

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 AND BIAxIAL GEOGRIDS MANUFACTURED BY THE TENSAR CORPORATION, MORROW, GEORGIA.

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

1.2.1 CONNECTION ROD SHALL BE 4'-6" x 3/8"Ø (25% GLASS FILLED HDPE).

1.3 GEOTEXTILE FILTER FABRIC SHALL BE 8 OZ/SY (MIN.) NON-WOVEN, NEEDLE-PUNCHED POLYPROPYLENE WITH MIN. PERMITTIVITY OF 1.0 SEC⁻¹

1.4 WALL FACING

1.4.1 FACING SHALL BE PRE-FABRICATED BLACK STEEL WELDED WIRE FORMS LINED WITH BIAxIAL GEOGRID WRAP OR OPTIONAL MECHANICAL CONNECTION SYSTEM WITHOUT BIAxIAL GEOGRID WRAP. WIRE FORM GEOMETRY SHALL BE AS DETAILED IN THE CONSTRUCTION DRAWINGS.

1.5 TENSAR EARTH TECHNOLOGIES, INC. SHALL PROVIDE TO THE CONTRACTOR THE FOLLOWING MATERIALS ONLY:

WWF FACING FORMS AND STRUTS
FILTER FABRIC
GEOGRID
GEOGRID CONNECTOR, AS APPLICABLE

2.0 TECHNICAL REQUIREMENTS

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

2.2 WELDED WIRE FACING SHALL BE MONITORED FOR DEFORMATION AND COMPLIANCE TO FDOT STANDARD SPECIFICATIONS SECTION 548 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 FACING MOVES DURING BACKFILL OPERATIONS.

3.0 TENSAR GEOGRID PLACEMENT

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

3.2 TENSAR GEOGRID REINFORCEMENT SHALL BE CONTINUOUS THROUGHOUT THEIR EMBEDMENT LENGTH(S). BODKIN SPLICE CONNECTION SHALL NOT BE UTILIZED UNLESS PRE-APPROVED BY THE ENGINEER.

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 SINGLE 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 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 (UX) GEOGRIDS SHALL BE ROLLED OUT WITH THE LONG AXIS OF THE APERTURES (MACHINE DIRECTION) PERPENDICULAR TO THE WELDED WIRE FORM FACE. TENSAR BIAxIAL (BX) 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 OVERLAPPING LAYERS OF GEOGRID AS SHOWN ON THE DRAWINGS.

4.0 CHANGES TO REINFORCEMENT 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 PRIOR WRITTEN APPROVAL OF THE TENSAR EARTH TECHNOLOGIES, INC DESIGN ENGINEER.

5.0 DRAINAGE

5.1 THE TENSAR REINFORCED WALL HAS BEEN DESIGNED BASED 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 TO BE 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, TENSAR EARTH TECHNOLOGIES, INC. 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 EXTERNAL STABILITY. (ALSO 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. (ALSO SEE SECTION 7.5)

7.0 SPECIAL PROVISIONS

7.1 WALL ELEVATION VIEWS, LOCATIONS AND GEOMETRY OF EXISTING AND PROPOSED STRUCTURES MUST BE VERIFIED BY THE CONTRACTOR BEFORE DEVELOPING 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 STATED DESIGN PARAMETERS ON CONTROL DRAWINGS OR STRUCTURE GEOMETRY SHALL REQUIRE DESIGN MODIFICATIONS PRIOR TO PROCEEDING WITH CONSTRUCTION.

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

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

7.6 SEE CONTROL DRAWINGS, FDOT STANDARD SPECIFICATIONS AND PROJECT SPECIAL PROVISIONS FOR ADDITIONAL REQUIRED MATERIALS AND METHODS.

7.7 A COPY OF THE TENSAR EARTH TECHNOLOGIES, INC. TEMPORARY RETAINING WALL SYSTEM INSTALLATION GUIDELINES MUST BE ON SITE AT ALL TIMES DURING WALL CONSTRUCTION.

THIS SYSTEM MAY BE USED IN ALL ENVIRONMENTS.

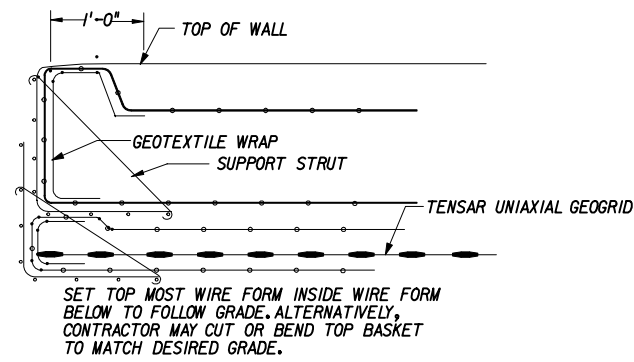
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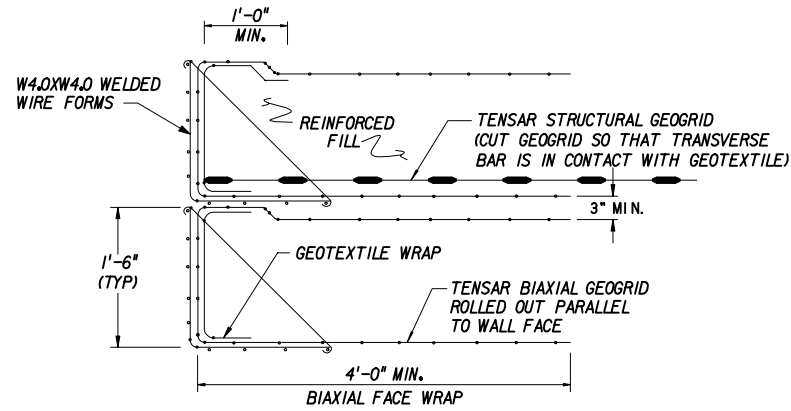
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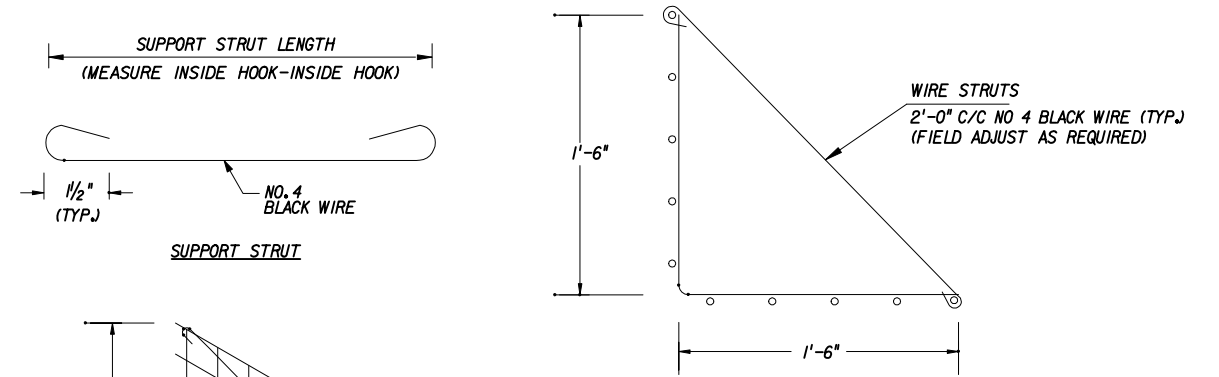
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION					
RETAINING WALL SYSTEM TENSAR EARTH TECHNOLOGIES TEMPORARY RETAINING WALL					
Designed By	BS	3/03	Approved By		
Drawn By	WL	3/03	Revision	Sheet No.	Index No.
Checked By	JSB	3/03	04	1 of 4	5125



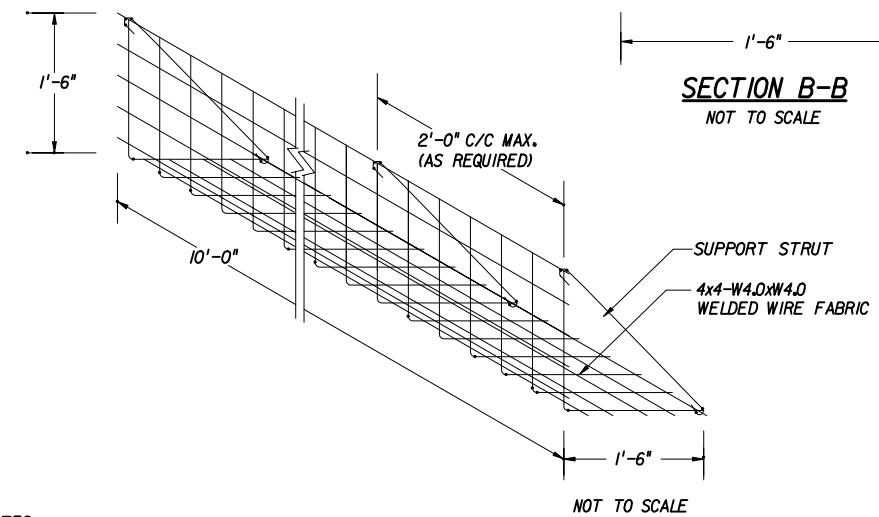
TOP WIRE BASKET DETAIL
NOT TO SCALE



WALL FACE DETAIL
NOT TO SCALE

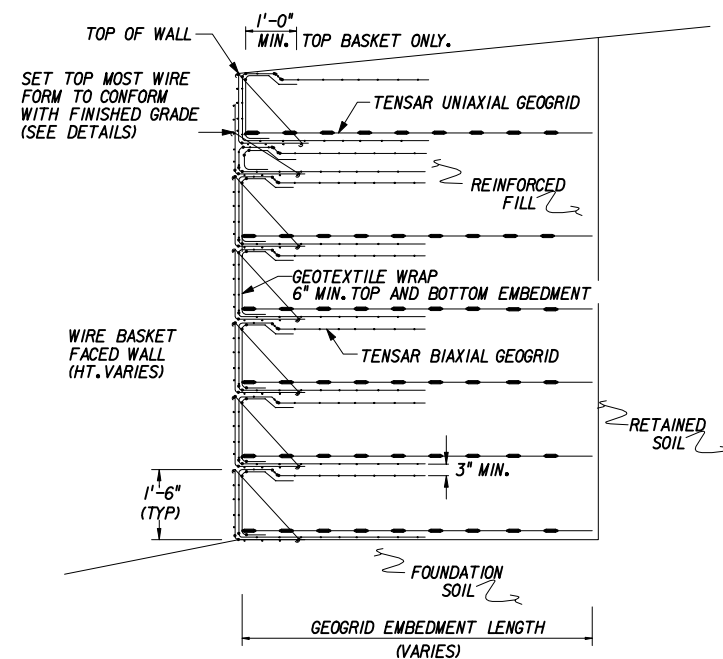


SECTION B-B
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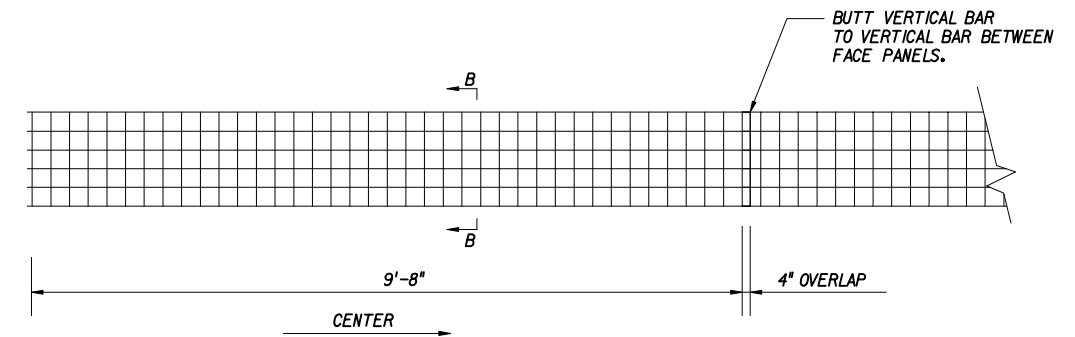


NOTES:

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 4" OVER LAPPING AT ENDS.



TYPICAL CROSS-SECTION
NOT TO SCALE



WELDED WIRE FORM DETAIL
FOR BIAXIAL GEOGRID WRAP FACING
NOT TO SCALE

THIS SYSTEM MAY BE USED IN ALL ENVIRONMENTS.

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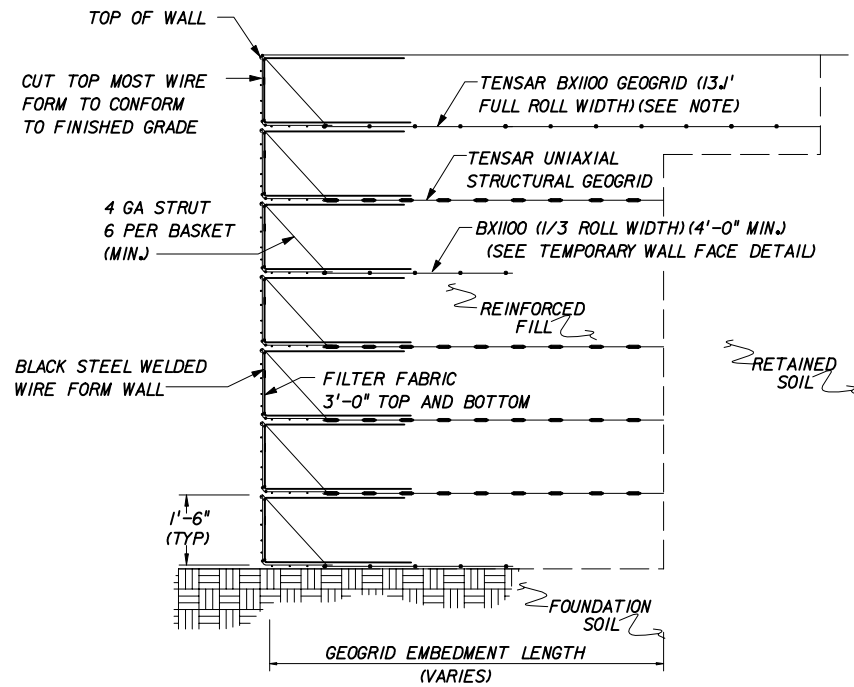
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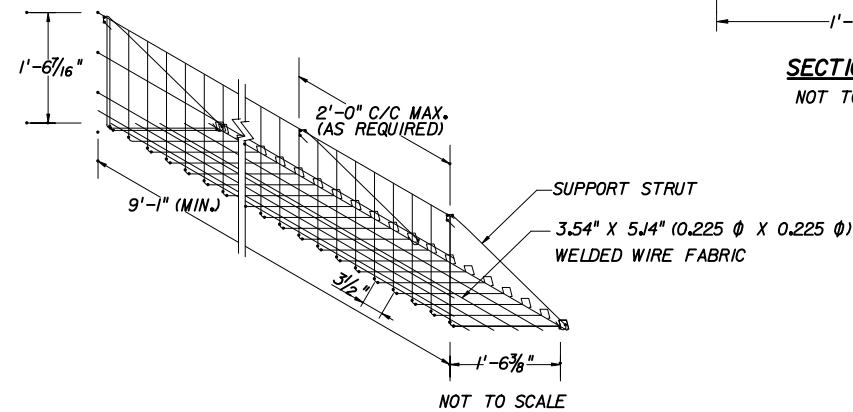
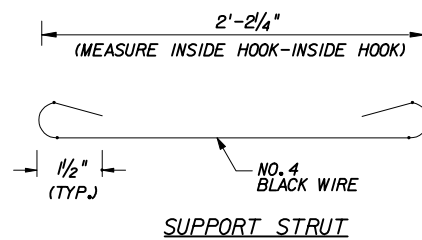
BIAXIAL GEOGRID WRAP FACING

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
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TENSAR EARTH TECHNOLOGIES				
TEMPORARY RETAINING WALL				
Names	Dates	Approved By		
Designed By	BS	3/03	[Signature]	
Drawn By	WL	3/03	State Structures Design Engineer	
Checked By	JSB	3/03	Revision	Index No.
			04	2 of 4
				5125



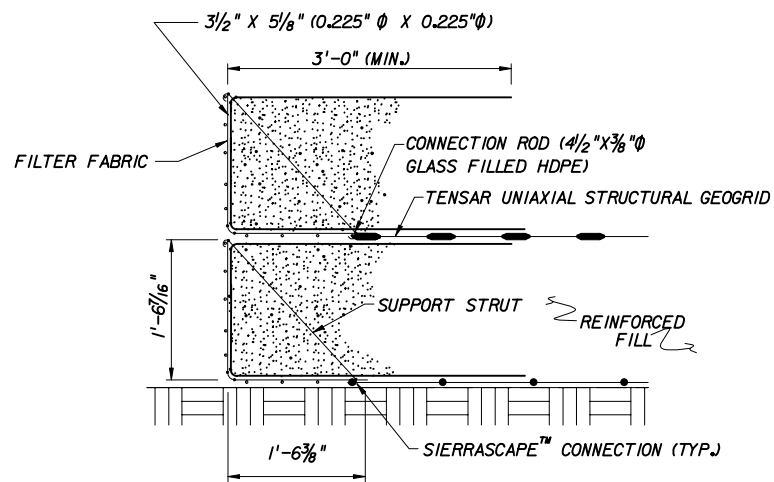
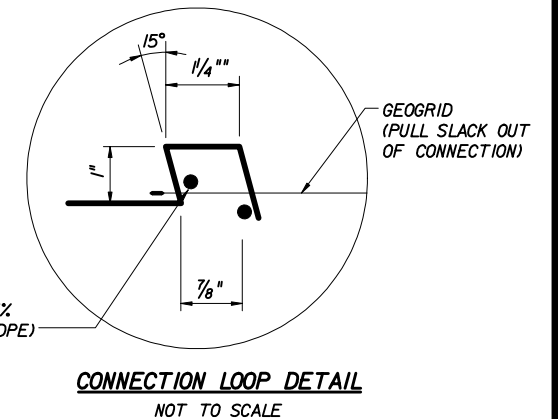
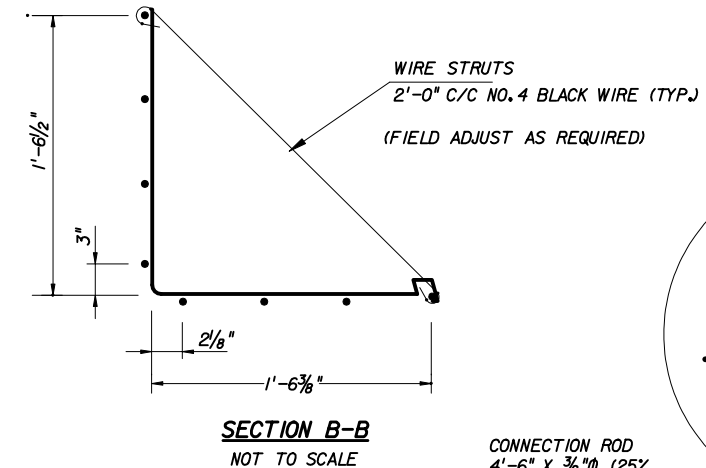
OPTIONAL TYPICAL CROSS-SECTION
NOT TO SCALE

NOTE:
A FULL ROLL OF BX1100 SHOULD BE PLACED IN ALL TOP BASKETS NOT CONTAINING PRIMARY REINFORCEMENT.

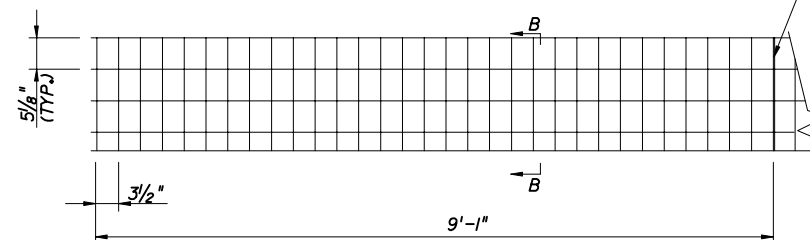


NOTES:

1. FACING TO CONSIST OF PREFABRICATED WWF 3.56" X 5J4" (0.225Ø X 0.225Ø) FORMS, PER ASTM A497.
2. ALL FORMS AND STRUTS SHALL BE FABRICATED WITH NO. 4 BLACK WIRE.
3. OVERALL LENGTH OF WIRE FORMS IS 9'-1".



OPTIONAL WALL FACE DETAIL
NOT TO SCALE



OPTIONAL WIRE FORM DETAIL
NOT TO SCALE

OVERLAPPING ONE PAIR OF VERTICAL BARS BETWEEN FACE PANELS.

THESE DETAILS FOR "OPTIONAL NON-BIAXIAL GEOGRID WRAP WITH MECHANICAL CONNECTION" MAY BE USED IN LIEU OF THE DETAILS FOR "BIAXIAL GEOGRID WRAP FACING".

OPTIONAL MECHANICAL CONNECTION SYSTEM WITHOUT BIAXIAL GEOGRID WRAP

THIS SYSTEM MAY BE USED IN ALL ENVIRONMENTS.

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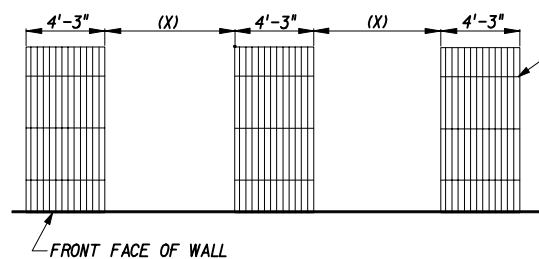
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Designed By BS	3/03	State Structures Design Engineer		
Drawn By WL	3/03	Revision	Sheet No.	Index No.
Checked By JSB	3/03	04	3 of 4	5125



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

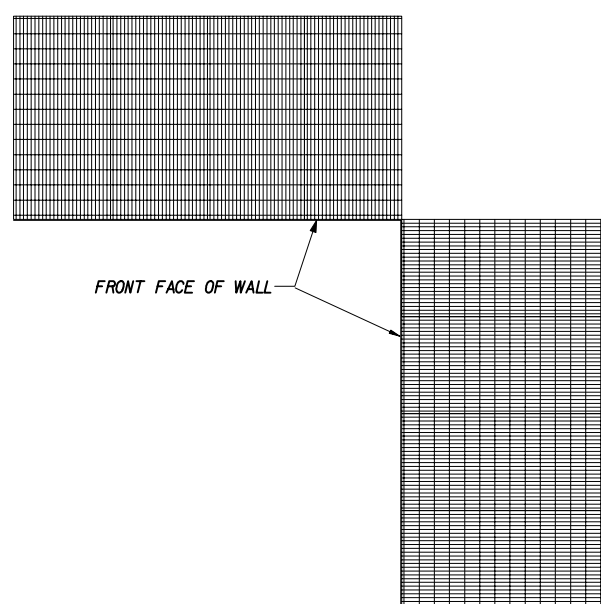
NOTES:

LESS THAN 100% COVERAGE MAY ONLY BE USED WITH THE OPTIONAL NON-BIAXIAL GEOGRID WRAP WITH MECHANICAL CONNECTION.

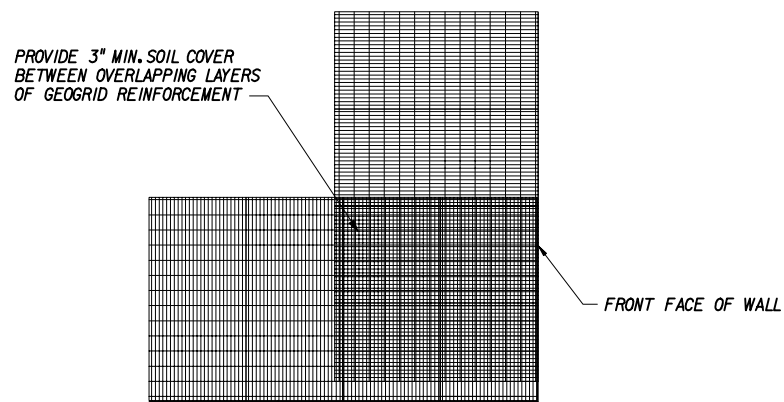
FOR LESS THAN 100% COVERAGE, PRIMARY REINFORCEMENT SHALL BE CONNECTED TO THE WWF FACING.

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.

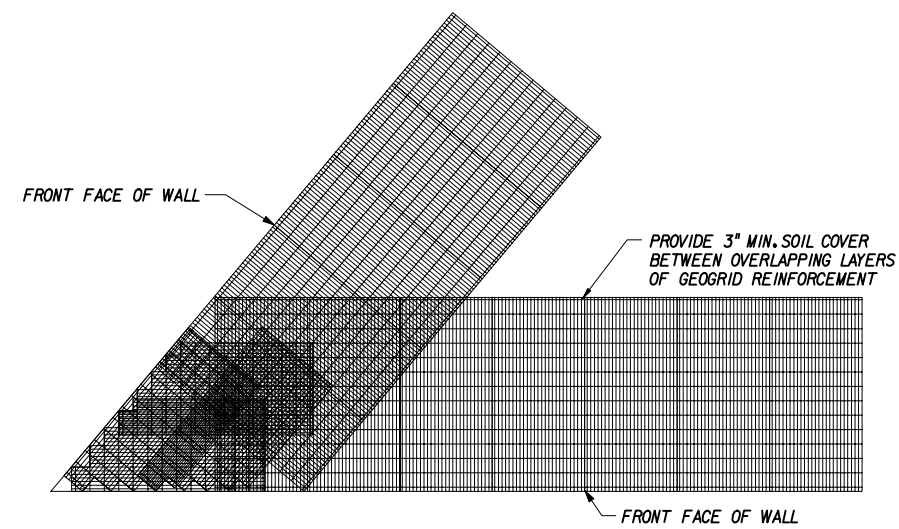
TYPICAL GEOGRID COVERAGE
NOT TO SCALE



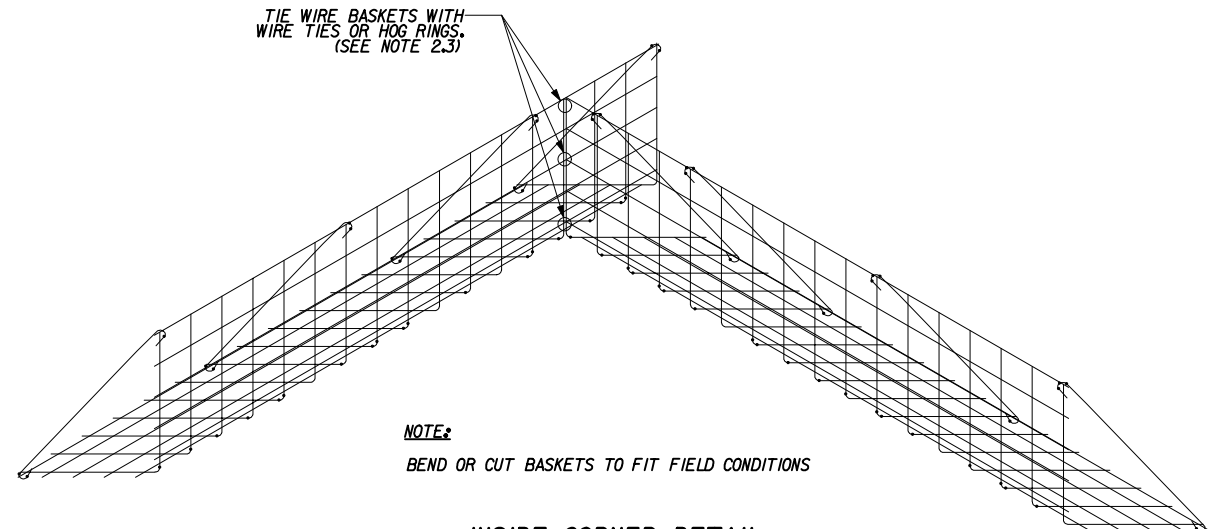
GEOGRID 90° INSIDE CORNER DETAIL
NOT TO SCALE



GEOGRID 90° OUTSIDE CORNER DETAIL
NOT TO SCALE

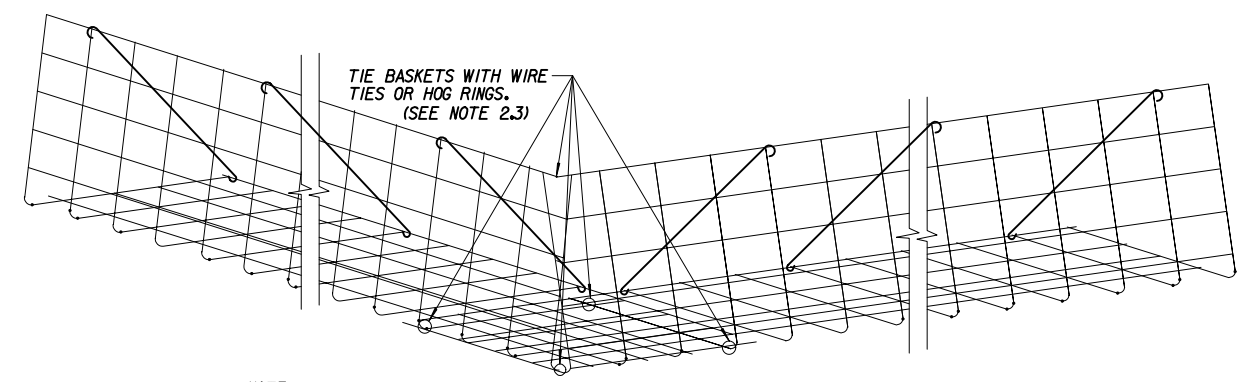


GEOGRID ACUTE CORNER DETAIL
NOT TO SCALE



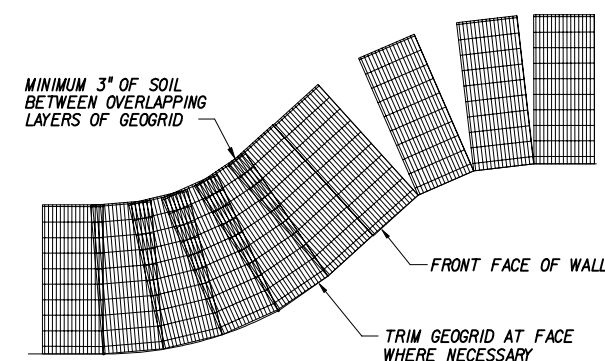
NOTE:
BEND OR CUT BASKETS TO FIT FIELD CONDITIONS

INSIDE CORNER DETAIL
NOT TO SCALE



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

OUTSIDE CORNER DETAIL
NOT TO SCALE



GEOGRID PLACEMENT ON CURVES
NOT TO SCALE

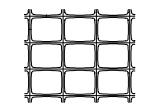
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Designed By	BS	3/03	Approved By <i>D. V. [Signature]</i>	
Drawn By	WL	3/03	Revision	Sheet No.
Checked By	JSB	3/03	04	4 of 4
				Index No. 5125