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TACO BELL - EMBARK CREDIT UNION

GREAT FALLS, MONTANA

GENERAL NOTES:

DESIGN PROVISIONS:

- THE FOLLOWING EFFECTIVE STRENGTH PARAMETERS WERE ASSUMED IN THE PREPARATION OF THE STRUCTURAL CALCULATIONS FOR THE RECON RETAINING WALL SYSTEM:

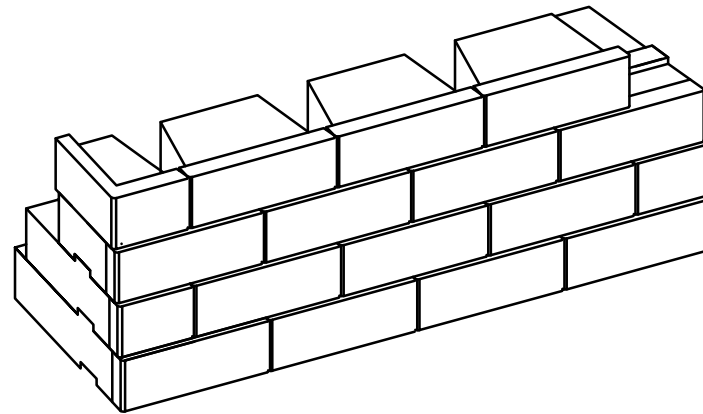
	ϕ	c	γ	SOIL TYPE
REINFORCED SOIL	32°	0 PSF	120 PCF	GRANULAR BACKFILL
RETAINED SOIL (WALL 1)	40°	0 PSF	120 PCF	CRUSHED STONE
RETAINED SOIL (WALL 2)	26°	0 PSF	120 PCF	ONSITE LEAN CLAY
FOUNDATION SOIL	26°	0 PSF	120 PCF	ONSITE LEAN CLAY

SOILS INFORMATION OBTAINED FROM GEOTECHNICAL INVESTIGATION REPORT PREPARED BY BIG SKY SUBSURFACE DATED 12/19/12. FOUNDATION SOILS SHALL BE EVALUATED BY A GEOTECHNICAL ENGINEER OR OWNERS REPRESENTATIVE TO ENSURE THAT THE BEARING SOILS MEET OR EXCEED THE DESIGN CONDITIONS OR ASSUMPTIONS.

- THE WALLS ARE DESIGNED TO MEET THE FOLLOWING DESIGN PARAMETERS AND MAXIMUM SURCHARGE LOADINGS:

UNIT TYPE: RECON SERIES 50 (24" UNITS)
REINFORCEMENT: STRATA SG350 (WALL 2) / GRAVITY (WALL 1)
DESIGN METHOD: AASHTO LRFD
LIVE LOAD: 250 PSF (WALL 1) / 150 PSF (WALL 2)
DEAD LOAD: NONE
BACK SLOPE: NONE
TOE SLOPE: 4H:1V
SEISMIC: 0.34 g (SEISMIC SITE CLASS B)
WIND LOAD: 20.7 PSF (PER IBC SECTION 1609)
HYDROSTATIC: N/A (DRAINAGE PROVIDED)

- THE FOUNDATION SOILS AT THE WALL LOCATIONS SHALL BE CAPABLE OF SAFELY SUPPORTING THE MINIMUM APPLIED BEARING PRESSURE AS SHOWN ON THE WALL PROFILES WITHOUT FAILURE OR EXCESSIVE SETTLEMENT. LOCAL BEARING CAPACITY SHALL BE CONFIRMED BY THE SITE GEOTECHNICAL ENGINEER AFTER FOUNDATION EXCAVATION AND PRIOR TO WALL CONSTRUCTION.



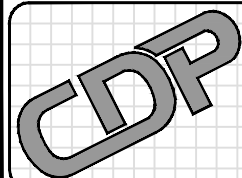
SHEET INDEX

SHEET	DESCRIPTION
1.	TITLE SHEET
2.	SITE PLAN
3.	WALL 1 ELEVATION
4.	WALL 2 ELEVATION
5.	WALL 2 ELEVATION
6.	WALL 2 ELEVATION
7.	TYPICAL WALL SECTION A - A
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9.	TYPICAL RECON UNIT DETAILS
10.	TYPICAL REINFORCEMENT DETAILS
11.	TRAFFIC BARRIER DETAILS
12.	SPECIFICATIONS

GENERAL NOTES:

SUGGESTED QUALITY ASSURANCE PROVISIONS:

- MULTIPLE CONTRACTORS (FENCE, WALL, GRADING, ETC.) MAY BE USED TO COMPLETE THE OVERALL PROJECT AS SHOWN ON THESE SHOP DRAWINGS. PLANS DO NOT DEFINE SCOPE OF WORK FOR INDIVIDUAL ENTITIES. SEE CONTRACT DOCUMENTS FOR SPECIFIC DETAILS ON THE SCOPE OF WORK THAT WILL BE PROVIDED BY ALL PARTIES.
- WALL CONSTRUCTION SHALL BE SUPERVISED BY A QUALIFIED ENGINEER OR TECHNICIAN TO VERIFY FIELD AND SITE SOIL CONDITIONS. IF THIS WORK IS NOT PERFORMED BY THE SITE GEOTECHNICAL ENGINEER, A QUALIFIED GEOTECHNICAL ENGINEER/TECHNICIAN SHALL BE CONSULTED IN THOSE MATTERS PERTAINING TO THE SOIL CONDITIONS AND WALL PERFORMANCE.
- THE FOUNDATION SOILS AT THE BASE OF THE WALLS SHALL BE INSPECTED BY THE GEOTECHNICAL ENGINEER. ANY UNSUITABLE SOILS OR IMPROPERLY COMPACTED EMBANKMENT MATERIAL SHALL BE REMOVED AND REPLACED AS DIRECTED BY THE ENGINEER PRIOR TO WALL CONSTRUCTION TO PROVIDE ADEQUATE BEARING CAPACITY AND MINIMIZE SETTLEMENT.
- ALL WALL EXCAVATION AND RETAINED SOILS SHALL BE INSPECTED FOR GROUNDWATER CONDITIONS. ANY ADDITIONAL DRAINAGE PROVISIONS REQUIRED IN THE FIELD SHALL BE INCORPORATED INTO THE WALL CONSTRUCTION AS DIRECTED BY THE GEOTECHNICAL ENGINEER.
- WALL BACKFILL MATERIAL SHALL BE TESTED AND APPROVED BY THE ENGINEER, MEETING THE MINIMUM REQUIREMENTS OF THE APPROVED DESIGN PLANS OR SPECIFICATIONS.
- ALL SOIL BACKFILL SHALL BE TESTED BY THE GEOTECHNICAL ENGINEER FOR MOISTURE, DENSITY, AND COMPACTION PERIODICALLY (EVERY 2' VERTICALLY, 100'-200' C/C) MEETING THE MINIMUM REQUIREMENTS OF THE APPROVED DESIGN PLANS OR SPECIFICATIONS.
- THE CONTRACTOR SHALL ESTABLISH AND MAINTAIN QUALITY CONTROL FOR THE CONSTRUCTION OF THE WALL TO ASSURE COMPLIANCE WITH CONTRACT REQUIREMENTS AND MAINTAIN RECORDS OF ITS QUALITY CONTROL.
- ALL WALL ELEVATIONS, GRADES, AND BACK SLOPE CONDITIONS SHALL BE VERIFIED BY THE ENGINEER IN THE FIELD FOR CONFORMANCE WITH APPROVED DESIGN PLANS. ANY REVISIONS TO THE STRUCTURAL OR DESIGN CRITERIA SHALL REQUIRE DESIGN MODIFICATIONS PRIOR TO PROCEEDING WITH CONSTRUCTION.

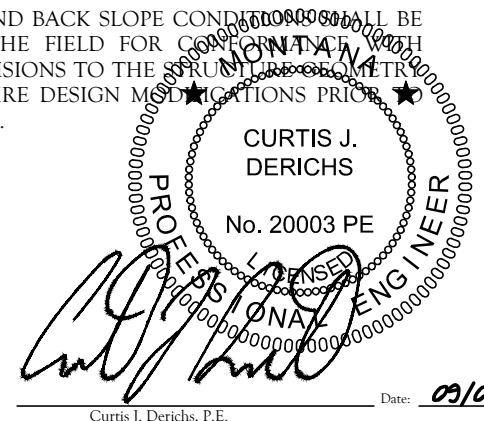


CIVIL DESIGN
PROFESSIONALS

8609 LYNDALE AVENUE SOUTH, SUITE 200 BLOOMINGTON, MN 55420
PHONE: (952) 303-5312 | FAX: (763) 392-1989 | WEBSITE: WWW.CDP-USA.COM
SITE SOLUTION PROFESSIONALS, INC. D.B.A. CIVIL DESIGN PROFESSIONALS

No.	Date	Revision	By
1			
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Designed By: TPH	Project: TACO BELL - EMBARK CREDIT UNION GREAT FALLS, MONTANA	Registration No: 20003
Scale: N.T.S.	Title: TITLE SHEET	Project No: 13-510
Date: SEPT 5, 2013		Sheet No: 1

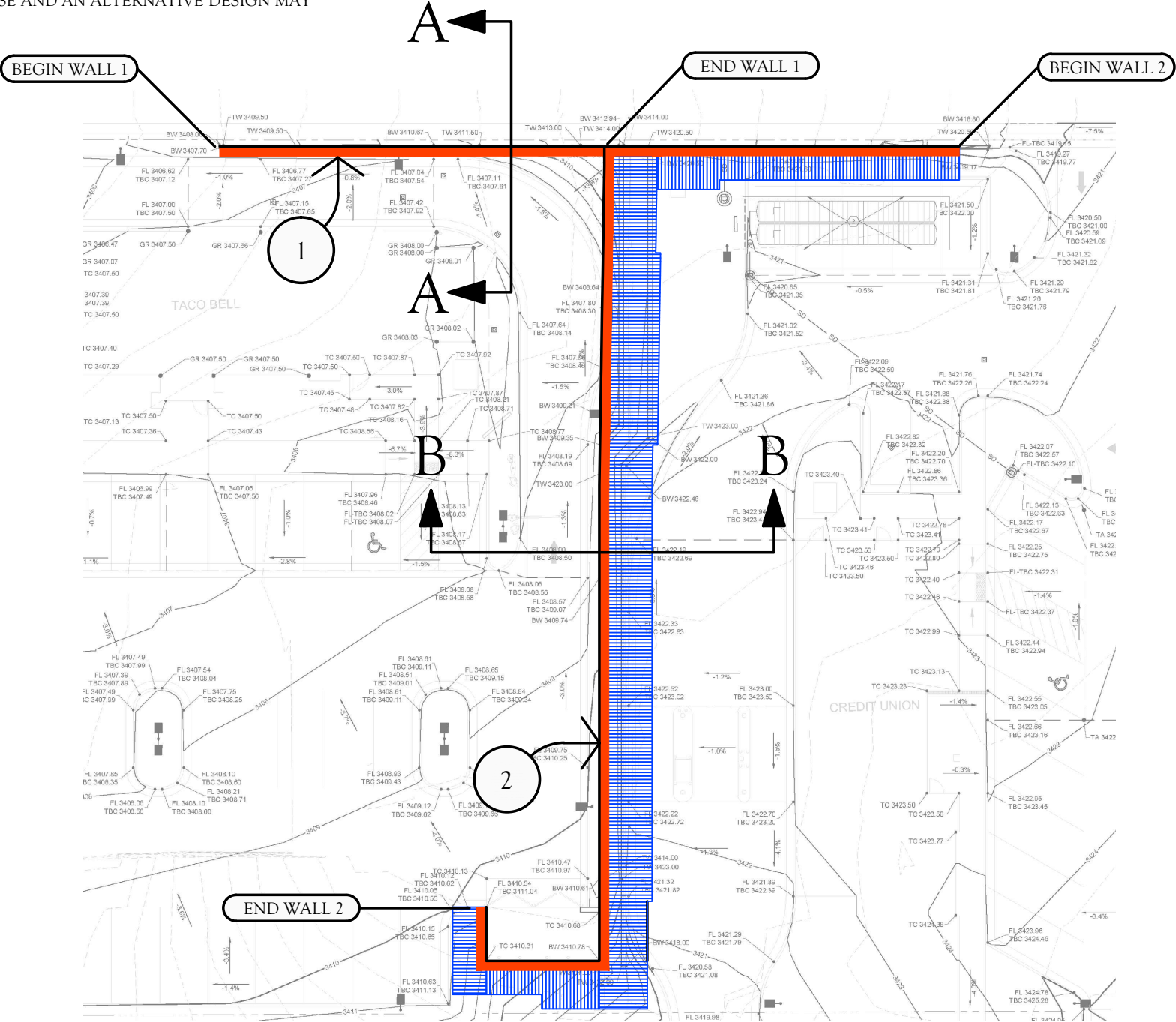


Curtis J. Derichs, P.E.

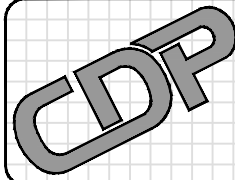
Date: 09/05/13

GENERAL NOTES:

1. THE SITE PLAN SHOWN IS FOR ILLUSTRATIVE PURPOSES ONLY. IT WAS REPRODUCED FROM GRADING AND DRAINAGE PLANS PREPARED BY CTA DATED 07/18/2013 .
2. THE APPROXIMATE LOCATION OF UTILITIES KNOWN TO EXIST AS SHOWN ON THE PLANS ARE BASED ON THE BEST INFORMATION AVAILABLE AT THE TIME OF PLAN PREPARATION.
3. THE CONTRACTOR SHALL VERIFY INVERTS OF PROPOSED AND EXISTING UTILITIES TO ENSURE THERE ARE NO CONFLICTS. THE ENGINEER SHALL BE CONTACTED IF CONFLICTS ARISE AND AN ALTERNATIVE DESIGN MAY BE REQUIRED.



Know what's below.
Call before you dig.



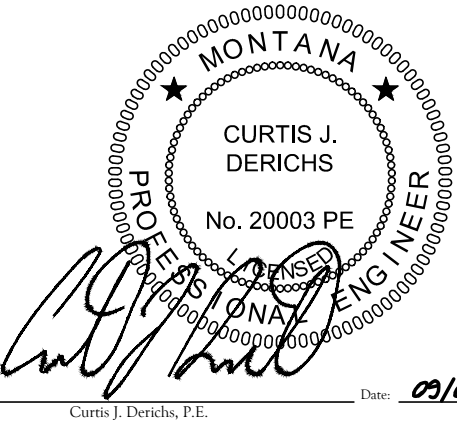
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Designed By:
TPH
Scale:
1" = 30'
Date:
SEPT 5, 2013

Project:
TACO BELL - EMBARK CREDIT UNION
GREAT FALLS, MONTANA
Title:
SITE PLAN

Registration No:
20003
Project No:
13-510
Sheet No:
2



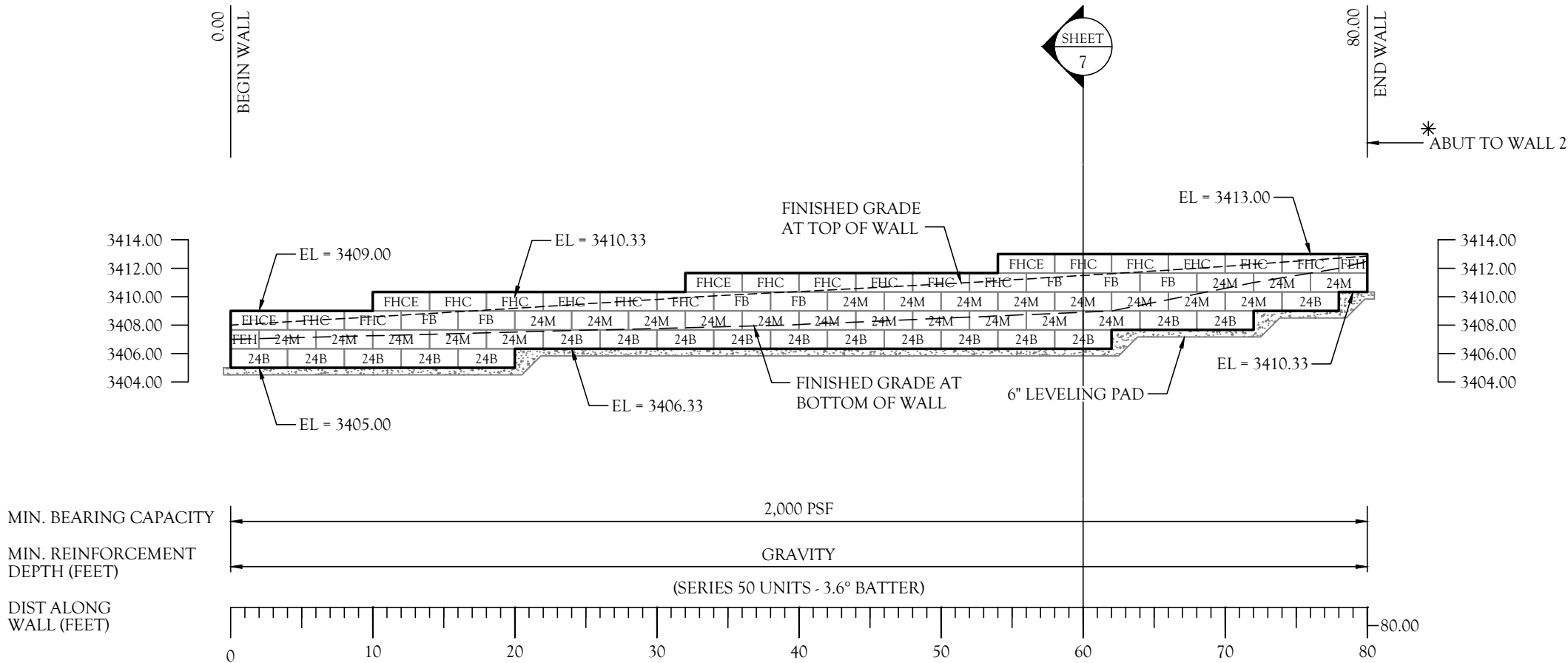
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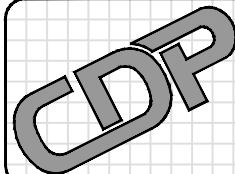
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- WALL 1 SHALL BE BACKFILLED AT A 1H:1V EXTENDING OFF THE BACK OF THE BOTTOM UNIT WITH 100% FREE DRAINING, WASHED, ANGULAR CRUSHED STONE (SPEC 2.07/SHEET 12).
- * 3. A GEOTEXTILE FABRIC SHALL BE PLACED WHERE RETAINING WALLS ABUT TO WALLS AS SHOWN ON SITE PLAN (SHEET 2). OVERLAP ALL ABUTMENT JOINTS 24" WITH A MINIMUM 48" WIDE FABRIC TO PREVENT THE COREFILL AND BACKFILL FROM MIGRATING THROUGH THE ABUTMENT JOINTS.
- SEE MANUFACTURER INFORMATION FOR ADDITIONAL CONSTRUCTION DETAILS FOR THE RECON RETAINING WALL SYSTEM. THE MANUFACTURER INFORMATION SHALL ACCOMPANY THE CONSTRUCTION PLANS.

RECON BLOCK KEY:					
FHC	FULL HIGH CAPSTONE	43	CB	24" DEEP MIDDLE CORNER	17
FHCE	FULL HIGH CAPSTONE END	6	T	24" DEEP TOP BLOCK	38
FE	FENCE END BLOCK	4	24M	24" DEEP FULL MIDDLE	429
FEH	FENCE END HALF	6	2H	24" DEEP HALF MIDDLE	1
FB	FENCE BLOCK	34	24B	24" DEEP FULL BOTTOM	81
RCT	RIGHT CORNER TOP	6	45M	45" DEEP FULL MIDDLE	45
LCT	LEFT CORNER TOP	3	WWW.RECONWALLS.COM		

CONTRACTOR SHALL CONFIRM ALL QUANTITIES



RECON WALL 1 - FRONT FACE ELEVATION

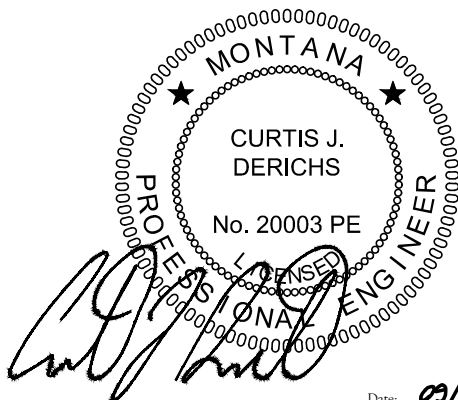


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Designed By: TPH	Project: TACO BELL - EMBARK CREDIT UNION GREAT FALLS, MONTANA	Registration No: 20003
Scale: 1" = 10'	Title: WALL 1 ELEVATION	Project No: 13-510
Date: SEPT 5, 2013		Sheet No: 3



Curtis J. Derichs, P.E.

Date: 09/05/13

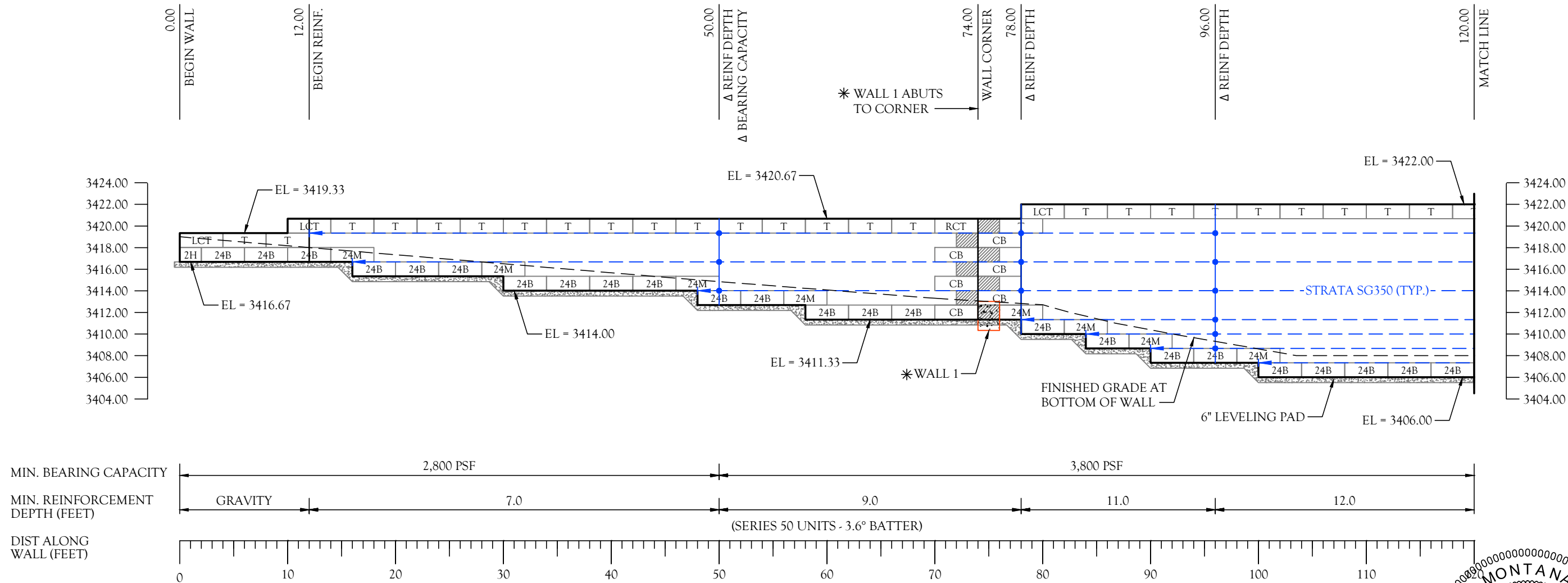
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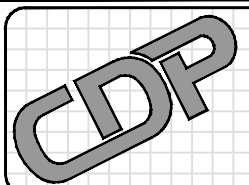
1. WALL 1 IS DESIGNED AS A GRAVITY WALL AND WALL 2 IS DESIGNED AS A REINFORCED WALL WITH STRATA SG350 AND SG550 GEOGRID REINFORCEMENT AT THE ELEVATIONS SHOWN.
2. ALL UNITS NOT SHOWN ARE 24" DEEP FULL MIDDLE UNITS.
- * 3. A GEOTEXTILE FABRIC SHALL BE PLACED WHERE RETAINING WALLS ABUT TO WALLS AS SHOWN ON SITE PLAN (SHEET 2). OVERLAP ALL ABUTMENT JOINTS 24" WITH A MINIMUM 48" WIDE FABRIC TO PREVENT THE COREFILL AND BACKFILL FROM MIGRATING THROUGH THE ABUTMENT JOINTS.
4. SEE MANUFACTURER INFORMATION FOR ADDITIONAL CONSTRUCTION DETAILS FOR THE RECON RETAINING WALL SYSTEM. THE MANUFACTURER INFORMATION SHALL ACCOMPANY THE CONSTRUCTION PLANS.

RECON BLOCK KEY:					
FHC	FULL HIGH CAPSTONE	43	CB	24" DEEP MIDDLE CORNER	17
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FEH	FENCE END HALF	6	2H	24" DEEP HALF MIDDLE	1
FB	FENCE BLOCK	34	24B	24" DEEP FULL BOTTOM	81
RCT	RIGHT CORNER TOP	6	45M	45" DEEP FULL MIDDLE	45
LCT	LEFT CORNER TOP	3	WWW.RECONWALLS.COM		

CONTRACTOR SHALL CONFIRM ALL QUANTITIES



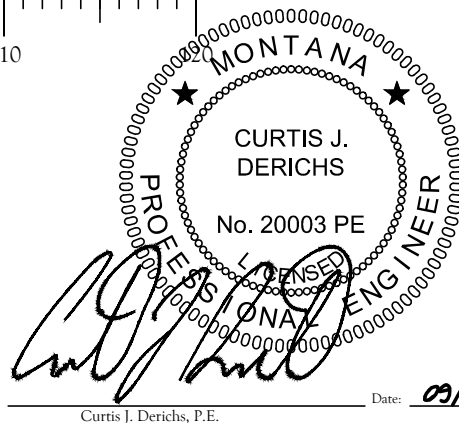
RECON WALL 2 - FRONT FACE ELEVATION



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Designed By: TPH	Project: TACO BELL - EMBARK CREDIT UNION GREAT FALLS, MONTANA	Registration No: 20003
Scale: 1" = 10'	Title: WALL 2 ELEVATION	Project No: 13-510
Date: SEPT 5, 2013		Sheet No: 4



1. WALL 1 IS DESIGNED AS A GRAVITY WALL AND WALL 2 IS DESIGNED AS A REINFORCED WALL WITH STRATA SG350 AND SG550 GEOGRID REINFORCEMENT AT THE ELEVATIONS SHOWN.
2. ALL UNITS NOT SHOWN ARE 24" DEEP FULL MIDDLE UNITS.
3. SEE MANUFACTURER INFORMATION FOR ADDITIONAL CONSTRUCTION DETAILS FOR THE RECON RETAINING WALL SYSTEM. THE MANUFACTURER INFORMATION SHALL ACCOMPANY THE CONSTRUCTION PLANS.

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RCT	RIGHT CORNER TOP	6	45M	45" DEEP FULL MIDDLE	45
LCT	LEFT CORNER TOP	3	WWW.RECONWALLS.COM		

[illegible]

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No.	Date	Revision	By
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Project:	TACO BELL - EMBARK CREDIT UNION GREAT FALLS, MONTANA
Title:	WALL 2 ELEVATION

A circular professional engineer seal for the state of Montana. The outer ring contains the word "MONTANA" at the top and "PROFESSIONAL ENGINEER" around the bottom, separated by two stars. Inside the ring, the name "CURTIS J. DERICH'S" is printed above the number "No. 20003 PE". Below the number, there are two overlapping signatures in black ink. At the very bottom of the seal, the words "LICENSED PROFESSIONAL ENGINEER" are visible. To the right of the seal, the date "Date: 09/10" is handwritten. A horizontal line runs across the bottom of the page, with the text "Curtis J. Derichs, P.E." written below it.

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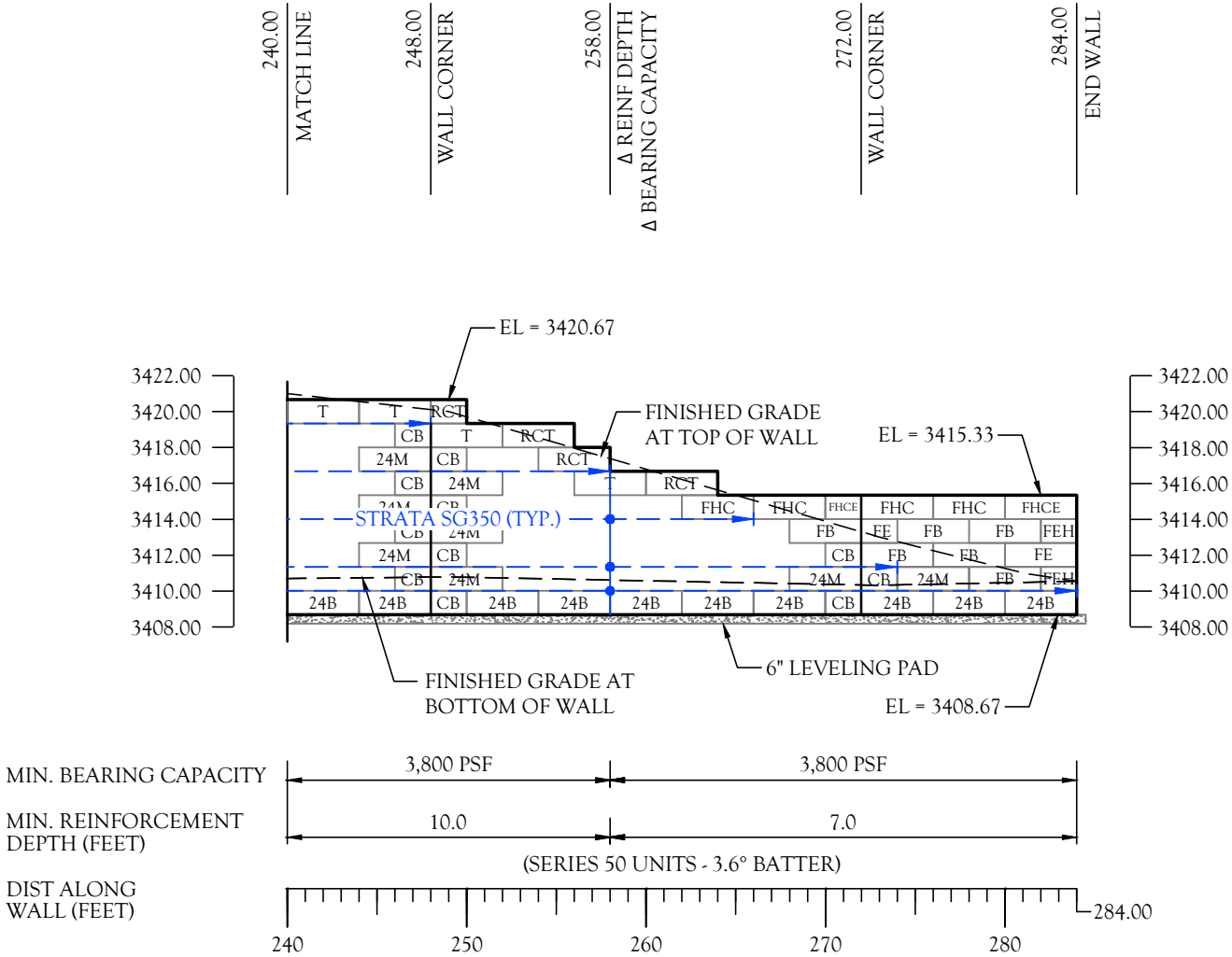
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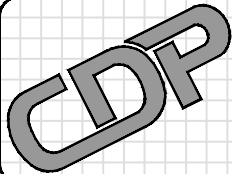
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FEH	FENCE END HALF	6	2H	24" DEEP HALF MIDDLE	1
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RCT	RIGHT CORNER TOP	6	45M	45" DEEP FULL MIDDLE	45
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CONTRACTOR SHALL CONFIRM ALL QUANTITIES



RECON WALL 2 - FRONT FACE ELEVATION



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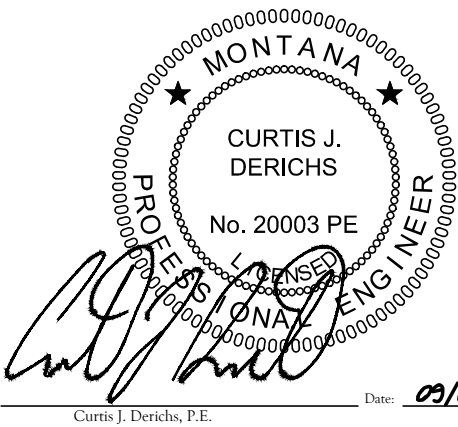
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Designed By:
TPH
Scale:
1" = 10'
Date:
SEPT 5, 2013

Project:
TACO BELL - EMBARK CREDIT UNION
GREAT FALLS, MONTANA
Title:
WALL 2 ELEVATION

Registration No:
20003
Project No:
13-510
Sheet No:
6



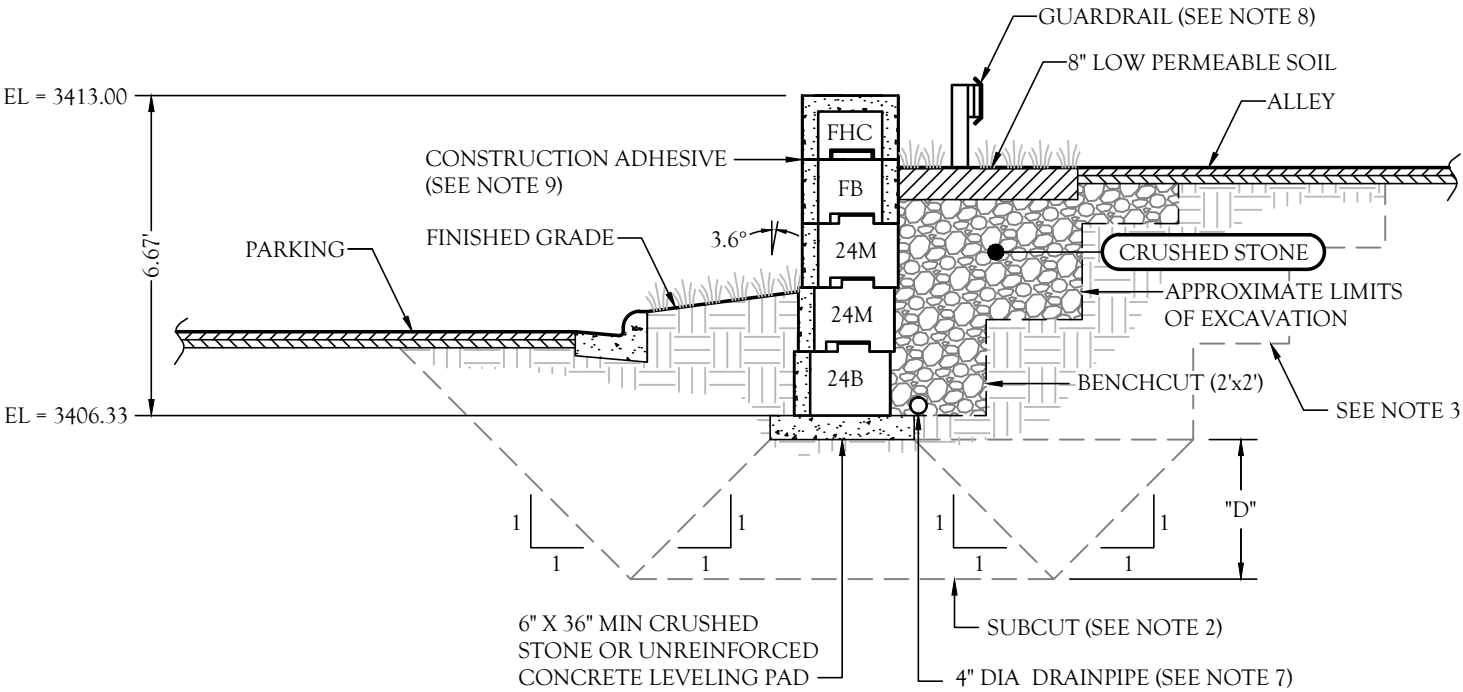
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GENERAL NOTES:

- 1. THE SECTION SHOWN IS A REPRESENTATIVE WALL SECTION. THE WALL HEIGHTS, ELEVATIONS, TOE SLOPES, AND BACK SLOPES VARY ACCORDING TO THE ELEVATION PLAN AND SITE PLAN RESPECTIVELY.
- 2. UPON EXCAVATION, WHERE UNSUITABLE SOILS ARE FOUND, SUBCUT TO DEPTH "D" AS REQUIRED BY THE ONSITE GEOTECHNICAL ENGINEER AND REPLACE WITH SUITABLE COMPACTED STRUCTURAL FILL TO ACHIEVE THE REQUIRED BEARING CAPACITY. THE STRUCTURAL FILL SHALL BE COMPACTED TO A MINIMUM 95% STANDARD PROCTOR DENSITY.
- 3. APPROXIMATE LIMITS OF EXCAVATION VARIES WHERE SUBCUT IS REQUIRED. ACTUAL LIMITS AND SIDE SLOPES SHALL BE DETERMINED BY OSHA REGULATIONS AND MATCH FIELD CONDITIONS AS DETERMINED BY THE CONTRACTOR.
- 4. ALL WORK AND MATERIALS SHALL COMPLY WITH ALL STATE, COUNTY AND CITY REGULATIONS AND CODES AS WELL AS OSHA STANDARDS.
- 5. WALL 1 IS DESIGNED AS A GRAVITY WALL AND WALL 2 IS DESIGNED AS A REINFORCED WALL WITH STRATA SG350 GEOGRID REINFORCEMENT AT THE ELEVATIONS SHOWN.

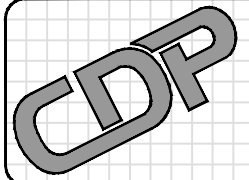
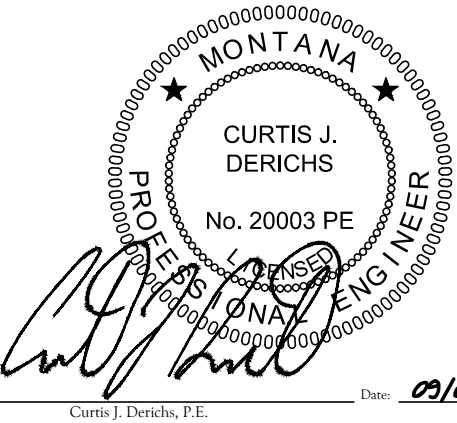
GENERAL NOTES:

- 6. WALL 1 SHALL BE BACKFILLED AT A 1H:1V EXTENDING OFF THE BACK OF THE BOTTOM UNIT WITH 100% FREE DRAINING, WASHED, ANGULAR CRUSHED STONE (SEE SPEC 2.07).
- 7. 4" CORRUGATED PERFORATED DRAINPIPE WRAPPED WITH A GEOTEXTILE FABRIC INSTALLED AT BACK OF BOTTOM UNIT (WALL 1). OUTLET INTO ONSITE DRAINAGE OR LOW END OF WALL.
- 8. FOR GUARDRAIL PLACEMENT, SEE DETAILS 8/9 AND DETAIL 4/10.
- 9. INSPECT EXCAVATION SLOPES FOR ACTIVE SEEPAGE AND PLACE ADDITIONAL DRAINS WHERE SEEPAGE OCCURS.
- 10. DO NOT BRING HEAVY COMPACTION OR PAVING EQUIPMENT WITHIN 3' OF THE BACK OF THE RECON RETAINING WALL.
- 11. SEE MANUFACTURER'S INFORMATION FOR ADDITIONAL DETAILS ON THE RECON RETAINING WALL SYSTEM. THE MANUFACTURER INFORMATION SHALL ACCOMPANY THE CONSTRUCTION PLANS.



LEGEND:	
FHC	FULL HIGH CAPSTONE
FB	FENCE BLOCK
24M	24" DEEP FULL MIDDLE
24B	24" DEEP FULL BOTTOM
45M	45" DEEP FULL MIDDLE

GRAVITY WALL SECTION A - A
(WALL 1 SECTION SHOWN AT 60')



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PROFESSIONALS
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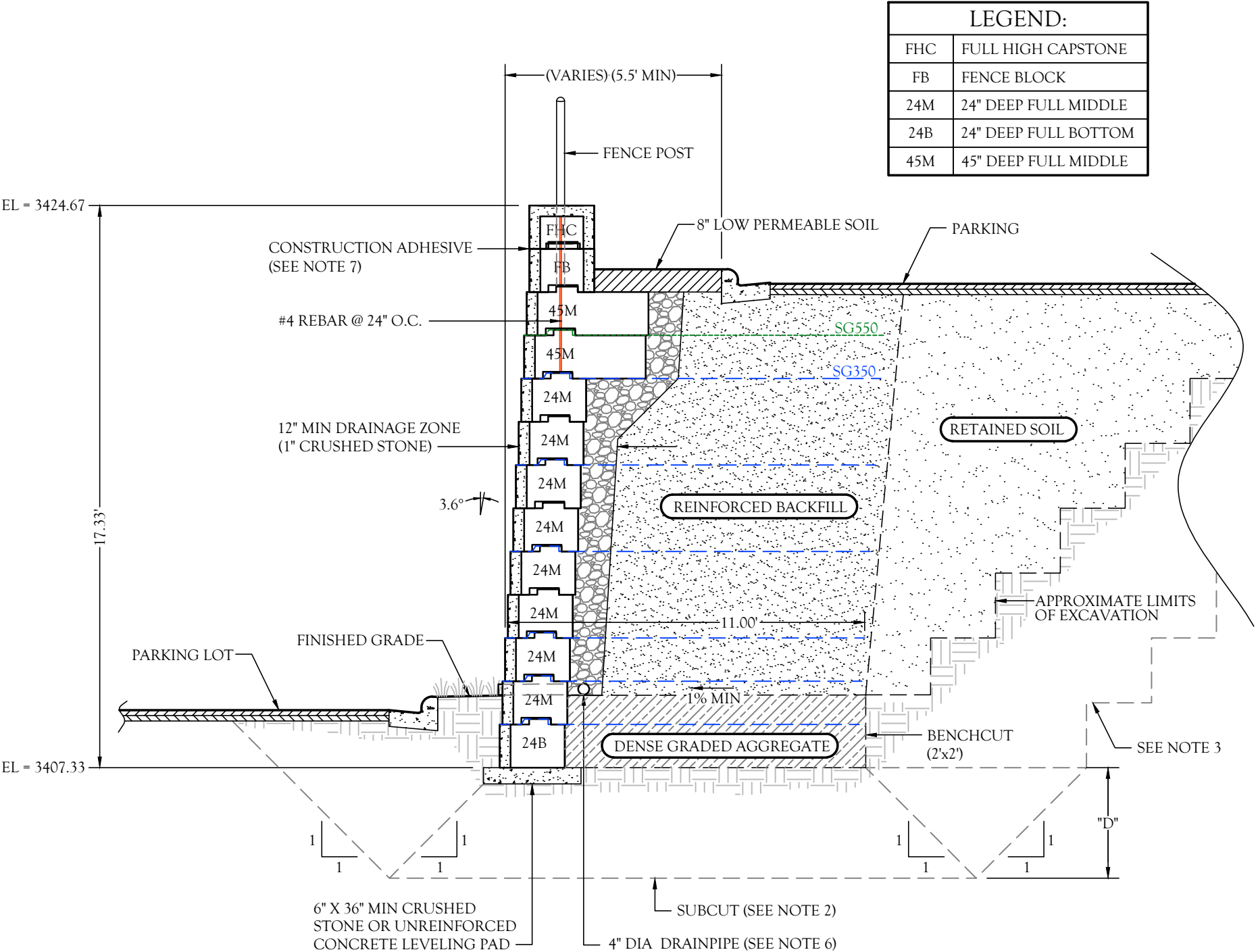
No.	Date	Revision	By
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Designed By: TPH	Project: TACO BELL - EMBARK CREDIT UNION GREAT FALLS, MONTANA	Registration No: 20003
Scale: 1/4" = 1' - 0"		Project No: 13-510
Date: SEPT 5, 2013	Title: TYPICAL WALL SECTION A - A	Sheet No: 7

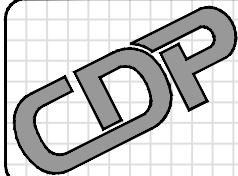
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2. UPON EXCAVATION, WHERE UNSUITABLE SOILS ARE FOUND, SUBCUT TO DEPTH "D" AS REQUIRED BY THE ONSITE GEOTECHNICAL ENGINEER AND REPLACE WITH SUITABLE COMPACTED STRUCTURAL FILL TO ACHIEVE THE REQUIRED BEARING CAPACITY. THE STRUCTURAL FILL SHALL BE COMPACTED TO A MINIMUM 95% STANDARD PROCTOR DENSITY.
3. APPROXIMATE LIMITS OF EXCAVATION VARIES WHERE SUBCUT IS REQUIRED. ACTUAL LIMITS AND SIDE SLOPES SHALL BE DETERMINED BY OSHA REGULATIONS AND MATCH FIELD CONDITIONS AS DETERMINED BY THE CONTRACTOR.
4. ALL WORK AND MATERIALS SHALL COMPLY WITH ALL STATE, COUNTY AND CITY REGULATIONS AND CODES AS WELL AS OSHA STANDARDS.
5. THE WALLS SHALL BE CONSTRUCTED WITH RECON 24" DEEP UNITS USING 3.6° BATTER. WALL 1 IS DESIGNED AS A GRAVITY WALL AND WALL 2 IS DESIGNED AS A REINFORCED WALL WITH STRATA SG350 GEOGRID REINFORCEMENT AT THE ELEVATIONS SHOWN.
6. 4" CORRUGATED PERFORATED DRAINPIPE WRAPPED WITH A GEOTEXTILE FABRIC INSTALLED AT FINISHED GRADE (WALL 2) ON TOP OF DENSE GRADED AGGREGATE WITH POSITIVE DRAINAGE (1% MIN). OUTLET THROUGH FACE AT 40' O.C. AND/OR ONSITE DRAINAGE AND LOW POINTS OF WALL.
7. CONSTRUCTION ADHESIVE SHALL BE PLACED BETWEEN UNITS TO PREVENT BLOCKS FROM DISLODGING DURING VEHICLE IMPACT. SEE MANUFACTURER'S INFORMATION FOR ADDITIONAL DETAILS.
8. INSPECT EXCAVATION SLOPES FOR ACTIVE SEEPAGE AND PLACE ADDITIONAL DRAINS WHERE SEEPAGE OCCURS.
9. DO NOT BRING HEAVY COMPACTION OR PAVING EQUIPMENT WITHIN 3' OF THE BACK OF THE RECON RETAINING WALL.
10. SEE MANUFACTURER'S INFORMATION FOR ADDITIONAL DETAILS ON THE RECON RETAINING WALL SYSTEM. THE MANUFACTURER INFORMATION SHALL ACCOMPANY THE CONSTRUCTION PLANS.



REINFORCED WALL SECTION B - B
(WALL 2 SECTION SHOWN AT 157')



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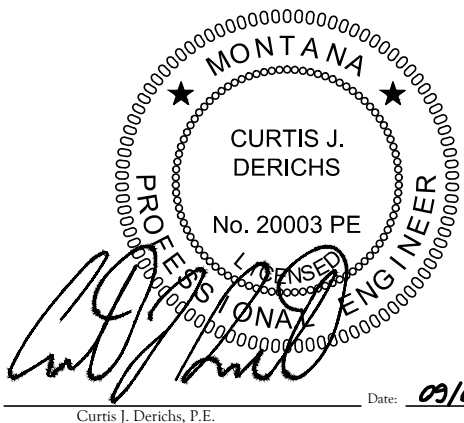
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Designed By:
TPH
Scale:
1/4" = 1' - 0"
Date:
SEPT 5, 2013

Project:
TACO BELL - EMBARK CREDIT UNION
GREAT FALLS, MONTANA
Title:
TYPICAL WALL SECTION B - B

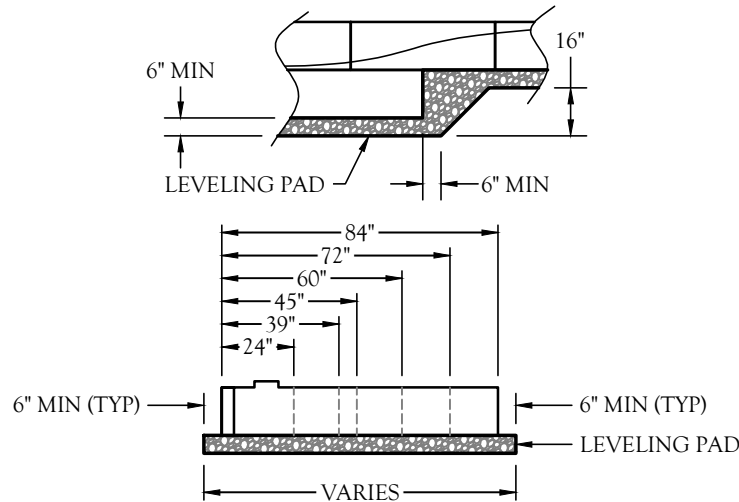
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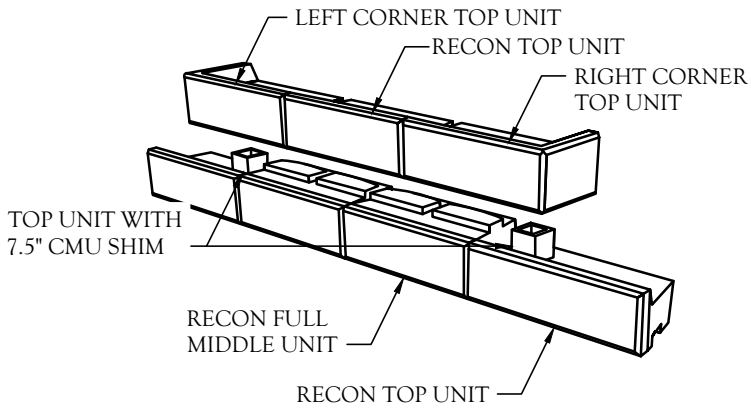
1. THE LEVELING PAD SHALL BE CONSTRUCTED OF CRUSHED STONE OR 2,000 PSI± UNREINFORCED CONCRETE.
2. THE CONTRACTOR SHALL HAVE A QUALIFIED GEOTECHNICAL ENGINEER VERIFY THE FOUNDATION SOILS TO ENSURE THAT IT MEETS OR EXCEEDS THE MINIMUM BEARING CAPACITY REQUIREMENTS.
3. THE BASE FOUNDATION SHALL BE APPROVED PRIOR TO PLACEMENT OF THE LEVELING PAD.



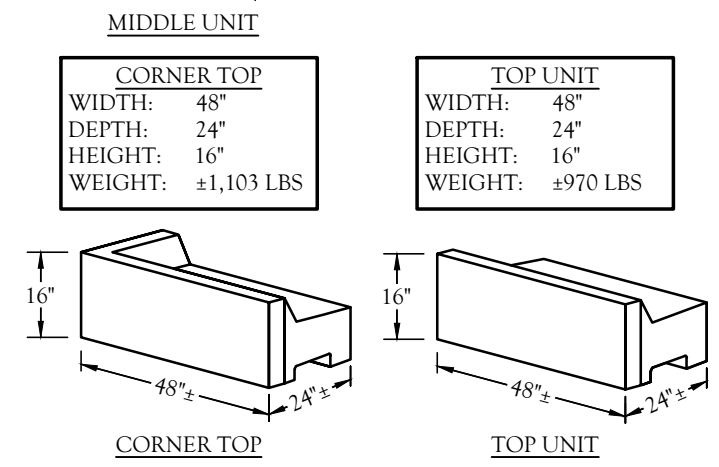
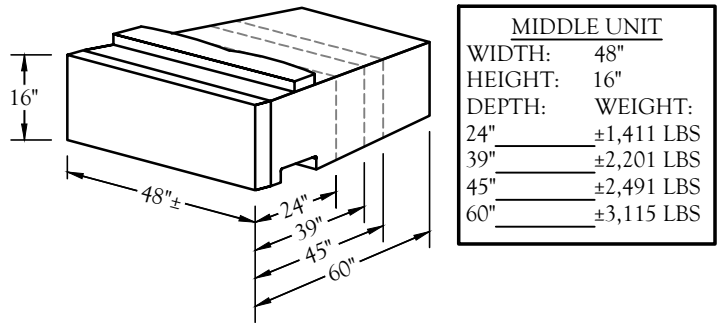
1 LEVELING PAD
9 SCALE: N.T.S.

NOTES:

1. IT WILL BE NECESSARY FOR BLOCK STABILITY TO ADD A CONCRETE SHIM BENEATH THE PORTION OF THE TOP CORNER UNIT THAT BEARS ON PART OF ANOTHER UNIT LOCATED BELOW.
2. THE SHIM IS TYPICALLY A STANDARD CONCRETE MASONRY UNIT (CMU). USING ADHESIVE ON THE SHIM WILL RESIST MOVEMENT DURING CONSTRUCTION.



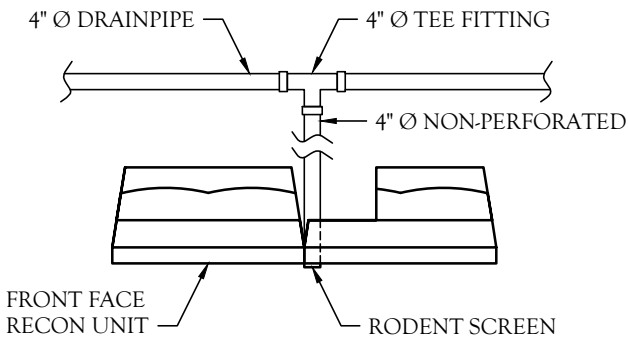
2 STANDARD TOP OF WALL STEP
9 SCALE: N.T.S.



3 RECON UNIT
9 SCALE: N.T.S.

NOTES:

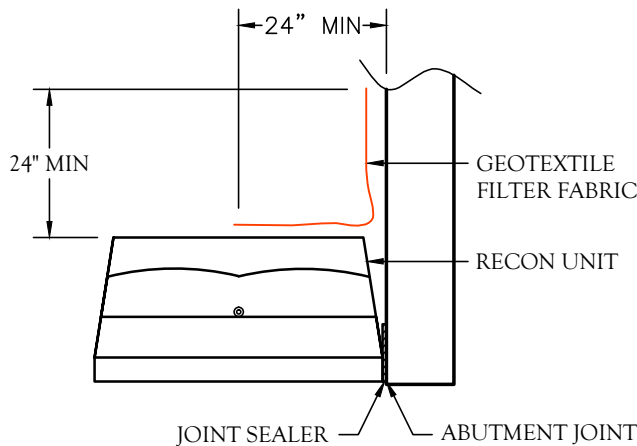
1. 4" DIAMETER CORRUGATED PERFORATED PLASTIC DRAINPIPE WRAPPED WITH A GEOTEXTILE FABRIC.
2. PROVIDE RODENT SCREEN AND 4" DIAMETER NON-PERFORATED PLASTIC PIPE OUTLET THROUGH WALL.
3. OUTLET INTO ONSITE DRAINAGE SYSTEM, THROUGH FACE OF WALL AT 50' O.C. MAXIMUM, AND/OR LOW POINTS ALONG WALL.



4 DRAINPIPE OUTLET
9 SCALE: N.T.S.

NOTES:

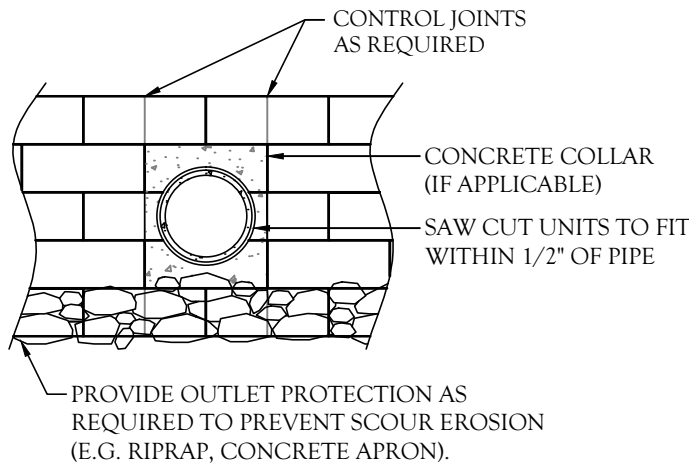
1. A GEOTEXTILE FABRIC SHALL BE PLACED WHERE THE RETAINING WALLS ABUT TO EXISTING FOUNDATIONS AS SHOWN ON THE RETAINING WALL SITE PLAN. OVERLAP ALL ABUTMENT JOINTS 24" WITH A MINIMUM 48" WIDE FABRIC.



5 ABUTMENT WRAP
9 SCALE: N.T.S.

NOTES:

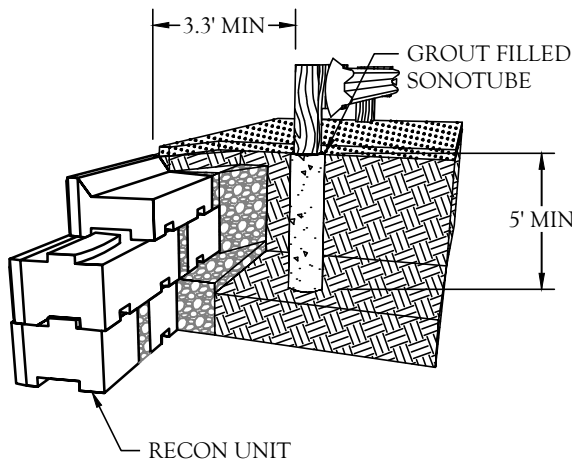
1. FOR PIPES LARGER THAN 24", A CONCRETE COLLAR MAY BE CAST AROUND PIPE FOR EASE OF CONSTRUCTION AND AESTHETICS.



6 TYPICAL PIPE OUTLET
9 SCALE: N.T.S.

NOTES:

1. PLACE SONOTUBES AT GUARDRAIL POST LOCATIONS.
2. GROUT GUARDRAIL POSTS INTO SONOTUBES.
3. DESIGNED BY OTHERS.

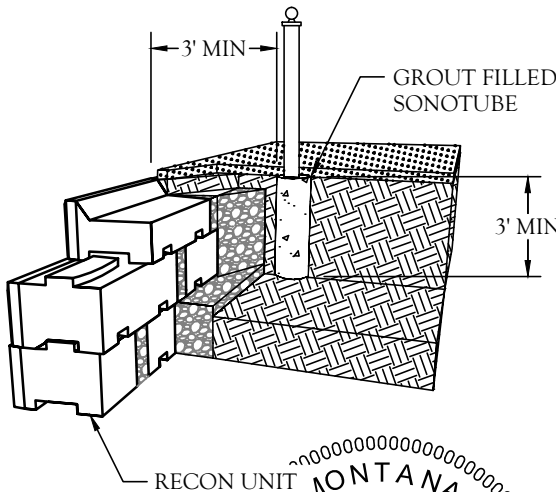


REFERENCE:
AASHTO 2002 STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES 17TH EDITION, SECTION 5 - RETAINING WALLS, TRAFFIC LOADS AND BARRIERS 5.8.12.2.

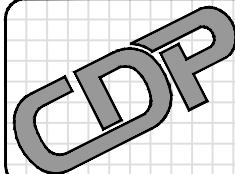
7 TYPICAL GUARDRAIL INSTALLATION
9 SCALE: N.T.S.

NOTES:

1. PLACE SONOTUBES AT FENCE POST LOCATIONS.
2. GROUT FENCE POSTS INTO SONOTUBES.
3. DESIGNED BY OTHERS.



8 TYPICAL FENCE POST INSTALLATION
9 SCALE: N.T.S.



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Scale:
AS NOTED
Date:
SEPT 5, 2013

Project:
TACO BELL - EMBARK CREDIT UNION
GREAT FALLS, MONTANA
Title:
TYPICAL RECON UNIT DETAILS

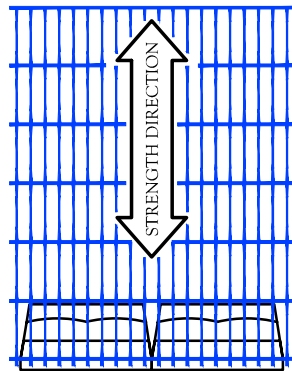
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20003
Project No:
13-510
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PROFESSIONAL ENGINEER
MONTANA
CURTIS J. DERICH
No. 20003 PE
Date: 09/05/13
Curtis J. Derichs, P.E.

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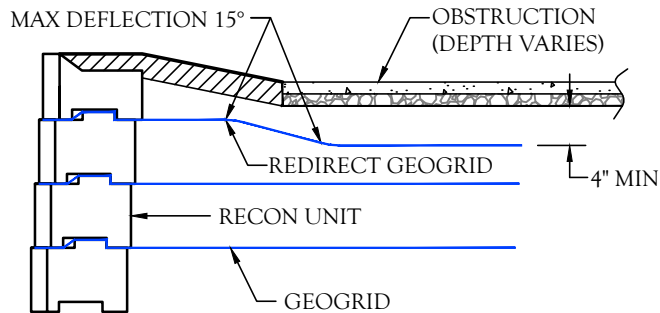
- 1. INSTALL GEOGRID IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATION AND CONSTRUCTION DRAWINGS.
- 2. LEVEL AND COMPACT BACKFILL MATERIAL TO THE LEVEL OF REINFORCEMENT.
- 3. POSITION GEOGRID OVER THE TONGUE AND GROOVE AND TO WITHIN 2" OF THE FRONT EXPOSED FACE. PLACE NEXT COURSE OF UNITS.
- 4. PRIOR TO BACKFILLING, PULL GEOGRID TAUT TO REMOVE WRINKLES AND FOLDS. STAKE GEOGRID AS REQUIRED.



1
10 GEOGRID ORIENTATION
SCALE: N.T.S.

NOTES:

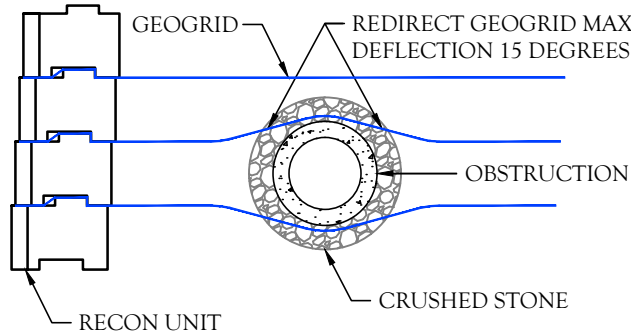
- 1. CONTRACTOR SHALL COORDINATE THE PLACEMENT OF GEOGRID TO AVOID CONFLICT WITH OBSTRUCTION (PAVEMENT). GEOGRID SHALL BE SEPARATED FROM OBSTRUCTION BY A MINIMUM OF 4" (AS SHOWN).



2
10 TYPICAL GEOGRID DEFLECTION
SCALE: N.T.S.

NOTES:

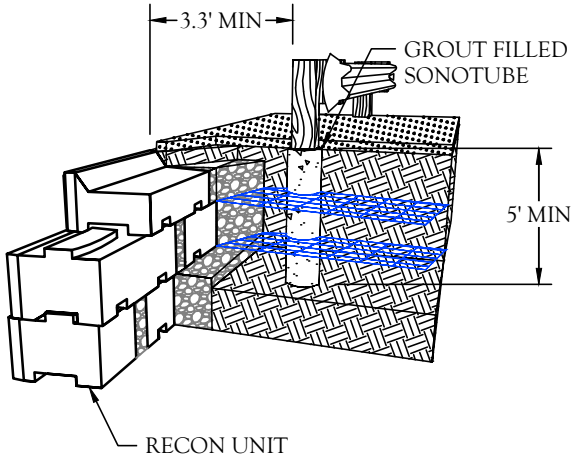
- 1. INSTALL GEOGRID IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATION AND CONSTRUCTION DRAWINGS.
- 2. PROVIDE 6" MINIMUM OF CRUSHED STONE AROUND UTILITY PIPE.
- 3. MAINTAIN 3" MINIMUM CLEARANCE BETWEEN GEOGRID AND UTILITY.



3
10 TYPICAL UTILITY PARALLEL TO WALL
SCALE: N.T.S.

NOTES:

- 1. PLACE SONOTUBES AT GUARDRAIL POST LOCATIONS.
- 2. HAND CUT GEOGRID AROUND SONOTUBE.
- 3. GROUT GUARDRAIL POSTS INTO SONOTUBES.
- 4. DESIGNED BY OTHERS.

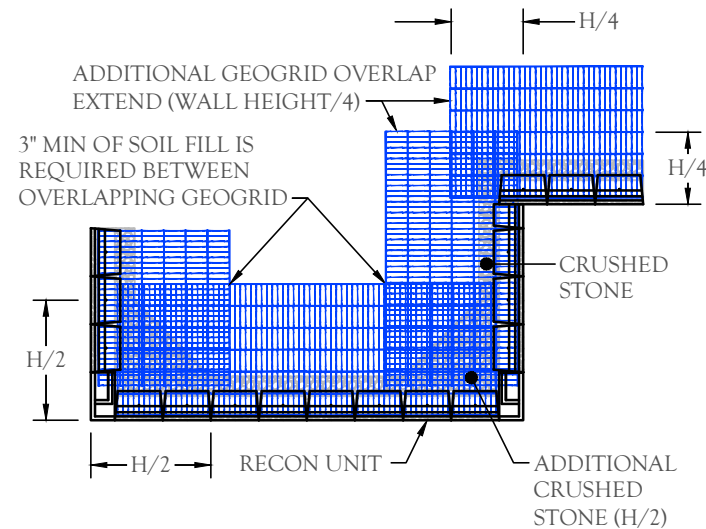


REFERENCE:
AASHTO 2002 STANDARD SPECIFICATIONS FOR HIGHWAY
BRIDGES 17TH EDITION, SECTION 5 - RETAINING WALLS,
TRAFFIC LOADS AND BARRIERS 5.8.12.2.

4
10 TYPICAL GUARDRAIL INSTALLATION
SCALE: N.T.S.

NOTES:

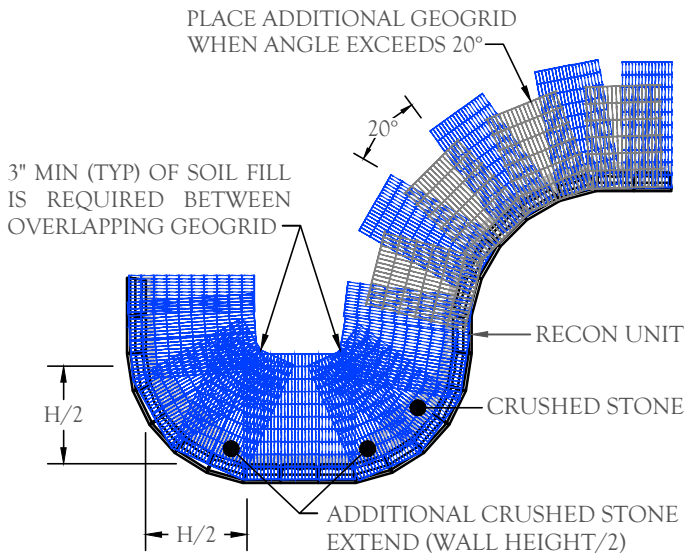
- 1. INSTALL GEOGRID IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATION AND CONSTRUCTION DRAWINGS.
- 2. 'H' IS WALL HEIGHT.



5
10 GEOGRID INSTALLATION ON CORNERS
SCALE: N.T.S.

NOTES:

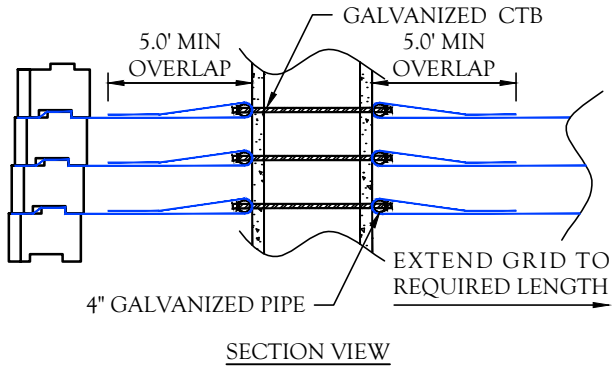
- 1. INSTALL GEOGRID IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATION AND CONSTRUCTION DRAWINGS.
- 2. "H" IS WALL HEIGHT.



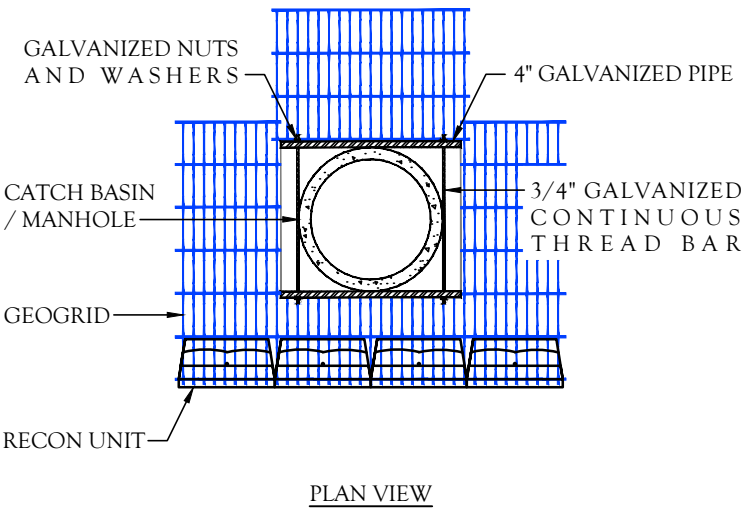
6
10 GEOGRID INSTALLATION ON CURVES
SCALE: N.T.S.

NOTES:

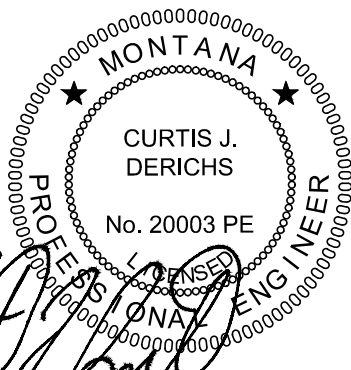
- 1. REINFORCE WALL AT CATCH BASINS AS SHOWN. ALL STEEL PARTS SHALL BE HOT-DIP GALVANIZED.



7
10 TYPICAL VERTICAL OBSTRUCTION
SCALE: N.T.S.

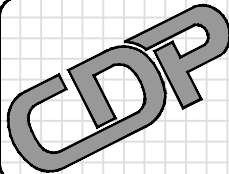


PLAN VIEW



Curtis J. Derichs, P.E.

Date: 09/05/13



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Designed By: TPH	Project: TACO BELL - EMBARK CREDIT UNION GREAT FALLS, MONTANA	Registration No: 20003
Scale: AS NOTED	Title: TYPICAL REINFORCMENT DETAILS	Project No: 13-510
Date: SEPT 5, 2013		Sheet No: 10

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VEHICLE BARRIER CONSTRUCTION NOTES:

1.

IN GENERAL, THE VEHICLE BARRIER WILL BE CONSTRUCTED ON TOP OF A RETAINING WALL BUILT WITH THE RECON BLOCK. THE RETAINING WALL MUST BE CONSTRUCTED PURSUANT TO RETAINING WALL SPECIFICATIONS, AS MODIFIED TO INCORPORATE THE VEHICLE BARRIER.
2.

THE VEHICLE BARRIER BLOCKS SHALL BE PRECAST WITH 6" DIAMETER HOLES OR COREDRILL HOLES ONSITE TO ALLOW FOR PLACEMENT OF VERTICAL REINFORCING (#5 REBAR) TO CONNECT BLOCKS DOWN TO THE SECOND COURSE OF 45" DEEP BLOCKS BELOW TOP OF WALL. IF CONTRACTOR OPTS TO COREDRILL HOLES ONSITE, HOLES MAY BE SMALLER THAN 6" AS THE NEED TO ALIGN HOLES DURING WALL CONSTRUCTION IS ELIMINATED.
3.

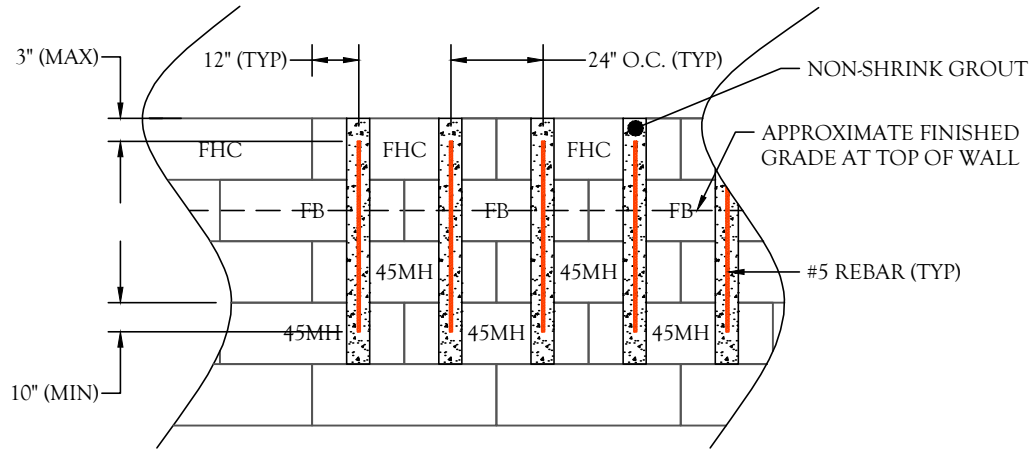
FENCE BLOCKS SHALL BE PLACED ABOVE TWO COURSES OF 45" DEEP BLOCKS ON THE TOP PORTION OF THE WALL. TAKE CARE TO MAKE SURE THAT THE PRECAST HOLES ALIGN THROUGH BOTH COURSES OF FENCE BLOCK AND THE TOP TWO COURSES OF 45" DEEP BLOCKS.
4.

PLACE REBAR IN HOLES AND FILL WITH NON-SHRINK GROUT. HOLE LOCATIONS SHALL BE DETERMINED BY MANUFACTURER AND RECON WALL SYSTEMS (TYPICALLY 24" O.C.).
5.

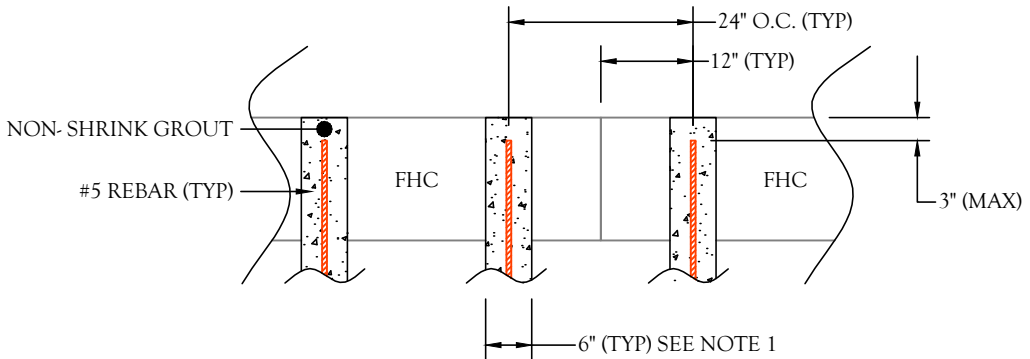
THE THE FULL HIGH CAPSTONE (FHC) SHALL BE BONDED TO THE WALL BARRIER WITH ADHESIVE TO PREVENT FHC FROM DISLODGING DURING VEHICLE IMPACT. ADHESIVE SHALL BE DESIGNED TO WITHSTAND MOISTURE AND TEMPERATURE EXTREMES, REMAIN FLEXIBLE, AND SHALL BE SPECIFICALLY FORMULATED FOR BONDING MASONRY TO MASONRY.
6.

DURING WALL CONSTRUCTION, AN ADDITIONAL FREESTANDING UNIT MAY BE REQUIRED TO MEET THE MINIMUM BARRIER HEIGHT REQUIREMENT WHEN THE FINISHED GRADE AT TOP OF WALL CHANGES IN ELEVATION.
7.

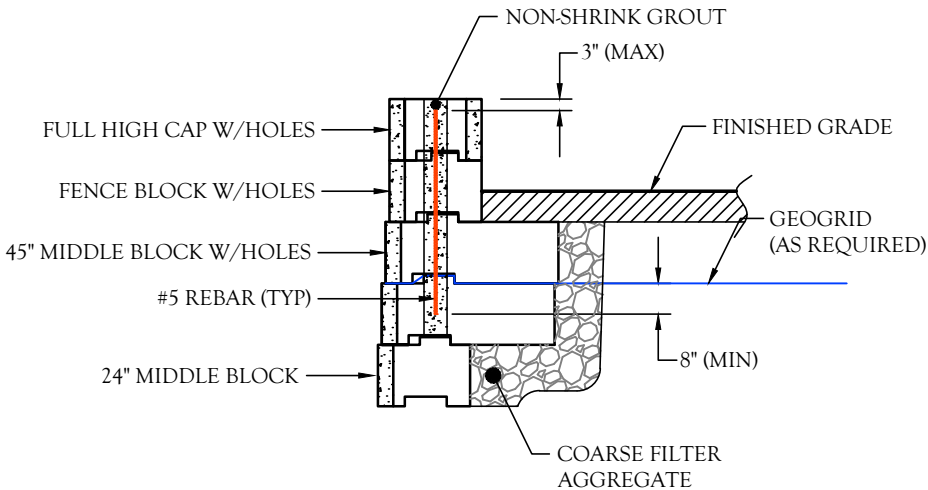
SEE MANUFACTURER'S INFORMATION FOR ADDITIONAL DETAILED INFORMATION AND REQUIREMENTS ON THE RECON WALL SYSTEM VEHICLE BARRIER. THE MANUFACTURER INFORMATION SHALL ACCOMPANY THE CONSTRUCTION PLANS.



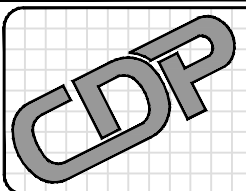
TYPICAL BARRIER ELEVATION DETAIL



ENLARGED BARRIER ELEVATION DETAIL



VEHICLE BARRIER SECTION

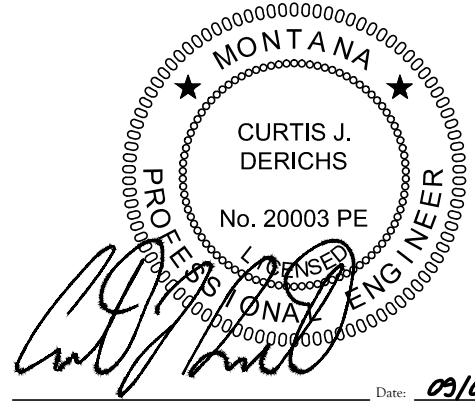


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Designed By: TPH	Project: TACO BELL - EMBARK CREDIT UNION GREAT FALLS, MONTANA	Registration No: 20003
Scale: N.T.S.	Title: TRAFFIC BARRIER DETAILS	Project No: 13-510
Date: SEPT 5, 2013		Sheet No: 11



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Date: 09/05/13

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PART 1: GENERAL

1.01 DESCRIPTION

- A. THE WORK TO BE PERFORMED INCLUDES SOURCING, PROVIDING AND INSTALLING CONCRETE RETAINING WALL BLOCKS TO THE LINES AND GRADES AS SPECIFIED ON THE PROJECT CONSTRUCTION DRAWINGS AND AS MAY BE FURTHER SPECIFIED HEREIN.
- B. WORK INCLUDES PREPARING FOUNDATION SOIL, FURNISHING AND INSTALLING LEVELING PAD, DRAINAGE AGGREGATE, AND BACKFILL TO THE LINES AND GRADES SHOWN ON THE CONSTRUCTION DRAWINGS.
- C. WORK INCLUDES FURNISHING AND INSTALLING ALL RELATED MATERIALS REQUIRED FOR CONSTRUCTION OF THE RETAINING WALL AS SHOWN ON THE CONSTRUCTION SHOP DRAWINGS.

1.02 REFERENCE STANDARDS

- A. ASTM D448 SIZES OF AGGREGATE FOR ROAD AND BRIDGE CONSTRUCTION.
- B. ASTM D698 LABORATORY COMPACTION CHARACTERISTICS USING STANDARD EFFORT.

1.03 QUALITY ASSURANCE

- A. OWNER SHALL BE RESPONSIBLE FOR SOIL TESTING AND INSPECTION QUALITY CONTROL DURING EARTHWORK OPERATIONS.

PART 2: MATERIALS

2.01 DEFINITIONS

- A. RETAINING WALL UNIT - A PRECAST CONCRETE SEGMENTAL FACING BLOCK THAT IS ABLE TO BE ARRANGED, STACKED, PLACED, COMBINED, OR INTERCHANGED EASILY INTO AN ASSEMBLED WALL SYSTEM.
- B. DRAINAGE AGGREGATE - CLEAN 1" CRUSHED ANGULAR ROCK LOCATED WITHIN AND IMMEDIATELY BEHIND THE RETAINING WALL UNITS TO FACILITATE DRAINAGE.
- C. FOUNDATION SOIL - SOIL ZONE IMMEDIATELY BENEATH THE RETAINING WALL FACING UNITS, THE WALL LEVELING PAD, AND THE REINFORCED SOIL ZONE.
- D. GEOGRID - A GEOSYNTHETIC MATERIAL MANUFACTURED OF HIGH TENSILE MATERIALS SPECIFICALLY FOR THE PURPOSE OF REINFORCING AND CREATING A STRUCTURAL SOIL MASS.
- E. LEVELING PAD - AN UNREINFORCED CAST-IN-PLACE OR COMPACTED CRUSHED STONE PAD WHICH SERVES AS A FLAT SURFACE FOR PLACING THE INITIAL COURSE OF PRECAST UNITS.
- F. REINFORCED BACKFILL - SOIL ZONE EXTENDING FROM THE DRAINAGE AGGREGATE ZONE TO THE BACK OF THE EMBEDDED GEOGRID.
- G. RETAINED BACKFILL - SOIL IMMEDIATELY BEHIND THE RETAINING WALL REINFORCED BACKFILL FOR A REINFORCED WALL OR THE SOIL IN THE 1H:1V ZONE UP FROM THE BACK OF THE BOTTOM BLOCK FOR A GRAVITY WALL..
- H. SUBSURFACE DRAINAGE SYSTEM - A SYSTEM FOR REMOVING WATER FROM BEHIND THE WALL AND CHANNELING IT TO A POINT OF POSITIVE DRAINAGE.

2.02 RECON UNITS

- A. RECON WALL UNITS SHALL HAVE A MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 4,000 PSI. STANDARD WEIGHT CONCRETE SHALL HAVE A 6% AIR ENTRAINMENT BY VOLUME. WEIGHT OF CONCRETE SHALL BE 145 PCF.
- B. TEXTURE ON THE FACE OF THE BLOCK SHALL BE AS SPECIFIED BY OWNER.

2.03 GEOGRID

- A. GEOGRID SHALL BE THE TYPE AS SHOWN ON THE DRAWINGS HAVING THE PROPERTY REQUIREMENTS DESCRIBED WITHIN THE MANUFACTURER'S SPECIFICATIONS AND REQUIRED BY THE DESIGN.

2.04 LEVELING PAD MATERIAL

- A. MATERIAL SHALL CONSIST OF UNREINFORCED CONCRETE OR COMPACTED CRUSHED STONE AS SHOWN ON THE CONSTRUCTION DRAWING.

2.05 DRAINAGE AGGREGATE

- A. DRAINAGE AGGREGATE SHALL CONSIST OF CLEAN 1" CRUSHED STONE OR CRUSHED GRAVEL MEETING THE FOLLOWING GRADATION:

SIEVE SIZE	% PASSING
1"	100
3/4"	100 - 75
NO. 4	0 - 10
NO. 200	0 - 5

2.06 REINFORCED BACKFILL (WALL 2) (GRANULAR MATERIAL - PHI 32°)

- A. REINFORCED BACKFILL SHALL BE FREE OF DEBRIS OR ORGANIC MATERIAL MEETING THE FOLLOWING GRADATION:

SIEVE SIZE	% PASSING
2"	100
3/4"	100 - 75
NO. 4	20 - 100
NO. 40	0 - 60
NO. 200	0 - 25

PLASTICITY INDEX (PI)<10

- B. THE MAXIMUM AGGREGATE SIZE SHALL BE LIMITED TO 2" UNLESS FIELD TESTS HAVE BEEN PERFORMED TO EVALUATE POTENTIAL STRENGTH REDUCTION TO INSTALLATION.
- C. MATERIAL CAN BE SITE EXCAVATED MATERIAL WHEN THE ABOVE REQUIREMENTS ARE MET. UNSUITABLE SOILS FOR BACKFILL (HIGH PLASTIC CLAYS OR ORGANIC MATERIALS) SHALL NOT BE USED IN THE REINFORCED SOIL MASS.
- D. CONTRACTOR SHALL SUBMIT REINFORCED FILL SAMPLE AND TEST RESULTS TO THE ARCHITECT/ENGINEER FOR APPROVAL PRIOR TO CONSTRUCTION.

2.07 RETAINED BACKFILL (WALL 1) (CRUSHED STONE - PHI 40°)

- A. RETAINED BACKFILL SHALL BE FREE OF DEBRIS OR ORGANIC MATERIAL MEETING THE FOLLOWING GRADATION:

SIEVE SIZE	% PASSING
1"	100
3/4"	100 - 75
NO. 4	0 - 10
NO. 200	0 - 5

2.08 RETAINED BACKFILL (WALL 2) (ONSITE LEAN CLAY - PHI 26°)

- A. RETAINED BACKFILL SHALL BE FREE OF DEBRIS OR ORGANIC MATERIAL MEETING THE FOLLOWING GRADATION:

SIEVE SIZE	% PASSING
2"	100
3/4"	100 - 75
NO. 4	20 - 100
NO. 200	0 - 60

PLASTICITY INDEX (PI)<20 AND LIQUID LIMITS (LL)<40

- B. THE MAXIMUM AGGREGATE SIZE SHALL BE LIMITED TO 2" UNLESS FIELD TESTS HAVE BEEN PERFORMED TO EVALUATE POTENTIAL STRENGTH REDUCTION TO INSTALLATION.
- C. MATERIAL CAN BE SITE EXCAVATED MATERIAL WHEN THE ABOVE REQUIREMENTS ARE MET. UNSUITABLE SOILS FOR BACKFILL (HIGH PLASTIC CLAYS OR ORGANIC MATERIALS) SHALL NOT BE USED IN THE REINFORCED SOIL MASS.
- D. CONTRACTOR SHALL SUBMIT REINFORCED FILL SAMPLE AND TEST RESULTS TO THE ARCHITECT/ENGINEER FOR APPROVAL PRIOR TO CONSTRUCTION.

PART 3: EXECUTION

3.01 EXCAVATION

- A. CONTRACTOR SHALL EXCAVATE TO THE LINES AND GRADES SHOWN ON THE CONSTRUCTION DRAWINGS. CONTRACTOR SHALL BE CAREFUL NOT TO DISTURB EMBANKMENT AND FOUNDATION MATERIALS BEYOND LINES SHOWN.

3.02 FOUNDATION SOIL PREPARATION

- A. FOUNDATION SOIL SHALL BE EXCAVATED AS REQUIRED FOR LEVELING PAD DIMENSIONS SHOWN ON THE CONSTRUCTION DRAWINGS, OR AS DIRECTED BY THE GEOTECHNICAL ENGINEER.
- B. UNSUITABLE SOILS SHALL BE REMOVED AND REPLACED WITH ACCEPTABLE MATERIAL.
- C. OVER-EXCAVATED AREAS SHALL BE BACKFILLED WITH APPROVED COMPACTED BACKFILL MATERIAL.

3.03 BASE LEVELING PAD

- A. LEVELING PAD MATERIALS SHALL BE PLACED UPON APPROVED FOUNDATION AS SHOWN ON THE CONSTRUCTION DRAWINGS TO A MINIMUM THICKNESS OF 6".
- B. AGGREGATE MATERIAL SHALL BE COMPACTED TO PROVIDE A DENSE, LEVEL SURFACE ON WHICH TO PLACE THE FIRST COURSE OF MODULAR UNITS. COMPACTION SHALL BE TO 95% OF STANDARD PROCTOR DENSITY AS DETERMINED IN ACCORDANCE WITH ASTM D698. FOR CRUSHED ROCK, MATERIAL SHALL BE DENSELY COMPACTED AS DETERMINED BY VISUAL OBSERVATION.

3.04 UNIT INSTALLATION

- A. THE FIRST COURSE OF CONCRETE MODULAR WALL UNITS SHALL BE CAREFULLY PLACED ON THE BASE LEVELING PAD. EACH UNIT SHALL BE CHECKED FOR LEVEL AND ALIGNMENT.
- B. UNITS ARE PLACED SIDE BY SIDE FOR FULL LENGTH OF WALL ALIGNMENT. ALIGNMENT MAY BE DONE BY MEANS OF A STRING LINE OR OFFSET FROM A BASE LINE.
- C. SWEEP EXCESS MATERIAL FROM TOP OF UNITS AND INSTALL NEXT COURSE. ENSURE THAT EACH COURSE IS COMPLETELY UNIT FILLED, BACKFILLED AND COMPACTED PRIOR TO PROCEEDING TO NEXT COURSE.

3.05 GEOGRID INSTALLATION

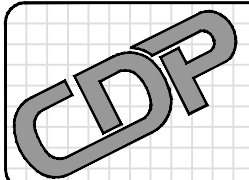
- A. GEOGRID SHALL BE LAID AT THE PROPER ELEVATIONS AND ORIENTATION AS SHOWN ON THE CONSTRUCTION DRAWINGS OR AS DIRECTED BY THE ENGINEER. EMBED GRID OVER THE TONGUE AND GROOVE AND UP THE UNEXPOSED FRONT EDGE OF THE BLOCK.
- B. THE GEOGRID SHALL BE PULLED TAUT (50LBS/FT) TO ELIMINATE LOOSE FOLDS AND PRETENSION THE REINFORCEMENT. STAKE OR SECURE BACK EDGE OF GEOGRID PRIOR TO AND DURING BACKFILL AND COMPACTION.
- C. CORRECT ORIENTATION (ROLL DIRECTION) OF THE GEOGRID SHALL BE VERIFIED BY THE CONTRACTOR.

3.06 FILL PLACEMENT

- A. BACKFILL MATERIAL SHALL BE PLACED WITH A MAXIMUM OF 8" LIFTS AND COMPACTED TO 95% OF STANDARD PROCTOR DENSITY. AS DETERMINED IN ACCORDANCE WITH ASTM D698. THE IN PLACE MOISTURE CONTENT SHALL NOT EXCEED THE OPTIMUM MOISTURE CONTENT AS DETERMINED IN ACCORDANCE WITH ASTM D698 AND BE NO LOWER THAN 2% BELOW OPTIMUM MOISTURE CONTENT.
- B. ONLY HAND-OPERATED COMPACTION EQUIPMENT SHALL BE ALLOWED WITHIN 3' OF THE BACK SURFACE OF THE CONCRETE UNITS.

3.07 CAPSTONE / FREE STANDING BLOCK INSTALLATION

- A. CLEAN AND APPLY ADHESIVE TO TOP COURSE OF RECON WALL UNITS PRIOR TO PLACING CAPSTONE.
- B. CAPSTONES SHALL BE SET IN A BED OF ADHESIVE DESIGNED TO WITHSTAND MOISTURE AND TEMPERATURE EXTREMES, REMAIN FLEXIBLE, AND SHALL BE SPECIFICALLY FORMULATED FOR BONDING MASONRY TO MASONRY.
- C. TRIM SIDES OF INTERIOR CAPSTONES TO INSURE PROPER FIT WITH WALL. DO NOT LEAVE CUT SURFACES EXPOSED TO VIEW IN THE FINISHED WALL.

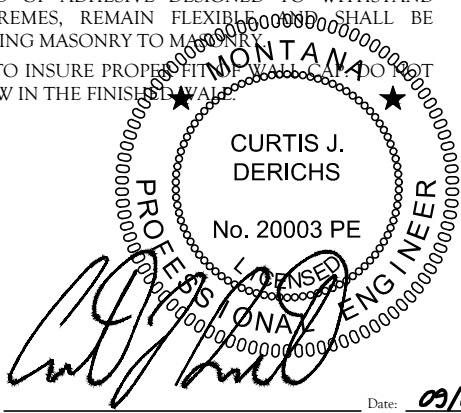


Civil Design
PROFESSIONALS

8609 LYNDALE AVENUE SOUTH, SUITE 200 BLOOMINGTON, MN 55420
PHONE: (952) 303-5312 | FAX: (763) 392-1989 | WEBSITE: WWW.CDP.US.COM
SITE SOLUTION PROFESSIONALS, INC. D.B.A. CIVIL DESIGN PROFESSIONALS

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Designed By: TPH	Project: TACO BELL - EMBARK CREDIT UNION GREAT FALLS, MONTANA	Registration No: 20003
Scale: N.T.S.		Project No: 13-510
Date: SEPT 5, 2013	Title: SPECIFICATIONS	Sheet No: 12



Curtis J. Derichs, P.E.

Date: 09/05/13