

CreteWoodTM EZ Ties Unit

ST. LOUIS COUNTY MASTERPLAN

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EZ Ties with Z-lokTM

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COVER SHEET

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August 2008

APPLICATION

The CreteWood™ EZ Ties retaining wall system is a reinforced soil structure combining an architecturally attractive concrete facing block with geogrid reinforcement. The Mirafi geogrid reinforcement interlocks with the EZ Tie wall units with the exclusive Z-lok™ locking system and fill soil to create a stable gravity retaining wall. Design of these reinforced soil structures uses well established guidelines that are readily available. The following specifications and details provide a design to incorporate geogrid reinforcement into the soil for the purposes of constructing retaining walls. Consult CreteWood, LLC for additional details regarding design, appearance, and aesthetic considerations.

STANDARD DESIGN PROCEDURE

The following design tables established for the construction of soil reinforced walls are based upon generally accepted soil parameters in the St. Louis County, Missouri area. An engineer shall review the site conditions and the soil present at the proposed location of the soil reinforced walls to determine if the actual conditions match the assumed parameters. All soil parameters assumed in the design are well drained, long term strength conditions. High plastic silts, and clays should be avoided without specific design recommendations from local geotechnical engineers. Frost heave and settlement need to be addressed if warranted by conditions. Also, special precautions are necessary for walls constantly in contact with water, i.e. near or at rivers, lakes, and ponds.

Three typical geometric cases were selected for these tables. The first case is a typical retaining wall with horizontal backfill, the second case is a 3:1 sloping backfill, and the third case is a tiered wall. The horizontal backfill layout is designed with 100 lb per sf surcharge. The following is a summary of the design parameters used and the minimum factors of safety which the tables are based on.

SOIL PROPERTIES:

	Friction Angle (degrees)	Unit Weight (#/cf)	Cohesion (#/sf)
Wall fill	28	120	0
Retained Backfill	28	120	0
Foundation Soil	28	120	0

Friction Angle - degrees
Unit Weight - lbs per cf
Cohesion - lbs per sf

MINIMUM FACTORS OF SAFETY CALCULATED

Reinforcement Pullout = 1.5
Reinforcement Rupture = 1.5
External Sliding = 1.5
Overturning = 2.0
Overall for Unknowns = 1.5
Bearing Capacity = 2000 psf

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APPLICATION

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SPECIFICATIONS - St. Louis County Masterplan

Materials

Retaining wall units shall be CreteWood™ EZ Tie units, 6" tall x 9" deep x 5' wide, as manufactured by CreteWood LLC. The units are precast concrete manufactured from a self consolidating mix that produces a minimum 28-day compressive strength of 3000 psi. The units shall be produced in adherence to the standards set forth in the National Precast Concrete Association Quality Control manual for precast concrete plants.

The reinforced wall backfill material shall be compacted soil from on-site. The soil shall be free of clumps, free of rocks larger than 4", and free of organic materials. Do not use high plastic soils that have a PI>20 or LL>40.

Geogrids shall be Miragrid 2XT, or 3XT as manufactured by TC Mirafi Group. Both geogrid designations meet the strength requirements of the design calculations. The **geotextile filter fabric** shall be Mirafi 140NL.

The leveling pad shall be constructed of well graded crushed limestone similar to 1" minus.

The drainage rock shall be free draining rock such as 3/4" clean crushed limestone.

The perforated pipe shall be HDPE coil pipe.

Wall Foundation

Foundation soil shall be excavated as required for the leveling pad and the reinforced fill zone to the depths and locations shown on the plan sheet. The exposed foundation soil shall be observed prior to construction to verify that the exposed material is suitable for a net design bearing pressure of 2000 psf and that the base of the excavation is free of loose soil, uncompacted fill, water, or frozen material. Undercut any unsuitable soil. Undercut areas shall be filled with crushed limestone and compacted to at least 95% of the material's standard Proctor maximum dry density.

Construct the crushed rock leveling pad to lines and grades shown on the plans.

Construct the horizontal drainage layer at the lines and grades shown on the plans. The 6" of drainage rock shall be separated from the rock with a filter fabric. Place the perforated pipe behind the base unit and in the drainage layer. Slope the pipe to the low point in the wall and daylight the pipe through the wall face.

Wall Construction

Install the first course of units on the leveling pad. Install the next course in a running bond stack. Pull unit forward. Backfill units and continue construction. Drainage rock shall be directly behind the wall units a minimum 12" thick.

Geogrid Reinforcing

The geogrids shall be cut to design lengths and placed between the blocks at the elevations shown on the plans. The geogrid's primary strength direction will be directed perpendicular to the wall face (into the fill.) The geogrids placed outside a plus or minus 4" zone of the geogrid design elevation will not be accepted. The geogrid shall be placed horizontally and lay flat on the reinforced fill soil. The geogrid shall be placed so that a minimum of 8" of grid is between the block layers. Slack in the geogrid shall be removed prior to placing additional backfill.

Wall Backfill

Wall backfill material shall be placed in maximum 8" loose lifts and compacted to at least 95% of the material's maximum dry density as determined by the standard Proctor method. Backfill shall be placed, spread, and compacted in such a manner that minimizes wrinkles and movement of the geogrid. Field density testing shall be conducted by a qualified soils technician to verify that at least the minimum degree of compaction is being obtained.

Place 12" of drainage rock behind units.

During backfill placement the 3 foot zone directly behind the wall shall be limited to the use of hand operated compaction equipment only.

Construction equipment shall not be operated directly on the geogrid.

Protection of Work

The surface of the wall backfill shall be graded at the end of each day of work to provide positive surface drainage away from the wall. Grading shall include proper contouring of fills in adjacent areas to prevent the flow of surface water into the reinforced earth zone.

The design of the walls are based on conditions and loads imposed on the wall at completion of the project. Prior to project completion, the wall is vulnerable to damages caused by construction activity adjacent to the wall. Of particular concern is the of grading and pavement construction equipment on the retained backfill at the top of the wall. Only equipment with a weight not exceeding one ton can be used in the 3 foot zone directly behind the back of the wall face.

The soil in front of the walls shall be protected from future erosion.

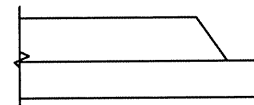
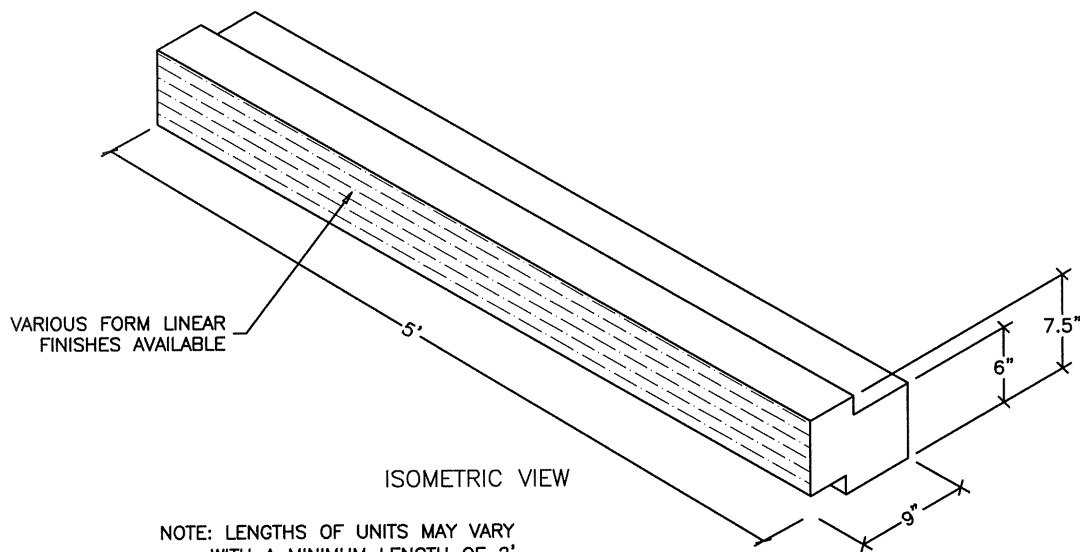
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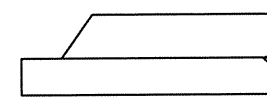
SPECIFICATIONS

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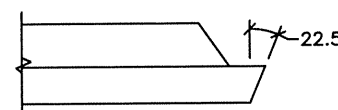


RIGHT BEVEL

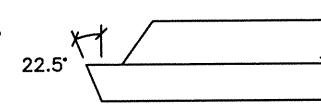


LEFT BEVEL

90° CORNER
NOT TO SCALE

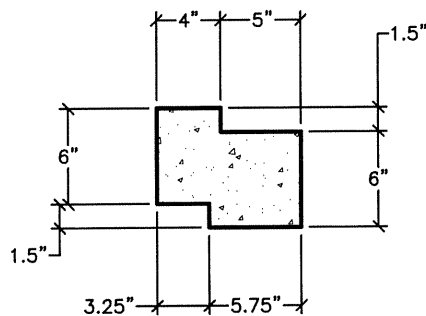


RIGHT BEVEL



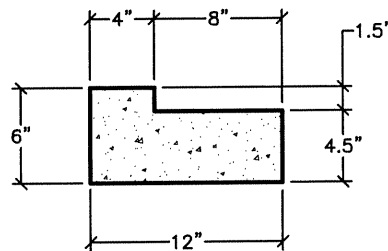
LEFT BEVEL

ANGLE PIECE
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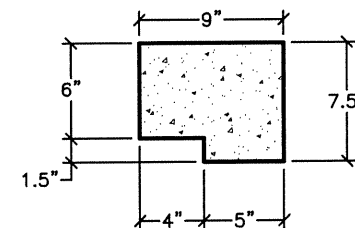
SIDE VIEW

UNIT DETAIL
NOT TO SCALE



SIDE VIEW

BOTTOM UNIT
NOT TO SCALE



SIDE VIEW

CAP UNIT
NOT TO SCALE

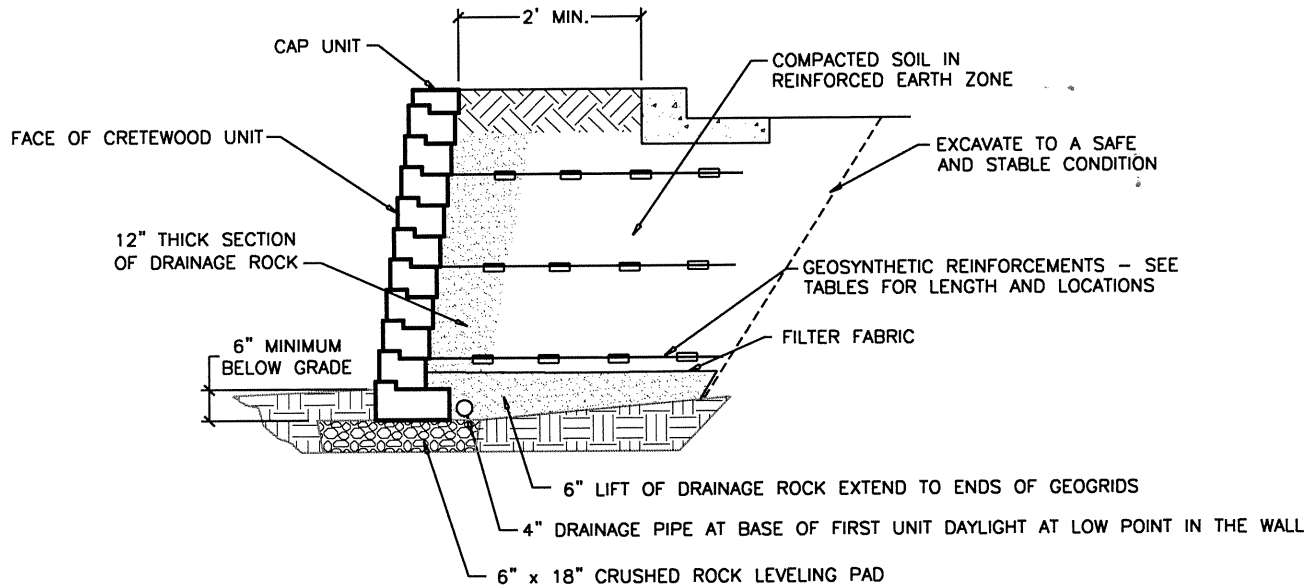
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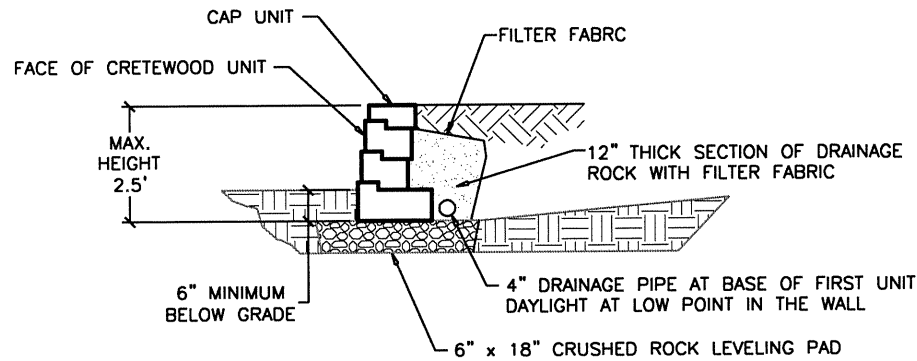
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TYPICAL SECTION - WITH REINFORCEMENT

NOT TO SCALE



TYPICAL SECTION - WITHOUT REINFORCEMENT

NOTE: SURCHARGE LOADS OTHER THAN PARKING LOT LOADS MUST BE LOCATED A MINIMUM 8' BEHIND THE WALL FACE.

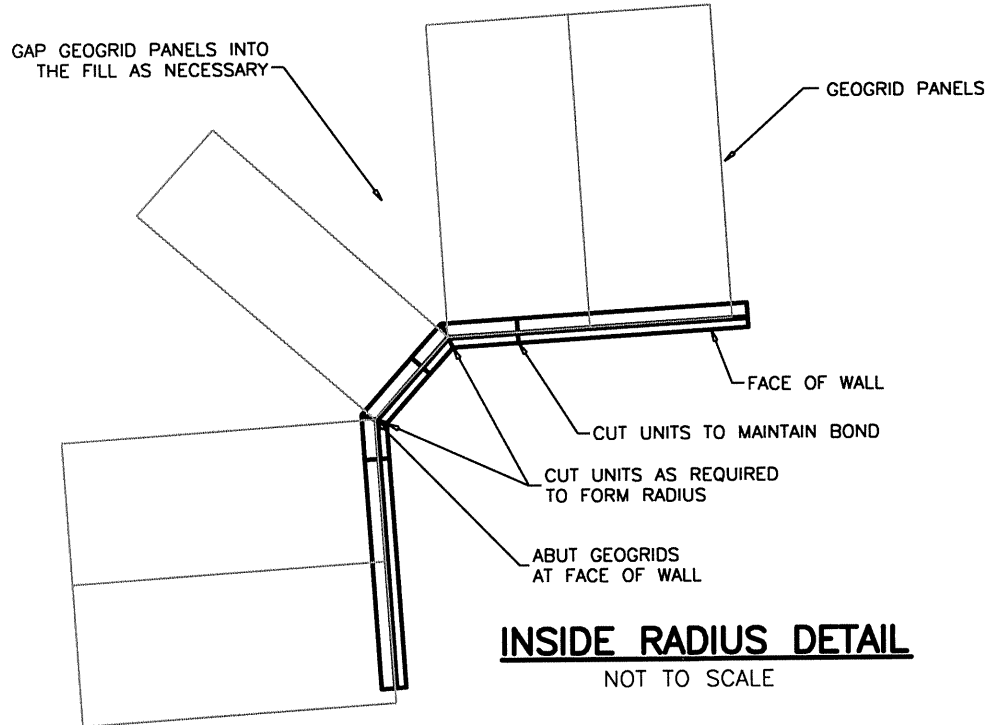
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TYPICAL SECTIONS

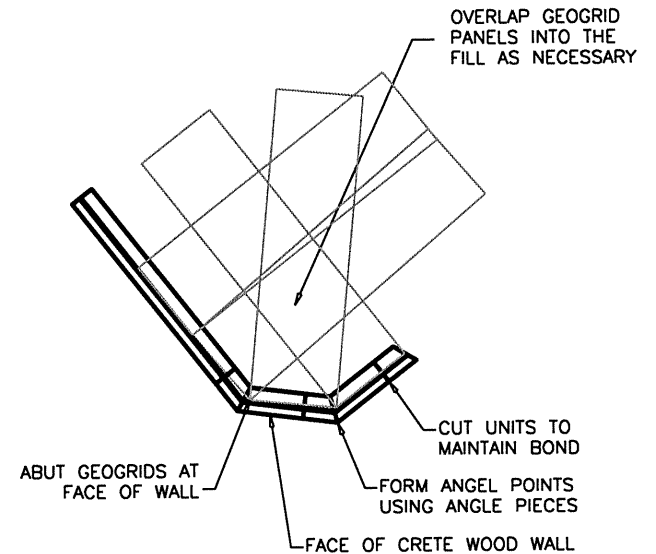
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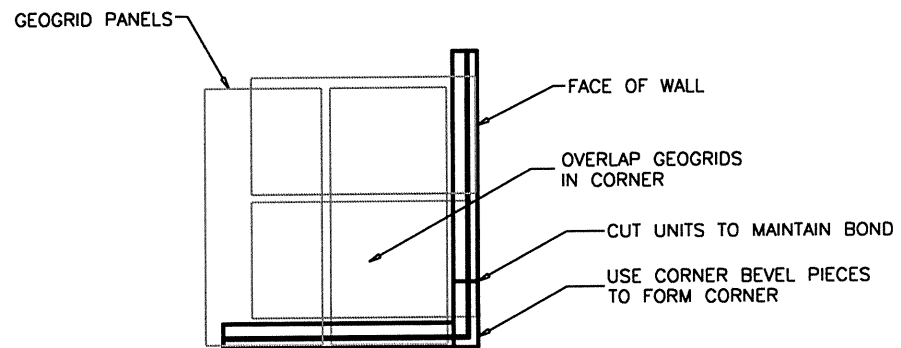
INSIDE RADIUS DETAIL

NOT TO SCALE



OUTSIDE RADIUS DETAIL

NOT TO SCALE



OUTSIDE CORNER DETAIL

NOT TO SCALE

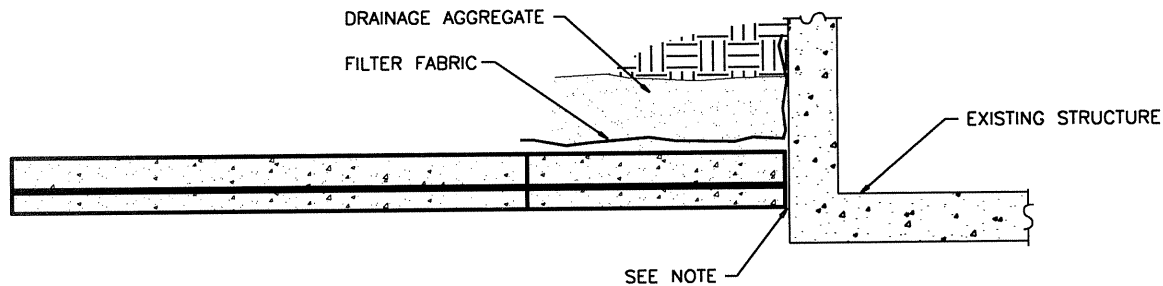
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DETAILS

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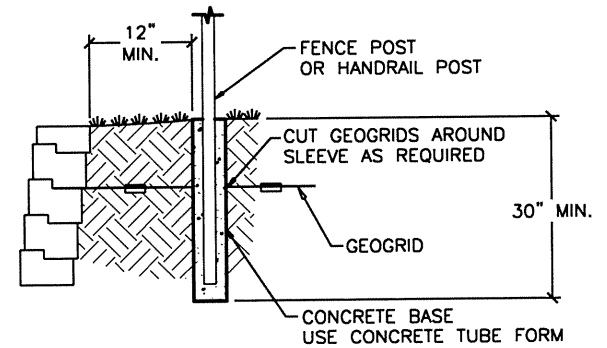
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- NOTE:
1. AT ABUTMENT, ALTERNATE FULL UNIT WITH HALF UNIT EVERY OTHER COURSE
 2. START AT FIXED POINTS AND WORK INTO MIDDLE PART OF WALL.
 3. DO NOT ATTACH CRETEWOOD UNITS TO OTHER STRUCTURES.

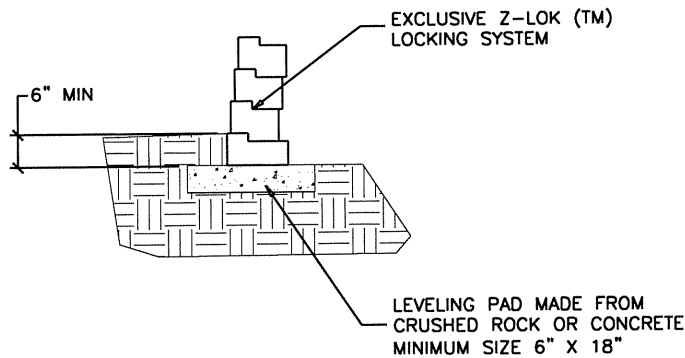
ABUTMENT DETAIL

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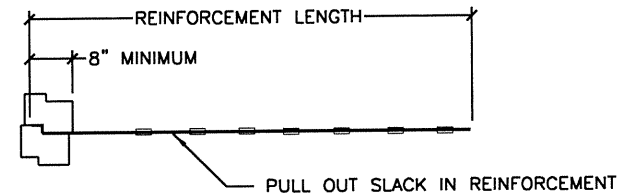
FENCE DETAIL

NOT TO SCALE



LEVELING PAD DETAIL

NOT TO SCALE



CONNECTION DETAIL

NOT TO SCALE

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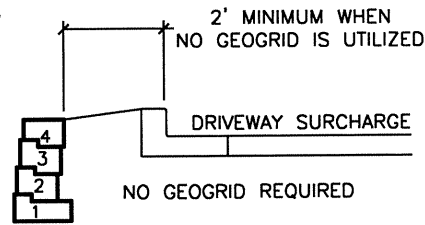
DETAILS

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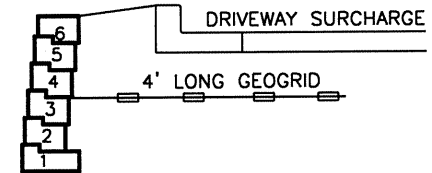
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NOTES:

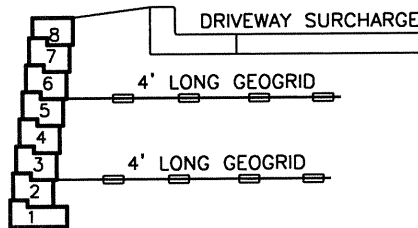
1. GEOGRID LENGTH MEASURED FROM FACE OF WALL.
2. GEOGRIDS ARE MIRAGRID 2XT OR MIRAGRID 3XT.
3. WALL HEIGHT MEASURED FROM TOP OF LEVELING PAD.
4. SEE TYPICAL SECTION DETAIL FOR BACKFILL REQUIREMENTS AND CONSTRUCTION NOTES.



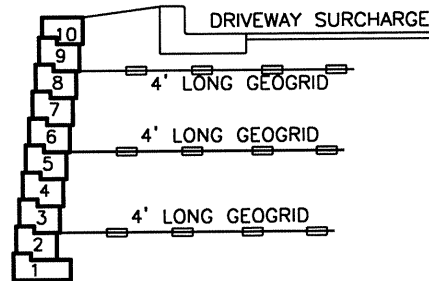
2' TALL WALL



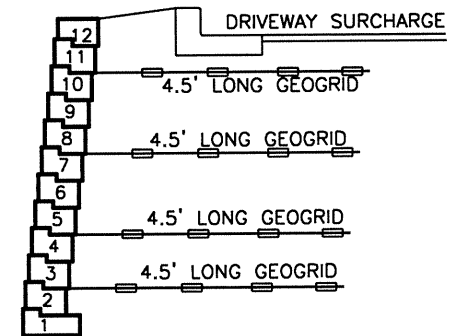
3' TALL WALL



4' TALL WALL



5' TALL WALL



6' TALL WALL

TYPICAL SECTION – DRIVEWAY SURCHARGE

NOT TO SCALE

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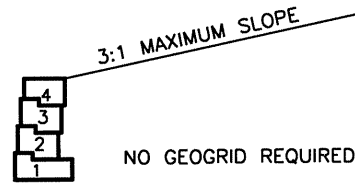
HORIZONTAL GRADE

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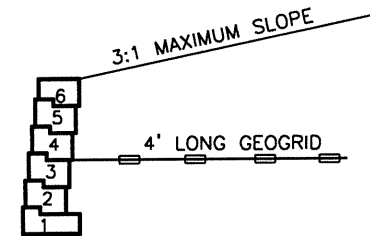
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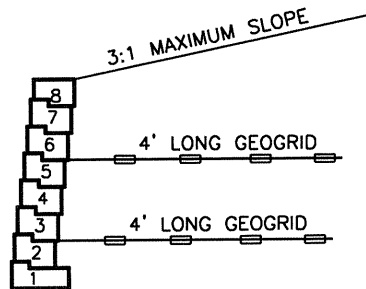
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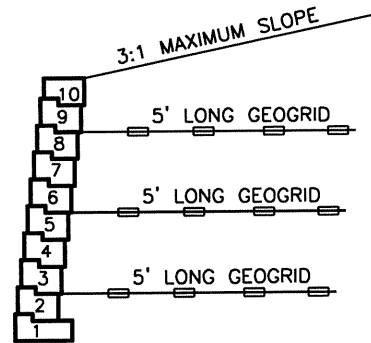
2' TALL WALL



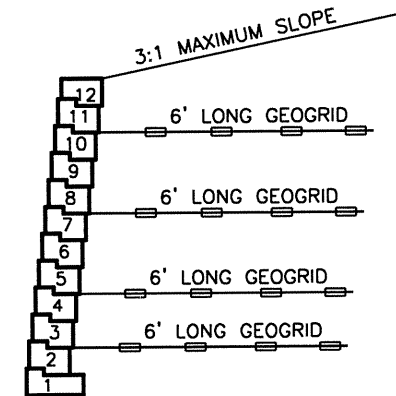
3' TALL WALL



4' TALL WALL



5' TALL WALL



6' TALL WALL

TYPICAL SECTION – SLOPING FILL
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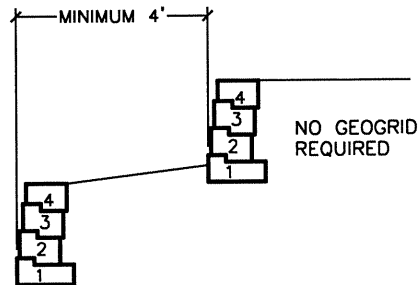
SLOPING GRADE

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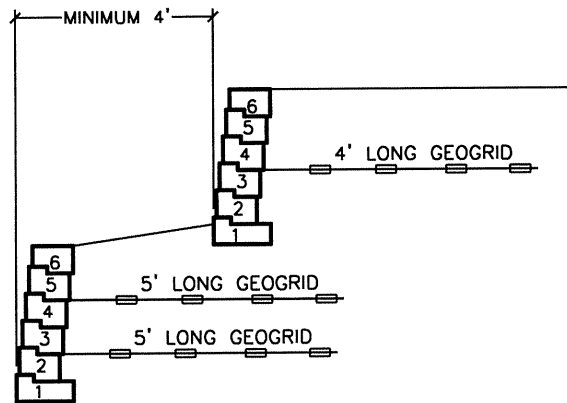
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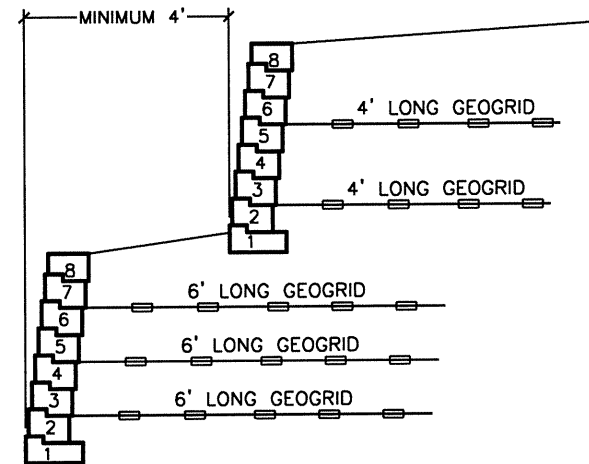
1. GEOGRID LENGTH MEASURED FROM FACE OF WALL.
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3. WALL HEIGHT MEASURED FROM TOP OF LEVELING PAD.
4. SEE TYPICAL SECTION DETAIL FOR BACKFILL REQUIREMENTS AND CONSTRUCTION NOTES.



2' TIERED WALLS



3' TIERED WALLS



4' TIERED WALLS

COMPACTED ROCK BACKFILL
REQUIRED ON BOTTOM WALL TO
ENDS OF GEOGRIDS TO REDUCE
SETTLEMENTS OF UPPER WALL

TYPICAL SECTION – TIERED WALLS

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TIERED WALL

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