SEGMENTAL RETAINING WALL SPECIFICATIONS

PART 1 - GENERAL NOTES

1.1 SCOPE OF WORK

FURNISHING AND INSTALLING SEGMENTAL RETAINING WALL UNITS, GEOGRID REINFORCEMENT, WALL FILL, AND BACKFILL TO THE LINES AND GRADES SHOWN ON THE CONSTRUCTION DRAWINGS AND AS SPECIFIED HEREIN. THE CONTRACT ALSO INCLUDES THE FURNISHING AND INSTALLING ALL APPURTENANT MATERIALS, EQUIPMENT, AND LABOR REQUIRED FOR CONSTRUCTION OF THE GEOGRID REINFORCED, SEGMENTAL RETAINING WALL. ALL EXISTING AND PROPOSED CONSTRUCTION AND SITE GRADING INFORMATION WAS REFERENCED FROM AN ELECTRONIC VERSION OF THE *GRADING AND DRAINAGE PLAN* (SHEET C7.1) FOR CAMPBELL POINTE TOWNHOMES PH5-6, DATED AUGUST 21, 2019, PREPARED BY DRAPER ADEN ASSOCIATES (DAA).

1.2 REFERENCE STANDARDS

A. ASTM C90-75 (1981 REV) - HOLLOW LOAD BEARING MASONRY UNITS.
B. ASTM C140-75 (1981 REV) - SAMPLING AND TESTING CONCRETE MASONRY UNITS.
C. ASTM C145-75 (1981 REV) - SOLID LOAD BEARING CONCRETE MASONRY UNITS.
D. GEOSYNTHETIC RESEARCH INSTITUTE (GRI), GRI-GG4 - DETERMINATION OF LONG TERM DESIGN STRENGTH OF GEOGRIDS.
E. ASTM D 638 - TEST METHOD FOR TENSILE PROPERTIES OF PLASTIC.
F. ASTM D 1248 - SPECIFICATION OF POLYETHYLENE PLASTICS MOLDING AND EXTRUSION MATERIALS.
G. ASTM D 4218 - TEST METHOD FOR CARBON BLACK CONTENT IN POLYETHYLENE COMPOUNDS BY THE MUFFLE FURNACE TECHNIQUE.
H. ASTM D 3034 - SPECIFICATION FOR POLYVINYL CHLORIDE (PVC) PIPE.
I. ASTM C 1372 - SPECIFICATIONS FOR SEGMENTAL RETAINING WALL UNITS.
J. ASTM D 2487 - STANDARD PRACTICE FOR CLASSIFICATION OF SOILS FOR ENGINEERING PURPOSES (UNIFIED SOIL CLASSIFICATION SYSTEM)

1.3 DELIVERY, STORAGE AND HANDLING

A. CONTRACTOR SHOULD CHECK THE MATERIALS UPON DELIVERY TO ASSURE THAT PROPER MATERIAL HAS BEEN RECEIVED.
B. CONTRACTOR SHOULD PREVENT EXCESSIVE MUD, WET CEMENT, EPOXY, AND LIKE MATERIALS WHICH MAY AFFIX THEMSELVES, FROM COMING IN CONTACT WITH THE MATERIALS.
C. GEOGRIDS SHOULD BE STORED ABOVE -20° F.
D. CONTRACTOR SHOULD PROTECT THE MATERIALS FROM DAMAGE. DAMAGED MATERIAL SHOULD NOT BE INCORPORATED INTO THE REINFORCED RETAINING WALL.

1.4 SUBMITTALS/CERTIFICATION

THE CONTRACTOR SHALL SUBMIT A MANUFACTURER'S CERTIFICATION, PRIOR TO THE START OF THE WORK, THAT THE RETAINING WALL SYSTEM COMPONENTS MEET THE REQUIREMENTS OF ASTM C 1372 AND OTHER REQUIREMENTS SPECIFIED HEREIN. THIS CERTIFICATION SHOULD BE PROVIDED TO THE GEOTECHNICAL ENGINEER FOR REVIEW AND APPROVAL PRIOR TO WALL CONSTRUCTION.

PART 2 - PRODUCTS

2.1 DEFINITIONS

A. GEOGRID IS A HIGH DENSITY POLYETHYLENE OR POLYPROPYLENE GRID, SPECIFICALLY FABRICATED FOR USE AS A SOIL REINFORCEMENT.
B. CONCRETE RETAINING WALL UNITS ARE AS DETAILED ON THE DRAWINGS AND AS SPECIFIED HEREIN.
C. GEOSYNTHETIC DRAINAGE COMPOSITES ARE POLYETHYLENE NET STRUCTURE WITH NON-WOVEN GEOTEXTILES BONDED TO BOTH SIDES.
D. REINFORCED BACKFILL IS THE SOIL WHICH IS USED AS FILL FOR THE REINFORCED SOIL MASS.
E. CONTROLLED FILL IS THE SOIL WHICH IS USED AS FILL IN AREAS OUTSIDE THE REINFORCED SOIL MALL.
F. FOUNDATION SOIL IS THE IN-SITU SOIL OR CONTROLLED COMPACTED FILL PLACED BELOW THE BOTTOM OF THE RETAINING WALL AND GEOGRID ZONE.

2.2 MATERIALS

THE CONTRACTOR SHOULD SUBMIT MANUFACTURER'S CATALOG AND SAMPLES OF THE PROPOSED MATERIALS FOR APPROVAL BY THE PROJECT GEOTECHNICAL ENGINEER A MINIMUM OF SEVEN DAYS BEFORE THE START OF CONSTRUCTION. MATERIALS SHOULD BE TRANSPORTED TO THE SITE ONLY AFTER APPROVAL OF THE PROPOSED MATERIALS BY THE PROJECT GEOTECHNICAL ENGINEER.

A. CONCRETE UNITS

1. MASONRY UNITS SHOULD BE ANCHOR DIAMOND PRO PS RETAINING WALL UNITS. SUBSTITUTION OF OTHER CONCRETE UNITS OF SUBSTANTIALLY SIMILAR SIZE AND WEIGHT MAY BE ALLOWED WITH THE PRIOR APPROVAL OF THE GEOTECHNICAL ENGINEER.
2. CONCRETE WALL UNITS SHOULD HAVE A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 3000 PSI, IN ACCORDANCE WITH ASTM C-90. THE CONCRETE SHOULD HAVE ADEQUATE FREEZE/THAW PROTECTION WITH A MAXIMUM MOISTURE ABSORPTION OF 6 PERCENT.
3. MODULAR CONCRETE MATERIALS SHALL CONFORM TO THE REQUIREMENTS OF ASTM C 1372 - STANDARD SPECIFICATIONS FOR SEGMENTAL RETAINING WALL UNITS.
4. THE UNITS SHALL PASS 100 FREEZE/THAW CYCLES IN WATER WITH LESS THAN 1% WEIGHT LOSS IN ACCORDANCE WITH ASTM C 1372.
5. EXTERIOR DIMENSIONS MAY VARY. UNITS ARE REQUIRED TO HAVE A MINIMUM OF ONE SQUARE FOOT OF FACE AREA EACH.
6. UNITS SHOULD HAVE ANGLED SIDES AND BE CAPABLE OF ATTAINING CONCAVE AND CONVEX ALIGNMENT CURVES IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS. UNITS SHOULD BE INTERLOCKED WITH NON-CORROSIVE REINFORCED FIBERGLASS PINS.
7. UNITS SHOULD BE INTERLOCKED TO PROVIDE 1 INCH OF SETBACK PER BLOCK (7.1° BATTER ANGLE).

B. LEVELING PAD

MATERIAL FOR LEVELING PAD/FOOTING SHOULD CONSIST OF COMPACTED COARSE GRADED AGGREGATES MEETING THE REQUIREMENTS OF AGGREGATE BASE COURSE (ABC) AS SPECIFIED IN THE 2018 NORTH CAROLINA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES. A MINIMUM OF 6 INCHES DEEP AND 30 INCHES WIDE COMPACTED LEVELING PAD IS REQUIRED.

C. FIBERGLASS CONNECTING PINS

1. THERMOSET ISOPTHALIC POLYESTER RESIN PULTRUDED FIBERGLASS REINFORCEMENT RODS, A MINIMUM ONE-HALF INCH IN DIAMETER.
2. PINS SHOULD HAVE A MINIMUM FLEXURAL STRENGTH OF 128,000 PSI AND SHORT BEAM SHEAR OF 6,400 PSI.
3. FOR SUBSTITUTE CONCRETE UNITS, USE OF OTHER COMPATIBLE CONNECTOR SYSTEMS MAY BE ALLOWED WITH THE PRIOR APPROVAL OF THE GEOTECHNICAL ENGINEER.

D. GEOGRID

GEOGRID SHOULD CONSIST OF MIRAGRID 05XT, OR EQUIVALENT AS APPROVED BY THE GEOTECHNICAL ENGINEER. THE GEOGRID SHOULD HAVE A MINIMUM LONG-TERM DESIGN STRENGTH OF 2,768 POUNDS PER FOOT. THE LONG-TERM DESIGN STRENGTH IS DEFINED AS THE ULTIMATE STRENGTH DIVIDED BY REDUCTION FACTORS FOR CREEP, DURABILITY, AND INSTALLATION DAMAGE.

E. REINFORCED BACKFILL

REINFORCED BACKFILL SHOULD CONSIST OF CONTROLLED, COMPACTED GRANULAR SOILS MEETING THE REQUIREMENTS OF UNIFIED SOIL CLASSIFICATION SYSTEM (USCS) GW, GP, GM, SW, SP, SM IN ACCORDANCE WITH ASTM D2487, WITH MAXIMUM LIQUID LIMIT OF 40, MAXIMUM PLASTICITY INDEX OF 15, AND MINIMUM INTERNAL FRICTION ANGLE OF 30 DEGREES. ALTERNATE SOIL CLASSIFICATIONS MAY BE CONSIDERED ON A CASE-BY-CASE BASIS, PROVIDED THEY MEET THE LIQUID LIMIT, PLASTICITY INDEX, AND INTERNAL FRICTION ANGLE REQUIREMENTS SPECIFIED ABOVE. BASED ON THE AVAILABLE SUBSURFACE INFORMATION, SUITABLE MATERIALS MAY BE AVAILABLE FROM ON-SITE EXCAVATIONS. HOWEVER, SEGREGATION AND STOCKPILING OF SUITABLE MATERIALS WILL LIKELY BE REQUIRED. IF ADEQUATE QUANTITIES OF THESE MATERIALS ARE NOT AVAILABLE ON-SITE, IMPORTED BACKFILL SHOULD MEET THE ABOVE REQUIREMENTS, AND SHOULD BE APPROVED BY THE GEOTECHNICAL ENGINEER PRIOR TO PLACEMENT. LABORATORY TESTING, INCLUDING CLASSIFICATION AND DIRECT SHEAR TESTING, WILL BE REQUIRED TO VERIFY THE DESIGN SOIL PROPERTIES. ALL REINFORCED BACKFILL SHOULD BE PLACED AS CONTROLLED FILL COMPACTED TO MINIMUM 95 PERCENT OF THE MAXIMUM DRY DENSITY IN ACCORDANCE WITH THE STANDARD PROCTOR (ASTM D-698) AT MOISTURE CONTENTS WITHIN 2 PERCENTAGE POINTS OF OPTIMUM.

F. CONTROLLED FILL

CONTROLLED FILL SOILS TO BE PLACED OUTSIDE THE REINFORCED BACKFILL AREA WITHIN 25 FEET OF THE RETAINING WALL FACE SHOULD CONSIST OF ON-SITE OR IMPORTED BORROW SOILS MEETING THE REQUIREMENTS OF UNIFIED SOIL CLASSIFICATION SYSTEM (USCS) GW, GP, GM, SW, SP, SM IN ACCORDANCE WITH ASTM D2487, WITH MAXIMUM LIQUID LIMIT OF 40, MAXIMUM PLASTICITY INDEX OF 15, AND MINIMUM INTERNAL FRICTION ANGLE OF 30 DEGREES. ALTERNATE SOIL CLASSIFICATIONS MAY BE CONSIDERED ON A CASE-BY-CASE BASIS, PROVIDED THEY MEET THE LIQUID LIMIT, PLASTICITY INDEX, AND INTERNAL FRICTION ANGLE REQUIREMENTS SPECIFIED ABOVE. LABORATORY TESTING, INCLUDING CLASSIFICATION AND DIRECT SHEAR TESTING, WILL BE REQUIRED TO VERIFY THE DESIGN SOIL PROPERTIES. ALL FILL MATERIALS PROPOSED TO BE PLACED BEHIND THE REINFORCED BACKFILL ZONE SHOULD BE PLACED AS CONTROLLED FILL COMPACTED TO MINIMUM 95 PERCENT OF THE MAXIMUM DRY DENSITY IN ACCORDANCE WITH THE STANDARD PROCTOR (ASTM D-698) AT MOISTURE CONTENTS WITHIN 2 PERCENTAGE POINTS OF OPTIMUM.

G. LOW-PERMEABILITY SOIL

LOW-PERMEABILITY SOILS TO BE PLACED AT THE TOP OF THE WALL WHERE SPECIFIED SHOULD CONSIST OF SANDY, SILTY OR CLAYEY SOILS MEETING THE REQUIREMENTS OF UNIFIED SOIL CLASSIFICATION SYSTEM (USCS) ML, CL, SM, OR SC IN ACCORDANCE WITH ASTM D2487, WITH A MINIMUM OF 25% PASSING THE #200 SIEVE.

H. DRAINAGE PIPE

THE DRAINAGE PIPES SHOULD BE PERFORATED OR SLOTTED PVC PIPE MANUFACTURED IN ACCORDANCE WITH ASTM D-3034.

I. FILTER FABRIC

FILTER FABRIC SHOULD BE NON-WOVEN, POLYPROPYLENE GEOTEXTILE, 140 N MANUFACTURED BY NICOLON MIRAFI GROUP OR APPROVED EQUIVALENT.

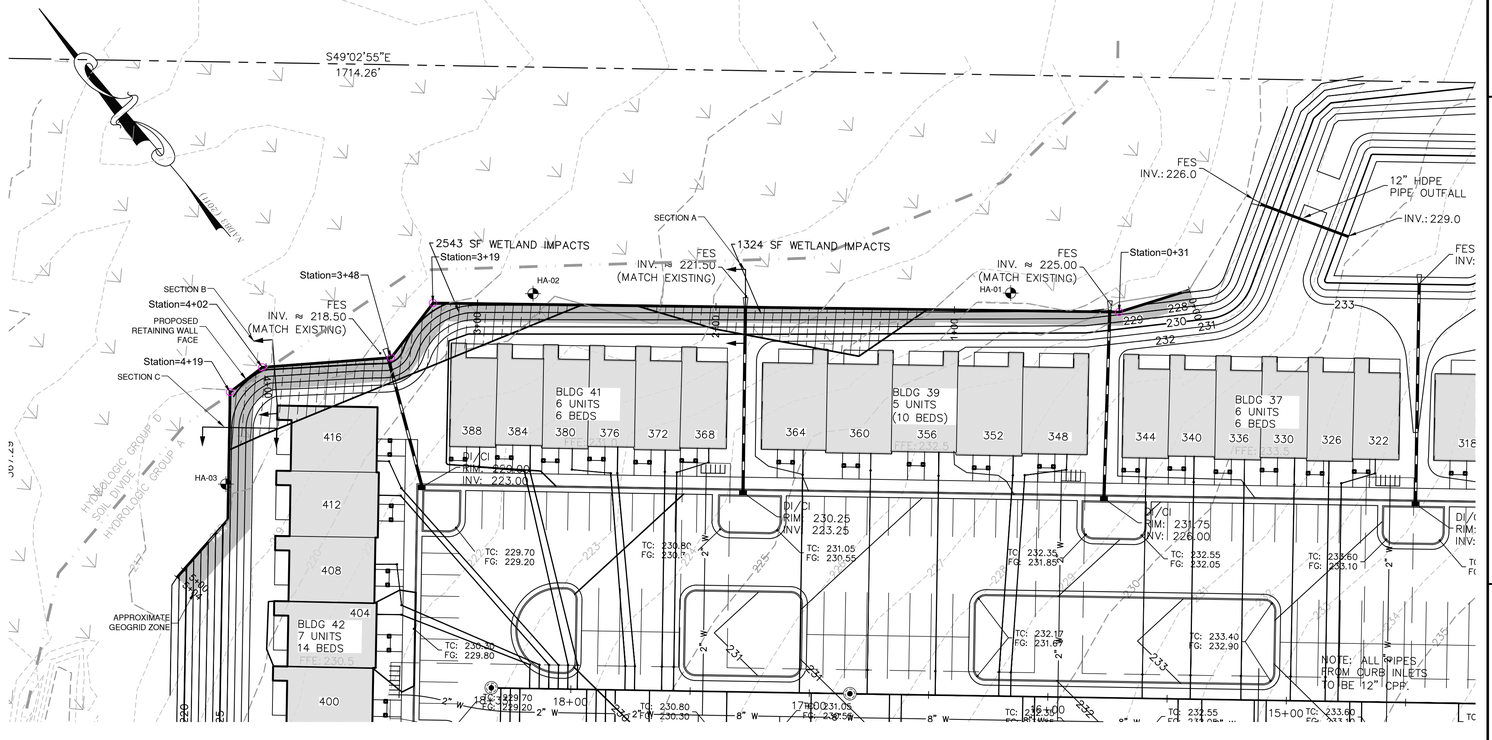
PART 3 - EXECUTION

A. EXCAVATION

1. THE CONTRACTOR SHOULD EXCAVATE TO THE LINES AND GRADES SHOWN ON THE CONSTRUCTION DRAWINGS. UNDER NO CIRCUMSTANCES SHOULD THE EXCAVATION LINES AND GRADES BE EXCEEDED, EXCEPT WITH THE GEOTECHNICAL ENGINEER'S APPROVAL. THE CONTRACTOR SHOULD PROTECT THE EXCAVATION FROM SLOUGHING BY PLACING A MEMBRANE OVER THE FACE OF THE EXCAVATION.
2. PRIOR TO RETAINING WALL CONSTRUCTION AND THE PLACEMENT OF FILL, ALL TOPSOIL SHOULD BE STRIPPED AND REMOVED FROM THE SITE.
3. EXCAVATIONS SHOULD BE SLOPED OR OTHERWISE SUPPORTED IN ACCORDANCE WITH OCCUPATION SAFETY AND HEALTH ADMINISTRATION (OSHA) AND OTHER LOCAL AND STATE REGULATIONS.

B. FOUNDATION SUBGRADE PREPARATION

1. FOUNDATION SOIL SHOULD BE EXCAVATED AS REQUIRED FOR INSTALLATION OF LEVELING PAD, GEOGRID AND OTHER ELEMENTS AND AS SHOWN ON THE CONSTRUCTION DRAWINGS.
2. FOUNDATION SOIL SHOULD BE OBSERVED BY THE GEOTECHNICAL ENGINEER OR THEIR QUALIFIED REPRESENTATIVE TO VERIFY THAT THE ACTUAL FOUNDATION SOIL STRENGTH MEETS OR EXCEEDS ASSUMED DESIGN STRENGTH. SOILS NOT MEETING REQUIRED STRENGTH SHOULD BE REMOVED AND REPLACED WITH CONTROLLED, COMPACTED MATERIAL AS DIRECTED BY THE PROJECT GEOTECHNICAL ENGINEER OR THEIR QUALIFIED REPRESENTATIVE.
3. OVER-EXCAVATED AREAS SHOULD BE BACKFILLED WITH APPROVED MATERIAL AND COMPACTED TO 95 PERCENT OF MAXIMUM DRY DENSITY IN ACCORDANCE WITH THE STANDARD PROCTOR (ASTM D-698) AT MOISTURE CONTENTS WITHIN 2 PERCENTAGE POINTS OF OPTIMUM.
4. ALLOWABLE BEARING PRESSURE FOR NATURAL AND CONTROLLED, COMPACTED FILL SOILS SHOULD BE AS SPECIFIED IN PART 5.
5. THE EXPOSED FOUNDATION SUBGRADE SHOULD BE PROOF-ROLLED WITH A LOADED DUMP TRUCK. ANY SOFT OR UNSTABLE AREAS IDENTIFIED DURING PROOF-ROLLING SHOULD BE OVER-EXCAVATED AND BACKFILLED WITH CONTROLLED FILL OR STONE AS DIRECTED BY THE PROJECT GEOTECHNICAL ENGINEER OR THEIR QUALIFIED REPRESENTATIVE.
6. ANY FILLS REQUIRED TO ESTABLISH SLOPING SURFACES IN FRONT OF THE WALLS SHOULD CONSIST OF CONTROLLED FILL AND SHOULD BE PLACED, COMPACTED, AND FIELD TESTED IN ACCORDANCE WITH THE REQUIREMENTS SPECIFIED HEREIN.



RETAINING WALL LOCATION PLAN

SCALE: 1" = 30'

LEGEND

HA-01 IDENTIFICATION AND APPROXIMATE LOCATION OF HAND AUGER BORINGS PERFORMED BY DRAPER ADEN ASSOCIATES (DAA) ON JUNE 10, 2019.

NOTES

1. BASE MAP ADAPTED FROM AN ELECTRONIC VERSION OF THE *GRADING AND DRAINAGE PLAN* (SHEET C7.1) FOR CAMPBELL POINTE TOWNHOMES PH 5-6, DATED AUGUST 21, 2019, PREPARED BY DRAPER ADEN ASSOCIATES (DAA).
2. THE EXPLORATION LOCATIONS WERE SELECTED AND FIELD-LOCATED BY DAA PERSONNEL BY VISUAL ESTIMATIONS FROM EXISTING SITE FEATURES. THE EXPLORATION LOCATIONS SHOULD BE CONSIDERED ACCURATE TO THE DEGREE IMPLIED BY THE METHOD OF FIELD-LOCATION.

C. LEVELING PAD

1. THE LEVELING PAD SHOULD BE PLACED AS SHOWN ON THE CONSTRUCTION DRAWINGS WITH A MINIMUM THICKNESS OF 6 INCHES.
2. LEVELING PAD MATERIALS SHOULD BE INSTALLED UPON UNDISTURBED IN-SITU SOILS OR CONTROLLED, COMPACTED BACKFILL.
3. LEVELING PAD SHOULD BE PREPARED TO ENSURE COMPLETE CONTACT OF RETAINING WALL UNIT WITH BASE. GAPS SHOULD NOT BE ALLOWED.

D. UNIT INSTALLATION

1. FIRST COURSE OF CONCRETE WALL UNITS SHOULD BE PLACED ON THE LEVELING PAD. THE UNITS SHOULD BE CHECKED FOR LEVEL AND ALIGNMENT. THE FIRST COURSE IS THE MOST IMPORTANT TO PROVIDE ACCURATE AND ACCEPTABLE RESULTS.
2. VERIFY THAT UNITS ARE IN FULL CONTACT WITH BASE.
3. UNITS ARE PLACED SIDE BY SIDE FOR FULL LENGTH OF WALL ALIGNMENT. ALIGNMENT MAY BE ESTABLISHED USING A STRING LINE OR OFFSET FROM BASE LINE.
4. INSTALL FIBERGLASS CONNECTING PINS.
5. LAY UP EACH COURSE ENSURING THAT THE CONNECTING PINS ARE INSERTED THROUGH FRONT SLOT OF THE UNIT, AND INTO THE RECEIVING SLOT IN THE COURSE BENEATH. REPEAT PROCEDURE TO THE EXTENT OF WALL HEIGHT.
6. AT THE END OF EACH COURSE WHERE THE WALL CHANGES ELEVATION, UNITS SHOULD BE TURNED INTO THE BACKFILL. UNITS SHOULD BE LAID AS TO CREATE THE MINIMUM RADIUS POSSIBLE UNLESS OTHERWISE SHOWN ON THE DRAWINGS, A MINIMUM OF ONE UNIT SHOULD BE INSTALLED INTO THE GRADE. ONLY THE FRONT FACE OF THE UNITS SHOULD BE VISIBLE FROM THE SIDE OF THE WALL.
7. CONVEX AND CONCAVE CURVES AND ANGLES SHOULD BE MADE USING IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
8. CAP UNITS SHOULD BE INSTALLED AND BONDED WITH CONSTRUCTION ADHESIVE OR EPOXY CEMENT AS REQUIRED BY THE MANUFACTURER.
9. THE CONTRACTOR SHOULD PROVIDE POSITIVE DRAINAGE ALONG THE REAR SIDE OF THE RETAINING WALL DURING CONSTRUCTION.

E. GEOGRID INSTALLATION

1. ALL UTILITIES IN THE VICINITY OF ANY RETAINING WALL OR GEOGRID REINFORCEMENT MUST BE INSTALLED AND PROPERLY BACKFILLED PRIOR TO PLACING THE GEOGRID SOIL REINFORCEMENT OR CONSTRUCTING THE WALL, EXCEPT WHERE STORM DRAIN PIPES ARE PLANNED TO DAYLIGHT THROUGH THE FACE OF THE WALL. AT THESE LOCATIONS, CAREFUL COORDINATION BETWEEN THE RETAINING WALL CONTRACTOR AND UTILITY CONTRACTOR WILL BE REQUIRED.
2. THE GEOGRID REINFORCEMENT SHOULD BE LAID HORIZONTALLY ON COMPACTED BACKFILL AND CONNECTED TO THE CONCRETE WALL UNITS. HOOK GRID OVER THE FIBERGLASS CONNECTING PINS, PULL TAUT, AND ANCHOR BEFORE BACKFILL IS PLACED ON THE GEOGRID.
3. SLACK IN THE GEOGRID AT THE WALL UNIT CONNECTIONS SHOULD BE REMOVED IN A MANNER, AND TO SUCH A DEGREE, AS APPROVED BY THE GEOTECHNICAL ENGINEER OR THEIR QUALIFIED REPRESENTATIVE.
4. GEOGRID SHOULD BE LAID AT THE PROPER ELEVATION AND ORIENTATION AS SHOWN ON THE CONSTRUCTION DRAWINGS OR AS DIRECTED BY THE GEOTECHNICAL ENGINEER OR THEIR QUALIFIED REPRESENTATIVE.
5. CORRECT ORIENTATION (ROLL DIRECTION) OF THE GEOGRID SHOULD BE VERIFIED BY THE CONTRACTOR.
6. GEOGRID SHOULD BE SECURED IN-PLACE WITH STAPLES, PINS, SAND BAGS, OR BACKFILL AS REQUIRED BY FILL PROPERTIES, FILL PLACEMENT PROCEDURES, OR WEATHER CONDITIONS, OR AS DIRECTED BY THE GEOTECHNICAL ENGINEER OR THEIR QUALIFIED REPRESENTATIVE.
7. GEOGRID REINFORCEMENT SHALL BE CONTINUOUS THROUGHOUT THEIR EMBEDMENT LENGTHS AND PLACED SIDE-BY-SIDE TO PROVIDE 100 PERCENT COVERAGE AT EACH LEVEL AS SPECIFIED IN THESE PLANS. SPLICED CONNECTIONS BETWEEN SHORTER PIECES OF GEOGRID OR GAPS GREATER THAN 2 INCHES BETWEEN ADJACENT PIECES OF GEOGRID ARE NOT PERMITTED. OVERLAP OF 2 INCHES BETWEEN ADJACENT PIECES OF GEOGRID IS RECOMMENDED.
8. A MINIMUM 3-INCH THICK LAYER OF SOIL SHOULD BE SPREAD BETWEEN GEOGRID LAYERS IN OVERLAP AREAS.
9. WHERE GEOGRID LAYERS ARE INTERRUPTED BY THE STORM DRAIN PIPES WHICH ARE PLANNED TO EXTEND THROUGH THE REINFORCED ZONE, THE GEOGRIDS SHOULD BE TRIMMED AS CLOSE AS POSSIBLE TO THE STORM DRAIN PIPES.

F. FILL PLACEMENT

1. WALL BACKFILL MATERIAL SHOULD BE PLACED IN MAXIMUM 8-INCH THICK LOOSE LIFTS AND COMPACTED TO 95 PERCENT OF THE STANDARD PROCTOR (ASTM D-698) AT MOISTURE CONTENTS WITHIN 2 PERCENTAGE POINTS OF OPTIMUM.
2. BACKFILL SHOULD BE PLACED, SPREAD, AND COMPACTED IN SUCH A MANNER THAT MINIMIZES THE DEVELOPMENT OF WRINKLES IN AND/OR MOVEMENT OF THE GEOGRID.
3. ONLY HAND-OPERATED COMPACTION EQUIPMENT SHOULD BE ALLOWED WITHIN 4 FEET OF THE WALL FACE.
4. BACKFILL SHOULD BE PLACED FROM THE WALL OUTWARD TO ENSURE THAT THE GEOGRID REMAINS TAUT.
5. TRACKED CONSTRUCTION EQUIPMENT SHOULD NOT BE OPERATED BEHIND OR ABOVE THE WALL.
6. RUBBER-TIRED EQUIPMENT MAY PASS OVER THE GEOGRID REINFORCEMENT AT SLOW SPEEDS, LESS THAN 10 MPH. SUDDEN BRAKING AND SHARP TURNING SHOULD BE AVOIDED.
7. PLACE FILTER FABRIC BETWEEN THE UNIT CORE FILL AND THE REINFORCED BACKFILL AS SHOWN ON PLANS. THE FILTER FABRIC SHOULD BE EMBEDDED A MINIMUM OF TWO FEET INTO THE REINFORCED FILL. IN THE AREAS WHERE THE PROPOSED STORM DRAIN PIPES EXTEND THROUGH THE REINFORCED ZONE, THE FILTER FABRIC SHOULD BE TRIMMED AND WRAPPED AS NECESSARY TO PROVIDE ADEQUATE SEPARATION BETWEEN THE DRAINAGE FILL AND REINFORCED BACKFILL.
8. THE FINISHED SLOPING SURFACE ON THE TOE SIDE OF RETAINING WALLS SHOULD BE PROTECTED BY LOAMING AND SEEDING IN ACCORDANCE WITH PROJECT REQUIREMENTS.
9. THE RETAINING WALL FILL PLACEMENT SHOULD BE COORDINATED WITH THE PLACEMENT OF THE MASS GRADING FILLS BEHIND THE RETAINING WALL TO ENSURE THAT THE MATERIALS WITHIN 25 FEET OF THE WALL FACE MEET THE CONTROLLED FILL REQUIREMENTS SPECIFIED HEREIN. THE PLACEMENT OF THE SOILS WITHIN THIS AREA SHOULD BE OBSERVED AND DOCUMENTED BY THE GEOTECHNICAL ENGINEER OR THEIR QUALIFIED REPRESENTATIVE.

G. DRAINAGE

1. DRAINAGE FILL SHOULD BE PLACED BEHIND THE WALL TO THE LIMITS SHOWN. THE DRAINAGE FILL SHOULD BE MINIMUM 12 INCHES THICK, AND SHOULD CONSIST OF AASHTO NO. 57 STONE. THE DRAINAGE FILL SHOULD BE WRAPPED IN FILTER FABRIC (MIRAFI 140N OR EQUAL) AS SHOWN ON THE DRAWINGS. THE FILTER FABRIC SHOULD BE TRIMMED AS NECESSARY TO FIT AROUND THE STORM DRAIN PIPES WHICH ARE PLANNED TO DAYLIGHT THROUGH THE WALL FACE.
2. POSITIVE DRAINAGE SHOULD BE MAINTAINED DURING AND AFTER CONSTRUCTION. SOILS WITHIN THE REINFORCED ZONE THAT BECOME WET DURING CONSTRUCTION SHOULD BE DRIED TO OPTIMUM MOISTURE AND RE-COMPACTED OR REMOVED AND REPLACED.
3. INSTALL THE PERFORATED DRAINAGE PIPES AND LATERAL DRAINAGE PIPES INCREMENTALLY ALONG WITH THE INSTALLATION OF CONCRETE UNITS AND PLACEMENT OF FILL. THE PLACEMENT OF THE LONGITUDINAL DRAINAGE PIPE WILL NEED TO BE COORDINATED WITH THE INSTALLATION OF THE STORM DRAIN PIPES TO AVOID POTENTIAL CONFLICTS.

PART 4 - CONSTRUCTION OBSERVATION AND TESTING

A. RETAINING WALLS SHOULD ONLY BE CONSTRUCTED UNDER THE OBSERVATION OF A REGISTERED PROFESSIONAL GEOTECHNICAL ENGINEER OR THEIR QUALIFIED REPRESENTATIVE. IT IS RECOMMENDED THAT DRAPER ADEN ASSOCIATES SHOULD PROVIDE CONSTRUCTION OBSERVATION AND TESTING SERVICES FOR THE PROPOSED RETAINING WALL CONSTRUCTION TO ENSURE CONTINUITY AND TO VERIFY THAT THE INTENT OF THIS RETAINING WALL DESIGN IS PROPERLY IMPLEMENTED DURING CONSTRUCTION.
B. THE REQUIRED BEARING PRESSURE BENEATH THE FOOTING OF THE WALL SHOULD BE VERIFIED IN THE GEOTECHNICAL ENGINEER OR THEIR QUALIFIED REPRESENTATIVE. TESTING DOCUMENTATION MUST BE PROVIDED TO THE GEOTECHNICAL ENGINEER PRIOR TO THE START OF WALL CONSTRUCTION. THE REQUIRED TEST PROCEDURE SHALL BE THE DYNAMIC CONE PENETROMETER (DCP) TEST ASTM STP-399.
C. THE SUITABILITY OF FILL MATERIAL SHOULD BE CONFIRMED BY THE GEOTECHNICAL ENGINEER OR THEIR QUALIFIED REPRESENTATIVE.

PART 5 - DESIGN CRITERIA

1. THE REQUIRED MINIMUM ALLOWABLE FOUNDATION BEARING PRESSURE IS 1,500 PSF.
2. ASSUMED DESIGN PARAMETERS FOR FOUNDATION SOILS:
   2.1. INTERNAL FRICTION ANGLE = 20 DEGREES
   2.2. COHESION = 100 PSF
   2.3. MOIST UNIT WEIGHT = 115 PCF
3. ASSUMED DESIGN PARAMETERS FOR RETAINED SOILS (WITHIN 25 FEET OF THE WALL FACE):
   3.1. INTERNAL FRICTION ANGLE = 30 DEGREES
   3.2. MOIST UNIT WEIGHT = 115 PCF
4. ASSUMED DESIGN PARAMETERS FOR REINFORCED SOILS:
   4.1. INTERNAL FRICTION ANGLE = 30 DEGREES
   4.2. MOIST UNIT WEIGHT = 115 PCF
5. A GLOBAL STABILITY ANALYSIS OF THE PROPOSED RETAINING WALL AND ASSOCIATED SLOPES BASED ON THE ASSUMED SOIL PARAMETERS YIELDED A FACTOR OF SAFETY AGAINST GLOBAL INSTABILITY OF GREATER THAN 1.3.
6. IT SHOULD BE NOTED THAT MODIFICATION OF THE RETAINING WALL DESIGN OR IMPROPER CONSTRUCTION PRACTICES, INCLUDING USE OF MATERIALS WHICH DO NOT MEET THE ASSUMED DESIGN PARAMETERS OUTLINED ABOVE, MAY REDUCE THE FACTOR OF SAFETY AGAINST GLOBAL INSTABILITY AND/OR IMPACT THE STABILITY OF THE PROPOSED RETAINING WALL.
7. **THE SOIL PARAMETERS ASSUMED FOR DESIGN SHOULD BE VERIFIED BY LABORATORY TESTING PRIOR TO COMMENCEMENT OF CONSTRUCTION. SPECIFICALLY, CLASSIFICATION AND DIRECT SHEAR TESTING IS REQUIRED TO VERIFY THE SOIL PROPERTIES AND ASSUMED DESIGN FRICTION ANGLE OF THE REINFORCED BACKFILL AND RETAINED SOILS.**
8. THIS RETAINING WALL IS NOT DESIGNED TO RESIST THE ACCUMULATION OF HYDROSTATIC PRESSURES BEHIND THE WALL.

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 028909 5.26.20 TYRUS CLAYTON, JR.

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RETAINING WALL 1 - LOCATION PLAN AND NOTES

CAMPBELL POINTE TOWNHOMES PH 6

HARNETT COUNTY, NORTH CAROLINA

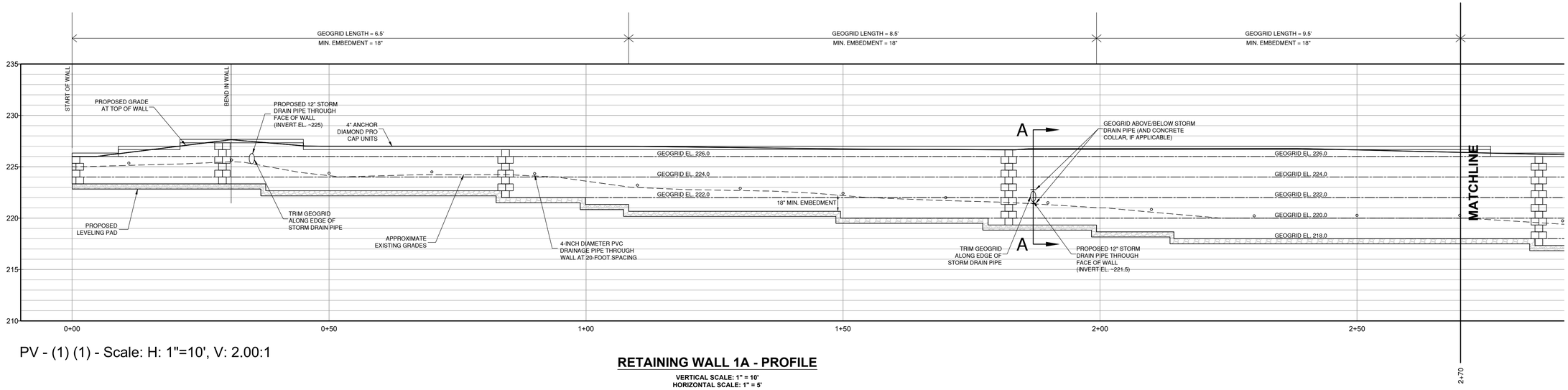
REVISIONS

1/8/2020: RE-DESIGN FOR ANCHOR DIAMOND PRO PS BLOCK UNITS.
5/27/2020: RE-DESIGN FOR LAYOUT CHANGES.

RELEASED FOR PERMITTING AND CONSTRUCTION

DESIGNED BY:	FDP
DRAWN BY:	FDP
CHECKED BY:	CTC Jr
SCALE:	1" = 30'
DATE:	09/03/2019
PROJECT NUMBER:	R14245N-08

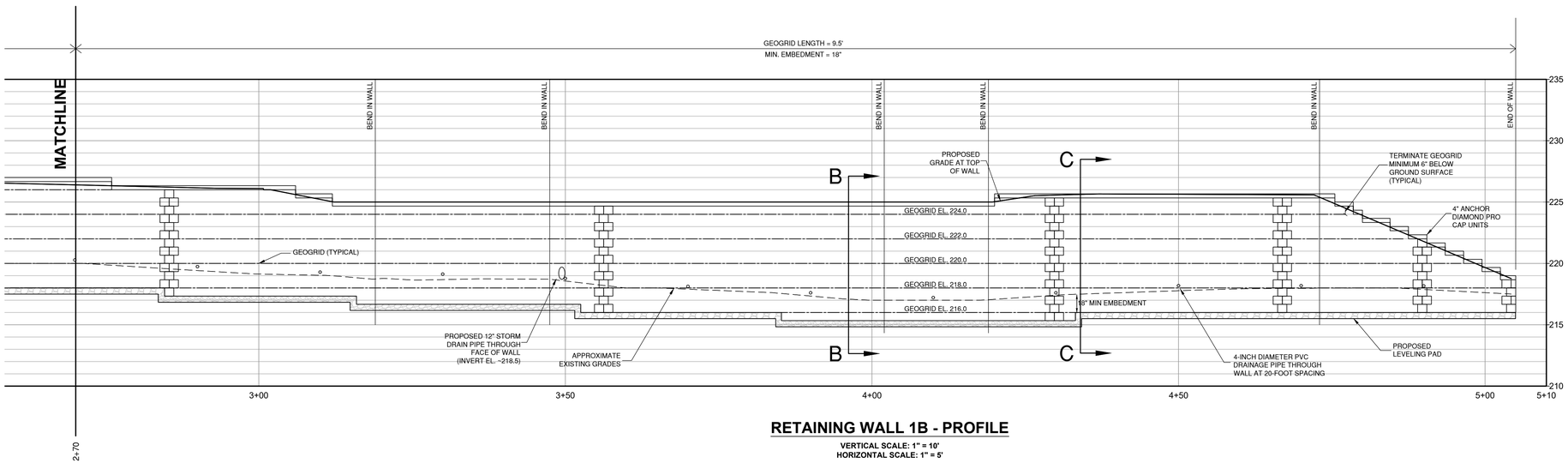
RW1



PV - (1) (1) - Scale: H: 1"=10', V: 2.00:1

RETAINING WALL 1A - PROFILE

VERTICAL SCALE: 1" = 10'
HORIZONTAL SCALE: 1" = 5'



RETAINING WALL 1B - PROFILE

VERTICAL SCALE: 1" = 10'
HORIZONTAL SCALE: 1" = 5'

NORTH CAROLINA PROFESSIONAL SEAL 028909 5.26.20 ENGINEER C. TYRUS CLAYTON, JR.

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• Blacksburg, VA
• Northern Virginia
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• Virginia Beach, VA

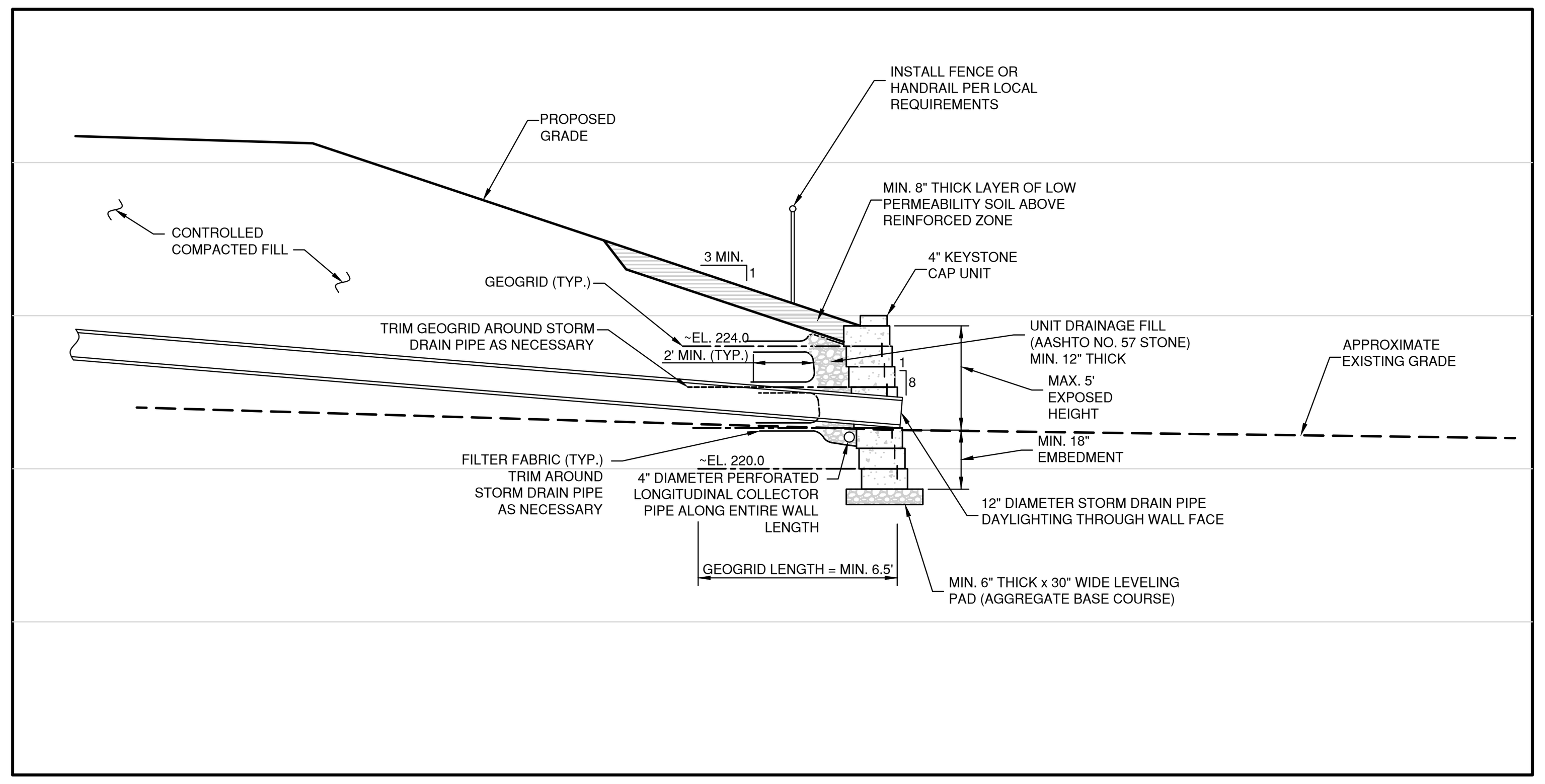
RETAINING WALL 1 - PROFILE
CAMPBELL POINTE TOWNHOMES PH 6
HARNETT COUNTY, NORTH CAROLINA

REVISIONS
1/8/2020: RE-DESIGN FOR ANCHOR DIAMOND PRO PS BLOCK UNITS.
5/27/2020: RE-DESIGN FOR LAYOUT CHANGES.

RELEASED FOR PERMITTING AND CONSTRUCTION

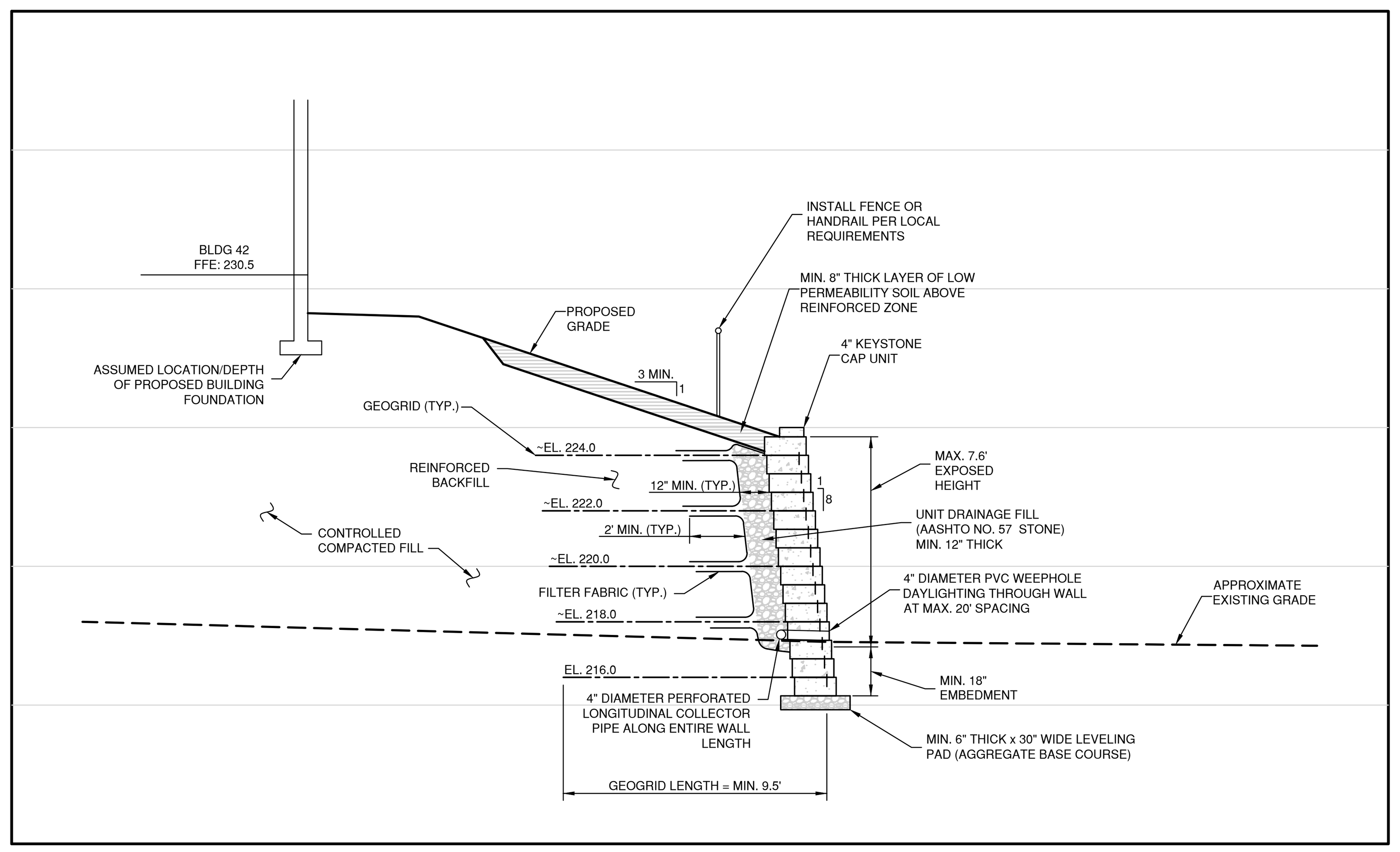
DESIGNED BY:	FDP
DRAWN BY:	FDP
CHECKED BY:	CTC Jr
SCALE:	(AS SHOWN)
DATE:	09/03/2019
PROJECT NUMBER:	R14245N-08

RW2



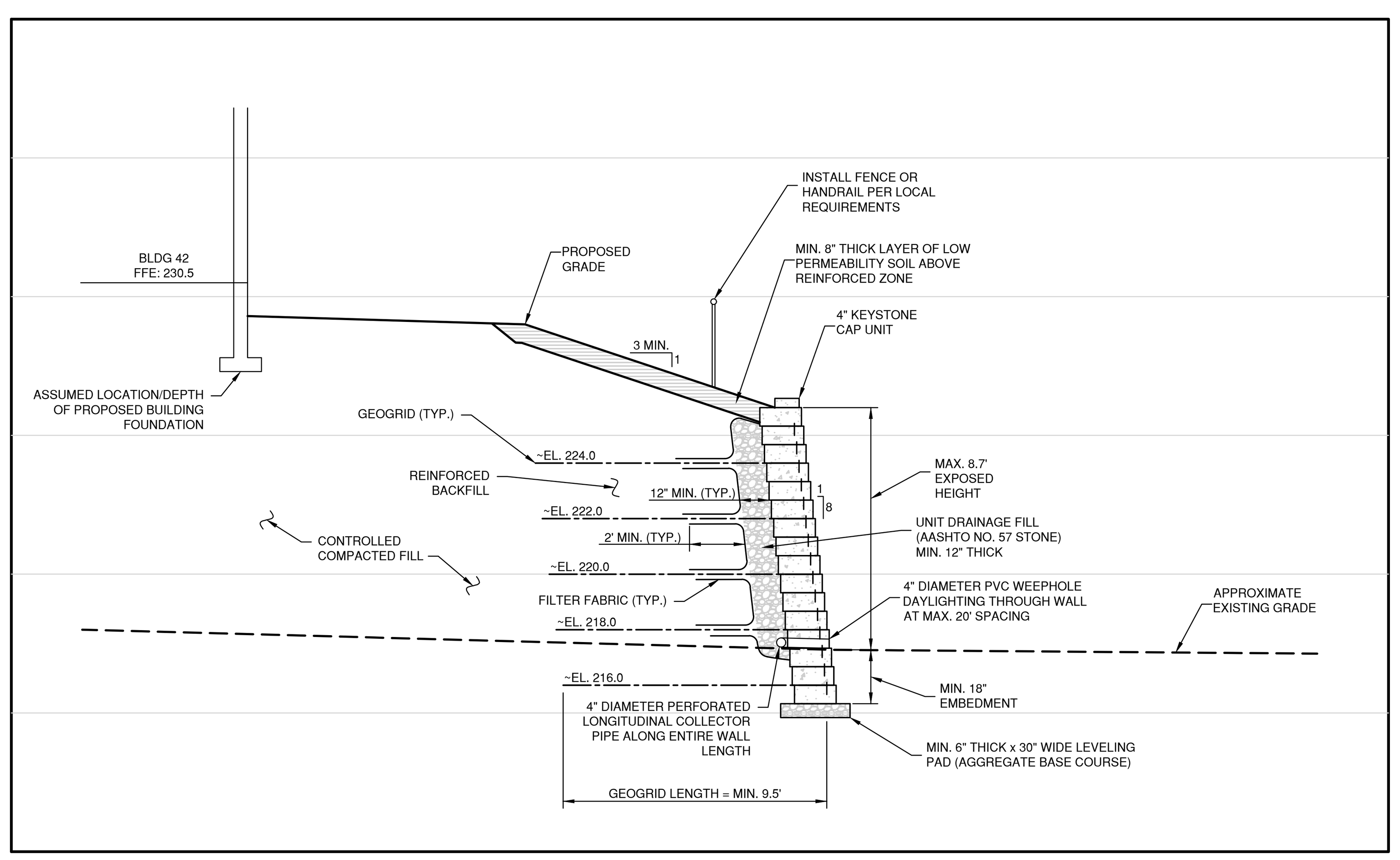
RETAINING WALL 1 - SECTION A-A

VERTICAL SCALE: 1" = 5'
HORIZONTAL SCALE: 1" = 5'



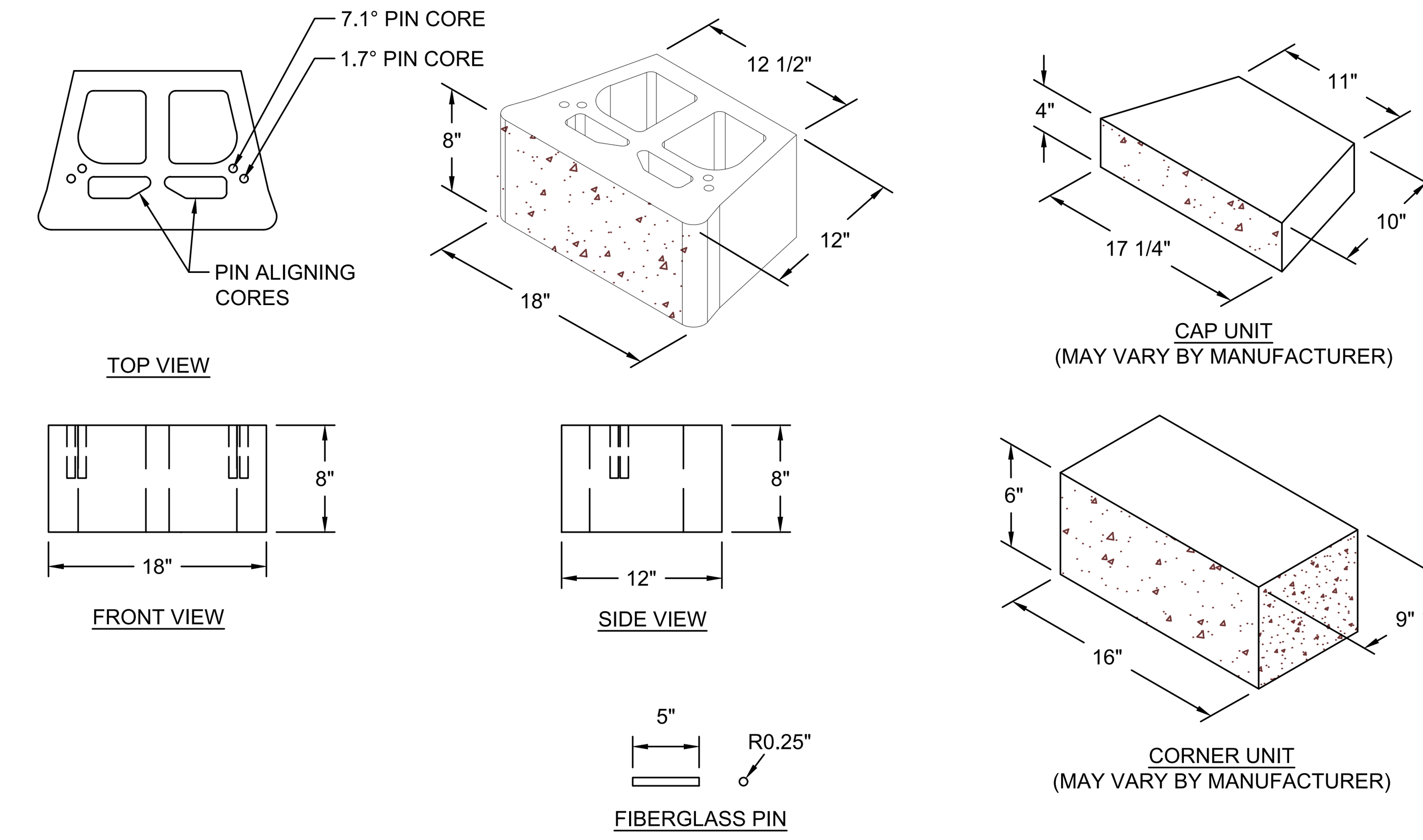
RETAINING WALL 1 - SECTION B-B

VERTICAL SCALE: 1" = 5'
HORIZONTAL SCALE: 1" = 5'



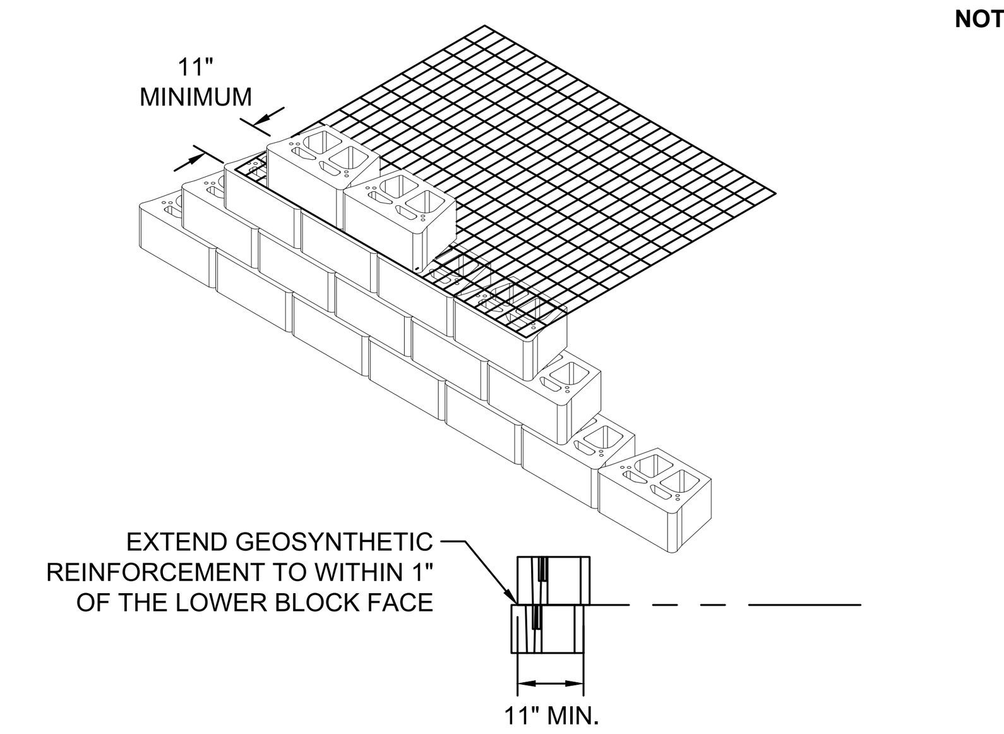
RETAINING WALL 1 - SECTION C-C

VERTICAL SCALE: 1" = 5'
HORIZONTAL SCALE: 1" = 5'



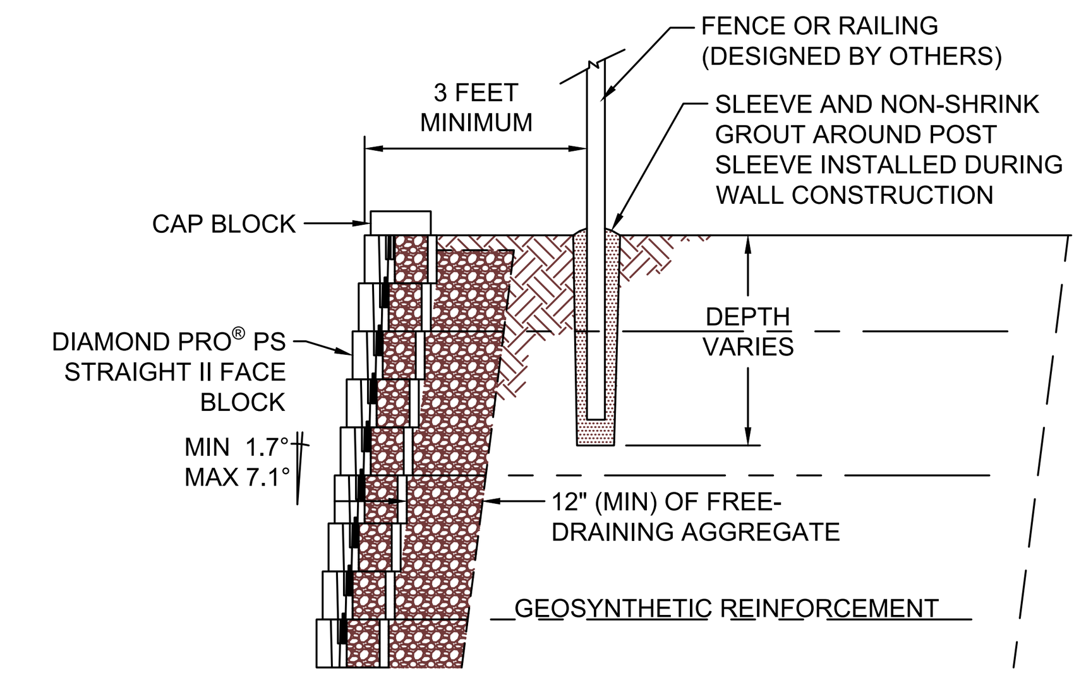
INDIVIDUAL BLOCK DETAILS

NOT TO SCALE



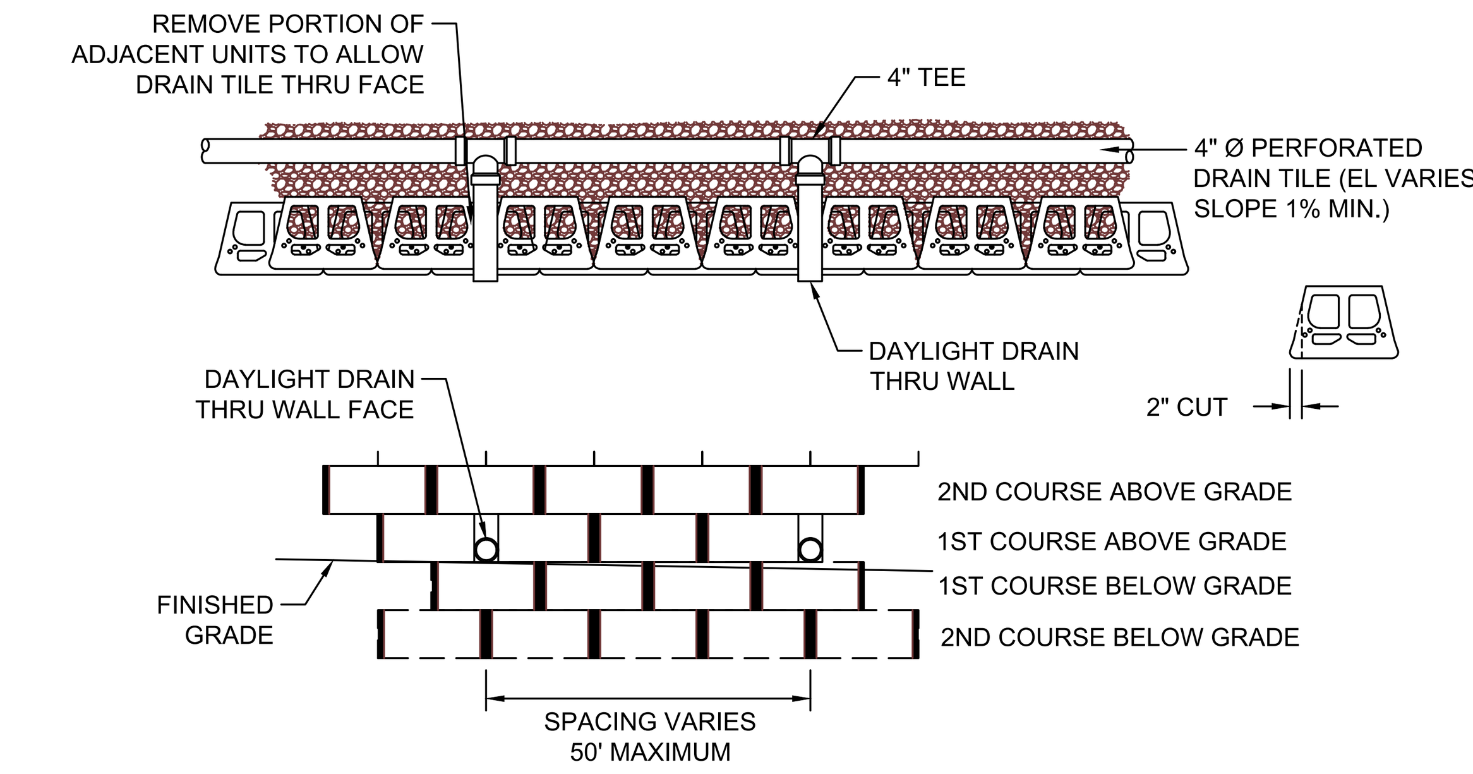
REINFORCEMENT CONNECTION DETAIL

NOT TO SCALE



TYPICAL FENCE/RAILING DETAIL

NOT TO SCALE



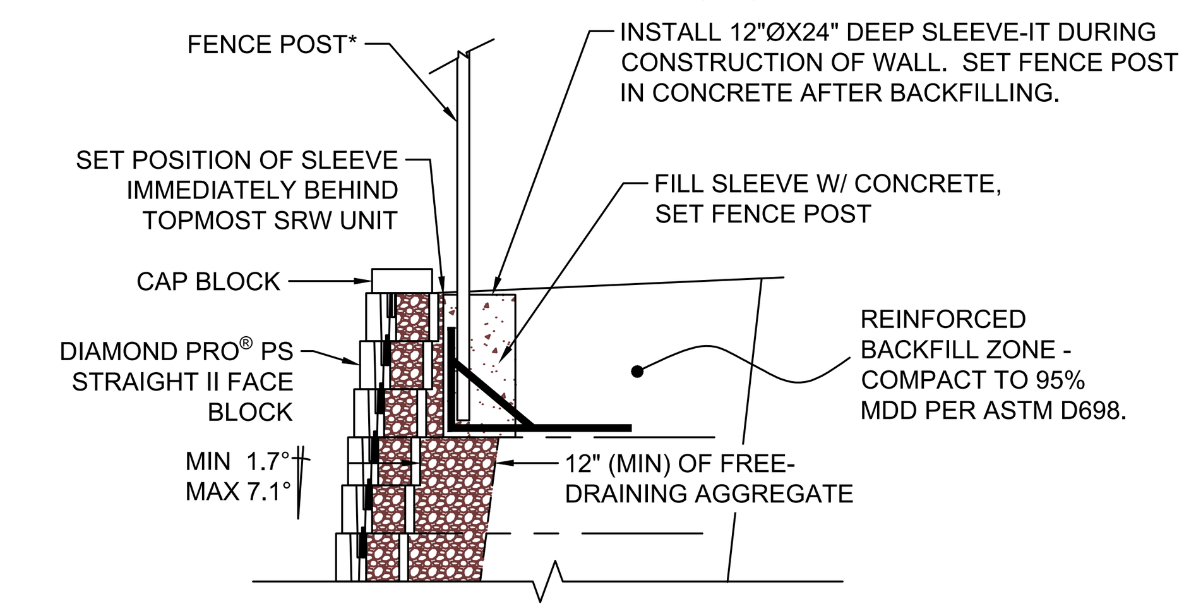
TYPICAL DETAIL FOR DRAIN PIPE THROUGH WALL FACE

NOT TO SCALE

FOR MORE INFORMATION CONTACT: STRATA GLOBAL SOLUTIONS 1-800-680-7750

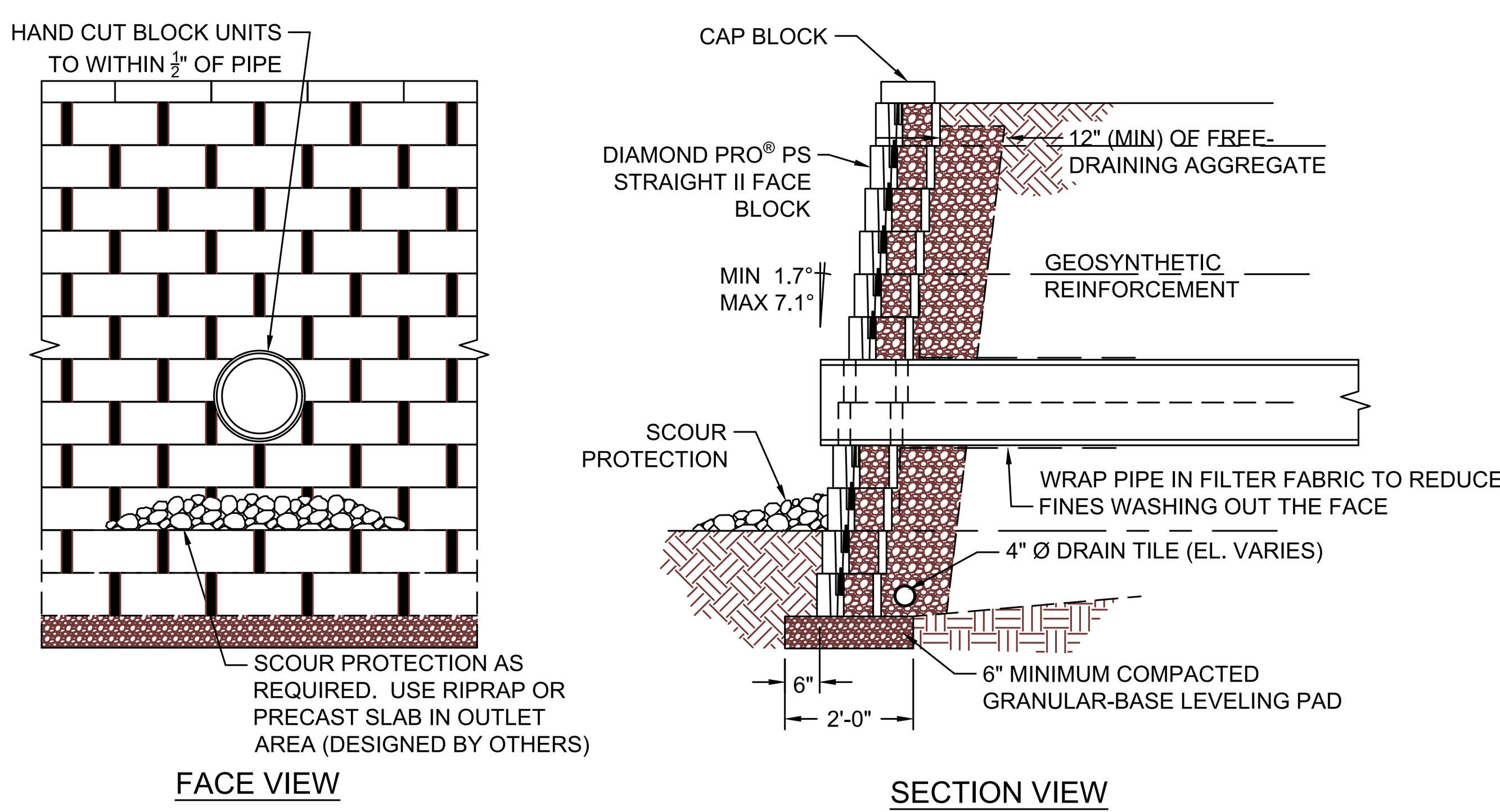
*FENCING SYSTEMS APPROVED FOR USE WITH SLEEVE-IT ARE LIMITED TO THE FOLLOWING HEIGHTS:

A. CHAIN LINK UP TO 8 FEET ABOVE FINISHED GRADE WITH POST SPACING OF 8 FEET (MIN)
B. ORNAMENTAL (STEEL, ALUMINUM, WROUGHT IRON) POST UP TO 6 FEET ABOVE GRADE WITH POST SPACING OF 10 FEET (MIN)
C. OPEN BOARD / GAP BOARD (70% OPEN) POST UP TO 6 FEET ABOVE FINISHED GRADE WITH POST SPACING OF 6 FEET (MIN)



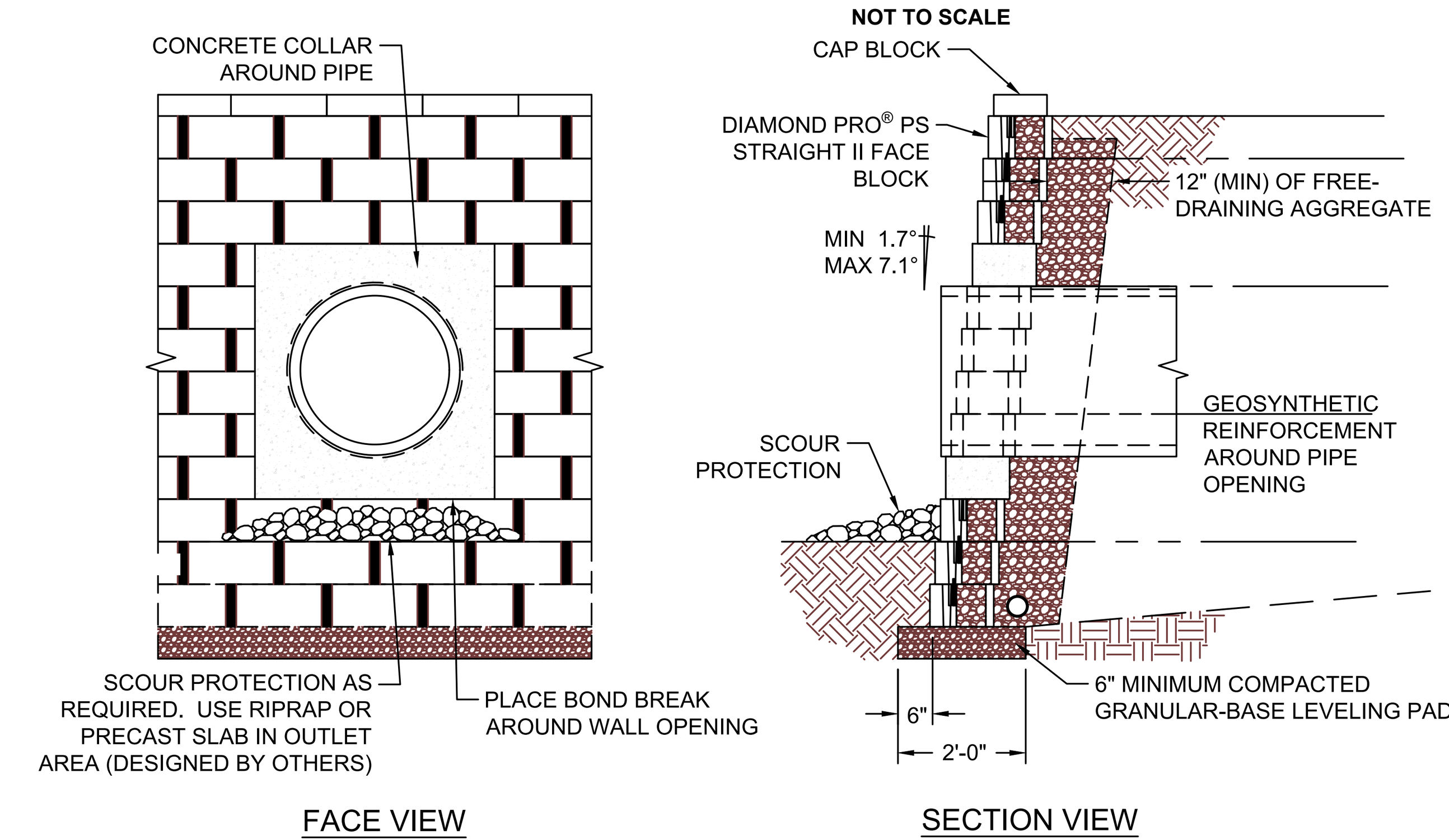
TYPICAL FENCE/RAILING DETAIL WITH SLEEVE-IT

NOT TO SCALE



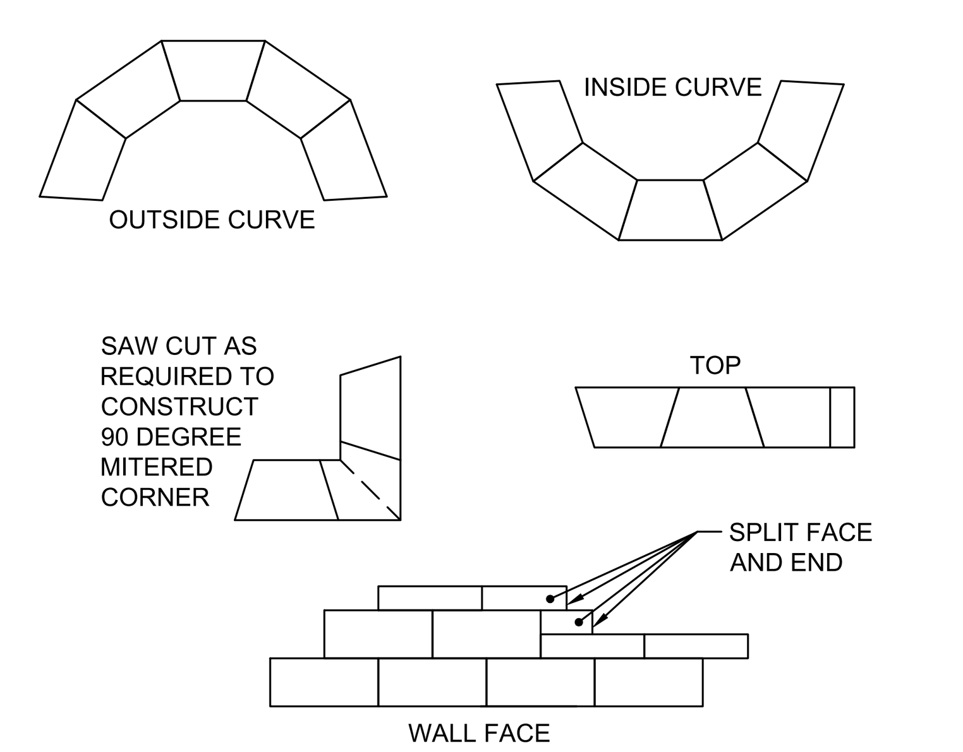
TYPICAL DETAIL FOR SMALL UTILITIES THROUGH WALL

NOT TO SCALE



TYPICAL DETAIL FOR LARGE UTILITIES THROUGH WALL

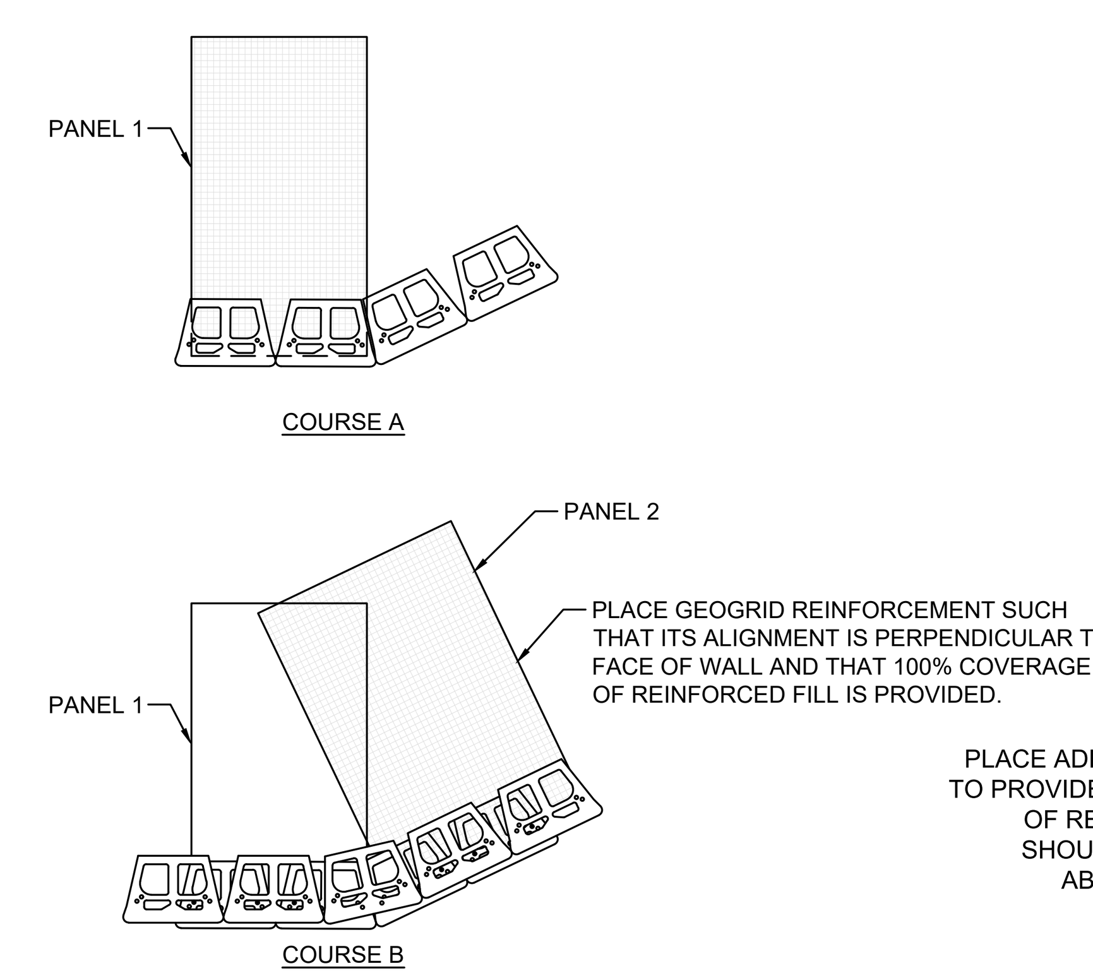
NOT TO SCALE



1. ALWAYS START CAPPING WALL FROM THE LOWEST ELEVATION.
2. LAYOUT CAPS PRIOR TO USING ADHESIVE.
3. CUT CAPS TO FIT. VARIOUS COMBINATIONS OF LONG AND SHORT CAP FACES WILL BE NECESSARY FOR RADII GREATER THAN THE MINIMUM.
4. ALTERNATE SHORT AND LONG CAP FACES EVERY OTHER CAP TO ACHIEVE A STRAIGHT ROW OF CAPS.
5. USE EXTERIOR-GRADE CONSTRUCTION ADHESIVE TO SECURE CAPS.

CAPPING DETAILS

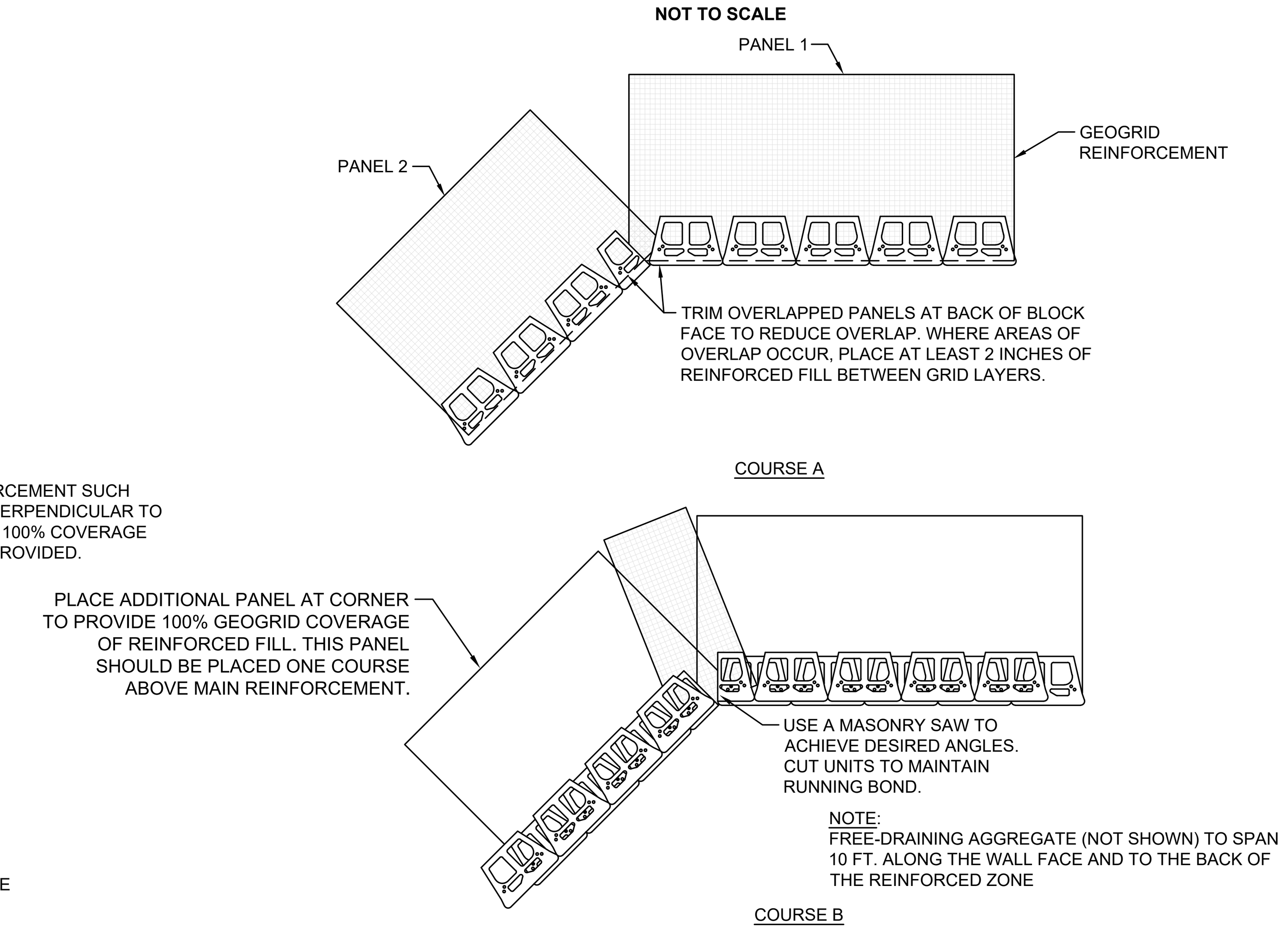
NOT TO SCALE



NOTES:
1. ALTERNATE COURSES "A" & "B" AS NEEDED TO FULL HEIGHT OF WALL.
2. MODIFY UNITS AS NEEDED TO MAINTAIN RUNNING BOND.
3. ADHERE ALL PARTIAL UNITS WITH CONSTRUCTION GRADE ADHESIVE.
4. ADJUST PLACEMENT IN FIELD TO ACHIEVE DESIRED ANGLE
5. FREE-DRAINING AGGREGATE (NOT SHOWN) TO SPAN 10 FT. ALONG THE WALL FACE AND TO THE BACK OF THE REINFORCED ZONE

TYPICAL DETAIL FOR OUTSIDE ANGLES

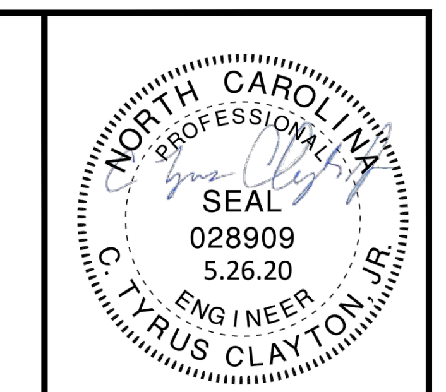
NOT TO SCALE



NOTE:
FREE-DRAINING AGGREGATE (NOT SHOWN) TO SPAN 10 FT. ALONG THE WALL FACE AND TO THE BACK OF THE REINFORCED ZONE

TYPICAL DETAIL FOR INSIDE ANGLES

NOT TO SCALE



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RETAINING WALL 1 - TYPICAL SECTIONS AND DETAILS

CAMPBELL POINTE TOWNHOMES PH 6

HARNETT COUNTY, NORTH CAROLINA

REVISIONS

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