Steven V. Stenger
County Executive

Saint Louis
COUNTY
TRANSPORTATION
PUBLIC WORKS

Daniel W. Dreisewerd, P.E., PTOE
Acting Director

Stephanie Leon Streeter, P.E.
Deputy Director

August 22, 2018

Mr. Michael Yount, PE
Engineering Solutions, P.C.
5393 Old Baumgartner Road
Saint Louis, MO 63129

Re: Permit Application **#18BLD-03051: Residential Master Plans** for Building Products, Inc., using the **Anchor Sterling 6" Block Retaining Wall System**

Dear Mr. Yount:

I am pleased to inform you that the plans submitted for review of the **Anchor Sterling 6"** Retaining Walls are **approved** and the new master plan numbers are as follows:

Single Tier, 6' high max, No Slope, Compacted Rock Backfill, No Surcharge	**707-18-82**
Single Tier, 6' high max, 3:1 Max Slope, Compacted Rock Backfill, No Surcharge	**707-18-83**
Single Tier, 6' high max, No Slope, Compacted Rock Backfill, 120psf LL Surcharge	**707-18-84**
Double Tier, 4' high max (each tier), No Slope, Compacted Rock Backfill, No Surcharge	**707-18-85**
Double Tier, 4' high max (each tier), 3:1 Max Slope, Compacted Rock Backfill, No Surcharge	**707-18-86**
Double Tier, 4' high max (each tier), No Slope, Compacted Rock Backfill, 120psf LL Surcharge	**707-18-87**

Please inform your customers of the following **procedures they need to follow** when applying for a residential retaining wall permit with Saint Louis County:

1. Submit a **completed permit application** form that includes the **selected master plan number.**

2. Submit **four (4) site plans** showing the location and length of the wall, drawn to scale, with the top-of-wall and bottom-of-wall elevations noted at the ends and midpoint of each wall, at a minimum. Dimension the wall(s) distance from any structures, parking lots, easements and property lines. Show with arrows the existing and proposed direction of site drainage at and around the proposed wall area.

3. Submit **four (4) copy sets** of the approved master plan (13 pages total).

4. Your customers should be made aware that **a Saint Louis County Pre-grading Inspection may be required** to assess any potential major changes on the site grading and drainage when a retaining wall is proposed closer than 10-feet to a property line. Conditions on the site plans submitted may also indicate a Saint Louis County Pre-grading Inspection is needed.

Please call me at 314-615-7149 or e-mail at rdelbert@stlouisco.com if you have any questions.

Sincerely,

Ryan Delbert
Building Code Review Section
Division of Code Enforcement

DUPLICATE COPY
ST. LOUIS COUNTY
DEPARTMENT OF TRANSPORTATION &
PUBLIC WORKS
DATE

St. Louis County Masterplan
Construction Drawings

Index of Drawings:

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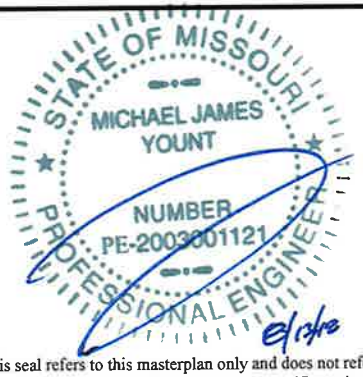
Sheet 2 Specifications
Sheet 3 Specifications (cont.)
Sheet 4 Specifications (cont.)

GENERAL CONSTRUCTION DETAILS
Sheet 5 Details
Sheet 6 Details (cont.)
Sheet 7 Details (cont.)

DESIGN SECTIONS
Sheet 8 Single Wall, 3:1 Slope Above Wall, No Surcharge
Sheet 9 Single Wall, Level Backslope, No Surcharge
Sheet 10 Single Wall, Level Backslope, 120 psf Live Load Surcharge (Residential Driveway)
Sheet 11 Double Terrace, 3:1 Slope Above Wall, No Surcharge
Sheet 12 Double Terrace, Level Backslope, No Surcharge
Sheet 13 Double Terrace, Level Backslope, 120 psf Live Load Surcharge (Residential Driveway)



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ANCHOR™ Sterling™
Masterplan, St. Louis County, Mo.

BUILDING PRODUCTS CORP.
950 Freeburg Ave
Belleville, IL. 62220
800-427-6282

Engineering Solutions, P.C.
5393 Old Baumgartner Rd
St. Louis Mo. 63129
Phone (314) 842-8200

Title & Index

General

This masterplan is for Anchor Sterling retaining walls on one or two family residential properties only. These plans shall specify the structural requirements of single tier walls up to six feet in height and double tier walls up to four feet each for the specific applications shown. Retaining walls that support a house or other structure or that apply a surcharge to a house or other structure (including swimming pools and other retaining walls) and walls in contact with water such as lakes, rivers, ponds or creeks or any application outside of these specific design sections and/or soil parameters shown herein, are excluded. The user of this masterplan is responsible for confirming its applicability. Retaining walls not meeting these parameters should be individually engineered. This plan must be used in its entirety. The contractor shall locate & protect all existing utilities, and shall be responsible for all worker and public safety at the retaining wall site. The contractor shall be responsible for compliance with all OSHA regulations. All installation shall be per the retaining wall manufacturer's construction recommendations and/or as noted herein.

Site Plan

All walls requiring a St. Louis County permit shall be shown on a site plan drawn to scale showing the locations of the wall relative to property lines, easements & existing or proposed structures. This site plan shall show elevations along the top and bottom of the wall relative to a on site benchmark. The site plan shall show the ground surface inclinations above and below the wall for a lateral distance of at least 25'. The site plan shall clearly define drainage in the wall area.

Drainage

A drainage design is not part of this masterplan. However drainage is an important component of the complete wall design. When feasible, it is recommended that surface water be diverted to not drain over the top of the wall. A swale or drainage boxes/structures can be used to divert surface water. Any drain piping should be watertight piping to an acceptable outfall below the wall & should not be connected to the perforated draintile used for internal wall drainage. If it is necessary to direct the water over the top of the wall concentration to one point should be avoided. The owner should expect some periodic maintance of the soil cap & the soil cover at the toe of the wall being required. Water should not be allowed to pond above the wall.

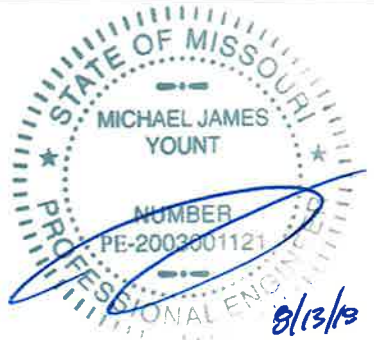
Guard Rails/Fencing

Non-Wind Loading guard rails/fencing shall be installed installed above the wall where required per code in accordance with Anchor Retaining Walls specifications. Wind loaded fences or vehicular guard rails can affect the retaining wall and should be designed by a qualified engineer.

Materials

The **Leveling Pad** shall be constructed 1" minus crushed limestone compacted to at least 90% modified proctor with minimum dimensions of 6" thick and 24" wide.

Retaining Wall Units shall be Anchor Sterling as manufactured by Building Products. Units must be 12" deep. Concrete wall units shall meet the requirements of ASTM C90-90 and compressive strength shall be a minimum of 3000 psi. The maximum water adsorption shall be limited to 8.0 percent. The concrete shall have adequate freeze thaw resistance in accordance with ASTM 666-90.



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Specifications

Materials (cont.)

The **reinforced wall backfill** material shall be 1" clean crushed limestone. Placed in 8" (max) lifts and compacted.

Any **additional backfill** outside of the reinforcing zone shall be granular material or low plastic soil compacted to at least 90% modified proctor. All vegetation shall be stripped in areas to be filled & areas should be benched where slope exceeds 4/1.

Geogrid shall be Geostar 200, or approved equivalent.

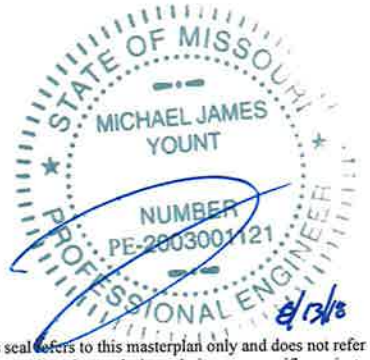
Filter Fabric shall be Carthage Mills FX40 or Mirafi 140N or approved equivalent.

Drain Tile shall be 4" HDPE perforated & extended to daylight at the wall low point.

The **Soil Cap** shall consist of compacted low plastic impervious soil above the structural backfill in areas not to be paved.

Wall Foundation Excavation

Foundation soil shall be excavated as required for the leveling pads and the structural backfill zone. All excavations shall comply with OSHA safety requirements. The exposed foundation material & retained materials shall be observed prior to placing the leveling pad rock to confirm the soil parameters comply with the design assumptions. The retained material shall be low plastic with a internal angle of friction of at least 26 degrees. Foundation soil shall be low plastic and have a minimum bearing capacity of 1,500 psf and an effective internal angle of friction of 26 degrees. Any soils that are soft, plastic (LL > 50%), frozen, or wet and untested fills shall be removed and recompacted to 90% modified Proctor under the direction of the geotechnical engineer. Care should be taken to identify any utility trenches in the area. The contracractor shall identify if the backfill in these trenches has been property placed & compacted. See sewer & utility backfill section to follow.



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Specifications (cont.)

Wall Construction

Provide a 6" thick x 24" wide crushed limestone leveling pad centered beneath the base block compacted to at least 90% modified proctor. Install the first course of blocks on the leveling pad, units must be level in all directions & be in complete contact with the leveling pad. Install the next course in a running bond stack. Adjust for setback per course. Continue stacking subsequent courses until the level of the first layer of geogrid is reached. Install draintile & daylight prior to backfilling. Backfill material shall be placed in maximum 8" lifts and compacted. Backfill shall be placed , spread and compacted in such a manner that minimizes wrinkles and movement of the geogrid. During backfill placement only hand operated equipment shall be used in the 4' zone directly behind the wall. The front of the wall shall be backfilled and compacted to finished grade. Backfill the wall face with compacted soil to the correct elevation. Next install reinforcement as shown and continue construction. Filter fabric shall separate the 1" clean backfill from the retained soil and the soil cap. Filter fabric shall not cover the foundation materials. The geogrid shall be cut to the lengths shown and placed in accordance with the tables shown on the design sections. The geogrid shall be orientated so that the direction of maximum strength is perpendicular to the face of the wall. There shall be at least 10" of geogrid between the block layers. The geogrid must be kept taut & level. All geogrid installation shall be in accordance with the manufacturers specifications. Install the soil cap, compact & finish grade for proper drainage per the approved site plan.

Sewer & Utuility Trench Backfill

Any excavation to be backfilled within a distance of (2) times the wall height from the wall face must be compacted to at least 90% modified proctor. Any excavations made below the wall should be backfilled with 1" or 2" minus compacted to 90% modified proctor, or as directed by a geotechnical engineer.

Protection of Work

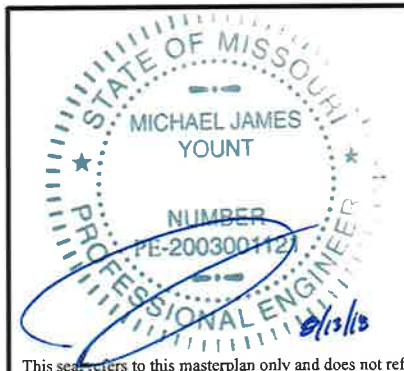
The surfaces surrounding the wall shall be graded at the end of each day to provide positive drainage away from the wall. Grading shall include proper contouring of fills in adjacent areas to prevent the flow of excessive surface water toward the wall. Finish grading should be completed in accordance with the approved site development plan.

The stability of temporary excavation during wall construction is beyond the scope of this design and is the responsibility of the contractor.

Design Parameters

This design is based on design parameters that must be field verified. This verification should include both existing soils & the new fill material. If actual conditions are of lesser strength or quality than the design parameters redesign or remediation may be required. A pre-construction soils investigation may reduce the risk of discovering poor materials & increasing the overall cost of the project during construction.

No changes shll be made to these plans without written approval of Engineering Solutions, P.C.



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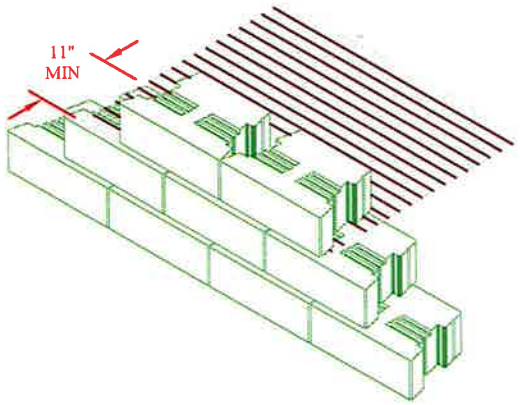
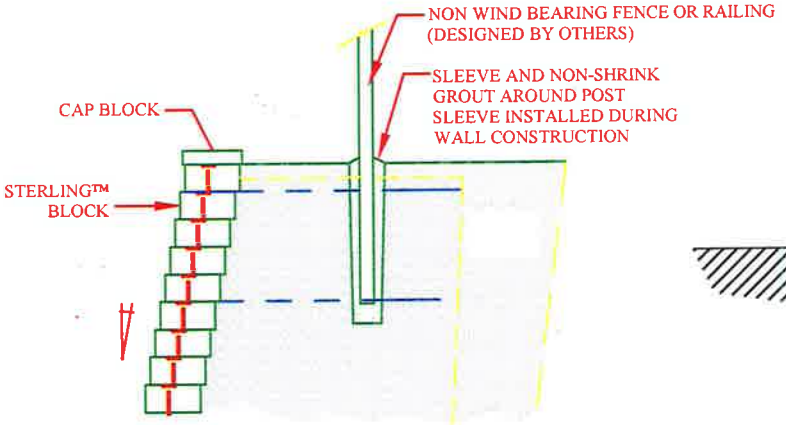
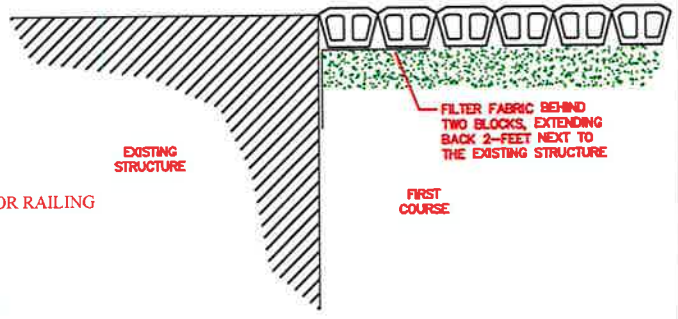
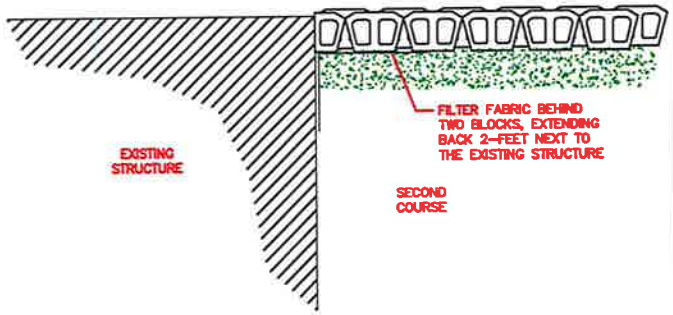
Specifications (cont.)

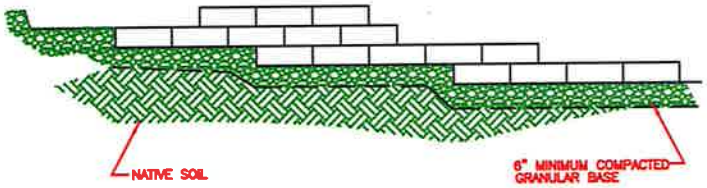




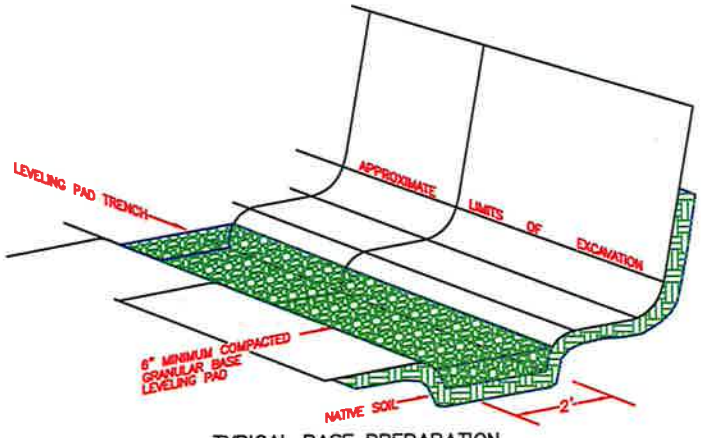




WALL ABUTTING EXISTING STRUCTURE
(NOT TO SCALE)



TYPICAL STEP-UP DETAIL
(NOT TO SCALE)



TYPICAL BASE PREPARATION
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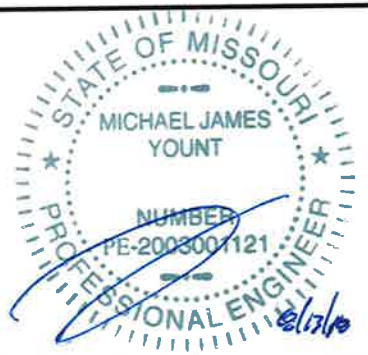

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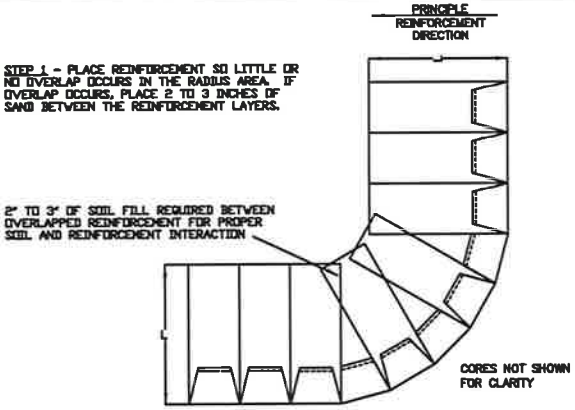
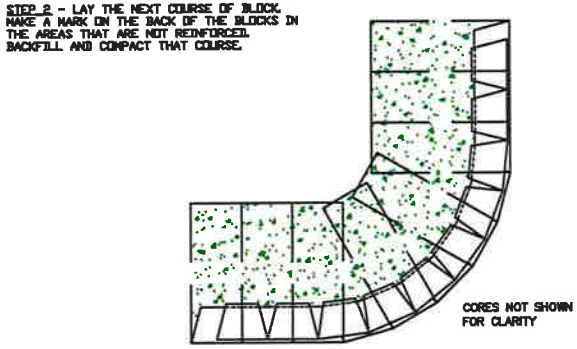
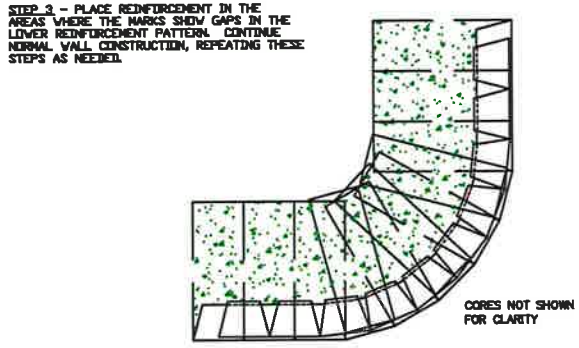
Typical Details

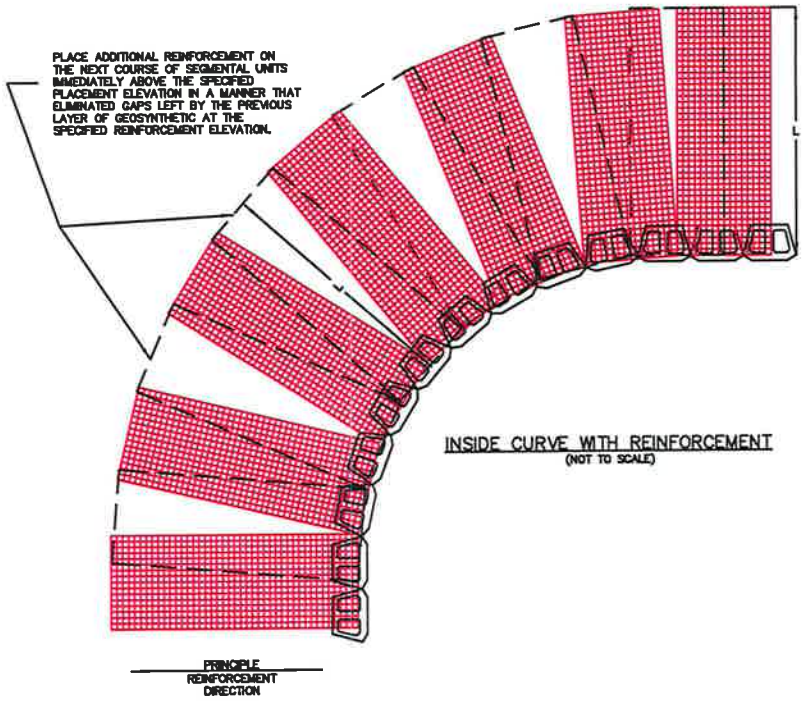
Sheet 5 of 13







OUTSIDE CURVE WITH REINFORCEMENT
(NOT TO SCALE)



INSIDE CURVE WITH REINFORCEMENT
(NOT TO SCALE)

STATE OF MISSOURI
MICHAEL JAMES YOUNT
NUMBER PE-2003001121
PROFESSIONAL ENGINEER
8/13/18

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Typical Details
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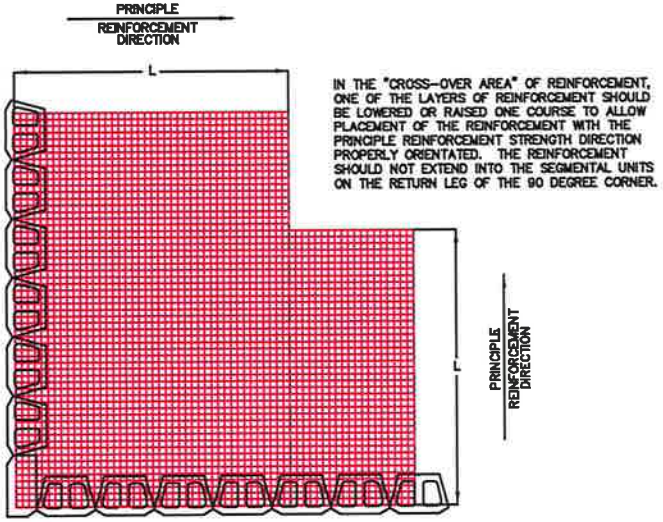
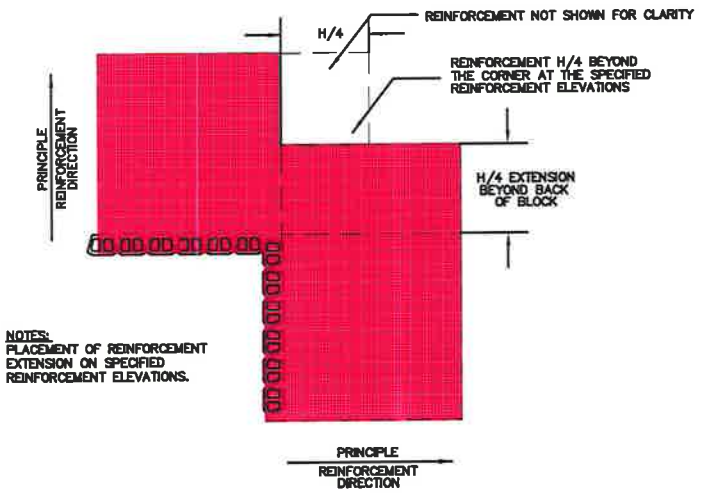
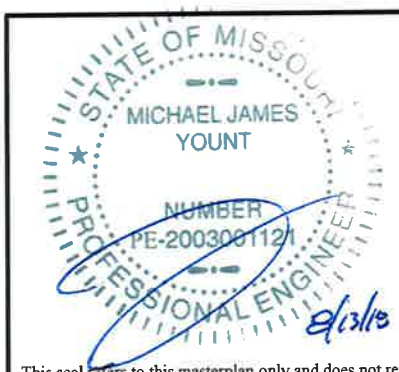


ANCHOR DIAMOND PRO BLOCK
90 DEGREE OUTSIDE CORNER WITH REINFORCEMENT
(NOT TO SCALE)



ANCHOR DIAMOND PRO BLOCK
90 DEGREE INSIDE CORNER WITH REINFORCEMENT
(NOT TO SCALE)



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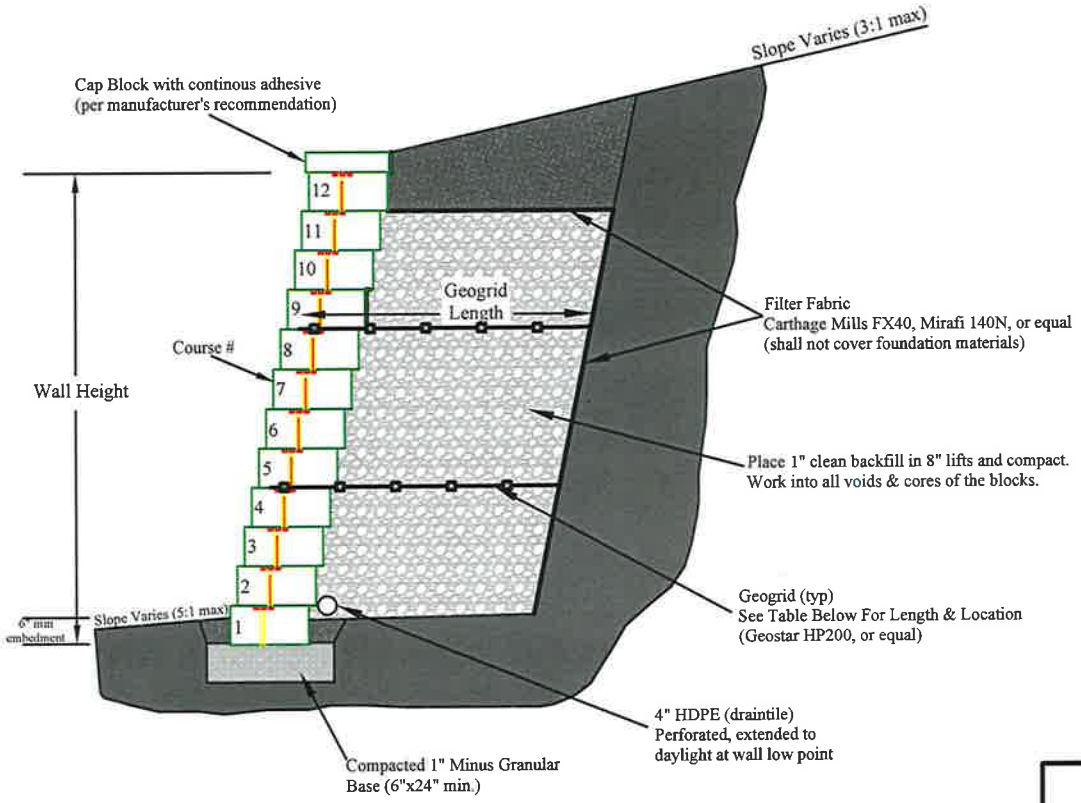
Typical Details
(cont.)



Geogrid Table - 3:1 (max) Slope Above Wall

Wall Height (feet) (without cap)	Sterling (6")		
	# of Geogrid Layers	Geogrid Location (on top of couse #)	Geogrid Length (ft)
3.0	1	3	4.0'
4.0	1	4	4.0'
5.0	2	4,8	4.5'
6.0	2	4,8	5.5'

Refer to Specifications Sheets 2-4 & Construction Details Sheets 5-7 for Additional Requirements

STATE OF MISSOURI
MICHAEL JAMES YOUNT
NUMBER PE-2003001121
PROFESSIONAL ENGINEER
5/13/2

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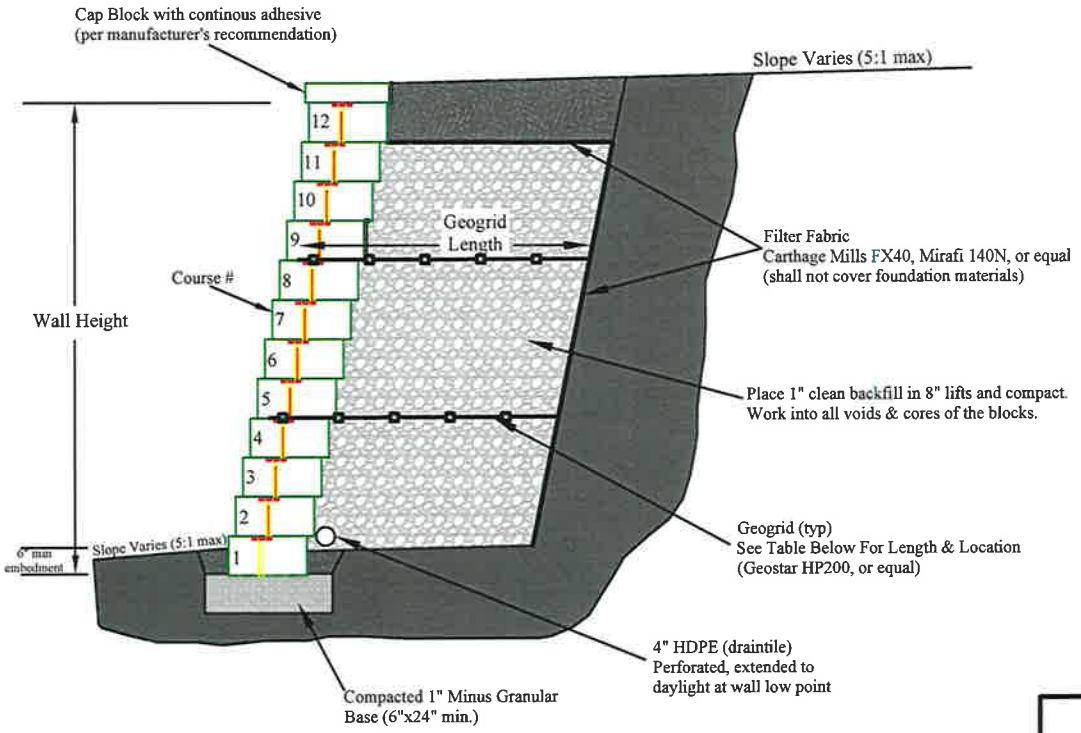
Typical Cross Section
3:1 Slope, No Surcharge



Geogrid Table - No Slope Above Wall

Wall Height (feet) (without cap)	Sterling (6")		
	# of Geogrid Layers	Geogrid Location (on top of couse #)	Geogrid Length (ft)
3.0	1	3	4.0'
4.0	1	4	4.0'
5.0	2	4,8	4.0'
6.0	2	4,8	5.0'

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STATE OF MISSOURI
MICHAEL JAMES YOUNT
NUMBER PE-2003001121
PROFESSIONAL ENGINEER
3/13/18

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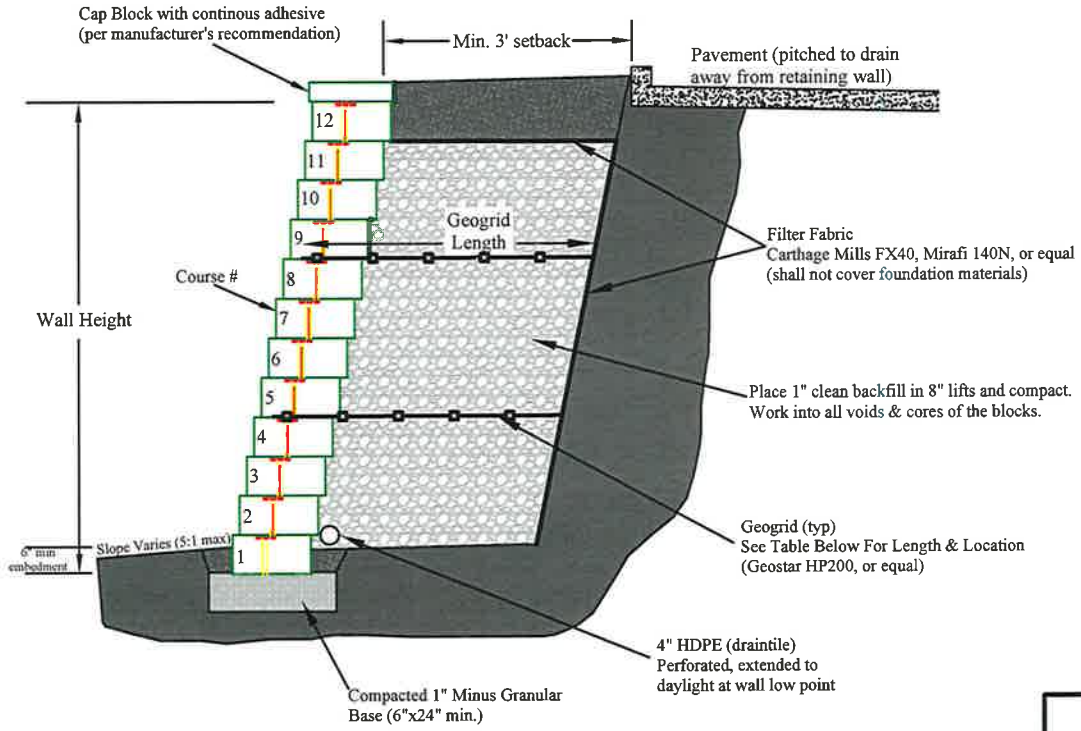
Typical Cross Section
Level Backslope, No Surcharge



Geogrid Table - 3:1 (max) Slope Above Wall

Wall Height (feet) (without cap)	Sterling (6")		
	# of Geogrid Layers	Geogrid Location (on top of couse #)	Geogrid Length (ft)
3.0	1	3	4.0'
4.0	1	4	4.0'
5.0	2	4,8	4.0'
6.0	2	4,8	5.0'

Refer to Specifications Sheets 2-4 & Construction Details Sheets 5-7 for Additional Requirements

STATE OF MISSOURI
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PROFESSIONAL ENGINEER
8/13/10

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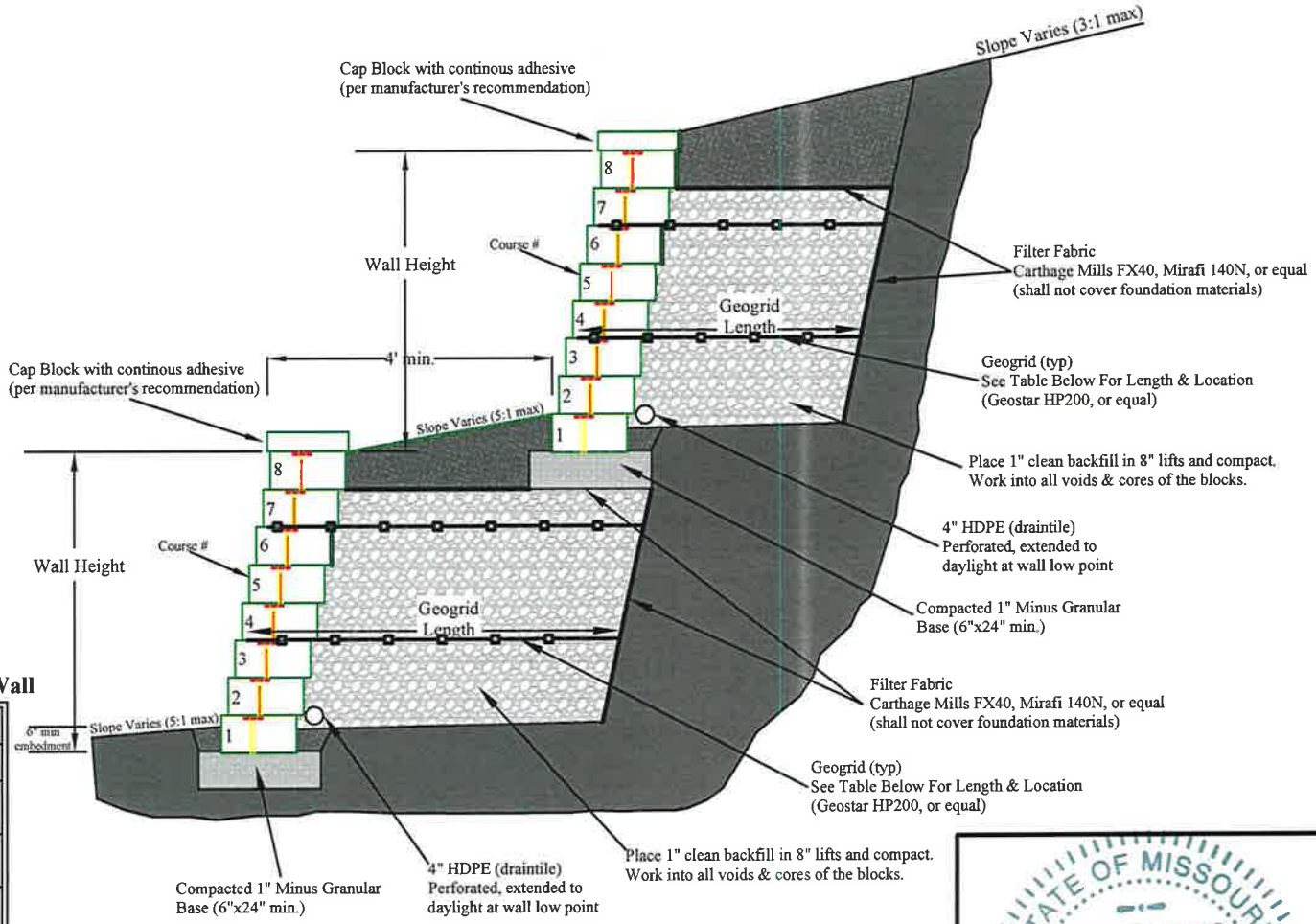
Typical Cross Section
Level Backslope, 150 psf Surcharge
(Residential Driveway)



Geogrid Table - 2 Terrace 3:1 (max) Slope Above Wall

Wall Height (feet) (without cap)	Sterling (6"), Upper Terrace		
	# of Geogrid Layers	Geogrid Location (on top of couse #)	Geogrid Length (ft)
2.0	No Geogrid Required		
3.0	1	3	4.0'
4.0	2	3,6	4.0'

Wall Height (feet) (without cap)	Sterling (6"), Lower Terrace		
	# of Geogrid Layers	Geogrid Location (on top of couse #)	Geogrid Length (ft)
2.0	1	2	4.0'
3.0	1	3	5.0'
4.0	2	3,6	6.0'

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6/13/18

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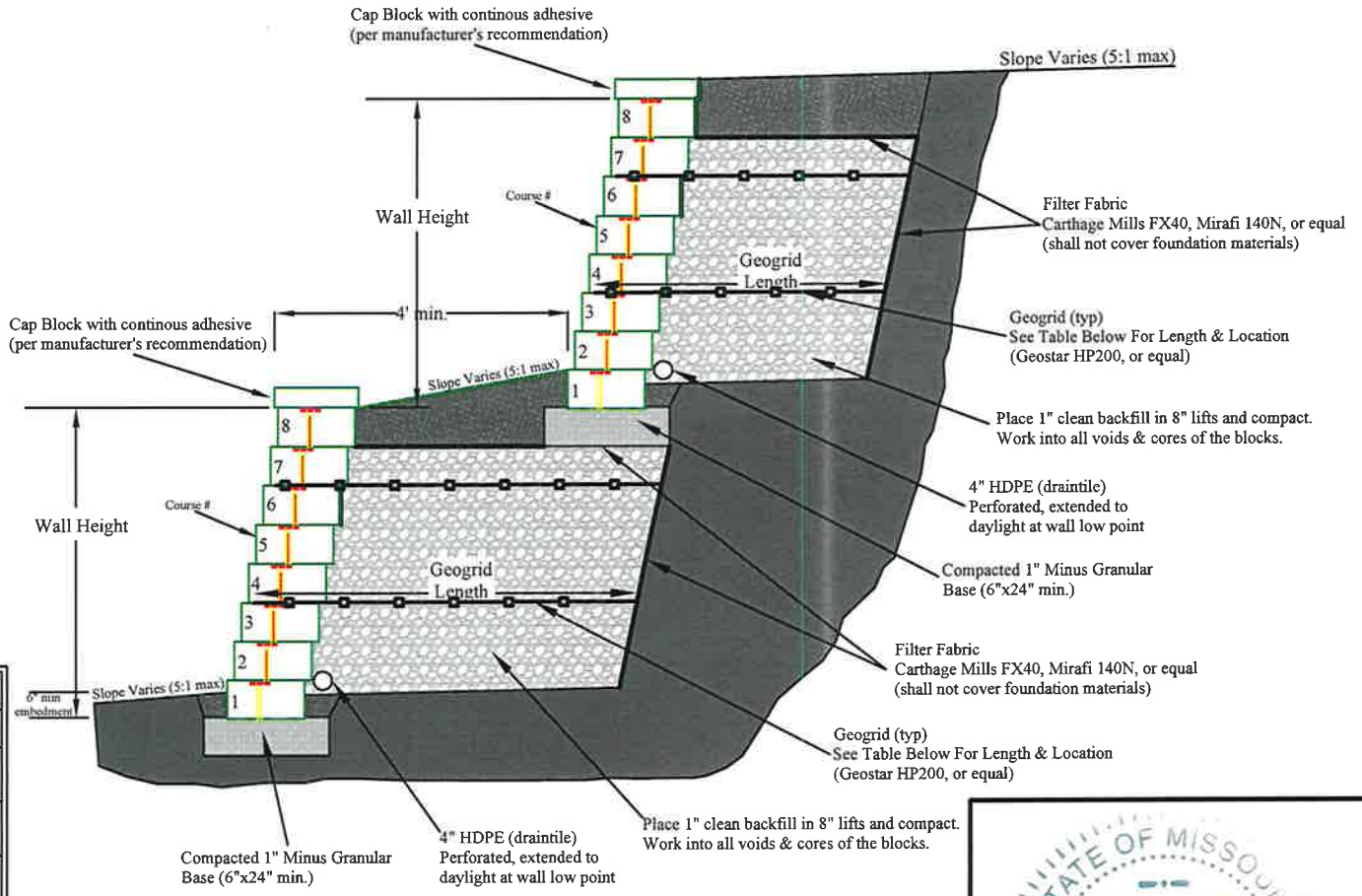
Typical Cross Section
3:1 Slope, No Surcharge



Geogrid Table - 2 Terrace No Slope Above Wall

Wall Height (feet) (without cap)	Sterling (6"), Upper Terrace		
	# of Geogrid Layers	Geogrid Location (on top of couse #)	Geogrid Length (ft)
2.0	No Geogrid Required		
3.0	1	3	4.0'
4.0	2	3,6	4.0'

Wall Height (feet) (without cap)	Sterling (6"), Lower Terrace		
	# of Geogrid Layers	Geogrid Location (on top of couse #)	Geogrid Length (ft)
2.0	1	2	4.0'
3.0	1	3	5.0'
4.0	2	3,6	6.0'

Refer to Specifications Sheets 2-4 & Construction Details Sheets 5-7 for Additional Requirements

STATE OF MISSOURI
MICHAEL JAMES YOUNT
NUMBER PE-2003001121
PROFESSIONAL ENGINEER
5/17/18

This seal refers to this masterplan only and does not refer to any other plan or design relating to a specific project

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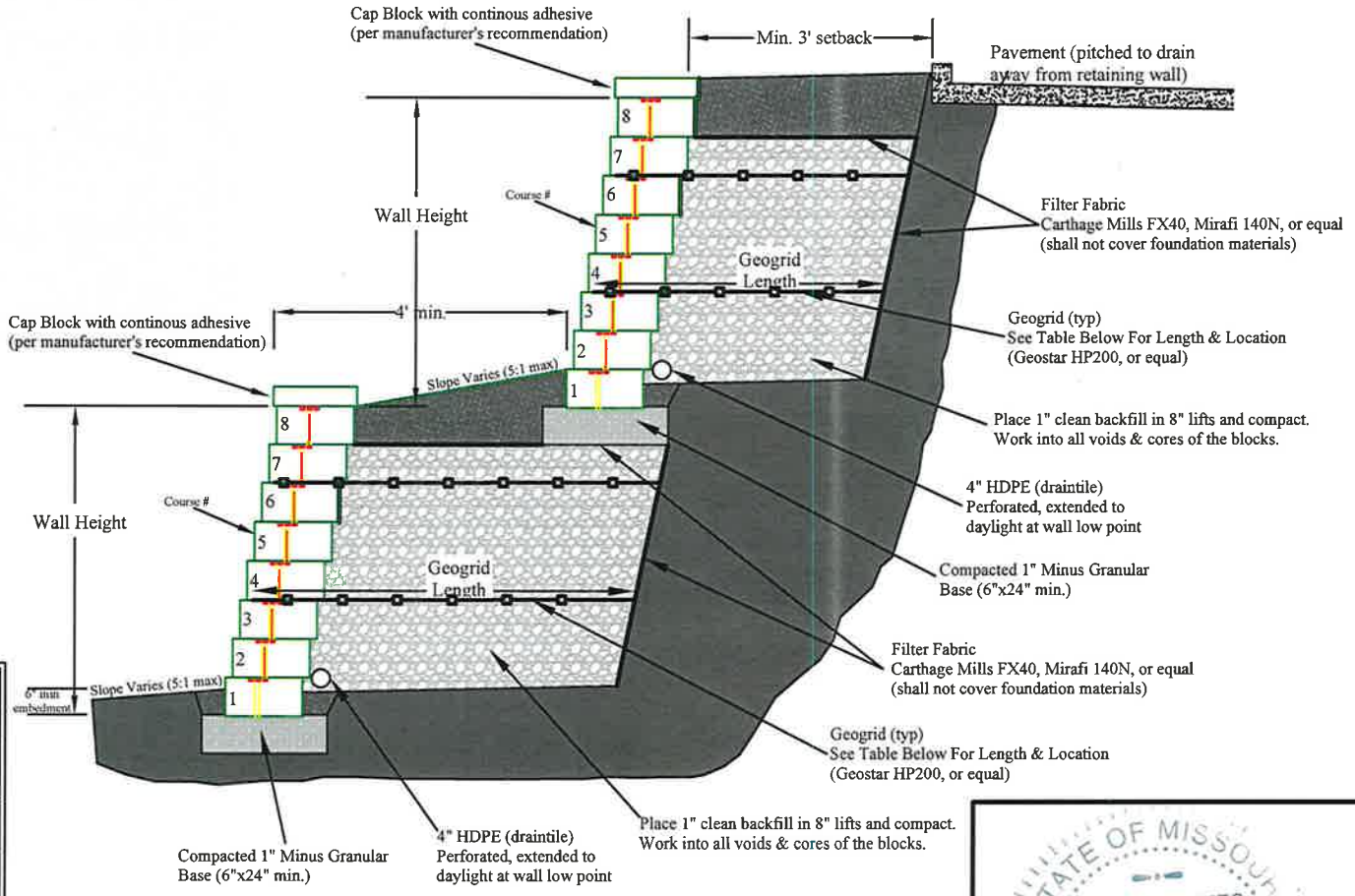
Sterling™
Masterplan, St. Louis County, Mo.

BUILDING PRODUCTS CORP.
950 Freeburg Ave
Belleville, IL. 62220
800-427-6282

Engineering Solutions, P.C.
5393 Old Baumgartner Rd
St. Louis Mo. 63129
Phone (314) 842-8200

Typical Cross Section
Level Backslope, No Surcharge

Sheet 12 of 13



Geogrid Table - 2 Terrace No Slope Above Wall

Wall Height (feet) (without cap)	Sterling (6"), Upper Terrace		
	# of Geogrid Layers	Geogrid Location (on top of couse #)	Geogrid Length (ft)
2.0	No Geogrid Required		
3.0	1	3	4.0'
4.0	2	3,6	4.0'

Wall Height (feet) (without cap)	Sterling (6"), Lower Terrace		
	# of Geogrid Layers	Geogrid Location (on top of couse #)	Geogrid Length (ft)
2.0	1	2	4.5'
3.0	1	3	5.0'
4.0	2	3,6	6.0'

Refer to Specifications Sheets 2-4 &
Construction Details Sheets 5-7 for
Additional Requirements

STATE OF MISSOURI
MICHAEL JAMES YOUNT
NUMBER PE-2003001121
PROFESSIONAL ENGINEER
8/13/13

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Typical Cross Section
Level Backslope, 150 psf Surcharge
(Residential Driveway)