

**CONSTRUCTION NOTES FOR THE PLACEMENT OF TENSAR GEOGRIDS AND BACKFILL SOILS FOR TENSAR WWF TEMPORARY RETAINING WALL**

**1.0 MATERIALS**

1.1 GEOGRID REINFORCING SHALL BE TENSAR UNIAXIAL GEOGRID AND BIAXIAL GEOGRIDS MANUFACTURED BY THE TENSAR CORPORATION, MORROW, GEORGIA.

1.2 BODKIN BARS SHALL BE 1/2" X 1/4" HDPE BARS MANUFACTURED BY THE TENSAR CORPORATION, MORROW, GEORGIA.

1.3 GEOTEXTILE FILTER FABRIC TG600 SHALL BE MANUFACTURED BY EVERGREEN TECHNOLOGIES, INC., EVERGREEN, ALABAMA OR EQUIVALENT AS APPROVED BY THE ENGINEER.

**1.4 WALL FACING**

1.4.1 FACING SHALL BE PRE-FABRICATED BLACK STEEL WELDED WIRE FORMS (WWF) 4" x 4" - W4.0 x W4.0 AND GEOTEXTILE FABRIC. WIRE FORM GEOMETRY SHALL BE AS DETAILED IN THE CONSTRUCTION DRAWINGS.

**2.0 TECHNICAL REQUIREMENTS**

2.1 FILL MATERIALS SHALL BE PLACED FROM THE BACK OF THE WELDED WIRE FACING FORMS TOWARDS THE ENDS OF THE GEOGRID TO ENSURE FURTHER TENSIONING.

2.2 WELDED WIRE FACING SHALL BE MONITORED DURING FILL PLACEMENT AND COMPACTION. COMPACTION EQUIPMENT AND OPERATION PROCEDURES MAY HAVE TO BE MODIFIED TO PREVENT EXCESSIVE DEFORMATION OF THE FLEXIBLE WELDED WIRE FACING.

2.3 TIE WIRES OR HOG RINGS MAY BE REQUIRED IF WWF MOVES DURING BACKFILL OPERATIONS.

**3.0 TENSAR GEOGRID PLACEMENT**

3.1 TENSAR GEOGRID SHALL BE PLACED AT THE SAME LOCATIONS AND ELEVATIONS SHOWN IN THE SHOP DRAWINGS.

3.2 TENSAR GEOGRID REINFORCEMENT SHALL BE CONTINUOUS THROUGHOUT THEIR EMBEDMENT LENGTHS. THE BODKIN CONNECTION SHALL NOT BE UTILIZED UNLESS PRE-APPROVED BY THE ENGINEER PRIOR TO CONSTRUCTION.

3.2.1 IF PRE-APPROVED, TENSAR UNIAXIAL GEOGRIDS MAY BE SPLICED UTILIZING THE BODKIN CONNECTION DETAIL. NO MORE THAN ONE SPLICE SHALL BE ALLOWED IN ANY ONE LENGTH OF REINFORCING AND NO SPLICES SHALL BE ALLOWED FOR GEOGRIDS LESS THAN 6 feet IN LENGTH (EACH). THE BODKIN CONNECTION SHALL NOT BE PLACED LESS THAN 6 feet BELOW PLANNED FINISHED GRADE, NOR HORIZONTALLY NOR VERTICALLY ADJACENT TO ANOTHER BODKIN CONNECTION.

3.3 PRIOR TO PLACING FILL, THE GEOGRID MATERIALS SHALL BE PLACED TO LAY FLAT AND PULLED TAUT TO REMOVE ANY SLACK IN THE GEOGRIDS.

3.4 TRACKED CONSTRUCTION EQUIPMENT SHALL NOT BE OPERATED DIRECTLY ON THE GEOGRID. A MINIMUM FILL THICKNESS OF 6 inches IS REQUIRED FOR OPERATION OF TRACKED VEHICLES OVER THE GEOGRID. TURNING OF TRACKED VEHICLES SHOULD BE KEPT TO A MINIMUM TO PREVENT TRACKS FROM DISPLACING THE FILL AND/OR THE GEOGRID.

3.5 RUBBER-TIRED VEHICLES MAY PASS OVER THE GEOGRID REINFORCEMENT AT SLOW SPEEDS, LESS THAN 10 MPH. SUDDEN BRAKING AND SHARP TURNING SHALL BE AVOIDED.

3.6 TENSAR UNIAXIAL GEOGRIDS SHALL BE ROLLED OUT WITH THE LONG AXIS OF THE APERTURES (MACHINE DIRECTION) PERPENDICULAR TO THE WELDED WIRE FORM FACE. TENSAR BIAXIAL GEOGRIDS SHALL BE ROLLED OUT WITH THE MACHINE DIRECTION BAR PARALLEL TO THE WELDED WIRE FORM FACE.

3.6.1 UNIAXIAL (UX) GEOGRIDS SHALL BE CUT NEXT TO THE CROSS MACHINE DIRECTION BAR. UX GEOGRIDS SHALL BE UNROLLED PERPENDICULAR TO THE WALL FACE.

3.6.2 BIAXIAL GEOGRIDS SHALL BE CUT NEXT TO THE MACHINE DIRECTION BAR. BX GEOGRIDS SHALL BE UNROLLED PARALLEL TO THE WALL FACE.

3.7 GEOGRIDS SHALL BE CUT AND PLACED SO THAT A TRANSVERSE BAR IS EXTENDED TO THE BACK FACE OF THE WELDED WIRE FORM.

3.8 A MINIMUM OF 3 inches OF FILL MATERIAL SHALL BE REQUIRED BETWEEN LAYERS OF BIAXIAL, UNIAXIAL AND FILTER FABRIC, UNLESS OTHERWISE SHOWN.

**4.0 CHANGES TO GEOGRID LAYOUT OR PLACEMENT**

4.1 NO CHANGES TO THE TENSAR GEOGRID LAYOUT, INCLUDING, BUT NOT LIMITED TO, LENGTH, GEOGRID TYPE, OR ELEVATION, SHALL BE MADE WITHOUT THE EXPRESSED PRIOR WRITTEN CONSENT OF TENSAR EARTH TECHNOLOGIES, INC.

**5.0 DRAINAGE**

5.1 THE TENSAR REINFORCED WALL HAS BEEN DESIGNED ON THE ASSUMPTION THAT THE REINFORCED BACKFILL MATERIAL SHALL BE FREE OF SUBSURFACE DRAINAGE OF WATER (SEEPAGE).

**6.0 DESIGN PARAMETERS**

**6.1 SOIL PARAMETERS**

SEE WALL CONTROL DRAWINGS FOR SOIL CHARACTERISTICS OF FOUNDATION MATERIAL TO BE USED IN THE DESIGN OF THE WALL SYSTEM. THE CONTRACTOR SHALL PROVIDE SOIL DESIGN PARAMETERS FOR BACKFILL MATERIAL BASED ON THE ACTUAL SOIL CHARACTERISTICS UTILIZED AT THE SITE. THE VALUES OF FRICTION ANGLE, APPARENT COHESION AND UNIT WEIGHT SHALL BE PROVIDED IN THE SHOP DRAWINGS.

**6.1.1 DESIGN**

THE DESIGN CONTAINED ON THESE DRAWINGS IS BASED ON INFORMATION PROVIDED BY OTHERS. ON THE BASIS OF THIS INFORMATION, THE TENSAR CORPORATION IS RESPONSIBLE FOR INTERNAL STABILITY OF THE STRUCTURE ONLY. EXTERNAL STABILITY DESIGN INCLUDING FOUNDATION AND SLOPE STABILITY IS THE RESPONSIBILITY OF OTHERS.

**6.2 FACTORS OF SAFETY:**

6.2.1 INTERNAL STABILITY:  
 MAXIMUM GEOGRID DESIGN STRENGTH = 0.29 ULT  
 MINIMUM FACTOR OF SAFETY FOR GEOGRID PULLOUT = 1.5  
 MINIMUM FACTOR OF SAFETY FOR SLIDING AT LOWEST GEOGRID = 1.5  
 GEOGRID-SOIL INTERACTION COEFFICIENT = 0.8  
 PERCENT COVERAGE OF GEOGRID = VARIES

6.2.2 EXTERNAL STABILITY:  
 MINIMUM FACTOR OF SAFETY FOR SLIDING = 1.5  
 MINIMUM FACTOR FOR SAFETY FOR OVERTURNING = 2.0  
 EXTERNAL STABILITY IS THE RESPONSIBILITY OF OTHERS. TENSAR EARTH TECHNOLOGIES, INC. ACCEPTS NO LIABILITY OR RESPONSIBILITY FOR GLOBAL STABILITY. (SEE SECTION 7.5)

6.2.3 GLOBAL STABILITY:  
 GLOBAL STABILITY IS THE RESPONSIBILITY OF OTHERS. TENSAR EARTH TECHNOLOGIES, INC. ACCEPTS NO LIABILITY OR RESPONSIBILITY FOR GLOBAL STABILITY. (SEE SECTION 7.5)

**7.0 SPECIAL PROVISIONS**

7.1 WALL ELEVATION VIEWS AND LOCATIONS AND GEOMETRY OF EXISTING STRUCTURES MUST BE VERIFIED BY THE CONTRACTOR BEFORE COMMENCEMENT OF SHOP DRAWINGS.

7.2 TENSAR EARTH TECHNOLOGIES, INC. ASSUMES NO LIABILITY FOR INTERPRETATION OR VERIFICATION OF SUBSURFACE CONDITIONS, SUITABILITY OF SOIL DESIGN PARAMETERS AND INTERPRETATION OF SUBSURFACE GROUNDWATER CONDITIONS.

7.3 ANY REVISIONS TO DESIGN PARAMETERS STATED ON CONTROL DRAWINGS OR STRUCTURE GEOMETRY SHALL REQUIRE DESIGN MODIFICATIONS PRIOR TO PROCEEDING WITH CONSTRUCTION.

7.4 THIS DESIGN IS ONLY VALID FOR THE INTERNAL STABILITY OF THE PROPOSED TENSAR REINFORCED RETAINING WALLS AS SHOWN HEREIN.

7.5 BEARING CAPACITY, TOTAL SETTLEMENT, DIFFERENTIAL SETTLEMENT, AND THEIR EFFECTS ON THE TENSAR REINFORCED RETAINING WALL SYSTEM SHALL BE THE RESPONSIBILITY OF OTHERS.

THIS SYSTEM MAY BE USED IN ALL ENVIRONMENTS.

THIS DESIGN IS BASED UPON SPECIFIC PROPERTIES OF TENSAR PRODUCTS (GEOGRIDS, DRAINAGE COMPOSITES AND EROSION MEDIA), WHICH ARE PROPRIETARY TO THE TENSAR CORPORATION 1210 CITIZENS PARKWAY, MORROW GA, 30260. ANY SUBSTITUTION OF THE SPECIFIED PRODUCTS WILL INVALIDATE THIS DESIGN.

THIS DRAWING, DESIGN NOTES AND ASSOCIATED CALCULATIONS HAVE BEEN PREPARED BY TENSAR EARTH TECHNOLOGIES, INC. FOR PRELIMINARY DESIGN PURPOSES AND SHALL NOT BE USED FOR FINAL DESIGN OR CONSTRUCTION.

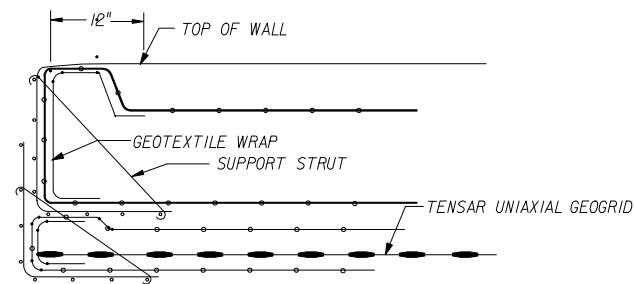
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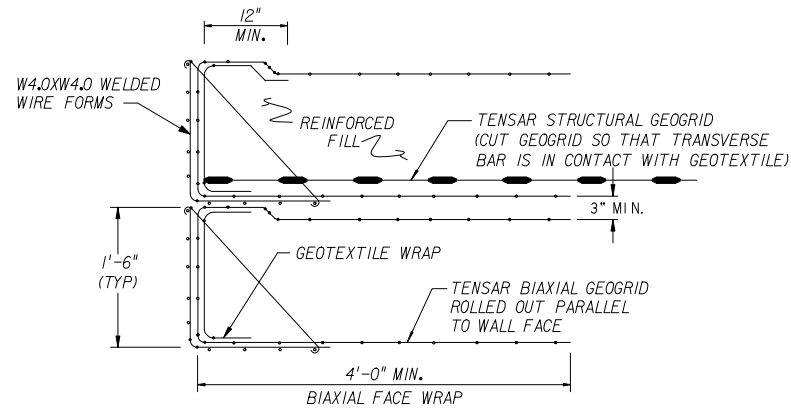
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
RETAINING WALL SYSTEM TENSAR EARTH TECHNOLOGIES TEMPORARY RETAINING WALL				
Names	Dates	Approved By <i>[Signature]</i>		
Designed By		State Structures Design Engineer		
Drawn By	JMS	8/14/98	Revision	Sheet No. Index No.
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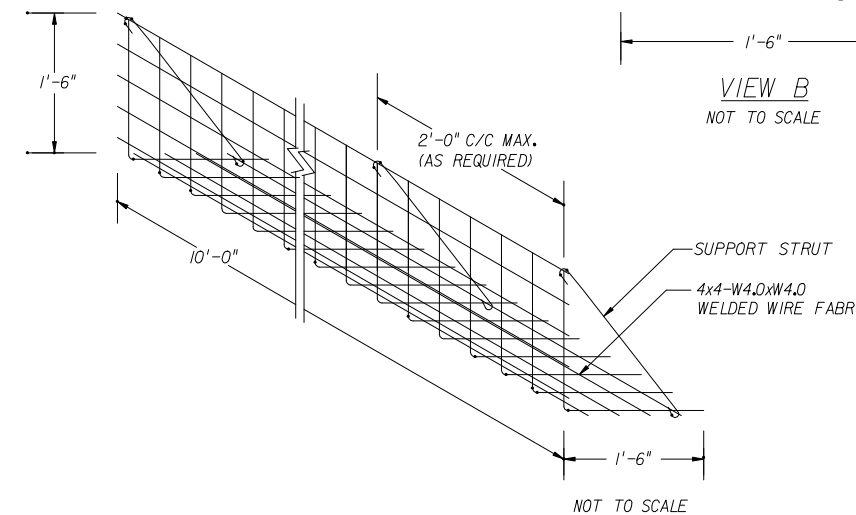
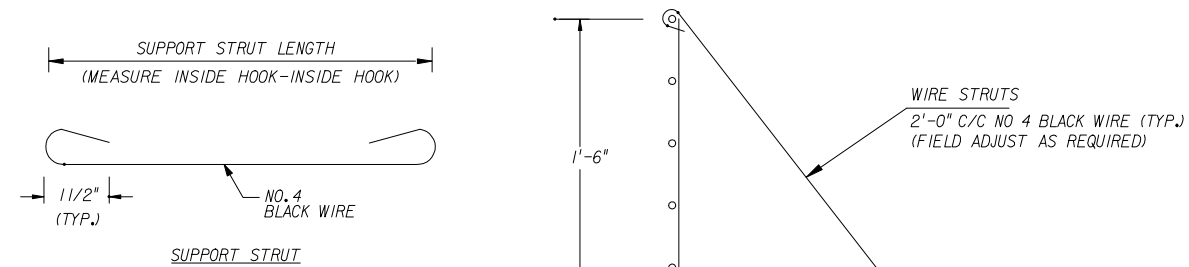


SET TOP MOST WIRE FORM INSIDE WIRE FORM BELOW TO FOLLOW GRADE.

**TOP WIRE BASKET DETAIL**  
NOT TO SCALE



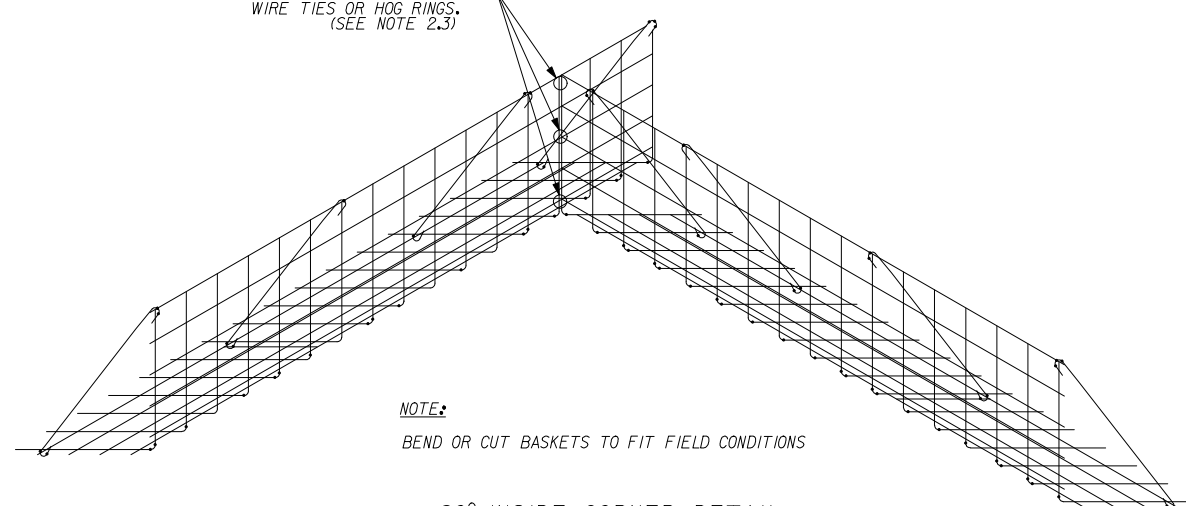
**WALL FACE DETAIL**  
NOT TO SCALE



**NOTES:**

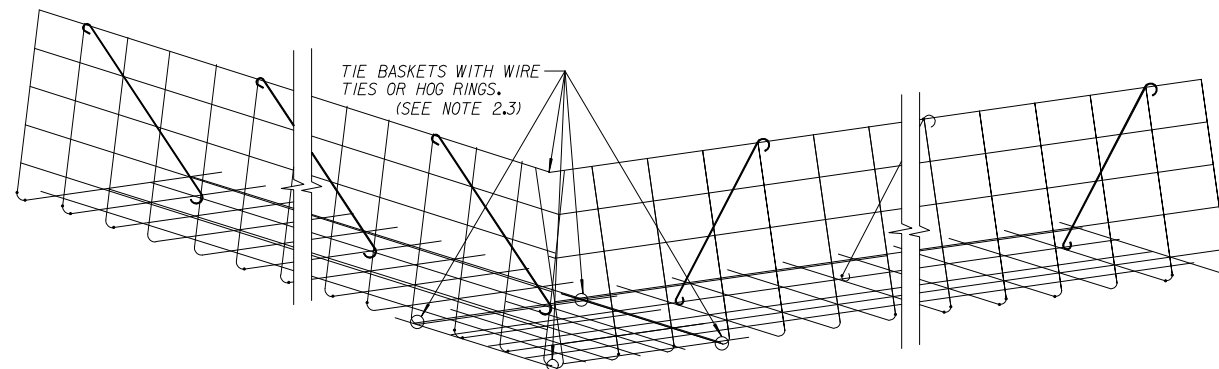
1. FACING TO CONSIST OF PREFABRICATED WWF 4x4-W4.0xW4.0 FORMS, PER ASTM A497.
2. ALL FORMS AND STRUTS WILL BE FABRICATED WITH NO. 4 BLACK WIRE.
3. OVERALL LENGTH OF WIRE FORMS IS 10'-0". EFFECTIVE CONSTRUCTED WIDTH IS 9'-8" WITH 2" OVER LAPPING AT ENDS.
4. STRUT LENGTH AND CROSS-SECTIONAL FORM DIMENSIONS TO BE

TIE WIRE BASKETS WITH WIRE TIES OR HOG RINGS. (SEE NOTE 2.3)



**NOTE:**  
BEND OR CUT BASKETS TO FIT FIELD CONDITIONS

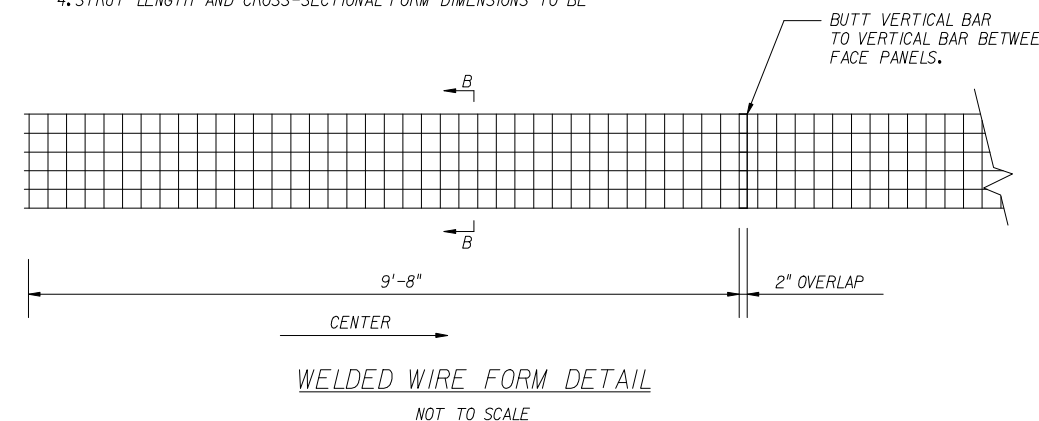
**90° INSIDE CORNER DETAIL**  
NOT TO SCALE



TIE BASKETS WITH WIRE TIES OR HOG RINGS. (SEE NOTE 2.3)

**NOTE:**  
BEND OR CUT BASKETS TO FIT FIELD CONDITIONS AND ENSURE THAT GEOTEXTILE FILTER FABRIC T6600 AND BIAXIAL GEOGRID OVERLAP 1'-0" MINIMUM.

**90° OUTSIDE CORNER DETAIL**  
NOT TO SCALE



**WELDED WIRE FORM DETAIL**  
NOT TO SCALE

THIS SYSTEM MAY BE USED IN ALL ENVIRONMENTS.

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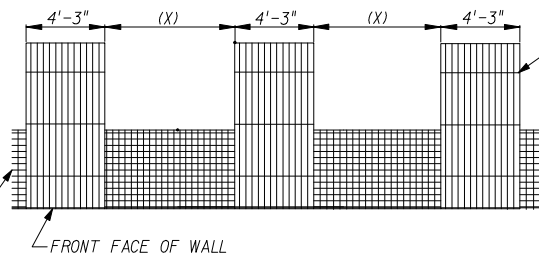


STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**RETAINING WALL SYSTEM  
TENSAR EARTH TECHNOLOGIES  
TEMPORARY RETAINING WALL**

Names	Dates	Approved By		
Designed By		[Signature]	State Structures Design Engineer	
Drawn By	JMS 8/14/98		Revision	Sheet No.
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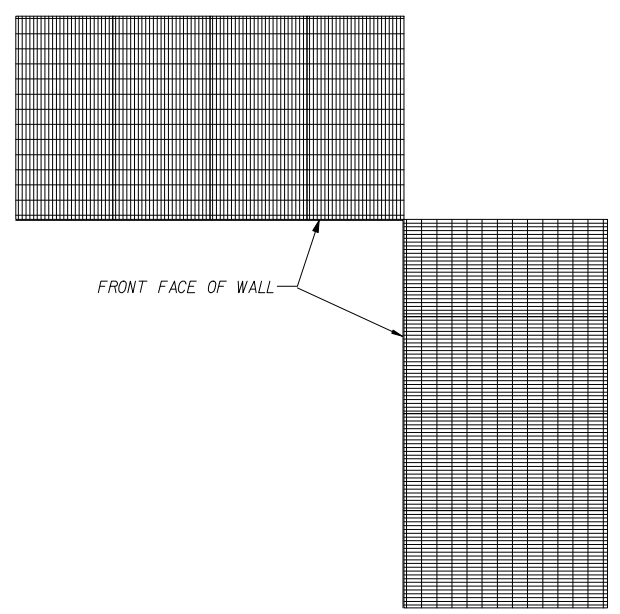


PERCENT COVERAGE	X
100	0
75	1'-5"
56	3'-4"

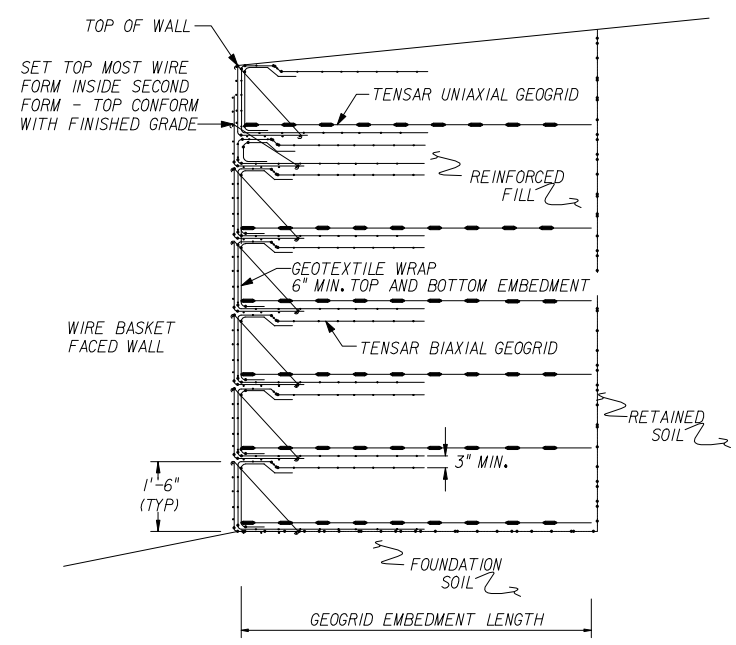
BIAXIAL (1/3 ROLL WIDTH) 4'-3" WIDE ROLLED OUT PARALLEL TO WALL FACE. BIAXIAL GEOGRID SHALL BE PROVIDED BETWEEN PRIMARY REINFORCEMENT ONLY WHEN 56% COVERAGE IS SPECIFIED.

**NOTE:**  
ALTERNATE LAYERS OF UNIAXIAL PRIMARY REINFORCEMENT SHALL BE PLACED IN STAGGERED PATTERN SUCH THAT THE LAYER ABOVE IS PLACED WITH THE CENTERLINE OF THE GEOGRID IN ALIGNMENT WITH THE CENTERLINE OF THE SPACE BELOW.

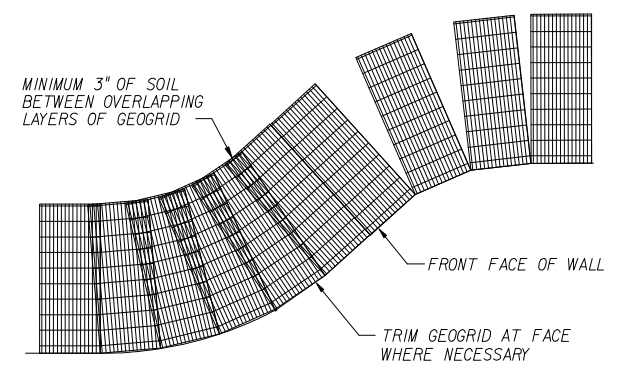
TYPICAL GEOGRID COVERAGE  
NOT TO SCALE



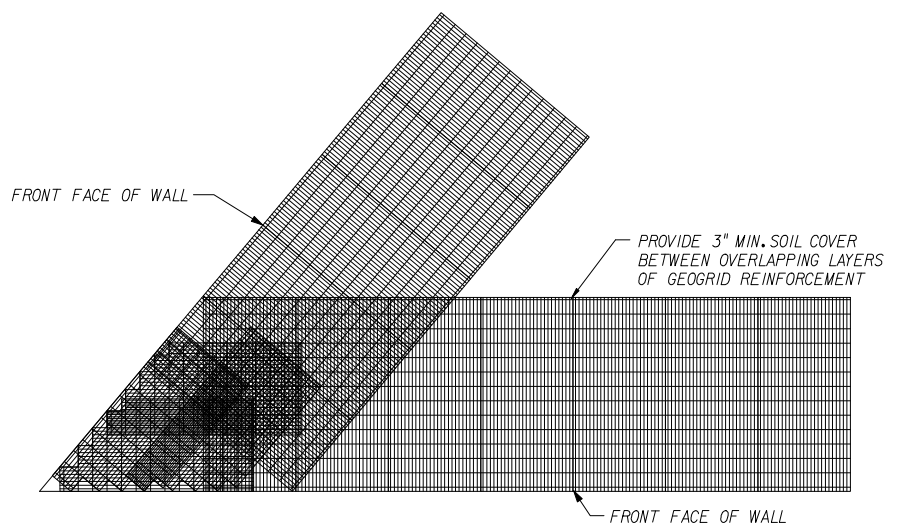
GEOGRID 90° INSIDE CORNER DETAIL  
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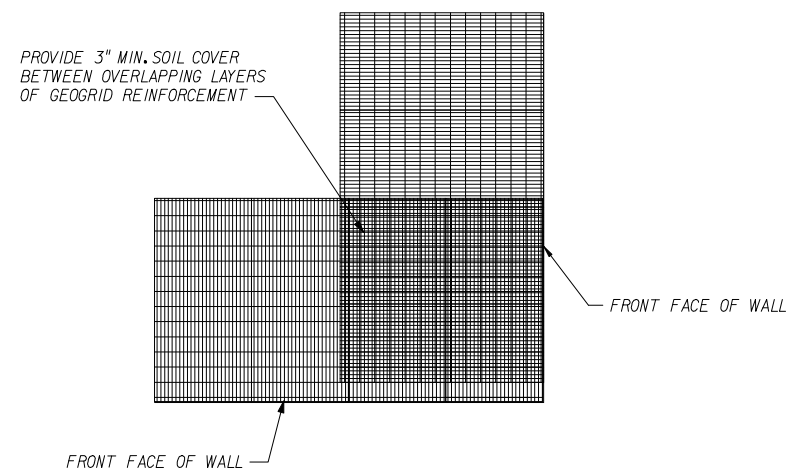
TYPICAL CROSS-SECTION  
NOT TO SCALE



GEOGRID PLACEMENT ON CURVES  
NOT TO SCALE



GEOGRID ACUTE CORNER DETAIL  
NOT TO SCALE



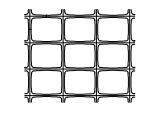
GEOGRID 90° OUTSIDE CORNER DETAIL  
NOT TO SCALE

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