CASTLE MANOR / BROOKSHIRE - ESTIMATING MATERIALS

1. HOW MANY WALL UNITS ARE NEEDED?

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

Block: SF x 1.39 = _____ # units
x .67 Retaining (using of each size)

2. HOW MANY CAP UNITS WILL I NEED?

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, factor 10%.)

LI ÷ CF = _____ caps.

3. HOW MUCH GEOSYNTHETIC REINFORCEMENT STRUCTURAL BACKFILL DO I NEED?

Choose the appropriate estimating chart based on your project conditions. For curved walls add 10%.

CASTLE MANOR / BROOKSHIRE INSTALLATION INSTRUCTIONS CONSTRUCTION GUIDE FOR RETAINING WALLS

BEFORE BEGINNING BASE COURSE, SEE BASIC INSTALLATION FOR RETAINING WALL CONSTRUCTION GUIDE SECTION FOR BASE PREP AND LEVELING PAD INSTRUCTIONS

BASE COURSE

- This is the most important step in the installation process.
- Begin laying block at the lowest elevation of the wall, whenever possible.
- Place first block with the wide side to the front and level, front to back and side to side; lay subsequent blocks in the same manner. When using the center pin channel, units should be pitched back ŵ/16-inch for each foot of wall height.
- Align string line with the center channel to check for proper alignment. *See Diagram 1.*
- Place the blocks side by side, with wide side to the front and make sure the blocks are in full contact with the leveling pad. Level front to back and side to side. *See Diagram 2.*
- If the wall is on an incline, don't slope the blocks. Step them up so they remain consistently level.
- Place soil in front of the base course and compact. Base course should be buried. Continue to fill and compact after each course is laid.
- Clean any debris off the top of the blocks.

Diagram 1 - Base Course and String Line

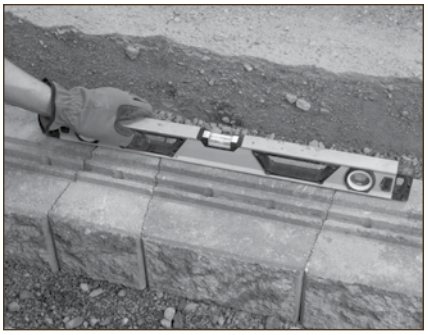


Diagram 2 - Level each unit

CONSTRUCTION OF NEXT COURSE AND PIN PLACEMENT

- For a battered wall, place the next course of blocks and align the pin hole with the battered channel of the block on the course below. *See Diagram 3.*
- For a vertical wall, place the next course of blocks and align with the vertical channel of the block on the below course.
- Insert pins into the pin core of the block. *See Diagram 4.*
- Maintain running bond with the course below.
- Place 12 inches (minimum) of backfill aggregate behind the wall units and fill voids between the wall units. Place backfill soil and compact. Only lightweight hand operated compaction equipment is allowed within 3 feet from the back of the wall.
- Clean any debris off the top of the blocks before placement of the next course.

Diagram 3 - Pin Placement (Battered Channel)

DRAINAGE DESIGN (PER DESIGN)

- Each project is unique. The grades on the site will determine at what level to install the drainpipe. Place the drainpipe (4-inch perforated piping) so water drains down and away from the wall into a storm drain, or daylight just above grade.
- Fill in the area behind the blocks with clean drainage aggregate, at least 1 foot from the wall. You may need to place and backfill several courses to achieve the proper drainage level. *See Diagram 5.*
- The 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.

Diagram 4 - Pin Placement (Vertical Channel)

REINFORCED BACKFILL PLACEMENT AND COMPACTION (PER PLAN)

- Place reinforced backfill in 6 to 8 inch loose lifts and compact to the densities specified on the approved wall constructions plans.
- Only hand operated compaction equipment is allowed within 3 feet from the back of the wall.
- If the compaction equipment is too small to achieve the required compaction, thinner lifts should be used.
- Install each subsequent course in a similar manner. Repeat procedure to the extent of the wall height.

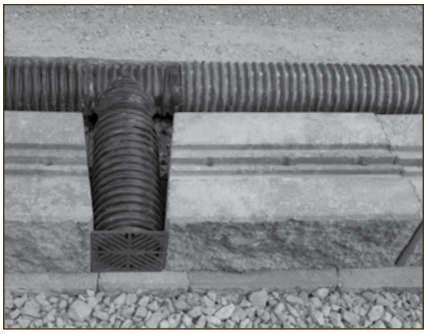


Diagram 5 - Drain Pipe Placement

REINFORCEMENT PLACEMENT (PER PLAN)

- Refer to the approved wall construction plans for the reinforcement type, strength, and placement location. Measure and cut the reinforcement to the lengths shown on the plans.
- Ensure the reinforced backfill is placed and compacted flush with the top of the units and is graded reasonably flat prior to reinforcement placement. Clean any debris off the top layer of blocks prior to reinforcement placement.
- The reinforcement has a primary strength direction, which must be laid perpendicular to the wall face.
- Place the reinforcement within 1 inch of the front of the units. *See Diagram 6.*
- Apply the next course of blocks to secure the reinforcement in place. Insert pins through the pin core. Pull the reinforcement hand taut and place staples, stakes, or fill at the back of the reinforcement tension during placement of drainage aggregate and reinforced backfill.
- Place a minimum of 6 inches of reinforced backfill prior to operating equipment above the reinforcement. Avoid sudden braking or turning on fill placed over the reinforcement.

Diagram 6 - Reinforcement

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 and seed or plant to stabilize the surface.
- Consult the wall design engineer if water may be directed behind the wall. If needed, create a swale to divert water away from the wall. 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 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 success of your retaining wall system. These instructions are meant as general guidelines. Site-specific conditions may warrant additional installation requirements.

LAYING PATTERN GUIDE FOR MULTI HEIGHT RETAINING WALLS

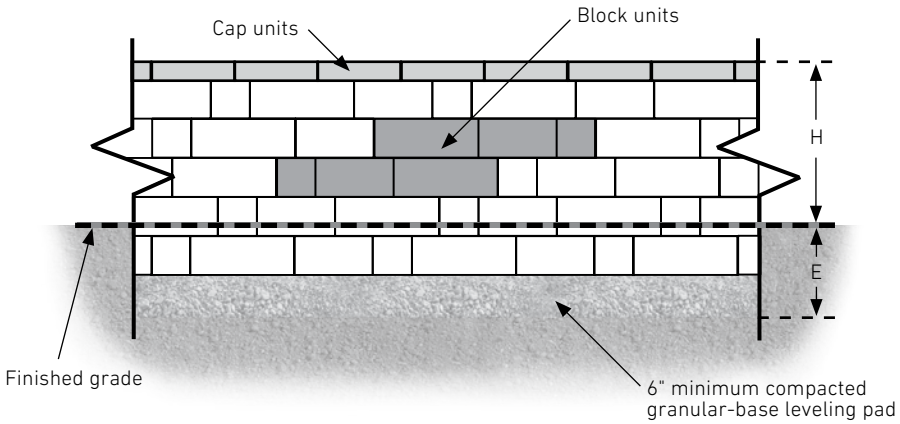
WHEN TO USE A PATTERN

You can install the multipiece retaining wall 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 the pattern exactly. Pleasing random patterns can be built using an equal number of 6- and 3-inch high blocks or using an equal square footage of blocks in each size. These patterns 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 geogrid. 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.

SEQUENT™ PANEL INSTALLATION PATTERN

9-inch by 5-foot 8-inch Installation Pattern. This 9-inch high by 34-inch long installation pattern uses an equal number of units of each face size to make the panel. This installation pattern is one of many possible options. Others can be used for different appearances.



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.

CASTLE MANOR / BROOKSHIRE INSTALLATION INSTRUCTIONS CONSTRUCTION GUIDE FOR FREESTANDING WALLS

BEFORE BEGINNING BASE COURSE, SEE BASIC INSTALLATION FOR RETAINING WALL CONSTRUCTION GUIDE SECTION FOR BASE PREP AND LEVELING PAD INSTRUCTIONS

BASE COURSE

Once the pad is compact and level, begin placing the units. Center the units on the pad and alternate the short and long faces. The ends of the units should be in contact. Level the blocks front to back and side to side. Lay subsequent blocks in the same manner. The base course must be buried below grade and should be included when calculating total wall height. *See Diagram 7.*

Diagram 7 - Base Course

CONSTRUCTION OF THE NEXT COURSE AND PIN PLACEMENT

- Clean any debris off the top of the blocks
- Place the next course of blocks and align the pin core with the vertical channel of the block on the course below and maintain running bond.
- Insert pins through the pin cores. *See Diagram 8.*
- Repeat this process to complete the wall. Glue top two courses and caps in place with a concrete adhesive.

Diagram 8 - Pin Placement

STRUCTURAL DESIGN ELEMENTS

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

- Curves
- 90-Degree Corners
- Columns

ENDING A WALL WITHOUT A COLUMN

To end a wall without a column, split the unit down the center using the split line as a guide. Alternate courses as shown until the desired height of wall is reached. Cut wall units to maintain running bond. Glue all corner pieces with a concrete adhesive. *See Diagram 9.*

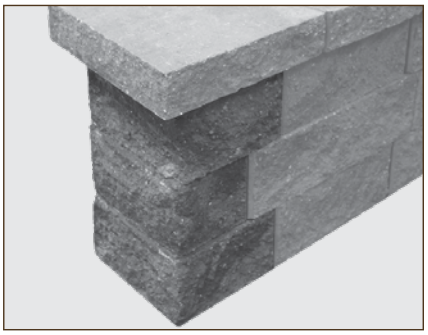
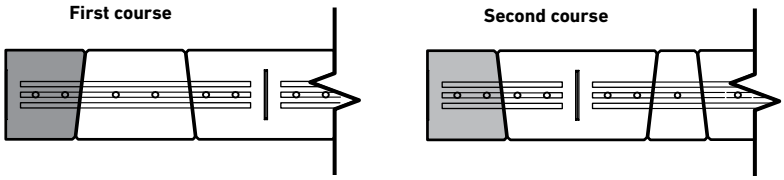


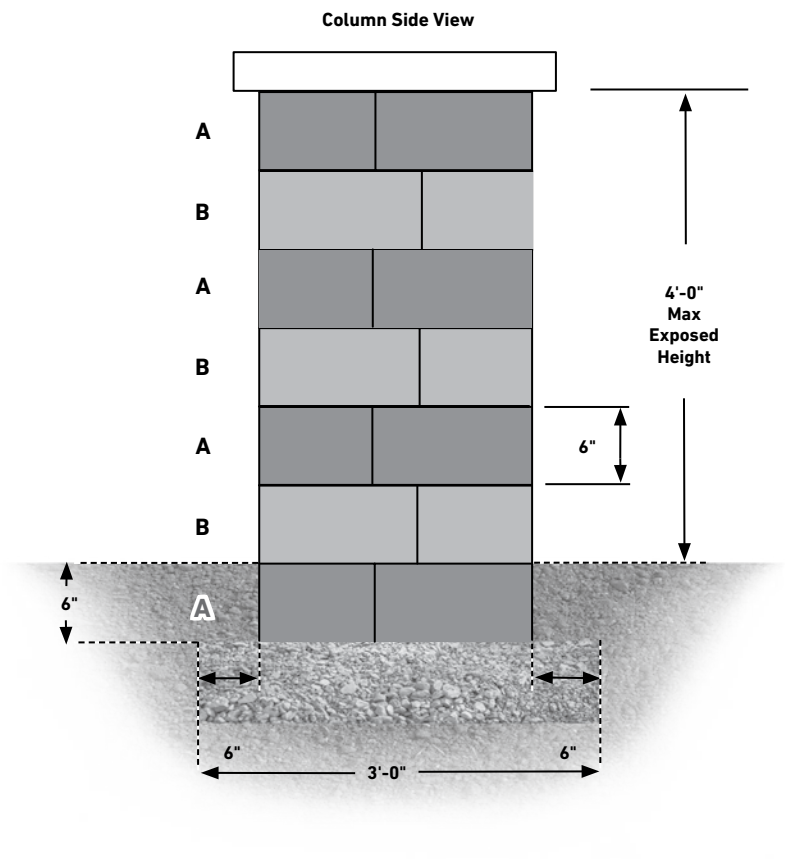
Diagram 9 - Wall End Example

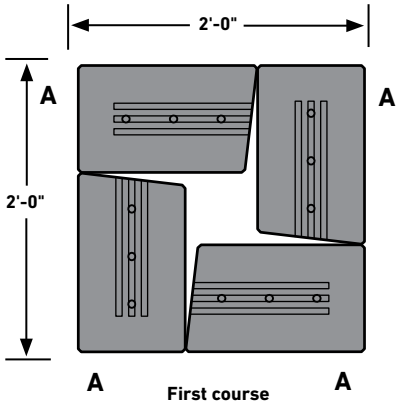


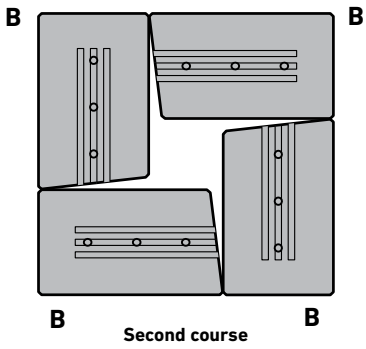
COLUMNS

When used with a freestanding wall, a column increases wall stability. The column leveling pad should extend 6 inches beyond each column edge and be at least 6 inches deep after compaction. To build a column, place the first column unit and level front to back and side to side. Place the second perpendicular to the first. Use a square as a guide. Place the third and fourth units in a similar fashion. Make sure all units are level with each other.

Alternate the position of the column units on each course and continue placing units in this manner. Glue every course. Continue building until you've reached the desired height. Cap the column with a cap unit of your choice and glue in place.







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.