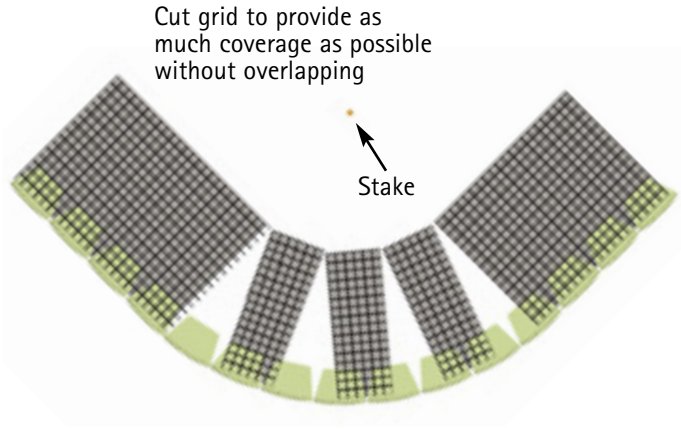
NEXT COURSE

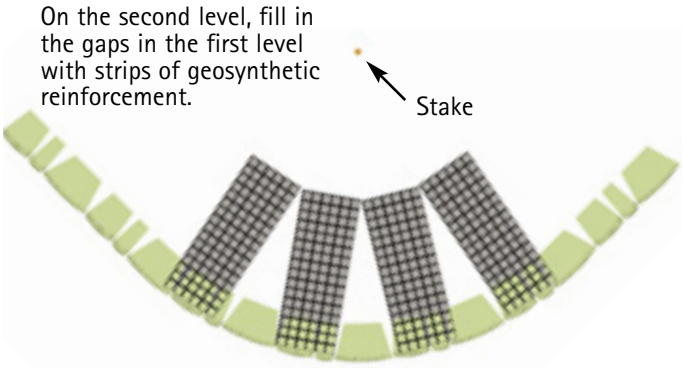
Place the next course of blocks, marking the backs of blocks to identify unreinforced areas. This step is important because when this course is backfilled, it's impossible to locate the unreinforced areas. Use the marked blocks as a guide, placing subsequent sections of reinforcement to overlap the gaps left on the previous course. This will ensure total reinforcement coverage. Repeat this procedure throughout the construction of the radius curve when reinforcement is required.

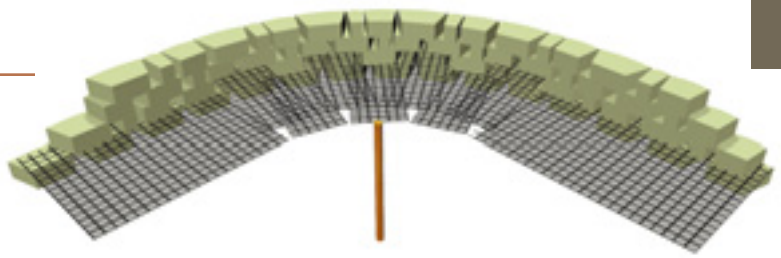
MINIMUM OUTSIDE RADIUS

Diamond Stone Cut™ Casual Face	2.5 feet
Diamond Stone Cut Formal Face	4 feet
Diamond® Beveled Face	2 feet
Diamond® Straight Face	4 feet
Diamond Pro®	4 feet
Diamond Pro Stone Cut™ (using all units)	4 feet
Highland Stone® (using all units)	4 feet

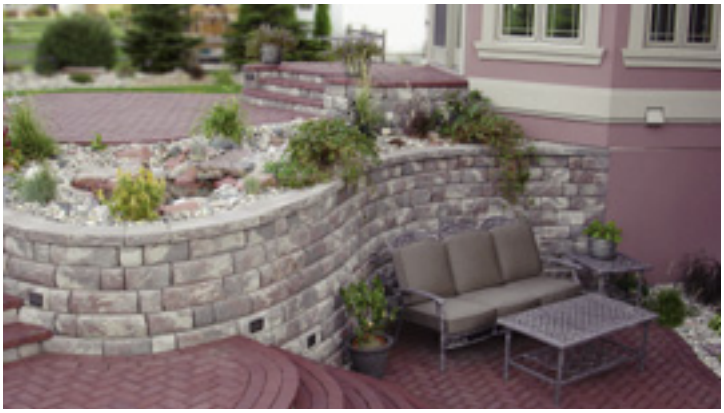
Highland Stone® units shown





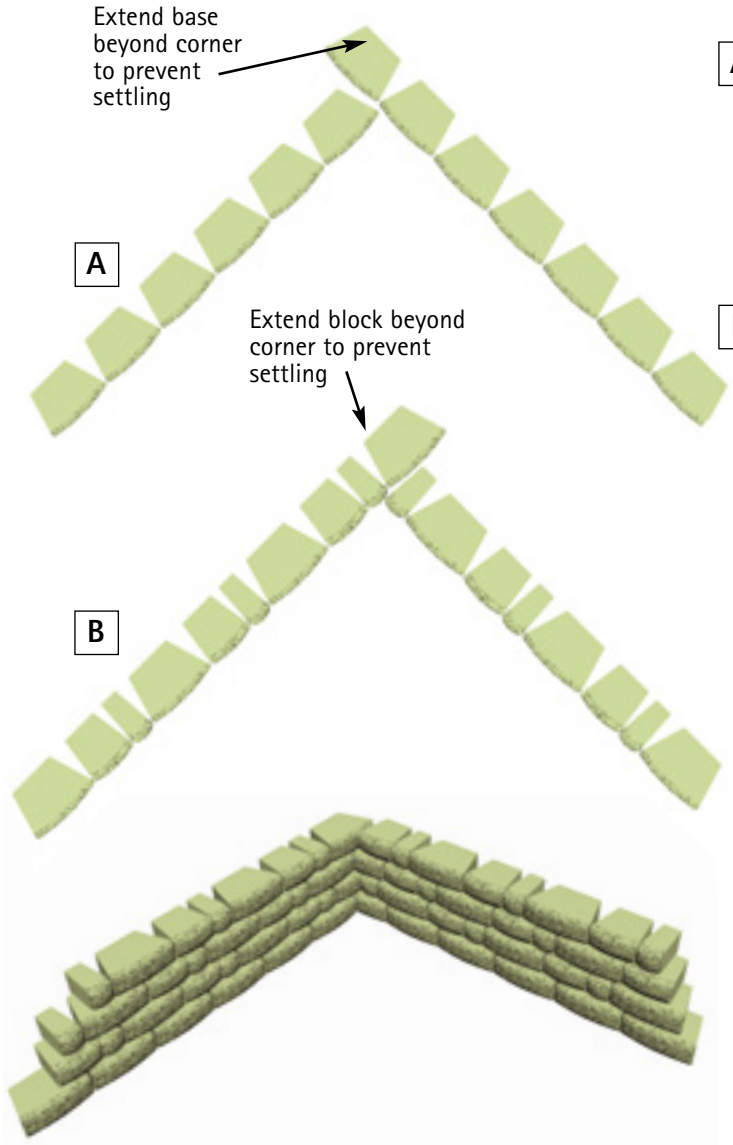


From this viewpoint, it is possible to see the complete grid coverage between the two layers of grid.



Turn an open patio into a cozy corner with curved Highland Stone® walls. Wall curves are repeated in the steps.

INSIDE 90° CORNERS



BASE COURSE

A To create an inside 90° corner, begin by placing a block at the corner. Then lay a second block perpendicular to the first and continue laying out the rest of the base course working from the corner out. Make sure to construct the base course according to standard site prep and installation procedures described earlier.

NEXT COURSE

B On the second course, place all blocks on bond along one side of the corner. Once the second course of one wall is established, begin the second course of the adjacent wall. Split units* may be required on this wall to maintain running bond when using Diamond® and Diamond Pro.®

*To split a block, use a hydraulic splitter or split manually by using a hammer and chisel to score the block on all sides. Pound the chisel on the same line until the block splits. If partial unit sides are not exposed, use a circular cut-off saw with a masonry blade to achieve a tighter fit.

Block placement in the corner should alternate direction with each succeeding course.

A quiet corner is sheltered with an inside 90° corner built with Highland Stone.® Step up the caps in 3-inch increments for a finished look. See page 24 for more information about stepping up caps.

INSIDE 90° CORNERS WITH REINFORCEMENT

FIRST COURSE WITH GEOGRID

A To install reinforcement on an inside 90° corner, begin by checking the wall plan to determine reinforcement lengths and elevations. Cut reinforcement to the lengths shown in the wall plan, paying attention to the reinforcement strength direction.

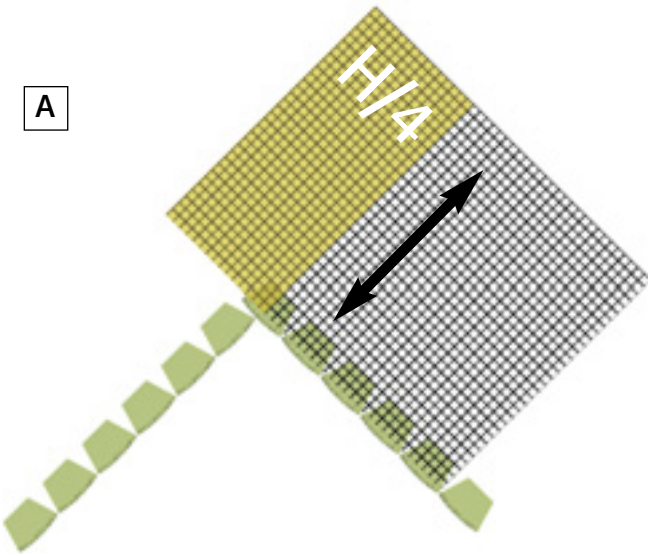
Next, determine the proper placement of the reinforcement by dividing the proposed height of the wall by four. This represents the distance that reinforcement should extend beyond the front of the adjoining wall.

Measure this distance from the front of the adjoining wall, begin the grid placement here. Make sure the grid is placed within 2 inches of the face of the wall and runs along the back of the adjoining wall.

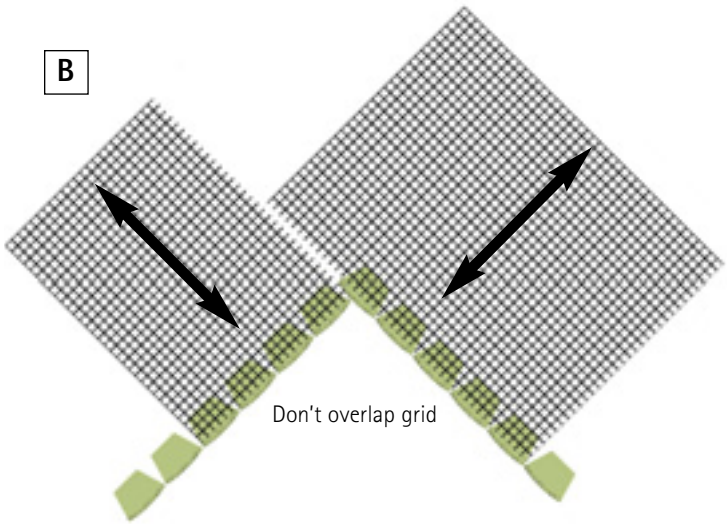
Example: If overall wall height is 8 feet, the reinforcement extension would be 2 feet.

B Place the next section of reinforcement on the adjoining wall. The reinforcement should not overlap and should lie flush with previously placed sections. Once reinforcement is in place, the next courses of block can be installed.

A



B



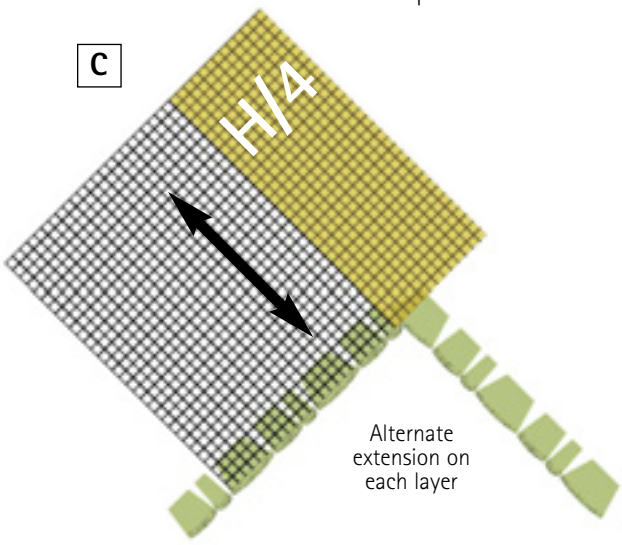
SECOND COURSE WITH GEOGRID

C The first section of grid on this course is placed using the same formula that determines placement in front of adjoining wall.

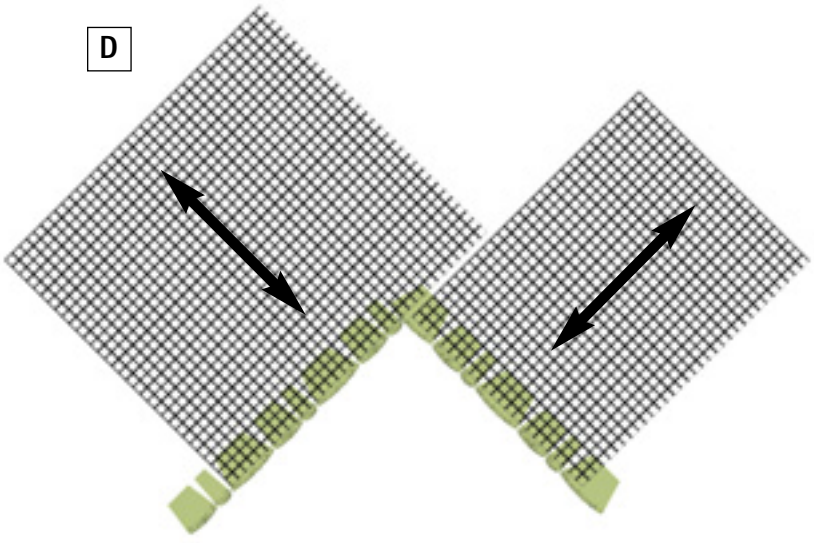
Alternate the reinforcement extension on each course where reinforcement is required.

D Place the next section of reinforcement on the adjoining wall. The reinforcement should not overlap and should lie flush with previously placed sections. Once reinforcement is in place, the next courses of block can be installed.

C



D

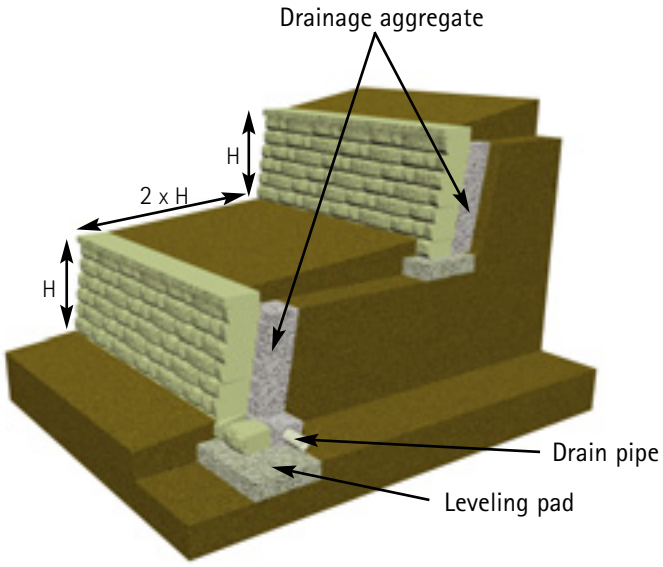


= Strength direction

TERRACES

INDEPENDENT TERRACED WALLS

For each wall to be independent of others, it must be built using a 2:1 ratio — the upper wall must be built a distance away from the lower wall of at least twice the height of the lower wall. In addition, the upper wall must also be equal to or less than the height of the lower wall. Exceptions to this general rule include weak soil conditions or where slopes exist above, below or between wall locations. For example, if the lower terrace is 4 feet tall, the distance between the terraces must be at least 8 feet and the upper wall must not be higher than 4 feet.

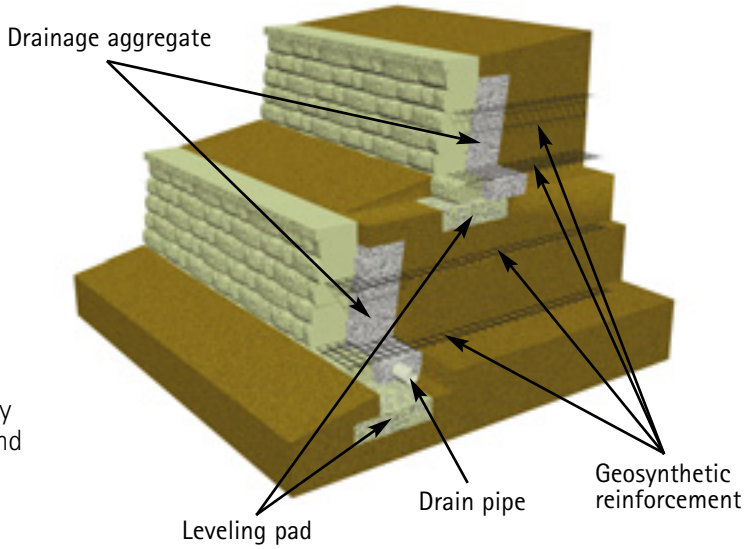


Drainage is vital to maintaining stable, long-lasting terraced walls. Drain tile must be installed so that the water is directed around or under the lower wall (never place the drain tile outlet for the upper wall above or behind the lower wall).

For more detailed information about drainage, see Daylighting and Drainage Swales on page 28.

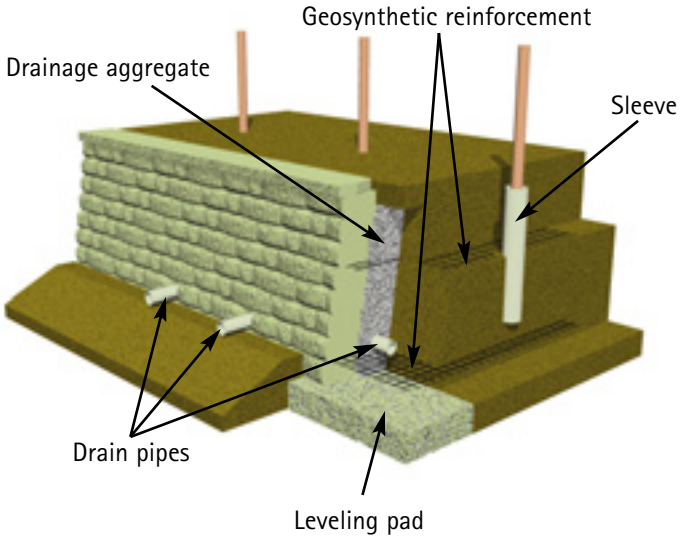
DEPENDENT TERRACED WALLS

When the distance between the lower and upper walls is less than twice the height of the lower wall, the walls become structurally dependent on each other. In this situation, it is important to take global stability into account, incorporating additional reinforcement — and longer layers — into the wall plan. In addition, structurally dependent walls require even more excavation, backfill and time. So plan ahead. Be sure to check the wall plan for specific requirements. For structurally dependent walls, consult with a qualified engineer.



FENCES

Know the dimensions of the fence to determine the placement of the sleeves. Provide at least 1 inch clearance between the inside of the sleeve and the outside of the post, and allow for mortar and grout. Install the sleeves according to the wall plan during the construction of the wall.



If the fence is at least 3 feet behind the wall, generally no additional reinforcement is required. If the fence is installed within 3 feet, there may be some load transferred to the wall from wind, snow or pedestrians. Additional reinforcement around the fence sleeves may be needed.

Grout the fence post into the sleeve after the wall is built.

Tip: Visit www.fencesleeve.com for information about sleeves.

WATER APPLICATIONS

Water applications are a great way to get more use from a property.

BASE COURSE

Place a filter fabric with extra length in front of the wall.

Install leveling pad and the base course of block, including drain tile and drainage aggregate. Wrap the extended filter fabric up along the face of the base course. Place soil fill in front of the wall and compact. Install another section of filter fabric in front of the wall to protect against erosion. Cover the fabric with a minimum of 3 inches of sand. Install larger stones such as riprap to hold it in place.

NEXT COURSE

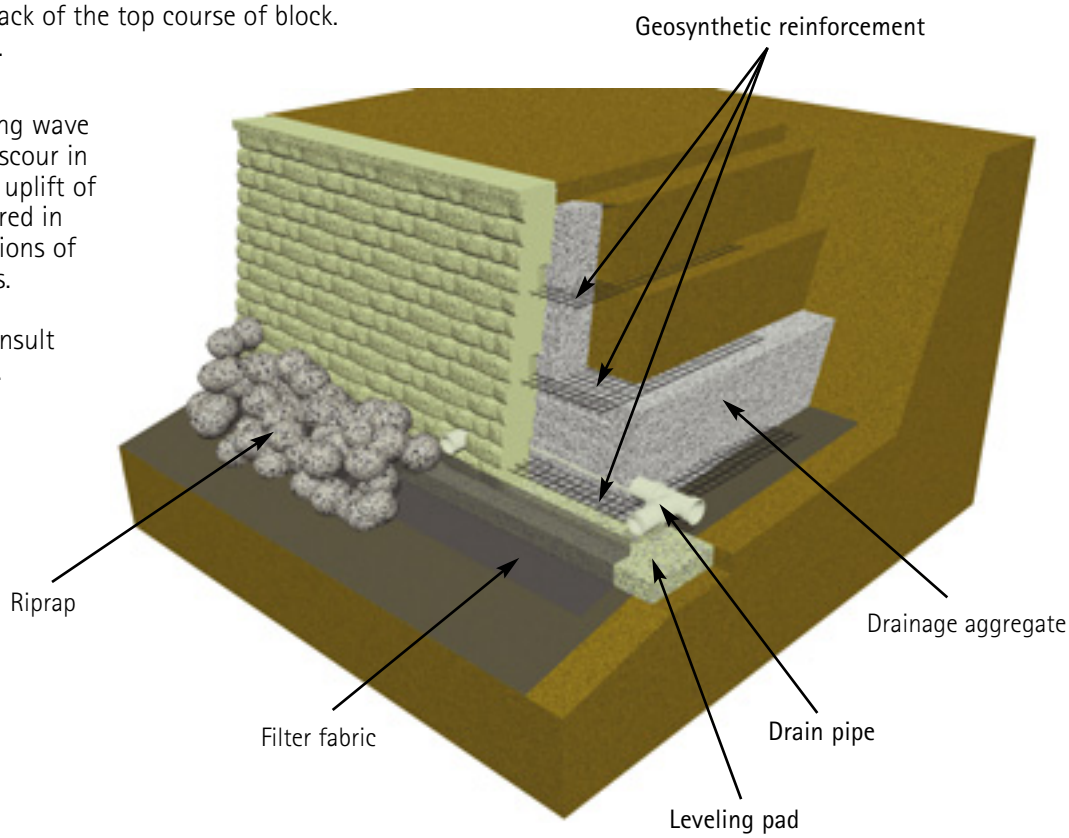
Continue constructing the wall. Drainage is vital. To prevent clogging of the drainage aggregate and drain tile by fine-grained soils, a geosynthetic filter fabric is installed to separate the drainage aggregate from the reinforced soils.

ADDITIONAL COURSES

Continue these steps until the wall is complete. The last section of filter fabric should cover the drainage aggregate and run up against the back of the top course of block. Add fill soil and compact.

Numerous issues, including wave or ice impact, erosion or scour in front of the wall, and ice uplift of the wall must be considered in the use of water applications of segmental retaining walls.

For more information, consult with a qualified engineer.



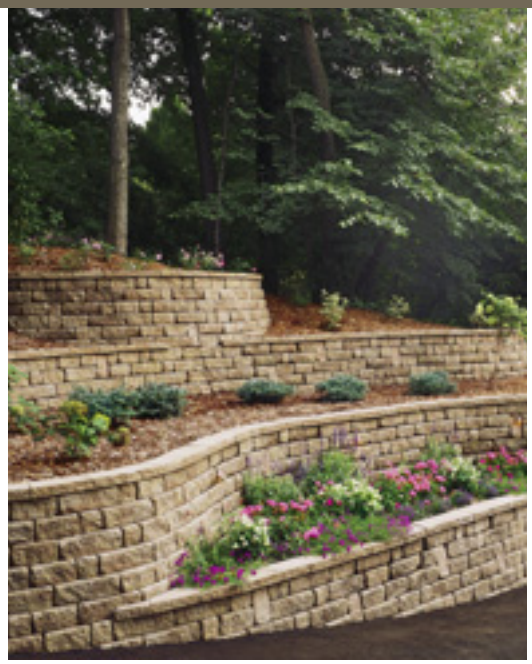
JUMPER UNIT INSTALLATION

Install jumper units on top of an 18-inch-wide Highland Stone® unit.

Set the jumper unit approximately 1 inch back from the face of the 18-inch-wide block on the lower course.

Apply a concrete adhesive to secure the jumper unit.

Place an 18-inch-wide Highland Stone® unit on top of the jumper unit.



Jumper units break up the horizontal lines in this Highland Stone® installation. Use the estimating formula on the left to determine how many units are needed in a project.

A JUMPER UNIT ESTIMATING

Circle the desired density of jumper units in the wall.

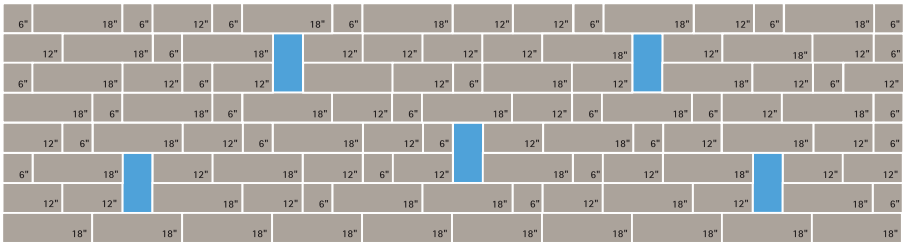
Every 3 square feet (SF) Every 6 SF Every 9 SF Every 12 SF

B

SF of wall (without jumper units or base course) ÷ 3 6 9 12 jumper units per SF = # jumper units

PLACEMENT

There is no required pattern for the Highland Stone jumper unit. You can achieve different looks by increasing or decreasing the number of jumper units. At right is a helpful pattern.



Jumper unit every 12 square feet.

INSTALLATION OF HIGHLAND STONE® WITH GEOSYNTHETIC REINFORCEMENT

USING HIGHLAND STONE® 6-INCH BLOCKS

Check the wall construction plan for which courses will need reinforcement.

The first layer of geogrid should be placed at ground level between base course and first exposed wall course.

Clean any debris off the top layer of blocks. Measure and cut the reinforcement to the design length in the plan. The reinforcement has a design strength direction, which must be laid perpendicular to the wall.

Place the front edge of the reinforcement on the block, 2 inches from the face of the block.

Install the next course of block to secure the reinforcement in place.

When a jumper unit intercepts the reinforcement, cut the reinforcement and position it around the jumper unit. *See Diagram 1.*

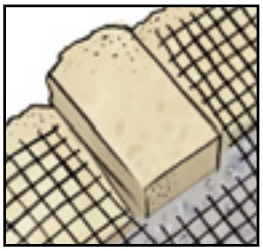


Diagram 1

USING HIGHLAND STONE® 3-INCH AND 6-INCH BLOCK COMBINATION

Follow the instructions for Highland Stone 6-inch block at left for the first layer of geogrid.

If walls are constructed using a random pattern, check the appropriate Geosynthetic Reinforcement Estimating Charts on pages 39 through 41 to help estimate the number of grid layers needed. The charts are for estimating purposes and should not be used for construction. Consult with a qualified engineer to design walls.

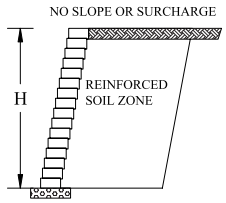
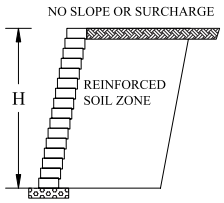
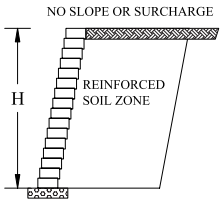
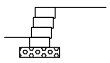
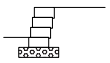
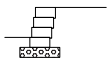
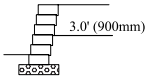
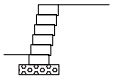
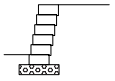
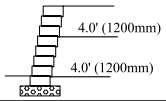
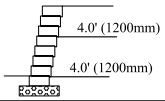
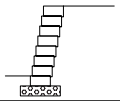
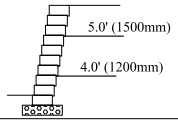
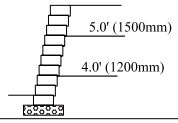
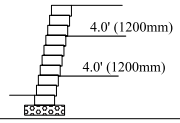
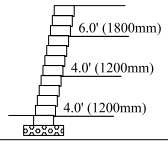
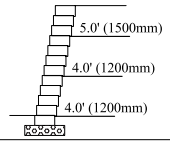
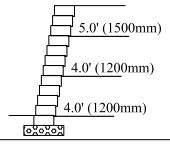
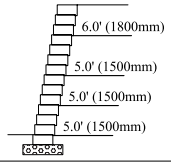
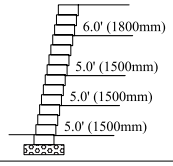
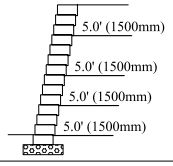
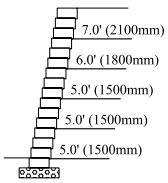
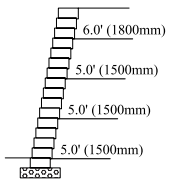
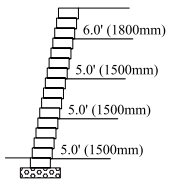
Cut around blocks extending into the next-higher course. *See Diagram 1.* To ensure reinforcement integrity, place grid on the horizontal plane that requires cutting around as few blocks as possible.

For specific information on reinforcement, refer to the Geosynthetic Reinforcement Estimating Charts on pages 39 to 41.

ESTIMATING CHARTS

Detail shown is conceptual only and should not be used for construction without the seal of a local qualified engineer.

NO SLOPE OR SURCHARGE (WALL HAS A LEVEL TOE AND CREST, AND NO LOADS)

H	CLAY AND SILT SOIL ϕ = 26° γ = 120 pcf (19 kN/cubic meter)	SILTY/CLAYEY SAND SOIL ϕ = 30° γ = 120 pcf (19 kN/cubic meter)	CLEAN SAND AND GRAVEL SOIL ϕ = 34° γ = 120 pcf (19 kN/cubic meter)
			
2.0 FT. (600mm)	NO REINFORCEMENT REQUIRED 	NO REINFORCEMENT REQUIRED 	NO REINFORCEMENT REQUIRED 
3.0 FT. (900mm)		NO REINFORCEMENT REQUIRED 	NO REINFORCEMENT REQUIRED 
4.0 FT. (1200mm)			NO REINFORCEMENT REQUIRED 
5.0 FT. (1500mm)			
6.0 FT. (1800mm)			
7.0 FT. (2100mm)			
8.0 FT. (2400mm)			

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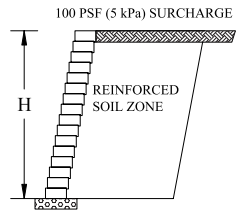
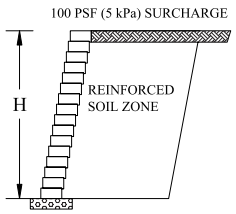
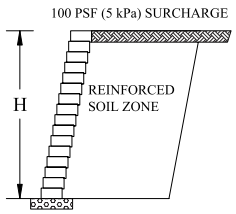
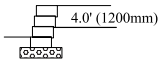
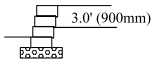
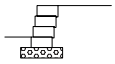
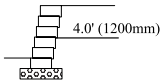
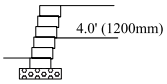
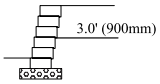
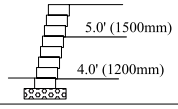
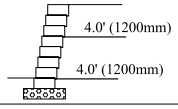
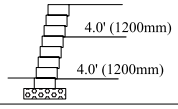
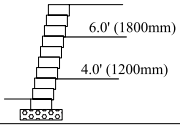
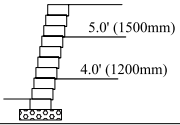
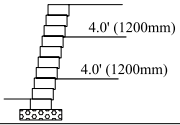
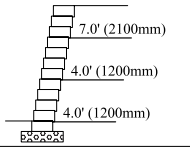
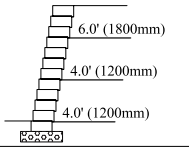
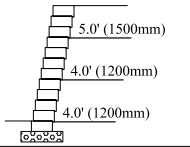
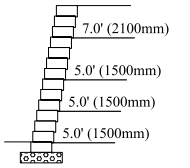
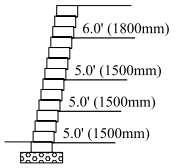
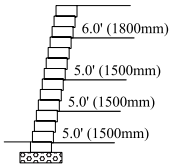
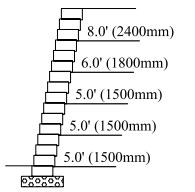
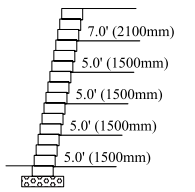
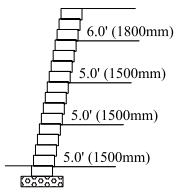
SURCHARGE (LOAD ON THE WALL)

H	CLAY AND SILT SOIL ϕ = 26° γ = 120 pcf (19 kN/cubic meter)	SILTY/CLAYEY SAND SOIL ϕ = 30° γ = 120 pcf (19 kN/cubic meter)	CLEAN SAND AND GRAVEL SOIL ϕ = 34° γ = 120 pcf (19 kN/cubic meter)
			
2.0 FT. (600mm)			NO REINFORCEMENT REQUIRED 
3.0 FT. (900mm)			
4.0 FT. (1200mm)			
5.0 FT. (1500mm)			
6.0 FT. (1800mm)			
7.0 FT. (2100mm)			
8.0 FT. (2400mm)			

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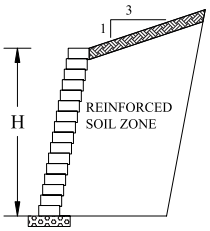
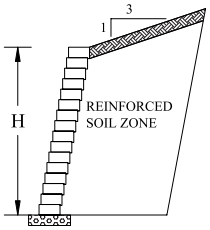
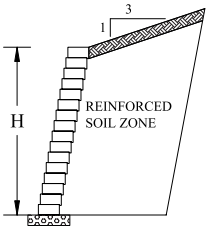
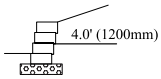
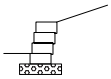
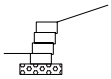
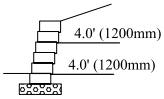
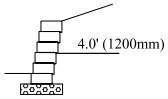
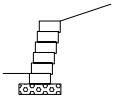
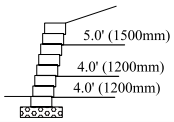
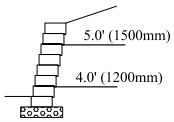
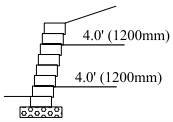
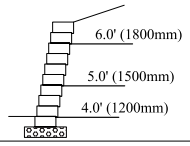
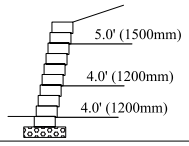
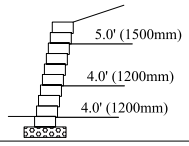
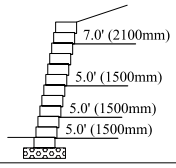
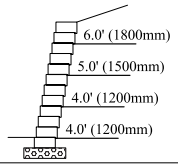
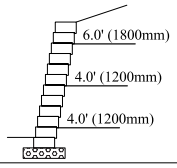
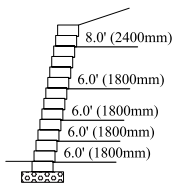
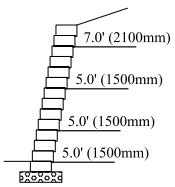
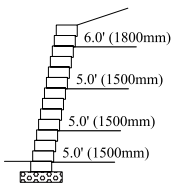
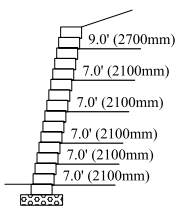
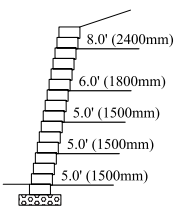
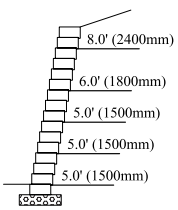
3:1 (HORIZONTAL TO VERTICAL) CREST SLOPE

	CLAY AND SILT SOIL	SILTY/CLAYEY SAND SOIL	CLEAN SAND AND GRAVEL SOIL
H	$\phi = 26°$ $\gamma = 120$ pcf (19 kN/cubic meter) 	$\phi = 30°$ $\gamma = 120$ pcf (19 kN/cubic meter) 	$\phi = 34°$ $\gamma = 120$ pcf (19 kN/cubic meter) 
2.0 FT. (600mm)		NO REINFORCEMENT REQUIRED 	NO REINFORCEMENT REQUIRED 
3.0 FT. (900mm)			NO REINFORCEMENT REQUIRED 
4.0 FT. (1200mm)			
5.0 FT. (1500mm)			
6.0 FT. (1800mm)			
7.0 FT. (2100mm)			
8.0 FT. (2400mm)			

These estimating charts were developed for use with the following reinforcements: Mirafi 2XT or stronger, Huesker 30 or stronger, Strata 150 or stronger, and Synteen SF 20 or stronger.

DIAMOND PRO STONE CUT™ AND DIAMOND PRO®
ESTIMATING CHARTS

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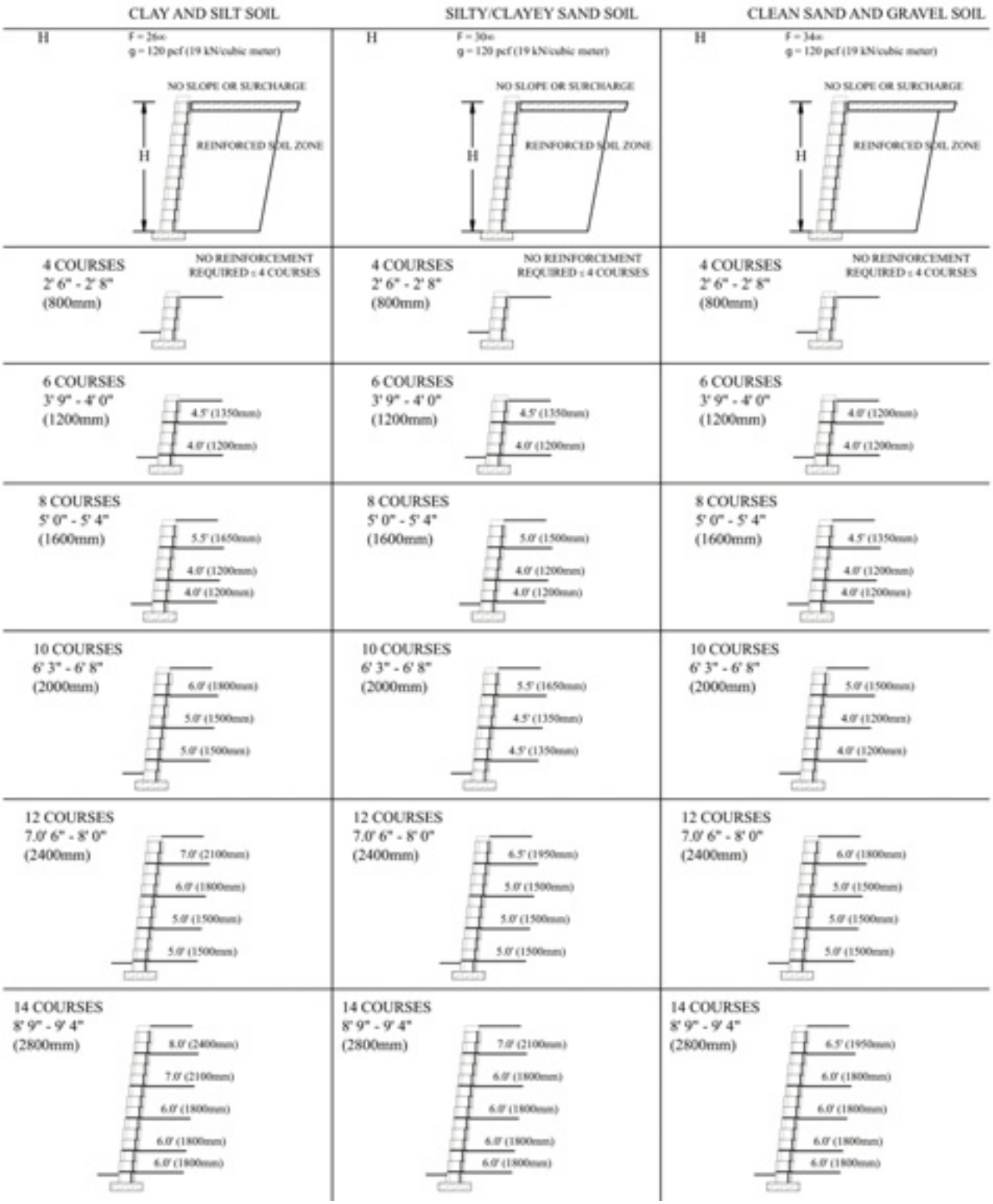
NO SLOPE OR SURCHARGE



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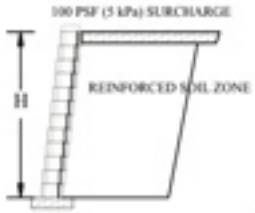
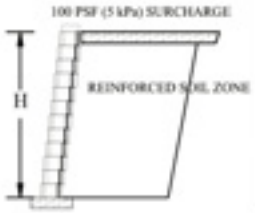
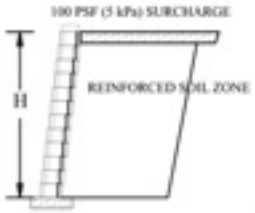
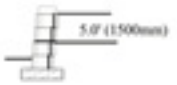
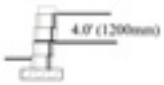
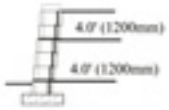
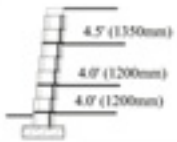
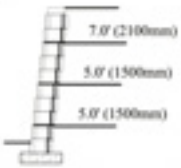
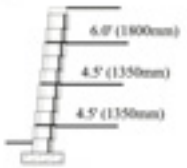
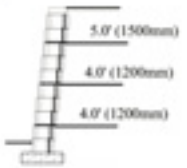
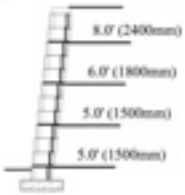
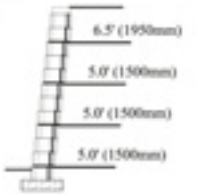
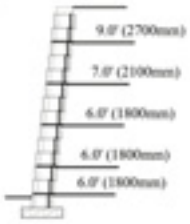
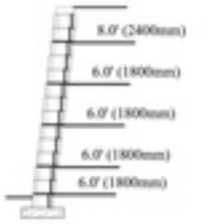
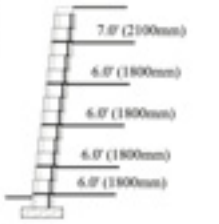
SURCHARGE

	CLAY AND SILT SOIL	SILTY/CLAYEY SAND SOIL	CLEAN SAND AND GRAVEL SOIL
H	F = 26o g = 120 pcf (19 kN/cubic meter) 	F = 30o g = 120 pcf (19 kN/cubic meter) 	F = 34o g = 120 pcf (19 kN/cubic meter) 
4 COURSES 2' 6" - 2' 8" (800mm)			
6 COURSES 3' 9" - 4' 0" (1200mm)			
8 COURSES 5' 0" - 5' 4" (1600mm)			
10 COURSES 6' 3" - 6' 8" (2000mm)			
12 COURSES 7' 6" - 8' 0" (2400mm)			
14 COURSES 8' 9" - 9' 4" (2800mm)			

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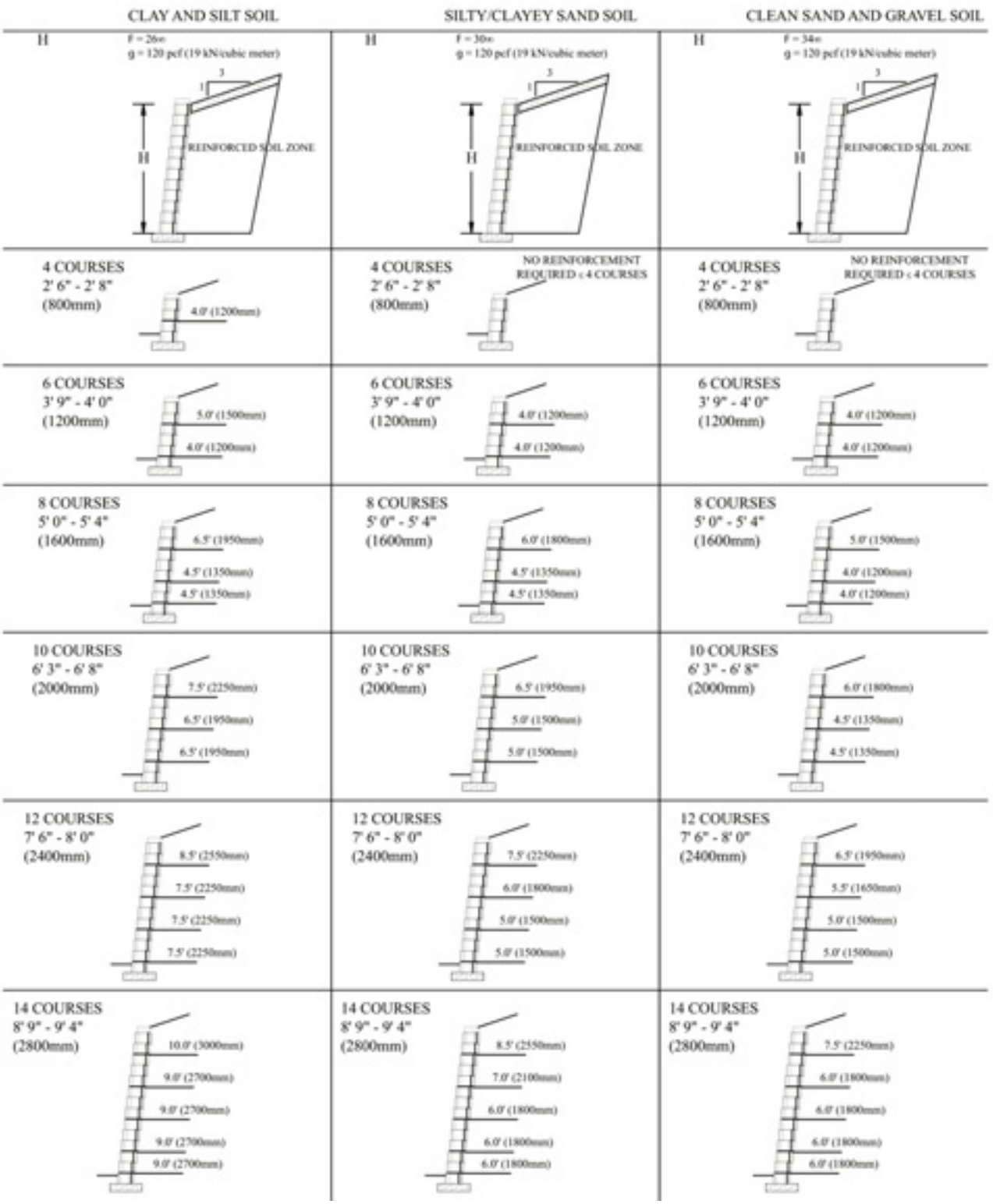
3:1 CREST SLOPE



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WALL MAINTENANCE

Concrete block walls, like everything else on a property, require care and maintenance. With any newly built retaining wall, there are maintenance aspects that are important to watch for after the wall is completed. Provide this information to the property owner when a project is complete.

Basic wall maintenance areas:

- Site grading
- Surface treatments
- Wall performance
- Weed growth
- Salt spray

SITE CONSIDERATIONS

Every newly built retaining wall has soils or backfills placed behind, and sometimes below, the wall and compacted during construction. Some extra settling is quite common after the wall is completed. Inspecting the wall each spring for any unusual or excessive settling can save you from a potentially large problem.

All retaining walls should be designed and built to route water around or over the wall face. Once an area behind the wall begins to settle, water goes to work to enlarge that area. If a low spot is neglected behind a wall, each new rainfall will collect water and work its way down behind the wall. If the area behind the wall is flat, this can create a pool above the wall, and this pooling effect turns the soils soft. If the wall wasn't designed or engineered to hold up the added weight, a blowout could occur.

Preventing this problem is easy. Inspect walls each spring. Look for low spots and areas that have settled. Pull back the landscape mulch or sod on the surface and add enough fill to bring the drainage back to its proper level. This will ensure a lifetime of performance from the wall.

LANDSCAPE MAINTENANCE

Once a new retaining wall is completed, the surface areas surrounding the wall that were disturbed during construction are typically finished with some type of landscape treatment. This might include paving, landscape plantings, mulch, sod or seed for turf, or some ground cover. These surface treatments provide an important function for the wall, as they capture and route the water from each rainfall.

These surface treatments will need to be checked each spring until they are completely established. Walk the site carefully, and look for areas that aren't in proper condition. Replace bad sod, reseed bare areas, and work with the ground covers to encourage growth and coverage. Look for areas of erosion, ruts and channels on the surface, and relandscape as necessary. A little work each spring in the areas surrounding the retaining wall will prevent erosion from becoming a problem and will also enhance the landscape around the wall.

WEED GROWTH

As with concrete and asphalt pavement, a segmental retaining wall can let an occasional weed grow in its face. By plucking the odd weed that may have found its way into the wall, walls can be kept weed-free. Walls may also be sprayed once annually just like lawns.

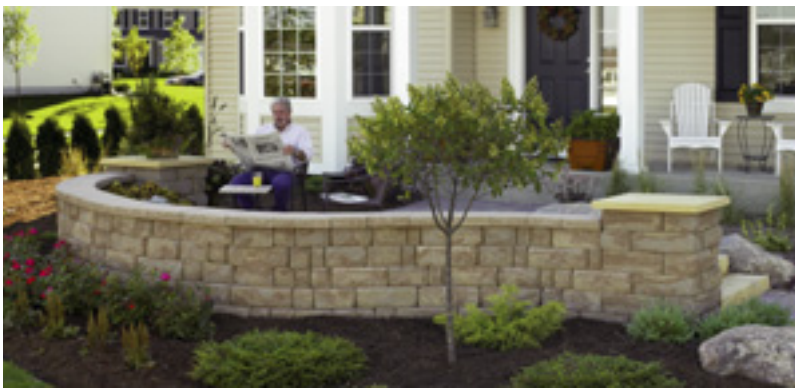
WALL INSPECTION

Retaining walls are made to last a long time. The concrete units are designed and produced to handle tough winter weather and long, hot summers. They won't rot or decay.

Each spring, complete an inspection of the actual wall. Take a few minutes to check out the wall, including the blocks and caps. Begin by looking for any movement in the wall from the previous season. If drainage or erosion problems are not corrected, some wall movement could occur.

If a soft spot was not properly compacted at the wall base, you could see some minor settling of the wall. Minor settling will not hurt the structural integrity of the wall. However, if it happens, it is possible to unstack the blocks in that area, raise the settled spot at the wall base and restack the blocks.

Check walls each spring for bulges or rotation. Again, this can only happen if the wall was not properly installed, but it is prudent to watch over the wall performance. At the sign of any significant forward movement or rotation, get a professional contractor or qualified engineer to evaluate the movement and determine the cause.



Avoid deicing salt spray to help extend the life of any wall.

SALT SPRAY

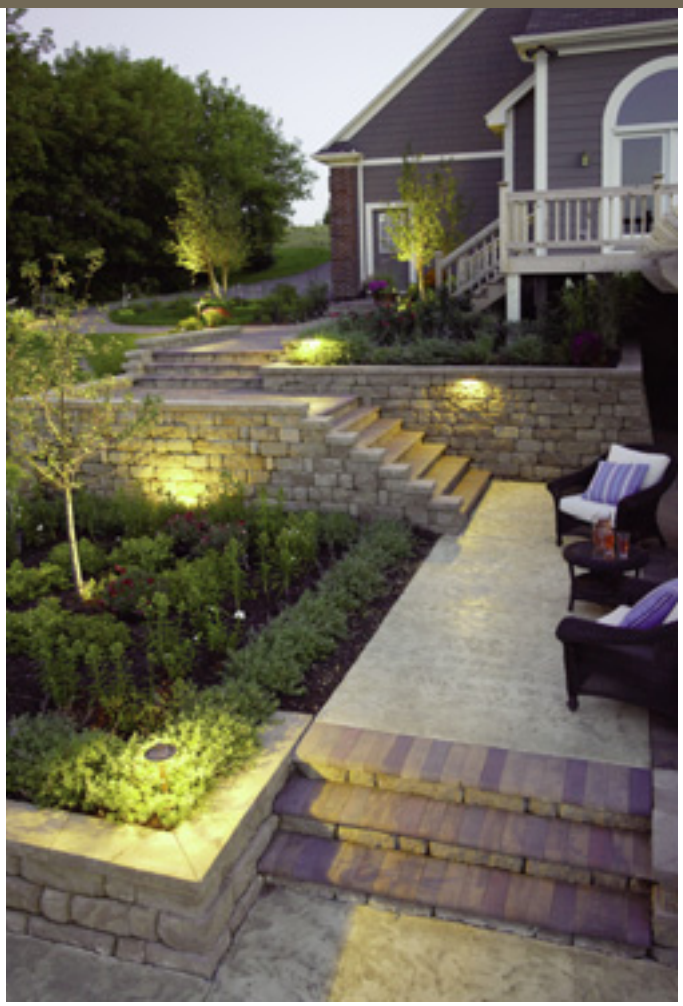
In northern climates, use of deicing salts around a wall could cause surface damage to the blocks or caps. Look for pockmarks or spalling on the blocks in areas where salts are used for winter ice control.

Avoid using salt deicers on or around retaining or Free Standing Walls. If deicers are used in areas around walls, contact a local building materials outlet for a deicer that will not harm concrete. In cases where salt spray may exist, design the wall in such a manner that snow melt and snowbanks containing the salted snow are directed away from the wall.

MAINTENANCE TIPS

Follow these simple maintenance steps to ensure long-term performance from concrete block:

- Thoroughly inspect the wall every year.
- Correct any settling or grading problems around the wall.
- Maintain the landscape surfaces around the wall.
- Take notice of any wall movement – settling, bulging or rotation – and then take proper corrective measures.
- Control any weed growth as necessary.
- Avoid use of salts as deicers around the wall.



Inspect walls every spring and maintain the landscape to maximize the life of any installation.

EFFLORESCENCE

There is a chance that a few weeks or months after a wall installation, a white haze may appear on the surface of the blocks. This is known as efflorescence. There is no reason to be concerned because the blocks are experiencing a natural process. The condition will usually correct itself with time and exposure to the elements.

THE CHEMISTRY OF EFFLORESCENCE

All concrete products contain cement which produces lime or water-soluble calcium oxide. Lime can also be in the aggregates or soil. Although concrete segmental retaining wall blocks are solid, strong and very dense, they contain millions of microscopic capillaries that run from the interior to the surface. Moisture from rain, sprinkler systems or dew enters these microscopic capillaries. Calcium oxide inside the block reacts with the water in the capillaries and forms calcium hydroxide. This rises to the surface, reacts with the carbon dioxide in the air and forms a white haze of calcium carbonate. When moisture on the surface evaporates, the white haze of efflorescence becomes visible.

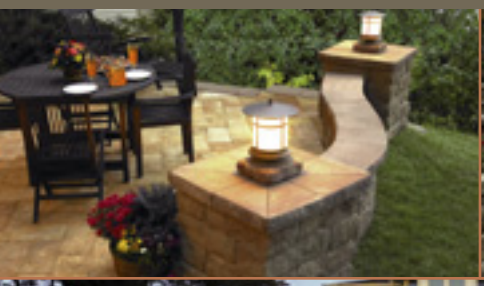
ELIMINATING EFFLORESCENCE

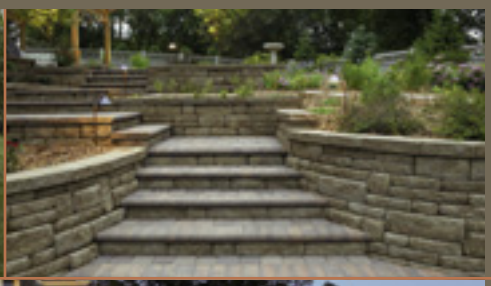
Most producers of segmental retaining wall blocks put chemical additives in the concrete to reduce the likelihood of efflorescence. In most cases, they do the job. However, completely eliminating the chance of efflorescence isn't possible because it's a natural by-product of hardened concrete. It will stop when no more calcium hydroxide is available to move to the surface.

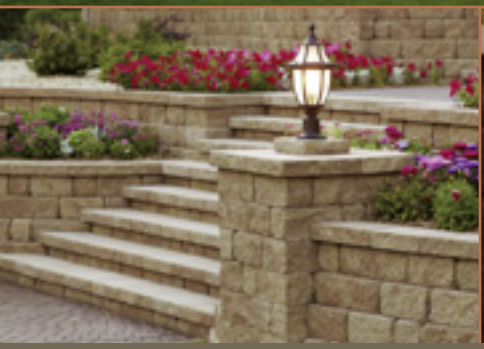
REMOVING EFFLORESCENCE

There are cleaners available that can remove efflorescence. Consult your dealer to find an appropriate cleaner. Cleaning should be performed immediately after efflorescence has appeared. It may reappear as long as the chemical reaction continues, and cleaning may need to be done until efflorescence has stopped.

Most cleaners contain acid and detergents; be sure to follow all label directions and environmental regulations. Careless or improper cleaning can result in injury, damage and discoloration on the surface of the concrete block. Always conduct a test in a small, inconspicuous area before applying any cleaner to the entire wall.







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For complete installation instructions, refer to the Installation Video or contact your local licensed Anchor Wall Systems manufacturer or Anchor Wall Systems.

In the United States, Anchor Wall Systems products are backed by a Limited Warranty. For a complete copy of the Anchor Wall Systems Warranty, visit your local distributor or manufacturer or contact Anchor Wall Systems at 1-877-295-5415 or www.anchorwall.com.

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