

New
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ANCHOR DIAMOND® • ANCHOR HIGHLAND STONE™



Estimating & Installation Manual



In the United States, Anchor Wall Systems products are sold only by licensed Anchor Wall Systems producers and are backed by a 5-Year 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. ©2002 Anchor Wall Systems, Inc. 5959 Baker Road, Suite 390, Minnetonka, MN 55345-5995 USA. For more information call us toll-free in the U.S. at 1-800-473-4452. Outside the U.S. call +1-952-933-8855 or visit www.anchorwall.com.



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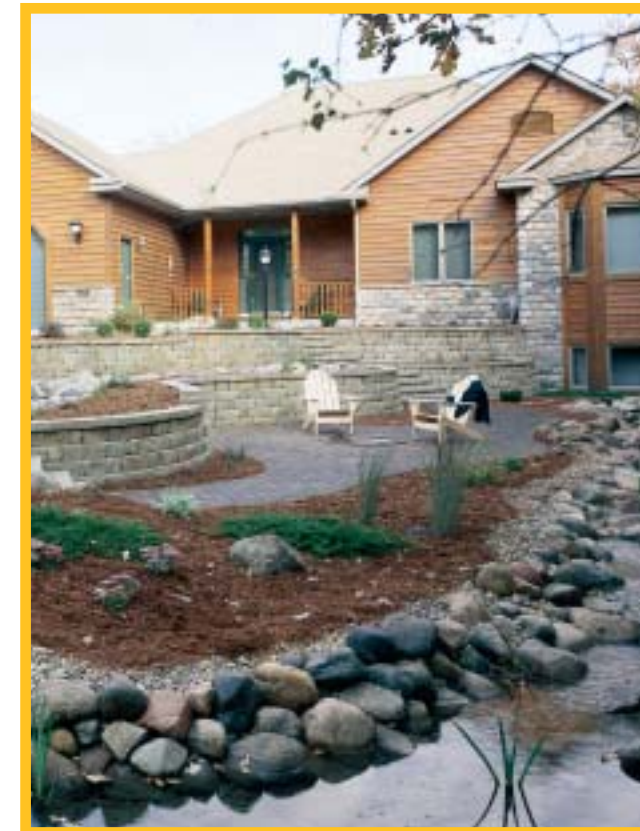


THERE ARE TWO TYPES OF RETAINING WALLS: GRAVITY WALLS AND REINFORCED WALLS

A gravity wall, or non-reinforced wall, relies on the weight and batter of the retaining wall to resist the loads imposed on the structure by the retaining soil. Diamond units and Highland Stone units can be used to build gravity walls up to 4 feet (1.2m) tall.

A reinforced wall is designed by a qualified engineer using geosynthetic reinforcement. Reinforced walls are usually greater than 4 feet (1.2m) tall and have special loading conditions present like slopes or surcharges.

With products from Anchor Wall Systems, there's no need for mechanical attachments or mortar because of the patented rear lip that ensures quick, accurate installation and alignment.



HOW TO USE THIS BOOK

This guide is designed to provide information for product quantity, cost estimating and installation purposes. Actual project conditions vary, so final wall design, including the design of geosynthetic reinforcement, must be performed by a professional engineer.

If you require additional installation information, request the Anchor Highland Stone Installation and Special Applications video, demonstrating basic wall construction as well as special wall applications, including inside and outside 90° corners and inside and outside radii; steps; cap replacement; terraced walls; water applications; fences and guard rails.

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



GOOD BUSINESS TIPS FOR INSTALLERS:

1. Ask questions to understand your customer's needs, make recommendations and present a written bid and plan that's agreed to prior to proceeding.
2. For walls taller than 4 feet (1.2m) or site conditions in clay or poor soils, meet with a wall design engineer to discuss the design of the walls, review soil types, drainage and the geosynthetic reinforcement needed.
3. Prepare a drawing of the site with the wall location, lengths and elevations.
4. Understand the site soils. Ideal soils are sand and gravel. Clay soils may require the involvement of an engineer. Organic soils should NOT be used as fill behind the wall.
5. Plan the drainage to avoid erosion or buildup of water behind the wall. For example, where will water drain through the wall? Where will downspouts expel? Will there be an underground sprinkler system?
6. Confirm the location of underground utilities.
7. Obtain all necessary building permits.
8. Follow the guidelines for job site safety established by your state's Department of Labor. Take special precautions for OSHA requirements, which include maintaining safe slopes.
9. Document the scope of the project, including changes made during construction. Use photos, which are excellent in assisting with questions once construction is complete and you've moved onto new projects.



ANCHOR DIAMOND® AND ANCHOR HIGHLAND STONE™ PRODUCTS AND SPECIFICATIONS



Anchor Diamond®

The leading choice for building gravity walls up to 4 feet (1.2m) high. (Walls higher than 4 feet (1.2m) should be designed by an engineer.) The Diamond unit is easy to install and use in creating interesting retaining walls. Choose straight or beveled face styles.

Straight Unit

Nominal Dimensions:
6" x 17 1/4" x 12"
(150mm x 435mm x 300mm)
Weight*: 72 lbs. (33 kg.)
Coverage .72 sq. ft. (.065m²)
Set back 1 1/8" (28mm)
10.6' Batter

Beveled Unit

Nominal Dimensions:
6" x 15 7/8" x 12"
(150mm x 400mm x 300mm)
Weight*: 68 lbs. (31 kg.)
Coverage .67 sq. ft. (.06m²)
Set back 1 1/8" (28mm)
10.6' Batter

New! Anchor Highland Stone™

Designed with attractive earth tone colors and a rough-hewn texture to achieve the look and feel of natural stone. A 3-piece system that is easy to design and install, the Anchor Highland Stone can reach heights of 4 feet (1.2m) without reinforcement. (Walls higher than 4 feet (1.2m) should be designed by an engineer.)

Large Unit

Nominal Dimensions:
6" x 18" x 12"
(150mm x 450mm x 300mm)
Weight*: 73 lbs. (33 kg.)
Coverage .75 sq. ft. (.07m²)
Set back 1 1/8" (28mm)
10.6' Batter

Medium Unit

Nominal Dimensions:
6" x 12" x 12"
(150mm x 300mm x 300mm)
Weight: 59 lbs. (27 kg.)
Coverage .50 sq. ft. (.045m²)
Set back 1 1/8" (28mm)
10.6' Batter

Small Unit

Nominal Dimensions:
6" x 6" x 12"
(150mm x 150mm x 300mm)
Weight: 30 lbs. (14 kg.)
Coverage .25 sq. ft. (.0225m²)
Set back 1 1/8" (28mm)
10.6' Batter

Cap Unit

Nominal Dimensions:
3" x 17 1/4" x 10" (75mm x 435mm x 250mm) Weight: 32 lbs. (15 kg.)



Cap Unit

Nominal Dimensions:
3" x 17 1/4" x 10"
(75mm x 435mm x 250mm)
Weight: 32 lbs. (15 kg.)



Step Unit

Nominal Dimensions:
6" x 16" x 12"
(150mm x 400mm x 300mm)
Weight: 85 lbs. (39 kg.)

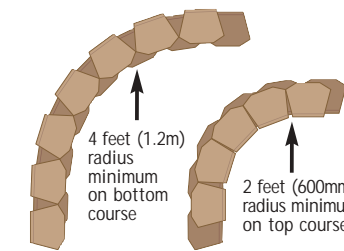
CHOICE: YOU CREATE WHATEVER YOU WANT WITH DESIGN FLEXIBILITY, SHAPES AND COLORS

Retaining wall products from Anchor Wall Systems are available in a number of different sizes and styles suitable for your various projects. There are a variety of warm, earth tone hues and natural, rock-like textures to choose from.

Like planning the entire project, it's worth investing a little time and thought into the colors chosen for retaining wall and paving stone products. Use these tips to help your customers find the right look that complements their landscape.

- Consider the color of the house or buildings and existing surroundings and choose colors and textures that complement them.
- If you choose colors for your retaining walls that are an exact match to the home or building, separate the two with plantings to add contrast and break up the monotony.

- Use contrasting colors that match different aspects of the home or building. For example, if the building is light colored with a dark roof, choosing a dark colored retaining wall might complement nicely.
- Blend the color and texture to the architectural style present. A brick exterior might be complemented nicely by a straight-faced wall; brighter colors or beveled face style work well with contemporary architecture.
- When using concrete paving stones, contrast the color to the walls. If you have a dark paving stone patio, choose a lighter, complementary color for the wall.
- To view a chart highlighting home colors and recommended retaining wall colors, visit www.anchorwall.com/consumer.



Inside Radius Outside Radius
(Diamond beveled face units shown)

BUILDING A RADIUS

Minimum Inside Radius:
Diamond Beveled Face = 4 feet (1.2m)
Diamond Straight Face = 8 feet (2.4m)
Highland Stone = 8 feet (2.4m)
"Minimum Inside Radius" is on the bottom course.

Minimum Outside Radius:
Diamond Beveled Face = 2 feet (600mm)
Diamond Straight Face = 4 feet (1.2m)
Highland Stone = 4 feet (1.2m)
"Minimum Outside Radius" is on the top course.

* Partial Core

Note: Nominal Dimensions. Actual dimensions and weight may vary from these nominal dimensions due to variations resulting from the manufacturing process. Specifications may change without notice. See your Anchor representative for details, color options, block dimensions and additional information.

Dimensions may vary in store locations.

Gravity wall height includes a buried base course.

General Information

Compressive Strength 3,500 psi
Absorption rate 7% max
Material Composition High quality zero slump concrete



Wall Installation

Anchor Wall Systems offers you a choice of products, colors and textures.

If you've installed Diamond before, you'll find that installation of the Anchor Highland Stone is amazingly similar (and just as quick, efficient and accurate). The following installation instructions feature a single rear-lip product, the Diamond, but the techniques outlined are for either product. Where there are variations, we've added the appropriate information.

Step 1

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 reinforcement material. The trench for the leveling pad should be a minimum width of 24 inches (600mm) and 12 inches (300mm) deep.

Step 2

Leveling Pad

- An aggregate leveling pad is made of a good compactible base material of 3/4 inch (19mm) minus with fines.
- The pad must extend 6 inches (150mm) in front and behind the first course of block, and be at least 6 inches (150mm) deep.
- Compact the aggregate and make sure it's level.

Step 3

Base Course

- The most important step in the construction process. Bury your base course of block.
- Run a string line along the back of the block to align the wall units.
- Use the right tools: a shovel, a level, and a rubber mallet.
- Begin laying block at the lowest elevation of the wall.
- Remove the rear lip of the block so that it will lie flat on the leveling pad.
- Place the blocks side by side, flush against each other, and make sure the blocks are in full contact with the leveling pad.
- Level front to back and side to side. If the wall site is on an incline, don't slope the blocks; step them up so they remain consistently level.
- Check the blocks for proper alignment before moving onto the next step.
- For Highland Stone, we recommend using the largest unit, the 18" (450mm) wide unit, for the base course.

Step 4

Anchor Diamond®

Next Lift Construction:

- Clean any debris off the top of the blocks.
- Place the second course of blocks on the base course while maintaining running bond and pull each block forward as far as possible to ensure the correct set back.
- Backfill with drainage aggregate directly behind the block and add soil fill behind the aggregate.
- Compact the backfill before the next course is laid.
- Get to know the other contractors to make sure they don't drive heavy equipment near the wall.
- Self propelled compaction equipment should not be used within 4 feet (1.2m) of the wall units.
- You'll need partial units to stay on bond. A masonry saw is recommended for partial units. Remember to use the appropriate protective equipment like safety glasses when cutting units. Minimum cutting is required. Just use another size of a Highland Stone unit.

Step 4A

Anchor Highland Stone™

Next Lift Construction:

- Follow instructions as noted above.
- You can install the Anchor Highland Stone system using any combination of units.
- Keep the wall bond by placing units in a staggered relationship to the course beneath.
- The chart shown shows a base course of all 18" (450mm) wide units. This straight wall features a pattern of 18" (450mm), 6" (150mm), and 12" (300mm) units in a repeating sequence.

6"	12"	18"	6"	12"	18"	6"	12"	18"
4"	18"	6"	12"	18"	6"	12"	18"	6"
8"	6"	12"	18"	6"	12"	18"	6"	12"
12"	18"	6"	12"	18"	6"	12"	18"	
16"	6"	12"	18"	6"	12"	18"	6"	12"
8"	12"	18"	6"	12"	18"	6"	12"	18"
6"	18"	6"	12"	18"	6"	12"	18"	6"
18"	18"	18"	18"	18"	18"	18"	18"	

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.

Step 5

Drainage Design

- Each project is unique. The grades on your site will determine 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.
- Fill in the area behind the blocks with drainage aggregate, at least 12 inches (300mm) from the wall.
- Each project is unique. You may need to place and backfill several courses to achieve the proper drainage level.
- For best results, 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 75 feet (25m) and at low points of the wall. In order for the drainage aggregate to function properly, it must keep clear of regular soil fill.

Step 6

Compaction

- Shovel the in-fill soil behind the drainage aggregate and compact the in-fill 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 base course and compact. Base course should be buried.

Step 7

Reinforcement (if required)

- Check your 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.
- 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 (50mm) 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 in-fill soil and compact it.
- Know how your choice of reinforcement works! The strength direction of the reinforcement must be placed perpendicular to the wall.
- Remember. Place the front edge of the reinforcement on top of the block, making sure it's within 2 inches (50mm) 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 (150mm) of backfill is required prior to operating vehicles on the reinforcement. And remember, avoid sudden turning or braking.

Step 8

Finish Grade and Surface Drainage

- Protect your wall with a finished grade at the top and bottom.
- To ensure proper water drainage away from the wall, use 6 inches (150mm) of soil with low permeability. This will minimize water seeping into the soil and drainage aggregate behind the wall.

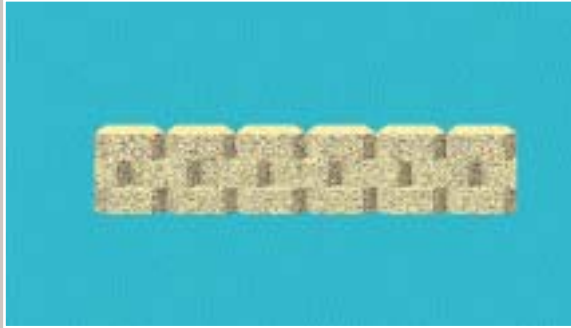
Step 9

Site Cleaning & Restoration

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



Running Bond



Step 1

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.

Step 2

Any wall that is not perfectly straight will eventually run off bond. 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.

Tip: It may be possible to run the off bond block into the soil bank to avoid cutting of partial units.

Step 3

Once the partial unit is in place, adhere with a concrete adhesive. Partial units should not be less than five inches (125mm) 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.



Step 1

Always start capping from the lowest elevation. Caps are trapezoidal in shape and must be laid alternatively short and long cap faces to achieve a straight line. If your wall elevation changes, caps can be stacked where the wall steps up. Begin laying caps at the 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. On a 90° corner wall, the corner caps need to be saw cut to achieve a 45° mitered corner. After layout is complete and caps are saw cut or split to size, carefully adhere with a concrete adhesive. For capping inside and outside radius curves, lay the cap units side by side without alternating long and short cap faces.

Tip: To determine the minimum number of caps needed on an average straight wall, measure the length of the wall. Multiply the length of the wall by 12 inches and divide by 14.5. If you are working in Metric, multiply the length of your wall in meters by 1000 and divide by 340. Additional caps will be needed for elevation changes and radius curves.



Cap Units



Steps



Step 1

Lay out the base course according to your wall design.

Step 2

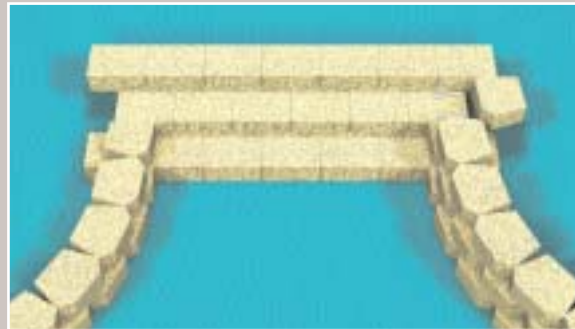
Add the second course of steps, staggering them from the previous course to maintain running bond. Remember, it is very important to backfill and compact behind and along the sides of each course of step units. Place step units so the face of the step overlaps the previous course by 1.5 to 2 inches (35-50mm). Adhere the front of the step units to the preceding course with a concrete adhesive. Place and compact soil fill prior to installing the next course.



Step 3

Build the second course of your wall. Place a standard block near the second course of steps, maintaining running bond with the base course. Measure and cut a block to fit the space remaining between the step unit and the second course of your wall. Place the unit in the wall, making sure that both the vertical edges fit tight against both the step and standard unit. Remove the rear lip on the blocks when necessary, and angle the blocks flush with the face of the previous course. Adhere in place with a concrete adhesive. This procedure will help maintain a uniform step width throughout construction. Complete the second course of the wall. Repeat these steps following proper constructions until the wall is finished.

Tip: Drain tile can be placed behind the lowest step units at grade. An alternative would be to place the drain tile behind each wall adjacent to the steps.



Step 1

Independent Terraced Walls.

For each wall to be independent of the other, they 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 3 feet (1m) tall the distance between the upper terrace must be 6 feet (2m).

Step 2

Proper 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).

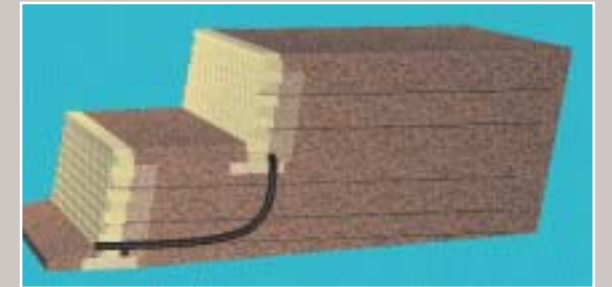
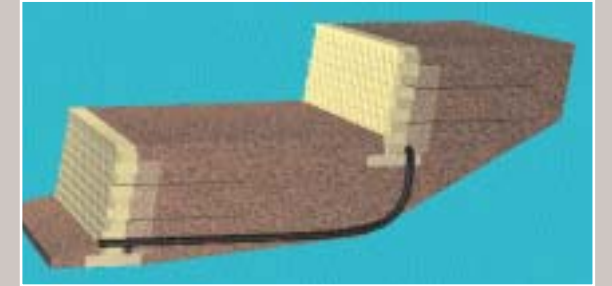
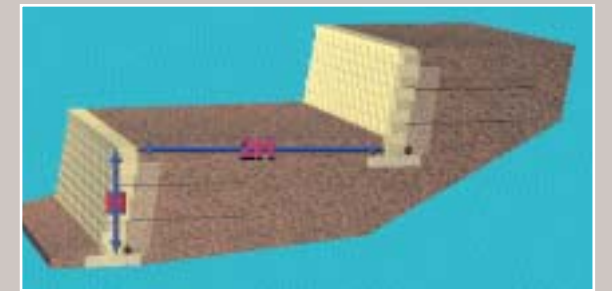
Step 3

Dependent 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 segmental retaining wall engineer.



Terraces



Inside 90° Corners



Step 1

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.

Step 2

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.

** 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.

Step 3

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

Outside 90° Corners



Step 1

To build an outside 90° corner, begin by placing a half unit at the corner. Remove the locator lip so that the block lays flat. Then lay the rest of the base course working from the corner block out.

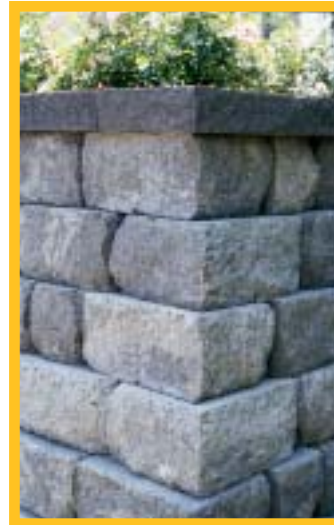
Step 2

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

Step 3

Use split units** as necessary to maintain running bond.

** 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.



Step 1

To install reinforcement on an inside 90° corner, begin by checking your wall plan to determine reinforcement lengths and elevations. Cut your reinforcement to the lengths identified in your wall plan, paying attention to the reinforcement strength direction. Next, determine the proper placement of the reinforcement by dividing the total proposed height of the wall by 4. 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 and begin your grid placement here. Make sure the grid is placed within 2 inches (50mm) of the face of the wall and runs along the back of the adjoining wall.

Example:

If your overall wall height is 8 feet (2.4m), the reinforcement extension would be 2 feet (600mm).



Step 2

The next section of reinforcement on the adjoining wall can then be placed using the same formula to determine placement in front of 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. Alternate the reinforcement extension on each course where reinforcement is required.

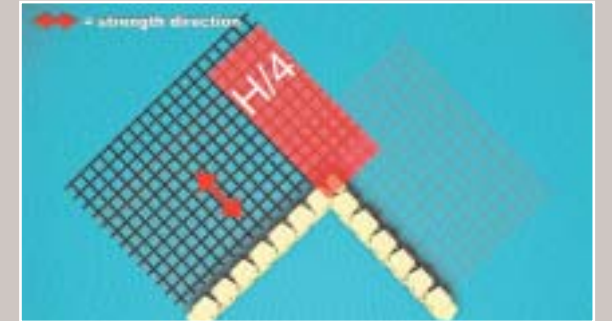
Step 1

Begin by checking your 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 (50mm) of the face of the block and running along the back of the adjoining wall.

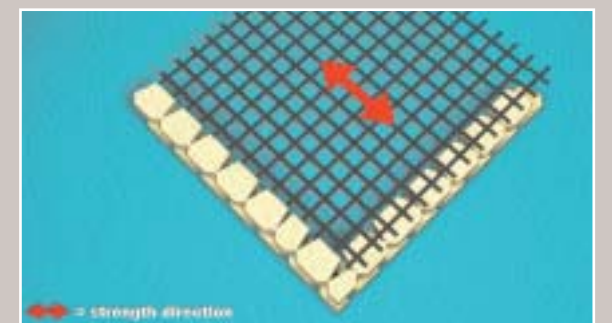
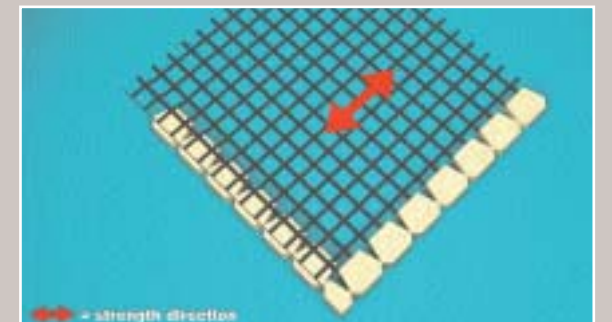
Step 2

Lay the next course of block, backfill and compact. When installing the next section of reinforcement, place within 2 inches (50mm) of the face of the block and running along the back of the adjacent wall. Alternate the reinforcement extension on each course where reinforcement is required.

Reinforcement–Inside 90° Corners



Reinforcement–Outside 90° Corners



Inside Curves



Step 1

Check your wall plan to determine the radius of your base course. This will be the smallest radius in the wall and must not be less than the minimum for the block system you are using. 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. Inside curves with beveled units have a minimum radius of 4 feet (1.2m). Inside curves with straight units have a minimum radius of 8 feet (2.4m). When calculating a radius add 1 1/4 inch (30mm) for the set back of each course. Partial units may be required to maintain running bond. For the Highland Stone, the minimum radius is 8 feet (2.4m).

Step 2

For the second course, make sure the lip of each block is in contact with the back of the units below to ensure structural stability. The set back 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. Once a partial unit is cut to size, adhere in place with a concrete adhesive.



Outside Curves



Step 1

When building an outside radius curve, begin by calculating the radius of your top course. This will be the smallest radius in the wall and must not be less than the minimum for the block system you are using*. 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. Outside curves with beveled units have a minimum radius of 2 feet (600mm). Outside curves with straight units have a minimum radius of 4 feet (1.2m). When calculating a radius add a minimum 1 1/4 inch (30mm) for the set back of each course. Partial units may be required to maintain a running bond. For the Highland Stone, the minimum radius is 4 feet (2.4m).

Step 2

For each course, make sure the lip of each block is in contact with the back of the units below to ensure structural stability. The set back 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. Once a split unit is cut to size, adhere in place with a concrete adhesive.



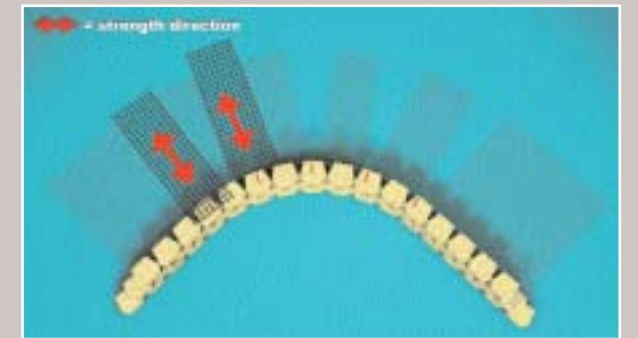
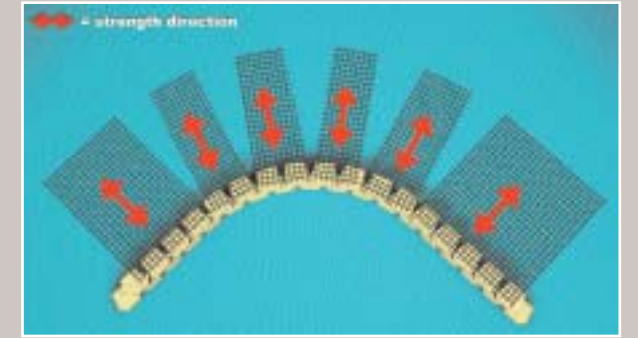
Step 1

Cut reinforcement to the required lengths as specified in your wall plan. Lay segments of reinforcement within 2 inches (50mm) of the face of the wall, making sure that the strength direction of each section is perpendicular to the wall face.

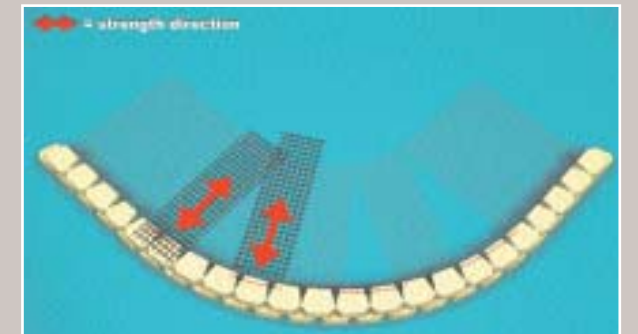
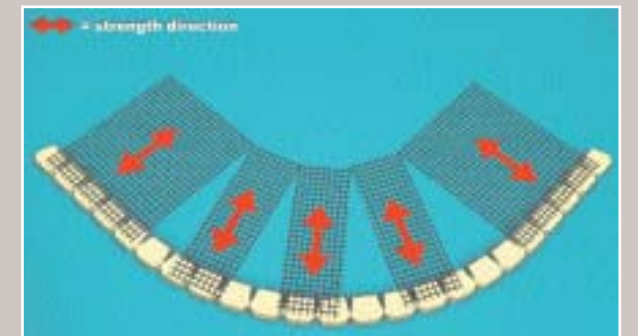
Step 2

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.

Reinforcement—Inside Curves



Reinforcement—Outside Curves



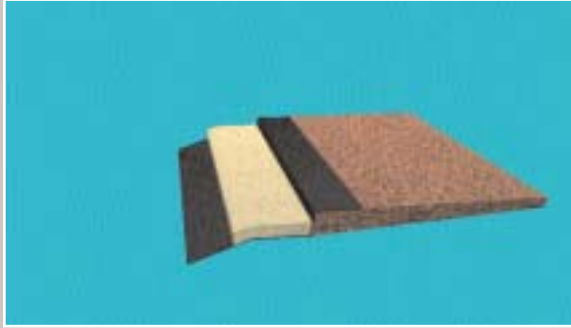
Step 1

Cut reinforcement to the required lengths as specified in your wall plan. Lay sections of the reinforcement within 2 inches (50mm) 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.

Step 2

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.

Water Applications



Step 1

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

Step 2

Install your leveling pad and the first 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 (75mm) of sand.

Step 3

Install larger stones such as riprap to hold it in place. Continue constructing your 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 reinforce soils.

Step 4

Continue these steps until your 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.

Keep in mind there are numerous issues related to water wall applications including wave or ice impact, erosion or scour in front of the wall and ice uplift of the wall that must be considered in the use of water applications of segmental retaining walls.

For more information consult with a qualified engineer.



Step 1

Know the specific dimensions of the fence to determine the placement of the sleeves. Sleeves should be at least 1 inch (25mm) larger in radius than the fence posts to allow for mortar or grout. Install the sleeves according to the wall plan during the construction of your wall.

Step 2

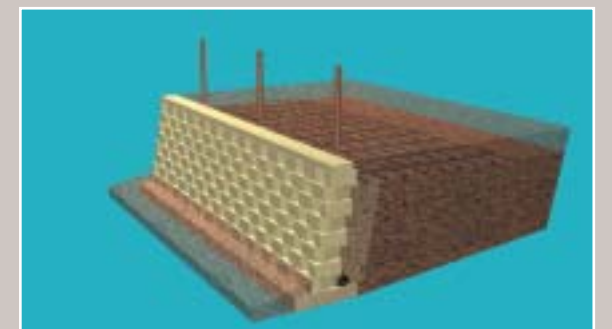
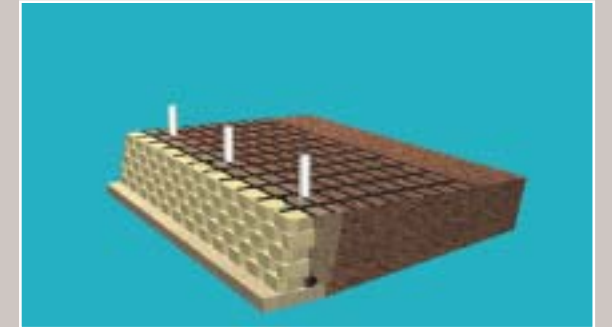
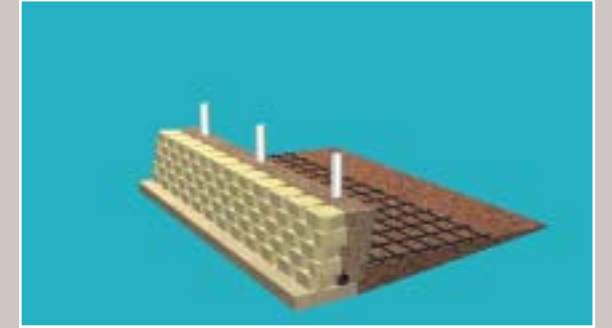
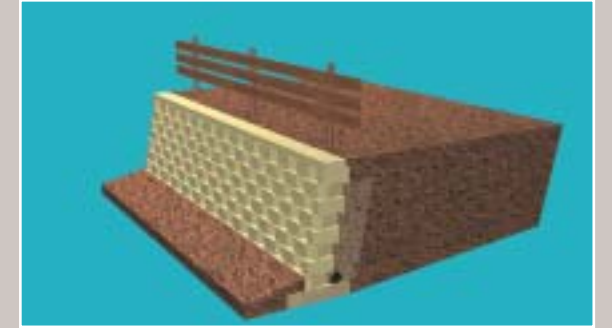
If the fence is at least 3 feet (1m) behind the wall, generally no additional reinforcement is required. If the fence is installed within 3 feet (1m), there may be some load transferred to the wall from wind, snow or pedestrians. Additional reinforcement around the fence sleeves may be needed.

Step 3

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



Fences



Special Applications



USING LIGHTS IN YOUR ANCHOR RETAINING WALL

Step 1

Begin by locating the center of the block where the light fixture is to be attached. Once the center has been determined, mark the location for each screw hole. Drill holes in the block to accommodate the screws.

Step 2

For the conduit wires, drill a hole leading from the front face of the segmental retaining wall unit to the back of the block. This hole needs to be large enough to lead your conduit wires through the block to your light fixture.

Step 3

Insert and run the conduit wires through the hole in the block until they are exposed on the back of the block.

Step 4

Attach the light fixture on the front face of the block and tighten the screws that will hold the light fixture in place. It should be installed so that it is flush, or nearly flush, with the face of the block.

Step 5

Carefully follow electrical instructions in regard to wiring.

Step 6

Install the block and connect the wire to complete the light installation.

Note: Be sure to follow the manufacturer's instructions, as various light fixtures may be assembled differently.



USING ANCHOR DIAMOND STEP UNITS TO BUILD A PILLAR

The landscape installer was challenged by the homeowner to build pillars for lampposts. Here's what he did:

Lay out a base course for the pillar using Anchor Diamond Step Units.

For each course of your pillar, you'll use and cut four step units.

Using a hydraulic splitter, cut the four step units to 14 inches (350mm) wide.

Lay the 14-inch (350mm) wide step units in a square formation with the face of each unit on one side of the square.

When the four blocks are laid, you'll notice an approximate 2-inch (50mm) square between the blocks, which provides you space to run conduit.

Lay the next course following the same directions. Adhere with a high quality concrete adhesive. Stack the blocks vertically. There is no set back to this pillar.

To cap the pillar, place the long face of the Diamond Cap unit toward the outside and cut 45-degree angles.

Allow a gap for the conduit.

On this project, the light fixture required an additional base, which is made out of a cap unit too. The cap unit was cut to a 10-inch x 10-inch (250mm by 250mm) square and the light is mounted onto the cap.

At the base of the pillar, the conduit for the light fixture was buried in the base course. The installer noted that you can also notch the base course block to achieve an outlet for the conduit.

USING ANCHOR WALL SYSTEMS PRODUCTS IN WATER FEATURES

Anchor retaining wall products can be used in many ways to complement water features.

- As the retaining wall built around streams or facing a pond.
- To build a slope needed for a waterfall.
- To support a stream or bog.

If your wall is supporting a water feature:

Determine the load on the wall. If the wall is more than 4 feet (1.2m) high, consult a wall engineer to design the wall using geosynthetic reinforcement.

Like building a retaining wall, a successful pond project begins with the building of the base using high-quality liners.

For best results use a 45 mil EPDM Rubber Liner.

Follow the manufacturer's instructions for installing the liner, which might include covering the liner with boulders and gravel, which prevents UV light from degrading the liner.

If your wall is in contact with water, refer to the instructions for water applications on page 17.

If you have a special application or project you've completed using Anchor Wall Systems retaining wall products, please send a photo and description of the project to: Anchor Wall Systems, Attn: Landscape Market Manager, 5959 Baker Road, Suite 390, Minnetonka, MN 55345.



Reinforcement Estimating Chart

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

NO SLOPE OR SURCHARGE		
CLAY AND SILT SOIL	SILTY/CLAYEY SAND SOIL	CLEAN SAND AND GRAVEL SOIL
$\phi = 28^\circ$ $\gamma = 120 \text{ pcf (18 kN/m}^3 \text{ bulk mass)}$	$\phi = 30^\circ$ $\gamma = 120 \text{ pcf (18 kN/m}^3 \text{ bulk mass)}$	$\phi = 34^\circ$ $\gamma = 120 \text{ pcf (18 kN/m}^3 \text{ bulk mass)}$
NO SLOPE OR SURCHARGE REINFORCED SOIL ZONE 	NO SLOPE OR SURCHARGE REINFORCED SOIL ZONE 	NO SLOPE OR SURCHARGE REINFORCED SOIL ZONE
2.0 FT. (600mm) NO REINFORCEMENT REQUIRED 	2.0 FT. (600mm) NO REINFORCEMENT REQUIRED 	2.0 FT. (600mm) NO REINFORCEMENT REQUIRED
3.0 FT. (900mm) 3.0' (900mm) 	3.0 FT. (900mm) NO REINFORCEMENT REQUIRED 	3.0 FT. (900mm) NO REINFORCEMENT REQUIRED
4.0 FT. (1200mm) 4.0' (1200mm) 	4.0 FT. (1200mm) 4.0' (1200mm) 	4.0 FT. (1200mm) NO REINFORCEMENT REQUIRED
5.0 FT. (1500mm) 5.0' (1500mm) 4.0' (1200mm) 	5.0 FT. (1500mm) 5.0' (1500mm) 4.0' (1200mm) 	5.0 FT. (1500mm) 4.0' (1200mm) 4.0' (1200mm)
6.0 FT. (1800mm) 6.0' (1800mm) 4.0' (1200mm) 4.0' (1200mm) 	6.0 FT. (1800mm) 5.0' (1500mm) 4.0' (1200mm) 4.0' (1200mm) 	6.0 FT. (1800mm) 5.0' (1500mm) 4.0' (1200mm) 4.0' (1200mm)
7.0 FT. (2100mm) 6.0' (1800mm) 5.0' (1500mm) 5.0' (1500mm) 5.0' (1500mm) 	7.0 FT. (2100mm) 6.0' (1800mm) 5.0' (1500mm) 5.0' (1500mm) 5.0' (1500mm) 	7.0 FT. (2100mm) 5.0' (1500mm) 5.0' (1500mm) 5.0' (1500mm) 5.0' (1500mm)
8.0 FT. (2400mm) 7.0' (2100mm) 6.0' (1800mm) 5.0' (1500mm) 5.0' (1500mm) 	8.0 FT. (2400mm) 6.0' (1800mm) 5.0' (1500mm) 5.0' (1500mm) 5.0' (1500mm) 	8.0 FT. (2400mm) 6.0' (1800mm) 5.0' (1500mm) 5.0' (1500mm) 5.0' (1500mm)

Reinforcement Estimating Chart

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

SURCHARGE		
CLAY AND SILT SOIL	SILTY/CLAYEY SAND SOIL	CLEAN SAND AND GRAVEL SOIL
$\phi = 28^\circ$ $\gamma = 120 \text{ pcf (18 kN/m}^3 \text{ bulk mass)}$	$\phi = 30^\circ$ $\gamma = 120 \text{ pcf (18 kN/m}^3 \text{ bulk mass)}$	$\phi = 34^\circ$ $\gamma = 120 \text{ pcf (18 kN/m}^3 \text{ bulk mass)}$
100 PSF (5 kPa) SURCHARGE REINFORCED SOIL ZONE 	100 PSF (5 kPa) SURCHARGE REINFORCED SOIL ZONE 	100 PSF (5 kPa) SURCHARGE REINFORCED SOIL ZONE
2.0 FT. (600mm) 6.0' (1800mm) 	2.0 FT. (600mm) 3.0' (900mm) 	2.0 FT. (600mm) NO REINFORCEMENT REQUIRED
3.0 FT. (900mm) 4.0' (1200mm) 	3.0 FT. (900mm) 4.0' (1200mm) 	3.0 FT. (900mm) 3.0' (900mm)
4.0 FT. (1200mm) 5.0' (1500mm) 4.0' (1200mm) 	4.0 FT. (1200mm) 4.0' (1200mm) 4.0' (1200mm) 	4.0 FT. (1200mm) 4.0' (1200mm)
5.0 FT. (1500mm) 6.0' (1800mm) 4.0' (1200mm) 	5.0 FT. (1500mm) 5.0' (1500mm) 4.0' (1200mm) 	5.0 FT. (1500mm) 4.0' (1200mm) 4.0' (1200mm)
6.0 FT. (1800mm) 7.0' (2100mm) 6.0' (1800mm) 4.0' (1200mm) 	6.0 FT. (1800mm) 6.0' (1800mm) 4.0' (1200mm) 4.0' (1200mm) 	6.0 FT. (1800mm) 5.0' (1500mm) 4.0' (1200mm) 4.0' (1200mm)
7.0 FT. (2100mm) 8.0' (2400mm) 7.0' (2100mm) 5.0' (1500mm) 	7.0 FT. (2100mm) 7.0' (2100mm) 5.0' (1500mm) 5.0' (1500mm) 	7.0 FT. (2100mm) 6.0' (1800mm) 5.0' (1500mm) 5.0' (1500mm)
8.0 FT. (2400mm) 9.0' (2700mm) 8.0' (2400mm) 6.0' (1800mm) 	8.0 FT. (2400mm) 8.0' (2400mm) 6.0' (1800mm) 5.0' (1500mm) 	8.0 FT. (2400mm) 7.0' (2100mm) 6.0' (1800mm) 5.0' (1500mm)

Reinforcement Estimating Chart

3:1 (HORIZONTAL TO VERTICAL) CREST SLOPE			
	CLAY AND SILT SOIL	SILTY/CLAYRY SAND SOIL	CLEAN SAND AND GRAVEL SOIL
H	φ = 28° γ = 120 pcf (19.2 kN/m ³ moist)	φ = 30° γ = 120 pcf (19.2 kN/m ³ moist)	φ = 34° γ = 120 pcf (19.2 kN/m ³ moist)
2.0 FT. (600mm)		NO REINFORCEMENT REQUIRED	NO REINFORCEMENT REQUIRED
3.0 FT. (900mm)		NO REINFORCEMENT REQUIRED	NO REINFORCEMENT REQUIRED
4.0 FT. (1200mm)		NO REINFORCEMENT REQUIRED	NO REINFORCEMENT REQUIRED
5.0 FT. (1500mm)		NO REINFORCEMENT REQUIRED	NO REINFORCEMENT REQUIRED
6.0 FT. (1800mm)		NO REINFORCEMENT REQUIRED	NO REINFORCEMENT REQUIRED
7.0 FT. (2100mm)		NO REINFORCEMENT REQUIRED	NO REINFORCEMENT REQUIRED
8.0 FT. (2400mm)		NO REINFORCEMENT REQUIRED	NO REINFORCEMENT REQUIRED

Product Quantity Estimator for Anchor Highland Stone™

To Use: Locate Wall Length and Wall Height to Identify Number of 18", 12", and 6" Wide Units Needed

Identify Wall Height <i>Includes Buried Base*</i>	1: Identify Wall Length									
	5'	10'	15'	20'	25'	30'	35'	40'	45'	50'
1'	6 - 18" 2 - 12" 2 - 6"	11 - 18" 4 - 12" 4 - 6"	15 - 18" 5 - 12" 5 - 6"	21 - 18" 7 - 12" 7 - 6"	26 - 18" 9 - 12" 9 - 6"	30 - 18" 10 - 12" 10 - 6"	36 - 18" 12 - 12" 12 - 6"	41 - 18" 14 - 12" 14 - 6"	53 - 18" 23 - 12" 23 - 6"	51 - 18" 17 - 12" 17 - 6"
1.5'	8 - 18" 4 - 12" 4 - 6"	14 - 18" 7 - 12" 7 - 6"	20 - 18" 10 - 12" 10 - 6"	28 - 18" 14 - 12" 14 - 6"	34 - 18" 17 - 12" 17 - 6"	40 - 18" 20 - 12" 20 - 6"	48 - 18" 24 - 12" 24 - 6"	54 - 18" 27 - 12" 27 - 6"	60 - 18" 30 - 12" 30 - 6"	68 - 18" 34 - 12" 34 - 6"
2'	9 - 18" 5 - 12" 5 - 6"	17 - 18" 10 - 12" 10 - 6"	25 - 18" 15 - 12" 15 - 6"	34 - 18" 20 - 12" 20 - 6"	42 - 18" 25 - 12" 25 - 6"	50 - 18" 30 - 12" 30 - 6"	59 - 18" 35 - 12" 35 - 6"	67 - 18" 40 - 12" 40 - 6"	75 - 18" 45 - 12" 45 - 6"	84 - 18" 50 - 12" 50 - 6"
2.5'	11 - 18" 7 - 12" 7 - 6"	21 - 18" 14 - 12" 14 - 6"	30 - 18" 20 - 12" 20 - 6"	41 - 18" 27 - 12" 27 - 6"	51 - 18" 34 - 12" 34 - 6"	60 - 18" 40 - 12" 40 - 6"	71 - 18" 47 - 12" 47 - 6"	81 - 18" 54 - 12" 54 - 6"	90 - 18" 60 - 12" 60 - 6"	101 - 18" 67 - 12" 67 - 6"
3'	13 - 18" 9 - 12" 9 - 6"	24 - 18" 17 - 12" 17 - 6"	35 - 18" 25 - 12" 25 - 6"	48 - 18" 34 - 12" 34 - 6"	59 - 18" 42 - 12" 42 - 6"	70 - 18" 50 - 12" 50 - 6"	83 - 18" 59 - 12" 59 - 6"	94 - 18" 67 - 12" 67 - 6"	105 - 18" 75 - 12" 75 - 6"	118 - 18" 84 - 12" 84 - 6"
3.5'	14 - 18" 10 - 12" 10 - 6"	27 - 18" 20 - 12" 20 - 6"	40 - 18" 30 - 12" 30 - 6"	54 - 18" 40 - 12" 40 - 6"	67 - 18" 50 - 12" 50 - 6"	80 - 18" 60 - 12" 60 - 6"	94 - 18" 70 - 12" 70 - 6"	107 - 18" 80 - 12" 80 - 6"	120 - 18" 90 - 12" 90 - 6"	134 - 18" 100 - 12" 100 - 6"
4'	16 - 18" 12 - 12" 12 - 6"	31 - 18" 24 - 12" 24 - 6"	45 - 18" 35 - 12" 35 - 6"	61 - 18" 47 - 12" 47 - 6"	76 - 18" 59 - 12" 59 - 6"	90 - 18" 70 - 12" 70 - 6"	106 - 18" 82 - 12" 82 - 6"	121 - 18" 94 - 12" 94 - 6"	135 - 18" 105 - 12" 105 - 6"	151 - 18" 117 - 12" 117 - 6"
Diamond® Caps	5	9	13	17	21	25	29	33	37	41

*Note: These numbers include a buried base course of 18" wide Highland Stone™ units.

Estimating by Square Feet of Wall:	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	200	300	400
Number of each unit (18", 12", 6") needed: Does NOT include base course.	14	17	20	24	27	30	34	37	40	44	47	50	54	57	60	64	67	134	201	268

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Materials Quantity Estimator for Anchor Highland Stone™ & Diamond®

(In Cubic Yards)

Leveling Pad: An aggregate leveling pad is made of a good compactable base material of 3/4" minus with fines.

Material: 3/4" with fines	Wall Length																	
	5'	6'	7'	8'	9'	10'	11'	12'	13'	14'	15'	20'	25'	30'	35'	40'	45'	50'
	0.20	0.23	0.27	0.32	0.35	0.39	0.43	0.46	0.50	0.55	0.59	0.78	0.98	1.17	1.37	1.55	1.75	1.94

Drainage: Use drainage aggregate that is clean, 1" minus crushed stone or granular fill.

Wall Height <i>Includes Buried Course</i>	Wall Length																	
	5'	6'	7'	8'	9'	10'	11'	12'	13'	14'	15'	20'	25'	30'	35'	40'	45'	50'
1'	0.19	0.22	0.26	0.30	0.33	0.37	0.41	0.44	0.48	0.52	0.56	0.74	0.93	1.11	1.30	1.48	1.67	1.85
1.5'	0.28	0.33	0.39	0.44	0.50	0.56	0.61	0.67	0.72	0.78	0.83	1.11	1.39	1.67	1.94	2.22	2.50	2.78
2'	0.37	0.44	0.52	0.59	0.67	0.74	0.81	0.89	0.96	1.04	1.11	1.48	1.85	2.22	2.59	2.96	3.33	3.70
2.5'	0.46	0.56	0.65	0.74	0.83	0.93	1.02	1.11	1.20	1.30	1.39	1.85	2.31	2.78	3.24	3.70	4.17	4.63
3'	0.56	0.67	0.78	0.89	1.00	1.11	1.22	1.33	1.44	1.56	1.65	2.22	2.78	3.33	3.89	4.44	5.00	5.56
3.5'	0.65	0.78	0.91	1.04	1.17	1.30	1.43	1.56	1.69	1.81	1.94	2.59	3.24	3.89	4.54	5.19	5.83	6.48
4'	0.74	0.89	1.04	1.19	1.33	1.48	1.63	1.78	1.93	2.07	2.22	2.96	3.70	4.44	5.19	5.93	6.67	7.41

**To convert cubic yards to tons: Multiply cubic yards by 1.6 (Y cubic yards x 1.6 = Z tons)

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Product Quantity Estimator for Anchor Diamond®–Straight Face Units

To Use: Locate Wall Length and Wall Height to Identify Number of Diamond Units Needed.

		1: Identify Wall Length									
2: Identify Wall Height	5'	10'	15'	20'	25'	30'	35'	40'	45'	50'	
<i>Includes Buried Course</i>											
1' (2 Courses) *	7	14	21	28	35	42	49	56	63	69	
1.5' (3 Courses) *	10	21	31	42	52	63	73	83	94	104	
2' (4 Courses) *	14	28	42	56	69	83	97	111	125	139	
2.5' (5 Courses) *	17	35	52	69	87	104	122	139	156	174	
3' (6 Courses) *	21	42	63	83	104	125	146	167	188	208	
3.5' (7 Courses) *	24	49	73	97	122	146	170	194	219	243	
4' (8 Courses) *	28	56	83	111	139	167	194	222	250	278	
Diamond® Caps	5	9	13	17	21	25	29	33	37	41	

*Note: These numbers include a buried base course.

Estimating by Square Feet of Wall:	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	200	300	400
Number of each unit needed: Does NOT include base course. **	28	35	42	49	56	63	70	77	84	91	98	105	112	119	126	133	139	278	418	557

**Formula: Multiply Square Feet of Wall by 1.39130

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Product Quantity Estimator for Anchor Diamond®–Beveled Face Units

To Use: Locate Wall Length and Wall Height to Identify Number of Diamond Units Needed.

		1: Identify Wall Length									
2: Identify Wall Height	5'	10'	15'	20'	25'	30'	35'	40'	45'	50'	
<i>Includes Buried Base</i>											
1' (2 Courses) *	7	15	22	30	37	45	52	60	67	75	
1.5' (3 Courses) *	11	22	34	45	56	67	78	90	101	112	
2' (4 Courses) *	15	30	45	60	75	90	104	119	134	149	
2.5' (5 Courses) *	19	37	56	75	93	112	131	149	168	187	
3' (6 Courses) *	22	45	67	90	112	134	157	179	201	224	
3.5' (7 Courses) *	26	52	78	104	131	157	183	209	235	261	
4' (8 Courses) *	30	60	90	119	149	179	209	239	269	299	
Diamond® Caps	5	9	13	17	21	25	29	33	37	41	

*Note: These numbers include the base course numbers noted above.

Estimating by Square Feet of Wall:	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	200	300	400
Number of each unit needed: Does NOT include base course. **	30	38	45	49	60	68	75	83	90	98	105	113	120	128	135	143	150	300	450	600

**Formula: Multiply Square Feet of Wall by 1.5

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GLOSSARY OF COMMONLY USED TERMS

Batter

The facing angle created by SRW unit set back, measured from a vertical line drawn from the toe of the wall. The batter on both the Anchor Diamond and the Highland Stone is 10.6'.

Drain rock

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

Foundation Soil

The soil which supports the leveling pad and the reinforced soil zone of a soil-reinforced SRW system.

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 and 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 nonwoven.

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.

Infill

Soil located behind the SRW units and drainage fill. May be reinforced with soil reinforcement.

Leveling pad

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. The pad is typically constructed with free draining granular soil to facilitate compaction and drainage.

Overturning

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

Permeable

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

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

The undisturbed soil for cut walls or the common backfill soil compacted behind infill soils.

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.

Surcharge

External load, usually applied at the top of an 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.

FREQUENTLY ASKED QUESTIONS

What is backfill?

The material used to fill the excavated area behind the wall. This can sometimes be the original excavated soil. We recommend using 3/4 inch (19mm) minus aggregate with no fine lines as your backfill material.

What is the base?

The area in which you will lay your first course of block. We suggest using 3/4 inch (19mm) minus aggregate fines as your base material.

What are fines?

The smaller particles of aggregate.

How do I prepare my base?

Lay 24 inches (610mm) of compactible aggregate (sand and gravel) in the bottom of the trench and compact. We recommend using 3/4 inch (19mm) minus aggregate with fines as your base material and the use of a plate compactor to compact.

Do I really have to bury the first course?

Yes! Compacting the base and burying and leveling the first course are necessary for a long-lasting, beautiful wall.

How many cap units do I need?

To determine the number of cap units needed, convert the total linear feet of your wall to inches and divide by 14.5.

What colors are available?

Contact your local dealer or licensed manufacturer to find out what colors are available in your area.

What is compaction/and how do I compact?

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

What is a course?

The horizontal layers of blocks used to build a wall.

What is drainage aggregate?

The material used to refill the void between the back of the block and the native soil. It is recommended aggregate be placed directly behind the blocks and acceptable native (original) soil be used for the remaining void.

What is grade?

Ground level.

What is a gravity wall?

A wall that resists the forces of soil through the weight and batter of the segmental retaining wall unit.

How high can I build my wall under ideal soil conditions without geosynthetic reinforcement?

Highland: 4 feet (1.2m) which includes a buried base course.
Diamond: 4 feet (1.2m) which includes a buried base course.

What is running bond?

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

Can I build multiple terraced walls in order to stay at or under the maximum wall height?

Terracing is one method of retaining areas with a total wall height greater than 4 feet (1.2m). The site of the second wall should be located behind the first wall at a distance of at least or greater than 2 times the height of the first wall, under ideal soil conditions. By using this method, the weight of the second wall has very little to no bearing on the first wall. This method should be used only if each wall does not exceed 4 feet (1.2m).

