

SDP 02-87

20.0 STANDARDS AND SPECIFICATIONS FOR VEGETATIVE STABILIZATION DEFINITION

Using vegetation as cover for barren soil to protect it from forces that cause erosion

Vegetative stabilization specifications are used to promote the establishment of vegetation on exposed soil. When soil is stabilized with vegetation, the soil is less likely to erode and more likely to allow infiltration of rainfall, thereby reducing sediment loads and run-off to downstream areas, and improving wildlife habitat and visual resources.

CONDITIONS WHERE PRACTICE APPLIES This practice shall be used on denuded areas as specified on the plans and may be used on highly erodible or critically eroding areas. This specification is divided into Temporary Seeding, to quickly establish vegetative cover for short duration O(up to one year), and Permanent Seeding, for long term vegetative cover. Examples of applicable areas for Temporary Seeding are temporary Soil Stockpiles, cleared areas being left idle between construction phases, earth dikes, etc. and for Permanent Seeding are lawns, dams, cut and fill slopes and other areas at final grade, former stockpile and staging areas, etc. EFFECTS ON WATER QUALITY AND QUANTITY

Planting vegetation in disturbed areas will have an effect on the water budget, especially on volumes and rates of runoff, infiltration evaporation, transpiration, percolation, and groundwater recharge. Vegetation, over time, will increase organic matter content and improve the water holding capacity of the soil and subsequent plant growth. Vegetation will help reduce the movement of sediment, nutrients, and other chemicals carried by runoff to receiving waters. Plants will also help protect groundwater supplies by assimilating those substances present within the root zone. Sediment control devices must remain in place during grading, seedbed preparation, seeding, mulching and vegetative establishment to prevent large quantities of sediment and associated chemicals and nutrients from washing into surface waters. SECTION 1 - VEGETATIVE STABILIZATION METHODS AND MATERIALS

A. Site Preparation Install erosion and sediment control structures (either temporary of permanent) such as diversions, grade stabilization structures, berms, waterways, or sediment control basins.

ii. Perform all grading operations at right angles to the slope. Final grading and shaping is not usually necessary for temporary seeding. iii. Schedule required soil tests to determine soil amendment composition and application rates for sites

having disturbed area over 5 acres. Soil Amendments (Fertilizer and Lime Specifications) Soil tests must be performed to determine the exact ratios and application rates for both lime and fertilizer on sites having disturbed areas over 5 acres. Soil analysis may be performed by the University of Maryland or a recognized commercial laboratory. Soil samples taken for engineering purposes may also be used for chemical analyses.

. Fertilizers shall be uniform in composition, free flowing and suitable for accurate application by approved equipment. Manure may be substituted for fertilizer with prior approval from the appropriate approval authority. Fertilizers shall all be delivered to the site fully labeled according to the applicable state fertilizer laws and shall bear the name, trade name or trademark and warranted of the producer

iii. Lime materials shall be ground limestone (hydrated or burnt lime may be substituted) which contains at least 50% total oxides (calcium oxide plus magnesium oxide). Limestone shall be ground to such fineness that at least 50% will pass through a *100 mesh sieve and 98-100% will pass through a *20 mesh sieve. Incorporate lime and fertilizer into the top 3-5" of soil by disking or other suitable means.

Seedbed Preparation a. Seedbed preparation shall consist of loosening soil to a depth of 3" to 5" by means of

suitable agricultural or construction equipment, such as disc harrows or chisel plows or rippers mounted on construction equipment. After the soil is loosened it should not be rolled or dragged smooth, but left in the roughened condition. Sloped areas (greater than 3:1) should be tracked leaving the surface in an irregular condition with ridges running parallel to the contour of the slope.

Apply fertilizer and lime as prescribed on the plans. In corporate lime and fertilizer into the top 3-5" of soil by disking or other suitable means.

ii. Permanent Seeding

a. Minimum soil conditions required for permanent vegetative establishment:

1. Soil pH shall be between 6.0 and 7.0.

1. Soil pH shall be between 5.00 parts per million (ppm). Soluble salts shall be less than 500 parts per million (ppm).

The soil shall contain less than 40% clay, but enough fine grained material (>30% silt plus clay) to provide the capacity to hold a moderate amount of moisture. An exception is if lovegrass of serecia lespedezas is to be planted, then a sandy soil (<30% silt plus clay) would be acceptable. Soil shall contain 1.5% minimum organic matter by weight.

Soil must contain sufficient pore space to permit adequate root penetration If these conditions cannot be met by soils on site, adding topsoil is required

in accordance with Section 21 Standard and Specification for Topsoil. Areas previously graded in conformance with the drawings shall be maintained in a true and even grade, then scarified or otherwise loosened to a depth of 3-5" to permit bonding of the topsoil to the surface area and to create horizontal erosion check slots to prevent topsoil to the surface area and to create horizontal erosion check slots to prevent topsoil from sliding down a slope.

Apply soil amendments as per soil test or as included on the plans.

Mix soil amendments into the top 3-5" of topsoil by disking or other suitable means. Lawn areas should be raked to smooth the surface, remove large objects like stones and branches, and ready the area for seed and application. Where site conditions will not permit normal seedbed preparation, loosen surface soil by dragging with a heavy chain or other equipment to roughen the surface. Steep slopes (steeper than 3:1) should be tracked by a dozer leaving the soil in an irregular condition with ridges running parallel to the contour of the slope. The top 1-3" of soil should be loose and friable. Seedbed loosening may not be necessary on newly disturbed areas.

Seed Specifications All seed must meet the requirements of the Maryland State Seed Law. All seed shall be subject to re-testing by a recognized seed laboratory. All seed used shall have been tested within the 6 months immediately preceding the date of sowing such material on this job.

Note: Seed tags shall be made available to the inspector to verify type and rate of seed used oculant - The inoculant for treating legume seed in the seed mixtures shall be a pure culture of nitrogen-fixing bacteria prepared specifically for the species. Inoculants shall not be used later than the date indicated on the container. Add fresh inoculant as directed on package. Use four times the recommended rate when hydroseeding. Note: It is very important to keep inoculant as cool as possible until used. Temperatures above 75°-80° F. can weaken bacteria and make the inoculant less effective.

Methods of Seeding Hydroseeding: Apply seed uniformly with hydroseeder (slurry includes seed and fertilizer), broadcas or drop seeded, or a cultipacker seeder. a. If fertilizer is being applied at the time of seeding, the application rates amounts will not

exceed the following: nitrogen; maximum of 100 lbs. per acre total of soluble nitrogen; P205 (phosphorous); 200 lbs/ac; K20 (potassium): 200 lbs/ac. time - use only ground agricultural limestone, (Up to 3 tons per acre may be applied by hydroseeding). Normally, not more than 2 tons are applied by hydroseeding at any one time. Do not use burnt or hydrated lime when hydroseeding.
Seed and fertilizer shall be mixed on site and seeding shall be done immediately and

without_interruption. ii. Dry Seeding: This includes use of conventional drop or broadcast spreaders. Seed spread dry shall be incorporated into the subsoil at the rates prescribed on the Temporary or Permanent Seeding Summaries or Tables 265 or 26. The seeded area shall then be rolled with a weighted roller to provide good seed to soil contact. Where practical, seed should be applied in two directions perpendicular to each other. Apply half the seeding rate in each direction.

iii. Drill or Cultipacker Seeding: Mechanized seeders that apply and cover seed with soil Cultipacking seeders are required to bury the seed in such a fashion as to provide at least 1/4 inch of soil covering. Seedbed must be firm after planting.

Where practical, seed should be applied in two directions perpendicular to each other. Apply half the seeding rate in each direction. F. Mulch Specifications (In order of preference)

Straw shall consist of thoroughly threshed wheat, rye or oat straw, reasonable bright in color, and shall not be musty, moldy, caked, decayed, or excessively dusty and shall be free of noxious weed seeds as specified in the Maryland Seed Law. ii. Wood Cellulose Fiber Mulch (WCFM)

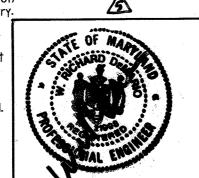
a. WCFM shall consist of specially prepared wood cellulose processed into a uniform

fibrous physical state. WCFM shall be dyed green or contain a green dye in the package that will provide an appropriate color to facilitate visual inspection of the uniformly spread slurry. WCFM, including dye, shall contain no germination or growth inhibiting factors.

WCFM materials shall be manufactured and processed in such a manner that the wood cellulose fiber mulch will remain in uniform suspension in water under agitation and will blend with seed, fertilizer and other additives to form a homogeneous slurry. The mulch material shall form a blotter-like ground cover, on application, having moisture absorption and percolation properties and shall cover and hold grass seen in contact with the soil without inhibiting the growth of the grass seedlings. WCFM material shall contain no elements or compounds at concentration levels that will be phytol-toxic.

f. WCFM must conform to the following physical requirements: fiber length to approximately 10 mm., diameter approximately 1 mm., pH range of 4.0 to 8.5, ash content of 1.6% maximum and water holding capacity of 90% minimum.

Note: Only sterile straw mulch should be used in areas where one species of grass is desired



i.Richard demarid pezigg**s**

Mulching Seeded Areas - Mulch shall be applied to all seeded areas immediately after seeding. If grading is completed outside of the seeding season, mulch along shall be applied as prescribed in this section, and maintained until the seeding season returns and seeding can be performed in

accordance with these specifications. ii. When straw mulch is used, it shall be spread over all seeded areas at the rate of 2 tons/acre. Mulch shall be applied to a uniform loose depth of between 1" and 2". Mulch applied shall achieve a uniform distribution and depth so that the soil surface is not exposed. If a mulch anchoring tool is

to be used, the rate should be increased to 2.5 tons/acre. iii. Wood cellulose fiber used as a mulch shall be applied at a net dry weight of 1,500 lbs. per acre. wood cellulose fiber shall be mixed with water, and the mixture shall contain a maximum of 50 of wood cellulose fiber per 100 gallons of water. Securing Straw Mulch (Mulch Anchoring): Mulch anchoring shall be performed immediately following mulch

application to minimize loss by wind or water. This may be done by one of the following methods (listed by preference), depending upon size of area and erosion hazard:

i. A mulch anchoring tool is a tractor drawn implement designed to punch and anchor mulch into the soil surface a minimum of two (2) inches. This practice is most effective on large areas, but is limited to flatter slopes where equipment can operate safely. It used on sloping land, this practice should be used on the contour if possible.

ii. Wood cellulose fiber may be used for anchoring straw. The fiber binder shall be applied at a net dry weight of 750 pounds/acre. The wood cellulose fiber shall be mixed with water and the mixture shall contain a maximum of 50 pounds of wood cellulose fiber per 100 gallons of water.

iii. Application of liquid binders should be heavier at the edges where wind catches mulch, such as in valleys and crest of banks. The remainder of area should be appear uniform after binde application. Synthetic binders – such as Acrylic DLR (Agro-Tack), DCA-70 Petroset, Terra To II, Terra Tack AR or other approved equal may be used at rates recommended by the manufacturer to anchor mulch.

iv. Lightweight plastic netting may be stapled over the mulch according to manufacturer's recommendations. Netting is usually available in rolls 4' to 15' feet wide and 300 to 3,000 feet long.

Incremental Stabilization - Cut Slopes All cuts slopes shall be dressed, prepared, seeded and mulched as the work progresses. Slopes

shall be excavated and stabilized in equal increments not to exceed 15'. ii. Construction sequence (Refer to Figure 3 below):

a. Excavate and stabilize all temporary swales, side ditches, or berms that will be used to convey runoff from the excavation.
b. Perform Phase 1 excavation, dress, and stabilize. Perform Phase 2 excavation, dress and stabilize. Overseed Phase 1 areas as

necessary.

Perform final phase excavation, dress and stabilize. Overseed previously seeded

Note: Once excavation has begun the operation should be continuous from grubbing through the completion of grading and placement of topsoil (if required) and permanent seed and mulch. Any interruptions in the operation of completing the operation out of the seeding season will necessitate the application of temporary stabilization. Incremental Stabilization of Embankments - Fill Slopes

Embankments shall be constructed in lifts as prescribed on the plans.

ii. Slopes shall be stabilized immediately when the vertical height of the multiple lifts reaches
 15", or when the grading operation ceases as prescribed in the plans.
 iii. At the end of each day, temporary berms and pipe slope drains should be constructed along the top edge
 of the embankment to intercept surface runoff and convey it down the slope in a non-erosive manner to

à sediment trapping device.
iv. Construction sequence: Refer to Figure 4 (below). Excavate and stabilize all temporary swales, side ditches, or berms that will be used to divert runoff around the fill. Construct slope silt fence on low side of fill as shown in Figure 5, unless other methods shown on the plans address this area.

Place Phase 1 embankment, dress and stabilize.

Place final phase embankment, dress and stabilize. Overseed previously seeded areas as necessary. Once the placement of fill has begun the operation should be continuous from grubbing through the completion of and placement of topsoil (if required) grading and permanent seed and mulch. any interruptions in the operation or completing the operation out of the seeding season will necessitate the application of temporary stabilization.

TEMPORARY SEEDING NOTES

Apply to graded or cleared areas likely to be redisturbed where a short-term vegetative cover is needed.

Seedbed Preparation: Loosen upper three inches of soil by raking. discing or other acceptable means before seeding, if not previously loosened. Soil Amendments: Apply 600 lbs. per acre 10-10-10 fertilizer (14

lbs. per 1000 sq.ft.). Seeding: For periods March 1 thru April 30 and from August 15 thru November 15, seed with 2-1/2 bushels per acre of annual rye (3.2 lbs. per 1000 sq.ft.). For the period May 1 thru August 14, seed with 3 lbs. per acre of weeping lovegrass (0.07 lbs. per 1000 sq.ft.). For

the period November 16 thru February 28, protect site by applying 2

tons per acre of well anchored straw mulch and seed as soon as possible in the spring, or use sod. Mulching: Apply 1-1/2 to 2 tons per acre (70 to 90 lbs. per 1000 sq.ft.) of unrotted small grain straw immediately after seeding. Anchor mulch immediately after application using mulch anchoring tool or 218 gal. per acre (5 gal. per 1000 sq.ft.) of emulsified asphalt on flat areas. On slopes, 8 ft. or higher, use 347 gal. per acre (8 gal.

Refer to the 1994 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOII EROSION AND SEDIMENT CONTROL for rate and methods not covered.

PERMANENT SEEDING NOTES

Apply to graded or cleared areas not subject to immediate further disturbance where a permanent long-lived vegetative cover is needed. Seedbed Preparation: Loosen upper three inches of soil by raking, discing or other acceptable means before seeding, if not previously

Soil Amendments: In lieu of soil test recommendations, use one of the following schedules

1) Preferred - Apply 2 tons per acre dolomitic limestone (92 lbs. per 1000 sq.ft.) and 600 lbs. per acre 10-10-10 fertilizer (14 lbs. per 1000 sq.ft.) before seeding. Harrow or disc into upper three inches of soil. At time of seeding, apply 400 lbs.

per acre 30-0-0 ureaform fertilizer (9 lbs. per 1000 sq.ft.). 2) Acceptable - Apply 2 tons per acre dolomitic limestone (92 lbs per 1000 sq.ft.) and 1000 lbs. per acre 10-10-10 fertilizer (23 Ibs. per 1000 sq.ft.) before seeding. Harrow or disc into upper three inches of soil.

Seeding: For the period March 1 thru April 30 and from August 1 thru October 15, seed with 60 lbs. per acre (1.4 lbs. per 1000 sq.ft.) of Kentucky 31 Tall Fescue. For the period May 1 thru July 31, seed with 60 lbs. Kentucky 31 Tall Fescue per acre and 2 lbs. per acre (0.05 lbs. per 1000 sq.ft.) of weeping lovegrass. During the period October 16 thru February 28, protect site by one of the following options

1) 2 tons per acre of well-anchored mulch straw and seed as soon as possible in the spring.

per 1000 sq.ft.) for anchoring.

3) Seed with 60 lbs. per acre Kentucky 31 Tall Fescue and mulch with 2 tons per acre well anchored straw

Mulching: Apply 1-1/2 to 2 tons per acre (70 to 90 lbs. per 1000 sq.ft.) of unrotted small grain straw immediately after seeding. Anchor mulch immediately after application using mulch anchoring tool or 218 gal. per acre (5 gal. per 1000 sq.ft.) of emulsified asphalt on flat areas. On slopes, 8 ft. or higher, use 347 gal. per acre (8 gal. per 1000 sq.ft.) for anchoring.

Maintenance: Inspect all seeded areas and make needed repairs. replacements and reseedings.

SEDIMENT CONTROL NOTES

1) A MINIMUM OF 48 HOURS NOTICE MUST BE GIVEN TO THE HOWARD COUNTY DEPARTMENT OF INSPECTIONS, LISCENSES AND PERMITS, SEDIMENT CONTROL DIVISION PRIOR TO THE START OF ANY CONSTRUCTION (313-1855).
2) ALL VEGETATIVE AND STRUCTURAL PRACTICES ARE TO BE INSTALLED

ACCORDING TO THE PROVISIONS OF THIS PLAN AND ARE TO BE IN CONFORMANCE WITH THE MOST CURRENT MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL AND REVISIONS THERETO.

3) FOLLOWING INITIAL SOIL DISTURBANCE OR RE-DISTURBANCE, PERMANENT OR TEMPORARY STABILIZATION SHALL BE COMPLETED WITHIN: a) 7 CALENDAR DAYS FOR ALL PERIMETER SEDIMENT CONTROL STRUCTURES, DIKES, PERIMETER SLOPES AND ALL SLOPES STEEPER THAN 3:1, b) 14 DAYS AS TO ALL OTHER DISTURBED OR GRADED AREAS ON THE PROJECT SITE.

4) ALL SEDIMENT TRAPS/BASINS SHOWN MUST BE FENCED AND WARNING

SIGNS POSTED AROUND THEIR PERIMETER IN ACCORDANCE WITH VOL. 1, CHAPTER 12, OF THE HOWARD COUNTY DESIGN MANUAL, STORM DRAINAGE 5) ALL DISTURBED AREAS MUST BE STABILIZED WITHIN THE TIME PERIOD SPECIFIED ABOVE IN ACCORDANCE WITH THE 1994 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL FOR PERMANENT SEEDING (SEC. 51), SOD (SEC. 54), TEMPORARY SEEDING (SEC. AND MULCHING (SEC. 52). TEMPORARY STABILIZATION WITH MULCH ALONE CAN ONLY BE DONE WHEN RECOMMENDED SEEDING DATES DO NOT ALLOW FOR PROPER GERMINATION AND ESTABLISHMENT OF GRASSES.

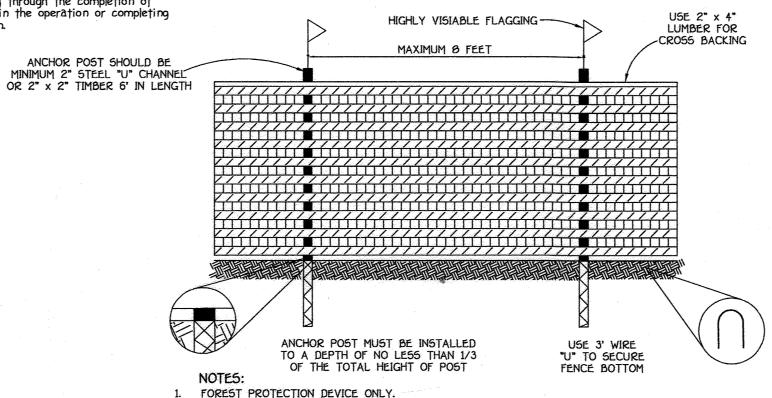
6) ALL SEDIMENT CONTROL STRUCTURES ARE TO REMAIN IN PLACE AND ARE TO BE MAINTAINED IN OPERATIVE CONDITION UNTIL PERMISSION FOR THEIR REMOVAL HAS BEEN OBTAINED FROM THE HOWARD COUNTY SEDIMENT CONTROL INSPECTOR.

7) SITE ANALYSIS: TOTAL AREA OF SITE 4.35 ACRES AREA DISTURBED 1.717 ACRES AREA TO BE ROOFED OR PAVED 0.627 ACRES AREA TO BE VEGETATIVELY STABILIZED 1.090 ACRES 6807 CU.YDS. OFFSITE WASTE/BORROW AREA LOCATION N/A CU.YDS.

B) ANY SEDIMENT CONTROL PRACTICE WHICH IS DISTURBED BY GRADING ACTIVITY FOR PLACEMENT OF UTILITIES MUST BE REPAIRED ON THE SAME DAY OF DISTURBANCE. ADDITIONAL SEDIMENT CONTROLS MUST BE PROVIDED, IF DEEMED NECESSARY BY THE HOWARD COUNTY SEDIMENT CONTROL INSPECTOR.

10) ON ALL SITES WITH DISTURBED AREAS IN EXCESS OF 2 ACRES, APPROVAL OF THE INSPECTION AGENCY SHALL BE REQUESTED UPON COMPLETION OF INSTALLATION OF PERIMETER EROSION AND SEDIMENT CONTROLS, BUT BEFORE PROCEEDING WITH ANY OTHER EARTH DISTURBANCE OR GRADING. OTHER BUILDING OR GRADING INSPECTION APPROVALS MAY NOT BE AUTHORIZED UNTIL THIS INITIAL APPROVAL BY THE INSPECTION AGENCY IS MADE.

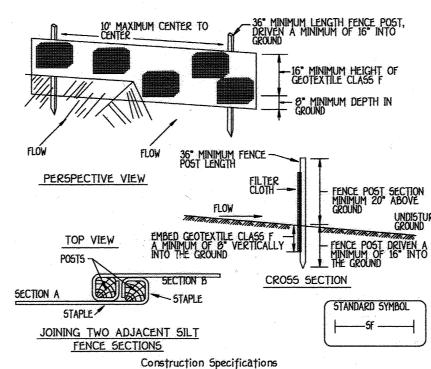
11) TRENCHES FOR THE CONSTRUCTION OF UTILITIES IS LIMITED TO THREE PIPE LENGHTS OR THAT WHICH SHALL BE BACK-FILLED AND STABILIZED WITHIN ONE WORKING DAY, WHICHEVER IS SHORTER.



RETENTION AREA WILL BE SET AS PART OF THE REVIEW PROCESS. BOUNDARIES OF RETENTION AREA SHOULD BE STAKED AND FLAGGED PRIOR TO INSTALLING DEVICE. ROOT DAMAGE SHOULD BE AVOIDED. PROTECTIVE SIGNAGE MAY ALSO BE USED.

DEVICE SHOULD BE MAINTAINED THROUGHOUT CONSTRUCTION. TREE PROTECTION DETAIL

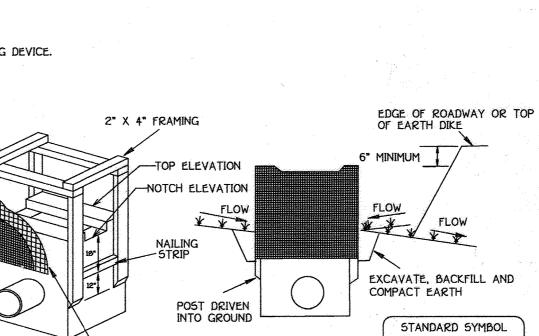
NOT TO SCALE BLAZE ORANGE PLASTIC MESH



1. Fence posts shall be a minimum of 36" long driven 16" minimum into the ground. Wood posts shall be 11/2" x 11/2" square (minimum) cut, or 13/4" diameter (minimum) round and shall be of sound quality hardwood. Steel posts will be standard T or U section weighting not less than 1.00 pond per linear foot. 2. Geotextile shall be fastened securely to each fence post with wire ties or staples at top and mid-section and shall meet the following requirements for Geotextile Class F:

3. Where ends of geotextile fabric come together, they shall be overlapped folded and stapled to prevent sediment bypass. 4. Silt Fence shall be inspected after each rainfall event and maintained when bulges occur or when sediment accumulation reached 50% of the fabric height.

SILT FENCE



WIRE MESH GEOTEXTILE CLASS E MAX. DRAINAGE AREA = 1/4 ACRE

Construction Specifications 1. Excavate completely around the inlet to a depth of 18" below the

notch elevation. 2. Drive the 2" x 4" construction grade lumber posts 1' into the ground at each corner of the inlet. Place nail strips between the posts on the ends of the inlet. Assemble the top portion of the 2" x 4" frame using the overlap joint shown on Detail 23A. The top of the frame (weir) must be 6" below adjacent roadways where flooding and safety issues may arise.

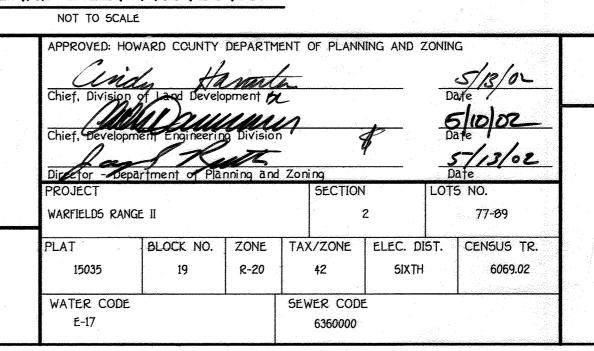
3. Stretch the 1/2" x 1/2" wire mesh tightly around the frame and fasten securely. The ends must meet and overlap at a post. 4. Stretch the Geotextile Class E tightly over the wire mesh with the geotixtile extending from the top of the frame to 18" below the inlet notch elevation. Fasten the geotextile firmly to the frame. The ends of the geotextile must meet at a post, be overlapped and folded, then fastened down.

5. Backfill around the inlet in compacted 6" layers until the layer of earth is level with the notch elevation on the ends and top elevation on the sides.

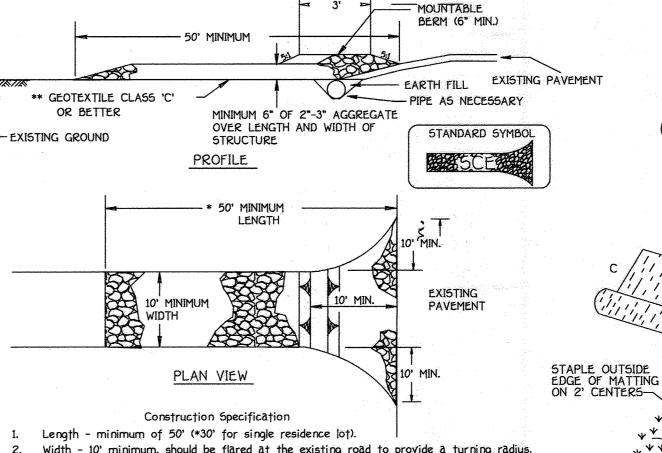
6. If the inlet is not in a sump, construct a compacted earth dike across the ditch line directly below it. The top of the earth dike

should be at least 6" higher than the top of the frame. 7. The structure must be inspected periodically and after each rain and the geotextile replaced when it becomes clogged.

STANDARD INLET PROTECTION



| | SIP



Width - 10' minimum, should be flared at the existing road to provide a turning radius Geotextile fabric (filter cloth) shall be placed over the existing ground prior to placing stone. **The plan approval authority may not require single family residences to use geotextile.

4. Stone - crushed aggregate (2" to 3") or reclaimed or recycled concrete equivalent shall be placed at least 6" deep over the length and width of the entrance. Surface Water - all surface water flowing to or diverted toward construction entrances shall be piped through the entrance, maintaining positive drainage. Pipe installed through the stabilized construction entrance shall be protected with a mountable berm with 5:1 slopes and a minimum of 6" of stone over the pipe. Pipe has to be sized according to the drainage. When the SCE is located at a high spot and has no drainage to convey a pipe will not be necessary. Pipe should be sized according to the amount of runoff to be conveyed. A 6" minimum will be required.

Location - A stabilized construction entrance shall be located at every point where construction traffic enters or leaves a construction site. Vehicles leaving the site must travel over the entire length of the stabilized construction entrance.

STABILIZED CONSTRUCTION ENTRANCE

NOT TO SCALE

SEQUENCE OF CONSTRUCTION

I. OBTAIN GRADING PERMIT 2. INSTALL SEDIMENT AND EROSION CONTROL DEVICES AS SHOWN ON PLAN 7 DAYS 3. CLEAR AND GRUB TO LIMITS OF DISTURBANCE 4 DAYS 4. INSTALL TEMPORARY SEEDING 2 DAYS 5. CONSTRUCT BUILDINGS 60 DAYS 6. FINE GRADE SITE AND INSTALL PERMANENT SEEDING AND LANDSCAPE 14 DAYS 7. REMOVE SEDIMENT CONTROL DEVICES AS UPLAND AREAS ARE STABILIZED AND PERMISSION IS GRANTED BY E/S CONTROL INSPECTOR. 7 DAYS

spaced 6" apart in a staggered pattern on either side. 6. The discharge end of the matting liner should be similarly secured with 2 double rows of staples. Note: If flow will enter from the edge of the matting then the area effected by the flow must be keyed-in. EROSION CONTROL MATTING NOT TO SCALE 10' MAXIMUM NOTE: FENCE POST SPACING SHALL NOT EXCEED 10 - CENTER TO CENTER 34" MINIMUM TIETIETIETIETIE 🖋 GROUND ' SURFACE

Construction Specifications

Key-in the matting by placing the top ends of the matting in a

Staple the 4" overlap in the channel center using an 18" spacing

Before stapling the outer edges of the matting, make sure the

Staples shall be placed 2' apart with 4 rows for each strip, 2

Where one roll of matting ends and another begins, the end of

the top strip shall overlap the upper end of the lower strip by 4",

shiplap fashion. Reinforce the overlap with a double row of staples

matting is smooth and in firm contact with the soil.

outer rows, and 2 alternating rows down the center.

narrow trench, 6" in depth. Backfill the trench and tamp firmly to

conform to the channel cross-section. Secure with a row of staples

about 4" down slope from the trench. Spacing between staples is 6".

CROSS-SECTION

OVERLAP OF MATTING

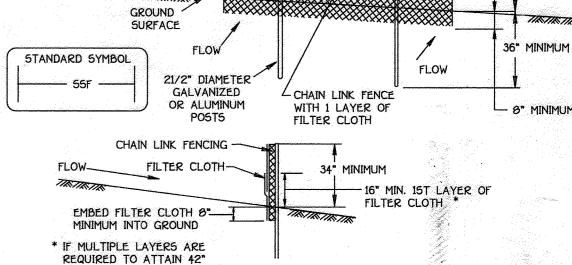
STRIPS WHERE TWO OR MORE STRIP WIDTHS ARE REQUIRED. ATTACH

STAPLES ON 10" CENTERS

STAPLE OUTSIDE

EDGE OF MATTING ON 2' CENTERS

TYPICAL STAPLES NO. 11



Construction Specifications 1. Fencing shall be 42" in height and constructed in accordance with the latest Maryland State Highway Details for Chain Link Fencing. The specification for a 6' fence shall be used, substituting 42" fabric and 6' length posts.

2. Chain link fence shall be fastened securely to the fence posts with wire ties. The lower tension wire, brace and truss rods, drive anchors and post caps are not required except on the ends of the fence.

3. Filter cloth shall be fastened securely to the chain link fence with ties spaced every 24" at the top and mid section. 4. Filter cloth shall be embedded a minimum of 8" into the ground.

5. When two sections of filter cloth adjoin each other, they shall be overlapped by 6" and folded. 6. Maintenance shall be performed as needed and silt buildups removed when "bulges" develop in the silt fence, or when silt reaches 50% of fence height

7. Filter cloth shall be fastened securely to each fence post with wire ties or staples at top and mid section and shall meet the following requirements for Geotextile Class F: Tensile Strength 50 lbs/in (min.) Test: MSMT 509 Tensile Modulus 20 lbs/in (min.) Test: MSMT 509 0.3 gal/ft /minute (max.) Test: MSMT 322 Flow Rate

Test: M5MT 322 Filtering Efficiency 75% (min.) Design Criteria Slope Length Silt Fence Length Steepness (maximum) (maximum) 0 - 10% 0 - 10:1 Unlimited Unlimited 10 - 20% 10:1 - 5:1 200 feet 1.500 feet 20 - 33% 5:1 - 3:1 100 feet 1,000 feet 33 - 50% 100 feet 500 feet 3:1 - 2:1 250 feet

> SUPER SILT FENCE NOT TO SCALE

SEDIMENT/EROSION CONTROL NOTES & DETAILS REVISED SITE DEVELOPMENT PLAN

WARFIELDS RANGE II SECTION 2 AREA 4

LOTS 77 THRU 89 TAX MAP No: 42 PARCEL: 454 SIXTH ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

SHEET 4 OF 8

DATE: FEBRUARY, 2002

SDP 02-87

SCALE: AS SHOWN

FISHER, COLLINS & CARTER, INC. VIL ENGINEERING CONSULTANTS & LAND SURVEYORS (410) 461 - 2855 ADD RETAINING WALL LOT 05 ADDED DRYWELLS TO BI THRU. 86 10-4-02 Rev. hse. & grd. lot 85 7-2-02

plan based on my personal knowledge of the site conditions and that it was prepared in accordance with the requirements of the Howard Soil Conservation District." Signature of Engineer Charles J. Crovo, Sr. P.E.

5ignature of Developer B. JAMES GREENFIELD

DEVELOPER'S CERTIFICATE "I/We certify that all development and construction will be done according to this plan, for sediment and erosion control and that any responsible personnel involved in the construction project will have a Certificate of Attendance at a Department of the Environment Approved Training Program for the Control of Sediment and Erosion before beginning the project. I also authorize periodic on-site inspection by the Howard Soil Conservation District."

ENGINEER'S CERTIFICATE

4-25-02

"I certify that this plan for erosion and sediment control represents a practical and workable

OWNER/BUILDER/DEVELOPER COLUMBIA BUILDERS COLUMBIA, MARYLAND 21044 (410) 730-3940

GENERAL NOTES:

- PROPERTIES OF STONE STRONG® RETAINING WALL FACING UNITS SHALL CONFORM TO THOSE PRESENTED IN THE STONE STRONG® PRODUCT LITERATURE.
- 2. GEOTEXTILE FABRIC SHALL MEET THE REQUIREMENTS OF AASHTO M-288-06, CLASS III (E.G., MIRAFI 140N OR EQUIVALENT)
- 3. THE WALL BASE (I.E., GRANULAR LEVELING PAD) SHALL CONSIST OF COARSE AGGREGATE, #5, 57, 67 OR 7.
- CONSTRUCTION OF THE RETAINING WALL COMPONENTS (I.E., PRECAST CONCRETE UNITS, UNIT FILL, DRAINAGE AGGREGATE, DRAINAGE PIPES, AND BACKFILL) SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S INSTALLATION RECOMMENDATIONS. PRIOR TO START OF WALL CONSTRUCTION, THE CONTRACTOR SHALL REVIEW THE MANUFACTURER'S INSTALLATION MANUAL FOR PRECAST CONCRETE STONE-FILLED RETAINING WALLS.
- 5. THE DESIGN WAS PERFORMED USING THE STONE STRONG SYSTEMS ® DESIGN SOFTWARE (VERSION 6.0), USING THE ALLOWABLE STRESS DESIGN (ASD) APPROACH.
- 6. THESE DRAWINGS HAVE BEEN PREPARED BY DEVELOPMENT DESIGN CONSULTANTS SOLELY FOR THE USE OF RECOMMENDED STONE STRONG® WALL INSTALLATION CONTRACTORS
- RETAINED BACKFILL SHALL BE PLACED IN HORIZONTAL LIFTS NOT EXCEEDING 8 INCHES IN COMPACTED LIFT THICKNESS AND COMPACTED TO A MINIMUM OF 95 PERCENT MAXIMUM DRY DENSITY AS DETERMINED BY ASTM D-698 (STANDARD PROCTOR DENSITY), COMPACTION OF THE NO. 57 CRUSHED AGGREGATE, IF USED IN THE RETAINED BACKFILL ZONE, MAY BE ACHIEVED BY A MINIMUM OF TWO PASSES OF A VIBRATORY ROLLER OR UNTIL THERE IS NO VISIBLE MOVEMENT OF THE AGGREGATE, AS DETERMINED BY THE GEOTECHNICAL TESTING AGENCY. COMPACTION TESTING IS NOT REQUIRED FOR THE NO. 57 STONE BACKFILL
- HEAVY COMPACTION EQUIPMENT SHALL NOT BE OPERATED WITHIN THREE FEET OF THE WALL FACE. HAND OPERATED EQUIPMENT SHALL BE USED WITHIN THREE FEET OF FACING UNITS. IMPACT TYPE COMPACTORS SHALL BE KEPT CLEAR OF THE WALL FACE. A REDUCED LIFT THICKNESS OF 4 INCHES SHALL BE USED WITHIN THREE FEET OF THE WALL FACE
- ALL WALL DIMENSIONS, WALL STEPS, ETC. ARE APPROXIMATE. CONTRACTOR SHALL ADJUST DIMENSIONS AS REQUIRED TO MEET ACTUAL FIELD CONDITIONS.
- 10. THE DESIGN OF THE PRECAST BLOCK GRAVITY RETAINING WALL IS BASED ON THE TOPOGRAPHIC AND LOCATION SURVEY PROVIDED BY STONE STRONG. THE WALL CONTRACTOR SHALL CONSTRUCT THE RETAINING WALL BASED ON THE LINES, GRADES, AND DIMENSIONS SHOWN ON THE APPROVED SITE PLANS. THE CONTRACTOR SHALL ADJUST THE WALL GRADES AND DIMENSIONS TO MEET ACTUAL FIELD CONDITIONS, AS APPROVED BY THE PROJECT CIVIL ENGINEER. DEVELOPMENT DESIGN CONSULTANTS SHALL BE GIVEN THE OPPORTUNITY TO REVIEW ANY CHANGES TO THE PROPOSED GRADING IN THE VICINITY OF THE RETAINING WALL, TO DETERMINE IF REDESIGN OF THE WALL IS REQUIRED.
- DURING CONSTRUCTION, THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING THE FOUNDATION SOILS, RETAINED BACFILL GRANULAR LEVELING PAD, AND DRAINAGE AGGREGATE AGAINST POTENTIAL EROSION AND SCOUR, UNTIL THE FINAL GROUND COVER (ON BOTH SIDES OF THE RETAINING WALL) HAS BEEN INSTALLED/FINISHED. STORM WATER RUNOFF SHOULD GENERALLY BE COLLECTED AND DIVERTED AWAY FROM THE RETAINING WALL AREA DURING CONSTRUCTION.
- 12. THE CONTRACTOR SHALL ENSURE ALL SURROUNDING STRUCTURES/EXISTING SLOPES/ROADWAYS ARE PROTECTED FROM THE EFFECTS OF WALL EXCAVATION. STABILITY OF EXISTING STRUCTURES, DURING CONSTRUCTION, IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR. ALL TEMPORARY EXCAVATIONS SHALL COMPLY WITH OSHA REGULATIONS (BY OTHERS)
- 13. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR AND HAVE CONTROL OVER CONSTRUCTION MEANS, METHODS TECHNIQUES. SEQUENCES AND PROCEDURES AND FOR COORDINATING ALL PORTIONS OF THE WORK UNDER THE CONTRACT. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR SITE SAFETY.
- SALVAGED AND CRUSHED CONCRETE PAVEMENTS AND CONCRETE STRUCTURES SHALL NOT BE USED AS BASE OR SUB BASE MATERIAL.
- 15. THE FOLLOWING SOIL PARAMETERS HAVE BEEN ASSUMED SINCE A GEOTECHNICAL ENGINEERING REPORT PREPARED WAS NOT

SOIL DESIGN PARAMETERS PRECAST BLOCK GRAVITY WALLS						
MATERIAL	DESCRIPTION	(PCF)	φ (DEGREES)	C (PSF)	MAX. APPLIED WALL BEARING PRESSURE	COMMENTS
Foundation Soils	Firm/Approved Natural Granular Soils, or Approved Compacted Granular Structural Fill (Note c.)	115±	φf =32	0	3,500 psf	Assumed
Retained Backfill	Compacted Granular Fill (SC, SM, SP, or more Granular per ASTM D-2487) LL < 40, Pl < 20	120±	φr =3 <i>0</i>	0	Use Unit Fill No On Site Material is Permitted Unless Approved By Design Engineer	No Geothecnical Report Was Provided For This Project.
Unit Fill	#5, 57, 67 OR 7 Crushed Aggregate, or Equivalent Free-Draining Material	103.8	φ=39	0		

- 16. ALTERNATIVE COMPLIANCE APPROVAL (WP-22-048) WAS APPROVED ON JANUARY 27, 2022 WITH RESPECT TO SECTION 16.116(a)(2)(iii) OF THE SUBDIVISION AND LAND DEVELOPMENT REGULATIONS TO CONSTRUCT A 6' HIGH RETAINING WALL AND FENCE IN THE REAR YARD WITHIN THE 100' STREAM BANK BUFFER SUBJECT TO THE FOLLOWING CONDITIONS:
 - 1. A redline revision to the Site Development Plan (SDP-02-087) shall be submitted to add the proposed retainingwall to the plan set. Structural computations shall be submitted with the redline as the height of the wall exceeds3 feet. All proposed grading for the wall shall be shown and the Limit of Disturbance shall be identified. The redlinerevision shall be approved, changes drafted on the originals and the retaining wall sheets added to the plan set prior to issuance of a building permit for the proposed retaining wall. Refer to comments from the Development Engineering Division dated January 12, 2022.
 - 2. The applicant shall plant a minimum of 7 native shade trees at least 2-inch caliper onsite within the 100' stream bank buffer. The locations, species and planting specifications (including deer protection) shall be included in the redline revision to SDP-02-087.
 - 3. Native shrubs shall be planted at the base of the retaining wall between the drain outfalls and the rear property line to prevent erosion within the stream buffer. The locations, species and planting and maintenance specifications (including deer protection) shall be included in the redline revision to SDP-02-087
 - 4. Any existing downspouts in the rear yard shall be retrofitted with rip-rap stone at the outfalls (2' x 2' minimum) to prevent additional erosion within the stream buffer. Any drain outlet pipes proposed below the retaining wall shall be stabilized with rip-rap stone at the outfalls. Details shall be included on the redline revision to SDP-02-087.
 - 5. The proposed retaining wall shall be constructed in the location shown on the alternative compliance plan exhibit. The height of the wall cannot exceed 6 feet within the 10' rear setback for accessory structures in accordance with Sections 108.0.D.4 and 128.0.A.9 of the Zoning Regulations.
 - 6. No removal of existing vegetation or trees is permitted within the 100' stream bank buffer 7. All disturbed areas shall be stabilized and seeded after construction is complete.
 - 8. The applicant shall comply with all building permit requirements from the Department of Inspections, Licenses \$

Permits and all requirements in the 'R-20' Zoning District Regulations

WARFIELDS RANGE II 10435 WHITE COURT STONE STRONG ® RETAINING WALL SYSTEM

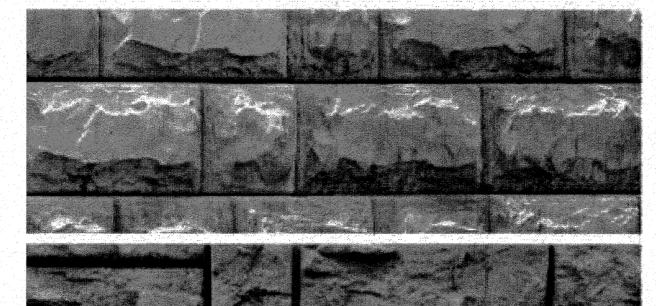
HOWARD COUNTY, MD

OWNER ADDRESS Christopher & Julie Kwak 10435 White Court Laurel MD 20723-5709

DEVELOPER ADDRESS Same As Owner

SITE ADDRESS 10435 White Court Laurel, MD 20723

LE STONE STRONG SYSTEMS°



CHISELED GRANITE

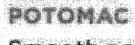
Derived from blocks hand-chiseled by artisans, the pattern is intended to match the classic look of natural, chiseled stone.

Block Type Chiseled Granite **Chiseled Granite** Fractured Ledge

Owner Selections

FRACTURED LEDGE Created from actual fractured ledge

stone, the highly defined pattern offers the most natural look to match most any application.



Smooth and broken up, this pattern was produced to replicate actual original cobblestone from the East Coast cities.

TENNESSEE FOOTHILLS

Sharp and well defined, the pattern was developed by laser-mapping actual retaining walls in the Smoky Mountains.

CONTRACTOR MUST VERIFY SOIL BEARING CAPACITY OF 3,500psi and Report Findings To Engineer BEFORE Installation of Base Course.



DEVELOPER: Same as Owner

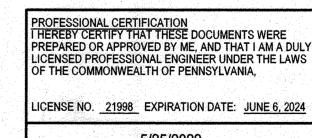
SITE ADDRESS 10435 WHITE COURT

Chris & Julie Kwak 10435 White Court Laurel MD 20723

REVISED SITE DEVELOPMENT PLAN

410.386.0564 (Fax)

10435 WHITE COURT RETAINING WALL FINAL WARFIELDS RANGE II SECTION 2, AREA 4, LOT 85 COVER SHEET





PROFESSIONAL ENGINEER NO. 21998

6TH ELECTION DISTRICT

REVISIONS DESCRIPTION OF CHANGES DRN. REV. DATE CO. FILE #: SDP-02-087 DES. BY: WRD TAX ACC. #: 06-566006 DRN, BY: CEB TAX MAP: 41 BLOCK / GRID: 24 DATE: 5/25/2022 DDC JOB#: 17041.59 PARCEL#: 454 SHEET NUMBER: ZONE / USE: R-20 5 of 8 DWG. SCALE: AS SHOWN

A. DESIGN PARAMETERS FOR THE ON-SITE SOILS AND BACKFILL PROVIDED IN THE CLIENT PROVIDED GEOTECHNICAL REPORT

B. C = COHESION, Q = FRICTION ANGLE, Y = MOIST UNIT WEIGHT, N/A = NOT APPLICABLE, LL = LIQUID LIMIT, AND PI = PLASTICITY INDEX.

C. MODERATELY TO HIGH PLASTIC CLAY AND SILT SOILS (CLASSIFIED AS CL/ML & CH/MH PER ASTM D-2487, WITH A LL > 45), IF ENCOUNTERED AT THE WALL'S FOUNDATION SUBGRADE, SHALL BE UNDERCUT A MINIMUM OF 18 INCHES (BELOW THE BOTTOM OF THE GRANULAR WALL BASE/LEVELING PAD) AND REPLACED WITH A COMPACTED GRANULAR MATERIAL, AS DETERMINED BY THE OWNER'S GEOTECHNICAL ENGINEER/TESTING AGENCY.

D. THE RETAINED BACKFILL MATERIALS SHALL BE SUBSTANTIALLY FREE OF SHALE OR OTHER SOFT, POOR DURABILITY PARTICLES. IF PROCESSED MATERIAL/AGGREGATE IS USED, THE MATERIAL SHALL HAVE A MAGNESIUM SULFATE SOUNDNESS LOSS OF LESS THAN 30 PERCENT AFTER FOUR (4) CYLES, AS DETERMINED BY ASTM C88-13.

E. DEVELOPMENT DESIGN CONSULTANTS SHALL BE NOTIFIED IMMEDIATELY IF THE ACTUAL SOIL CONDITIONS IN THE FIELD ARE NOT AS INDICATED BY THE ABOVE TABLE, OR IF UNSUITABLE/SOFT/LOOSE SOILS ARE ENCOUNTERED IN THE FIELD, AS DETERMINED BY THE OWNER'S/DEVELOPER'S GEOTECHNICAL TESTING AGENCY.

F. THE MAXIMUM APPLIED VERTICAL WALL BEARING PRESSURE(S) IS INDICATED ON THE WALL ELEVATION(S). BEARING CAPACITY AND SETTLEMENT OF THE FOUNDATION SOILS IS THE RESPONSIBILITY OF THE OWNER'S/DEVELOPER'S GEOTECHNICAL ENGINEER.

G. DESIGN IS BASED ON THE FOLLOWING MINIMUM SAFETY FACTORS: OVERTURNING = 1.50 GLOBAL STABILITY = 1.30 SLIDING = 1.50

CODES:

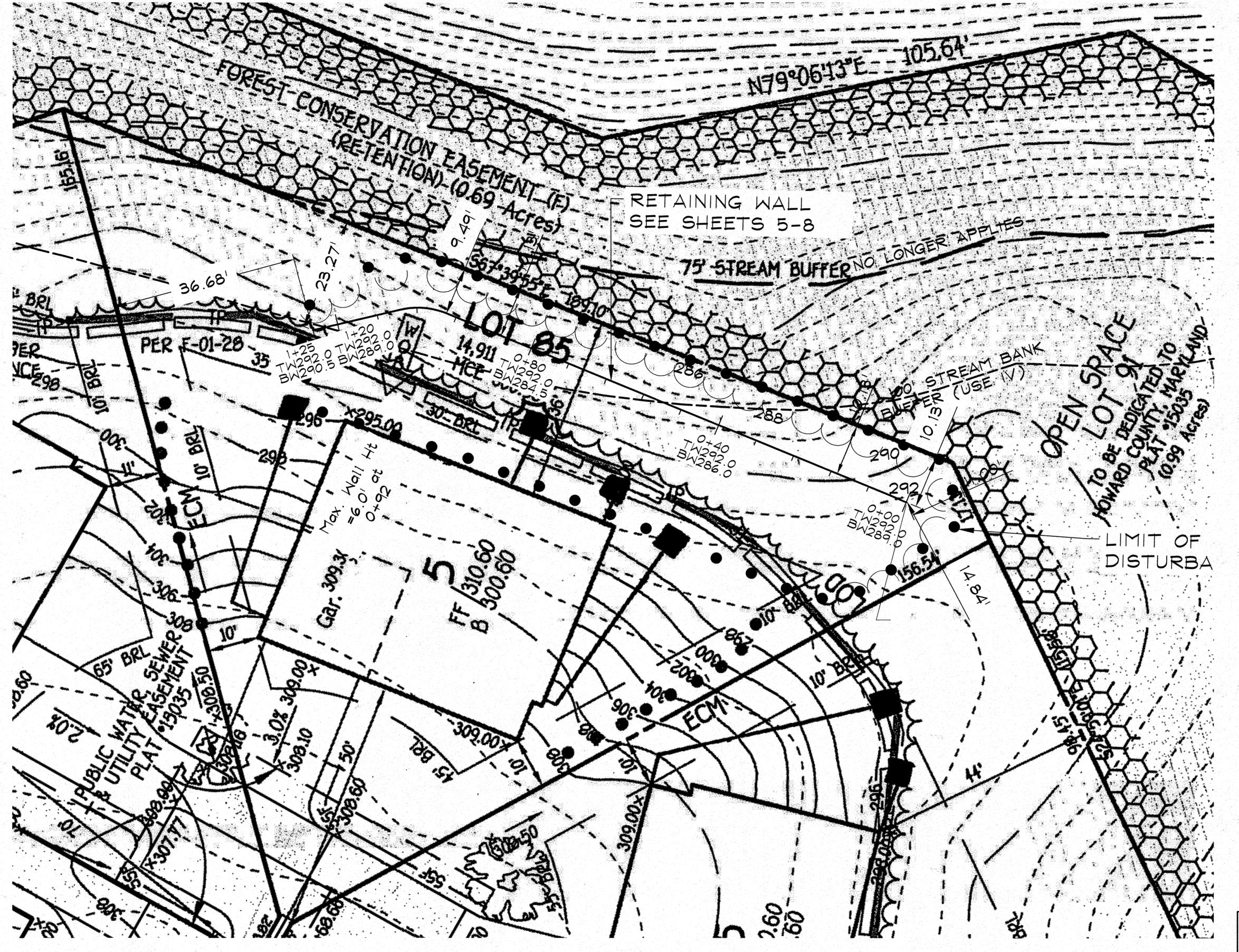
THE DESIGN AND DETAILING OF THE RETAINING WALL(S) WERE GENERALLY BASED ON THE IBC-2015, AND THE NCMA DESIGN MANUAL FOR SEGMENTAL RETAINING WALLS (3RD EDITION, 2010).

RECTOR OF PLANNING AND ZONIN

DEPARTMENT OF PLANNING AND ZONING

SDP-02-087

HOWARD COUNTY MD





Westminster, MD 21157

410.386.0564 (Fax) DDC@DDCinc.us

DEVELOPER:

Same as Owner

OWNER: Chris & Julie Kwak 10435 White Court Laurel MD 20723

SITE ADDRESS: 10435 WHITE COURT LAUREL, MD 20723

REVISED SITE DEVELOPMENT PLAN

10435 WHITE COURT RETAINING WALL FINAL WARFIELDS RANGE II SECTION 2, AREA 4, LOT 85 PLAN

PROFESSIONAL CERTIFICATION
I HEREBY CERTIFY THAT THESE DOCUMENTS WERE
PREPARED OR APPROVED BY ME, AND THAT I AM A DULY
LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS
OF THE COMMONWEALTH OF PENNSYLVANIA,

6TH ELECTION DISTRICT LICENSE NO. 21998 EXPIRATION DATE: JUNE 6, 2024

5/25/2022

W. RICHARD DEMARIO PROFESSIONAL ENGINEER NO. 21998

HOWARD COUNTY MD REVISIONS NO. DESCRIPTION OF CHANGES DRN. REV. DATE DES. BY: WRD CO. FILE #: SDP-02-087 TAX ACC. #: 06-566006 DRN. BY: CEB CHK. BY: TAX MAP: 41 DATE: 5/25/2022 BLOCK / GRID: 24 PARCEL#: 454 DDC JOB#:17041.59 SHEET NUMBER: ZONE / USE: R-20

DWG. SCALE: AS SHOWN

DEPARTMENT OF PLANNING AND ZONING

PLAN SCALE: 1"=10"

6 of 8 SDP-02-087

