PUBLIC WATER & PUBLIC SEWER PLAN

FOR

OAK HILL SUBDIVISION LOTS 1 THRU 6 (RESUBDIVISION OF LOT 16)

LOCATION OF SITE

9692 OAK HILL DRIVE ELLICOTT CITY, MD MAP 30, GRID 3, PARCELS 368 (LOT 16) & 321 2ND ELECTION DISTRICT, ZONED: R-20 HOWARD COUNTY CONTRACT No. 24-5002-D

	CONTINACT NO. 24-3002-D									
Sec.)	TYPE OF BUILDING: RESIDENTIAL DRAINAGE AREA : MIDDLE PATUXENT TREATMENT PLANT: LITTLE PATUXENT CENTER; SAVAGE, MD. NUMBER OF LOTS/PARCEL S/UNITS: 6 AREA OF RESIDENTIAL LOT/PARCEL: 2.69 AC NUMBER OF W.H.C.: 6 (PROPOSED) WATER ZONE : 550 TEST GRADIENT : 700	PROP. 8" PUBLIC SEWER PROP. 6" PUBLIC WATER PROP. DRIVEWAY (PRIVATE) PROP. DRIVEWAY (PRIVATE) 224-3050-5 312 312 312 312 313 312 313 312 313 313 314 315 316 317 318 318 318 318 318 318 318	24-1403-D 2 24-140	SNONDROP 24-1057-0 347-D-W8S CT. 24-1057-0 347-D-W8S CT. 24-1057-0 347-D-W8S CT. 24-1057-0 347-D-W8S CT. 24-1057-0 34-0847-D 32-08-08-08-08-08-08-08-08-08-08-08-08-08-						
	REFERENCE FILES: F-78-191 WP-17-014 F-17-067 DMV2-18-008	LOCATION MAP SCALE: 1"=600'	24-1557-1	JACK TO STANGBACK						

PROP. PUBLIC 6" WATER & PUBLIC 8" SANITARY SEWER PLAN PROP. PUBLIC 6" WATER & PUBLIC 8" SANITARY SEWER PROFILE STREAM CROSSING, NOTES & DETAILS

SHEET TITLE

SHEET INDEX

BENCHMARK GEODETIC SURVEY CONTROL - 24GE CONC. MON. FLEV 445 609 N 578,706.500

GEODETIC SURVEY CONTROL - 30BC CONC. MON.

PLAT & FINAL PLAN REFERENCE: F-17-067

THIS PLAN IS APPROVED FOR SOIL EROSION AND SEDIMENT CONTROL BY

E 1,352,699.732

TITLE SHEET

ELEV. 366,732 N 576,751.268

QUANTITIES TABLE AS-BUILT QUANTITIES MANUFACTURER / **ESTIMATED** QUANTITIES SUPPLIER U.S. Pipe U.S. P. pe 1/16 BEND A EA U.S. Pipe 1/32 BEND ₽EA HIGH DEFLECTION COUPLING Cambridge Lee 1 1/2" COPPER WATERLINE Cla-Val **6" AIR RELEASE VALVE** 350 National Pipe 6" PVC C-900 (DR-18) WATERLINE 570 6" DIP CL 54 WATERLINE 1EA FIRE HYDRANTS 1EA 6" X 6" WET TAP retiens flow Carr 1EA 12" X 6" WET TAP 1 EA Ford Meter Bogs increan Flow 3EA 6" VALVE Control 3 EA 6" X 6" TEE U.S. Pipe 8" DIP SEWER 4" SCH. 40 PVC SHC 8" SDR 35 PVC SANITARY LINE 6EA SANITARY CLEANOUT Contractors 2 EA SANITARY MANHOLE Pre cast Contractor's 1 EA TYPE 'A' SANITARY DROP MANHOLE 1 EA Precast Contractor's 1 EA TYPE 'B' SANITARY DROP MANHOLE Pre cast 20" STEEL CASING PIPE NAME OF UTILITY CONTRACTOR CHECKBOX

SHEET NUMBER

2

3

OWNER / DEVELOPER:

AS-BUILT DATE

SURVEY AND DRAFTING DIVISION

6314 GOLDEN STAR PLACE COLUMBIA, MD 21044 CONTACT: BRIAN GOLDSTEIN PHONE: 301.875.8460

REPLACEMENT SHEET OF APPROVED PLAN DATED 5-10-2018

DEPARTMENT OF PLANNING & ZONING DEPARTMENT OF PUBLIC WORKS HOWARD HOWARD COUNTY, MARYLAND COUNTY, MARYLAND

CHIEF, DEVELOPMENT ENGINEERING DIVISION

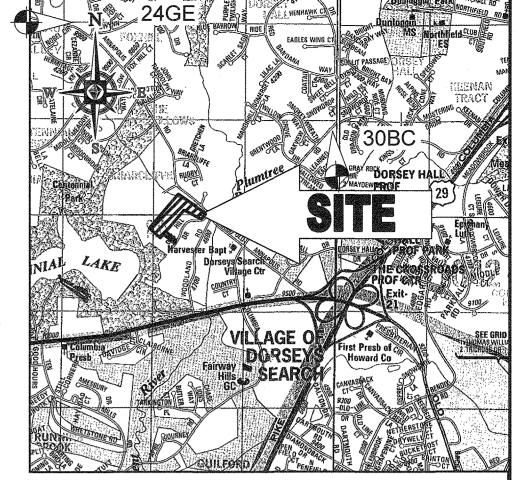


DMV2-18-008

B.B. ROWE	DE
	DF
PROFESSIONAL ENGINEER ARYLAND LICENSE NO. 40808 PROFESSIONAL CERTIFICATION I, BRANDON A ROWE, HERBY CERTIFY THAT THESE	C
OCUMENTS WELLE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 40808, EXPIRATION DATE: 7/3/2019	DAT

DES: AVG				
DLO. AVG				
DRN: AVG				
CK; M.K.				
Ch. W.K.				
	\triangle	10/29/18	UPDATED WATER AND SEWER DESIGN PER SITE GRADING CHANGES	RLB
DATE: 7/23/18	REV.	DATE	DESCRIPTION	BY

TITLE SHEET 368 (LOT 16) & 321 600' SCALE MAP NO. BLOCK NO._



ADC MAP COORDINATES: 4935-E2

PROTECT EXISTING MAINS AND SERVICES AND MAINTAIN UNINTERRUPTED SERVICE. ANY DAMAGE INCURRED SHALL BE REPAIRED IMMEDIATELY TO THE SATISFACTION OF THE ENGINEER AT THE CONTRACTOR'S EXPENSE.

2. TOPOGRAPHIC FIELD SURVEYS WERE PERFORMED BY CONTROL POINT ASSOCIATES, INC. ON 5/5/2016.

3. HORIZONTAL AND VERTICAL CONTROLS: GEODETIC SURVEY CONTROL - 24GE CONC. MON.

GEODETIC SURVEY CONTROL - 30BC CONC. MON. ELEV. 366.732 N 576,751.268

THE COORDINATES SHOWN ON THE DRAWINGS ARE BASED ON MARYLAND STATE REFERENCE SYSTEM NAD '83/91' AS PROJECTED B HOWARD COUNTY GEODETIC CONTROL STATIONS NO. 24GE AND NO. 30BC.

ALL VERTICAL CONTROLS ARE BASED ON NAVD'88. VERTICAL CONTROLS PROVIDED ON THE DRAWINGS ARE 24GE.

5. ALL PIPE ELEVATIONS SHOWN ARE INVERT ELEVATIONS UNLESS OTHERWISE NOTED ON THE PLANS.

CLEAR ALL UTILITIES BY A MINIMUM OF 12 INCHES. CLEAR ALL POLES BY 5'-0" MINIMUM OR TUNNEL AS REQUIRED UNLESS OTHERWISE NOTED. THE OWNER HAS CONTACTED THE UTILITY COMPANIES AND HAS MADE ARRANGEMENTS FOR BRACING OF POLES AS SHOWN ON THE DRAWINGS. IN THE EVENT THE CONTRACTOR'S WORK REQUIRES THE BRACING OF ADDITIONAL POLES, ANY COST INCURRED BY THE OWNER FOR THE BRACING OF ADDITIONAL POLES OR DAMAGES SHALL BE DEDUCTED FROM MONIES OWED BY THE CONTRACTOR. THE CONTRACTOR SHALL COORDINATE WITH THE UTILITY COMPANIES TO SCHEDULE THE BRACING OF THE POLES.

MANUAL, VOLUME IV, STANDARD SPECIFICATIONS AND DETAILS FOR CONSTRUCTION (LATEST EDITION). THE CONTRACTOR SHALL HAVE A COPY OF VOLUME IV ON THE JOB.

FOR DETAILS NOT SHOWN ON THE DRAWING, AND FOR MATERIALS AND CONSTRUCTION METHODS, USE HOWARD COUNTY DESIGN

WHERE TEST PITS HAVE BEEN MADE ON EXISTING UTILITIES, THEY ARE NOTED BY THE SYMBOL AT THE LOCATIONS OF THE TEST PITS. A NOTE OR NOTES CONTAINING THE RESULTS OF THE TEST PIT OR PITS IN INCLUDED ON THE DRAWINGS. EXISTING UTILITIES IN THE VICINITY OF THE PROPOSED WORK FOR WHICH TEST PITS HAVE NOT BEEN DUG SHALL BE LOCATED BY THE CONTRACTOR TWO WEEKS IN ADVANCE OF CONSTRUCTION OPERATIONS AT HIS OWN EXPENSE.

THE CONTRACTOR SHALL NOTIFY THE FOLLOWING UTILITY COMPANIES OR AGENCIES AT LEAST FIVE WORKING DAYS BEFORE STARTIN WORK SHOWN ON THESE PLANS:

AT & T 1-800-252-1133 BGE (CONSTRUCTION SERVICES) 410-637-8713 BGE (EMERGENCY) 410-685-0123 BUREAU OF UTILITIES 410-313-490 COLONIAL PIPELINE COMPANY 410-795-1390 MISS UTILITY 1-800-257-7777

GENERAL NOTES

VITHIN THE CONSTRUCTION STRIP ARE NOT BE REMOVED OR DAMAGED BY THE CONTRACTOR

THE CONTRACTOR SHALL REMOVE TREES, STUMPS, AND ROOTS ALONG THE LINE OF EXCAVATION. PAYMENT FOR SUCH REMOVAL SHALL BE INCLUDED IN THE UNIT PRICE BID FOR CONSTRUCTION OF THE MAIN.

THE CONTRACTOR SHALL NOTIFY THE BUREAU OF HIGHWAYS, HOWARD COUNTY, AT (410)313-7450 AT LEAST FIVE WORKING DAYS BEFORE OPEN CUTTING OR BORING/JACKING OF ANY COUNTY ROAD FOR LAYING WATER/SEWER MAINS OR HOUSE CONNECTIONS. THE APPROVAL OF THESE DRAWINGS WILL CONSTITUTE COMPLIANCE WITH DPW REQUIREMENTS PER SECTION 18.114(A) OF THE HOWARD

WAIVER DMV2-18-008 WAS APPROVED BY DPW ON 3/12/18 TO PROVIDE A 20" STEEL CASING PIPE, 2.11' OF SEPARATION BETWEEN THE STREAM BOTTOM AND STEEL CASING PIPE, AND 2.6' OF COVER OVER THE 8" SANITARY SEWER CARRIER PIPE.

ALL WATER MAINS TO BE P.V.C. C900 UNLESS OTHERWISE NOTED.

2. TOPS OF ALL WATER MAINS TO HAVE A MINIMUM OF 3'-6" OF COVER UNLESS OTHERWISE NOTED.

VALVES ADJACENT TO TEES SHALL BE STRAPPED TO TEES.

4. ALL FITTINGS SHALL BE BUTTRESSED OR ANCHORED WITH CONCRETE IN ACCORDANCE WITH THE STANDARD DETAILS UNLESS OTHERWISE PROVIDED FOR ON THE DRAWINGS.

FIRE HYDRANTS SHALL BE SET TO THE BURY LINE ELEVATIONS SHOWN ON THE DRAWINGS. ALL FIRE HYDRANTS SHALL BE RESTRAINED AND BUTTRESSED WITH CONCRETE IN ACCORDANCE WITH THE STANDARD DETAILS. THE SOIL AROUND THE FIRE HYDRANT SHALL BE COMPACTED IN ACCORDANCE WITH SECTION 1000 AND 1005 OF THE STANDARD SPECIFICATIONS.

6. THE CONTRACTOR SHALL NOT OPERATE ANY WATER MAIN VALVES ON THE EXISTING WATER SYSTEM.

TRACER WIRES AND CONTINUITY TEST STATION SHALL BE INSTALLED ON ALL DIP AND PVC WATER MAINS IN ACCORDANCE WITH

FOR PVC WATER MAINS, ALL RECORDS FOR THE QUALITY CONTROL AND QUALIFICATIONS TEST REQUIREMENTS NOTED IN SECTION 5.1 OF THE AWWA STANDARD C900 FOR PVC PRESSURE PIPE SHALL BE SUBMITTED WITH PIPE MATERIALS CERTIFICATIONS OR SHOP DRAWING PRIOR TO APPROVAL OF THE MATERIAL FOR USE. THE TEST RECORDS SHALL BE FOR THE PIPE TO BE INSTALLED UNDER THIS CONTRACT. ALL PVC PIPE SHALL CONTAIN MARKINGS TO ALLOW CROSS REFERENCING OF THE PIPE SUPPLIED TO THE TEST RECORDS.

UNLESS OTHERWISE NOTED ON THE PLANS OR IN THE SPECIFICATIONS SACRIFICIAL ANODES SHALL BE ON ALL VALVES AND METALLIC UNLESS OF HERWISE NOTED ON THE PLANS OR IN THE SPECIFICATIONS SACRIFICIAL ANODES SHALL BE ON ALL VALVES AND METALLIC FITTINGS USED WITH PVC WATER MAINS IN ACCORDANCE WITH VOLUME IV, STANDARD SPECIFICATIONS AND DETAILS FOR CONSTRUCTION. SEVENTEEN (17) POUND MAGNESIUM ANODES SHALL BE INSTALLED ON ALL VALVES AND DUCTILE IRON FITTINGS INCLUDING RESTRAINS AND HARNESSES. TWELVE (12) POUND ZINC ANODES SHALL BE INSTALLED ON ALL STAINLESS STEEL FITTINGS AND SADDLES USED WITH PVC MAINS. ALL "TEES" USED WITH PVC MAINS SHALL BE DUCTILE IRON.

PROPER ASSEMBLY OF GASKETED PVC PIPE JOINTS: THE MANUFACTURER'S INSERTION LINE OF GASKETED PVC PIPE JOINTS INDICATES THE MAXIMUM DEPTH OF INSERTION OF THE SPIGOT INTO THE BELL. AFTER ASSEMBLY OF THE JOINT, THE INSERTION LINE SHALL REMAIN VISIBLE. DUAL INSERTION LINES ON GASKETED PVC PIPE INDICATE THE MAXIMUM AND MINIMUM DEPTH OF INSERTION OF THE PIGOT INTO THE BELL. THE CONTRACTOR SHALL NOT OVER INSERT OR OVER HOME THE SPIGOT INTO THE BELL OF PVC PIPE

ALL CHANGES IN HORIZONTAL OR VERTICAL DIRECTION OF PVC WATER PIPE SHALL BE MADE WITH STANDARD BENDS, 5-DEGREE SWEEPS OR HIGH DEFLECTION (HD) COUPLINGS. NO BENDING OF THE PIPE OR DEFLECTING OF PVC PIPE JOINTS IS PERMITTED. WHERE HIGH DEFECTION COUPLINGS OR 5-DEGREE SWEEPS ARE PERMITTED, THE CONTRACTOR SHALL PROVIDE ONE FULL PIPE LENGTH (20-FOOT LONG) ON EITHER SIDE OF THE HIGH DEFLECTION COUPLING OR 5-DEGREE SWEEP. THE CONTRACTOR SHALL USE A VIBRATORY PLATE COMPACTOR OR OTHER APPROVED MEANS TO THOROUGHLY COMPACT THE #57 STONE ON BOTH SIDES OF THE HIGH DEFECTION COUPLING OR 5-DEGREE SWEEP, TAKING CARE NOT TO USE COMPACTION EQUIPMENT DIRECTLY OVER THE FITTING.

PVC HIGH DEFLECTION COUPLINGS SHALL BE LIMITED TO A TOTAL DEFECTION OF 3-DEGREES (1 ½-DEGREE ON EITHER END OF THE COUPLING), SHALL BE RATED FOR A MINIMUM 200 PSI MEETING THE REQUIREMENTS OF AWWA C900, SHALL HAVE A MINIMUM LAY ENGTH OF 9-INCHES AND SHALL HAVE CENTER STOPS. PVC HIGH DEFLECTION COUPLINGS SHALL BE CERTAINTEED PVC HIGH

FIVE DEGREE SWEEPS SHALL BE BELL BY SPIGOT, RATED FOR A MINIMUM 225 PSI, DR18 MEETING THE REQUIREMENTS OF AWWA C900 AND SHALL BE MULTI FITTINGS (IPEX) BLUE BRUTE DR18 OR EQUAL.

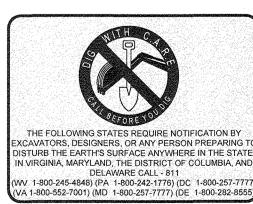
WHEN PVC HIGH DEFECTION COUPLINGS OR PVC 5-DEGREE SWEEPS ARE USED TO FACILITATE CHANGES IN HORIZONTAL OR VERTICAL ALIGNMENTS OF AWWA C-900 PVC PIPELINES, THE CONTRACTOR SHALL INSTALL DEVICES FOR THE PREVENTION OF OVER-INSERTION OF THE PVC PIPE SPIGOTS OR PLAIN ENDS INTO THE PUSH ON BELL JOINT ON BOTH SIDES OF THE HIGH DEFECTION COUPLINGS AND 5 DEGREE SWEEPS. BELL STOPS SHALL BE PLACED AT THE PROPER INSERTION LINE FOR THE FITTING. THE BELL STOP SHALL BE CONTRACTION. THE BELL STOPS SHALL BE SERIES 5000 MEGA-STOP, AS MANUFACTURED BY EBAA IRON, INC. OR APPROVED EQUAL

13. ALL SINGLE FAMILY DWELLINGS REQUIRE A MINIMUM OF 1 - 1 1/2" WHC WITH 1" METER, OUTSIDE SETTING.

 ALL SEWER MAINS SHALL BE DIP OR P.V.C. UNLESS OTHERWISE NOTED. ALL MANHOLES SHALL BE 4' - 0" INSIDE DIAMETER UNLESS OTHERWISE NOTED.

FORCE MAINS SHALL BE D.I.P. ONLY.

MANHOLES SHOWN WITH 12" AND 16" WALLS ARE FOR BRICK MANHOLES ONLY. MANHOLES DESIGNATED W.T. IN PLAN AND PROFILE SHALL HAVE WATERTIGHT FRAME AND COVERS, STANDARD DETAIL G5.52. WHERE WATERTIGHT FRAME AND COVER IS USED, SET TOP OF FRAME 1" - 6" ABOVE FINISHED GRADE UNLESS THERWISE NOTED ON THE DRAWINGS.



OAK HILL SUBDIVISION

(RE-SUBDIVISION OF LOT 16) 9692 OAK HILL DRIVE ELLICOTT CITY, MD MAP 30, GRID 3. PARCELS 368 (LOT 16) & 321 2ND ELEC. DISTRICT. ZONED:R-12 HOWARD COUNTY

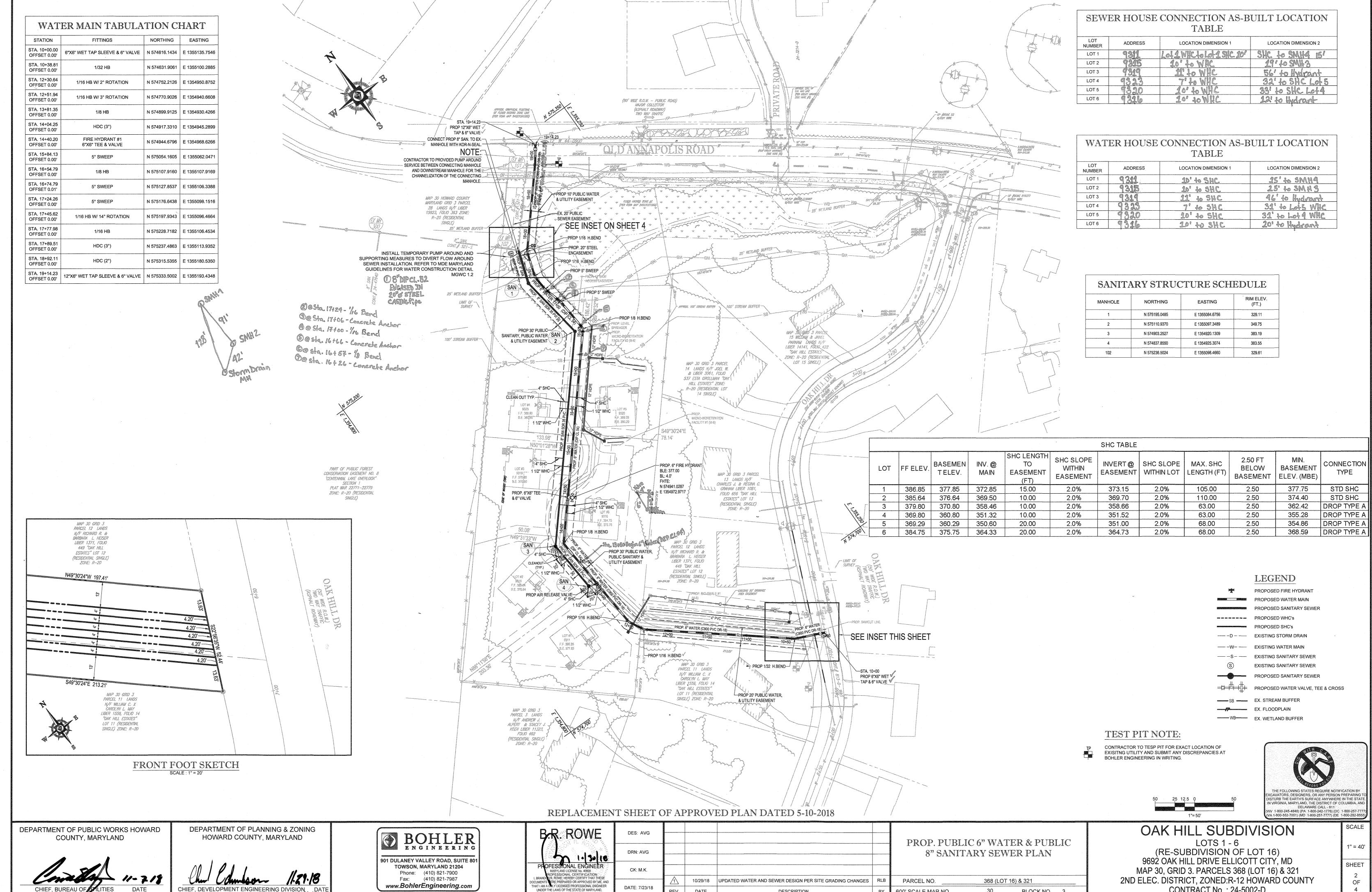
CONTRACT No.: 24-5002-D

SHEET OF

PARCEL NO.

SCALE

SHOWN



DATE: 7/23/18

REV.

DATE

DESCRIPTION

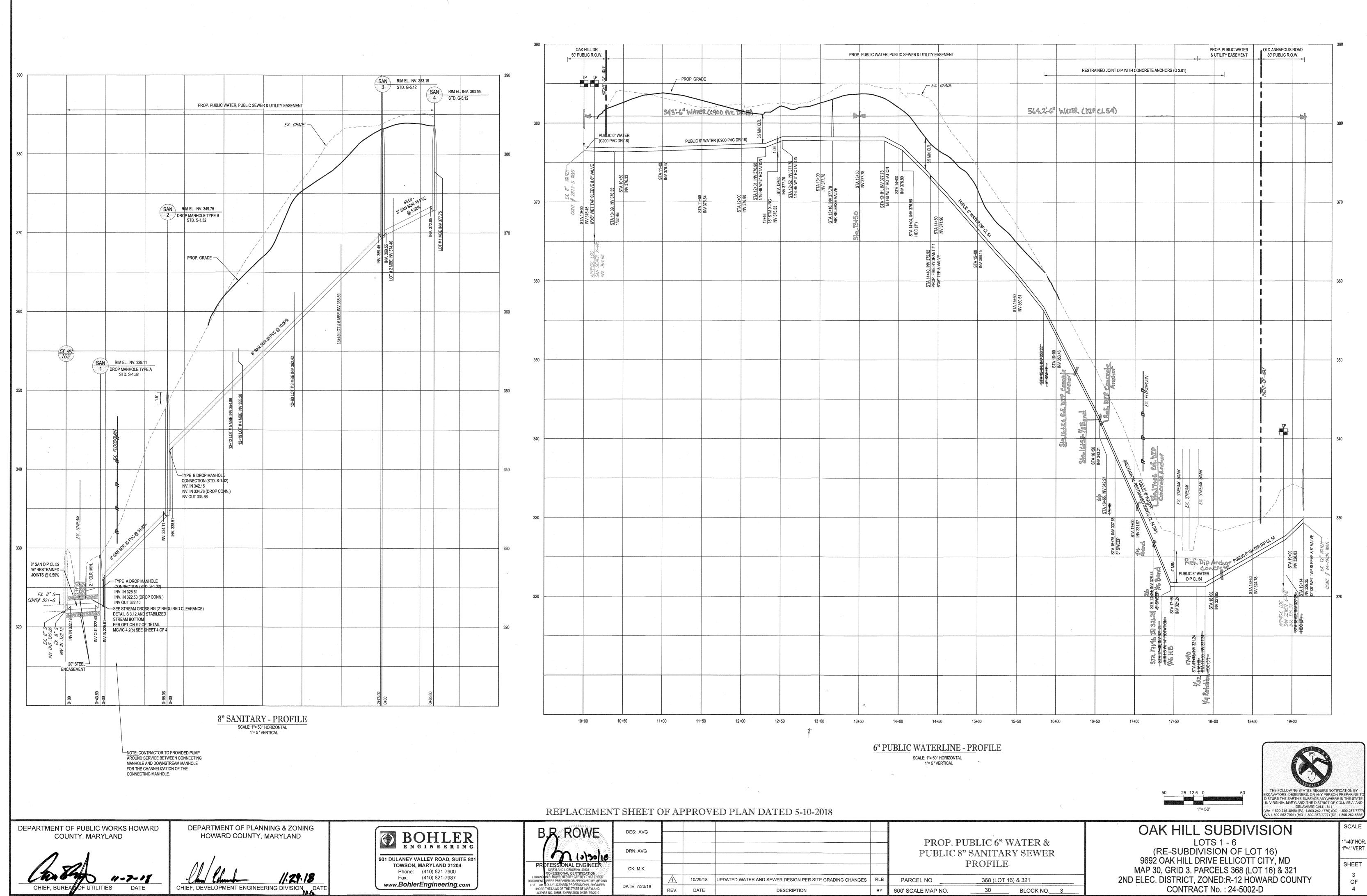
CHIEF, DEVELOPMENT ENGINEERING DIVISION

1" = 40' SHEET OF

CONTRACT No.: 24-5002-D

BLOCK NO. 3

600' SCALE MAP NO.



DATE: 7/23/18

REV.

DESCRIPTION

CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

OF

CONTRACT No.: 24-5002-D

30

600' SCALE MAP NO.

BLOCK NO. 3

20.0 STANDARDS AND SPECIFICATIONS FOR VEGETATIVE STABILIZATION

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

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.

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 (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 of final grade, former stockpile and staging areas,

Planting vegetation in disturbed areas will have an effect on the water budget, especially on volumes and rates of run-off, 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 run-off to receiving waters. Plants will also help protect groundwater supplies by assimilating those substances present within the root zone. Sediment control devices must retain in place during grading, seeded preparation, seeding, mulching and vegetative establishment to prevent large quantities of sediment and associated chemicals and nutrients from washing into surface

SECTION 1 - VEGETATIVE STABILIZATION METHODS AND MATERIALS

A. Site Preparation

CONDITIONS WHERE PRACTICE APPLIES

EFFECTS OF WATER QUALITY AND QUANTITY

i. Install erosion and sediment control structures (either temporary or permanent) such as diversion, 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.

B. 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 maybe performed by the University of Maryland or a recognized commercial laboratory. Soil samples taken for engineering purposed may also be used for chemical analyses.

ii. 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 warrantee of the

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. iv. Incorporate lime and fertilizer into the top 3-5" of soil by disking or other suitable

C. Seedbed Preparation

i. Temporary Seeding 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 plane. c. 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:

. Soil pH shall be between 6.0 and 7.0. . Soluble salts shall be less than 500 parts per million (ppm).

3. 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 or 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.

b. 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

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

d. Mix soil amendments into the top 3-5" to 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.

D. Seed Specifications

i. 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.

ii. Inoculant - The inoculant for treating legume seed in the seed mixtures shall be a pure culture of nitrogen-fixing bacteria prepared specially for the species. Inoculants shall not be used later than the date indicated in 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. Temperature above 75°-80°F. can weaken bacteria and make the inoculant less effective. E. Methods of Seeding

i. Hydroseeding: Apply seed uniformly with hydroseeder (slurry includes seed and fertilizer), broadcast or droop 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 (phosphorus); 200 lbs/ac; K20 (potassium); 200 lbs/ac.

b. Lime - 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.

c. Seed and fertilizer shall be mixed on site and seeding shall be done immediately and without

ii. Dry Seeding: This includes use of conventional drop or broadcast spreaders. a. 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. b. Where practical, seed should be applied in two directions perpendicular o each other. Apply half the seeding rate in each direction.

iii. Drill or Cultipacker Seeding: Mechanized seeders that apply and cover seed with soil.

a. 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.

b. Where practical, seed should be applied in two directions perpendicular to each other. Apply half the seed rate in each direction.

i. 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

b. 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

c. WCFM, including dye, shall contain no germination or growth inhibiting factors. d. 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 seed in contact with the soil without inhibiting the growth of the grass seedings.

F. 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,

G. Mulching Seeded Areas - Mulch shall be applied to all seeded areas immediately after seeding.

i. 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. The wood cellulose fiber shall be mixed with water, and the mixture shall contain a maximum of 50 lbs. of wood cellulose fiber per 100 gallons of water.

H. 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

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. If used on sloping land, this practice should be used on the contour

binder shall be applied at a net dry weight of 750 lbs./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 appear uniform after binder application. Synthetic binders- such as Acrylic DLR (Agro-Tack) DCA-70 Petroset, Terra Tax II, Terra Tack AR or other approved equal may be used at rates recommended by the manufacturer to

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

I. Incremental Stabilization - Cut Slopes

i. 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 c. Perform Phase 2 excavation, dress, and stabilize. Overseed Phase

d, Perform final phase excavation, dress, and stabilize. Overseed previously seeded areas as necessary. 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 out of the seeding season will necessitate the application of temporary stabilization.

J. Incremental Stabilization of Embankments - Fill Slopes

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

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. a sediment trapping device.

iii. At the end of each day, temporary berms and pipe slope drains should be constructed along the top edge of the embankment to inrercept surface runoff and convey it down the slope in a non-erosive manner to

iv. Construction sequence: Refer to Figure 4 (below).

a. 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.

b. Place Phase 1 embankment, dress, and stabilize.

c. Place Phase 2 embankment, dress, and stabilize.

d. Place final phase embankment, dress, and stabilize. Overseed previously seeded areas as necessary. Note: Once the placement of fill 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 or completing the operation out of the seeding season will necessitate the application of temporary stabilization.

SEQUENCE OF CONSTRUCTION

- 1. DUE TO FISH SPAWING OR MIGRATION THE STREAM CHANNEL SHALL NOT BE DISTURBED FROM OCTOBER 1 THROUGH APRIL 30. NO CONSTRUCTION SHALL BE DONE DURING THIS
- 3. ONCE ALL PERMIT ARE IN HAND SCHEDULE MEETING IN THE FIELD WITH THE SEDIMENT CONTROL INSPECTOR. - 1 DAY
- 4. INSTALL ANY PERIMETER SEDIMENT CONTROLS AS NEEDED PARALLEL TO THE STREAM
- 5. INSTALL PUMP AROUND PRACTICE PER DETAIL MGWC 1.2. 2 DAYS
- 6. INSTALL 8" SEWER MAIN & 6" WATER MAIN PIPES. STABILIZE STREAM BOTTOM PER OPTION
- 7. STABILIZE SLOPES UP GRADIENT OF THE STREAM BOTTOM PROTECTION WITH MATTRESSES PER DETAIL MGWC 2.8, 4 DAYS BRUSH
- 8. SEED AND STABILIZE AREAS OUTSIDE OF THE STREAM BANKS PER "STANDARDS
- SPECIFICATIONS FOR VEGETATIVE STABILIZATION". 2 DAYS
- 9. REMOVE TEMPORARY PUMP AND PRACTICE. 1 DAY

10. CONSTRUCT ENOUGH FOR ONE DAY'S WORK, INCLUDING BACKFILL AND STABILIZING AREA

11. ONCE SEDIMENT CONTROL INSPECTOR'S SATISFIED THAT THE DISTURBED AREAS HAVE BEEN STABILIZED REMOVE SEDIMENT CONTROL. - 3 DAYS

WORK PERFORMED INSIDE STREAM 20' PUBLIC SEWER BUFFER, WETLAND AND STREAM TO /& UTILITY EASEMENT BE STABILIZED AT THE END OF EACH WORK DAY ROCK TOE AND LIVE FASCINE INSTALĹ TEMPORÁRY PUMP SEE DETAIL AROUND AND SUPPORTING MEASURES TO DIVERT FLOW AROUND IN-STREAM @ SEWER AND WATER INSTALLATION. REFER TO MDE MARYLAND GUIDELINES FOR WATER CONSTRUCTION DETAIL MGWC 1 INSTALL STREAM PER PROTECTION DETAIL 4.2b AND PROP 10' PUBLIC WATER & UTILITY FASFMENT CONNECT PROP 8" SAN. TO EX. MH 102 MANHOLE WITH KOR-N-SEAL PROTECTION DETAIL ii. Wood cellulose fiber may be used for anchoring straw. The fiber 4.2b AND 2.8 BRUSH ~ MATTRESSES ROCK TOE AND LIVE SEE DETAIL FASCINE 20" STEEL SEE DETAIL ENCASEMENT S" 1/16 HB W/ROTATION PROP. 30' PUBLIC-SEWER PUBLIC WATER & UTILITY EASEMENT

MGWC 1.2: Pump-Around Practice

channel construction sites

Temporary measure for dewatering in-

DESCRIPTION The work should consist of installing a temporary pump around and supporting measures to divert flow around in-

IMPLEMENTATION SEQUENCE

Sediment control measures, pump-around practices, and associated channel and bank construction should be

- completed in the following sequence (refer to Detail 1.2): Construction activities including the installation of erosion and sediment control measures should not begin until all necessary easements and/or right-of-ways have been acquired. All existing utilities should be marked in the field prior to construction. The contractor is responsible for any damage to existing utilities that may result from construction and should repair the damage at his/her own expense to the county's or utility company's satisfaction.
- The contractor should notify the Maryland Department of the Environment or WMA sediment control inspector at least 5 days before beginning construction. Additionally, the contractor should inform the local environmental protection and resource management inspection and enforcement division and the provider of local utilities a minimum of 48 hours before starting construction.
- The contractor should conduct a pre-construction meeting on site with the WMA sediment control inspector, the county project manager, and the engineer to review limits of disturbance, erosion and sediment control requirements, and the sequence of construction. The contractor should stake out all limits of disturbance prior to the pre-construction meeting so they may be reviewed. The participants will also designate the contractor's staging areas and flag all trees within the limit of disturbance which will be removed for construction access. Trees should not be removed within the limit of disturbance without approval from the WMA or local authority.
- Construction should not begin until all sediment and erosion control measures have been installed and approved by the engineer and the sediment control inspector. The contractor should stay within the limits of the disturbance as shown on the plans and minimize disturbance within the work area whenever possible
- Upon installation of all sediment control measures and approval by the sediment control inspector and the local environmental protection and resource management inspection and enforcement division, the contractor should begin work at the upstream section and proceed downstream beginning with the establishment of stabilized construction entrances. In some cases, work may begin downstream if appropriate. The sequence of onstruction must be followed unless the contractor gets written approval for deviations from the WMA or local authority. The contractor should only begin work in an area which can be completed by the end of the day including grading adjacent to the channel. At the end of each work day, the work area must be stabilized and he pump around removed from the channel. Work should not be conducted in the channel during rain events.
- Sandbag dikes should be situated at the upstream and downstream ends of the work area as shown on the plans, and stream flow should be pumped around the work area. The pump should discharge onto a stable velocity dissipater made of riprap or sandbags.

TEMPORARY INSTREAM CONSTRUCTION MEASURES MARYLAND DEPARTMENT OF THE ENVIRONMEN REVISED NOVEMBER 200

MGWC 2.8: BRUSH MATTRESSES

Woody vegetative system for bank stabilization

DESCRIPTION

Brush mattresses are formed from live branches which are wired together to create an erosion resistant mat. This mat is then secured to the bank by live and/or dead stakes and partially covered with fill soil to initiate growth of the

EFFECTIVE USES & LIMITATIONS

Brush mattresses provide bank protection soon after establishment. They are generally resistant to wave and current action and function to:

capture sediment and rebuild streambanks facilitate the colonization of native riparian vegetation; and provide long-term durability and erosion control, especially when used on Rosgen stream types B3, B4, B5, B6,

C1, C2, C3, C4, C5, C6, DA, E3, E4, E5, and E6. Brush mattresses should be limited to use on:

sites having only low to moderate water level fluctuations and slope gradients not exceeding 2H:1V, streams with low to moderate suspended sediment loads since high loads may precipitate the burial of these bioengineering systems and complicate future planting efforts at the site, and native fill soils which contain enough fine material to allow the live branches to root and grow readily; key trenches backfilled with topsoil may be required on rocky slopes.

Additionally, this measure should be initiated in conjunction with a revegetation strategy since brush mattresses make it more difficult to propagate vegetative plantings once the mats become established.

MATERIAL SPECIFICATIONS

When choosing and preparing woody material for brush mattresses, the following guidelines should be followed: Live branches should be cut from fresh, green, healthy, dormant parent plants which are adapted to the site conditions whenever possible with the following guidelines:

- Woody branches up to 2.5 inches (6 centimeters) in diameter and 5 to 10 feet (1 to 3 meters) in length can be used for brush mattresses. 2. Commonly used woody plants for this measure include willow, poplar, and alder since they are versatile and have high growth rates with shrubby habits, fibrous root systems, and high transpiration rates,
- especially when in leaf. 3. A partial listing of woody plants recommended by the United States Department of Agriculture's Soil Conservation Service is presented in MGWC 2.4: Live Stakes

Live branch cuttings should be kept covered and moist at all times and should be placed in cold storage if more than a few hours clapse before installation

MARYLAND DEPARTMENT OF THE ENVIRONMENT SLOPE PROTECTION AND STABILIZATION TECHNIQUES WATERWAY CONSTRUCTION GUIDELINES REVISED NOVEMBER 2000

Brush mattresses should be installed as follows (refer to Detail 2.8): Live branches should be oriented in crisscross layers perpendicularly to the flow of water in slight manmade

- epressions along the embankment. The butt ends should alternate to provide a uniform mat thickness of at least 12 inches (0.3 meters) and a minimum percentage of air voids. Approximately 20 to 50 branches should be used per running meter provided their lengths are the same as
- the slope length. . If the branches are not long enough to cover the entire slope from the toe to the top of slope, multiple layers should be utilized with the branches in the lower layers overlapping those in the upper layers by at least 1

PAGE 1.2 - 2

MGWC 2.8: Brush Mattresses

MGWC 1.2: PUMP-AROUND PRACTICE

sediment bag, or other approved source. The measure should be located such that the water drains back into

Traversing a channel reach with equipment within the work area where no work is proposed should be avoided If equipment has to traverse such a reach for access to another area, then timber mats or similar measures should

and only where noted on the plans or specified. (See Section 4, Stream Crossings, Maryland Guidelines to

All stream restoration measures should be installed as indicated by the plans and all banks graded in accordance

with the grading plans and typical cross-sections. All grading must be stabilized at the end of each day with

After an area is completed and stabilized, the clean water dike should be removed. After the first sediment

flush, a new clean water dike should be established upstream from the old sediment dike. Finally, upon

. A pump around must be installed on any tributary or storm drain outfall which contributes baseflow to the work

area. This should be accomplished by locating a sandbag dike at the downstream end of the tributary or storm

reaches the tributary confluence. Construction in the tributary, including pump around practices, should follow

the same sequence as for the main stem of the river or stream. When construction on the tributary is completed,

work on the main stem should resume. Water from the tributary should continue to be pumped around the

The contractor is responsible for providing access to and maintaining all erosion and sediment control devices

l. After construction, all disturbed areas should be regraded and revegetated as per the planting plan.

drain outfall and pumping the stream flow around the work area. This water should discharge onto the same

2. If a tributary is to be restored, construction should take place on the tributary before work on the main stem

establishment of a new sediment dike below the old one, the old sediment dike should be removed.

be used to minimize disturbance to the channel. Temporary stream crossings should be used only when necessary

Water from the work area should be pumped to a sediment filtering measure such as a dewatering basin,

the channel below the downstream sandbag dike.

seed and mulch or seed and matting as specified on the plans

velocity dissipater used for the main stem pump around.

until the sediment control inspector approves their removal

work area in the main stem.

TEMPORARY INSTREAM CONSTRUCTION MEASURES

INSTALLATION GUIDELINES

- Once in position, the mattresses should be bound with wire and secured with 3-foot (0.9-meter) wooden stakes spaced at 2 to 3-foot (0.60 to 0.90-meter) intervals. The wire should be tied to notches in the stakes before they are driven into the ground; this allows for tension to develop in the wire when the stakes are driven, thereby pulling the mattress firmly to ground.
- Upon being bound and secured to the embankment, the mattresses should be covered with alternating layers of soil and water until only a portion of the top layer of branches is exposed, but all butt ends must be covered. The use of alternating applications of soil and water helps to insure a proper soil-branch interface to initiate
- Finally, the toe of the embankment should be reinforced against undercutting with a rock toe and vegetative measure such as a live fascine. (Refer to MGWC 2.1: Riprap and Figure 2.1.)

dewatering device

sediment dike

- pumps should discharge

dissipator made of rip rap

onto a stable velocity

or sandbags

REVISED NOVEMBER 2000 MARYLAND DEPARTMENT OF THE ENVIRONMENT PAGE 1.2 - 3 WATER MANAGEMENT ADMINISTRATION

Maryland's Guidelines To Waterway Construction

DETAIL 1.2: PUMP-AROUND PRACTICE

PLAN VIEW

discharge hoses

dewatering pump

intake hose

clean water dike

work area

completed in one day

SECTION A-A

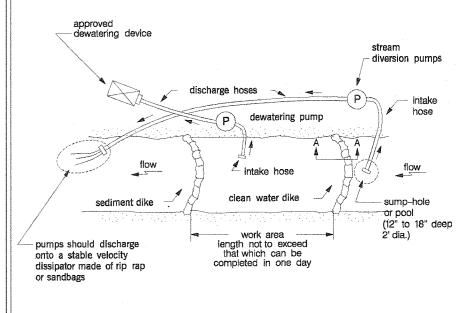
- diversion pumps

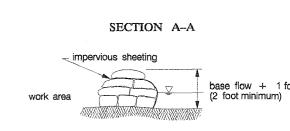
sump-hole

(12" to 18" deep

Maryland's Guidelines To Waterway Construction DETAIL 1.2: PUMP-AROUND PRACTICE

PLAN VIEW





SLOPE PROTECTION AND STABILIZATION TECHNIQUES PAGE 2.8 - 2

MARYLAND DEPARTMENT OF THE ENVIRONMEN WATERWAY CONSTRUCTION GUIDELINES REVISED NOVEMBER 2000

MARYLAND DEPARTMENT OF THE ENVIRONMEN

WATERWAY CONSTRUCTION GUIDELINES

REVISED NOVEMBER 2000 MARYLAND DEPARTMENT OF THE ENVIRONMENT PAGE 1.2 – 3 WATER MANAGEMENT ADMINISTRATION

CASING PIPE_ PLAN 2'-0" MIN FROM LOW FLOW CHANNEL ELEVATION A-A STEEL CASING PIPE 12 IN RIPRI 1, SEE DETAIL FOR RIP-RAP PROTECTION OF STREAM BANK, 2. PIPE SHOULD BE LOCATED AS CLOSE TO 90° TO STREAM FLOW AS PEASIBLE. ENLARGED STREAM VIEW: B—I 3. CONSTRUCT SEDIMENT CONTROL DEVICES AS PER CONTRACT DRAWINGS OR AS DIRECTED. . CLEARANCE FROM STREAM TO CASING PIPE SHALL NOT BE LESS THAN 2" 5. PROVIDE END SEAL TRANSITION BETWEEN CARRIER AND CASING PIPES OUTSIDE OF MANHOLE. SEE DETAIL G-7.31 FOR RUBBER END SEAL DETAIL.

2'-0" Clearance

lepartment of Public Works

ISTURB THE EARTH'S SURFACE ANYWHERE IN THE STAT DELAWARE CALL - 811 (WV 1-800-245-4848) (PA 1-800-242-1776) (DC 1-800-257-777 (VA 1-800-552-7001) (MD 1-800-257-7777) (DE 1-800-282-855

DEPARTMENT OF PUBLIC WORKS HOWARD COUNTY, MARYLAND

DEPARTMENT OF PLANNING & ZONING HOWARD COUNTY, MARYLAND

CHIEF, DEVELOPMENT ENGINEERING DIVISION DAT

BOHLER 901 DULANEY VALLEY ROAD, SUITE 801 TOWSON, MARYLAND 21204 Phone: (410) 821-7900 Fax: (410) 821-7987 www.BohlerEngineering.com

SIONAL ENGINEER

DES: AVG DRN: AVG CK: M.K. DATE: 4/16/18 DATE REV. DESCRIPTION

STREAM CROSSING, NOTES & DETAILS

S - 3.12

368 (LOT 16) & 321 PARCEL NO. 30 600' SCALE MAP NO.

BLOCK NO. 3

OAK HILL SUBDIVISION

(RE-SUBDIVISION OF LOT 16) 9692 OAK HILL DRIVE ELLICOTT CITY, MD MAP 30, GRID 3. PARCELS 368 (LOT 16) & 321 2ND ELEC. DISTRICT, ZONED:R-12 HOWARD COUNTY CONTRACT No.: 24-5002-D

SCALE SHOWN SHEET OF

CHIEF, BUREAU OF UTILITIES

F. Mulch Specifications (In order of preference)