

**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).

$$SF \div 1.5 = \# \text{ pieces of each unit}$$

**2. BURIED BASE UNIT ESTIMATING**

Build buried base course using 6" x 16" and 6" x 8" units. Determine the length (L) of the base in feet.

$$L \div 2 = \# \text{ pieces each 6" unit}$$

**3. CAP ESTIMATING**

Convert wall length (L) to inches: L x 12 = L in inches (LI). For curved walls, add 10%.

$$LI \div 7.5 = \# \text{ caps}$$

**4. LEVELING PAD AGGREGATE ESTIMATING**

Leveling pad aggregate is a compactible base material of 3/4-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. Use wall length (L) in feet. (Assumes 24-inch-wide trench.)

$$L \div 27 \times 1.1 = \text{CY}$$

$$\text{CY} \times 1.6 = \text{tons}$$

**5. 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 to determine square feet (SF).

$$SF \div 27 \times 1.1 = \text{CY}$$

$$\text{CY} \times 1.6 = \text{tons}$$

**6. GEOSYNTHETIC-REINFORCEMENT ESTIMATING**

See reinforcement estimating charts on anchorwall.com for variations in soil and site conditions.

**PROJECT ESTIMATING EXAMPLE:**

The wall is 50 feet long and 2.5 feet high. There is no toe or crest slope, and the soils are clean sand and gravel.

**1. EXPOSED WALL UNITS**

$$50' L \times 2' H = 100 SF \div 1.5 = 67 \text{ pieces of each unit}$$

**2. BURIED BASE UNITS**

$$50' L \div 2 = 25 \text{ each 6" unit}$$

**TOTAL WALL UNITS REQUIRED**

6" x 16", 6" x 8" units	Wall 67
	Base 25
	<b>Total 92</b>

$$3" \times 16", 3" \times 8" \text{ units} \quad 67$$

**3. CAP UNITS**

$$LI \text{ example: } 50' L \times 12" = 600"$$

$$\text{Project example: } 600" \div 7.5 = 80 \text{ caps}$$

**4. LEVELING PAD AGGREGATE**

$$50' L \div 27 = 1.9 \times 1.1 = 2.1 \text{ CY} \times 1.6 = 3.4 \text{ tons}$$

**5. DRAINAGE AGGREGATE**

$$50' L \times 2.5' H = 125 SF \div 27 \times 1.1 = 5.1 \text{ CY} \times 1.6 = 8.2 \text{ tons}$$

**6. GEOSYNTHETIC REINFORCEMENT**

See reinforcement estimating charts on anchorwall.com for variations in soil and site conditions.

All measurements are nominal

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**ESTIMATING FORMULAS**

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

- 1. EXPOSED WALL UNIT ESTIMATING**  
**Straight Walls** — Determine the square footage of the exposed wall: Exposed wall length (L) x height (H) = square feet (SF).  
**SF ÷ 1.8 = # pieces of each 6-inch-high unit**  
**# 6" units x 2 = # pieces of each 3-inch-high unit**  
**Curved Walls** — Determine the square footage of the exposed wall: When estimating, measure the largest wall face. Exposed wall length (L) x height (H) = square feet (SF).  
**SF ÷ 1.6 = # pieces of each 6-inch-high unit**  
**# 6" units x 2 = # pieces of each 3-inch-high unit**
- 2. BURIED BASE UNIT ESTIMATING**  
 Build buried base course using 6" x 16" and 6" x 8" units. Determine the length (L) of the base in feet.  
**L ÷ 1.8 = # pieces each 6" unit**  
 Add 10% for curves.
- 3. COLUMN ESTIMATING**  
 Estimate the quantity needed for a column by multiplying the height (H) in feet, including buried course, x 8.  
**H x 8 = # units per column**
- 4. CAP ESTIMATING**  
 Convert wall length (L) to inches: L x 12 = L in inches (LI). For curved wall, add 10%.  
**LI ÷ 7.5 = # caps**
- 5. WALL LEVELING PAD AGGREGATE ESTIMATING**  
 Leveling pad aggregate is a compactible base material of 3/4-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. Use wall length (L) in feet to determine cubic yards (CY). (Assumes 24-inch-wide trench.)  
**L ÷ 27 x 1.1 = CY**  
**CY x 1.6 = tons**
- 6. COLUMN LEVELING PAD AGGREGATE**  
 The leveling pad for a 24- x 24-inch column or pilaster is 36 inches square and at least 6 inches deep after compaction. Use leveling pad length (L) x width (W) x depth (D) in inches to calculate cubic yards (CY).  
**(L x W x D) ÷ 27 x 1.1 = CY**  
**CY x 1.6 x # columns = tons**

**PROJECT ESTIMATING EXAMPLE:**

The straight wall is 50 feet long and 2 feet high. There are 6 columns that are 3 feet high.

- 1. EXPOSED WALL UNITS**  
**50' L x 1.5' H = 75 SF**  
**75 SF ÷ 1.8 = 42 pieces of each 6-inch-high unit**  
**#6" units x 2 = 84 pieces of each 3-inch-high unit**
- 2. BURIED BASE UNITS**  
**50' L ÷ 1.8 = 28 each 6" units**

<b>TOTAL WALL UNITS REQUIRED</b>	
<b>6" x 16", 6" x 8" units</b>	<b>Wall 42</b>
	<b>Base 28</b>
	<b>Total 70</b>
<b>3" x 16", 3" x 8" units</b>	<b>84</b>
- 3. COLUMN UNITS**  
**3' x 8 = 24 column units per column**  
**Total column units needed**

<b>per column</b>	<b>24</b>
<b>x number of columns</b>	<b>6</b>
<b>Total column units</b>	<b>144</b>
- 4. CAP UNITS**  
**LI example: 50' L x 12" = 600"**  
**Project example: 600" ÷ 7.5 = 80 caps**
- 5. WALL LEVELING PAD AGGREGATE**  
**50' L ÷ 27 = 1.9 x 1.1 = 2.1 CY x 1.6 = 3.4 tons**
- 6. COLUMN LEVELING PAD AGGREGATE**  
**3' L x 3'W x .5' D = 4.5 ÷ 27 x 1.1 = .19 CY x 1.6 = .3 tons x 6 = 1.8 tons**

All measurements are nominal

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**RETAINING WALL PRODUCT QUANTITY ESTIMATOR**

To use: **1.** Locate wall length and wall height to identify quantities needed. **2.** Add buried base quantities. **3.** Add cap quantities.

Basic Estimating Formula is  $SF \div 1.5 = \#$  of pieces of each unit.

**1. EXPOSED WALL QUANTITIES**

Height in Feet	Number of Units	Wall Length in Feet									
		5'	10'	15'	20'	25'	30'	35'	40'	45'	50'
1.5'	6"x16"	5	10	15	20	25	30	35	40	45	50
	6"x8"	5	10	15	20	25	30	35	40	45	50
	3"x16"	5	10	15	20	25	30	35	40	45	50
	3"x8"	5	10	15	20	25	30	35	40	45	50
2.0'	6"x16"	7	14	20	27	34	40	47	54	60	67
	6"x8"	7	14	20	27	34	40	47	54	60	67
	3"x16"	7	14	20	27	34	40	47	54	60	67
	3"x8"	7	14	20	27	34	40	47	54	60	67
2.5'	6"x16"	9	17	25	34	42	50	59	67	75	84
	6"x8"	9	17	25	34	42	50	59	67	75	84
	3"x16"	9	17	25	34	42	50	59	67	75	84
	3"x8"	9	17	25	34	42	50	59	67	75	84
3.0'	6"x16"	10	20	30	40	50	60	70	80	90	100
	6"x8"	10	20	30	40	50	60	70	80	90	100
	3"x16"	10	20	30	40	50	60	70	80	90	100
	3"x8"	10	20	30	40	50	60	70	80	90	100
3.5'	6"x16"	12	24	35	47	59	70	82	94	105	117
	6"x8"	12	24	35	47	59	70	82	94	105	117
	3"x16"	12	24	35	47	59	70	82	94	105	117
	3"x8"	12	24	35	47	59	70	82	94	105	117
4.0'	6"x16"	14	27	40	54	67	80	94	107	120	134
	6"x8"	14	27	40	54	67	80	94	107	120	134
	3"x16"	14	27	40	54	67	80	94	107	120	134
	3"x8"	14	27	40	54	67	80	94	107	120	134
4.5'	6"x16"	15	30	45	60	75	90	105	120	135	150
	6"x8"	15	30	45	60	75	90	105	120	135	150
	3"x16"	15	30	45	60	75	90	105	120	135	150
	3"x8"	15	30	45	60	75	90	105	120	135	150
5.0'	6"x16"	17	34	50	67	84	100	117	134	150	167
	6"x8"	17	34	50	67	84	100	117	134	150	167
	3"x16"	17	34	50	67	84	100	117	134	150	167
	3"x8"	17	34	50	67	84	100	117	134	150	167
5.5'	6"x16"	19	37	55	74	92	110	129	147	165	184
	6"x8"	19	37	55	74	92	110	129	147	165	184
	3"x16"	19	37	55	74	92	110	129	147	165	184
	3"x8"	19	37	55	74	92	110	129	147	165	184
6.0'	6"x16"	20	40	60	80	100	120	140	160	180	200
	6"x8"	20	40	60	80	100	120	140	160	180	200
	3"x16"	20	40	60	80	100	120	140	160	180	200
	3"x8"	20	40	60	80	100	120	140	160	180	200
BASE	6"x16"	3	5	8	10	13	15	18	20	23	25
	6"x8"	3	5	8	10	13	15	18	20	23	25

**2. BURIED BASE QUANTITIES**
**3. CAP QUANTITIES**

Number of Units	Wall Length in Feet									
	5'	10'	15'	20'	25'	30'	35'	40'	45'	50'
Straight Wall	8	16	24	32	40	48	56	64	72	80
Curved Wall	9	18	27	36	44	53	62	71	80	88

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**FREESTANDING WALL PRODUCT QUANTITY ESTIMATOR**

To use: **1.** Locate wall length and wall height to identify quantities needed for straight or curved walls. **2.** Add buried base quantities. **3.** Add cap quantities. **4.** Estimate quantities needed for columns.

Basic Estimating Formula is SF ÷ 1.8 = # pieces of each 6" units. Multiply by 2 = # pieces 3" units.

**1. EXPOSED WALL QUANTITIES, STRAIGHT WALL**

Height in Feet	Number of Units	Straight Wall Length in Feet									
		5'	10'	15'	20'	25'	30'	35'	40'	45'	50'
1.5'	6"x16"	5	9	13	17	21	25	30	34	38	42
	6"x8"	5	9	13	17	21	25	30	34	38	42
	3"x16"	10	18	26	34	42	50	60	68	76	84
	3"x8"	10	18	26	34	42	50	60	68	76	84
2.0'	6"x16"	6	12	17	23	28	34	39	45	50	56
	6"x8"	6	12	17	23	28	34	39	45	50	56
	3"x16"	12	24	34	46	56	68	78	90	100	112
	3"x8"	12	24	34	46	56	68	78	90	100	112
2.5'	6"x16"	7	14	21	28	35	42	49	56	63	70
	6"x8"	7	14	21	28	35	42	49	56	63	70
	3"x16"	14	28	42	56	70	84	98	112	126	140
	3"x8"	14	28	42	56	70	84	98	112	126	140
3.0'	6"x16"	9	17	25	34	42	50	59	67	75	84
	6"x8"	9	17	25	34	42	50	59	67	75	84
	3"x16"	18	34	50	68	84	100	118	134	150	168
	3"x8"	18	34	50	68	84	100	118	134	150	168
Base	6"x16"	3	6	9	12	14	17	20	23	25	28
	6"x8"	3	6	9	12	14	17	20	23	25	28

**2. BURIED BASE QUANTITIES**
**1. EXPOSED WALL QUANTITIES, CURVED WALL**

Height in Feet	Number of Units	Curved Wall Length in Feet									
		5'	10'	15'	20'	25'	30'	35'	40'	45'	50'
1.5'	6"x16"	5	10	15	19	24	29	33	38	43	47
	6"x8"	5	10	15	19	24	29	33	38	43	47
	3"x16"	10	20	30	38	48	58	66	86	86	94
	3"x8"	10	20	30	38	48	58	66	86	86	94
2.0'	6"x16"	7	13	19	25	32	38	44	50	57	63
	6"x8"	7	13	19	25	32	38	44	50	57	63
	3"x16"	14	26	38	50	64	76	88	100	114	126
	3"x8"	14	26	38	50	64	76	88	100	114	126
2.5'	6"x16"	8	16	24	32	40	47	55	63	71	79
	6"x8"	8	16	24	32	40	47	55	63	71	79
	3"x16"	16	32	48	64	80	94	110	126	142	158
	3"x8"	16	32	48	64	80	94	110	126	142	158
3.0'	6"x16"	10	19	29	38	47	57	66	75	85	94
	6"x8"	10	19	29	38	47	57	66	75	85	94
	3"x16"	20	38	58	76	94	114	132	150	170	188
	3"x8"	20	38	58	76	94	114	132	150	170	188
Base	6"x16"	4	7	10	14	16	19	22	26	28	31
	6"x8"	4	7	10	14	16	19	22	26	28	31

**2. BURIED BASE QUANTITIES**
**3. CAP QUANTITIES**

Number of Units	Wall Length in Feet									
	5'	10'	15'	20'	25'	30'	35'	40'	45'	50'
Straight Wall	8	16	24	32	40	48	56	64	72	80
Curved Wall	9	18	27	36	44	53	62	71	80	88

**4. COLUMN QUANTITIES**

Number of Units	Height in Feet								
	2'	2.5'	3'	3.5'	4'	4.5'	5'	5.5'	6'
	16	20	24	28	32	36	40	44	48

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## INSTALLATION TIPS

### GETTING STARTED

Use best practices to lay out and build walls. See [anchorwall.com](http://anchorwall.com) for standard installation details. The information in this brochure will help you get started using Artisana™ retaining wall blocks.

### BASE COURSE

Since the 6-inch units are palletized together, it is easiest to use both the 6" x 16" and 6" x 8" units to build the base. This will help maintain the ratio of one to one with the blocks and will eliminate the need to pick through the smaller blocks on the pallet thus saving time. Remove the rear lip from the block to ensure proper contact with the gravel base. Pitch the base course back 1/16" for each foot of wall height, to keep the wall level on higher courses.

### COMPACTION

Keep heavy compaction equipment 4 feet away from the face of the wall and make sure you are compacting in proper lifts according to your equipment. After compaction, tap the back of the blocks with a rubber mallet or dead-blow hammer to ensure each block has remained seated against the block below.

### 90° CORNERS

Corners are built by using the corner/column unit in an alternating fashion. Reversing the block direction back and forth allows them to be integrated into the patterns with little effort. Depending on the wall layout, there may be a need to go off the pattern and randomly place wall blocks near the corner to blend together. Glue should be applied to every corner unit from bottom to top. Corner units should be set back to reflect the batter of the wall block units.

### USING 8-INCH UNITS IN CONSTRUCTION

The 8-inch-wide units in both the 3-inch and 6-inch heights have two shapes. One has an offset angle on the left side and the other has an offset on the right. Either block can be used in most situations. In a curved wall, it may be necessary to select one shape or the other. For example, if two 8-inch blocks of either height meet on a 16-inch unit, put the two 90-degree sides together to form a 16-inch unit.

### BUILDING AN OUTSIDE RADIUS CURVE

A function of geometry with battered, multiple-height walls is that the outside radius gets smaller as the wall gets taller. As a result, the spaces between the blocks also shrink. This requires some shaving or trimming of the blocks to fit. Plan to shave 3-inch blocks as you build. This will save time and saw blades. When removing a 1/2 inch or less, a small handheld grinder will be easier and quicker to use than a large saw.

### BUILDING AN INSIDE RADIUS CURVE

When building an inside curve, the radius gets bigger as the wall gets taller. Gapping is a function of geometry and batter and will happen with any multiple-height system. If the gaps created are small, distribute them over several blocks to minimize the openings. Otherwise, fill the opening with two blocks. This will require going off pattern for a while. For the best appearance, do not use pieces smaller than 4 inches. For example, a space that would be 8 inches in the pattern might be 9 inches on an inside radius. This would require cutting a 16-inch piece to 9 inches instead of using an 8-inch piece and a 1-inch sliver.

### USING GEOSYNTHETIC REINFORCEMENT

For walls that are shorter than 4 feet, use a light-weight grid, such as Miragrid 2XT. It is thinner and can be used in either direction for a strong wall. Use best practices for installing geosynthetic reinforcement grid. Lay grid perpendicular to the wall face, bringing it to within one inch from the wall face. Pull the grid tight before backfilling. Cut off the selvage on grid to eliminate any unevenness.

### STEPS

When constructing steps, consider whether it is a fill or a cut grade situation. Construction is similar but varies in the amount of dummy units required.

A fill step solution will have a base course of dummy units in the entire footprint of the steps. For each additional step, add dummy units behind the facing units for stability. The facing units on the steps should alternate between 8-inch and 16-inch blocks glued to the dummy units.

A cut-grade set of steps will use one layer of dummy blocks under each step, effectively stepping up the grade. Both applications will require some sort of tread to cover the facing units. The double-sided cap is a great solution.

### ALTERNATIVE TO GEOSYNTHETIC REINFORCEMENT

Stabilized aggregate is a porous backfill material that can be used as an alternative to grid when building with Artisana products in cut wall situations where you don't have room to excavate for geogrid. Excavation time can be reduced by as much as 40%. Reducing excavation also means reducing backfill time and eliminating the need to compact all the backfill soil.

Stabilized aggregate effectively increases the depth of the facing unit and creates a permeable concrete mass that can resist the weight of the soil wedge behind the wall. It is a proven system with several million square feet built worldwide with this method.

## WALL ABUTTING A COLUMN

Whether building a free standing wall or a retaining wall with column accents, the wall is abutted to the column. When constructed as a pilaster at the end of a free standing wall, cutting the wall pieces to fit against the column is the only work required.

When abutting the wall in the middle of the column face, some sculpting of the blocks will give a clean finished look to a project. The hand-cut look of the blocks give a soft, round appearance to each unit. If you butt the edge of a unit to the rounded face, gapping appears at the top and bottom of the block. The best way to finish this is to mark or scribe the block to fit the face of the column unit into the edge of the wall unit. This is easily achieved with a small hand-held grinder with a diamond blade.

## CAPPING

The double-sided cap has a right-angle side and an offset-angle side. The caps can be used in any of four directions since there is no specific top or bottom. There is an arrow on the side to guide capping straight walls. Just place the arrows in the same direction and touch them together as the caps are laid.

On a radius that usually requires extensive cutting, the fact that the cap can be turned any of four ways will reduce cutting dramatically. For example, on an arc of about 25 feet, a standard trapezoidal or rectangular cap would require cutting every other cap or about 10 caps. With this product, only four caps needed to be cut. This again saves time, saw wear and tear, and diamond blades.

## WHEN TO USE A PATTERN FOR RETAINING WALLS

You can install the Artisana™ retaining wall system in a random pattern using any combination of units. Just avoid vertical lines that span more than 18 inches in height.

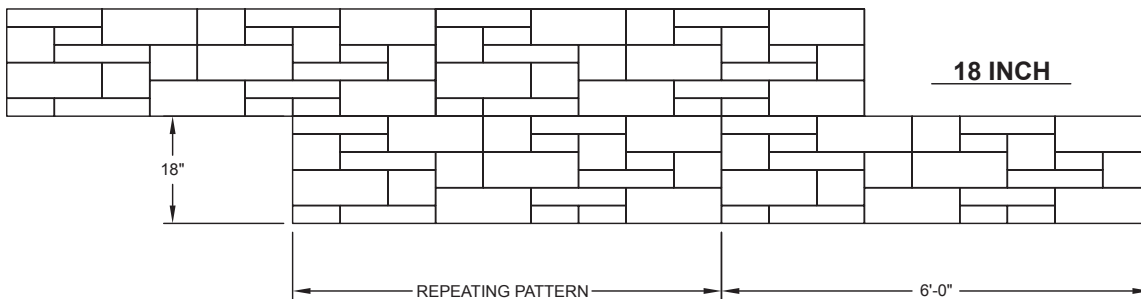
If you are building a wall without geosynthetic reinforcement, use a pattern for inspiration or follow a pattern exactly. Pleasing random patterns can be built using an equal number of 3- and 6-inch-high blocks. The estimating formulas in this

brochure 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. Stagger the patterns as shown to avoid vertical bonds.

### 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 if the grid is at 18 inches.

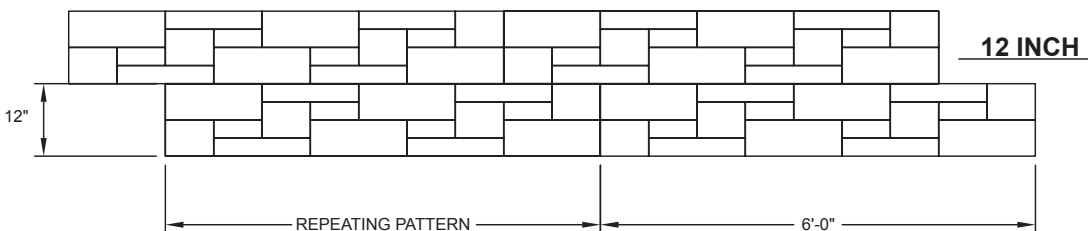


#### BLOCKS REQUIRED

6	6"X16"X8"
6	6"X8"X8"
6	3"X16"X8"
6	3"X8"X8"

### 12-INCH BY 6-FOOT PATTERN

This illustrates a 12-inch-high by 6-foot-long repeating pattern. When your plan requires reinforcement at 12 or 24 inches, this pattern is ideal because it eliminates cutting.



#### BLOCKS REQUIRED

4	6"X16"X8"
4	6"X8"X8"
4	3"X16"X8"
4	3"X8"X8"

