TESTING INFORMATION:
Testing Company: _____
Inspections Jurisdiction: _____

I hereby certify that the above named company has been retained and is qualified to perform all of the necessary testing required to construct the retaining wall designed in these plans. If required, the above named inspections department will be notified of the results of these tests and/or in the event that testing services are suspended.

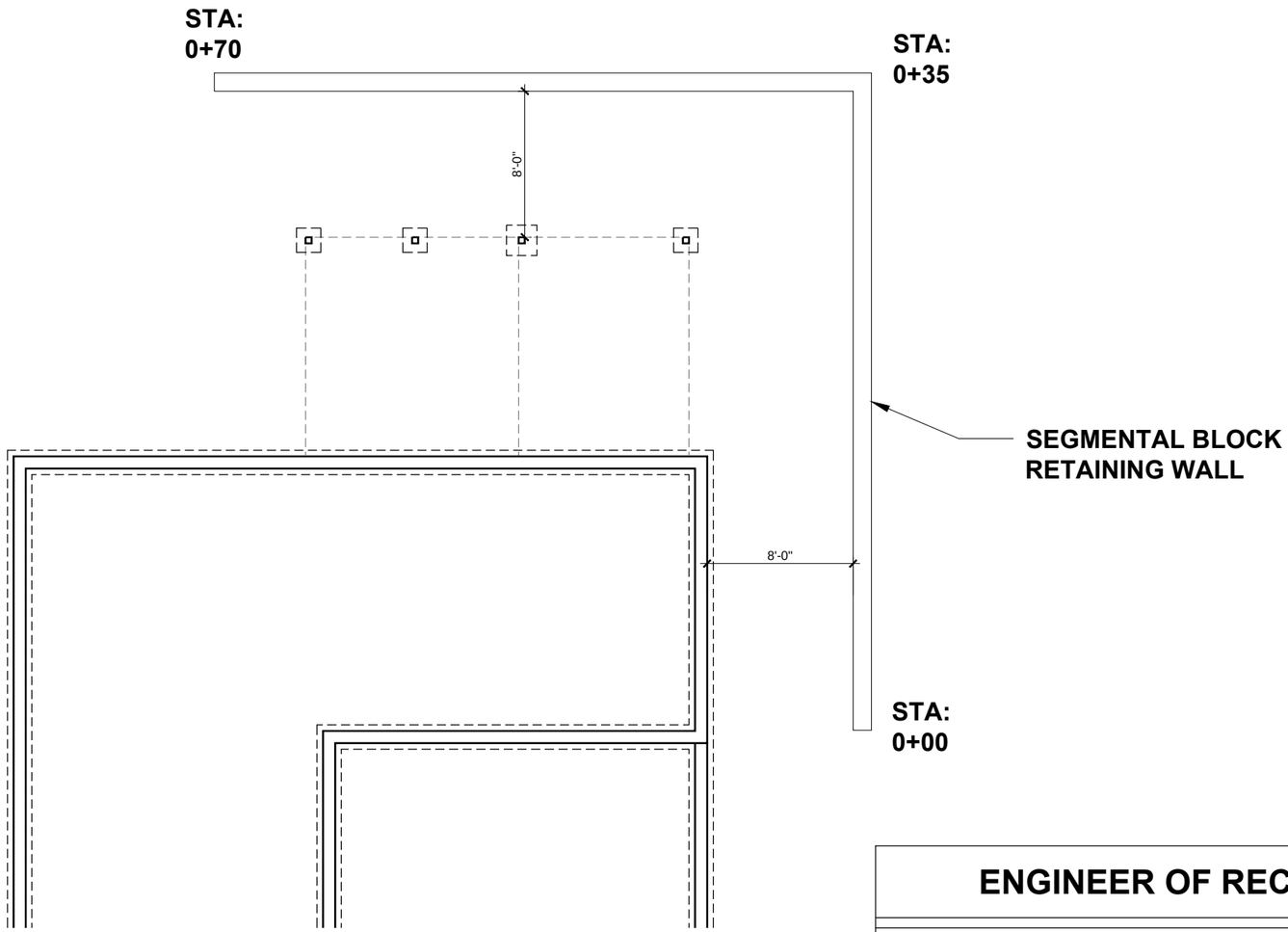
Contractor:

_____ _____
Print Name Signature

ENGINEER MUST BE PRESENT DURING CONSTRUCTION OF RETAINING WALL TO CERTIFY INSTALLATION OF WALL

IT IS THE CONTRACTORS' RESPONSIBILITY TO PROVIDE STABLE CUTS AND/OR TRENCH PROTECTION PER OSHA STANDARDS

TABLE OF CONTENTS:



RETAINING WALL: PLAN VIEW

SCALE: 1" = 8'-0"

Know what's below. Call before you dig.

UTILITY LINES & TRANSFORMER ARE TO BE LOCATED BEFORE CONSTRUCTION STARTS ON OR NEAR RETAINING WALL. CALL 811 TO MARK OFF UTILITIES BEFORE YOU DIG.

ENGINEER OF RECORD

JDS CONSULTING, PLLC
DESIGN · ENGINEERING · SURVEYING · ENERGY
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FIRM LIC. NO: P-0961
PROJECT REFERENCE: 21902443

NORTH CAROLINA PROFESSIONAL SEAL 045403 ENGINEER CHARLES E. TEAL
11/3/21

P-0961

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INFO@JDSCONSULTING.NET; WWW.JDSCONSULTING.NET

CLIENT: KB HOMES
PROJECT: HIGHLAND GROVE LOT 21
LOCATION: FUQUAY-VARINA, NORTH CAROLINA
SCALE: 1/8" = 1'-0" FOR 11x17 PAPER, 1/4" = 1'-0" FOR 22x34 PAPER, OR AS NOTED

PROJECT NO.: 21902443
DATE: 11/02/2021
DRAWN BY: KMC

RETAINING WALL PLAN VIEW

RW1.0

Specification Guidelines:

The following specifications provide typical requirements and recommendations. At the engineer of record's discretion these specifications may be revised to accommodate site specific design requirements.

SECTION 1: MODULAR RETAINING WALL SYSTEMS

PART 1: GENERAL

1.1 Scope

Work includes furnishing and installing modular concrete block retaining wall units to the lines and grades designated on the construction drawings and as specified herein.

1.2 Applicable Sections of Related Work

Geogrid Wall Reinforcement (see Section 2, Page 5)

1.3 Reference Standards

A. ASTM C1372 Standard Specification for Segmental Retaining Wall Units.
B. ASTM C1262 Evaluating the Freeze thaw Durability of Manufactured CMU's and Related concrete Units
C. ASTM D698 Moisture Density Relationship for Soils, Standard Method
D. ASTM D422 Gradation of Soils
E. ASTM C140 Sample and Testing concrete Masonry Units

1.4 Delivery, Storage, and Handling

A. Contractor shall check the materials upon delivery to assure proper material has been received.
B. Contractor shall prevent excessive mud, cementitious material, and like construction debris from coming in contact with the materials.
C. Contractor shall protect the materials from damage. Damaged material shall not be incorporated in the project (ASTM C1372).

PART 2: MATERIALS

2.1 Modular Wall Units

A. Wall units shall be modular wall units produced by a licensed manufacturer.
B. Wall units shall have minimum 28 day compressive strength of 3000 psi (20.7 MPa) in accordance with ASTM C1372. The concrete units shall have adequate freeze-thaw protection with an average absorption rate in accordance with ASTM C1372 or an average absorption rate of 7.5 lb/ft3 (120 kg/m3) for northern climates and 10 lb/ft3 (160 kg/m3) for southern climates.
C. Exterior dimensions shall be uniform and consistent. Maximum dimensional deviations on the height of any two units shall be 0.125 in. (3 mm).
D. Wall units shall provide a minimum of 110 lbs total weight per square foot of wall face area (555 kg/m²). Fill contained within the units may be considered 80% effective weight.
E. Exterior face shall be textured. Color as specified by owner.

2.2 Wall Rock

A. Material must be well-graded compactable aggregate, 0.25 in. to 1.5 in., (6 mm - 38 mm) with no more than 10% passing the #200 sieve. (ASTM D422)
B. Material behind and within the blocks may be the same material.

2.3 Infill Soil

A. Infill material shall be site excavated soils when approved by the on-site soils engineer unless otherwise specified in the drawings. Unsuitable soils for backfill (heavy clays or organic soils) shall not be used in the reinforced soil mass. Fine grained cohesive soils (ϕ<31) may be used in wall construction, but additional backfilling, compaction and water management efforts are required. Poorly graded sands, expansive clays and/or soils with a plasticity index (PI) >20 or a liquid limit (LL) >40 should not be used in wall construction.
B. The infill soil used must meet or exceed the designed friction angle and description noted on the design cross sections, and must be free of debris and predominantly consist of one of the following inorganic USCS soil types: GP, GW, SW, SP meeting the following gradation as determined in accordance with ASTM D422.

Sieve Size	Percent Passing
4 inch (100 mm)	100 - 75
No. 4 (4.75 mm)	100 - 20
No. 40 (0.425 mm)	0 - 60
No. 200 (0.075 mm)	0 - 35

C. Where additional fill is required, contractor shall submit sample and specifications to the wall design engineer or the onsite soils engineer for approval and the approving engineer must certify that the soils proposed for use has properties meeting or exceeding original design standards.

PART 3: WALL CONSTRUCTION

3.1 Excavation

A. Contractor shall excavate to the lines and grades shown on the construction drawings. Contractor shall use caution not to over-excavate beyond the lines shown, or to disturb the base elevations beyond those shown.
B. Contractor shall verify locations of existing structures and utilities prior to excavation. Contractor shall ensure all surrounding structures are protected from the effects of wall excavation.

3.2 Foundation Soil Preparation

A. Foundation soil shall be defined as any soils located beneath a wall.
B. Foundation soil shall be excavated as dimensioned on the plans and compacted to a minimum of 95% of Standard Proctor (ASTM D698) prior to placement of the base material.
C. Foundation soil shall be examined by the on-site soils engineer to ensure that the actual foundation soil strength meets or exceeds assumed design strength. Soil not meeting the required strength shall be removed and replaced with acceptable material.

3.3 Base

A. The base material shall be the same as the Wall Rock material (Section 2.2) or a low permeable granular material.
B. Base material shall be placed as shown on the construction drawing. Top of base shall be located to allow bottom wall units to be buried to proper depths as per wall heights and specifications.
C. Base material shall be installed on undisturbed native soils or suitable replacement fills compacted to a minimum of 95% Standard Proctor (ASTM D698).
D. Base shall be compacted at 95% Standard Proctor (ASTM D698) to provide a level hard surface on which to place the first course of blocks. The base shall be constructed to ensure proper wall embedment and the final elevation shown on the plans. Well-graded sand can be used to smooth the top 1/2 in. (13 mm) on the base material.
E. Base material shall be a 4 in. (100 mm) minimum depth for walls under 4 ft (1.2 m) and a 6 in. (150 mm) minimum depth for walls over 4 ft (1.2 m).

3.4 Unit Installation

A. The first course of wall units shall be placed on the prepared base with the raised lip facing up and out and the front edges tight together. The units shall be checked for level and alignment as they are placed.
B. Ensure that units are in full contact with base. Proper care shall be taken to develop straight lines and smooth curves on base course as per wall layout.
C. Fill all cores and cavities and a minimum of 12 in. (300 mm) behind the base course with wall rock. Use infill soils behind the wall rock and approved soils in front of the base course to firmly lock in place. Check again for level and alignment. Use a plate compactor to consolidate the area behind the base course. All excess material shall be swept from top of units.
D. Install next course of wall units on top of base course. Position blocks to be offset from seams of blocks below. Perfect "running bond" is not essential, but a 3 in. (75 mm) minimum offset is recommended. Check each block for proper alignment and level. Fill all cavities in and around wall units and to a minimum of 12 in. (300 mm) depth behind block with wall rock. For taller wall application the depth of wall rock behind the block should be increased; walls from 15 ft (4.57 m) to 25 ft (7.62 m) should have a minimum of 2 ft (0.61 m) and walls above 25ft (7.62 m) should have a minimum of 3 ft (0.9 m). Spread infill soil in uniform lifts not exceeding 8 in. (200 mm) in uncompacted thickness and compact to 95% of Standard Proctor (ASTM D698) behind the consolidation zone.
E. The consolidation zone shall be defined as 3 ft (0.9 m) behind the wall. Compaction within the consolidation zone shall be accomplished by using a hand operated plate compactor and shall begin by running the plate compactor directly on the block and then compacting in parallel paths from the wall face until the entire consolidation zone has been compacted. A minimum of two passes of the plate compactor are required with maximum lifts of 8 in. (200 mm). Expansive or fine-grained soils may require additional compaction passes and/or specific compaction equipment such as a sheepsfoot roller. Maximum lifts of 4 inches (100 mm) may be required to achieve adequate compaction within the consolidation zone. Employ methods using lightweight compaction equipment that will not disrupt the stability or batter of the wall. Final compaction requirements in the consolidation zone shall be established by the engineer of record.
F. Install each subsequent course in like manner. Repeat procedure to the extent of wall height.
G. As with any construction work, some deviation from construction drawing alignments will occur. Variability in construction of SRWs is approximately equal to that of cast-in-place concrete retaining walls. As opposed to cast-in-place concrete walls, alignment of SRWs can be simply corrected or modified during construction. Based upon examination of numerous completed SRWs, the following recommended minimum tolerances can be achieved with good construction techniques.

Vertical Control - ±1.25 in. (32 mm) max. over 10 ft (3 m) distance
Horizontal Location Control - straight lines ±1.25 in. (32 mm) over a 10 ft (3 m) distance.
Rotation - from established plan wall batter: 2.0°
Bulging - 1.0 in. (25 mm) over a 10 ft (3.0 m) distance

3.5 Additional Construction Notes

A. When one wall branches into two terraced walls, it is important to note that the soil behind the lower wall is also the foundation soil beneath the upper wall. This soil shall be compacted to a minimum of 95% of Standard Proctor (ASTM D698) prior to placement of the base material. Achieving proper compaction in the soil beneath an upper terrace prevents settlement and deformation of the upper wall. One way is to replace the soil with wall rock and compact in 8 in. (200 mm) lifts. When using on-site soils, compact in maximum lifts of 4 in. (100 mm) or as required to achieve specified compaction.
B. Filter fabric use is not suggested for use with cohesive soils. Clogging of such fabric creates unacceptable hydrostatic pressures in soil reinforced structures. When filtration is deemed necessary in cohesive soils, use a three dimensional filtration system of clean sand or filtration aggregate.
C. Embankment protection fabric is used to stabilize rip rap and foundation soils in water applications and to separate infill materials from the retained soils. This fabric should permit the passage of fines to preclude clogging of the material. Embankment protection fabric shall be a high strength polypropylene monofilament material designed to meet or exceed typical Corps of Engineers plastic filter fabric specifications (CW-02215); stabilized against ultraviolet (UV) degradation and typically exceeding the values set by block manufacturer.
D. Water management is of extreme concern during and after construction. Steps must be taken to ensure that drain pipes are properly installed and vented to daylight and a grading plan has been developed that routes water away from the retaining wall location. Site water management is required both during construction of the wall and after completion of construction.

SECTION 2: GEOGRID REINFORCEMENT SYSTEMS

PART 1: GENERAL

1.1 Scope

Work includes furnishings and installing geogrid reinforcement, wall block, and backfill to the lines and grades designated on the construction drawings and as specified herein.

1.2 Applicable Section of Related Work

Section 1: Modular Retaining Wall Systems.

1.3 Reference Standards

See specific geogrid manufacturer's reference standards.

Additional Standards:

A. ASTM D4595 - Tensile Properties of Geotextiles by the Wide-Width Strip Method
B. ASTM D5262 - Test Method for Evaluating the Unconfined Creep Behavior of Geogrids
C. ASTM D6638 Grid Connection Strength (SRW-U1)
D. ASTM D6916 SRW Block Shear Strength (SRW-U2)
E. GRI-GG4 - Grid Long Term Allowable Design Strength (LTADS)
F. ASTM D6706 - Grid Pullout of Soil

1.4 Delivery, Storage, and Handling

A. Contractor shall check the geogrid upon delivery to assure that the proper material has been received.
B. Geogrid shall be stored above -10 F (-23 C).
C. Contractor shall prevent excessive mud, cementitious material, or other foreign materials from coming in contact with the geogrid material.

PART 2: MATERIALS

2.1 Definitions

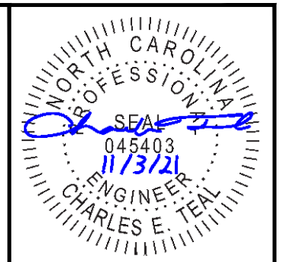
A. Geogrid or equivalent products shall be of high density polyethylene or polyester yarns encapsulated in a protective coating specifically fabricated for use as a soil reinforcement material.
B. Concrete retaining wall units are as detailed on the drawings and shall meet design specifications.
C. Drainage material is free draining granular material as defined in Section 1, 2.2 Wall Rock.
D. Infill soil is the soil used as fill for the reinforced soil mass.
E. Foundation soil is the in-situ soil.

2.2 Products

Geogrid shall be the type as shown on the drawings having the property requirements as described within the manufacturer's specifications or shall be an equivalent product meeting design properties.

2.3 Acceptable Manufacturers

A manufacturer's product shall be approved by the wall design engineer.



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CLIENT: KB HOMES

PROJECT: HIGHLAND GROVE LOT 21

LOCATION: FUQUAY-VARINA, NORTH CAROLINA

SCALE: 1/8" = 1'-0" FOR 11x17 PAPER. 1/4" = 1'-0" FOR 22x34 PAPER, OR AS NOTED

PROJECT NO.: 21902443

DATE: 11/02/2021

DRAWN BY: KMC

GENERAL NOTES & SPECS

GS1

PART 3: WALL CONSTRUCTION

3.1 Foundation Soil Preparation

A. Foundation soil shall be excavated to the lines and grades as shown on the construction drawings, or as directed by the on-site soils engineer.
B. Foundation soil shall be examined by the on-site soils engineer to assure that the actual foundation soil strength meets or exceeds assumed design strength.
C. Over-excavated areas shall be filled with compacted backfill material approved by on-site soils engineer.
D. Contractor shall verify locations of existing structures and utilities prior to excavation. Contractor shall ensure all surrounding structures are protected from the effects of wall excavation.

3.2 Wall Construction

Wall construction shall be as specified under Section 1, Part 3, Wall Construction.

3.3 Geogrid Installation

A. Install retaining wall to designated height of first geogrid layer. Backfill and compact the wall rock and infill soil in layers not to exceed 8 in. (200 mm) lifts behind wall to depth equal to designed grid length before grid is installed.
B. Cut geogrid to designed embedment length and place on top of retaining wall unit to back edge of lip. Extend away from wall approximately 3% above horizontal on compacted infill soils.
C. Lay geogrid at the proper elevation and orientations shown on the construction drawings or as directed by the wall design engineer.
D. Correct orientation of the geogrid shall be verified by the contractor and on-site soils engineer. Strength direction is typically perpendicular to wall face.
E. Follow manufacturer's guidelines for overlap requirements.
F. Place next course of retaining wall units on top of grid and fill block cores with wall rock to lock in place. Remove slack and folds in grid and stake to hold in place.
G. Adjacent sheets of geogrid shall be butted against each other at the wall face to achieve 100 percent coverage.
H. Geogrid lengths shall be continuous. Splicing parallel to the wall face is not allowed.

3.4 Fill Placement

A. Infill soil shall be placed in lifts and compacted as specified under Section 1, Part 3.4, Unit Installation.
B. Infill soil shall be placed, spread and compacted in such a manner that minimizes the development of slack or movement of the geogrid.
C. Only hand-operated compaction equipment shall be allowed within 3 ft (0.9 m) behind the wall. This area shall be defined as the consolidation zone. Compaction in this zone shall begin by running the plate compactor directly on the block and then compacting in parallel paths to the wall face until the entire consolidation zone has been compacted. A minimum of two passes of the plate compactor are required with maximum lifts of 8 in. (200 mm). Section 1, Part 3.4 E, Page 4.
D. When fill is placed and compaction cannot be defined in terms of Standard Proctor Density, then compaction shall be performed using ordinary compaction process and compacted so that no deformation is observed from the compaction equipment or to the satisfaction of the engineer of record or the site soils engineer.
E. Tracked construction equipment shall not be operated directly on the geogrid. A minimum fill thickness of 6 in. (150mm) is required prior to operation of tracked vehicles over the geogrid. Turning of tracked vehicles should be kept to a minimum to prevent tracks from displacing the fill and damaging the geogrid.
F. Rubber-tired equipment may pass over the geogrid reinforcement at slow speeds, less than 10 mph (16 Km/h). Sudden braking and sharp turning shall be avoided.
G. The infill soil shall be compacted to achieve 95% Standard Proctor (ASTM D698). Compaction tests shall be taken at 3 ft (0.9 m) behind the block and at the back of the reinforced zone. The frequency shall be as determined by the on-site soils engineer or as specified on the plan. Soil tests of the infill soil shall be submitted to the on-site soils engineer for review and approval prior to the placement of any material. The contractor is responsible for achieving the specified compaction requirements. The on-site soils engineer may direct the contractor to remove, correct or amend any soil found not in compliance with these written specifications.

3.5 Special Consideration

A. Geogrid can be interrupted by periodic penetration of a column, pier or footing structure.
B. Designed retaining wall will accept vertical and horizontal reinforcing with rebar and grout.
C. If site conditions will not allow geogrid embedment length, consider the following alternatives:
- Masonry Reinforced Walls - Soil Nailing
- Increased Wall Batter - Earth Anchors
- Double Masonry Unit Wall - Rock Bolts
- No-Fines Concrete
D. Geogrid should not be interrupted by the root systems of landscaped plants planted after wall construction. The maximum width of trees and shrubs over 4' tall should not overlap any area of the geogrid.

SECTION 3: WATER MANAGEMENT

PART 1: GENERAL DRAINAGE

1.1 Surface Drainage

Rainfall or other water sources such as irrigation activities collected by the ground surface atop the retaining wall can be defined as surface water. Retaining wall design shall take into consideration the management of this water.

A. At the end of each day's construction and at final completion, grade the backfill to avoid water accumulation behind the wall or in the reinforced zone.
B. Surface water must not be allowed to pond or be trapped in the area above the wall or at the toe of the wall.
C. Existing slopes adjacent to retaining wall or slopes created during the grading process shall include drainage details so that surface water will not be allowed to drain over the top of the slope face and/or wall. This may require a combination of berms and surface drainage ditches.
D. Irrigation activities at the site shall be done in a controlled and reasonable manner. If an irrigation system is employed, the design engineer or irrigation manufacture shall provide details and specification for required equipment to ensure against over irrigation which could damage the structural integrity of the retaining wall system.
E. Surface water that cannot be diverted from the wall must be collected with surface drainage swales and drained laterally in order to disperse the water around the wall structure. Construction of a typical swale system shall be in accordance with specifications set by block manufacturer.

1.2 Grading

The shaping and recontouring of land in order to prepare it for site development is grading. Site grading shall be designed to route water around the walls.

A. Establish final grade with a positive gradient away from the wall structure. Concentrations of surface water runoff shall be managed by providing necessary structures, such as paved ditches, drainage swales, catch basins, etc.
B. Grading designs must divert sources of concentrated surface flow, such as parking lots, away from the wall.

1.3 Drainage System

The internal drainage systems of the retaining wall can be described as the means of eliminating the buildup of incidental water which infiltrates the soils behind the wall. Drainage system design will be a function of the water conditions on the site. Possible drainage facilities include Toe and Heel drainage collection pipes and blanket or chimney rock drains or others. Design engineer shall determine the required drainage facilities to completely drain the retaining wall structure for each particular site condition.

A. All walls will be constructed with a minimum of 12 in. (300 mm) of wall rock directly behind the wall facing. The material shall meet or exceed the specification for wall rock outlined in Section 1, 2.2 Wall Rock.
B. The drainage collection pipe, drain pipe, shall be a 4 in. (100 mm) perforated or slotted PVC, or corrugated HDPE pipe as approved by engineer of record.
C. All walls will be constructed with a 4 in. (100mm) diameter drain pipe placed at the lowest possible elevation within the 12 in. (300mm) of wall rock. This drain pipe is referred to as a toe drain, Section 3, 1.4 Toe Drain.
D. Geogrid Reinforced Walls shall be constructed with an additional 4 in. (100 mm) drain pipe at the back bottom of the reinforced soil mass. This drain pipe is outlets in the event that excessive water flow exceeds the capacity of pipe over long stretches.

1.4 Toe Drain

A toe drain pipe should be located at the back of the wall rock behind the wall as close to the bottom of the wall as allowed while still maintaining a positive gradient for drainage to daylight, or a storm water management system. Toe drains are installed for incidental water management not as a primary drainage system.

A. For site configurations with bottoms of the base on a level plane it is recommended that a minimum one percent gradient be maintained on the placement of the pipe with outlets on 50 ft (15 m) centers, or 100 ft (30 m) centers if pipe is crowned between the outlets. This would provide for a maximum height above the bottom of the base in a flat configuration of no more than 6 in. (150mm).
B. For rigid drain pipes with drain holes the pipes should be positioned with the holes located down. The wall does not require that toe drain pipes be wrapped when installed into base rock complying with the specified wall rock material.
C. Pipes shall be routed to storm drains where appropriate or through or under the wall at low points when the job site grading and site layout allows for routing. Appropriate details shall be included to prevent pipes from being crushed, plugged, or infested with rodents.
D. On sites where the natural drop in grade exceeds the one percent minimum, drain pipes outlets shall be on 100 foot (30 m) centers maximum. This will provide outlets in the event that excessive water flow exceeds the capacity of pipe over long stretches.
E. When the drain pipe must be raised to accommodate outlets through the wall face, refer details provided by manufacturer.

1.5 Heel Drain

The purpose of the heel drain is to pick up any water that migrates from behind the retaining wall structure at the cut and route the water away from the reinforced mass during the construction process and for incidental water for the life of the structure.

A. The piping used at the back of the reinforced mass shall have a one percent minimum gradient over the length, but it is not critical for it to be positioned at the very bottom of the cut. Additionally the entire length of the pipe may be vented at one point and should not be tied into the toe drain.
B. The pipe may be a rigid pipe with holes at the bottom with an integral sock encasing the pipe or a corrugated perforated flexible pipe with a sock to filter out fines when required based on soil conditions. For infill soils with a high percentage of sand and/or gravel the heel drain pipe does not need to be surrounded by drainage rock. When working with soils containing more than fifty percent clay, one cubic foot of drainage rock is required for each foot of pipe.

1.6 Ground Water

Ground water can be defined as water that occurs within the soil. It may be present because of surface infiltration or water table fluctuation. Ground water movement must not be allowed to come in contact with the retaining wall.

A. If water is encountered in the area of the wall during excavation or construction, a drainage system (chimney, composite or blanket) must be installed as directed by the wall design engineer.
B. Standard retaining wall designs do not include hydrostatic forces associated with the presence of ground water. If adequate drainage is not provided the retaining wall design must consider the presence of the water.
C. When non-free draining soils are used in the retained zone, the incorporation of a chimney and blanket drain should be added to minimize the water penetration into the reinforced mass.

1.7 Concentrated Water Sources

All collection devices such as roof downspouts, storm sewers, and curb gutters are concentrated water sources. They must be designed to accommodate maximum flow rates and to vent outside of the wall area.

A. All roof downspouts of nearby structures shall be sized with adequate capacity to carry storm water from the roof away from the wall area. They shall be connected to a drainage system in closed pipe and routed around the retaining wall area.
B. Site layout must take into account locations of retaining wall structures and all site drainage paths. Drainage paths should always be away from retaining wall structures.
C. Storm sewers and catch basins shall be located away from retaining wall structures and designed so as not to introduce any incidental water into the reinforced soil mass.
D. A path to route storm sewer overflow must be incorporated into the site layout to direct water away from the retaining wall structure.

1.8 Water Application

Retaining walls constructed in conditions that allow standing or moving water to come in contact with the wall face are considered water applications. These walls require specific design and construction steps to ensure performance.

Table 1: Embankment Protection Fabric Specifications

Mechanical Property	Determination Method
Tensile Strength = 375 lbs (170 kg)	ASTM D-4632
Puncture Strength = 145 lbs (66 kg)	ASTM D-3787
Equivalent Opening Size (EOS) = 70 (U.S. Sieve #)	CW-02215
Mullen Burst = 480 psi (3.3 Mpa)	ASTM D-3786
Trapezoidal Tear = 105 lbs (48 kg)	ASTM D-4533
Percent Open Area = 4%	CW-02215
Permeability = 0.01 cm/sec	ASTM D-4491

A. Embankment protection fabric is used to stabilize rip rap and foundation soils in water applications and to separate infill materials from the retained soils. This fabric should permit the passage of fines to preclude clogging of the material. Embankment protection fabric shall be a high strength polypropylene monofilament material designed to meet or exceed typical Corps of Engineers plastic filter fabric specifications (CW-02215); stabilized against ultraviolet (UV) degradation and typically exceeding the values in Table 1.
B. Infill material shall be free draining to meet the site requirements based on wave action and rapid draw down conditions.
C. Rip rap or alternative products such as "Trilock" may be required as a toe protector to eliminate scour at the base of the wall.

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11/3/21

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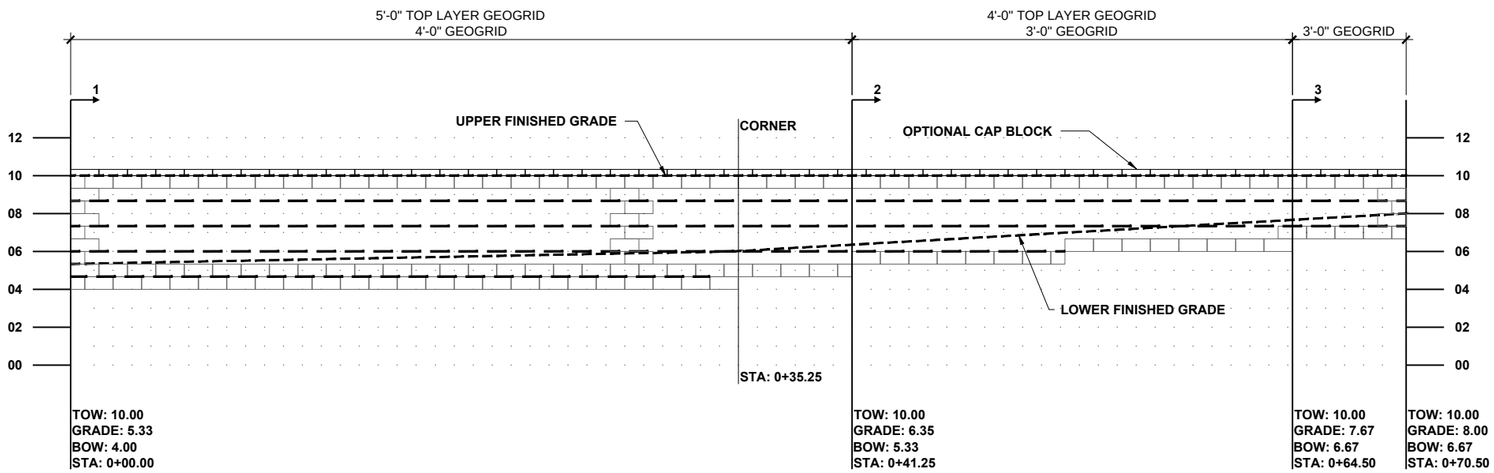
CLIENT: KB HOMES
PROJECT: HIGHLAND GROVE LOT 21
LOCATION: FUQUAY-VARINA, NORTH CAROLINA
SCALE: 1/8" = 1'-0" FOR 11x17 PAPER, 1/4" = 1'-0" FOR 22x34 PAPER, OR AS NOTED

PROJECT NO.: 21902443
DATE: 11/02/2021
DRAWN BY: KMC

GENERAL NOTES & SPECS

GS2

ENGINEER MUST BE PRESENT DURING CONSTRUCTION OF RETAINING WALL TO CERTIFY INSTALLATION OF WALL



FINISHED GRADE LINES ARE TO BE DETERMINED BY CONTRACTOR. MAXIMUM UNBALANCED FILL TO BE 4'-0" AND A MINIMUM OF 1.5 BLOCK(S) TO BE BURIED BELOW GRADE AT ANY POINT.

RETAINING WALL: ELEVATION

SCALE: 1/8" = 1'-0"

NORTH CAROLINA PROFESSIONAL SEAL 045403 ENGINEER CHARLES E. TEAL
11/3/21

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PROJECT NO.: 21902443

DATE: 11/02/2021

DRAWN BY: KMC

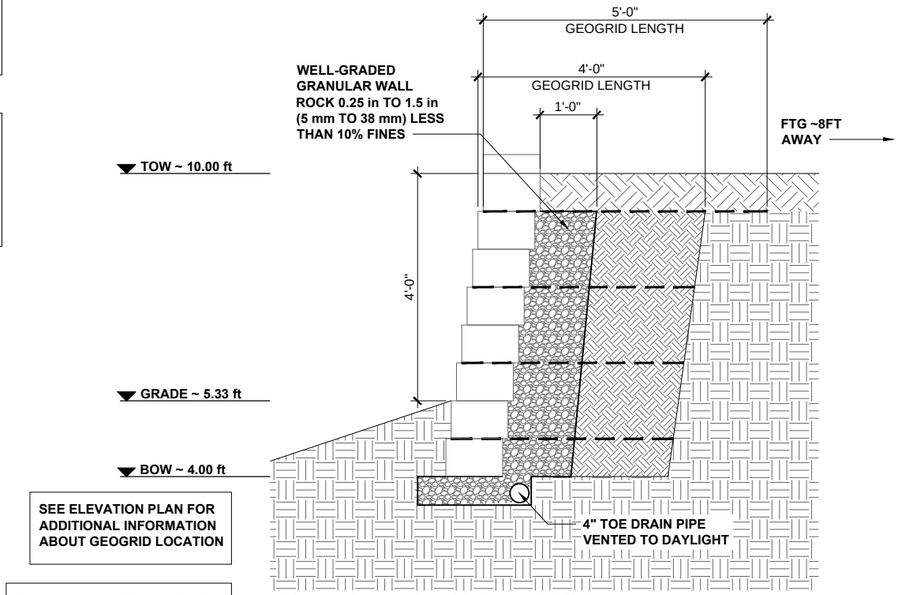
RETAINING WALL ELEVATION VIEW

RW2.0

ENGINEER MUST BE PRESENT DURING CONSTRUCTION OF RETAINING WALL TO CERTIFY INSTALLATION OF WALL

IT IS THE CONTRACTORS' RESPONSIBILITY TO PROVIDE STABLE CUTS AND/OR TRENCH PROTECTION PER OSHA STANDARDS

SEE ELEVATION PLAN FOR EXACT LOCATION OF GEOGRID ALONG WALL



FACTOR OF SAFETY SUMMARY
OVERTURNING FOS: 3.61
SLIDING FOS: 1.79

Section 1: (0ft - 41ft)
4'-0" MAX UNBALANCED FILL

WELL-GRADED GRANULAR WALL ROCK 0.25 in TO 1.5 in (5 mm TO 38 mm) LESS THAN 10% FINES, 12" MIN. OF BACKFILL

VIRGIN SOIL OR CONTROLLED FILL TO 95% COMPACTION

REINFORCED BACKFILL PER MFTR SPECS. COMPACTED TO MFTR SPECS.

– – – – – – – SECTION: GEOGRID

WALL UNIT TYPE - 8"H x 18"W x 12"D

GEOGRID REINFORCEMENT TYPE - STRATA 200 U.N.O. (OR EQUIVALENT)

ADDITIONAL NOTES:

1. Setback distance is approximate and does not consider curves, radii or corners.
2. Geogrids placed in the slope above the wall are used in the internal compound stability calculations and in the contributory area calculation of the top wall geogrid.
3. Place the geogrid, in the reinforced base, per the elevation view.
4. All geogrid length dimensions are minimum lengths that the geogrid must extend past the front face of the block.
5. Base of wall shall be 6" deep and 2' wide typical, U.N.O., with the stone extending 6" beyond the face of the first course of block.
6. For site configurations with bottoms of the base on a level plane a minimum one percent gradient shall be maintained on the placement of the toe and heel pipe. Pipe outlets shall be provided on 50' centers, or 100' centers if pipe is crowned between the outlets.
7. Retaining wall shall be constructed in accordance with block manufacturer's specifications and recommendations.
8. Maintain 3' consolidation zone behind face of wall. No heavy equipment or machinery shall be allowed within the consolidation zone.

FINISHED GRADE LINES ARE TO BE DETERMINED BY CONTRACTOR. A MINIMUM OF 1.5 BLOCK(S) TO BE BURIED BELOW GRADE AT ANY POINT.

RETAINING WALL: SECTION DETAIL

SCALE: 3/8" = 1'-0"

NORTH CAROLINA PROFESSIONAL SEAL 045403 ENGINEER CHARLES E. TEAL
11/3/21

P-0961

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INFO@JDSCONSULTING.NET; WWW.JDSCONSULTING.NET

CLIENT: KB HOMES
PROJECT: HIGHLAND GROVE LOT 21
LOCATION: FUQUAY-VARINA, NORTH CAROLINA
SCALE: 1/8" = 1'-0" FOR 11x17 PAPER, 1/4" = 1'-0" FOR 22x34 PAPER, OR AS NOTED

PROJECT NO.: 21902443
DATE: 11/02/2021
DRAWN BY: KMC

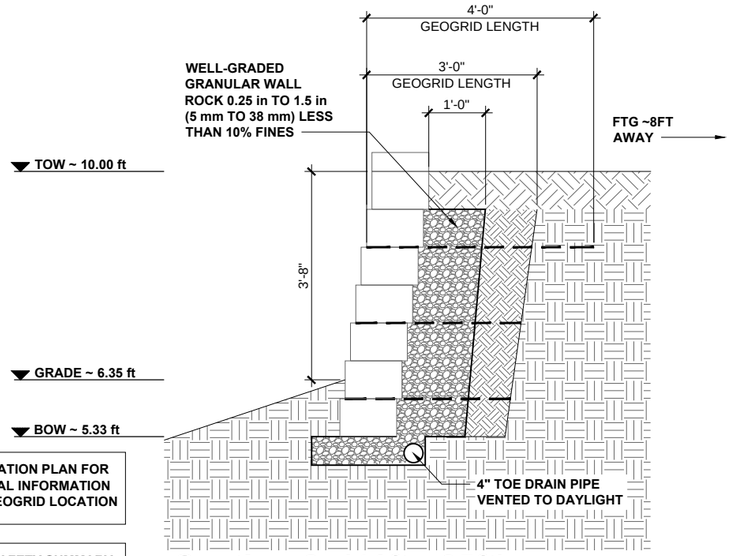
RETAINING WALL SECTION DETAILS

RW3.0

ENGINEER MUST BE PRESENT DURING CONSTRUCTION OF RETAINING WALL TO CERTIFY INSTALLATION OF WALL

IT IS THE CONTRACTORS' RESPONSIBILITY TO PROVIDE STABLE CUTS AND/OR TRENCH PROTECTION PER OSHA STANDARDS

SEE ELEVATION PLAN FOR EXACT LOCATION OF GEOGRID ALONG WALL



FACTOR OF SAFETY SUMMARY
OVERTURNING FOS: 3.74
SLIDING FOS: 1.87

Section 2: (41ft - 65ft)
3'-8" MAX UNBALANCED FILL

WELL-GRADED GRANULAR WALL ROCK 0.25 in TO 1.5 in (5 mm TO 38 mm) LESS THAN 10% FINES, 12" MIN. OF BACKFILL

VIRGIN SOIL OR CONTROLLED FILL TO 95% COMPACTION

REINFORCED BACKFILL PER MFTR SPECS. COMPACTED TO MFTR SPECS.

– – – – – – – SECTION: GEOGRID

WALL UNIT TYPE - 8"H x 18"W x 12"D

GEOGRID REINFORCEMENT TYPE - STRATA 200 U.N.O. (OR EQUIVALENT)

RETAINING WALL: SECTION DETAIL

SCALE: 3/8" = 1'-0"

FINISHED GRADE LINES ARE TO BE DETERMINED BY CONTRACTOR. A MINIMUM OF 1.5 BLOCK(S) TO BE BURIED BELOW GRADE AT ANY POINT.

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CLIENT: **KB HOMES**

PROJECT: **HIGHLAND GROVE LOT 21**

LOCATION: **FUQUAY-VARINA, NORTH CAROLINA**

SCALE: 1/8" = 1'-0" FOR 11x17 PAPER, 1/4" = 1'-0" FOR 22x34 PAPER, OR AS NOTED

PROJECT NO.: **21902443**

DATE: **11/02/2021**

DRAWN BY: **KMC**

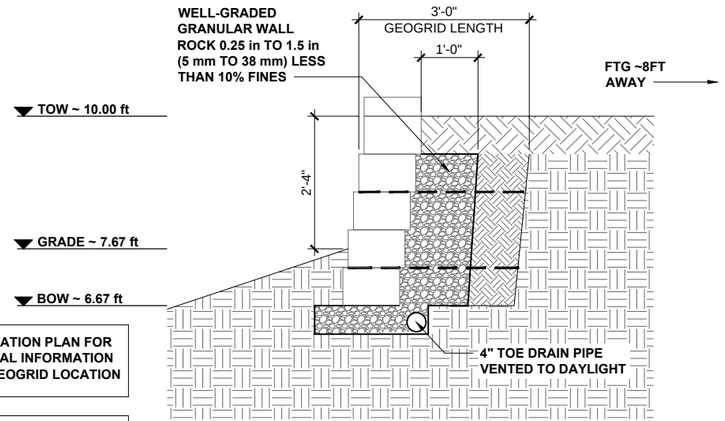
RETAINING WALL SECTION DETAILS

RW3.1

ENGINEER MUST BE PRESENT DURING CONSTRUCTION OF RETAINING WALL TO CERTIFY INSTALLATION OF WALL

IT IS THE CONTRACTORS' RESPONSIBILITY TO PROVIDE STABLE CUTS AND/OR TRENCH PROTECTION PER OSHA STANDARDS

SEE ELEVATION PLAN FOR EXACT LOCATION OF GEOGRID ALONG WALL



SEE ELEVATION PLAN FOR ADDITIONAL INFORMATION ABOUT GEOGRID LOCATION

FACTOR OF SAFETY SUMMARY
OVERTURNING FOS: 6.41
SLIDING FOS: 2.47

Section 3: (65ft - 70ft)
2'-4" MAX UNBALANCED FILL

WELL-GRADED GRANULAR WALL ROCK 0.25 in TO 1.5 in (5 mm TO 38 mm) LESS THAN 10% FINES, 12" MIN. OF BACKFILL

VIRGIN SOIL OR CONTROLLED FILL TO 95% COMPACTION

REINFORCED BACKFILL PER MFTR SPECS. COMPACTED TO MFTR SPECS.

– – – – – – – SECTION: GEOGRID

WALL UNIT TYPE - 8"H x 18"W x 12"D

GEOGRID REINFORCEMENT TYPE - STRATA 200 U.N.O. (OR EQUIVALENT)

RETAINING WALL: SECTION DETAIL

SCALE: 3/8" = 1'-0"

FINISHED GRADE LINES ARE TO BE DETERMINED BY CONTRACTOR. A MINIMUM OF 1.5 BLOCK(S) TO BE BURIED BELOW GRADE AT ANY POINT.

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CLIENT: KB HOMES
PROJECT: HIGHLAND GROVE LOT 21
LOCATION: FUQUAY-VARINA, NORTH CAROLINA
SCALE: 1/8" = 1'-0" FOR 11x17 PAPER, 1/4" = 1'-0" FOR 22x34 PAPER, OR AS NOTED

PROJECT NO.: 21902443
DATE: 11/02/2021
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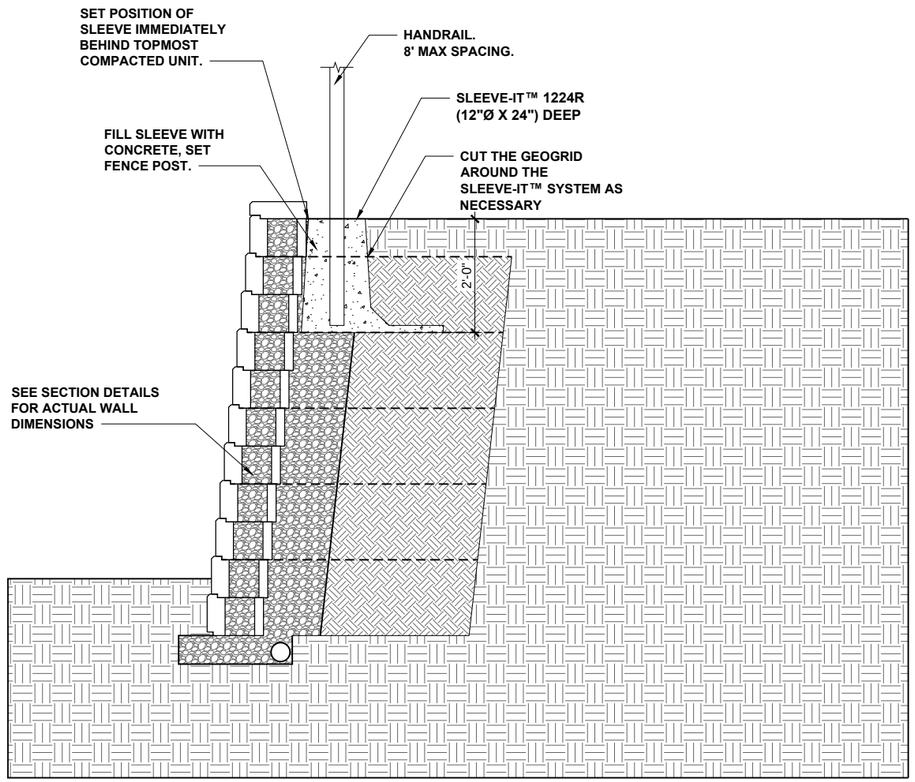
RETAINING WALL SECTION DETAILS

RW3.2

ENGINEER MUST BE PRESENT DURING CONSTRUCTION OF RETAINING WALL TO CERTIFY INSTALLATION OF WALL



RETAINING WALL: OPT. HANDRAIL DETAIL

SCALE: 3/8" = 1'-0"

INSTALLATION STEPS:

1. Prepare a level area approximately 24" wide x 36" deep behind the wall face. The prepared area should be 24" below the proposed top of wall (not including the cap stone).
2. Place the Sleeve-it unit on the level surface in an upright position with the front edge of the unit flush against the back of the wall. Multiple units should be spaced in accordance with fence specifications.
3. Encapsulate and stabilize the Sleeve-It by placing and compacting sufficient backfill material layers as required. If geogrid is required, slit the geogrid perpendicular to the wall face just enough to fit around the base of the unit while ensuring that the geogrid remains properly attached to the wall. Continue the backfilling process until the material reaches the top of the tower. Do not remove perforated lid until ready to place post.
4. Punch the perforated lid using a mallet or hammer to expose the inside of the Sleeve-It unit. Detached lids can be left inside the unit or discarded prior to pouring the infill material.
5. Place post through the exposed area and rest on the flat ground surface area inside the Sleeve-it cavity. Ensure that the post is upright and level and hold in place while carefully pouring infill material such as concrete through the exposed cavity. Follow guidelines as specified by infill supplier. Concrete is highly recommended as infill material.

WELL-GRADED GRANULAR WALL ROCK 0.25 in TO 1.5 in (5 mm TO 38 mm) LESS THAN 10% FINES, 12" MIN. OF BACKFILL

VIRGIN SOIL OR CONTROLLED FILL TO 95% COMPACTION

REINFORCED BACKFILL PER MFTR SPECS. COMPACTED TO MFTR SPECS.

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PROJECT: HIGHLAND GROVE LOT 21

LOCATION: FUQUAY-VARINA, NORTH CAROLINA

SCALE: 1/8" = 1'-0" FOR 11x17 PAPER, 1/4" = 1'-0" FOR 22x34 PAPER, OR AS NOTED

PROJECT NO.: 21902443

DATE: 11/02/2021

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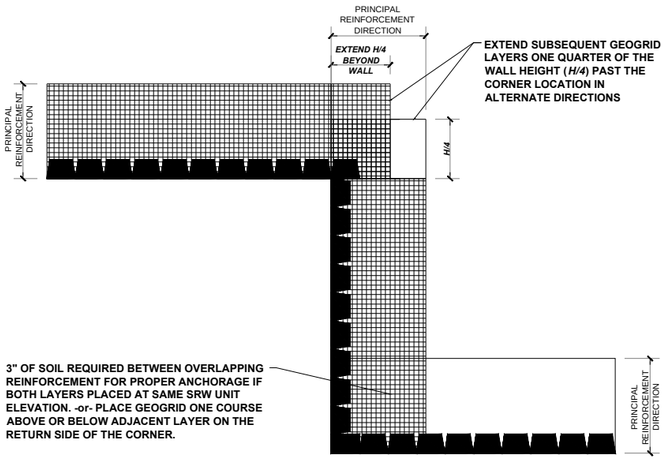
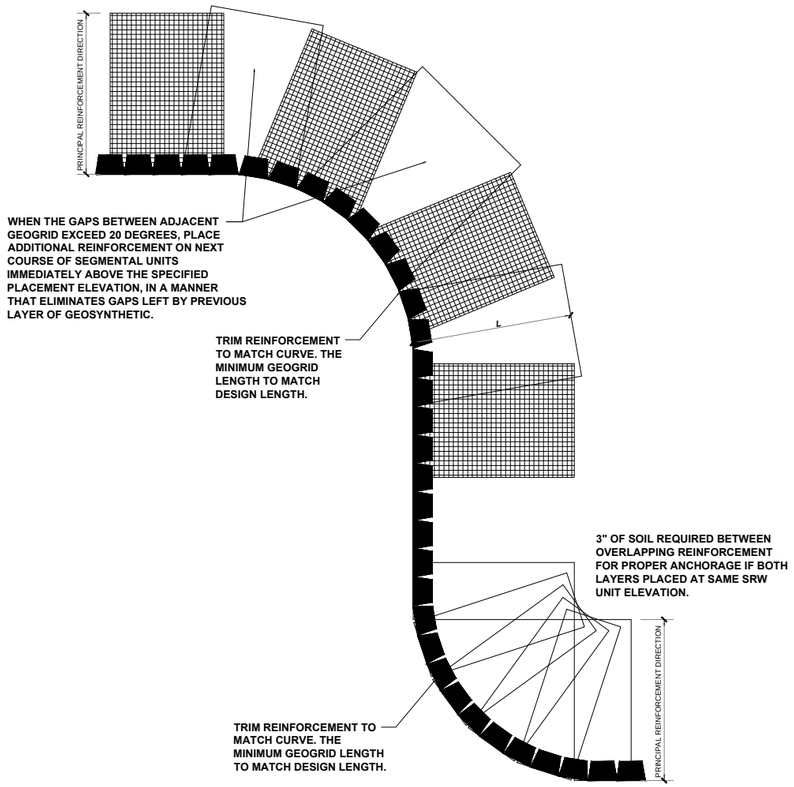
OPTIONAL HANDRAIL DETAIL

RW4.0



1 SRW SQUARED CORNER: GEOGRID PLACEMENT

SCALE: 1/8" = 1'-0"

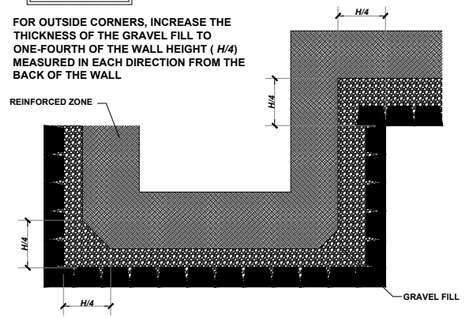


2 SRW CURVED CORNER: GEOGRID PLACEMENT

SCALE: 1/8" = 1'-0"

NOTE: GEOGRID NOT SHOWN FOR CLARITY

FOR OUTSIDE CORNERS, INCREASE THE THICKNESS OF THE GRAVEL FILL TO ONE-FOURTH OF THE WALL HEIGHT (H/4) MEASURED IN EACH DIRECTION FROM THE BACK OF THE WALL

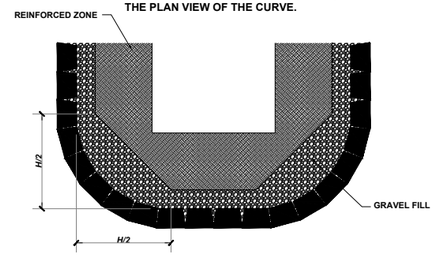


3 SRW SQUARED CORNER: GRAVEL FILL

SCALE: 1/8" = 1'-0"

NOTE: GEOGRID NOT SHOWN FOR CLARITY

FOR OUTSIDE CORNERS, INCREASE THE THICKNESS OF THE GRAVEL FILL TO ONE-HALF OF THE WALL HEIGHT (H/2) FOR THE PORTION OF THE CURVE MEASURED FROM THE POINT OF TANGENCY TO THE POINT OF CURVATURE WITHIN THE PLAN VIEW OF THE CURVE.



4 SRW CURVED CORNER: GRAVEL FILL

SCALE: 1/8" = 1'-0"

ENGINEER MUST BE PRESENT DURING CONSTRUCTION OF RETAINING WALL TO CERTIFY INSTALLATION OF WALL

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GEOGRID PLACEMENT DETAILS

RW5.0