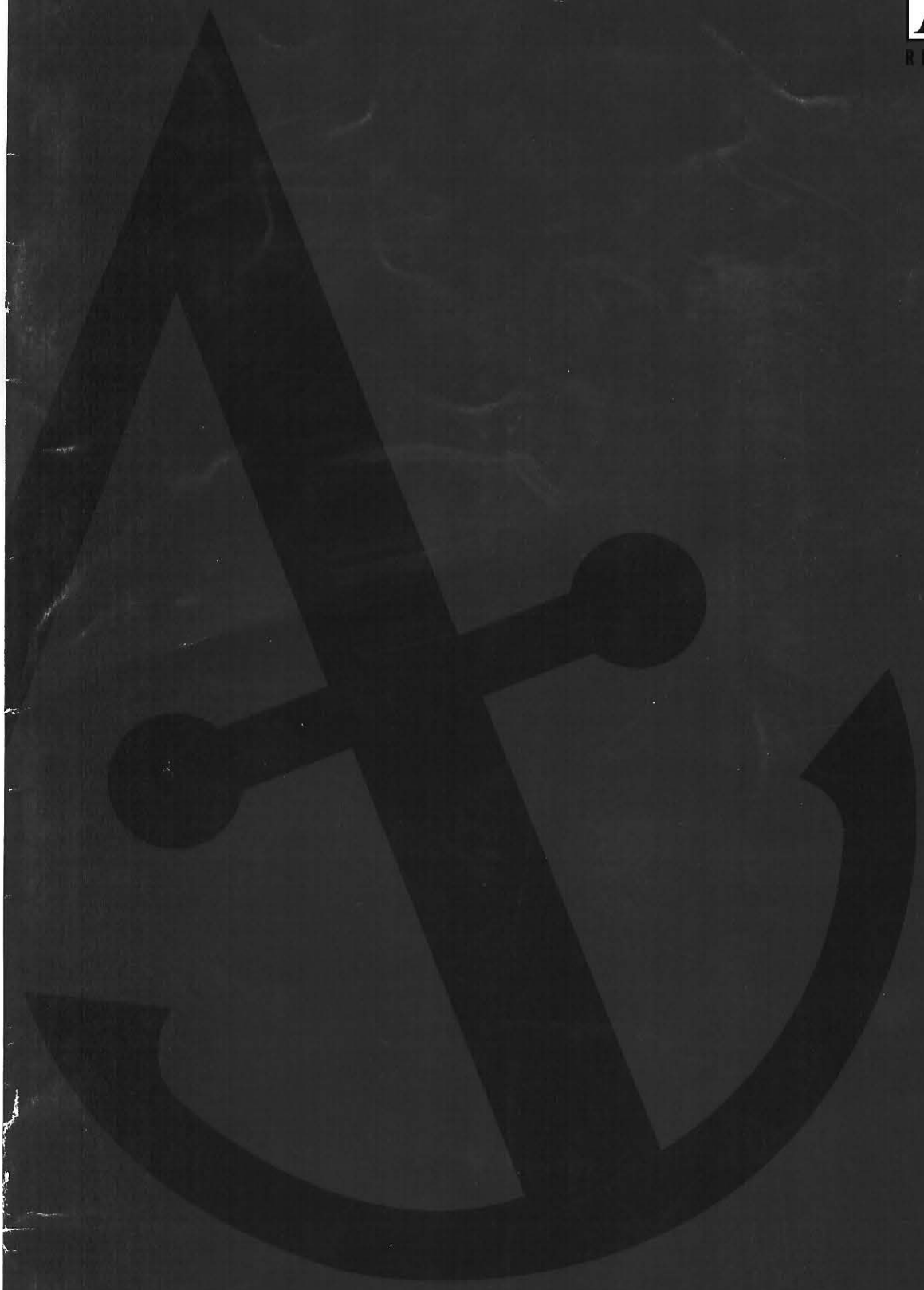
Anchor
RETAINING WALL SYSTEMS



Anchor Diamond®

Estimating and Installation Manual

ANCHOR DIAMOND®

INDEX

Anchor™
RETAINING WALL SYSTEMS

Professionals who choose Anchor Wall Systems get superior support.

More and more architects, engineers and contractors are choosing Anchor Wall Systems as the ideal solution for everything from residential landscaping to high volume, commercial tall wall construction. Why? Because every application of the Anchor product line supplies outstanding support. Support from a product with integrity. And support from experts ready to help make your retaining wall project a success.

Anchor Wall Systems offers cost-effective solutions built on sound engineering principles. Unlike other retaining wall alternatives, our walls stand tall without mortar or pins. Each block is built to last. And Anchor products are cost-effective, non-polluting and virtually maintenance-free. In warm earthtones and natural rock face textures, Anchor walls enhance landscapes with enduring beauty.

At Anchor, a good looking product of superior quality is not enough. Our versatile wall systems are supported by a network of knowledgeable producers, superior design technologies and engineering experts. Every time you choose Anchor Wall Systems, you can be confident you'll receive the support you need to get the job done right.

AN OUTSTANDING COMBINATION OF FORM AND FUNCTION.

The patented Anchor Diamond® pinless system is an unparalleled example of technical brilliance and functional versatility.

Molded into the form of every segmental unit is an integral rear lip. The lip automatically guides each new course ensuring proper alignment and a precise set-back. This superior design requires no mortar or pins.

The Anchor Diamond® system is based on proven engineering principles developed for gravity and soil reinforced retaining walls. The weight of the retaining wall acts to resist the loads imposed on the structure by the retained soil.

In cases where the weight of the wall does not provide sufficient resistance against soil forces, the use of geosynthetic soil reinforcement stabilizes the Anchor Diamond® system to virtually any height.

Even with geosynthetics, there's no need for mechanical attachments or mortar because of the Anchor Diamond® interlocking rear lip.

UNLIMITED POTENTIAL FOR CREATIVE DESIGN.

Anchor Diamond® units come in several shapes for extensive design freedom.

Straight and beveled splits can be used to create concave and convex curves, 90° inside and outside corners and terraces. Use an adhesive such as SB-10 Paver Bond on exposed partial units.

Cap Units can be used by a designer to achieve a more finished look. Use an adhesive such as SB-10 Paver Bond to secure caps.

Great results at even greater heights.

Anchor Diamond® blocks can be used to create tall walls of varying heights. Non-reinforced retaining walls created with Anchor Diamond® blocks can reach up to a maximum total wall height, including buried course(s) of 4 feet, when the following conditions are present:

- Slopes or other wall terraces are not present above or below the wall
- Site soils are clean sand and gravel
- No surcharge loads are present

If these conditions are not present, the maximum gravity wall height must be less than 4 feet.

REINFORCED AND NON-REINFORCED RETAINING WALLS

Geosynthetic reinforcement

Anchor Diamond® walls can be designed with geosynthetic reinforcement to attain heights in excess of 30 feet. The geosynthetics selected to provide reinforcement must have proven performance with the Anchor Diamond® unit through connection testing. Contact Anchor Wall Systems for connection testing results with many geosynthetic types.

Refer to the examples within this manual for geosynthetic reinforcement placement under varying conditions (slopes, soils and surcharges). It's important to note that all data provided in this manual is preliminary and for estimating purposes only, as your actual project conditions will vary. Your final design must be performed by a registered professional engineer.

Water projects

Water projects are another excellent application of Anchor Diamond® blocks. The following design considerations must be addressed for water projects:

- Velocity of the water impacting the structure
- Rapid draw-down effects
- Ice flow

Successful Anchor Diamond® water project designs use a combination of geosynthetics for reinforcement and filtration as well as rip-rap placed in front of the wall to protect the wall from scour. All water projects should be designed by a registered professional engineer. Refer to the Anchor Wall Systems Water Applications Manual for design information.

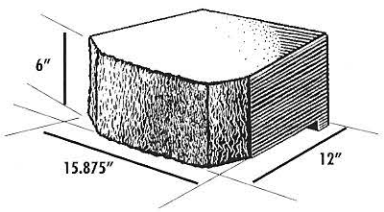
SPECIFICATIONS

GENERAL INFORMATION

Compressive strength:	3500 psi min.
Absorption rate:	7.0% max.
Material composition:	High quality zero slump concrete

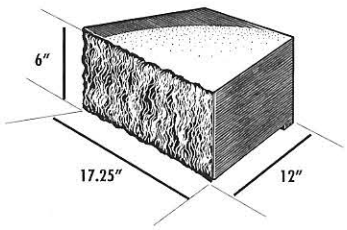
ANCHOR DIAMOND® BEVELED UNIT

Approximate Dimensions:	6″ x 15.875″ x 12″*
Approximate Weight:	68 lbs.**
Coverage:	.67 sq. ft.
SetBack:	1.125″



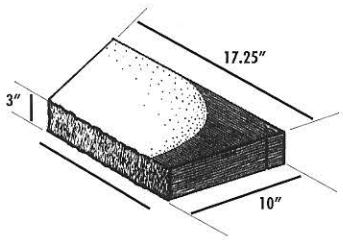
ANCHOR DIAMOND® STRAIGHT UNIT

Approximate Dimensions:	6″ x 17.25″ x 12″*
Approximate Weight:	72 lbs.**
Coverage:	.72 sq. ft.
SetBack:	1.125″



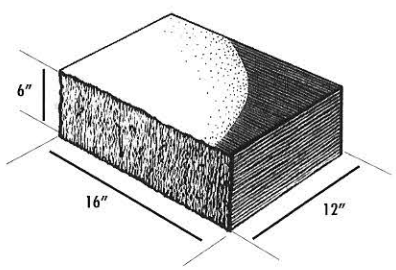
ANCHOR DIAMOND® CAP UNIT (Optional)

Approximate Dimensions:	3″ x 17.25″ x 10″*
Approximate Weight:	32 lbs.**



ANCHOR DIAMOND® STEP UNIT (Optional)

Approximate Dimensions:	6″ x 16″ x 12″*
Approximate Weight:	85 lbs.**



COLORS

Manufacturer's standard colors include, but are not limited to, gray and tan. Additional colors vary by region. Custom colors are available by special order only.

*Dimensions may vary by +/– .0625 inches

**Weight may vary slightly by region. Specifications may vary or change without notice.

ANCHOR DIAMOND®

Section 02830: Retaining Wall Specification

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes

1. Concrete segmental retaining wall units

B. Related Sections

1. Section - Geosynthetic Wall Reinforcement
2. Section - Backfill
3. Section - Drainage Fill
4. Section - Landscaping Turf
5. Section - Drain Tile

1.02 REFERENCES

A. American Society for Testing and Materials

1. ASTM C1372-99a; Standard Specification for Segmental Retaining Wall Units
2. ASTM C1262-98; Standard Test Method for Evaluating the Freeze-Thaw Durability of Manufactured Concrete Masonry Units and Related Concrete Units
3. ASTM C698-91; Standard Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 5.5-lb Rammer and 12-in. Drop, (Standard Proctor)
4. ASTM D1557-91; Standard Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10-lb Rammer and 18-in. Drop, (Modified Proctor)
5. ASTM D448-86; Standard Classification for Sizes of Aggregate for Road and Bridge Construction
6. ASTM C140-99b; Standard Test Methods of Sampling and Testing Concrete Masonry Units
7. ASTM D2922-96; Standard Test Method for Density of Soil and Soil-Aggregate In Place by Nuclear Methods (Shallow Depth)
8. ASTM D1556-90; Standard Test Method for Density of Soil In Place by the Sand Cone Method
9. ASTM D2488-93; Standard Practice for Description and Identification of Soils, Visual-Manual Procedure (USCS; Unified Soil Classification System)

1.03 SUBMITTALS

A. Submit the following in accordance with Section 01300:

1. Manufacturer's literature: Materials description.
2. Shop drawings: Retaining wall system design, including wall heights, geosynthetic reinforcement layout and drainage provisions. The shop drawings shall be signed by a registered professional engineer licensed in the state of wall installation.
3. Samples
   a. Furnish (1) unit in the color and face pattern specified if requested by the Architect. If approved, unit may be used in the finished work.
   b. 12 inches square or larger piece of the geosynthetic reinforcement specified.
4. Test reports from an independent laboratory stating moisture absorption and compressive strength properties of the concrete wall units meet the project specifications when tested in accordance with ASTM C 140-96, Sections 6, 8 and 9.

1.04 DELIVERY, STORAGE AND HANDLING

A. To prevent damage, store above ground on wood pallets or blocking. Remove damaged or otherwise unsuitable material, when so determined, from the site.

1. Faces of the concrete wall units shall be substantially free of chips, cracks and stains.
2. Prevent excessive mud, wet cement, epoxy, and like material, which may affix themselves from coming in contact with the materials.

1.05 EXTRA MATERIALS

A. Three replacement units identical to those installed on the Project.

1.06 DEFINITIONS

A. Geosynthetic reinforcement is a material specifically fabricated for use as a soil reinforcement.

B. Concrete retaining wall units are as detailed on the drawings and are specified under Section 02830: Anchor Diamond® Retaining Wall Units.

C. Drainage aggregate is a material used around and directly behind the concrete wall units.

E. Backfill is the soil, which is used as fill behind the drainage aggregate and within the reinforced soil mass if applicable.

F. Foundation soil is the soil mass supporting the leveling pad and reinforced zone of the retaining wall system.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Concrete Retaining Wall Unit: "Anchor Diamond® Retaining Wall Units" as manufactured under license from Anchor Wall Systems.

1. Concrete wall units shall meet requirements of ASTM C1372-97 except the maximum water absorption shall be limited to 7.0 percent and unit height dimensions shall not vary more than +/- 1/16 inch from that specified.

2. Concrete wall units are required to have a minimum of 0.67 square foot face area.

3. Color as selected by Architect from manufacturer's standard selections.

4. Face pattern: Geometry: Beveled or Straight.

5. Texture: Smooth or Split Rock Face.

6. The concrete units shall include an integral concrete shear connection, flange/locator.

B. Geosynthetic reinforcement: Polyester fiber geogrid, geotextile, or polypropylene woven geotextile for use as soil reinforcement.

C. Base: Material shall consist of drainage aggregate, sand and gravel and/or concrete as shown on the construction drawings. A minimum of 6 inches of compacted base is required.

D. Drainage aggregate: Fill between units shall consist of free-draining, crushed coarse aggregate that meets the gradation requirements of ASTM 448-86; Standard Classification for Sizes of Aggregate for Road and Bridge Construction, designation 57, 67, 6, 7 or 8.

E. Backfill: Materials are suitable non-organic soils at a moisture content which enables compaction to the specified densities. Unsuitable soils are organic soils and those soils with the USCS classification symbol of CH, OH, MH, OL, or PT. CL soils with a Plasticity Index (PI) greater than 25 are also considered unsuitable soils.

F. Drain tile: The drainage collection pipe shall be a perforated or slotted PVC or corrugated HDPE pipe. The pipe may be covered with a geotextile filter fabric to function as a filter.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine the areas and conditions under which the retaining wall is to be erected and notify the Architect or Civil Engineer in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected. Promptly notify the wall design engineer of any site conditions, which may affect wall performance or may require a reevaluation of the wall design.

B. Foundation soil shall be examined by the project geotechnical engineer to ensure that the actual foundation soil strength, meets or exceeds that required on the construction drawings.

3.02 EXCAVATION

A. Excavate to the lines and grades shown on the construction drawings. Over-excavation not approved by the owner or duly appointed owner's representative shall not be paid for and replacement with compacted fill and/or wall system components will be required at the Contractor's expense. Do not disturb base beyond the lines shown. The Contractor shall be responsible for the stability of the excavation and its influence on adjacent properties and structures.

3.03 FOUNDATION PREPARATION

A. Foundation soil shall be excavated as required for footing or base dimension shown on the construction drawings, or as directed by the engineer.

B. Soil not meeting the required strength shall be removed, sufficiently oversized from the front of the block and the back of the reinforcement and backfilled with suitable material.

C. Over-excavated areas shall be filled with suitable compacted backfill.

3.04 BASE COURSE PREPARATION

A. Base materials shall be placed as shown on the construction drawings with a minimum thickness of 6 inches.

B. Base materials shall be installed upon undisturbed soils, or foundation soils prepared in accordance with Section 3.03.

C. Material shall be compacted so as to provide a level, hard surface on which to place the first course of units.

D. Base materials shall be prepared to ensure complete contact of retaining wall unit. Gaps shall not be allowed.

E. Base materials shall be to the depths and widths shown on the plans. Reduce the depth of sand and gravel and replace with a one inch to two inch concrete topping. Concrete shall be lean, unreinforced and a maximum of two inches thick. Where a reinforced footing is required, place below the frost line.

3.05 ERECTION

A. First course of concrete wall units shall be placed on the prepared base material. Units shall be checked for level and alignment. The top of all units in base course shall be at the same elevation.

B. Ensure that concrete wall units are in full contact with base.

C. Concrete wall units shall be placed side by side for full length of wall alignment. Alignment may be done by using a string line or offset of wall line.

D. Fill all voids between concrete wall units with drainage aggregate.

E. A minimum of 12 inches of drainage aggregate shall be placed behind the concrete wall units.

F. Drain tile shall be installed at the lowest elevation possible to maintain gravity flow of water to outside of the reinforced zone. The drainage collection pipe shall be day-lighted to an appropriate location away from the wall system at not more than every 75 feet and at low points of the wall.

G. Remove all excess fill from top of units and install next course. Ensure drainage aggregate and backfill are compacted before installation of next course.

H. Install each succeeding course. Backfill as each course is completed. Pull the units forward until the locating surface of the unit contacts the locating surface of the units in the preceding course. Pull the units forward as far as possible.

I. Install geosynthetic reinforcement in accordance with geosynthetic manufacturer's recommendations and the design drawings.

3.06 BACKFILL PLACEMENT

A. Reinforced backfill shall be placed, spread and compacted in a manner that will minimize slack in the reinforcement.

B. Fill in the reinforced zone shall be placed and compacted in lifts not to exceed 6 to 8 inches in loose thickness where hand operated compaction equipment is used, and not exceeding 12 inches loose thickness where heavy, self-propelled compaction equipment is used.

C. All fill placed in the reinforced zone must be compacted to a minimum of 95 percent of the soil's standard Proctor density (ASTM D 698-91) or as recommended by the project geotechnical engineer.

D. Only lightweight hand-operated equipment shall be allowed within 4 feet of the back of the retaining wall units.

3.07 CAP UNIT INSTALLATION (IF APPLICABLE)

A. Apply construction adhesive to the top surface of the unit below and place the cap unit into desired position.

B. Cut cap units as required to obtain proper fit.

C. Backfill and compact to finish grade.

3.08 ADJUSTING AND CLEANING

A. Damaged units should be replaced with new units during construction.

B. Contractor shall remove debris caused by this construction and leave adjacent paved areas broom clean.

3.09 QUALITY CONTROL

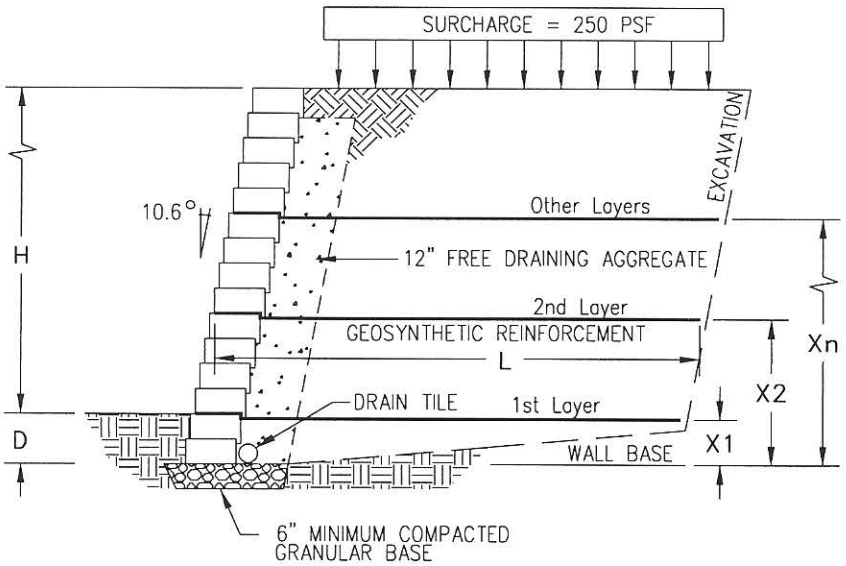
A. The wall installation contractor is responsible for quality control of installation of all materials. The contractor should enlist the assistance of a qualified independent third party to verify the correct installation of all materials according to these specifications and the construction drawings.

B. The Owner, at his own expense, should retain a qualified professional to perform random quality assurance checks of the contractor's work.

C. Work found to be deficient according to these specifications or the construction drawings must be corrected at the contractor's expense.

D. The retaining wall will not be considered complete until accepted by the engineer or duly appointed owner's representative.

TYPICAL SECTION



SAND/GRAVEL

$\phi = 34°$

$\gamma = 125$ pcf

DESIGN TABLE 1 250 PSF SURCHARGE

EXPOSED WALL HEIGHT H	DEPTH BELOW GRADE D	TOTAL NO. COURSES FOR FINISHED WALL	LENGTH L	GEOSYNTHETIC REINFORCEMENT PLACEMENT DISTANCE UP FROM WALL BASE IN FT.					
				X1	X2	X3	X4	X5	X6
2' 0"	6"	5	4' 0"	1' 0"					
3' 0"	6"	7	5' 0"	2' 0"					
4' 0"	6"	9	4' 6"	0' 6"	3' 0"				
5' 0"	6"	11	5' 0"	1' 6"	4' 0"				
6' 0"	6"	13	5' 6"	0' 6"	2' 6"	5' 0"			
7' 0"	6"	15	6' 6"	1' 0"	3' 6"	6' 0"			
8' 0"	6"	17	7' 0"	0' 6"	2' 6"	4' 6"	7' 0"		
9' 0"	6"	19	7' 6"	0' 6"	3' 0"	5' 6"	8' 0"		
10' 0"	6"	21	8' 0"	0' 6"	2' 6"	4' 6"	6' 6"	9' 0"	

DESIGN PARAMETERS:
Methodology – NCMA SRW Design Manual
Geosynthetic Reinforcement – LTDS = 670 lbs/ft (min)
Min. connection value of 670 lbs/ft., 10 degrees and max. of 1005 lbs/ft.

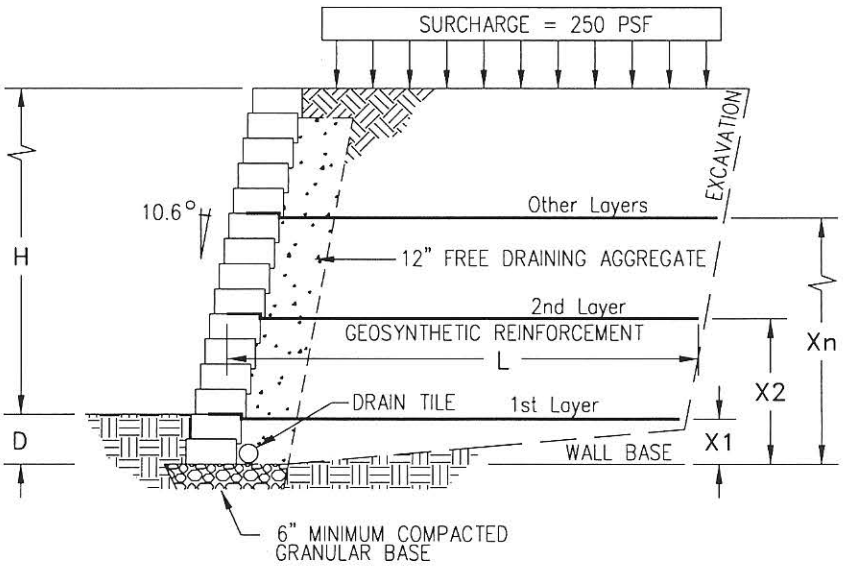
NOTE: For cost estimating purposes only. Professional engineering must be considered for proper design and reinforcement placement.

SILTY SAND

$\phi = 30^\circ$

$\gamma = 125$ pcf

TYPICAL SECTION



DESIGN TABLE 2 250 PSF SURCHARGE

EXPOSED WALL HEIGHT H	DEPTH BELOW GRADE D	TOTAL NO. COURSES FOR FINISHED WALL	LENGTH L	GEOSYNTHETIC REINFORCEMENT PLACEMENT DISTANCE UP FROM WALL BASE IN FT.					
				X1	X2	X3	X4	X5	X6
2' 0"	6"	5	5' 6"	1' 6"					
3' 0"	6"	7	5' 0"	0' 6"	2' 6"				
4' 0"	6"	9	6' 6"	1' 0"	3' 6"				
5' 0"	6"	11	7' 0"	0' 6"	2' 6"	4' 6"			
6' 0"	6"	13	7' 6"	0' 6"	3' 0"	5' 6"			
7' 0"	6"	15	8' 0"	0' 6"	2' 6"	4' 6"	6' 6"		
8' 0"	6"	17	8' 6"	0' 6"	2' 6"	5' 0"	7' 6"		
9' 0"	6"	19	9' 6"	0' 6"	2' 0"	4' 0"	6' 0"	8' 6"	
10' 0"	6"	21	10' 0"	0' 6"	2' 0"	3' 6"	5' 0"	7' 0"	9' 6"

DESIGN PARAMETERS:
Methodology – NCMA SRW Design Manual
Geosynthetic Reinforcement – LTDS = 670 lbs/ft (min)
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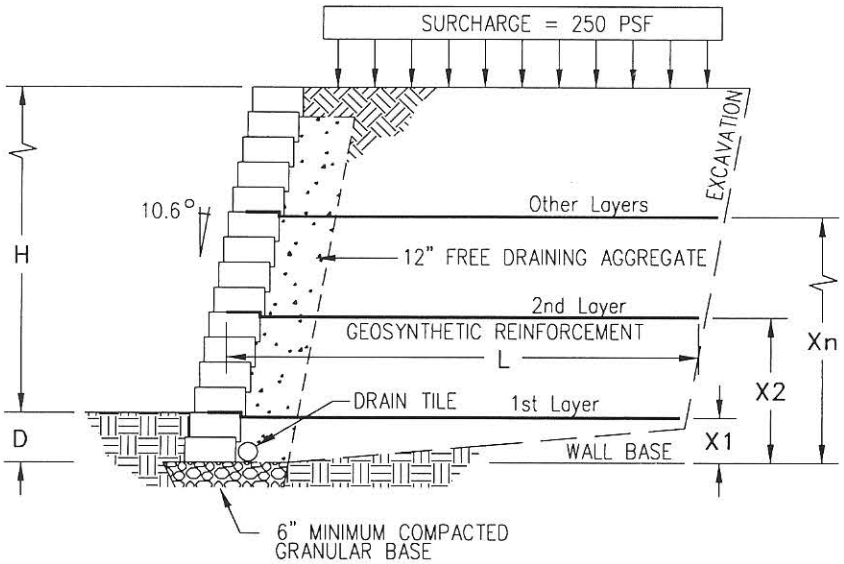
NOTE: For cost estimating purposes only. Professional engineering must be considered for proper design and reinforcement placement.

TYPICAL SECTION



SILTS/CLAY

$\phi = 26^{\circ}$

$\gamma = 120$ pcf

DESIGN TABLE 3 250 PSF SURCHARGE

EXPOSED WALL HEIGHT H	DEPTH BELOW GRADE D	TOTAL NO. COURSES FOR FINISHED WALL	LENGTH L	GEOSYNTHETIC REINFORCEMENT PLACEMENT DISTANCE UP FROM WALL BASE IN FT.						
				X1	X2	X3	X4	X5	X6	X7
2' 0"	6"	5	7' 0"	1' 6"						
3' 0"	6"	7	6' 6"	0' 6"	2' 6"					
4' 0"	6"	9	8' 0"	1' 0"	3' 6"					
5' 0"	6"	11	8' 6"	0' 6"	2' 6"	4' 6"				
6' 0"	6"	13	9' 0"	0' 6"	3' 0"	5' 6"				
7' 0"	6"	15	10' 0"	0' 6"	2' 0"	4' 0"	6' 6"			
8' 0"	6"	17	10' 6"	0' 6"	2' 0"	3' 6"	5' 0"	7' 6"		
9' 0"	6"	19	11' 0"	0' 6"	2' 0"	3' 6"	5' 0"	6' 6"	8' 6"	
10' 0"	6"	21	12' 0"	0' 6"	1' 6"	3' 0"	4' 6"	7' 0"	9' 6"	

DESIGN PARAMETERS:
Methodology – NCMA SRW Design Manual
Geosynthetic Reinforcement – LTDS = 670 lbs/ft (min)
Min. connection value of 670 lbs/ft., 10 degrees and max. of 1005 lbs/ft.

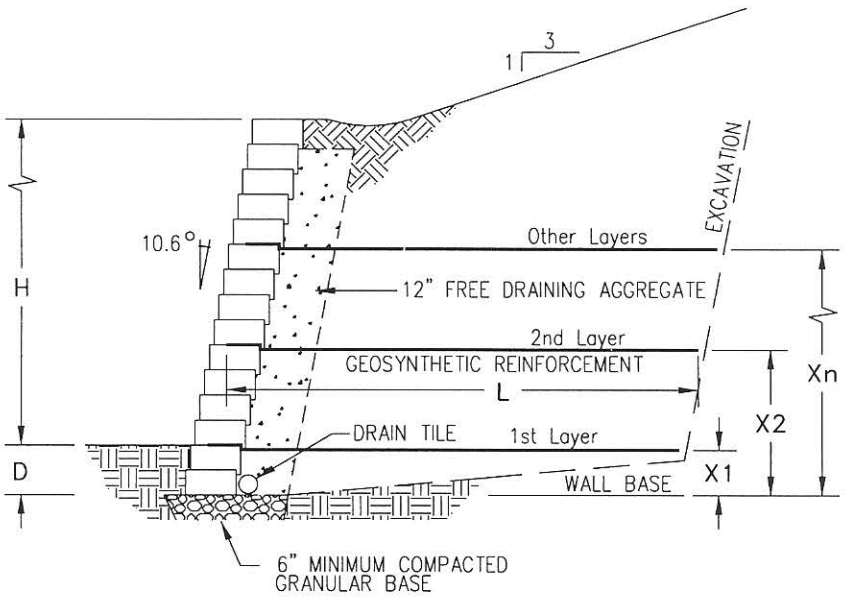
NOTE. For cost estimating purposes only. Professional engineering must be considered for proper design and reinforcement placement.

SAND/GRAVEL

$\phi = 34^\circ$

$\gamma = 125$ pcf

TYPICAL SECTION



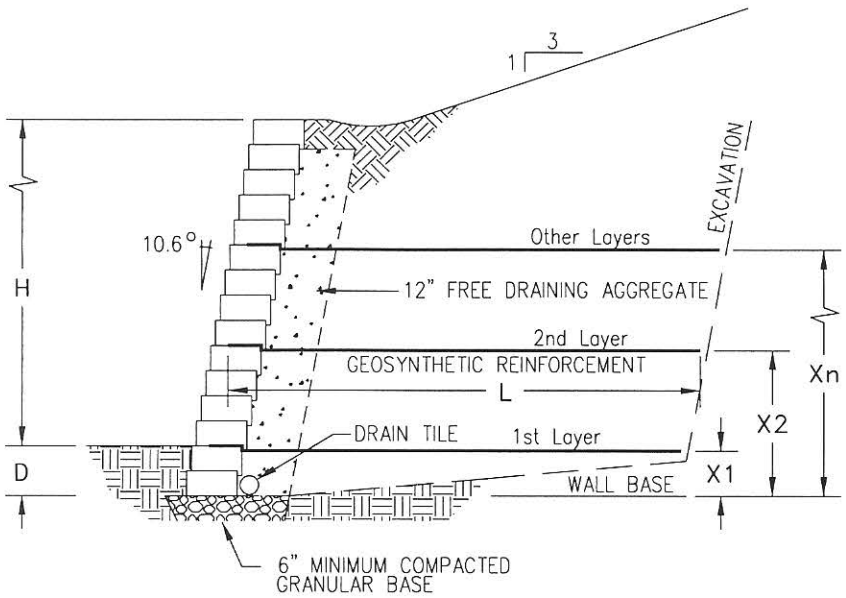
DESIGN TABLE 4 3:1 SLOPED BACKFILL

EXPOSED WALL HEIGHT H	DEPTH BELOW GRADE D	TOTAL NO. COURSES FOR FINISHED WALL	LENGTH L	GEOSYNTHETIC REINFORCEMENT PLACEMENT DISTANCE UP FROM WALL BASE IN FT.					
				X1	X2	X3	X4	X5	X6
3' 0"	6"	7	4' 0"	1' 6"					
4' 0"	6"	9	4' 0"	2' 6"					
5' 0"	6"	11	4' 6"	1' 0"	3' 6"				
6' 0"	6"	13	5' 0"	2' 0"	4' 6"				
7' 0"	6"	15	5' 6"	0' 6"	3' 0"	5' 6"			
8' 0"	6"	17	6' 6"	0' 6"	2' 0"	4' 0"	6' 6"		
9' 0"	6"	19	7' 0"	0' 6"	2' 6"	5' 0"	7' 6"		
10' 0"	6"	21	7' 6"	0' 6"	2' 0"	3' 6"	6' 0"	8' 6"	

DESIGN PARAMETERS:
Methodology – NCMA SRW Design Manual
Geosynthetic Reinforcement – LTDS = 670 lbs/ft (min)
Min. connection value of 670 lbs/ft., 10 degrees and max. of 1005 lbs/ft.

NOTE: For cost estimating purposes only. Professional engineering must be considered for proper design and reinforcement placement.

TYPICAL SECTION



SILTY SAND

$\phi = 30^{\circ}$

$\gamma = 125$ pcf

DESIGN TABLE 5 3:1 SLOPED BACKFILL

EXPOSED WALL HEIGHT H	DEPTH BELOW GRADE D	TOTAL NO. COURSES FOR FINISHED WALL	LENGTH L	GEOSYNTHETIC REINFORCEMENT PLACEMENT DISTANCE UP FROM WALL BASE IN FT.						
				X1	X2	X3	X4	X5	X6	X7
3' 0"	6"	7	4' 0"	1' 6"						
4' 0"	6"	9	5' 0"	2' 6"						
5' 0"	6"	11	5' 0"	1' 0"	3' 6"					
6' 0"	6"	13	5' 6"	0' 6"	2' 6"	4' 6"				
7' 0"	6"	15	6' 6"	0' 6"	3' 0"	5' 6"				
8' 0"	6"	17	7' 0"	0' 6"	2' 0"	4' 0"	6' 6"			
9' 0"	6"	19	8' 0"	0' 6"	2' 0"	3' 6"	5' 6"	7' 6"		
10' 0"	6"	21	8' 6"	0' 6"	2' 0"	3' 6"	6' 0"	8' 6"		

DESIGN PARAMETERS:
Methodology – NCMA SRW Design Manual
Geosynthetic Reinforcement – LTDS = 670 lbs/ft (min)
Min. connection value 670 lbs/ft., 10 degrees and max. of 1005 lbs/ft.

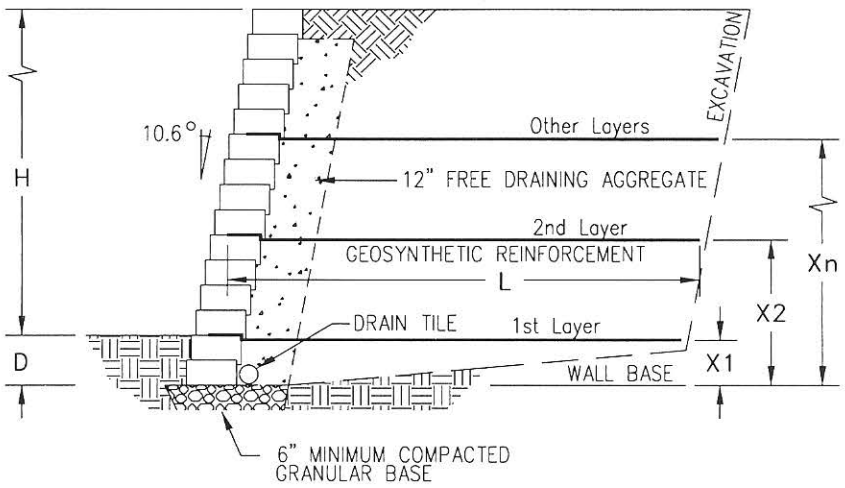
NOTE: For cost estimating purposes only. Professional engineering must be considered for proper design and reinforcement placement.

SAND/GRAVEL

$\phi = 34^{\circ}$

$\gamma = 125$ pcf

TYPICAL SECTION



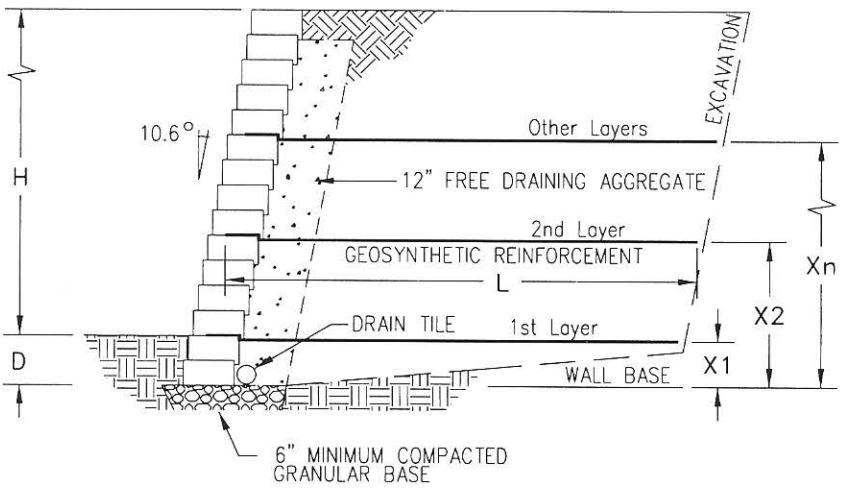
DESIGN TABLE 6 LEVEL BACKFILL

EXPOSED WALL HEIGHT H	DEPTH BELOW GRADE D	TOTAL NO. COURSES FOR FINISHED WALL	LENGTH L	GEOSYNTHETIC REINFORCEMENT PLACEMENT DISTANCE UP FROM WALL BASE IN FT.					
				X1	X2	X3	X4	X5	X6
4' 0"	6"	9	4' 0"	2' 0"					
5' 0"	6"	11	4' 0"	0' 6"	3' 0"				
6' 0"	6"	13	4' 6"	1' 6"	4' 0"				
7' 0"	6"	15	5' 0"	2' 6"	5' 0"				
8' 0"	6"	17	5' 6"	1' 0"	3' 6"	6' 0"			
9' 0"	6"	19	6' 0"	0' 6"	2' 6"	4' 6"	7' 0"		
10' 0"	6"	21	6' 6"	0' 6"	3' 0"	5' 6"	8' 0"		

DESIGN PARAMETERS:
Methodology – NCMA SRW Design Manual
Geosynthetic Reinforcement – LTDS = 670 lbs/ft (min)
Min. connection value of 670 lbs/ft., 10 degrees and max. value of 1005 lbs/ft.

NOTE: For cost estimating purposes only. Professional engineering must be considered for proper design and reinforcement placement.

TYPICAL SECTION



SILTY SAND

$\phi = 30^{\circ}$

$\gamma = 125$ pcf

DESIGN TABLE 7 LEVEL BACKFILL

EXPOSED WALL HEIGHT H	DEPTH BELOW GRADE D	TOTAL NO. COURSES FOR FINISHED WALL	LENGTH L	GEOSYNTHETIC REINFORCEMENT PLACEMENT DISTANCE UP FROM WALL BASE IN FT.					
				X1	X2	X3	X4	X5	X6
4' 0"	6"	9	4' 0"	2' 0"					
5' 0"	6"	11	4' 0"	0' 6"	3' 0"				
6' 0"	6"	13	5' 0"	1' 6"	4' 0"				
7' 0"	6"	15	5' 6"	0' 6"	2' 6"	5' 0"			
8' 0"	6"	17	6' 0"	1' 0"	3' 6"	6' 0"			
9' 0"	6"	19	6' 6"	0' 6"	2' 6"	4' 6"	7' 0"		
10' 0"	6"	21	7' 0"	0' 6"	3' 0"	5' 6"	8' 0"		

DESIGN PARAMETERS:
Methodology – NCMA SRW Design Manual
Geosynthetic Reinforcement – LTDS = 670 lbs/ft (min)
Min. connection value of 670 lbs/ft., 10 degrees and max. of 1005 lbs/ft.

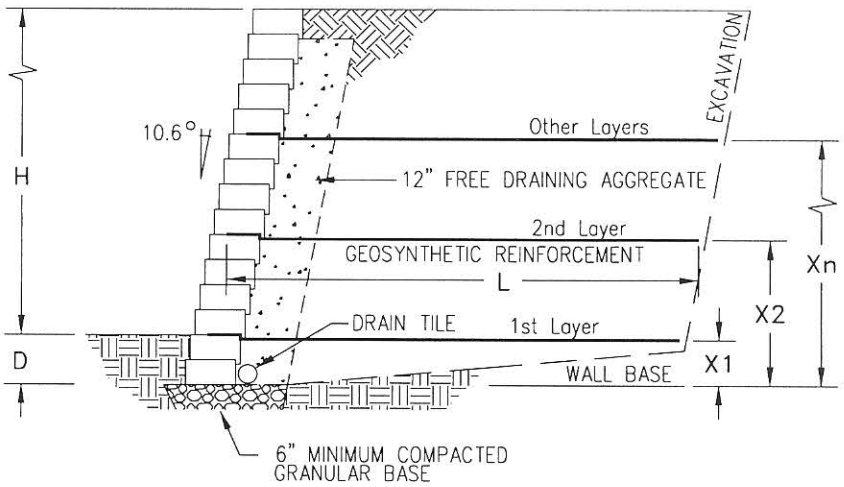
NOTE: For cost estimating purposes only. Professional engineering must be considered for proper design and reinforcement placement.

SILTS/CLAY

$\phi = 26^{\circ}$

$\gamma = 120$ pcf

TYPICAL SECTION



DESIGN TABLE 8 LEVEL BACKFILL

EXPOSED WALL HEIGHT H	DEPTH BELOW GRADE D	TOTAL NO. COURSES FOR FINISHED WALL	LENGTH L	GEOSYNTHETIC REINFORCEMENT PLACEMENT DISTANCE UP FROM WALL BASE IN FT.					
				X1	X2	X3	X4	X5	X6
3' 0"	6"	7	4' 0"	1' 6"					
4' 0"	6"	9	5' 0"	2' 0"					
5' 0"	6"	11	5' 0"	1' 0"	3' 6"				
6' 0"	6"	13	6' 0"	0' 6"	2' 6"	4' 6"			
7' 0"	6"	15	6' 6"	0' 6"	3' 0"	5' 6"			
8' 0"	6"	17	7' 0"	0' 6"	2' 0"	4' 0"	6' 6"		
9' 0"	6"	19	8' 0"	0' 6"	2' 6"	5' 0"	7' 6"		
10' 0"	6"	21	8' 6"	0' 6"	2' 0"	4' 0"	6' 0"	8' 6"	

DESIGN PARAMETERS:
Methodology – NCMA SRW Design Manual
Geosynthetic Reinforcement – LTDS = 670 lbs/ft (min)
Min. connection value of 670 lbs/ft., 10 degrees and max. of 1005 lbs/ft.

NOTE: For cost estimating purposes only. Professional engineering must be considered for proper design and reinforcement placement.

ANCHOR DIAMOND® WALL - BEVELED UNITS

UNITS REQUIRED PER SQUARE FOOT OF WALL SURFACE AREA

HEIGHT (FT) / LENGTH (FT)	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6	6.5	7	7.5	8
5	7	11	15	19	22	26	30	34	37	41	45	49	52	56	60
10	15	22	30	37	45	52	60	67	75	82	90	97	104	112	119
15	22	34	45	56	67	78	90	101	112	123	134	146	157	168	179
20	30	45	60	75	90	104	119	134	149	164	179	194	209	224	239
25	37	56	75	93	112	131	149	168	187	205	224	243	261	280	299
30	45	67	90	112	134	157	179	201	224	246	269	291	313	336	358
35	52	78	104	131	157	183	209	235	261	287	313	340	366	392	418
40	60	90	119	149	179	209	239	269	299	328	358	388	418	448	478
45	67	101	134	168	201	235	269	302	336	369	403	437	470	504	537
50	75	112	149	187	224	261	299	336	373	410	448	485	522	560	597
55	82	123	164	205	246	287	328	369	410	451	493	534	575	616	657
60	90	134	179	224	269	313	358	403	448	493	537	582	627	672	716
65	97	146	194	243	291	340	388	437	485	534	582	631	679	728	776
70	104	157	209	261	313	366	418	470	522	575	627	679	731	784	836
75	112	168	224	280	336	392	448	504	560	616	672	728	784	840	896
80	119	179	239	299	358	418	478	537	597	657	716	776	836	896	955
90	134	201	269	336	403	470	537	604	672	739	806	873	940	1007	1075
100	149	224	299	373	448	522	597	672	746	821	896	970	1045	1119	1194
125	187	280	373	466	560	653	746	840	933	1026	1119	1213	1306	1399	1493
150	224	336	448	560	672	784	896	1007	1119	1231	1343	1455	1567	1679	1791
175	261	392	522	653	784	914	1045	1175	1306	1437	1567	1698	1828	1959	2090
200	299	448	597	746	896	1045	1194	1343	1493	1642	1791	1940	2090	2239	2388
300	448	672	896	1119	1343	1567	1791	2015	2239	2463	2687	2910	3134	3358	3582

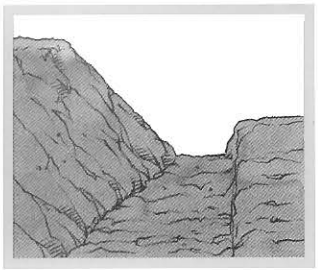
ANCHOR DIAMOND® WALL - STRAIGHT UNITS

UNITS REQUIRED PER SQUARE FOOT OF WALL SURFACE AREA

HEIGHT (FT) LENGTH (FT)	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6	6.5	7	7.5	8
5	7	10	14	17	21	24	28	31	35	38	42	45	49	52	56
10	14	21	28	35	42	49	56	63	69	76	83	90	97	104	111
15	21	31	42	52	63	73	83	94	104	115	125	135	146	156	167
20	28	42	56	69	83	97	111	125	139	153	167	181	194	208	222
25	35	52	69	87	104	122	139	156	174	191	208	226	243	260	278
30	42	63	83	104	125	146	167	188	208	229	250	271	292	313	333
35	49	73	97	122	146	170	194	219	243	267	292	316	340	365	389
40	56	83	111	139	167	194	222	250	278	306	333	361	389	417	444
45	63	94	125	156	188	219	250	281	313	344	375	406	438	469	500
50	69	104	139	174	208	243	278	313	347	382	417	451	486	521	556
55	76	115	153	191	229	267	306	344	382	420	458	497	535	573	611
60	83	125	167	208	250	292	333	375	417	458	500	542	583	625	667
65	90	135	181	226	271	316	361	406	451	497	542	587	632	677	722
70	97	146	194	243	292	340	389	438	486	535	583	632	681	729	778
75	104	156	208	260	313	365	417	469	521	573	625	677	729	781	833
80	111	167	222	278	333	389	444	500	556	611	667	722	778	833	889
90	125	188	250	313	375	438	500	563	625	688	750	813	875	938	1000
100	139	208	278	347	417	486	556	625	694	764	833	903	972	1042	1111
125	174	260	347	434	521	608	694	781	868	955	1042	1128	1215	1302	1389
150	208	313	417	521	625	729	833	938	1042	1146	1250	1354	1458	1563	1667
175	243	365	486	608	729	851	972	1094	1215	1337	1458	1580	1701	1823	1944
200	278	417	556	694	833	972	1111	1250	1389	1528	1667	1806	1944	2083	2222
300	417	625	833	1042	1250	1458	1667	1875	2083	2292	2500	2708	2917	3125	3333

Installation Guide

WALL CONSTRUCTION



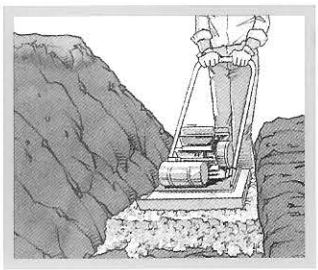
Step 1

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" and 12" deep.



Step 2

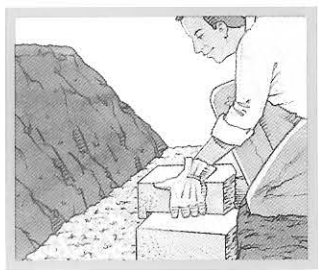
Leveling Pad

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

Step 3

Base Course

- The most important step in the construction process!
- 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.



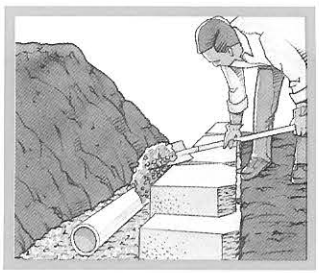
Step 4

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 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 of the wall units, or half of the wall height.

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 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 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.
- Do the same at the front of the wall, adding and compacting in-fill soil.

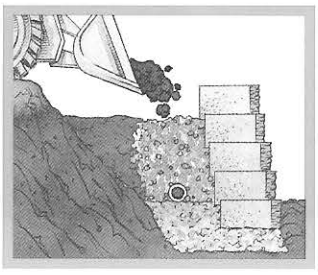
Step 7

Reinforcement

- Check your Wall Construction plan for which courses will need reinforcement grid.
- Clean any debris off the top layer of blocks.
- Measure and cut the reinforcement grid to the design length in the plans.
- The reinforcement grid 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 taught 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 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. And remember, avoid sudden turning or braking, and don't go over 10 miles per hour.

Step 8

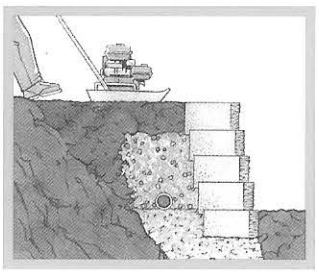
Finish Grade and Surface Drainage



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

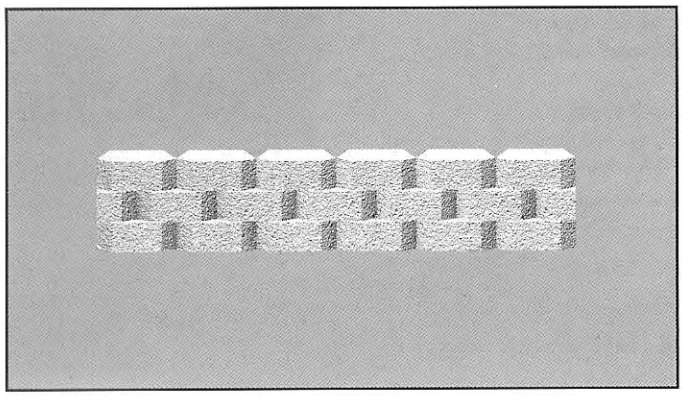
Step 9

Site Cleaning & Restoration

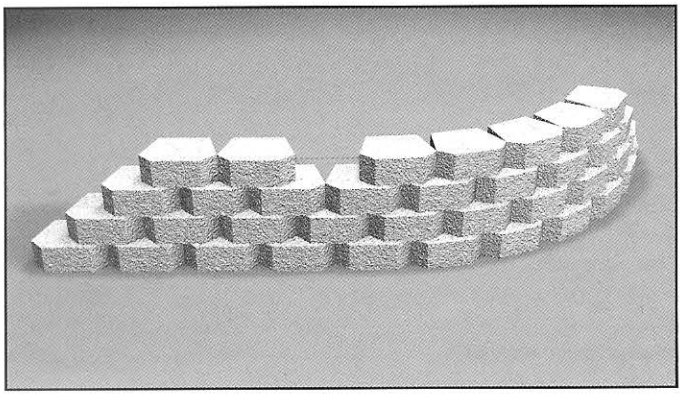


- Brush off the wall and pick up any debris left from the construction process.
- Notify the job superintendent in writing that the construction of the wall is complete and the project is ready for final inspection and acceptance.
- Following these Best Practices for construction will ensure the success 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

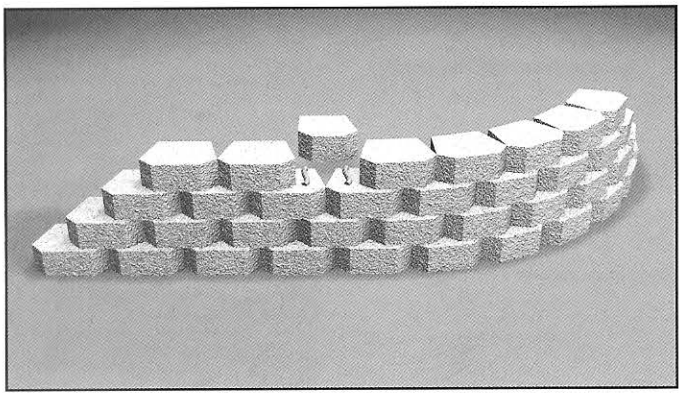


Step 1
Proper installation of any Anchor retaining wall requires that running bond be maintained. Running bond occurs when the blocks are centered over the vertical joints of the previous course. This adds to wall stability and makes your wall system aesthetically beautiful.



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.

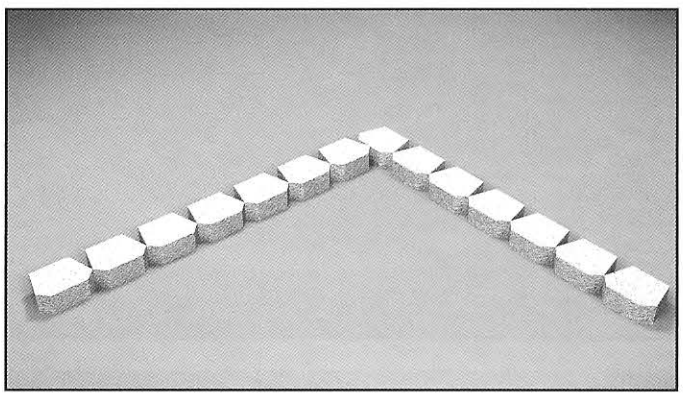
Tip: It may be possible to run the off bond block into the soil bank to avoid cutting of partial units.



Step 3
Once the partial unit is in place, adhere with a concrete adhesive. Partial units should not be less than five inches 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.

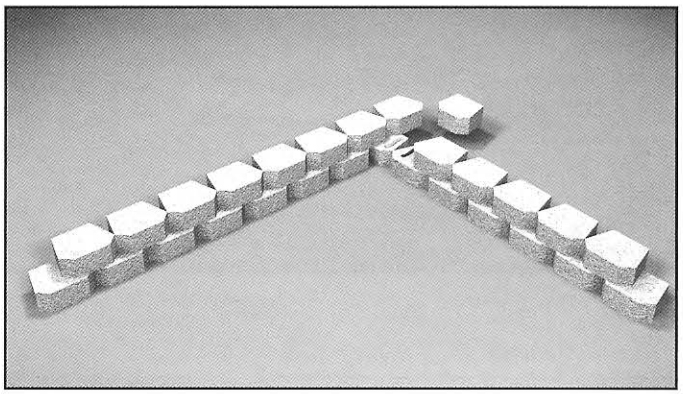
INSIDE 90° CORNERS

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.



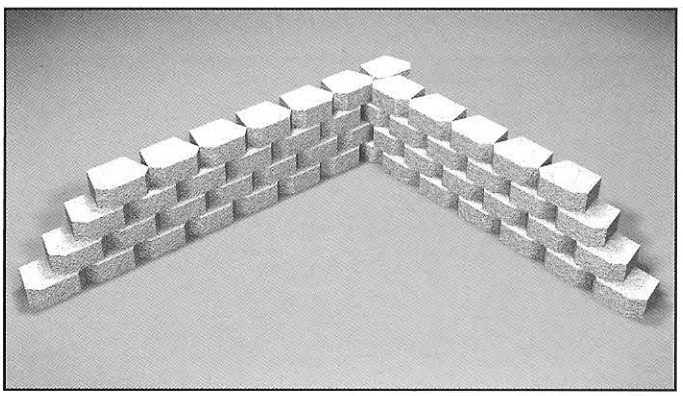
Step 2
On the second course, place all blocks on bond along one side of the corner. Once the second course of one wall is established, begin the second course of the adjacent wall.

Split units** may be required on this wall to maintain running bond.

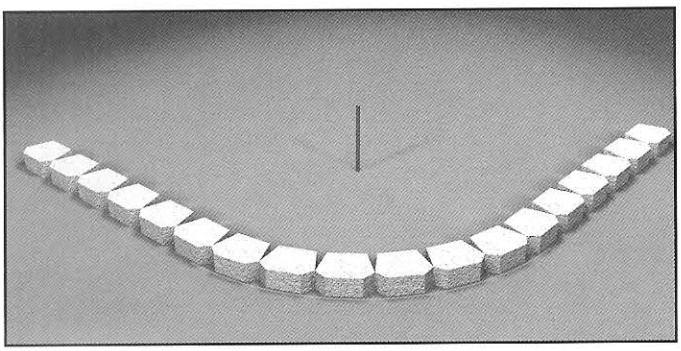


** To split a block, use a hammer and chisel to score the block on all sides. Pound the chisel on the same line until the block splits. If partial unit sides are not exposed, use a circular cut-off saw with a masonry blade to achieve a tighter fit.

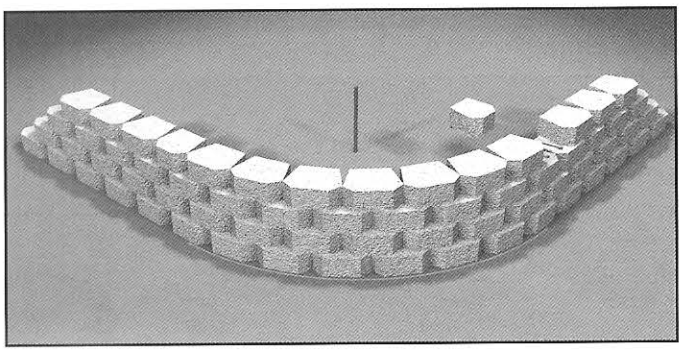
Step 3
Block placement in the corner should alternate direction with each succeeding course.



OUTSIDE CURVE



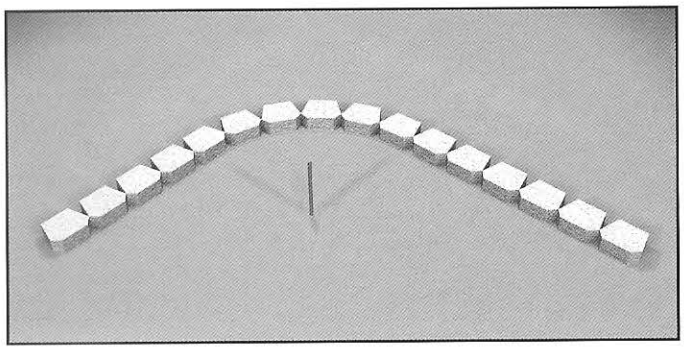
Step 1
When building an outside radius curve, begin by calculating the radius of your top course. This will be the smallest radius in the wall and must not be less than the minimum for the block system you are using*. Drive a stake into the ground at the desired center of the curve. Attach a string and rotate it in a circle around the stake to mark the radius in the soil. Align each block face with the radius curve and ensure level placement from side to side and front to back.



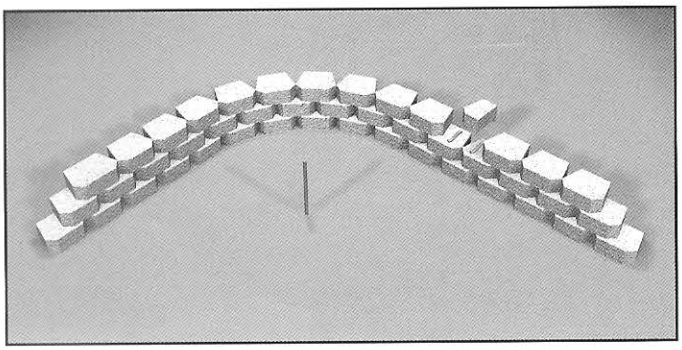
Step 2
For each course, make sure the lip of each block is in contact with the back of the units below to ensure structural stability. The set back of the block will cause the radius of each course to gradually decrease and eventually affect the running bond of the wall. To maintain proper running bond, use partial units as needed. Once a split unit is cut to size, adhere in place with a concrete adhesive.

*To calculate the radius of your top course, add 1/4" to the set back of your block and multiply that amount by the number of courses in your finished wall. Then subtract the result from the radius of the base course. This number must exceed the minimum requirements for the block system you're using.

INSIDE CURVE



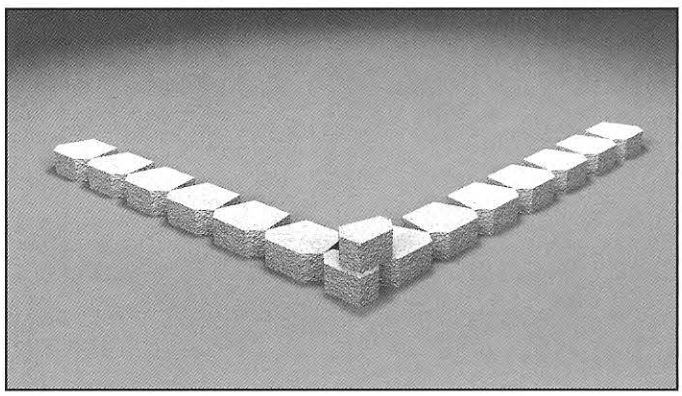
Step 1
Check your wall plan to determine the radius of your base course. This will be the smallest radius in the wall and must not be less than the minimum for the block system you are using. Begin by driving a stake into the ground at the desired center of the curve. Attach a string and rotate it in 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.



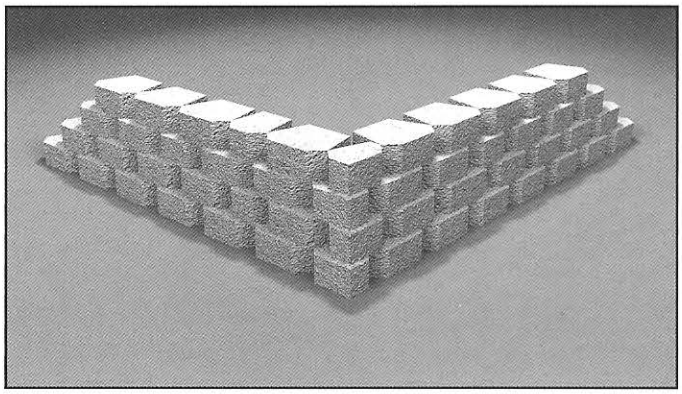
Step 2
For the second course, make sure the lip of each block is in contact with the back of the units below to ensure structural stability. The set back of the block will cause the radius of each course to gradually increase and eventually affect the running bond of the wall. To maintain proper running bond, use partial units as needed. Once a partial unit is cut to size, adhere in place with a concrete adhesive.

OUTSIDE 90° CORNERS

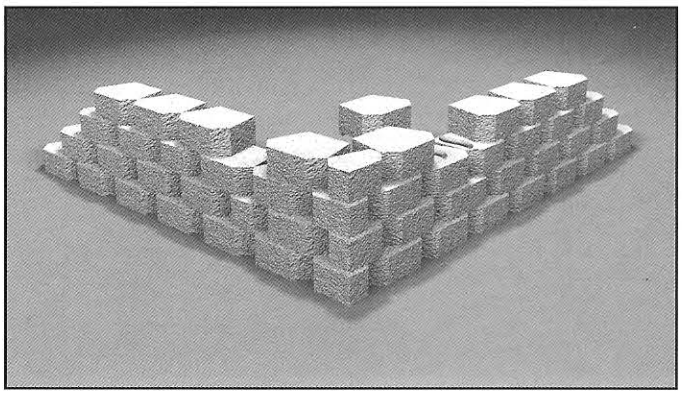
Step 1
To build an outside 90° corner begin by placing a half unit at the corner. Remove the locator lip so that the block lays flat. Then lay the rest of the base course working from the corner block out.



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.

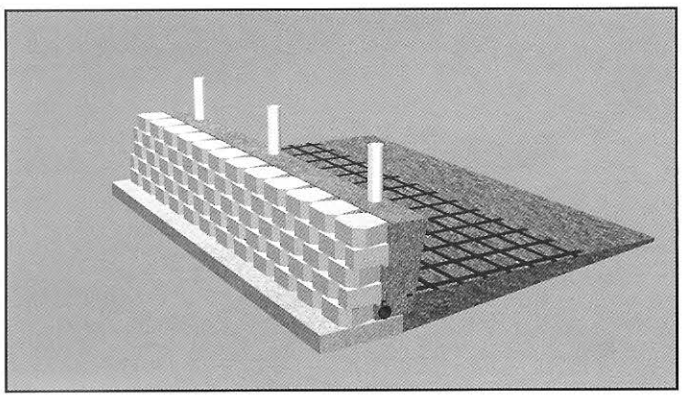


Step 3
Use split units** as necessary to maintain running bond.

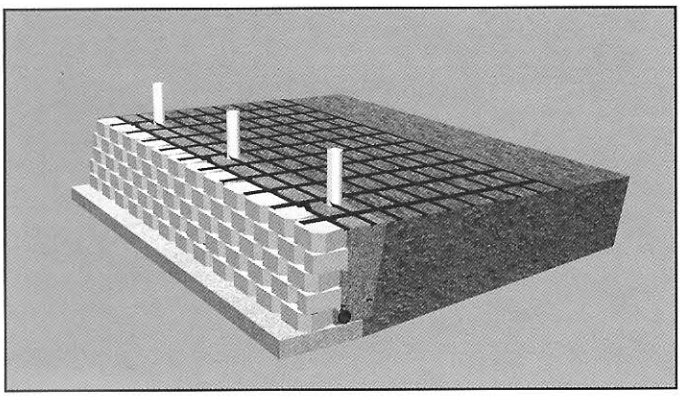


** To split a block, use a hammer and chisel to score the block on all sides. Pound the chisel on the same line until the block splits. If partial unit sides are not exposed, use a circular cut-off saw with a masonry blade to achieve a tighter fit.

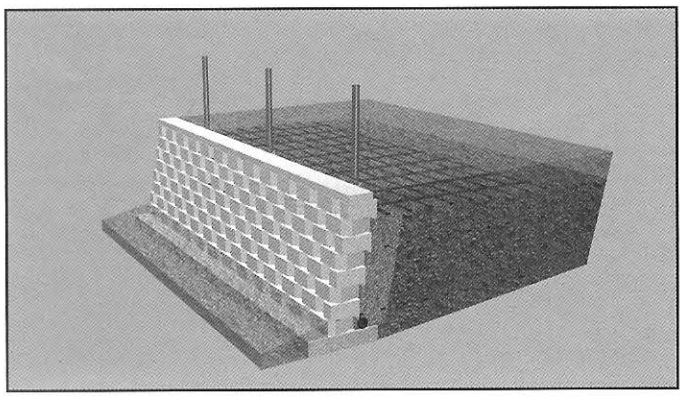
FENCES

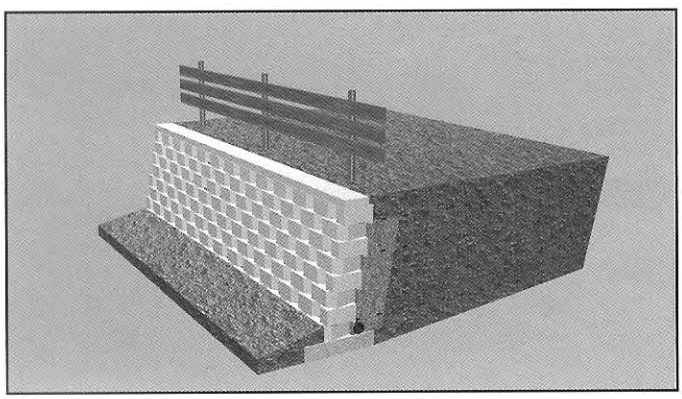


Step 1
Know the specific dimensions of the fence to determine the placement of the sleeves. Sleeves should be at least 1 inch larger in radius than the fence posts to allow for mortar or grout. Install the sleeves according to the wall plan during the construction of your wall.



Step 2
If the fence is at least 3 feet 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.



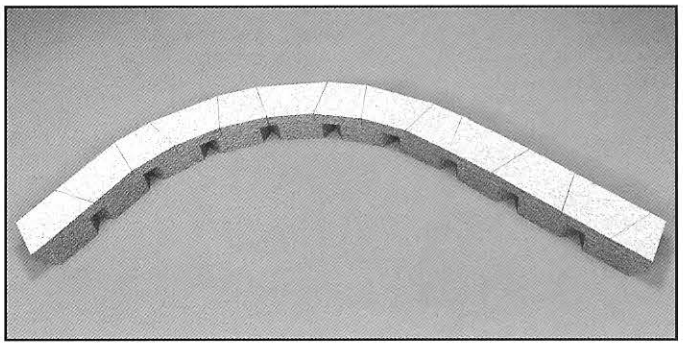


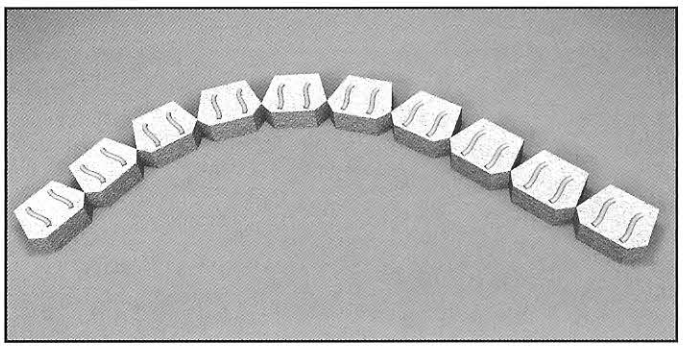
Step 3
Grout the fence post into the sleeve after the wall is built.

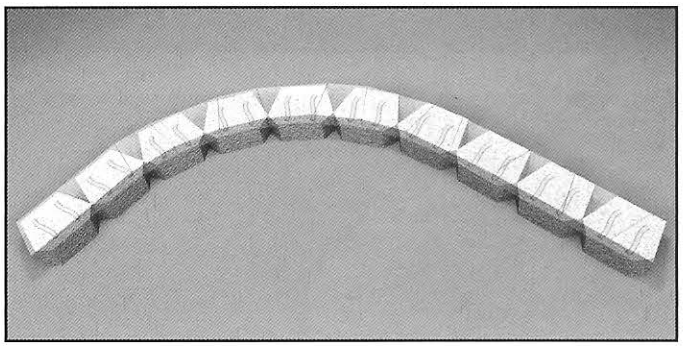
CAP UNITS

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.

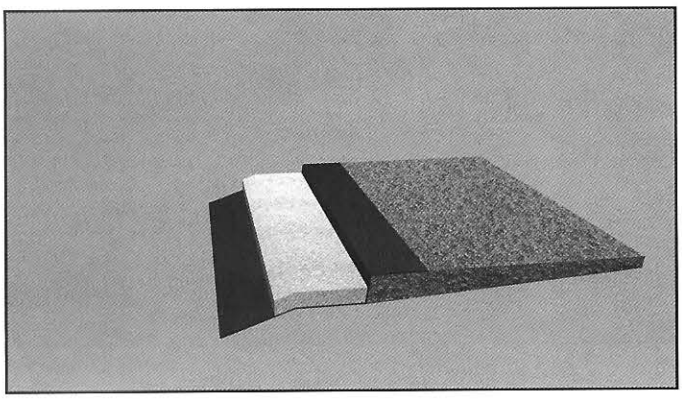
Tip: To determine the minimum number of caps needed on an average straight wall, measure the length of the wall. Multiply the length of the wall by 12 inches and divide by 14.5. Additional caps will be needed for elevation changes and radius curves.



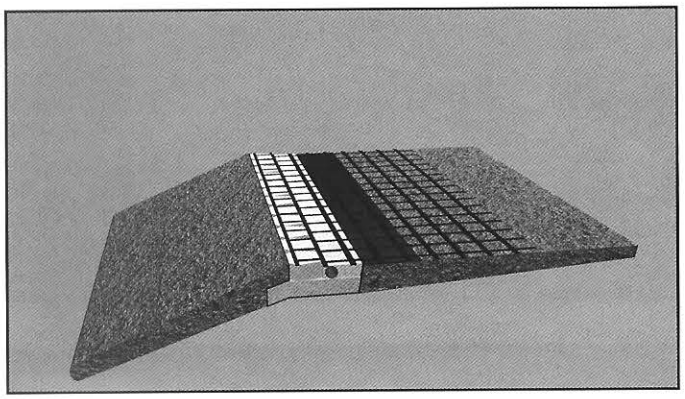




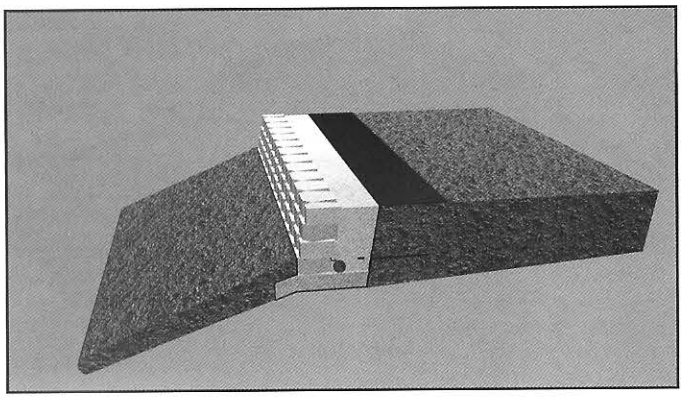
WATER



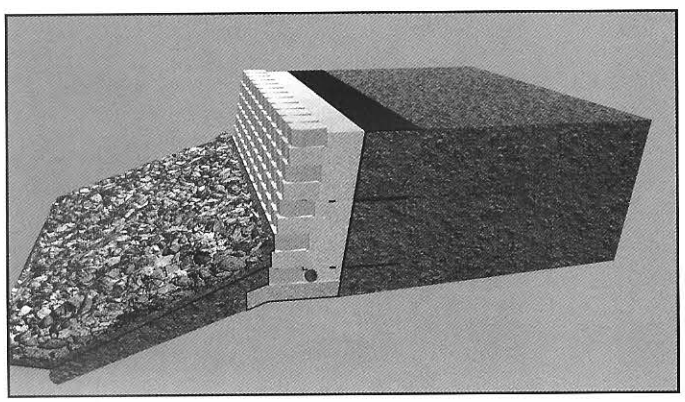
Step 1
Place a filter fabric with extra length in front of the wall.



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 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.

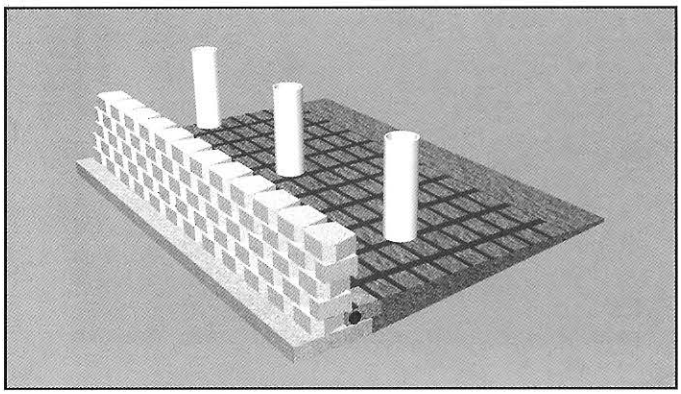


Step 4
Continue these steps until your wall is complete. The last section of filter fabric should cover the drainage aggregate and run up against the back of the top course of block. Add fill soil and compact. Keep in mind there are numerous issues related to water wall applications including wave or ice impact, erosion or scour in front of the wall and ice uplift of the wall.

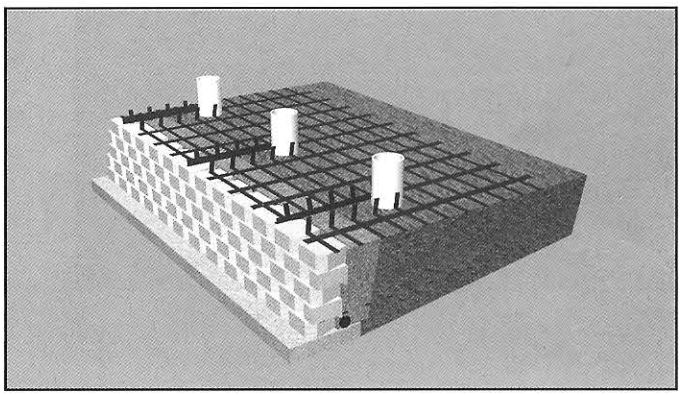
For more information consult with qualified engineer.

GUARDRAILS

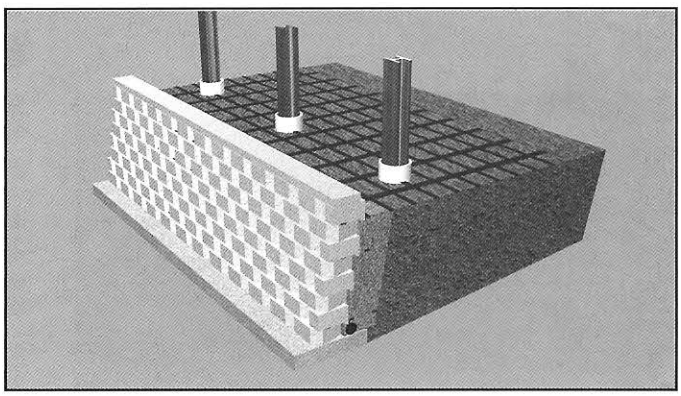
Step 1
Impact on a guardrail system can transfer additional load to your wall. This must be accounted for in the design and construction of the wall. Install a sleeve in the backfill soil at post locations during construction at least 3 feet from the face of the wall.



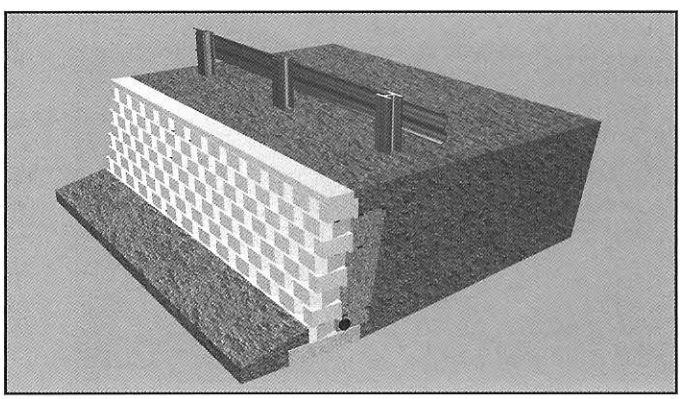
Step 2
Depending on impact loads, the post of the guardrail has to be buried deep enough so that it penetrates multiple layers of reinforcement.



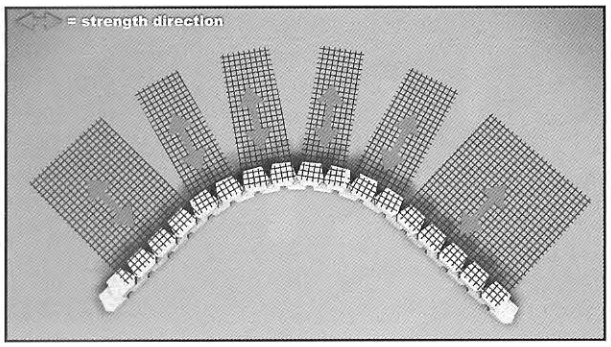
Step 3
An additional layer of reinforcement should be placed just below the top course for additional stability.



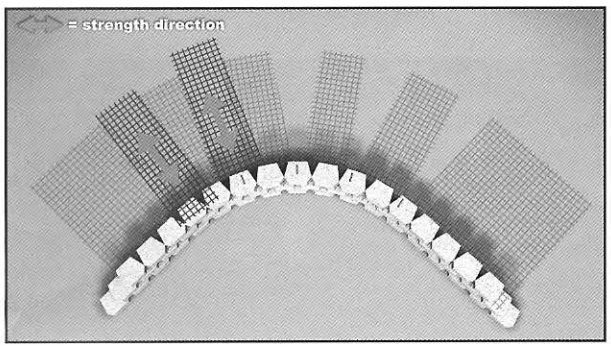
Step 4
Once the wall is constructed, insert the posts and apply grout.



REINFORCEMENT-INSIDE CURVE

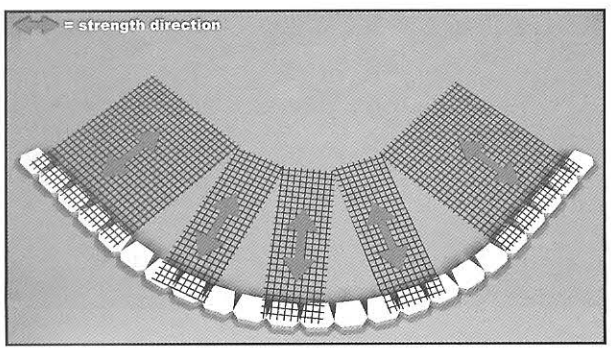


Step 1
Cut reinforcement to the required lengths as specified in your wall plan. Lay segments of reinforcement within 2 inches of the face of the wall, making sure that the strength direction of each section is perpendicular to the wall face.

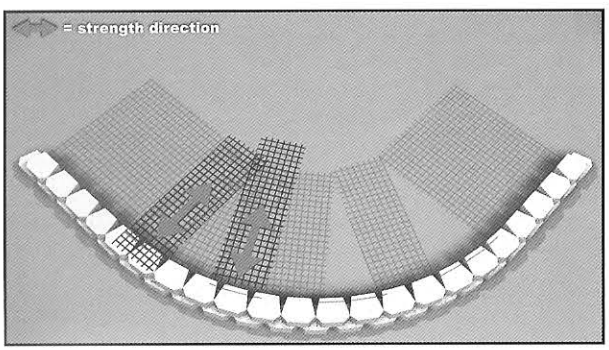


Step 2
Place the next course of blocks, marking the backs of blocks to identify the middle of unreinforced areas. Backfill and compact. Center subsequent sections of reinforcement on the marked blocks to ensure full reinforcement coverage. Repeat this procedure throughout the construction of the radius curve when reinforcement is required.

REINFORCEMENT-OUTSIDE CURVE



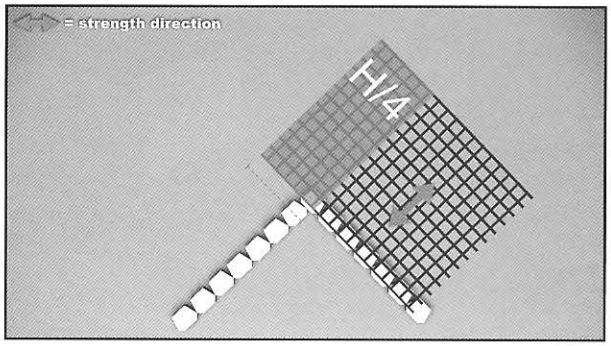
Step 1
Cut reinforcement to the required lengths as specified in your wall plan. Lay sections of the reinforcement within 2 inches of the face of the wall with the strength direction perpendicular to the wall face. Avoid overlapping the reinforcement by separating each section. Place the next course 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.



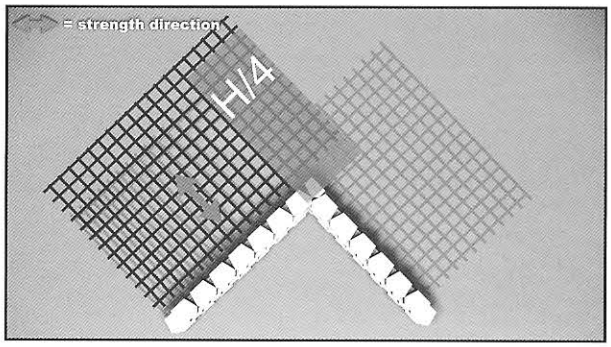
Step 2
Place the next course of blocks, marking the backs of blocks to identify unreinforced areas. This step is important because when this course is backfilled, it's impossible to locate the unreinforced areas. Use the marked blocks as a guide, placing subsequent sections of reinforcement to overlap 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.

REINFORCEMENT-INSIDE 90° CORNERS

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 of the face of the wall and runs along the back of the adjoining wall.



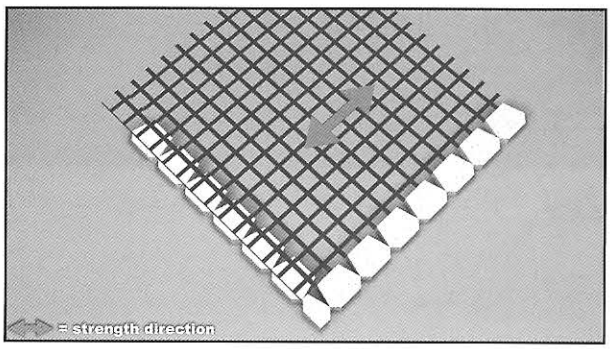
Example: If your overall wall height is 8 feet, the reinforcement extension would be 2 feet.



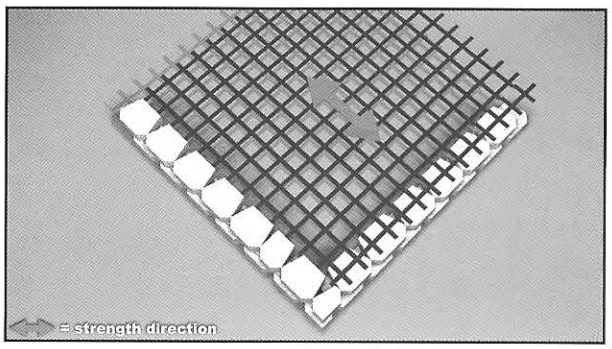
Step 2
The next section of reinforcement on the adjoining wall can then be placed using the same formula to determine placement in front of adjoining wall. The reinforcement should not overlap and should lie flush with previously placed sections. Once reinforcement is in place, the next courses of block can be installed. Alternate the reinforcement extension on each course where reinforcement is required.

REINFORCEMENT-OUTSIDE 90° CORNERS

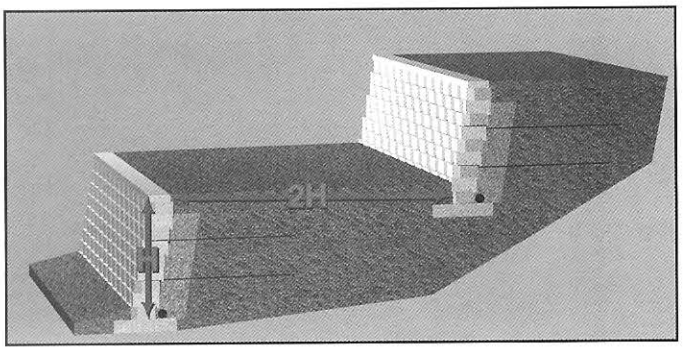
Step 1
Begin by checking your wall plan to determine reinforcement lengths and elevations. Lay a section of reinforcement near the corner of the wall, ensuring that it's placed within 2 inches of the face of the block and running along the back of the adjoining wall.



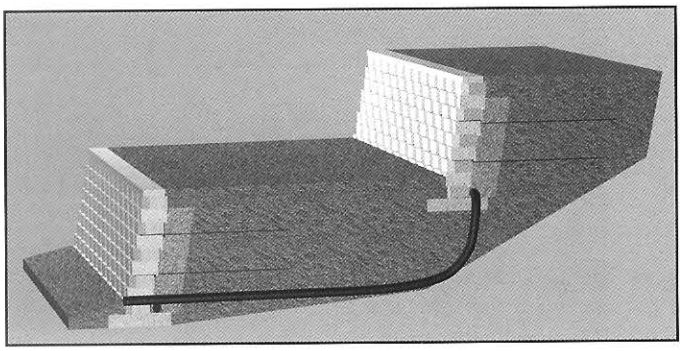
Step 2
Lay the next course of block, backfill and compact. When installing the next section of reinforcement, place within 2 inches of the face of the block and running along the back of the adjacent wall. Alternate the reinforcement extension on each course where reinforcement is required.



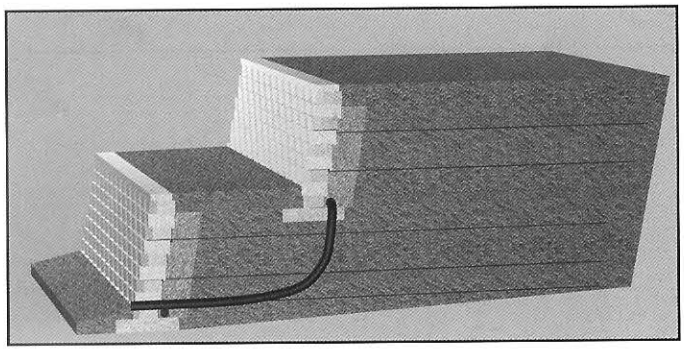
TERRACES



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. (e.g. If the lower terrace is 3' tall the distance between the upper terrace must be 6'.)



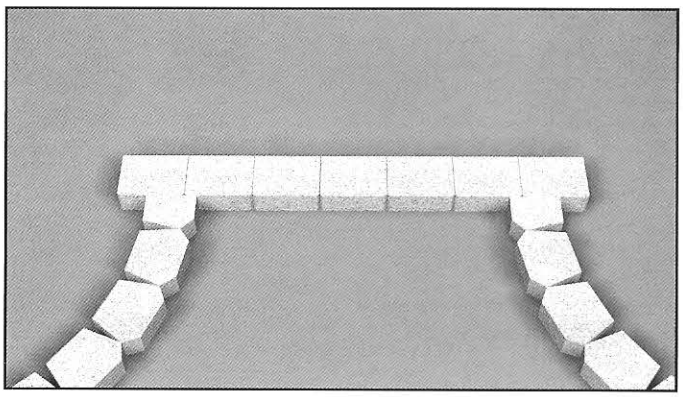
Step 2
Proper drainage is vital to maintaining stable, long lasting terraced walls. Drain tile must be installed so that the water is directed around or under the lower wall (never place the drain tile outlet above or behind the lower wall).



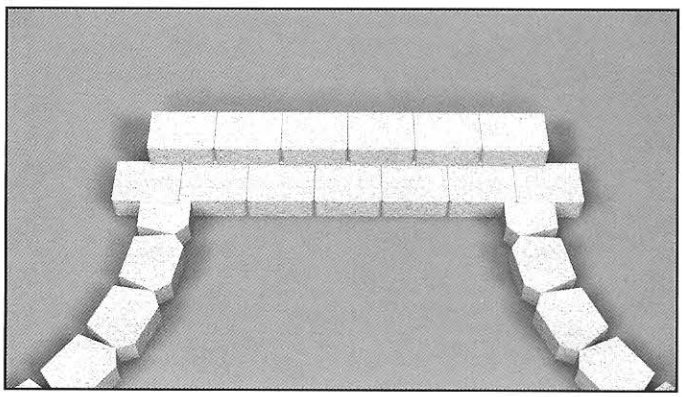
Step 3
Dependent Walls.
When the distance between the lower and upper walls is less than twice the height of the lower wall, the walls become structurally dependent on each other. In this situation, it is important to take global stability into account, incorporating additional reinforcement and longer 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 structually dependent walls consult with a qualified segmental wall engineer.

STEPS

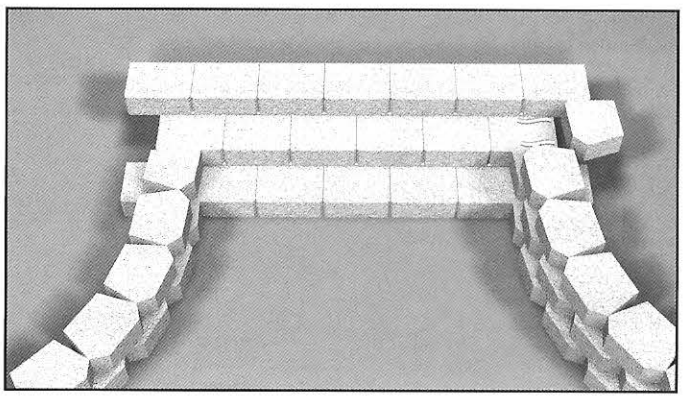
Step 1
Lay out the base course according to your wall design.



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. Adhere the front of the step units to the preceding course with a concrete adhesive.



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.