

Charlie A. Dooley
County Executive



HIGHWAYS & TRAFFIC

PUBLIC WORKS

April 15, 2011

Sheryl L. Hodges, D.E., P.E., L.P.G.
Director

Michael Yount, P.E.
c/o Engineering Solutions P.C.
12955 Gravois Rd.
Sunset Hills, MO 63127

RE: Additional Master Plan Designs for Anchor Retaining Walls
Permit Application #: 11BLD-00455

Mr. Yount:

I am pleased to inform you that the designs that you submitted for Diamond Pro, Diamond and Highland block retaining walls with the "no fines" concrete backfill and the Goestar Optima HP 200, Carthage Mills GX150, Miragrid 2XT or Stratagrid SG150 geogrid are approved for use within this jurisdiction as master plans. The master plan numbers assigned to identify each wall design are:

- Single tier wall up to 6' high with level backfill (max 1 vert : 5 horiz) 707-11-76
- Single tier wall up to 6' high with sloping backfill (max. 1 vert : 3 horiz) 707-11-77
- Single tier wall up to 6' high with level backfill and up to 120 psf surcharge 707-11-78

Anyone wishing to apply for a permit based on these plans must provide:

1. a completed permit application form that includes the appropriate master plan number.
2. municipal zoning approval (if the wall is located within the city limits of a municipality).
3. four (4) copies of the site plan showing the location and length of the wall, drawn to scale. Top and bottom of wall elevations, the direction of drainage, the retained side of the wall, and distances to any structures, parking lots, and property lines must be indicated on the site plan.
4. four (4) copies of the front elevation view of the wall with dimensions.
5. four (4) copies of construction details of the specific wall design to be built. These details (e.g. geogrid type, length, locations, leveling pad size, backfill material, etc.) must match those in the approved master plan (i.e. the 10 pages of plans and specifications that you submitted and I approved).

If you have any questions, you may contact me at (314) 615-3726.

Sincerely,

Chris Falk, P.E.

Building Code Review Section
Division of Code Enforcement

St. Louis County Masterplan Construction Drawings

Index of Drawings:

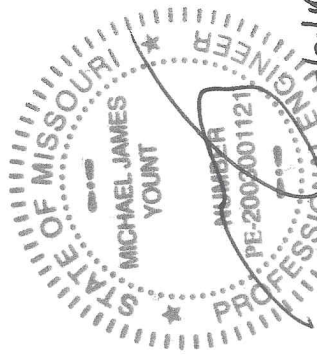
- Sheet 1 Title & Index
- Sheet 2 Specifications
- Sheet 3 Specifications (cont.)
- Sheet 4 Specifications (cont.)

GENERAL CONSTRUCTION DETAILS

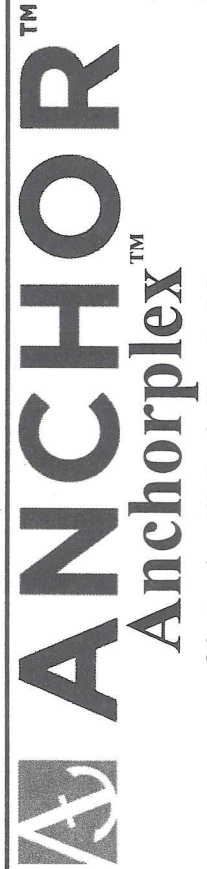
- Sheet 5 Details
- Sheet 6 Details (cont.)
- Sheet 7 Details (cont.)

DESIGN SECTIONS

- Sheet 8 Level Backslope, No Surcharge
- Sheet 9 3:1 Slope Above Wall, No Surcharge
- Sheet 10 Level Backslope, 120 psf Live Load Surcharge (Residential Driveway)



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Masterplan, St. Louis County, Mo.



Engineering Solutions, P.C.
12955 Gravois Road
Sunset Hills, Mo. 63127
Phone (314) 280-7748
Fax (314) 842-8201

Title & Index

Sheet 1 of 10

General

This masterplan is for Anchor Diamond Pro, Diamond & Highland 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 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 drain tile 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 maintenance 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 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 Diamond Pro, Diamond or Highland 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.

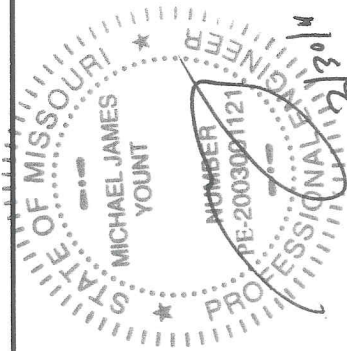
 **ANCHOR**TM
AnchorplexTM

Masterplan, St. Louis County, Mo.

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

Engineering Solutions, P.C.

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Sunset Hills, Mo. 63127
Phone (314) 280-7748
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Specifications

Sheet 2 of 10

Materials (cont.)

The reinforced wall backfill material shall be a low strength "no fines" concrete mix with the following mix design:

Specifications
Specified 28-day strength 1500 psi non-air
Water/cement ratio (lb/lbs) 0.41
Air Voids 25%
Slump 1-2 inches

Cement Portland type 1 cement 400 lbs, SG 3.15
(alternate) 200 lbs of fly ash & 200 lbs of portland type 1 cement

Aggregates Concrete sand SSD
Coarse aggregates #8's or #57's 2,540 lbs, SG 2.62
Unit wt. 98.88 lbs/ft3 rodded

Water Water, maximum total (lbs) 166 lbs, SG 1.0

Optional Admixture Pozzolith 100xR - retarder 8.0oz/yd

Any **additional backfill** to be retained shall be 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 Optima HP 200, Carthage Mills GX150, Miragrid 2XT, Startagrid SG150 as indicated on the plan, or approved equivalent.

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

Drain Tile shall be 4" HDPE perforated wrapped in fabric (sock) & 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

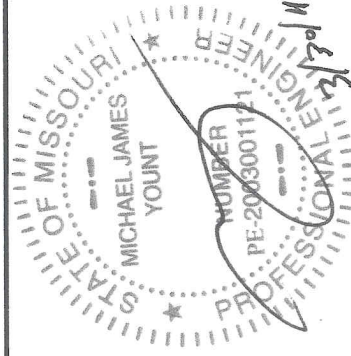
Foundation soil shall be excavated as required for the leveling pads and the structural backfill zone. All excavations shall comply with OSHA safety requirements. The exposed foundation material & retained materials shall be observed prior to placing the leveling pad rock to confirm the soil parameters comply with the design assumptions. The retained material shall be low plastic with a internal angle of friction of at least 28 degrees. Foundation soil shall be low plastic and have a minimum bearing capacity of 2,000 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.



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Specifications
(cont.)

Sheet 3 of 10

Wall Foundation Excavation (cont.)

Care should be taken to identify any utility trenches in the area. The contractor shall identify if the backfill in these trenches has been property placed & compacted. See sewer & utility backfill section to follow.

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 drain tile & daylight prior to backfilling. The first lift of structural backfill may then be placed. Be sure to "rod" the fill into all block cavities and voids. Backfill the wall face with compacted soil to the correct elevation. Next install reinforcement as shown and continue construction. Subsequent pours can be made as soon as the structural backfill has set. The entire wall height should not be backfilled in a single lift. The backfill lifts shall equal the spacing between geogrids. See manufacturer's manuals for Anchor Anchorplex construction for additional details. Filter fabric shall separate the structural backfill from the retained soil and the soil cap. Filter fabric shall not cover the foundation materials. The geogrids 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 geogrids 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 & Utility 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 shall be made to these plans without written approval of Engineering Solutions, P.C.

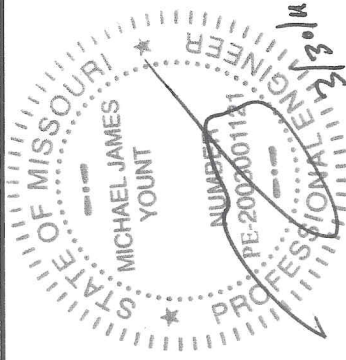


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Engineering Solutions, P.C.

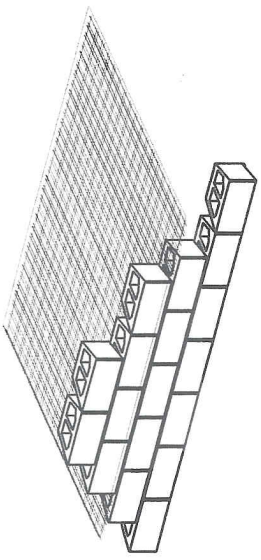
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Specifications
(cont.)

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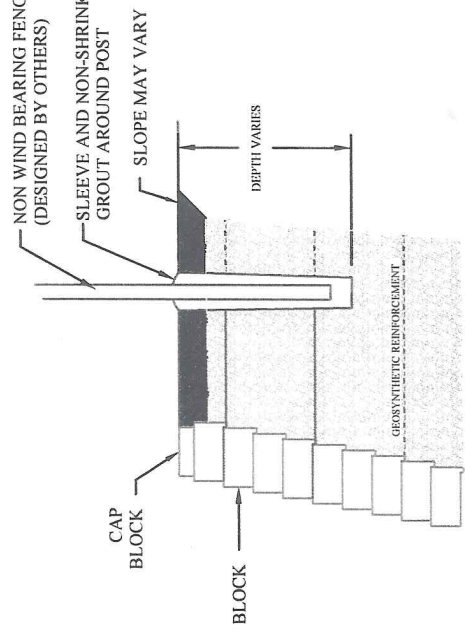


EXTEND GEOSYNTHETIC REINFORCEMENT TO WITHIN 2' OF THE LOWER BLOCK FACE



10" MIN

REINFORCEMENT CONNECTION DETAIL (NOT TO SCALE)

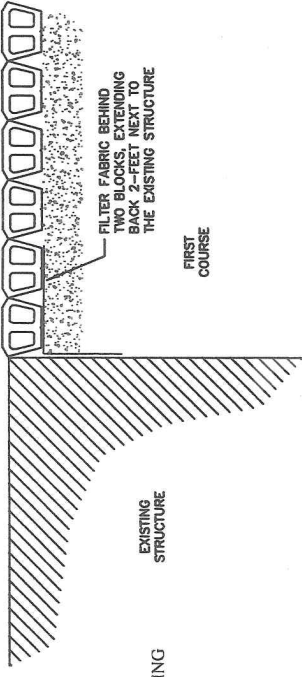


NON WIND BEARING FENCE OR RAILING (DESIGNED BY OTHERS)
SLEEVE AND NON-SHRINK GROUT AROUND POST
SLOPE MAY VARY

DEPTH VARIES

GEOSYNTHETIC REINFORCEMENT

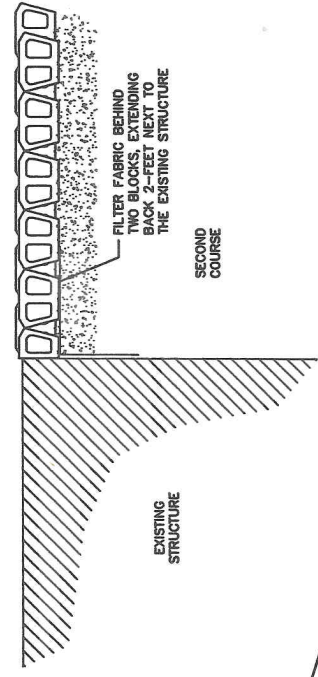
FENCE BEHIND WALL DETAIL (NOT TO SCALE)



FILTER FABRIC BEHIND TWO BLOCKS, EXTENDING BACK 2'-FEET NEXT TO THE EXISTING STRUCTURE

FIRST COURSE

EXISTING STRUCTURE

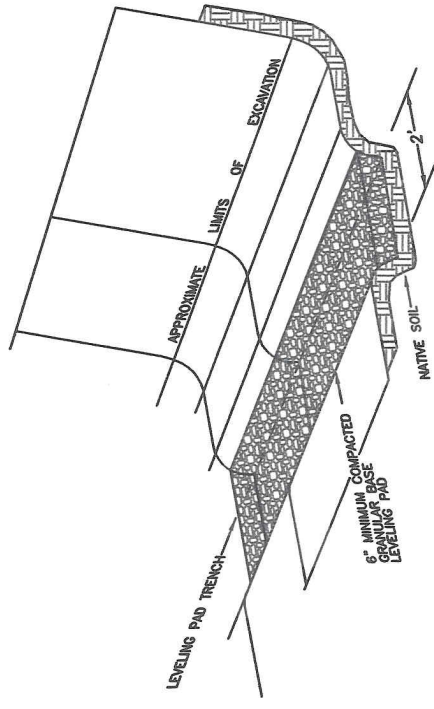


FILTER FABRIC BEHIND TWO BLOCKS, EXTENDING BACK 2'-FEET NEXT TO THE EXISTING STRUCTURE

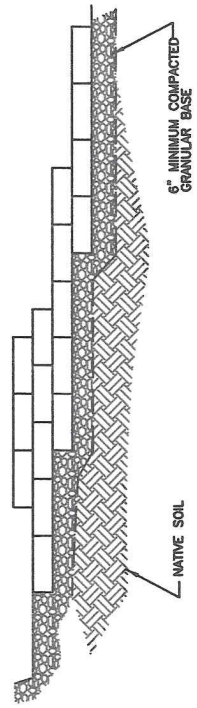
SECOND COURSE

EXISTING STRUCTURE

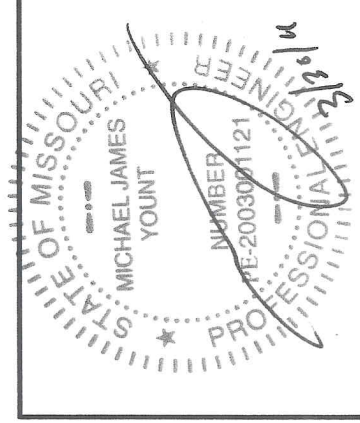
WALL ABUTTING EXISTING STRUCTURE (NOT TO SCALE)



TYPICAL BASE PREPARATION (NOT TO SCALE)



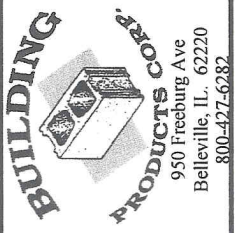
TYPICAL STEP-UP DETAIL (NOT TO SCALE)



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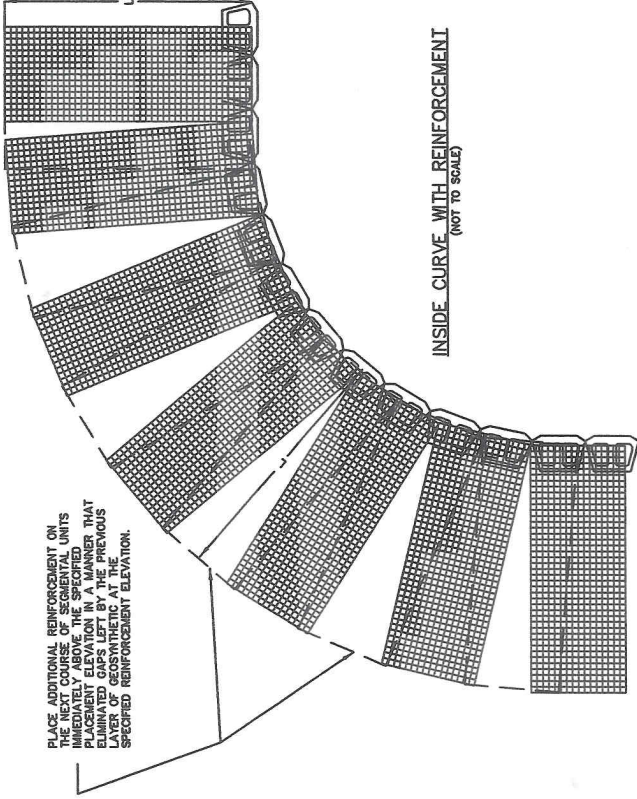
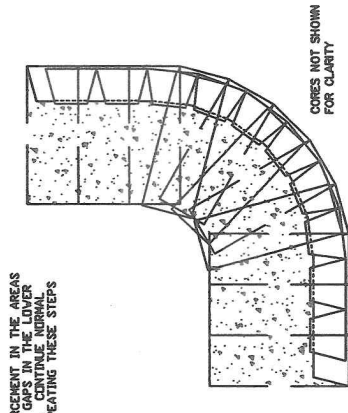
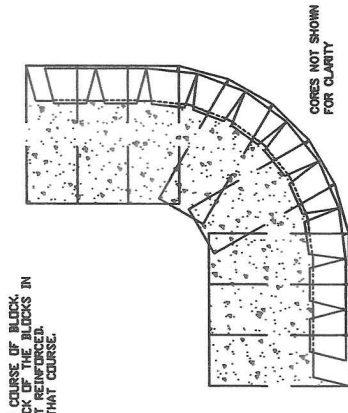
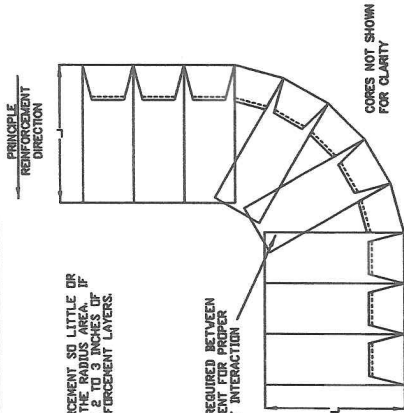
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Phone (314) 280-7748
Fax (314) 842-8201

Typical Details

Sheet 5 of 10



OUTSIDE CURVE WITH REINFORCEMENT (NOT TO SCALE)

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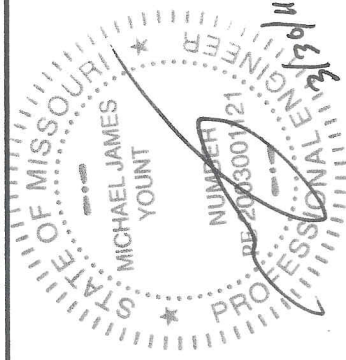
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Typical Details
 (cont.)

Sheet 6 of 10

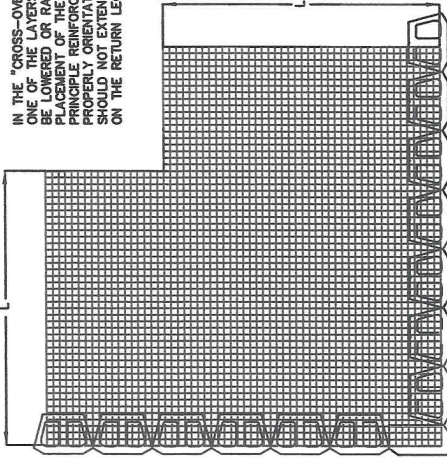


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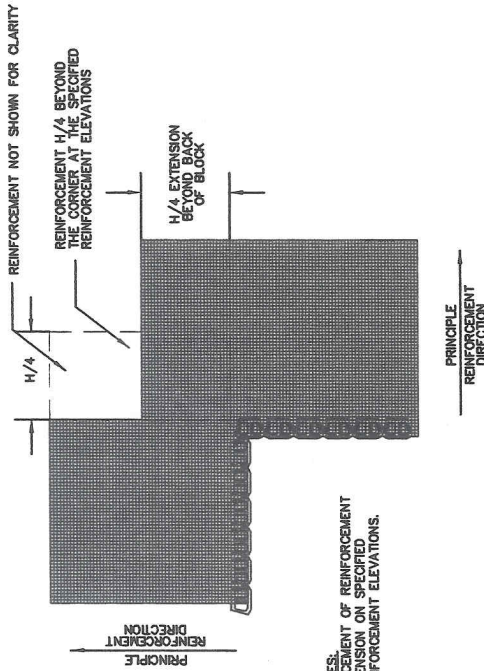
PRINCIPLE
REINFORCEMENT
DIRECTION

IN THE "CROSS-OVER AREA" OF REINFORCEMENT, ONE OF THE LAYERS OF REINFORCEMENT SHOULD BE LOWERED OR RAISED ONE COURSE TO ALLOW PLACEMENT OF THE REINFORCEMENT WITH THE PRINCIPLE REINFORCEMENT STRENGTH DIRECTION PROPERLY ORIENTATED. THE REINFORCEMENT SHOULD NOT EXTEND INTO THE SEGMENTAL UNITS ON THE RETURN LEG OF THE 90 DEGREE CORNER.

PRINCIPLE
REINFORCEMENT
DIRECTION



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



NOTES:
PLACEMENT OF REINFORCEMENT
EXTENSION ON SPECIFIED
REINFORCEMENT ELEVATIONS.

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



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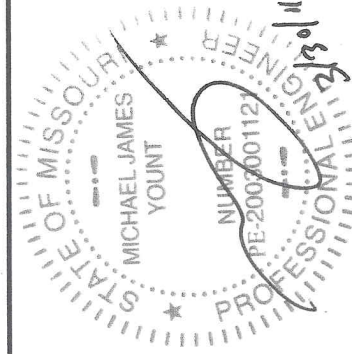
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800-427-6282

**Engineering
Solutions, P.C.**

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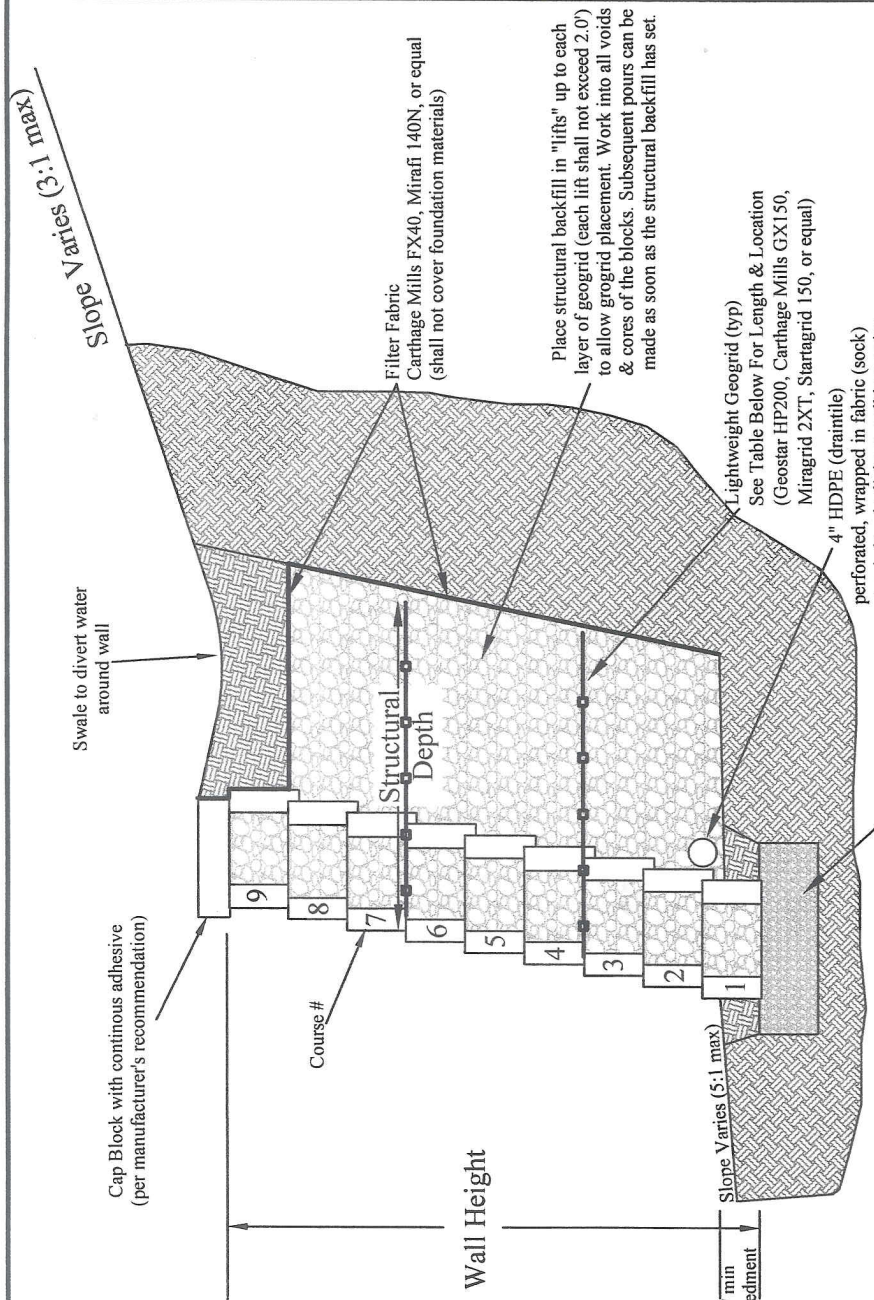


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Typical Details
(cont.)

Sheet 7 of 10

- The structural backfill material shall be a low strength "no fines" (free draining) concrete mix with the following mix design:
- Specifications**
 Specified 28-day strength 1500 psi non-air
 Water/cement ratio (lb/lbs) 0.41
 Air Voids 25%
 Slump 1-2 inches
- Cement (alternate)**
 Portland type 1 cement 400 lbs, SG 3.15
 200 lbs of fly ash & 200 lbs of portland type 1 cement
- Aggregates**
 Concrete sand SSD
 Coarse aggregates #8's or #57's 2,540 lbs, SG 2.62
 Unit wt. 98.88 lbs/ft³ rodded
- Water**
 Water, maximum total (lbs) 166 lbs, SG 1.0
- Optional Admixture**
 Pozzololith 100xR - retarder 8.0oz/yd



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

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Engineering Solutions, P.C.
 12955 Gravois Road
 Sunset Hills, Mo. 63127
 Phone (314) 280-7748
 Fax (314) 842-8201

Professional Engineer
 Michael James Yount
 State of Missouri
 License Number: 200300121

Typical Cross Section
 3:1 Slope, No Surcharge

Sheet 8 of 10

Structural Backfill Table - 3:1 (max) Slope Above Wall

Wall Height (feet) (without cap)	Anchor Diamond Pro (8")		Anchor Diamond (6") or Highland (6")	
	# of Geogrid Layers	Geogrid Location (on top of course #)	# of Geogrid Layers	Geogrid Location (on top of course #)
2.67	1	2	1	3
4.0	1	3	1	4
5.33	2	2,5	2	3,6
6.0	2	3,6	2	4,8



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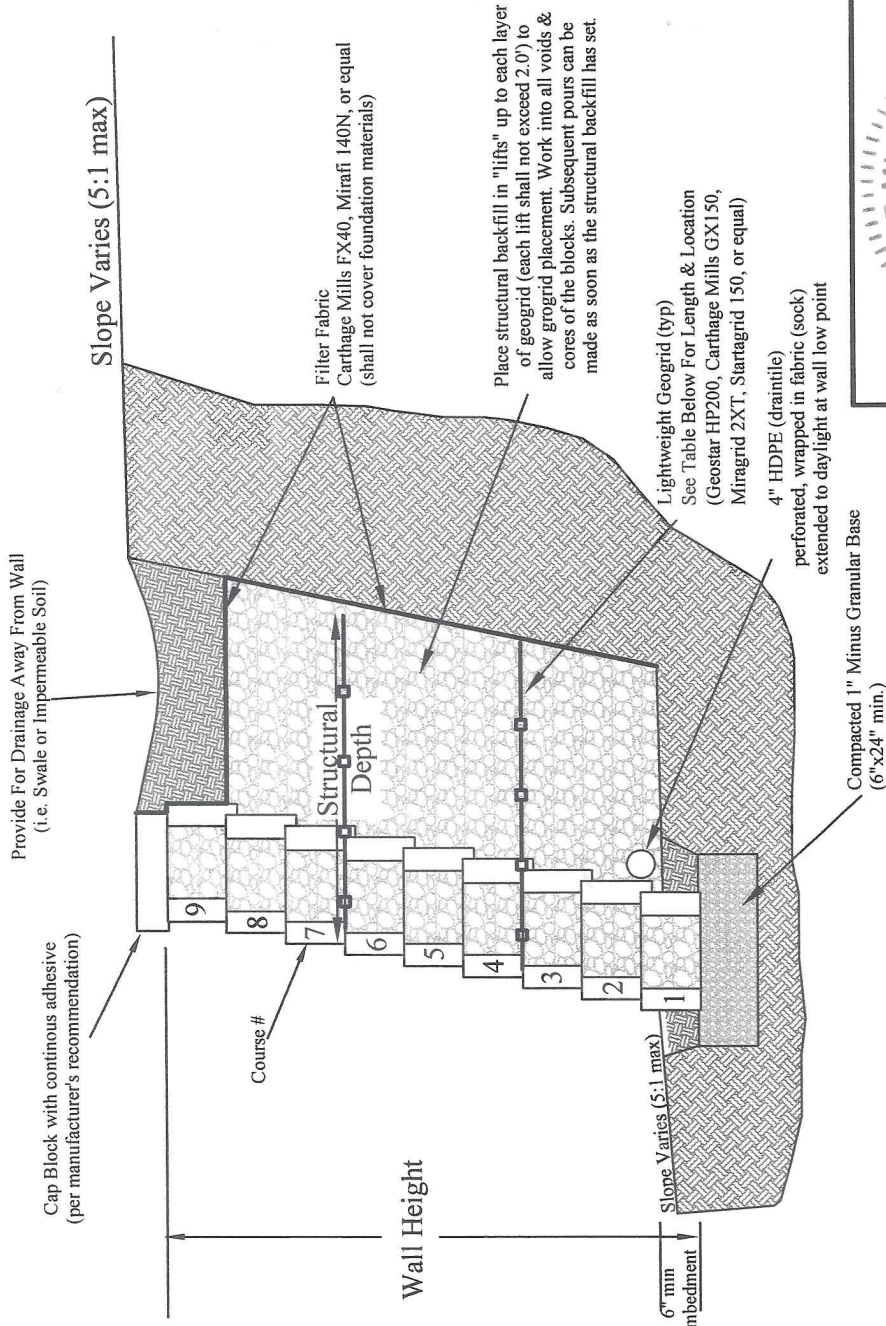
The structural backfill material shall be a low strength "no fines" (free draining) concrete mix with the following mix design:
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 Water/cement ratio (lb/lbs) 0.41
 Air Voids 25%
 Slump 1-2 inches

Cement (alternate)
 Portland type 1 cement 400 lbs, SG 3.15
 200 lbs of fly ash & 200 lbs of portland type 1 cement

Aggregates
 Concrete sand SSD
 Coarse aggregates #8's or #57's 2,540 lbs, SG 2.62
 Unit wt. 98.88 lbs/ft³ rodded

Water
 Water, maximum total (lbs) 166 lbs, SG 1.0

Optional Admixture
 Pozzololith 100xR - retarder 8.0oz/yd



Professional Engineer Seal for Michael James Yount, State of Missouri, License No. PE-200700112. The seal includes the text: 'STATE OF MISSOURI PROFESSIONAL ENGINEER MICHAEL JAMES YOUNT PE-200700112'. A handwritten signature and date '3/3/11' are present over the seal.

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Typical Cross Section
 Level Backslope, No Surcharge

Sheet 9 of 10

Structural Backfill Table - No Slope Above Wall (5:1 max)

Wall Height (feet) (without cap)	Anchor Diamond Pro (8")		Anchor Diamond (6") or Highland (6")	
	# of Geogrid Layers	Geogrid Location (on top of course #)	# of Geogrid Layers	Geogrid Location (on top of course #)
2.67	1	2	1	3
4.0	1	3	1	4
5.33	2	2,5	2	3,6
6.0	2	3,6	2	4,8

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

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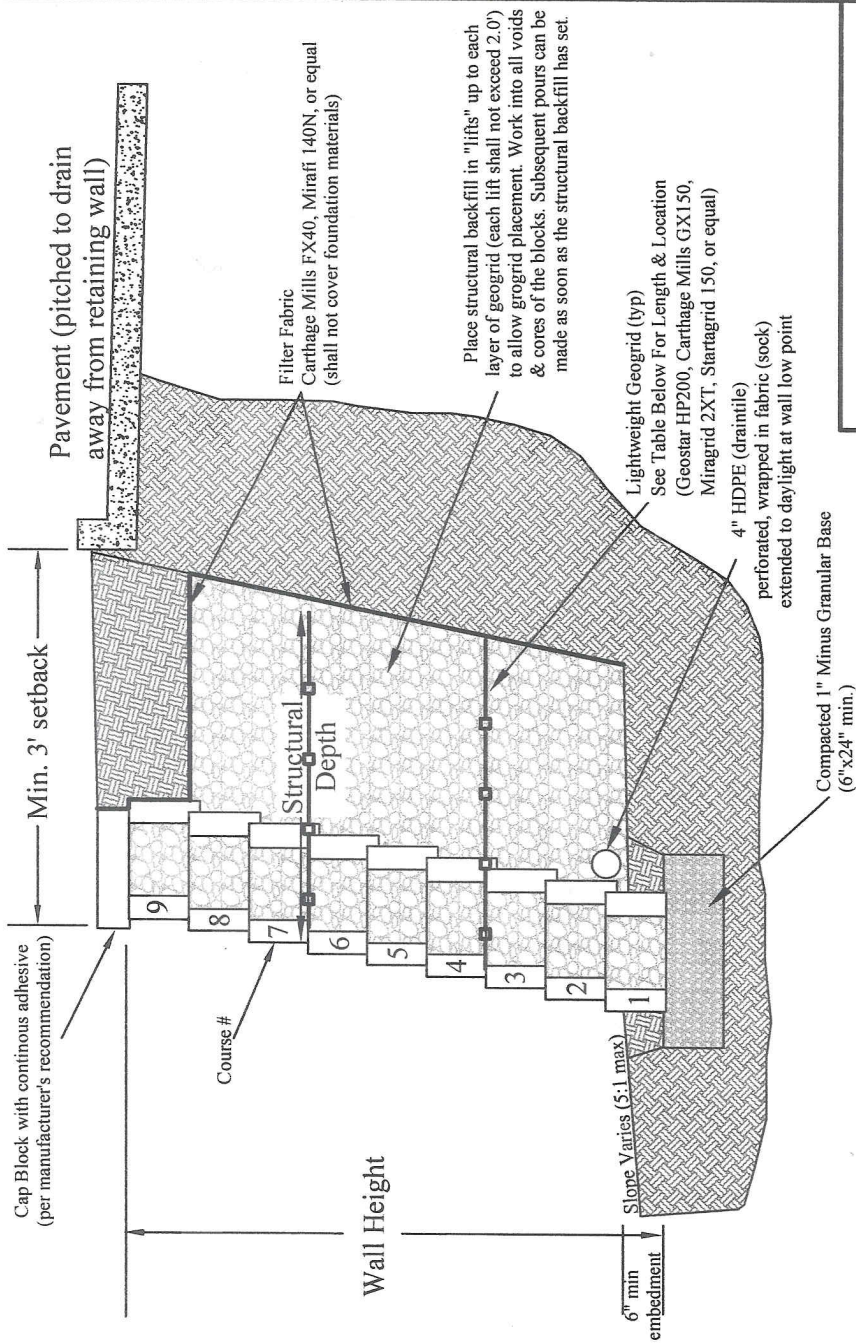
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 Air Voids 25%
 Slump 1-2 inches

Cement (alternate)
 Portland type 1 cement 400 lbs, SG 3.15
 200 lbs of fly ash & 200 lbs of portland type 1 cement

Aggregates
 Concrete sand SSD
 Coarse aggregates #8's or #57's 2,540 lbs, SG 2.62
 Unit wt. 98.88 lbs/ft³ rodded

Water
 Water, maximum total (lbs) 166 lbs, SG 1.0

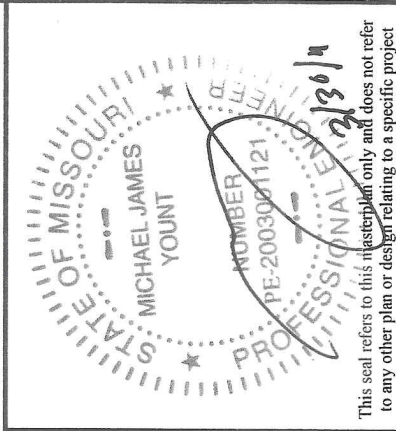
Optional Admixture
 Pozzolith 100xR - retarder 8.0oz/lyd



Structural Backfill Table - 120 psf Live Load Above Wall (residential driveway)

Wall Height (feet) (without cap)	Anchor Diamond Pro (8")		Anchor Diamond (6") or Highland (6")	
	# of Geogrid Layers	Geogrid Location (on top of course #)	# of Geogrid Layers	Geogrid Location (on top of course #)
2.67	1	2	1	3
4.0	1	3	1	4
5.33	2	2,5	2	3,6
6.0	2	3,6	2	4,8

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



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Typical Cross Section
 Level Backslope, 120 psf Surcharge (Residential Driveway)

Sheet 10 of 10



BRECKENRIDGE MATERIAL COMPANY

a division of BMC Enterprises, Inc.

Quick call list

800.CONCRETE (800.266.2738)

BRECKENRIDGE- MISSOURI LOCATIONS 314.962.1900 or 800.266.2738

**WEBSTER GROVES, MO &
CORPORATE HEADQUARTERS**
2829 Breckenridge Industrial Court
St. Louis, MO 63144

ARNOLD, MO
Hwy. 141 & Hwy. 21 - Cecos Lane
Paulina Hills, MO 63010

CHESTERFIELD, MO
16625 Chesterfield Airport Road
Chesterfield, MO 63017

EUREKA, MO
435 West Main Street
Eureka, MO 63025

FESTUS, MO
1160 Truman Blvd.
Festus, MO 63028

MARYLAND HEIGHTS, MO
2305 Creve Coeur Mill Road
Maryland Heights, MO 63028

O'FALLON, MO
1440 West Terra Lane
O'Fallon, MO 63366

PEVELY, MO
8799 Trautman Quarry Road
Pevely, MO 63070

ROLLA, MO
1901 Old St. James Road
Rolla, MO 65401

ST. LOUIS - DOWNTOWN
Rutger Street
1204 Wharf Street
St. Louis, MO 63102

SOUTH ST. LOUIS COUNTY
Mattis Road & Hwy. 21
St. Louis, MO 63128

SULLIVAN, MO
11023 North Service Road West
Sullivan, MO 63080

UNION, MO
Highway 47 & College Road
7350 Highway 47
Union, MO 63084

BRECKENRIDGE- ILLINOIS LOCATIONS 314.962.1900 or 800.266.2738

ALTON/GODFREY
4555 North Alby Street
Godfrey, IL 62035

COLLINSVILLE
710 Cedar Street
Collinsville, IL 62234

COLUMBIA
1950 Westgate Drive
Columbia, IL 62236

HAMEL
229 North Old Route 66
Hamel, IL 62046

POLITTE 573.438.5417

POLITTE, LLC
Hwy P, P.O. Box 368
Potosi, MO 63664
politte@usmo.com

5 Plants Servicing:

- **ARCADIA, MO**
573.546.7316
- **BONNE TERRE, MO**
573.358.0073
- **FARMINGTON, MO**
573.756.6611
- **POTOSI, MO**
573.438.5417
- **VIBURNUM, MO**
573.244.5463

Breckenridge Service Area



READY-MIX CONCRETE
BUILDING MATERIAL

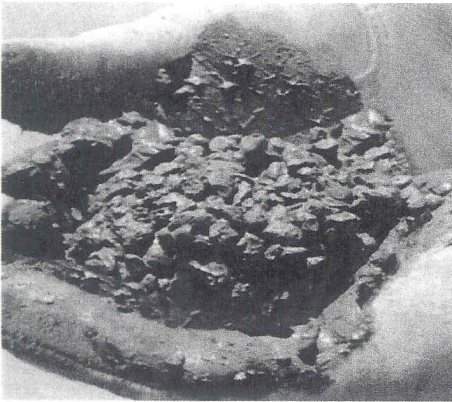
**BRECKENRIDGE
MATERIAL COMPANY**
2833 BRECKENRIDGE INDUSTRIAL COURT
P.O. BOX 19918
ST. LOUIS, MISSOURI 63144

RYAN BOHON
Sales Manager
rbohon@breckenridgematerial.com

Off: (314) 962-1234
Cell: (314) 322-6996
Fax: (314) 961-2362

STRUCTURAL BACKFILL MIX COMPONENTS

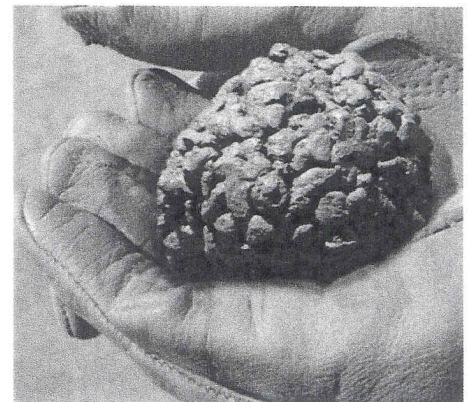
	Concrete Mix Data	Batch Weight/Cubic Yard	
Specifications	Water/cement ratio (lb./lbs.)	0.41	
	Air voids	25%	
	Slump	1 to 2 in.	
Cement	Portland type 1 cement	400 lbs.	Specific gravity 3.15
	Alternative Fly ash Portland type 1 cement	200 lbs. 200 lbs.	Specific gravity 2.50 Specific gravity 3.15
Aggregates	Concrete sand SSD Coarse aggregates #6, #8 or #57 (½ or ¾ in.) Unit weight 98.88 lbs./ft. ³ rodded	0 lbs. 2,540 lbs.	Specific gravity 2.62
	Water	Maximum total weight	166 lbs. Specific gravity 1.00
Admixture	Pozzolith 100x, retarder	8.0 oz./yd.	



Too much water



Too little water



Proper amount of water



2833 BRECKENRIDGE INDUSTRIAL COURT
P.O. BOX 19918
ST. LOUIS, MO 63144
(314) 962-1234 • FAX (314) 962-1540

March 8, 2011

Estimating Department – Attn: Building Products Corporation

RE: AnchorPlex

Breckenridge Material Company is pleased to offer our submittal for the above referenced project:

Structural Backfill Mix based on Anchor specs \$ 75.00 per cubic yard

Fuel Surcharges will be applied based on Dept of Energy report at time of delivery

Additional Items as needed:

Fuel Surcharges will be applied based on Dept of Energy report at time of delivery

High Range Water Reducer	\$ 6.00 / cy	Fibers – Standard Dose	\$ 6.00 / cy
Water Reducer @ Std. Dose	\$ 1.25 / cy	Finish Sand	\$ 2.50 / cy
Water Reducer @ Ext. Dose	\$ 2.75 / cy	Chilled Water	\$ 5.00 / cy
Non-Chloride Accelerator @ 1%	\$ 6.00 / cy	Addn'l Cement	\$ 6.00 / sack
		Ice	\$ Cost + 15%

*Winter Service as required \$ 4.75 / cy

***Mandatory In all Concrete 11/15 to 3/31**

Minimum Load Charges (Minimum 2 Yard Billing)

2-2 ¾ Cubic yards / \$100.00 3-3 ¾ Cubic Yards / \$ 75.00

4-4 ¾ Cubic Yards / \$ 50.00 5-5 ¾ Cubic Yards / \$ 25.00

Demurrage: Five minutes per cubic yard. Excess wait-time billed at \$2.00 per minute

Terms:

- Payment terms are net 30 / Prices firm for period noted above with confirming order within sixty days from bid date. Prices subject to change thereafter.
- All mixes quoted with Type I cement @ 28 day strengths unless otherwise noted
- Retainage is not included in this submittal and will not be allowed.
- **Fuel Surcharges will be applied based on Dept of Energy report at time of delivery.**
- Ordering concrete for this project constitutes agreement of the pricing and terms quoted.
- Above pricing based on normal delivery hours Monday–Friday 7am - 3:30pm.
- Additional late/overtime fees will be charged on all concrete delivered after 3:30pm and/or Saturdays.
- Additional small load charges will be assessed on any order under six yards. Pricing submitted upon request. There is a two yard billing minimum per order.
- **\$25.00 haul charge inc. in above.** Sales tax as applicable to be charged on materials only. Tax exempts forms must be received prior to start of project.
- **Prices expire 12/31/11.** Prices subject to change thereafter.

If there are any further questions, please contact me at 314-962-1234.

Sincerely,
Ryan Bohon
Sales Manager