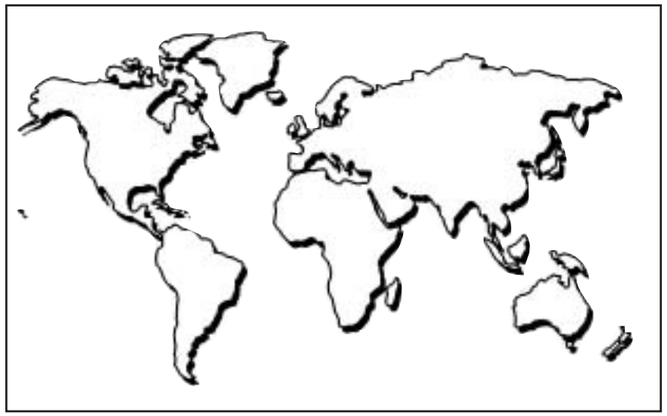
An international network is ready to deliver Anchor Wall Systems products when you need them, where you need them. Anchor Wall Systems products are available in:

Australia	*Northern Ireland*
Canada	*Philippines*
China	*Portugal*
Fiji	*South Korea*
Japan	*United Kingdom*
New Zealand	*United States*



INSTALLATION: Anchor Diamond Pro™ brand blocks are engineered to attain a maximum total wall height** of approximately three feet, four inches as a gravity wall without reinforcement. These heights assume level backfill and clean, compacted sand or gravel and no surcharge. For higher walls, or if these conditions are not present, professional engineering must be considered for proper design and reinforcement placement. It is the user's responsibility to obtain such design advice. Neither Anchor Wall Systems, Inc., nor its authorized manufacturers, assume any responsibility for the design and/or installation of walls constructed with the retaining wall products.

Warranty: In the United States, Anchor Wall Systems products are backed by a 5-year Limited Warranty. For a complete copy of the Anchor Wall Systems Warranty, visit your local retailer or contact Anchor Wall Systems at 1-877-295-5415 or www.anchorwall.com.

**Total wall height includes the height of any buried courses.

For more information call us toll-free in the U.S. at 1-800-473-4452.
Outside the U.S. call +1-952-933-8855 or visit www.anchorwall.com

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Anchor™
RETAINING WALL SYSTEMS

Anchor™
RETAINING WALL SYSTEMS

Anchor Diamond Pro™ (7.5)

Estimating and Installation Manual

ANCHOR DIAMOND PRO™

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Anchor™
RETAINING WALL SYSTEMS

Estimating and Installation Manual

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, outperforming traditional cast-in-place, timber, boulder and crib walls. 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 wall system 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 Pro™ 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 setback. This superior design requires no mortar or pins.

The Anchor Diamond Pro™ 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 Pro™ system to virtually any height.

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

UNLIMITED POTENTIAL FOR CREATIVE DESIGN

Anchor Diamond Pro™ 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.

Corner units facilitate construction of 90˚ inside and outside corners.

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 Pro™ blocks can be used to create tall walls of varying heights. Non-reinforced retaining walls created with Anchor Diamond Pro™ blocks can reach up to a maximum total wall height, including buried course(s), of 3 feet 4 inches, 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 3 feet 4 inches.

REINFORCED AND NON-REINFORCED RETAINING WALLS

Geosynthetic reinforcement

Anchor Diamond Pro™ 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 Pro™ 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 Pro™ 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 Pro™ 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 footing. All water projects should be designed by a registered professional engineer. Refer to the Anchor Wall Systems Water Applications Manual for design information.

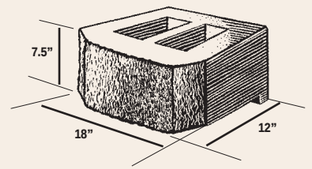
SPECIFICATIONS

GENERAL INFORMATION

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

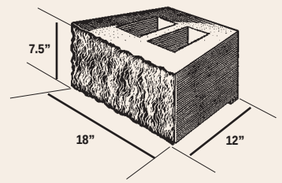
DIAMOND PRO™ BEVELED UNIT

Approximate Dimensions:	7.5" x 18" x 12"*
Approximate Weight:	72 lbs.**
Coverage:	.94 sq. ft.
Setback:	1.0"



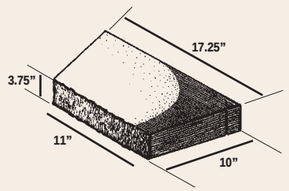
DIAMOND PRO™ STRAIGHT UNIT

Approximate Dimensions:	7.5" x 18" x 12"*
Approximate Weight:	74 lbs.**
Coverage:	.94 sq. ft.
Setback:	1.0"



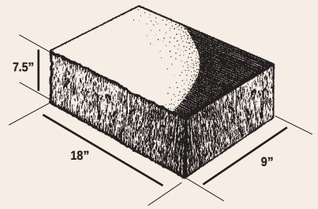
DIAMOND PRO™ CAP UNIT

Approximate Dimensions:	3.75" x 17.25" x 10"*
Approximate Weight:	40 lbs.**



DIAMOND PRO™ CORNER UNIT

Approximate Dimensions:	7.5" x 18" x 9"*
Approximate Weight:	101 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 +/- 1/16''

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

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 one unit in the color and face pattern specified if requested by the architect. If approved, unit may be used in the finished work.
   b. Twelve 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 C140, 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 Pro™ Retaining Wall Units.

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

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

E. 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 Pro™ 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 0.94 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 back-filled 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 1" to 2" concrete topping. Concrete shall be lean, unreinforced and a maximum of 2" 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 and within concrete wall units with drainage aggregate.

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

Section 02830: Retaining Wall Specification

ANCHOR DIAMOND PRO™

Section 02830: Retaining Wall Specification

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 D698-91) 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. Cap units may need to be cut to obtain a 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.

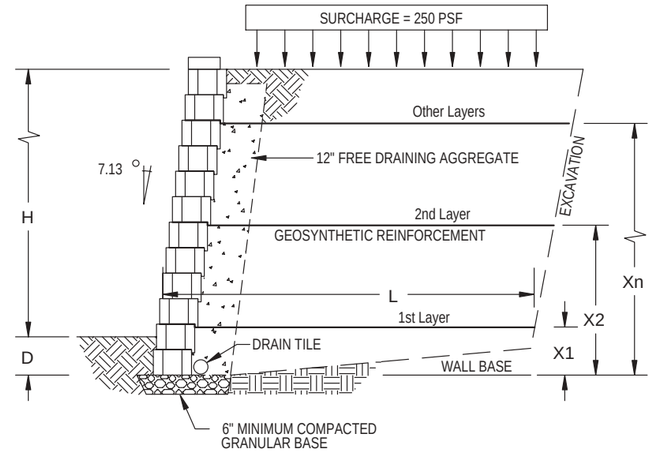
D. The retaining wall will not be considered complete until accepted by the engineer or duly appointed owner's representative.

SAND/GRAVEL

$\phi = 34^{\circ}$

$\gamma = 125$ pcf

TYPICAL SECTION



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	X7
2' 0"	6"	4	4' 0"	1' 3"						
3' 3"	6"	6	4' 6"	0' 7.5"	2' 6"					
5' 1.5"	6"	9	5' 6"	0' 7.5"	2' 6"	4' 5"				
7' 0"	6"	12	7' 0"	0' 7.5"	2' 6"	4' 5"	6' 3"			
8' 10.5"	6"	15	8' 0"	0' 7.5"	2' 6"	4' 5"	6' 3"	8' 1.5"		
10' 7"	8"	18	9' 0"	0' 7.5"	2' 6"	4' 5"	6' 3"	8' 1.5"	10' 0"	

DESIGN PARAMETERS:
Methodology - NCMA SRW Design Manual
Geosynthetic Reinforcement - LTDS = 750 lbs/ft (min)
Min. connection value of 500 lbs/ft., 30 degrees and max. of 1,000 lbs/ft.

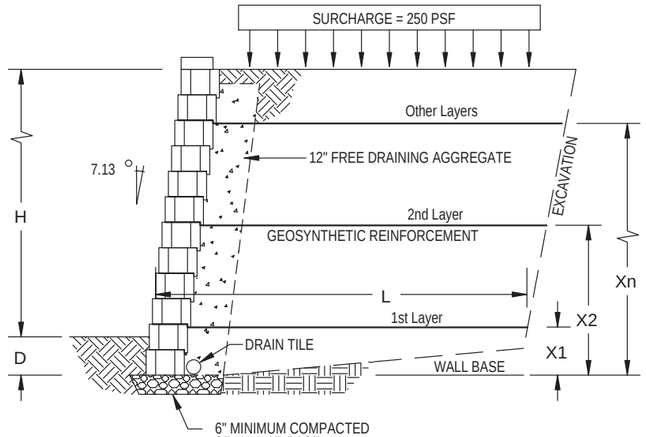
NOTE: For cost estimating purposes only. Professional engineering must be considered for proper design and reinforcement placement.

SILTY SAND

ϕ = 30°

γ = 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	X7
2' 0"	6"	4	5' 0"	1' 3"						
3' 3"	6"	6	5' 6"	0' 7.5"	2' 6"					
5' 1.5"	6"	9	6' 6"	0' 7.5"	2' 6"	4' 4.5"				
7' 0"	6"	12	7' 6"	0' 7.5"	2' 6"	4' 4.5"	6' 3"			
8' 10.5"	6"	15	8' 6"	0' 7.5"	2' 6"	4' 4.5"	6' 3"	8' 1.5"		
10' 7"	8"	18	10' 0"	0' 7.5"	2' 6"	4' 4.5"	6' 3"	8' 1.5"	10' 0"	

DESIGN PARAMETERS:
Methodology - NCMA SRW Design Manual
Geosynthetic Reinforcement - LTDS = 750 lbs/ft (min)
Min. connection value of 500 lbs/ft., 30 degrees and max. of 1,000 lbs/ft.

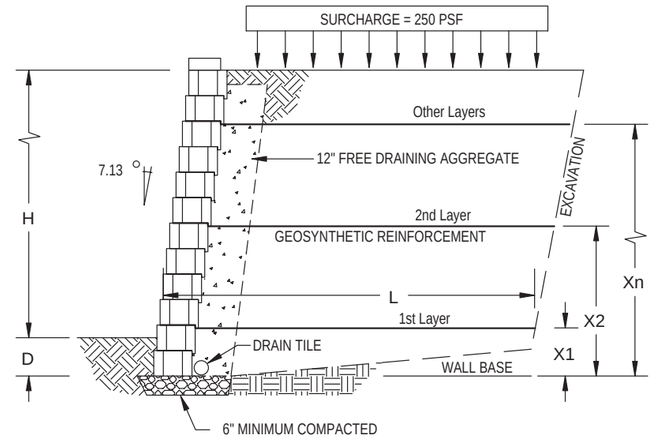
NOTE: For cost estimating purposes only. Professional engineering must be considered for proper design and reinforcement placement.

SILT/CLAY

ϕ = 26°

γ = 120 pcf

TYPICAL SECTION



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"	4	6' 0"	0' 7.5"	1' 10.5"					
3' 3"	6"	6	7' 0"	1' 3"	3' 1.5"					
5' 1.5"	6"	9	9' 0"	1' 3"	3' 1.5"	5' 0"				
7' 0"	6"	12	10' 6"	1' 3"	3' 1.5"	5' 0"	6' 10.5"			
8' 10.5"	6"	15	12' 0"	0' 7.5"	1' 10.5"	3' 1.5"	5' 0"	6' 10.5"	8' 9"	
10' 7"	8"	18	13' 0"	0' 7.5"	1' 10.5"	3' 1.5"	5' 0"	6' 10.5"	8' 9"	10' 7.5"

DESIGN PARAMETERS:
Methodology - NCMA SRW Design Manual
Geosynthetic Reinforcement - LTDS = 750 lbs/ft (min)
Min. connection value of 500 lbs/ft., 30 degrees and max. of 1,000 lbs/ft.

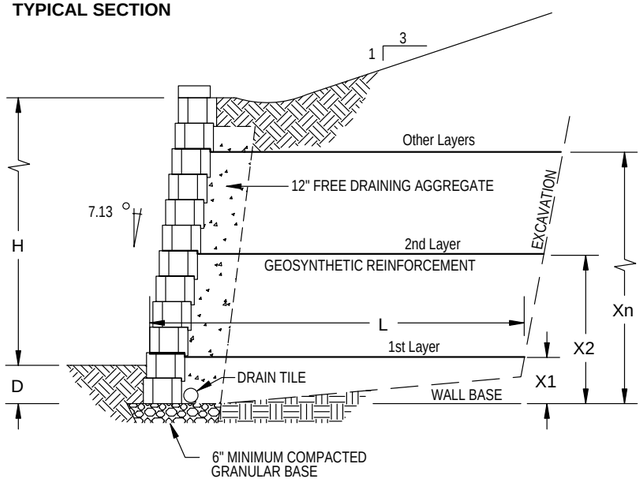
NOTE: For cost estimating purposes only. Professional engineering must be considered for proper design and reinforcement placement.

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	X7
3' 3"	6"	6	4' 0"	1' 10.5"						
5' 1.5"	6"	9	4' 6"	1' 10.5"	3' 9"					
7' 0"	6"	12	6' 0"	1' 10.5"	3' 9"	5' 7.5"				
8' 10.5"	6"	15	7' 0"	0' 7.5"	1' 10.5"	3' 9"	5' 7.5"	7' 6"		
10' 7"	8"	18	9' 0"	0' 7.5"	1' 10.5"	3' 9"	5' 7.5"	7' 6"	9' 4.5"	

DESIGN PARAMETERS:
Methodology - NCMA SRW Design Manual
Geosynthetic Reinforcement - LTDS = 750 lbs/ft (min)
Min. connection values of 500 lbs/ft., 30 degrees and max. of 1,000 lbs/ft.

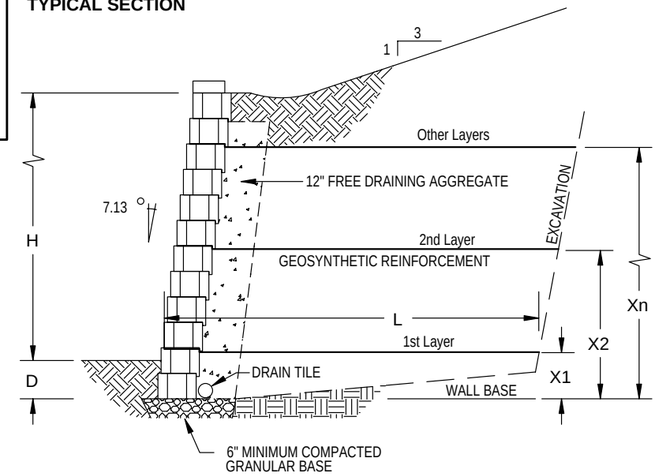
NOTE: For cost estimating purposes only. Professional engineering must be considered for proper design and reinforcement placement.

SILTY SAND

$\phi = 30^{\circ}$

$\gamma = 125$ pcf

TYPICAL SECTION



DESIGN TABLE 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' 3"	6"	6	4' 6"	1' 10.5"						
5' 1.5"	6"	9	5' 0"	1' 10.5"	3' 9"					
7' 0"	6"	12	6' 6"	0' 7.5"	1' 10.5"	3' 9"	5' 7.5"			
8' 10.5"	6"	15	8' 0"	0' 7.5"	1' 10.5"	3' 9"	5' 7.5"	7' 6"		
10' 7"	8"	18	9' 6"	0' 7.5"	1' 10.5"	3' 9"	5' 7.5"	7' 6"	9' 4.5"	

DESIGN PARAMETERS:
Methodology - NCMA SRW Design Manual
Geosynthetic Reinforcement - LTDS = 750 lbs/ft (min)
Min. connection values of 500 lbs/ft., 30 degrees and max. of 1,000 lbs/ft.

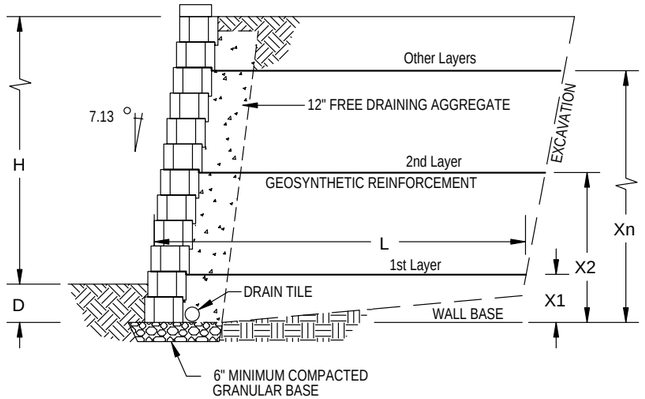
NOTE: For cost estimating purposes only. Professional engineering must be considered for proper design and reinforcement placement.

SAND/GRAVEL

ϕ = 34°

γ = 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
3' 3"	6"	6	4' 0"	1' 10.5"					
5' 1.5"	6"	9	4' 6"	1' 10.5"	3' 9"				
7' 0"	6"	12	5' 6"	1' 10.5"	3' 9"	5' 7.5"			
8' 10.5"	6"	15	6' 6"	0' 7.5"	1' 10.5"	3' 9"	5' 7.5"	7' 6"	
10' 7"	8"	18	7' 6"	0' 7.5"	1' 10.5"	3' 9"	5' 7.5"	7' 6"	9' 4.5"

DESIGN PARAMETERS:
Methodology - NCMA SRW Design Manual
Geosynthetic Reinforcement - LTDS = 750 lbs/ft (min)
Min. connection value of 500 lbs/ft., 30 degrees and max. of 1,000 lbs/ft.

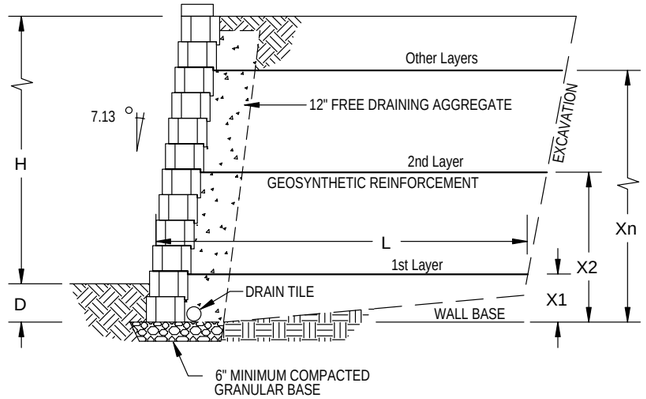
NOTE: For cost estimating purposes only. Professional engineering must be considered for proper design and reinforcement placement.

SILTY SAND

ϕ = 30°

γ = 125 pcf

TYPICAL SECTION



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
3' 3"	6"	6	4' 0"	1' 10.5"					
5' 1.5"	6"	9	4' 6"	1' 10.5"	3' 9"				
7' 0"	6"	12	5' 6"	1' 10.5"	3' 9"	5' 7.5"			
8' 10.5"	6"	15	7' 0"	0' 7.5"	1' 10.5"	3' 9"	5' 7.5"	7' 6"	
10' 7"	8"	18	8' 0"	0' 7.5"	1' 10.5"	3' 9"	5' 7.5"	7' 6"	9' 4.5"

DESIGN PARAMETERS:
Methodology - NCMA SRW Design Manual
Geosynthetic Reinforcement - LTDS = 750 lbs/ft (min)
Min. connection value of 500 lbs/ft., 30 degrees and max. of 1,000 lbs/ft.

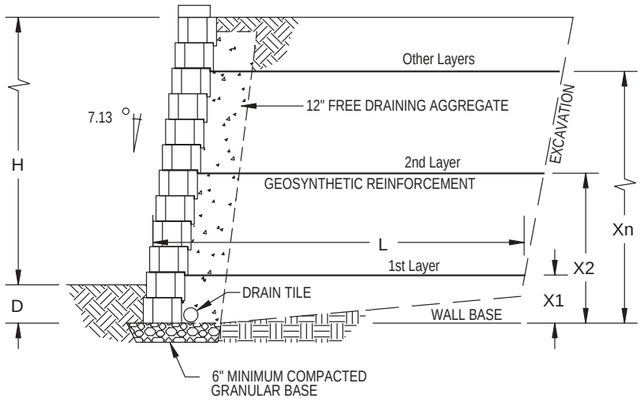
NOTE: For cost estimating purposes only. Professional engineering must be considered for proper design and reinforcement placement.

SILT/CLAY

$\phi = 26^{\circ}$

$\gamma = 120$ pcf

TYPICAL SECTION



DESIGN TABLE 8

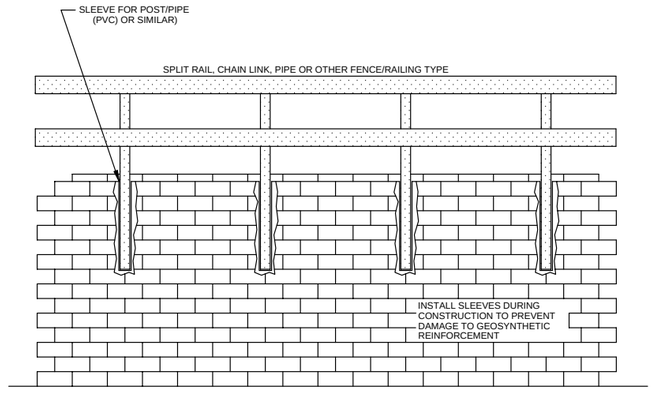
LEVEL BACKFILL

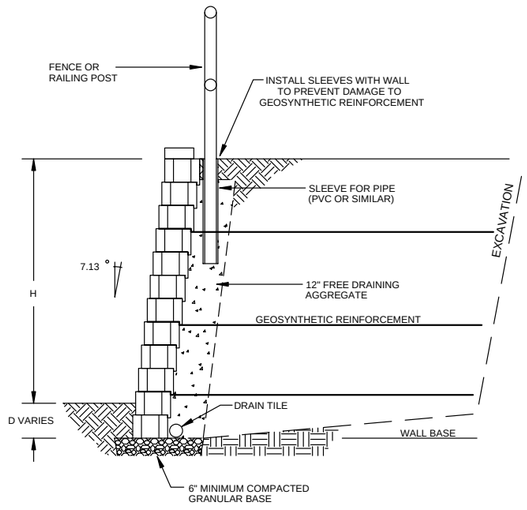
EXPOSED WALL HEIGHT H	DEPTH BELOW GRADE D	TOTAL NO. COURSES FOR FINISHED WALL	LENGTH L	GEOSYNTHETIC REINFORCEMENT PLACEMENT DISTANCE UP FROM WALL BASE IN FT.					
				X1	X2	X3	X4	X5	X6
2' 0"	6"	4	4' 0"	1' 3"					
3' 3"	6"	6	5' 0"	1' 10.5"					
5' 1.5"	6"	9	5' 6"	0' 7.5"	1' 10.5"	3' 9"			
7' 0"	6"	12	6' 6"	0' 7.5"	1' 10.5"	3' 9"	5' 7.5"		
8' 10.5"	8"	15	7' 6"	0' 7.5"	1' 10.5"	3' 9"	5' 7.5"	7' 6"	

DESIGN PARAMETERS:
Methodology - NCMA SRW Design Manual
Geosynthetic Reinforcement - LTDS = 750 lbs/ft (min)
Min. connection value of 500 lbs/ft., 30 degrees and max. of 1,000 lbs/ft.

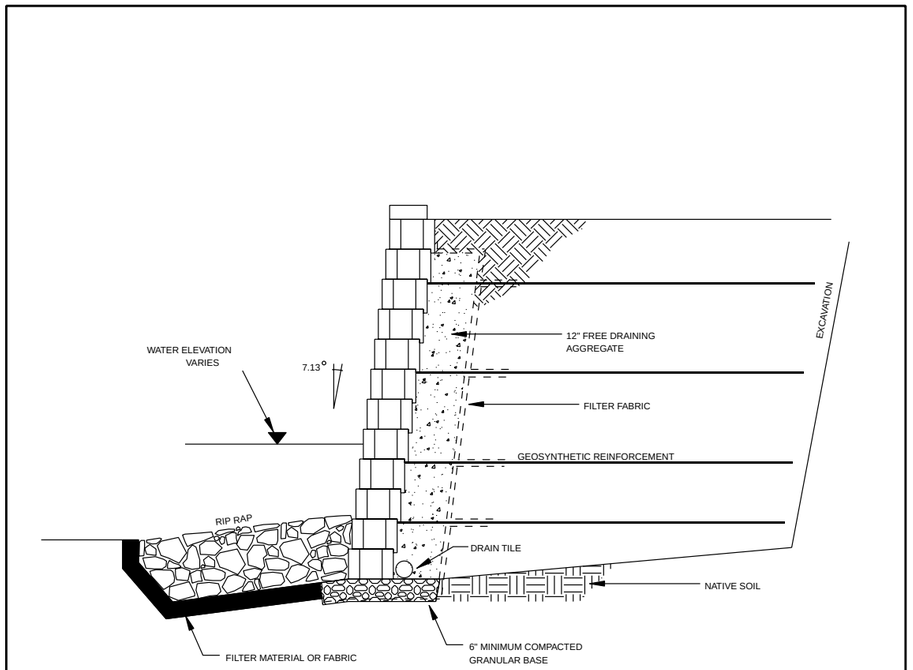
NOTE: For cost estimating purposes only. Professional engineering must be considered for proper design and reinforcement placement.

ANCHOR DIAMOND PRO - WALL FACE VIEW
WITH RAILING OR FENCE
(NOT TO SCALE)





ANCHOR DIAMOND PRO - WALL SECTION
WITH RAILING OR FENCE
(SCALE 3/8"=1'-0")



TYPICAL SHORELINE/CHANNEL WALL CONSTRUCTION

Design information, such as details for wall foundation, wall geosynthetic reinforcement and drainage, are contained in the NCMA Design Manual for Segmental Retaining Walls. Special design considerations for shoreline wall applications, including water and ice forces and wave action, are presented in the Anchor Wall Systems Water Applications Manual. Water velocity and rapid drawdown considerations are also presented in the Anchor Wall Systems Water Applications Manual.

ANCHOR DIAMOND PRO™ UNITS

UNITS REQUIRED GIVEN WALL LENGTH AND HEIGHT

7.5" HIGH UNITS

LENGTH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
HEIGHT	7.5"	1' 3"	1' 10.5"	2' 6"	3' 1.5"	3' 9"	4' 4.5"	5' 0"	5' 7.5"	6' 3"	6'10.5"	7' 6"	8' 1.5"	8' 9"	9' 4.5"
5	4	7	10	14	17	20	24	27	30	34	37	40	44	47	50
10	7	14	20	27	34	40	47	54	60	67	74	80	87	94	100
15	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150
20	14	27	40	54	67	80	94	107	120	134	147	160	174	187	200
25	17	34	50	67	84	100	117	134	150	167	183	200	217	234	250
30	20	40	60	80	100	120	140	160	180	200	220	240	260	280	300
35	24	47	70	94	117	140	164	187	210	234	257	280	304	327	350
40	27	54	80	107	134	160	187	214	240	267	294	320	347	374	400
45	30	60	90	120	150	180	210	240	270	300	330	360	390	420	450
50	34	67	100	134	167	200	234	267	300	334	367	400	434	467	500
55	37	74	110	147	184	220	257	294	330	367	404	440	477	514	550
60	40	80	120	160	200	240	280	320	360	400	440	480	520	560	600
65	44	87	130	174	217	260	304	347	390	434	477	520	564	607	650
70	47	94	140	187	234	280	327	374	420	467	514	560	607	654	700
75	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750
80	54	107	160	214	267	320	374	427	480	534	587	640	694	747	800
90	60	120	180	240	300	360	420	480	540	600	660	720	780	840	900
100	67	134	200	267	334	400	467	534	600	667	734	800	867	934	1000
125	84	167	250	334	417	500	584	667	750	834	917	1000	1084	1167	1250
150	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500
175	117	234	350	467	584	700	817	934	1050	1167	1284	1400	1517	1644	1750
200	134	267	400	534	667	800	934	1067	1200	1334	1467	1600	1734	1867	2000
300	200	400	600	800	1000	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000

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 inches and 14 inches deep.

Step 2
Leveling Pad
- An aggregate leveling pad is made of a good compactible base material of 3/4 inch 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.

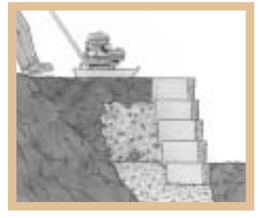
Step 4
Next Lift Construction
- Clean any debris off the top of the blocks.
- Place the second course of blocks on the base course while maintaining running bond and pull each block forward as far as possible to ensure the correct set back.
- Fill all voids between and within concrete wall units with drainage aggregate.
- 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.

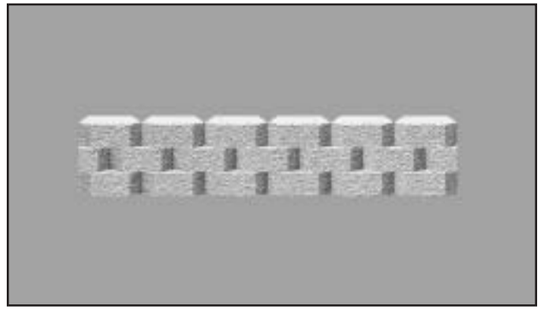
Step 6
Compaction
- Shovel the in-fill soil behind the drainage aggregate and compact the in-fill with a hand-operated compactor.
- Make sure the aggregate is level with or slightly below the top of the base course.
- Do the same at the front of the wall, adding and compacting in-fill soil.

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 taut and pin the back edge in place with stakes or staples.
- Add drainage aggregate behind the blocks, then add the in-fill soil and compact it.
- Know how your choice of reinforcement works. The strength direction of the reinforcement must be placed perpendicular to the wall.
- Remember! Place the front edge of the reinforcement on top of the block, making sure it's within 2 inches 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.

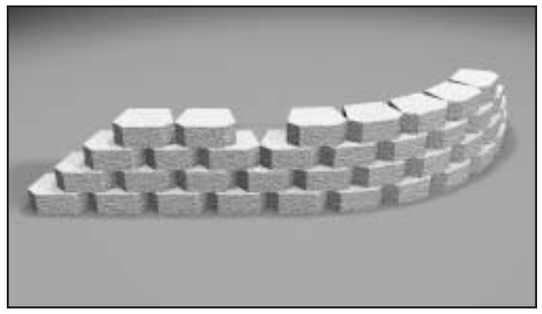


Step 9
Site Cleaning & Restoration
- Brush off the wall and pick up any debris left from the construction process.
- Notify the job superintendent in writing that the construction of the wall is complete and the project is ready for final inspection and acceptance.
- Following these Best Practices for 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.



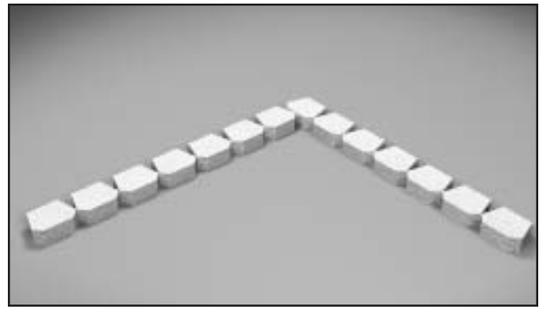
Step 2
Any wall that is not perfectly straight will eventually run off bond. When this happens, skip a block position and place the next block into the next place where it is back on bond. Measure the remaining gap and cut a block to fit.

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.

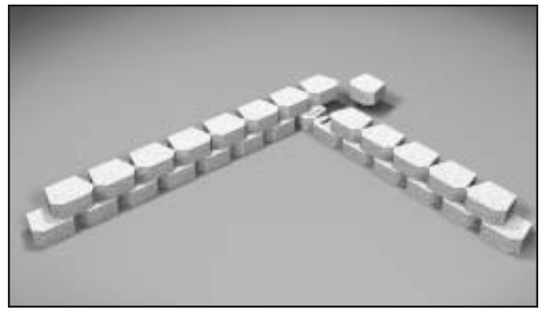
INSIDE 90˚ CORNERS

Step 1
To create an inside 90° corner, begin by placing a corner 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.

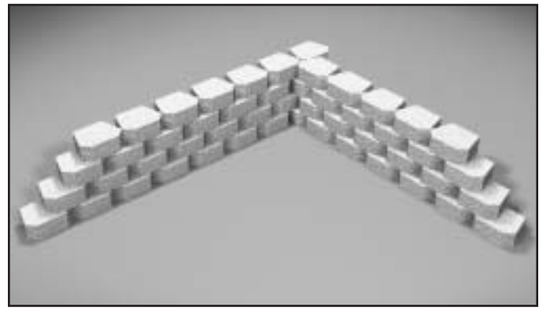


Step 2
On the second course, place all blocks on bond along one side of the corner. Once the second course of one wall is established, begin the second course of the adjacent wall.

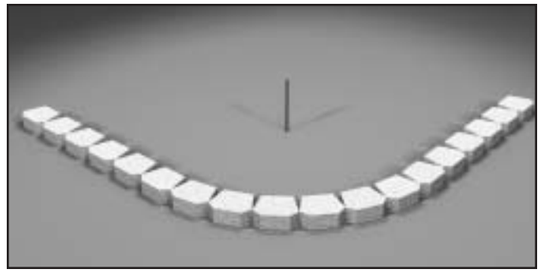
Split units may be required on this wall to maintain running bond. To split a block, use a mechanical splitter or a hammer and a chisel.



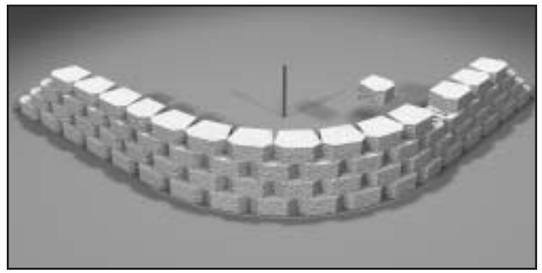
Step 3
Block placement in the corner should alternate direction with each succeeding course.



OUTSIDE CURVE



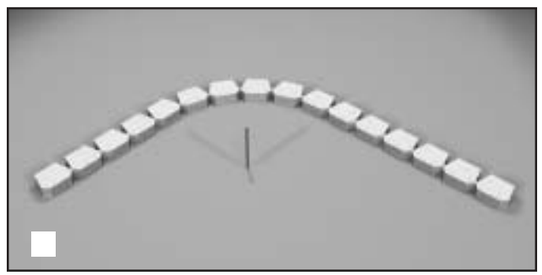
Step 1
When building an outside radius curve, begin by calculating the radius of your top course. This will be the smallest radius in the wall and must not be less than the minimum for the block system you are using*. Drive a stake into the ground at the desired center of the curve. Attach a string and rotate it in a circle around the stake to mark the radius in the soil. Align the back of the block with the radius curve and ensure level placement from side to side and front to back. Outside curves with beveled units have a minimum radius of 4'. Outside curves with straight units have a minimum radius of 4'. When calculating a radius add a minimum 1" for the set back of each course. Partial units may be required to maintain a running bond.



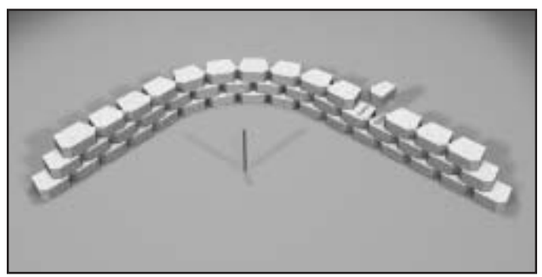
Step 2
For each course, make sure the lip of each block is in contact with the back of the units below to ensure structural stability. The setback of the block will cause the radius of each course to gradually decrease and eventually affect the running bond of the wall. To maintain proper running bond, use partial units as needed. 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 inch to the setback 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. Inside curves with beveled units have a minimum radius of 4'. Inside curves with straight units have a minimum radius of 6'. When calculating a radius add 1" for the setback of each course. Partial units may be required to maintain running bond.

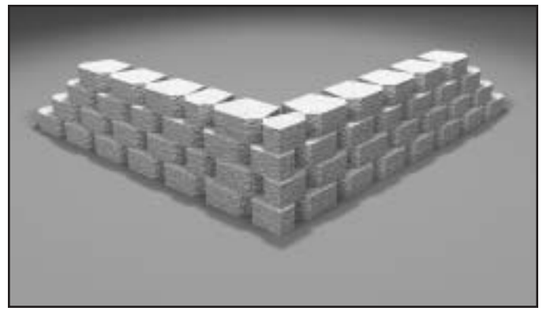


Step 2
For the second course, make sure the lip of each block is in contact with the back of the units below to ensure structural stability. The setback of the block will cause the radius of each course to gradually increase and eventually affect the running bond of the wall. To maintain proper running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

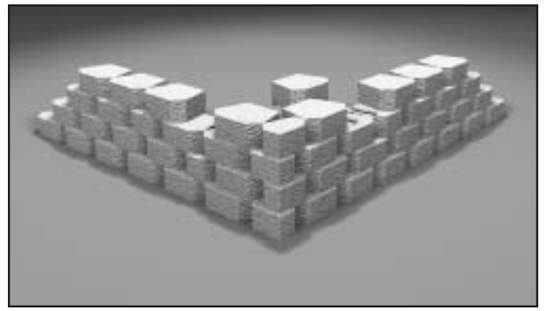
OUTSIDE 90˚ CORNERS

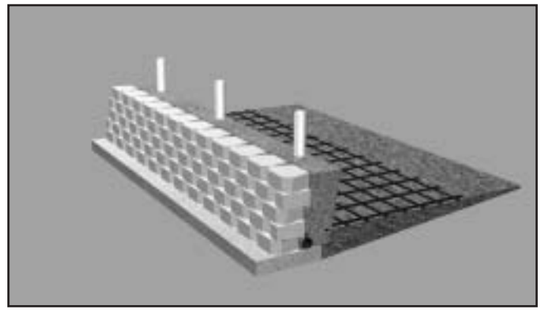
Step 1
To build an outside 90° corner, begin by placing a corner unit at the corner. Then lay the rest of the base course working from the corner unit out.

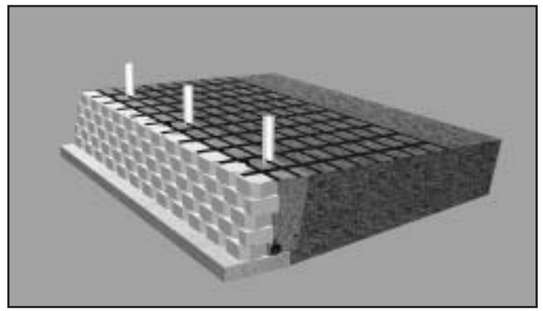
Step 2
Begin the second course with a corner unit in the alternate direction. Place the second and third blocks on either side of the corner unit. Once the corner unit is in position, adhere block in place with a concrete adhesive. Continue to alternate the corner unit orientation with each course and always use a concrete adhesive.

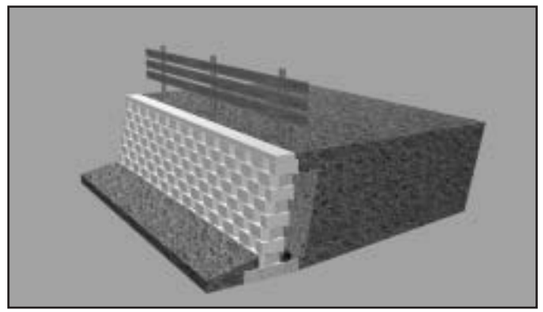


Step 3
Use split units as necessary to maintain running bond by using a mechanical splitter or a hammer and a chisel.









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.

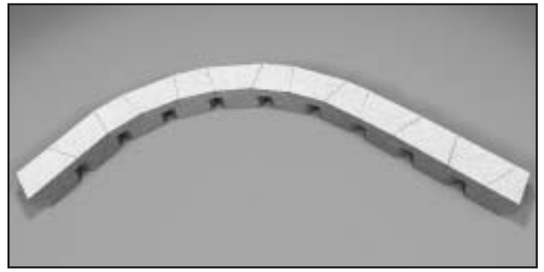
Step 2
If the fence is at least 3 feet behind the wall, generally no additional reinforcement is required. If the fence is installed within 3 feet, there may be some load transferred to the wall from wind, snow or pedestrians. Additional reinforcement around the fence sleeves may be needed.

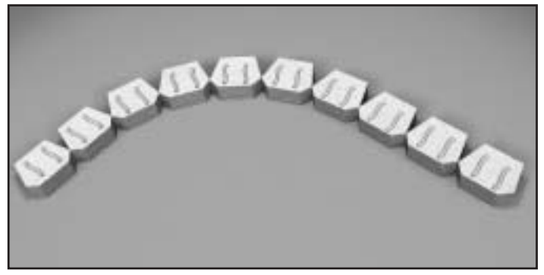
Step 3
Grout the fence post into the sleeve after the wall is built.

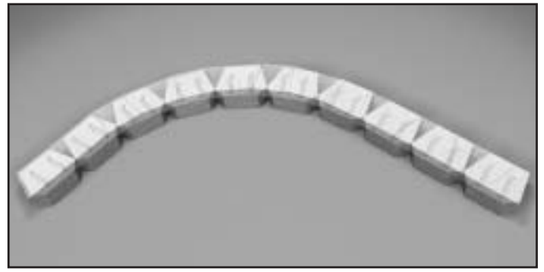
CAP UNITS

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.

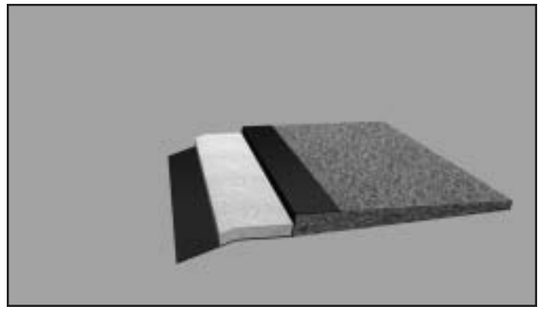
Tip: To determine the minimum number of caps needed on an average straight wall, measure the length of the wall. Multiply the length of the wall by 12 inches and divide by 14.5. Additional caps will be needed for elevation changes and radius curves.





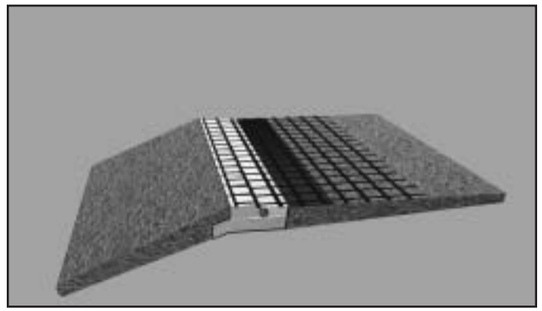


WATER

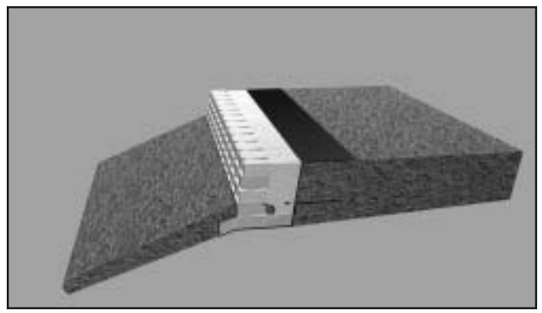


Note: In water applications, the reinforced zone should consist of free draining soil.

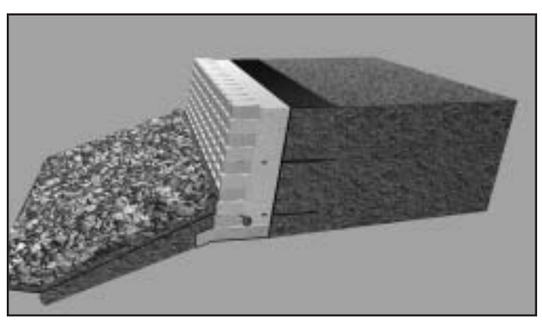
Step 1
Place a filter fabric with extra length in front of the wall.



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 rip-rap 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.

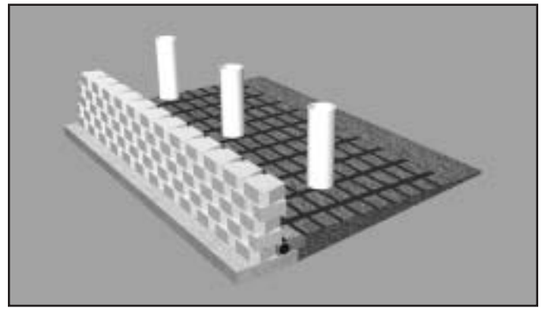


Step 4
Continue these steps until your wall is complete. The last section of filter fabric should cover the drainage aggregate and run up against the back of the top course of block. Add fill soil and compact. Keep in mind there are numerous issues related to water wall applications including wave or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

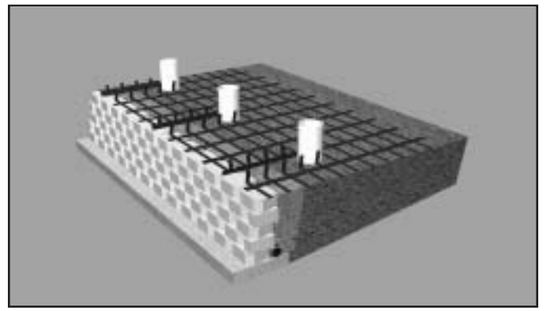
For more information consult with a qualified engineer.

GUARDRAILS

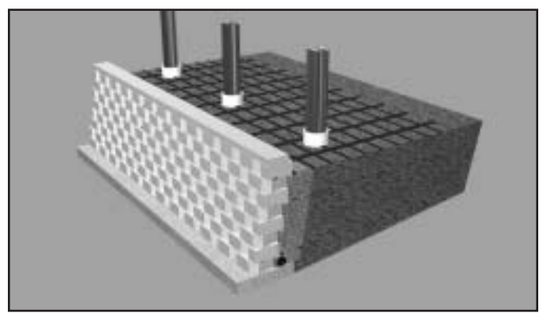
Step 1
Impact on a guardrail system can transfer additional load to your wall. This must be accounted for in the design and construction of the wall. Install a sleeve in the backfill soil at post locations during construction at least 3 feet from the face of the wall.



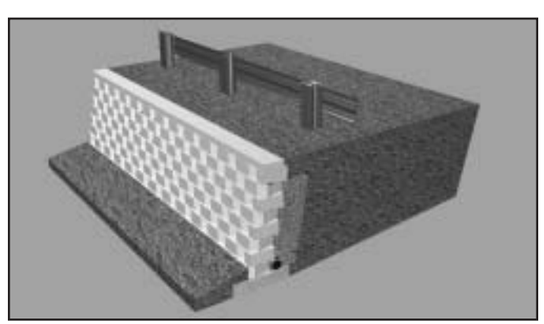
Step 2
Depending on impact loads, the post of the guardrail has to be buried deep enough so that it penetrates multiple layers of reinforcement.



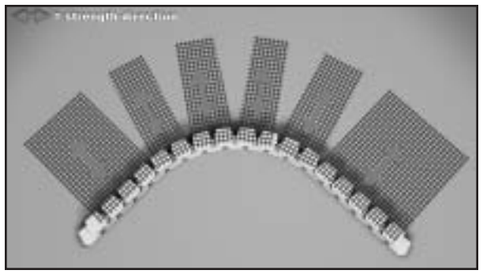
Step 3
An additional layer of reinforcement should be placed just below the top course for additional stability.



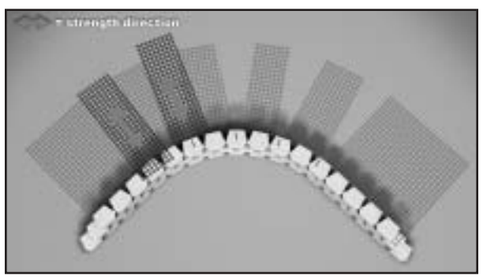
Step 4
Once the wall is constructed, insert the posts and apply grout.



REINFORCEMENT–INSIDE CURVE

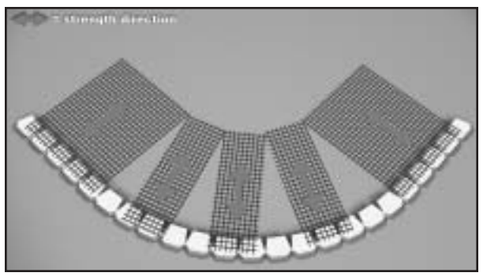


Step 1
Cut reinforcement to the required lengths as specified in your wall plan. Lay segments of reinforcement within 2 inches of the face of the wall, making sure that the strength direction of each section is perpendicular to the wall face.

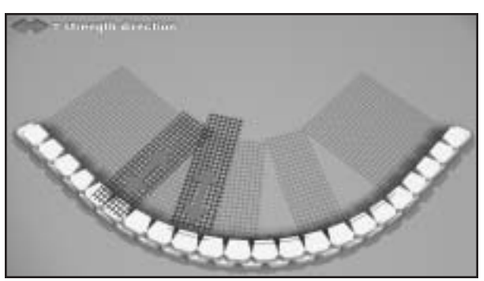


Step 2
Place the next course of blocks, marking the backs of blocks to identify the middle of unreinforced areas. Backfill and compact. Center subsequent sections of reinforcement on the marked blocks to ensure full reinforcement coverage. Repeat this procedure throughout the construction of the radius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

REINFORCEMENT–OUTSIDE CURVE



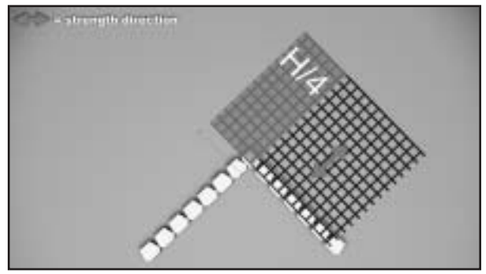
Step 1
Cut reinforcement to the required lengths as specified in your wall plan. Lay sections of the reinforcement within 2 inches of the face of the wall with the strength direction perpendicular to the wall face. Avoid overlapping the reinforcement by separating each section.



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.

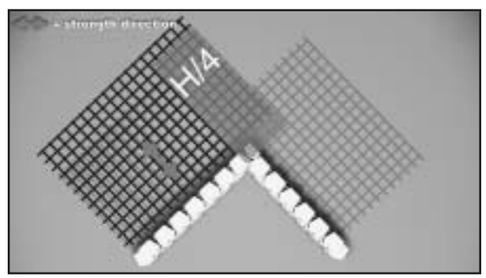
REINFORCEMENT–INSIDE 90˚ CORNERS

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.



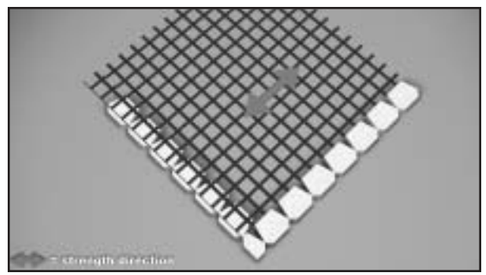
Example: If your overall wall height is 8 feet, the reinforcement extension would be 2 feet.

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.

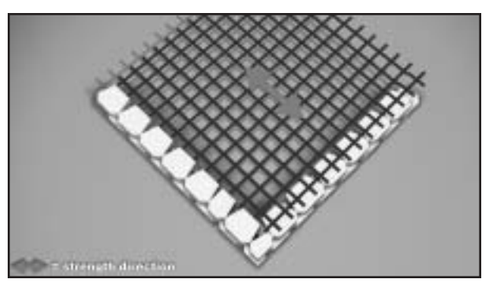


REINFORCEMENT–OUTSIDE 90˚ CORNERS

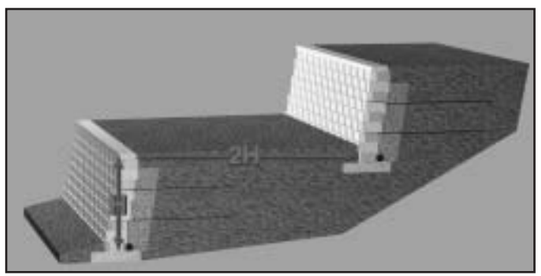
Step 1
Begin by checking your wall plan to determine reinforcement lengths and elevations. Lay a section of reinforcement near the corner of the wall, ensuring that it's placed within 2 inches of the face of the block and running along the back of the adjoining wall.



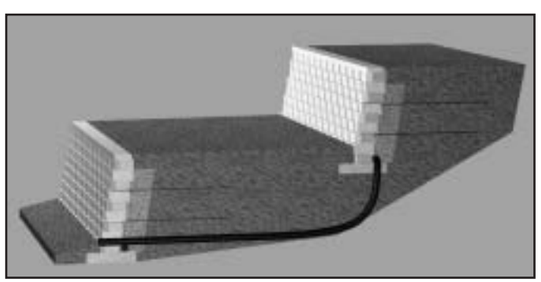
Step 2
Lay the next course of block, backfill and compact. When installing the next section of reinforcement, place within 2 inches of the face of the block and running along the back of the adjacent wall. Alternate the reinforcement extension on each course where reinforcement is required.



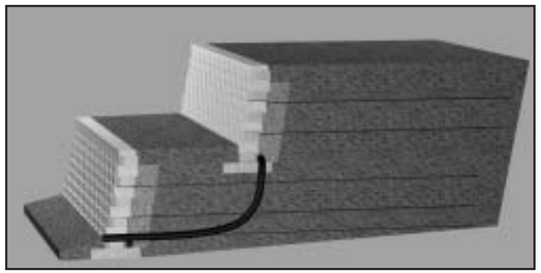
TERRACES



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



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 a qualified engineer.