



APPENDIX C LILLY RUN DESIGN



CITY OF HAVRE DE GRACE HARFORD COUNTY, MARYLAND

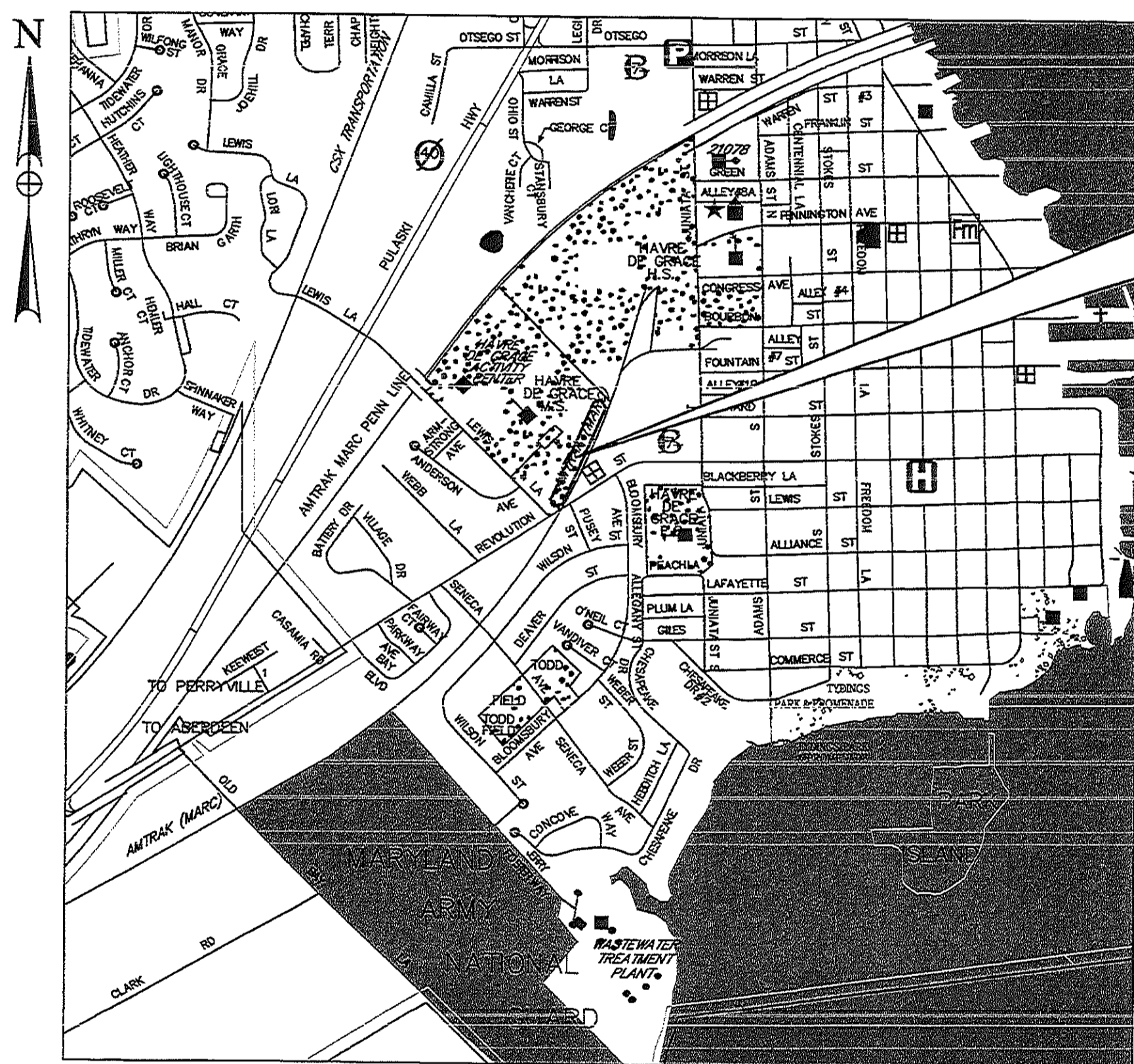
DEPARTMENT OF PUBLIC WORKS
BID NO. 16156

LILY RUN IMPROVEMENT PROGRAM WETLAND ENHANCEMENT AT HAVRE DE GRACE MIDDLE SCHOOL



INDEX OF SHEETS

SHEET NO.	SHEET DESIGNATION	DESCRIPTION
1	T-01	TITLE SHEET
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6	D-01	DETAIL SHEET
7	D-02	EROSION AND SEDIMENT CONTROL NOTES AND DETAILS
8-10	WT-01 to WT-03	WETLAND PLANTING PLANS AND DETAILS
11	SB-01	SOIL BORING LOGS



LOCATION MAP
SCALE 1" = 1000'

GENERAL NOTES

- SPECIFICATIONS: ALL WORK IS TO BE PERFORMED IN ACCORDANCE WITH MARYLAND STATE HIGHWAY ADMINISTRATIONS "SPECIFICATIONS FOR CONSTRUCTION AND MATERIALS" DATED JULY 2017, AND THE MOST RECENT REVISIONS THEREOF AND ADDITIONS THERETO. THE GENERAL PROVISIONS FOR THIS PROJECT ARE THOSE INCLUDED IN THE "HARFORD COUNTY ROAD CODE" GENERAL PROVISIONS COUNTY FUNDED PROJECTS, SECTIONS 100-110.
- UTILITIES: UTILITY LOCATIONS SHOWN ON THE PLANS ARE BASED ON LIMITED INFORMATION AVAILABLE. HOWEVER, IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THE ACCURACY OF THIS INFORMATION. THE COST OF REPAIR OR REPLACEMENT OF ANY SUCH FACILITIES DAMAGED BY THE CONTRACTOR'S OPERATIONS SHALL BE BORNE BY HIM.
- UTILITY RELOCATIONS: UTILITY RELOCATIONS MADE NECESSARY BY THE PROPOSED WORK WILL BE ACCOMPLISHED BY THE UTILITY OWNERS AT NO COST TO THE CONTRACTOR UNLESS NOTED OTHERWISE. WHEN SUCH WORK IS NECESSARY, THE CONTRACTOR SHALL NOTIFY APPROPRIATE PERSONNEL AS FOLLOWS:
CONTACT "MISS UTILITY" PHONE 1-800-257-7777, 48 HOURS IN ADVANCE FOR LOCATION OF ANY UTILITIES.
CONTACT HARFORD COUNTY D.P.W. DIVISION OF WATER AND SEWERS PHONE NO. 1-410-638-3289 OR 1-410-612-1612, 72 HOURS IN ADVANCE OF BEGINNING ANY CONSTRUCTION.
CONTACT BALTIMORE GAS & ELECTRIC CO. - PHONE NO. 1-410-291-3119, 48 HOURS IN ADVANCE OF BEGINNING ANY CONSTRUCTION.
- STANDARD DETAILS: REFERENCE MADE TO STANDARDS ARE TAKEN FROM THE HARFORD COUNTY ROAD CODE "SPECIFICATIONS FOR CONSTRUCTION AND MATERIAL, STANDARD DETAILS FOR DESIGN AND CONSTRUCTION" AND FROM "THE MARYLAND STATE HIGHWAY ADMINISTRATION'S BOOK OF STANDARDS-HIGHWAY AND INCIDENTAL STRUCTURES". IT WILL BE THE CONTRACTOR'S RESPONSIBILITY THAT THE STANDARD DRAWINGS IN HIS POSSESSION ARE THE LATEST REVISED STANDARDS UP TO AND INCLUDING THE DATE OF THE ADVERTISEMENT OF THIS CONTRACT.
- RIGHT-OF-WAY LINES: RIGHT-OF-WAY LINES SHOWN ON THESE PLANS DO NOT INCLUDE EASEMENTS. THEY ARE FOR ASSISTANCE IN INTERPRETING THE PLANS ONLY. THESE LINES DO NOT REPRESENT THE OFFICIAL PROPERTY ACQUISITION LINES. FOR OFFICIAL FEE RIGHT-OF-WAY AND EASEMENT INFORMATION, SEE THE APPROPRIATE RIGHT-OF-WAY PLATS.
- SOIL CONSERVATION: THE CONTRACTOR SHALL NOT DISTURB THE EXISTING VEGETATION OUTSIDE THE LIMITS OF DISTURBANCE STOCKPILING AND STAGING WILL BE ALLOWED ON SITE. SOIL STABILIZATION WILL CONFORM TO 2011 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL. THE CONTRACTOR WILL OBTAIN APPROVAL OF THE HARFORD COUNTY SOIL CONSERVATION DISTRICT FOR HIS PLANS IN CONTROLLING SEDIMENT EROSION FOR THE BORROW AREA AND DISPOSING OF ANY WASTE EXCAVATION.

DEVELOPER'S OWNER'S CERTIFICATION

"I/ WE HEREBY CERTIFY THAT ALL PROPOSED WORK SHOWN ON THESE CONSTRUCTION DRAWINGS AND ON THE APPROVED SEDIMENT CONTROL DRAWINGS WILL BE ACCOMPLISHED PURSUANT TO THESE PLANS. I/ WE UNDERSTAND THAT IT IS MY/ OUR RESPONSIBILITY TO HAVE THE CONSTRUCTION SUPERVISED AND CERTIFIED INCLUDING THE SUBMITTAL AND COUNTY APPROVAL OF "AS-BUILT" PLANS WITHIN 30 DAYS OF COMPLETION BY A REGISTERED PROFESSIONAL ENGINEER."

SIGNATURE *[Signature]* DATE 11-28-2017

ENGINEER'S CERTIFICATION

"I HEREBY CERTIFY THAT THIS PLAN HAS BEEN PREPARED BY ME OR UNDER MY SUPERVISION AND MEETS THE MINIMUM STANDARDS OF THE HARFORD COUNTY DEPARTMENT OF PUBLIC WORKS AND/OR THE U.S. DEPARTMENT OF AGRICULTURE - SOIL CONSERVATION SERVICE AND/OR THE MARYLAND DEPARTMENT OF NATURAL RESOURCES, WATER RESOURCES ADMINISTRATION"

SIGNATURE *[Signature]* DATE 11-10-17

DAVID T. MORICONI

P.E. NO. 16156

AS-BUILT CERTIFICATION

"I HEREBY CERTIFY THAT THE FACILITY SHOWN ON THIS PLAN WAS CONSTRUCTED AS SHOWN ON THE "AS-BUILT" PLAN AND MEETS THE APPROVED PLANS AND SPECIFICATION."

SIGNATURE _____ DATE _____

P.E. NO. _____

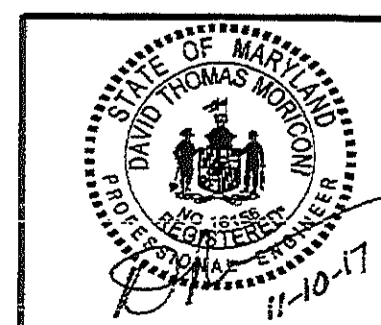
CERTIFY MEANS TO STATE OR DECLARE A PROFESSIONAL OPINION BASED UPON ONSITE INSPECTIONS AND MATERIAL TESTS WHICH ARE CONDUCTED DURING CONSTRUCTION. THE ONSITE INSPECTIONS AND MATERIAL TESTS ARE THOSE INSPECTIONS AND TESTS DEEMED SUFFICIENT AND APPROPRIATE BY COMMONLY ACCEPTED ENGINEERING STANDARDS. CERTIFY DOES NOT MEAN OR IMPLY A GUARANTEE BY THE ENGINEER NOR DOES AN ENGINEER'S CERTIFICATION RELIEVE ANY OTHER PARTY FROM MEETING REQUIREMENTS IMPOSED BY CONTRACT, EMPLOYMENT, OR OTHER MEANS, INCLUDING MEETING COMMONLY ACCEPTED INDUSTRY PRACTICES.

EROSION AND SEDIMENT CONTROL PLAN

RECOMMENDED FOR APPROVAL:
[Signature] 11-28-2017
HAVRE DE GRACE DPW

TECHNICAL CONCURRENCE:
[Signature] 11-28-17
HARFORD SOIL CONSERVATION DISTRICT

APPROVED:
[Signature] 11/28/17
HARFORD SOIL CONSERVATION DISTRICT



PROFESSIONAL CERTIFICATION
"I HEREBY CERTIFY THAT DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 16156, EXPIRATION DATE: 8/28/2018"



APPROVED:

DIRECTOR OF PUBLIC WORKS

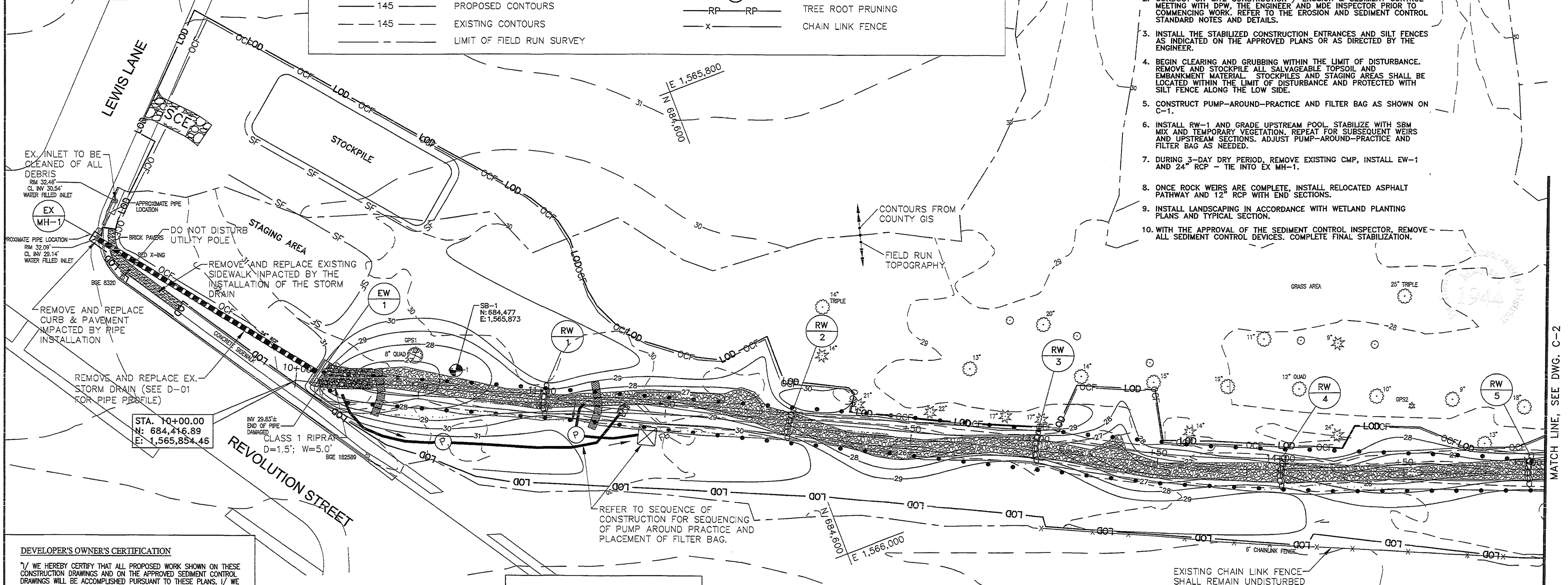
BASELINE COORDINATES			
POINT	STATION	NORTHING	EASTING
POB	10+00	684416.89	1565854.46
PI	10+46	684457.03	1565876.29
PI	11+20	684524.76	1565907.39
PI	13+38	684719.61	1566005.34
PI	13+84	684760.57	1566025.11
PI	15+78	684940.17	1566098.43
PI	16+29	684985.45	1566121.53
PI	17+18	685068.11	1566154.23
PI	17+81	685128.51	1566173.37
PI	18+07	685151.7	1566184.93
PI	18+28	685171.7	1566192.87
PI	18+90	685230.04	1566214.24
PI	20+73	685403.13	1566272.91
PI	21+80	685505.27	1566304.17
PI	22+06	685530.65	1566310.04
PI	22+37	685561.07	1566315.74
PI	22+62	685583.8	1566325.9
PI	22+98	685619.02	1566333.5
PI	23+16	685636.71	1566330.7
PI	23+53	685672.54	1566340.55
PI	23+86	685704.99	1566347.53
POE	24+16	685732.97	1566358.5

LEGEND

	WATERS OF THE U.S.		LIMIT OF DISTURBANCE (LOD)
	WETLAND		ORANGE CONSTRUCTION FENCE (OCF)
	NEW PAVEMENT (SEE PAVEMENT DETAIL)		SILT FENCE (SF)
	STREAMBED MATERIAL (SBM) MIX		DIVERSION FENCE (DF)
	REMOVAL OF EXISTING ASPHALT OR CONCRETE		PUMP AROUND PRACTICE
	ROCK WEIR		STABILIZED CONSTRUCTION ENTRANCE
	PROPOSED STORM DRAIN PIPE		FILTER BAG W/ HOSE ON MULCH
	FLOW DIRECTION		SANDBAGS
	PROPOSED 100-YEAR FLOOD PLAIN		TREE REMOVAL (SEE PLANTING PLANS)
	EXISTING 100-YEAR FLOOD PLAIN		TREE TRUNK PROTECTION
	PROPOSED CONTOURS		TREE ROOT PRUNING
	EXISTING CONTOURS		CHAIN LINK FENCE
	LIMIT OF FIELD RUN SURVEY		

SEQUENCE OF CONSTRUCTION

- NOTE THAT SOME SEQUENCE STEPS MAY BE PERFORMED CONCURRENTLY WITH THE APPROVAL OF THE COUNTY INSPECTOR. THE SEQUENCE IS BASED ON THE SOUTHERN SEGMENT BEING CONSTRUCTED FIRST, THEN THE NORTHERN SEGMENT.
- CONTACT MISS UTILITY 72 HOURS PRIOR TO THE START OF WORK AT 1-800-257-7777. IT IS THE CONTRACTOR'S RESPONSIBILITY TO REFERENCE AND MAINTAIN THE LOCATION MARKINGS DURING CONSTRUCTION.
 - CONDUCT ON-SITE CONSTRUCTION / EROSION & SEDIMENT CONTROL MEETING WITH DPW, THE ENGINEER AND MDE INSPECTOR PRIOR TO COMMENCING WORK. REFER TO THE EROSION AND SEDIMENT CONTROL STANDARD NOTES AND DETAILS.
 - INSTALL THE STABILIZED CONSTRUCTION ENTRANCES AND SILT FENCES AS INDICATED ON THE APPROVED PLANS OR AS DIRECTED BY THE ENGINEER.
 - BEGIN CLEARING AND GRUBBING WITHIN THE LIMIT OF DISTURBANCE. REMOVE AND STOCKPILE ALL SALVAGEABLE TOPSOIL AND EMBANKMENT MATERIAL. STOCKPILES AND STAGING AREAS SHALL BE LOCATED WITHIN THE LIMIT OF DISTURBANCE AND PROTECTED WITH SILT FENCE ALONG THE LOW SIDE.
 - CONSTRUCT PUMP-AROUND-PRACTICE AND FILTER BAG AS SHOWN ON C-1.
 - INSTALL RW-1 AND GRADE UPSTREAM POOL STABILIZE WITH SBM MIX AND TEMPORARY VEGETATION. REPEAT FOR SUBSEQUENT WEIRS AND UPSTREAM SECTIONS. ADJUST PUMP-AROUND-PRACTICE AND FILTER BAG AS NEEDED.
 - DURING 3-DAY DRY PERIOD, REMOVE EXISTING CMP, INSTALL EW-1 AND 24" RCP - TIE INTO EX MH-1.
 - ONCE ROCK WEIRS ARE COMPLETE, INSTALL RELOCATED ASPHALT PATHWAY AND 12" RCP WITH END SECTIONS.
 - INSTALL LANDSCAPING IN ACCORDANCE WITH WETLAND PLANTING PLANS AND TYPICAL SECTION.
 - WITH THE APPROVAL OF THE SEDIMENT CONTROL INSPECTOR, REMOVE ALL SEDIMENT CONTROL DEVICES. COMPLETE FINAL STABILIZATION.

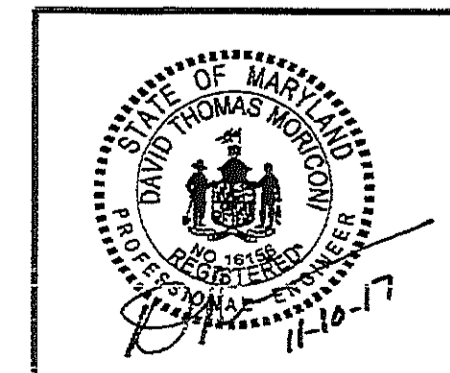


DEVELOPER'S OWNER'S CERTIFICATION
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 SIGNATURE _____ DATE _____

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 SIGNATURE *David T. Moriconi* DATE *11-10-17*
 P.E. NO. 16156

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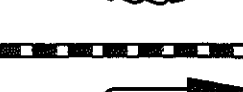

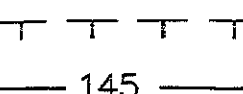
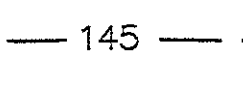
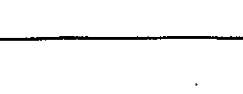
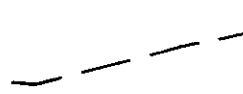



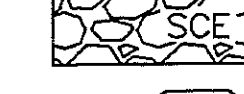



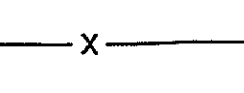


EROSION AND SEDIMENT CONTROL PLAN#
 RECOMMENDED FOR APPROVAL:
 HAVRE DE GRACE DPW
 TECHNICAL CONCURRENCE:
 HARFORD SOIL CONSERVATION DISTRICT
 APPROVED:
 HARFORD SOIL CONSERVATION DISTRICT

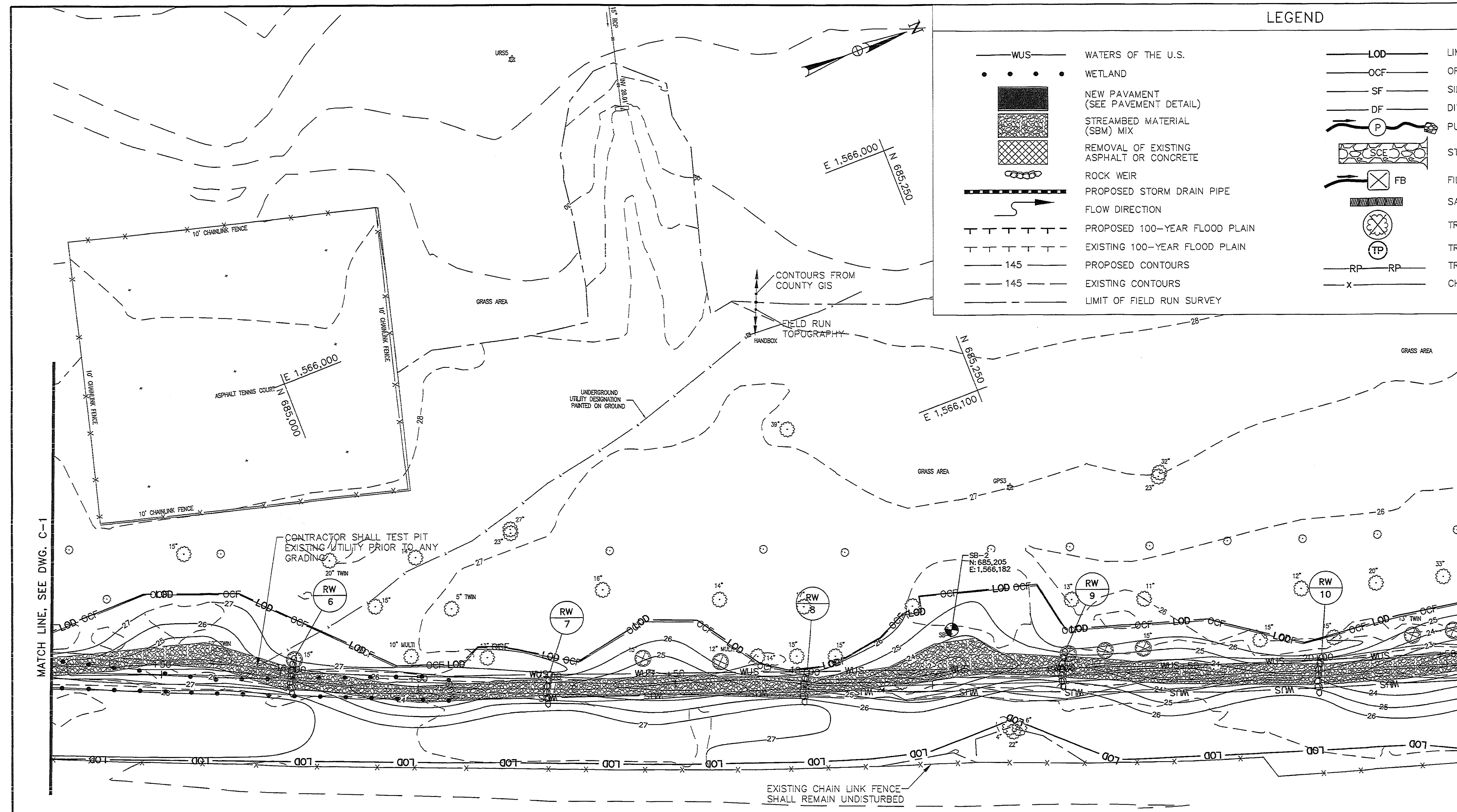


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AECOM

CITY OF HAVRE DE GRACE LILLY RUN WETLAND ENHANCEMENT HARFORD COUNTY, MD GRADING AND EROSION AND SEDIMENT CONTROL PLAN	
Revisions _____ _____ _____	Drawn By : CDF Designed By : MAL Reviewed By : DTM
Scale : _____ Date : JULY, 2017 Sheet _____ Of _____ C-1	CITY OF HAVRE DE GRACE MARYLAND

LEGEND

- WUS — WATERS OF THE U.S.
- • • • • WETLAND
-  NEW PAVEMENT (SEE PAVEMENT DETAIL)
-  STREAMBED MATERIAL (SBM) MIX
-  REMOVAL OF EXISTING ASPHALT OR CONCRETE
-  ROCK WEIR
-  PROPOSED STORM DRAIN PIPE
-  FLOW DIRECTION
-  PROPOSED 100-YEAR FLOOD PLAIN
-  EXISTING 100-YEAR FLOOD PLAIN
-  145 PROPOSED CONTOURS
-  145 EXISTING CONTOURS
-  LIMIT OF FIELD RUN SURVEY
- LOD — LIMIT OF DISTURBANCE (LOD)
- OCF — ORANGE CONSTRUCTION FENCE (OCF)
- SF — SILT FENCE (SF)
- DF — DIVERSION FENCE (DF)
-  PUMP AROUND PRACTICE
-  STABILIZED CONSTRUCTION ENTRANCE
-  FILTER BAG W/ HOSE ON MULCH
-  SANDBAGS
-  TREE REMOVAL (SEE PLANTING PLANS)
-  TREE TRUNK PROTECTION
-  TREE ROOT PRUNING
-  CHAIN LINK FENCE




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SIGNATURE  DATE 11-10-17
 P.E. NO. 16156

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RECOMMENDED FOR APPROVAL:

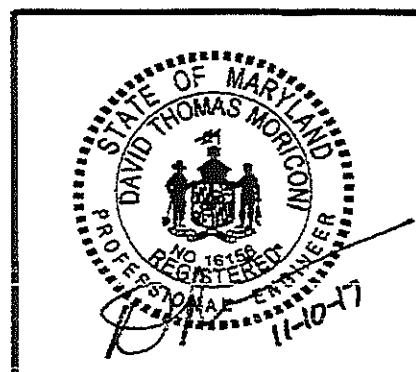
 HAVRE DE GRACE DPW

TECHNICAL CONCURRENCE:

 HARFORD SOIL CONSERVATION DISTRICT

APPROVED:

 HARFORD SOIL CONSERVATION DISTRICT



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Revisions

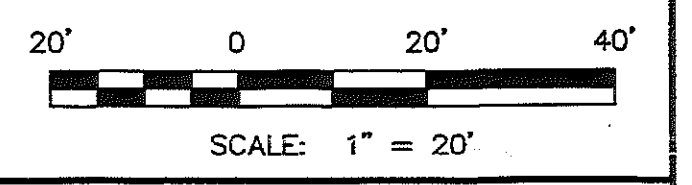
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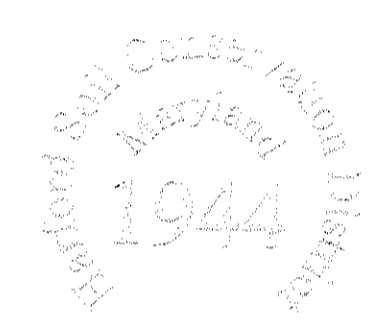
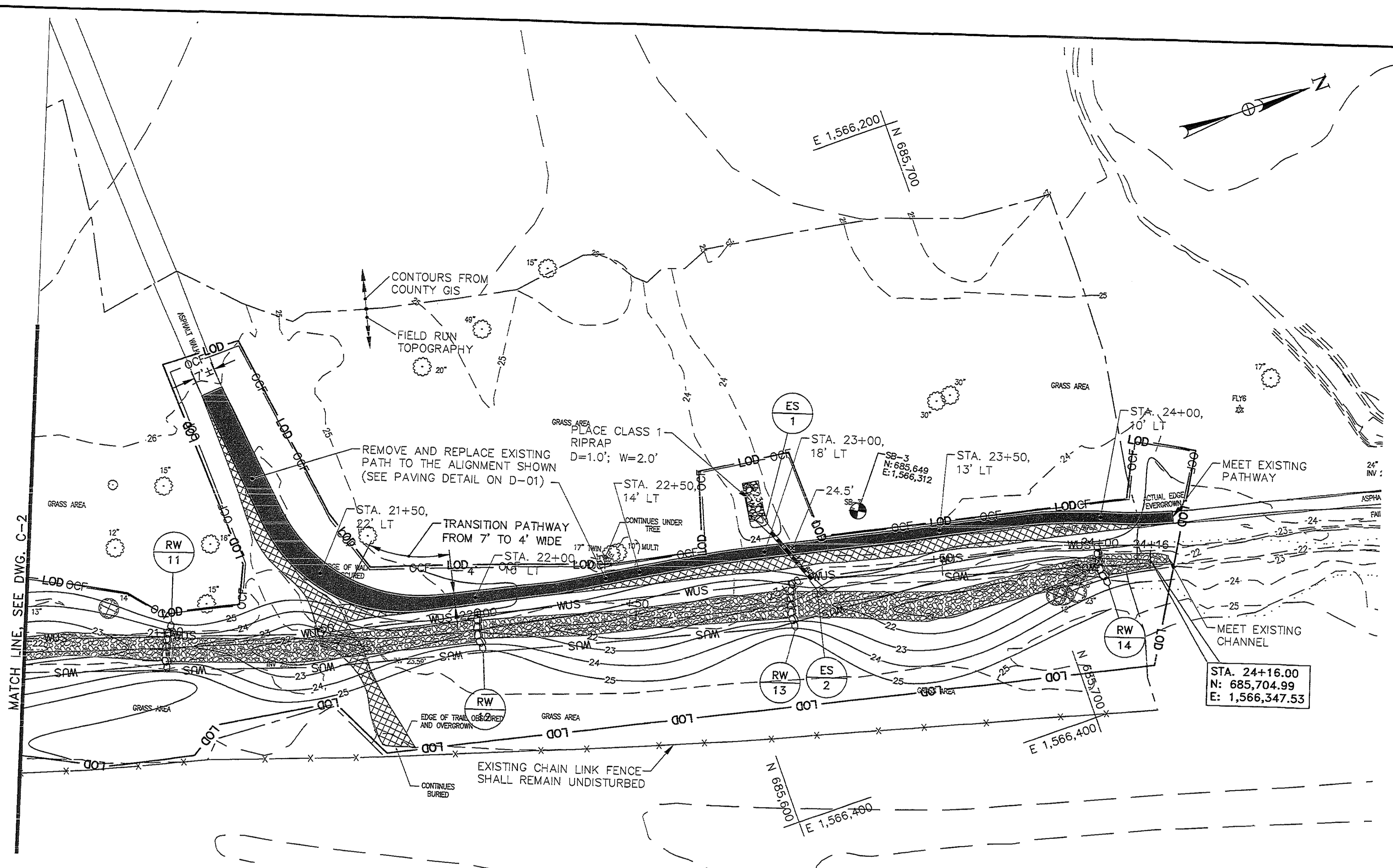
CITY OF HAVRE DE GRACE

LILLY RUN WETLAND ENHANCEMENT
 HARFORD COUNTY, MD
 GRADING AND EROSION AND
 SEDIMENT CONTROL PLAN

Drawn By : CDF
 Designed By : MAL
 Reviewed By : DTM

Scale : _____
 Date : JULY, 2017
 Sheet _____ Of _____ C-2





DEVELOPER'S OWNER'S CERTIFICATION
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 SIGNATURE *David T. Moriconi* DATE *11-10-17*
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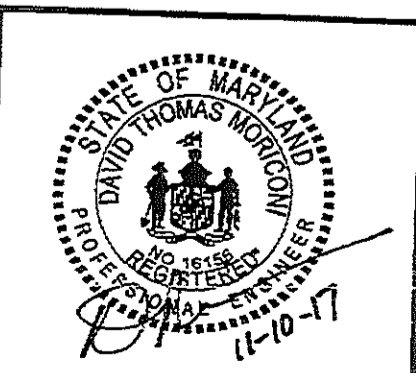
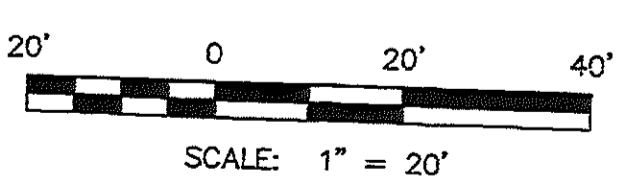
 HAVRE DE GRACE DPW
 TECHNICAL CONCURRENCE:

 HARFORD SOIL CONSERVATION DISTRICT
 APPROVED:

 HARFORD SOIL CONSERVATION DISTRICT

LEGEND

- | | |
|---|--|
| <ul style="list-style-type: none"> WUS WATERS OF THE U.S. WETLAND NEW PAVEMENT (SEE PAVEMENT DETAIL) STREAMBED MATERIAL (SBM) MIX REMOVAL OF EXISTING ASPHALT OR CONCRETE ROCK WEIR PROPOSED STORM DRAIN PIPE FLOW DIRECTION PROPOSED 100-YEAR FLOOD PLAIN EXISTING 100-YEAR FLOOD PLAIN 145 PROPOSED CONTOURS 145 EXISTING CONTOURS LIMIT OF FIELD RUN SURVEY | <ul style="list-style-type: none"> LOD LIMIT OF DISTURBANCE (LOD) OCF ORANGE CONSTRUCTION FENCE (OCF) SF SILT FENCE (SF) DF DIVERSION FENCE (DF) P PUMP AROUND PRACTICE SCE STABILIZED CONSTRUCTION ENTRANCE FB FILTER BAG W/ HOSE ON MULCH SANDBAGS TP TREE TRUNK PROTECTION RP TREE ROOT PRUNING X CHAIN LINK FENCE |
|---|--|



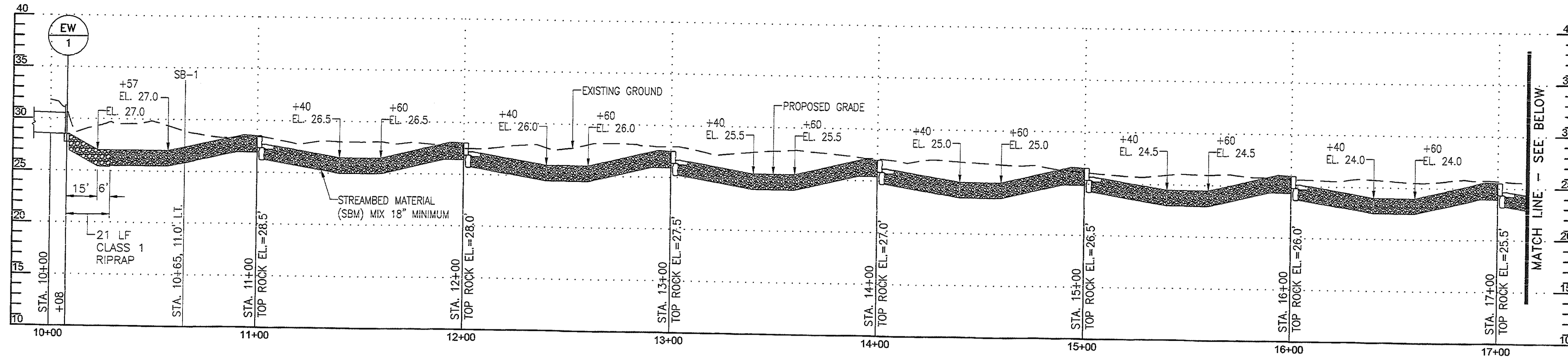
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AECOM

Revisions



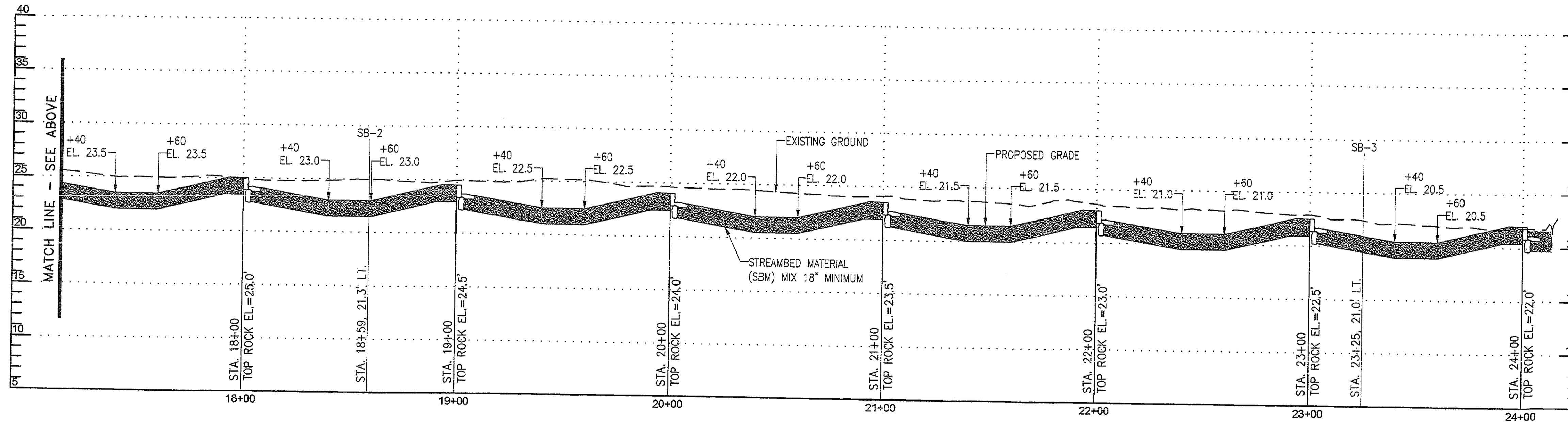
CITY OF HAVRE DE GRACE
 LILLY RUN WETLAND ENHANCEMENT
 HARFORD COUNTY, MD
 GRADING AND EROSION AND SEDIMENT CONTROL PLAN

Drawn By : CDF
 Designed By : MAL
 Reviewed By : DTM
 Scale : _____
 Date : AUGUST 2017
 Sheet _____ of _____ C-3



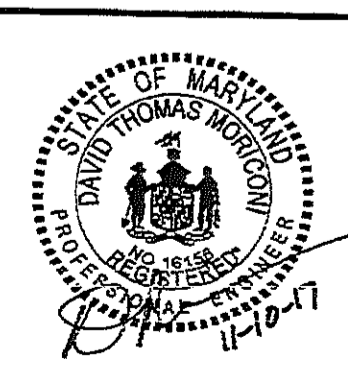
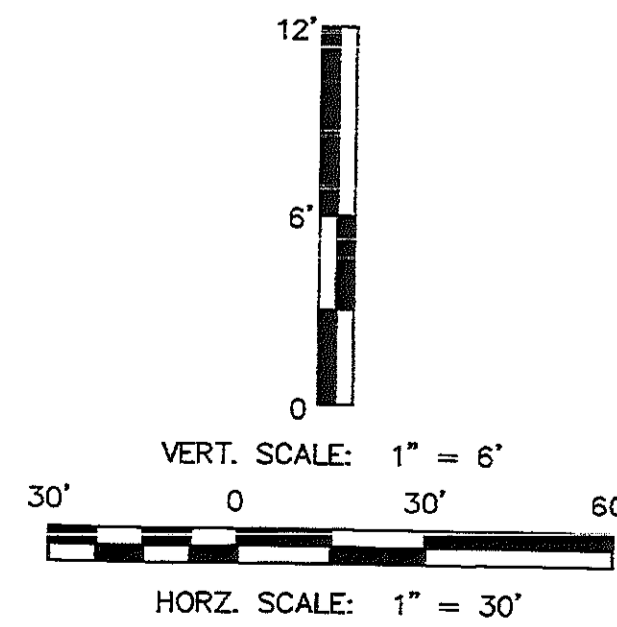
PROFILE - LILY RUN

SCALE: HORZ. 1"=30'
VERT. 1"=6'

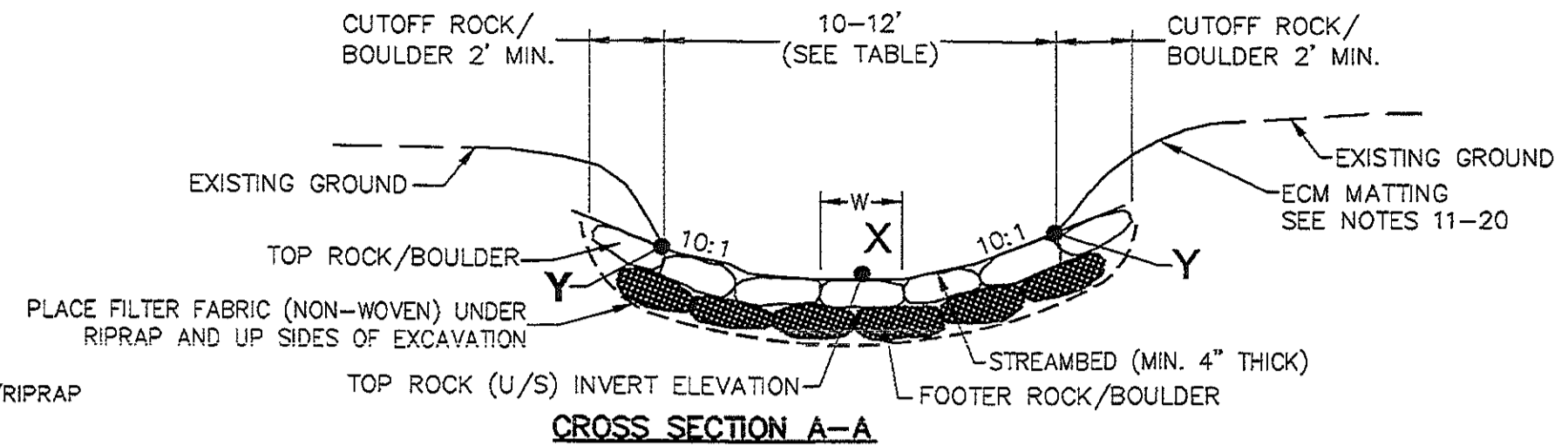
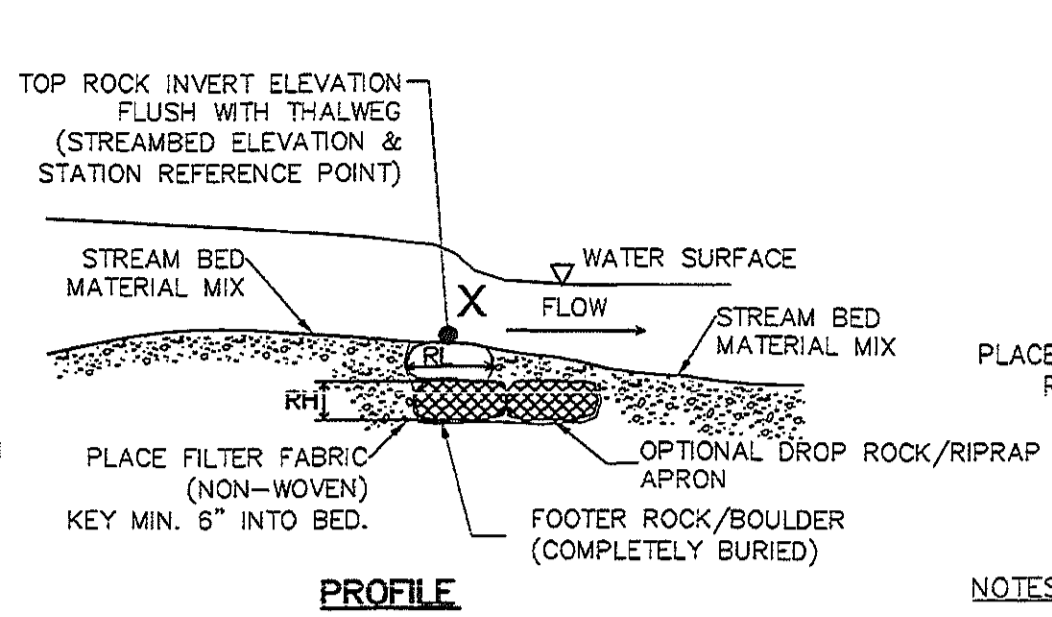
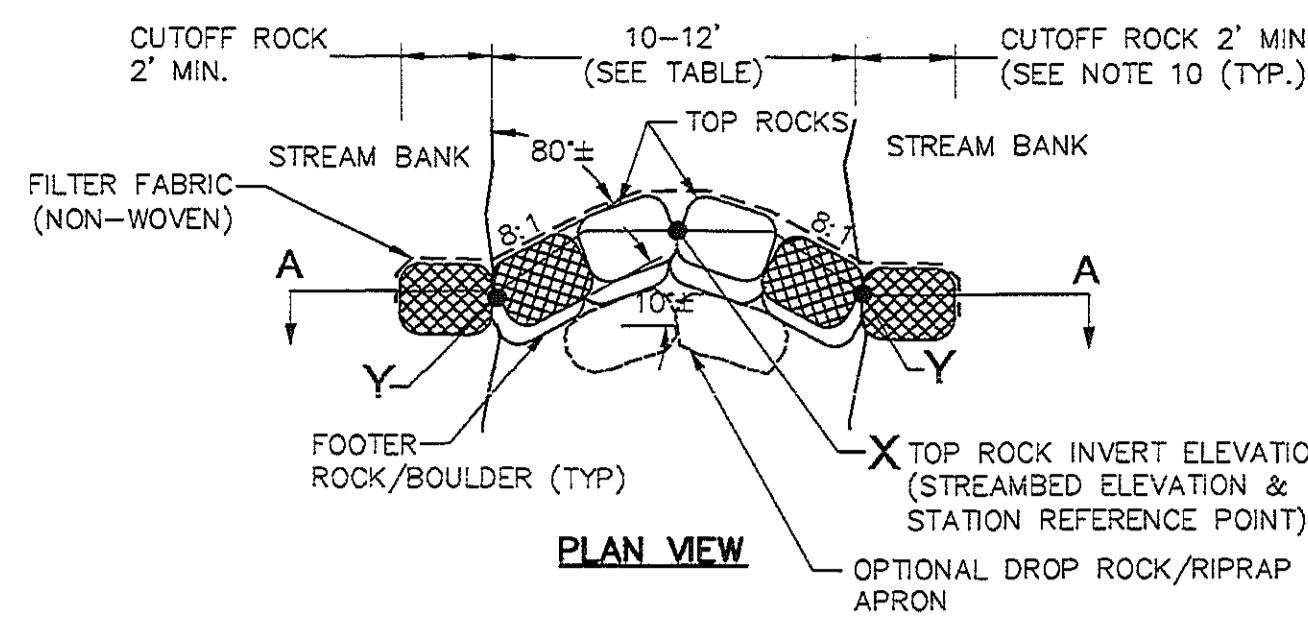


PROFILE - LILY RUN

SCALE: HORZ. 1"=30'
VERT. 1"=6'



PROFESSIONAL CERTIFICATION I HEREBY CERTIFY THAT DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 18156, EXPIRATION DATE: 8/28/2018.	Revisions	CITY OF HAVRE DE GRACE LILLY RUN WETLAND ENHANCEMENT HARFORD COUNTY, MD PROFILE
	Drawn By : CDF Designed By : MAL Reviewed By : DTM	



ROCK WEIR (RW) TABLE

STRUCTURE#	STATION	OFFSET	INVERT ELEVATION (X)	TIE-IN ELEVATION (Y)		TOTAL WEIR WIDTH	MINIMUM ROCK SIZE (RH) (W) (RL)		
				LEFT BANK	RIGHT BANK		(RH)	(W)	(RL)
RW1	11+00	0	28.5	29.0	29.0	10.0	1.25	2.0	2.0
RW2	12+00	0	28	28.5	28.5	10.0	1.25	2.0	2.0
RW3	13+00	0	27.5	28.0	28.0	10.0	1.25	2.0	2.0
RW4	14+00	0	27	27.5	27.5	10.0	1.25	2.0	2.0
RW5	15+00	0	26.5	27.0	27.0	10.0	1.25	2.0	2.0
RW6	16+00	0	26	26.5	26.5	12.0	1.25	2.0	2.0
RW7	17+00	0.1L	25.5	26.0	26.0	10.0	1.25	2.0	2.0
RW8	18+00	2.4L	25	25.5	25.5	10.0	1.25	2.0	2.0
RW9	19+00	3.5L	24.5	25.0	25.0	12.0	1.25	2.0	2.0
RW10	20+00	2.0R	24	24.5	24.5	12.0	1.25	2.0	2.0
RW11	21+00	0	23.5	24.0	24.0	12.0	1.25	2.0	2.0
RW12	22+00	0	23	23.5	23.5	10.0	1.25	2.0	2.0
RW13	23+00	1.0R	22.5	23.0	23.0	10.0	1.25	2.0	2.0
RW14	24+00	1.0R	22	22.5	22.5	10.0	1.25	2.0	2.0

ROCK WEIR DETAIL 1.3
NO SCALE

NOTES: (FOR DETAIL 1.3)

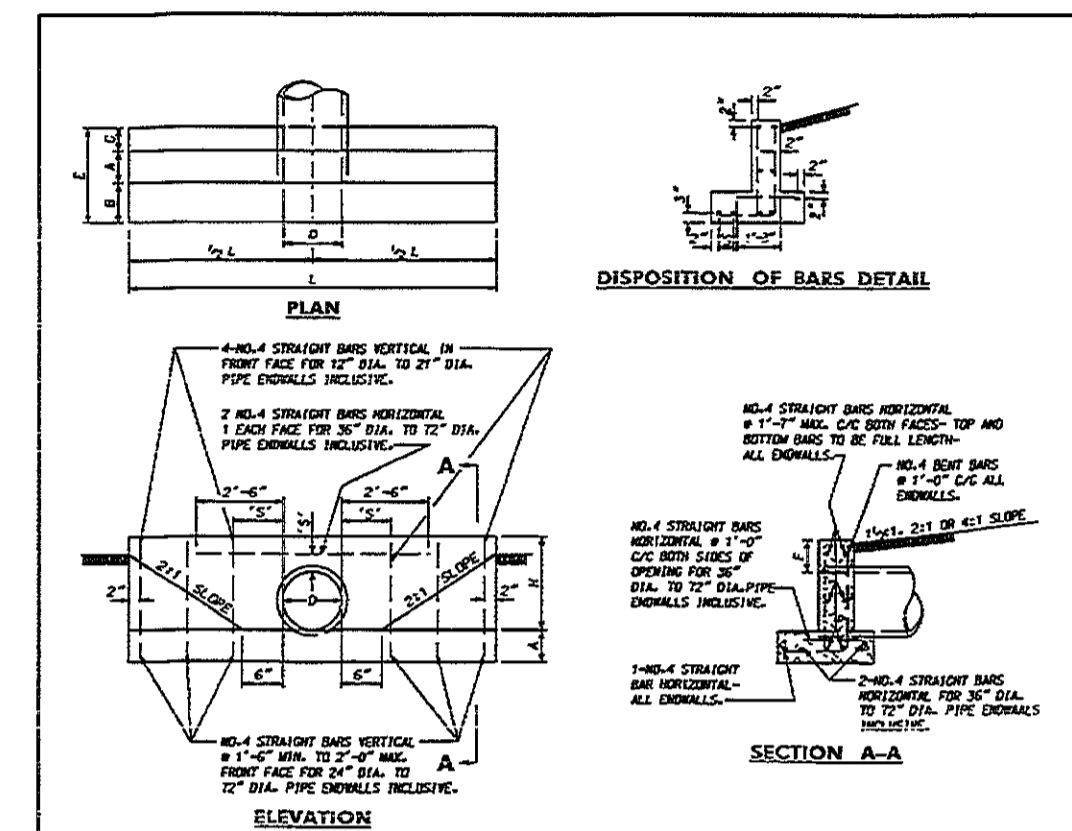
- SILL SHALL BE CONSTRUCTED BY EXCAVATING A TRENCH SLIGHTLY LARGER THAN THE SILL DIMENSIONS.
- TOP ROCKS SHALL BE SUPPORTED BY A FOOTER ROCK AND SHINGLED UPSTREAM AND INTO STREAM BANK. ALL ROCKS SHALL BE INTERLOCKED MINIMIZING OR ELIMINATING GAPS WITH NO VOIDS/GAPS LARGER THAN 4 INCHES.
- THE MINIMUM ELEVATION DISTANCE BETWEEN ELEVATION "X" AND ELEVATION "Y" IS 6-INCHES.
- PLACE FILTER FABRIC (NON-WOVEN) ON UPSTREAM SIDE OF SILL. FABRIC SHALL COVER THE UPSTREAM FACE OF THE ENTIRE SILL (EXCLUDING CUTOFF SILL) AND SHALL EXTEND A MAXIMUM OF 2 FEET UPSTREAM OF STRUCTURE.
- DISTURBED STREAMBED SHALL BE BACKFILLED WITH 6" MIN. OF STREAMBED MATERIAL TO MEET FINISHED GRADE.
- STREAM BANK AROUND STRUCTURE SHALL BE BACKFILLED AND HAND COMPACTED.
- SEE STRUCTURE TABLE, PROFILE, AND GRADING PLAN FOR ALL DIMENSIONS AND ELEVATIONS.
- SILL ROCKS/BOULDERS SHALL BE FLUSH WITH FINISHED GRADE AND CUTOFF ROCKS SHALL EXTEND A MINIMUM OF 4 FEET INTO STREAMBANK.
- PROVIDE DROP STONE/RIPRAP APRON DOWNSTREAM OF SILL AS DIRECTED.
- CAP VOID FROM BANK EXCAVATION ATOP CUTOFF ROCK / BOULDER WITH CLASS I RIPRAP (OR IMBRICATED WALL WHEN SHOWN ON PLANS. PACK VOIDS WITH TOPSOIL UNLESS ROCK IS STACKED AT > 2:1 SLOPE.
- BEGIN AT THE TOP OF THE SLOPE AND ANCHOR FIBER MATTING IN A 12" DEEP INITIAL ANCHOR TRENCH. BACKFILL TRENCH AND TAMP EARTH FIRMLY.
- UNROLL FIBER MATTING DOWNSLOPE IN THE DIRECTION OF WATER FLOW.
- OVERLAP EDGES OF ADJACENT PARALLEL ROLLS 6" AND ANCHOR AT 12" CENTERS.
- WHEN FIBER MAT MUST BE SPICED, PLACE END OVER END (SHINGLE STYLE) IN DIRECTION OF WITH 12" OVERLAP AND ANCHOR USING TWO STAGGERED ROWS OF STAPLES AT 8" CENTERS. ADDITIONAL FASTENING MAY BE REQUIRED WHERE MATTING IS CUT TO INSTALL PLANTINGS.
- LAY FIBER MAT LOOSELY AND ANCHOR SUFFICIENTLY TO MAINTAIN DIRECT CONTACT WITH THE SOIL - DO NOT STRETCH.
- FOR SLOPES 2:1 AND STEEPER USE A MINIMUM OF (3) 24-INCH WOOD STAKES PER SQUARE YARD AND FOR SLOPES FLATTER THAN 2:1 USE A MINIMUM OF (2) 24-INCH WOOD STAKES PER SQUARE YARD. PROVIDE ADDITIONAL STAKING ALONG CHANNEL BOTTOM WHERE ECM FORMS TOE OF SLOPE.
- WOOD STAKES SHALL BE ANGLED SUCH THAT EXPOSED PORTION (2"-4") FACES UPSTREAM.
- ANCHOR, FILL, AND COMPACT END OF FIBER MATTING IN 12"x6" TERMINAL ANCHOR TRENCH (MIRROR IMAGE OF INITIAL TRENCH). ANCHORING DIMENSIONS TO BE REDUCED IN AREAS OF NATURAL RESOURCES TO BE PROTECTED.
- EROSION CONTROL MATTING MAY BE EXTENDED UP STREAM BANK AS DIRECTED BY ENGINEER OR INSPECTOR.

STREAMBED MATERIAL (SBM) MIX

%	DOUBLE WASHED CONSTRUCTION SAND	30%
SBM	ROUND RIVER ROCK/GRAVEL (S6")	60%
MIX	SILICA COBBLE (4" - 12")	10%

- Notes:
- TOP LAYER OF SBM SHALL BE NATIVE BANKRUN RIVER ROCK.
 - REMAINING SBM CAN BE EITHER BANKRUN OR WASHED RIVER ROCK.

STREAMBED MATERIAL MIX 2.1
NO SCALE

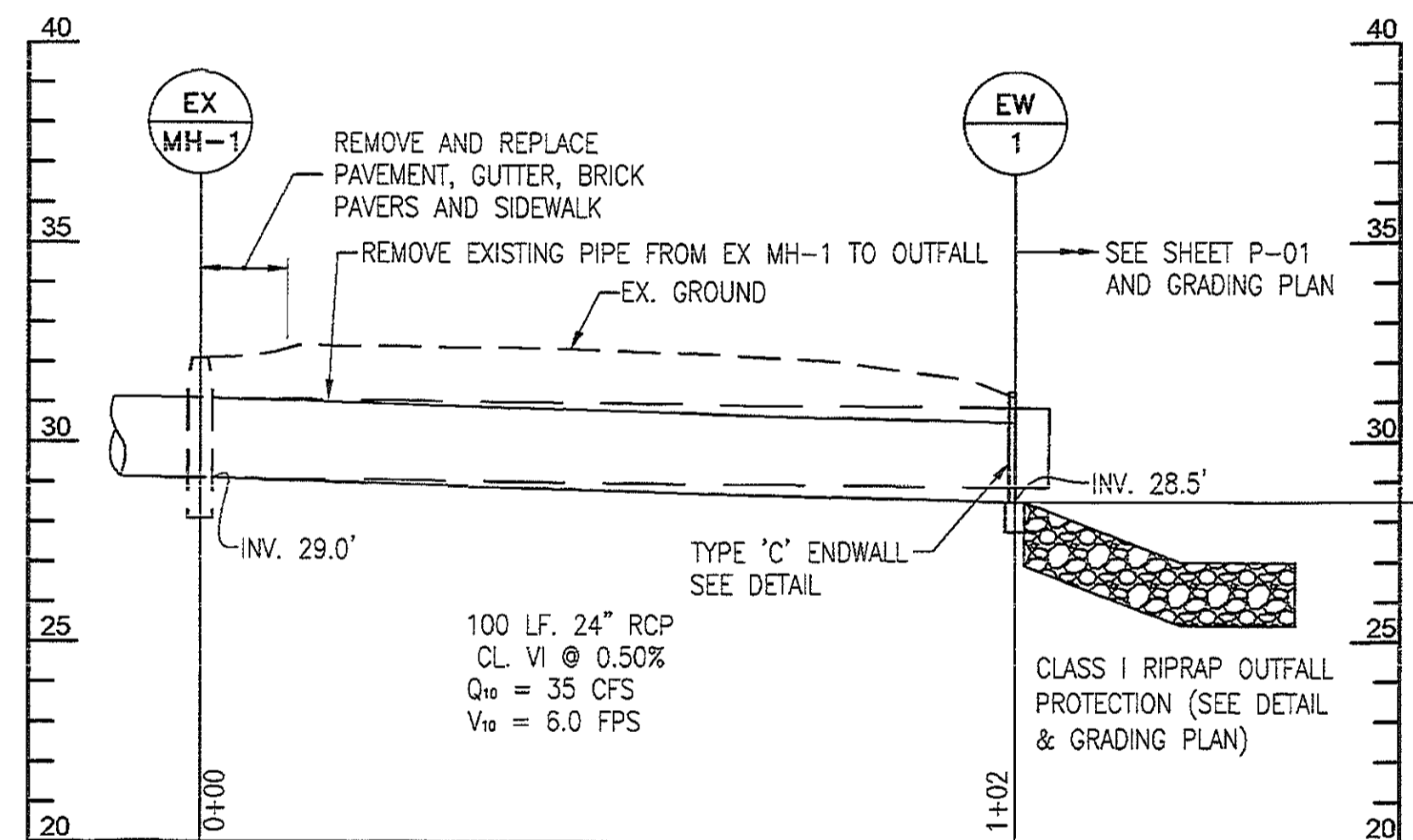


QUANTITIES FOR ESTIMATING PURPOSES ONLY

ITEM	DESCRIPTION	QUANTITY
1	CONCRETE	...
2	STEEL	...
3
4
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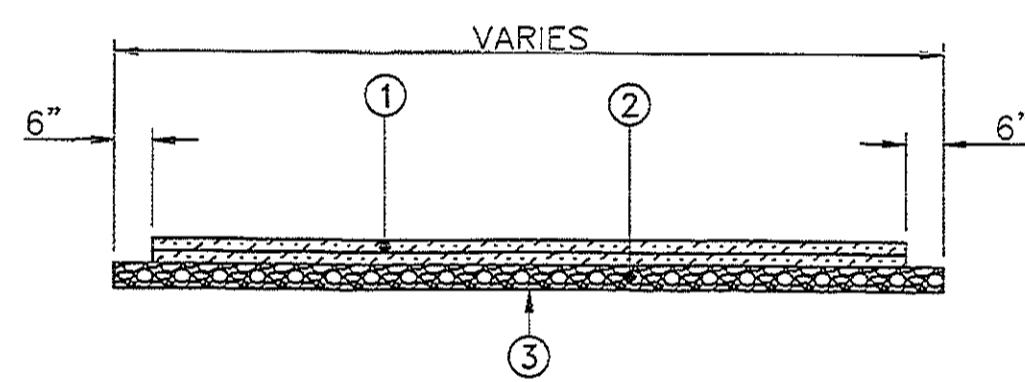
'S' DISTANCES
4" FOR 1/2" DIA. TO 2 1/2" DIA. PIPES INCLUSIVE.
6" FOR 3" DIA. TO 8" DIA. PIPES INCLUSIVE.
8" FOR 10" DIA. TO 18" DIA. PIPES INCLUSIVE.

GENERAL NOTES
SPECIFICATIONS LISTED E.G.A. CONCRETE SHALL BE MIX NO. 2. REINFORCING: WELDED STEEL BARS-W#4. ALL EXPOSED EDGES 1" MIN. UP AS DIRECTED.



PIPE PROFILE (EX. MH-1 TO EW-1)

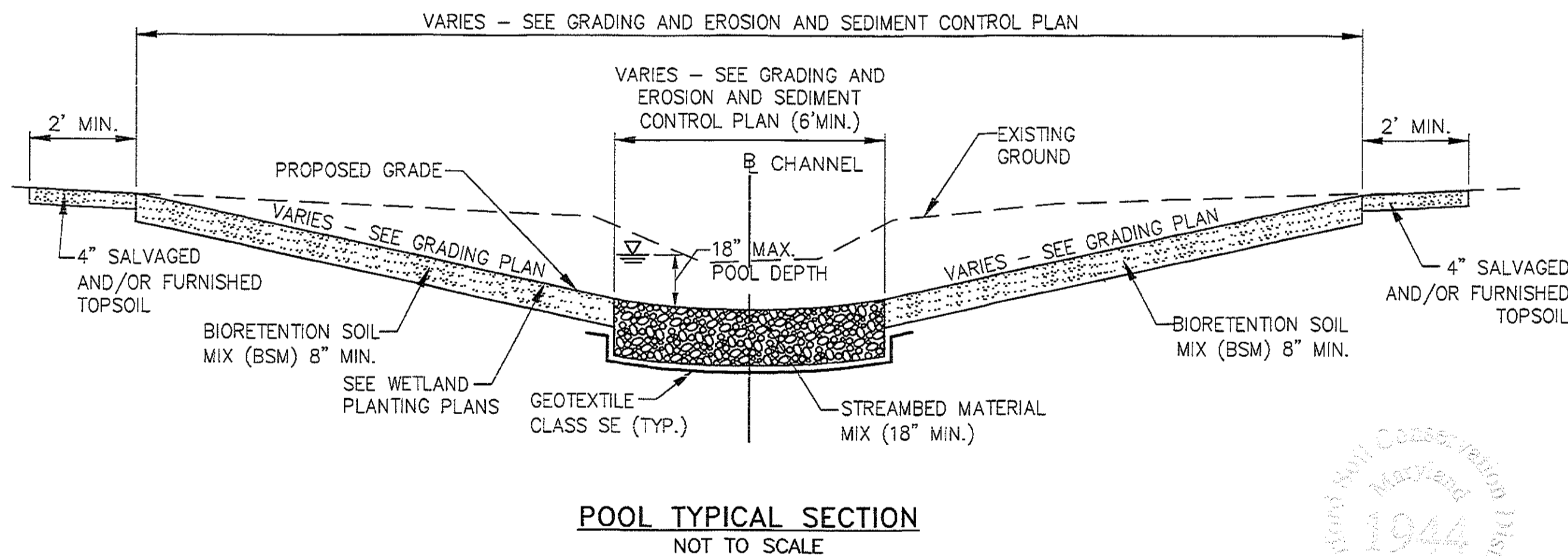
SCALE: HOR. 1"=20'
VER. 1"=5'



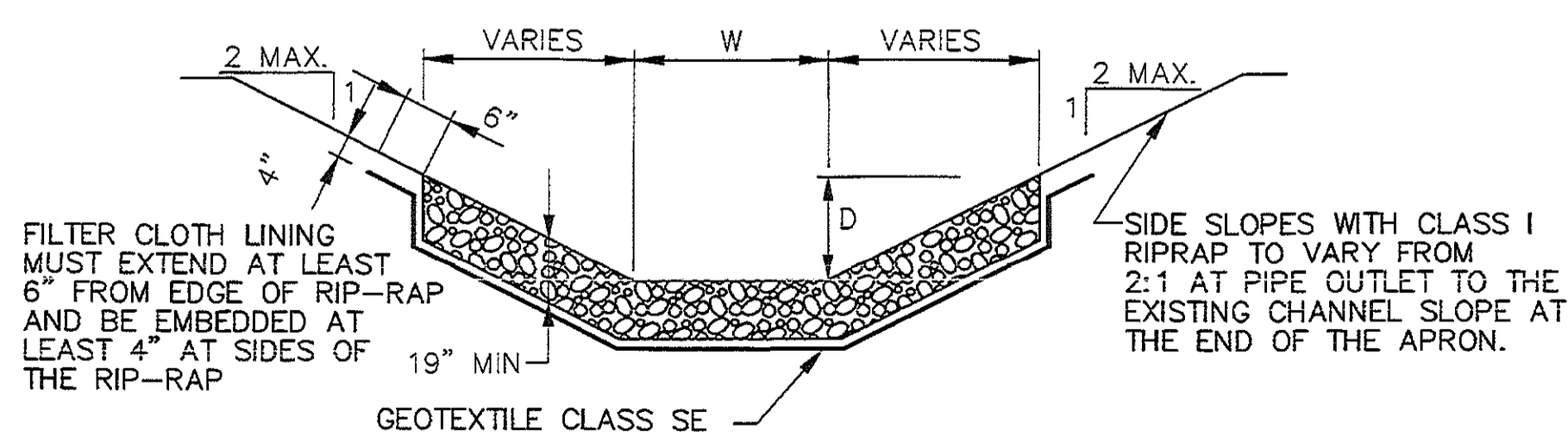
PAVING DETAIL 'A' HMA TRAIL
NOT TO SCALE

LEGEND

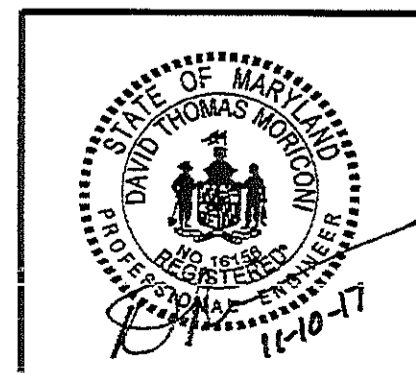
- 4" HOT-MIX ASPHALT SUPERPAVE 12.5mm FOR SURFACE, PG 64-22
- 6" GRADED AGGREGATE SUB-BASE (CR-6)
- TOP OF SUBGRADE AND LIMIT OF CLASS I EXCAVATION



POOL TYPICAL SECTION
NOT TO SCALE



SECTION VIEW CLASS I RIPRAP OUTFALL PROTECTION DETAIL
NOT TO SCALE



PROFESSIONAL CERTIFICATION
"I HEREBY CERTIFY THAT DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. LICENSE NO. 16156. EXPIRATION DATE: 8/28/2018."

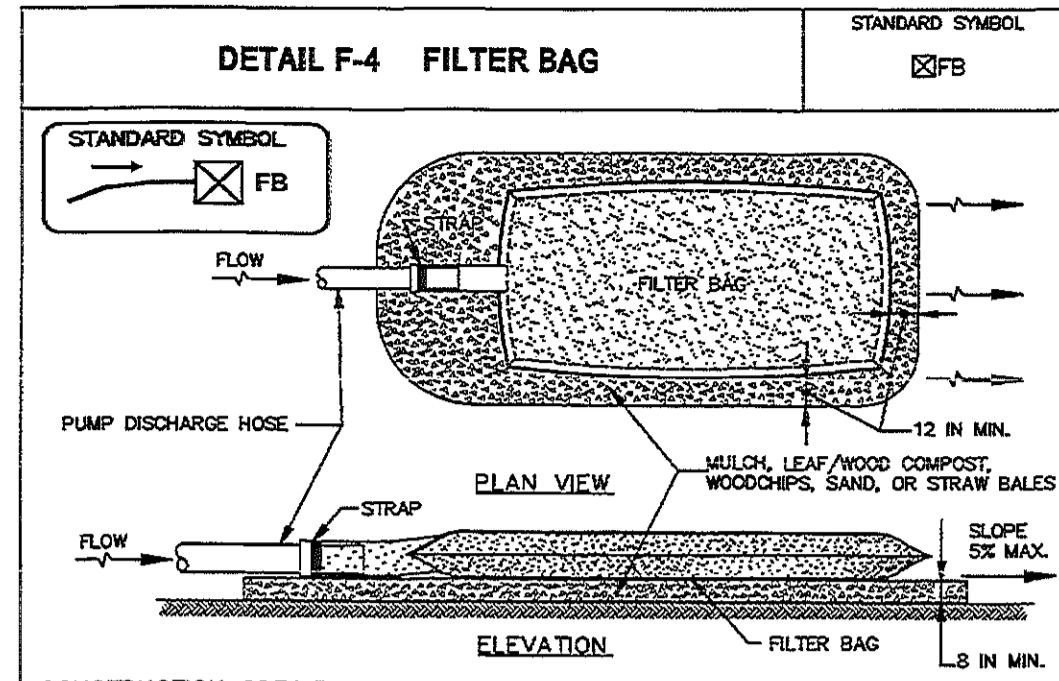
AECOM

Revisions

CITY OF HAVRE DE GRACE
LILLY RUN WETLAND ENHANCEMENT
HARFORD COUNTY, MD
STREAM DETAILS

Drawn By: CDF
Designed By: MAL
Reviewed By: DTM

Scale: _____
Date: JULY, 2017
Sheet: _____ Of _____ D-01

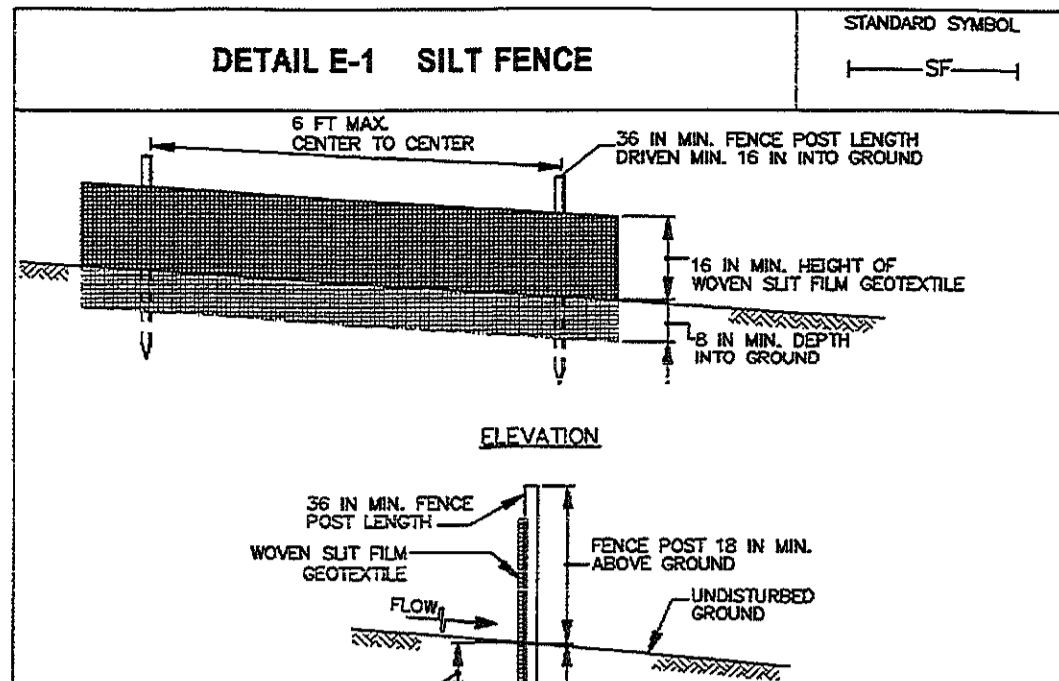


CONSTRUCTION SPECIFICATIONS

- TIGHTLY SEAL SLEEVE AROUND THE PUMP DISCHARGE HOSE WITH A STRAP OR SIMILAR DEVICE.
- PLACE FILTER BAG ON SUITABLE BASE (E.G., MULCH, LEAF/WOOD COMPOST, WOODCHIPS, SAND, OR STRAW BALES) LOCATED ON A LEVEL OR 2% MAXIMUM SLOPING SURFACE. DISCHARGE TO A STABILIZED AREA. EXTEND BASE A MINIMUM OF 12 INCHES FROM EDGES OF BAG.
- CONTROL PUMPING RATE TO PREVENT EXCESSIVE PRESSURE WITHIN THE FILTER BAG IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS. AS THE BAG FILLS WITH SEDIMENT, REDUCE PUMPING RATE.
- REMOVE AND PROPERLY DISPOSE OF FILTER BAG UPON COMPLETION OF PUMPING OPERATIONS OR AFTER BAG HAS REACHED CAPACITY. WHICHEVER OCCURS FIRST. SPREAD THE DEWATERED SEDIMENT FROM THE BAG IN AN APPROVED UPLAND AREA AND STABILIZE WITH SEED AND MULCH BY THE END OF THE WORK DAY. RESTORE THE SURFACE AREA BENEATH THE BAG TO ORIGINAL CONDITION UPON REMOVAL OF THE BAG.
- USE NONWOVEN GEOTEXTILE WITH DOUBLE STITCHED SEAMS USING HIGH STRENGTH THREAD. SIZE SLEVE TO ACCOMMODATE A MAXIMUM 4 INCH DIAMETER PUMP DISCHARGE HOSE. THE BAG MUST BE MANUFACTURED FROM A NONWOVEN GEOTEXTILE THAT MEETS OR EXCEEDS MINIMUM AVERAGE ROLL VALUES (MANY) FOR THE FOLLOWING:

GRAP TENSILE	250 LB	ASTM D-4632
PLUNCURE	150 LB	ASTM D-4633
FLOW RATE	70 GAL/MIN/FT ²	ASTM D-4491
PERMITTIVITY (SEC ²)	1.2 SEC ²	ASTM D-4491
UV RESISTANCE	70% STRENGTH @ 500 HOURS	ASTM D-4355
APPARENT OPENING SIZE (AOS)	0.15-0.18 MM	ASTM D-5751
SEAM STRENGTH	90%	ASTM D-4632
- REPLACE FILTER BAG IF BAG CLOSURES OR HAS RIPS, TEARS, OR PUNCTURES. DURING OPERATION KEEP CONNECTION BETWEEN PUMP HOSE AND FILTER BAG WATER TIGHT. REPLACE BEDDING IF IT BECOMES DISPLACED.

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL		
U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE	2011	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION
F9		

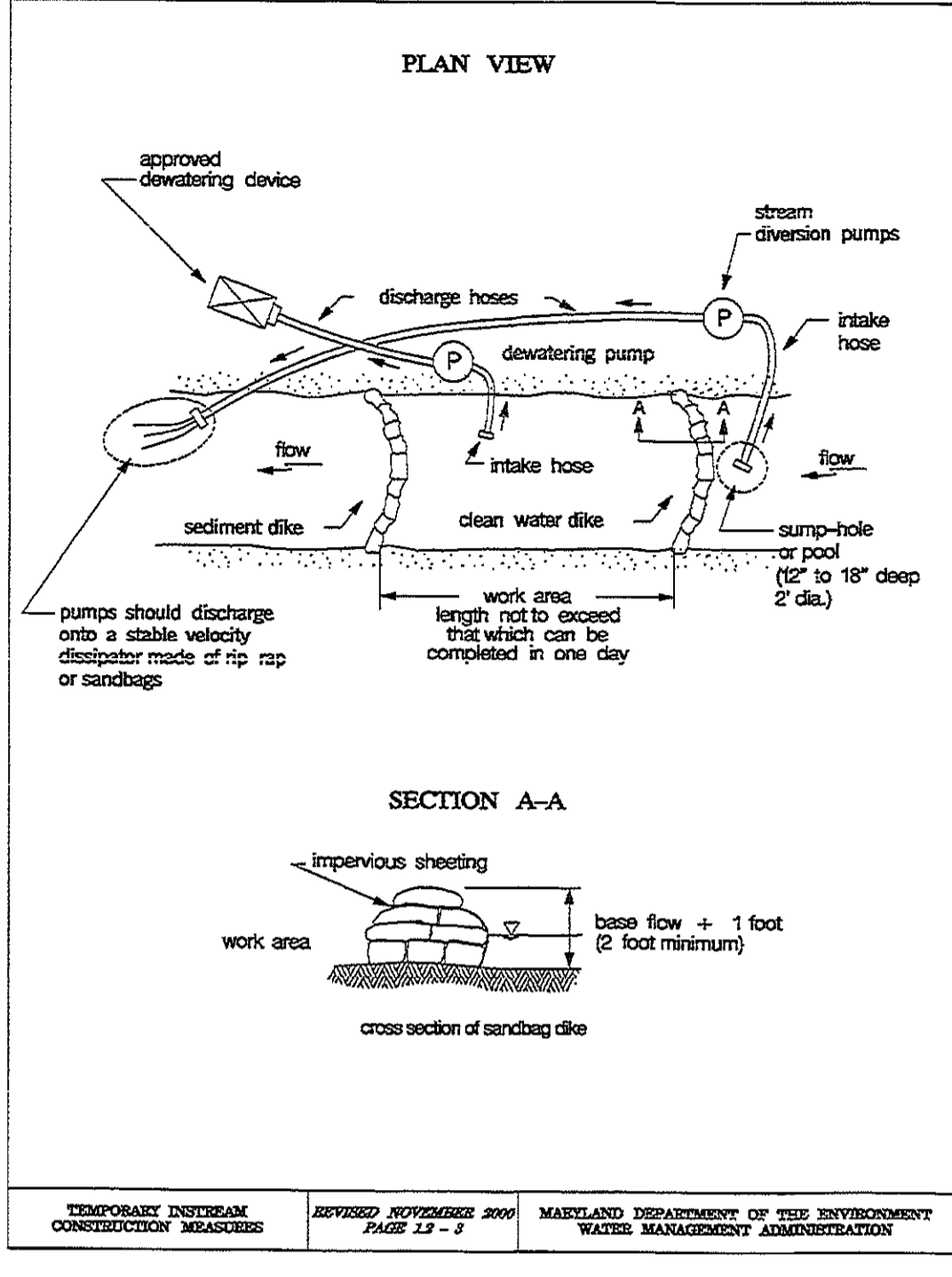


CONSTRUCTION SPECIFICATIONS

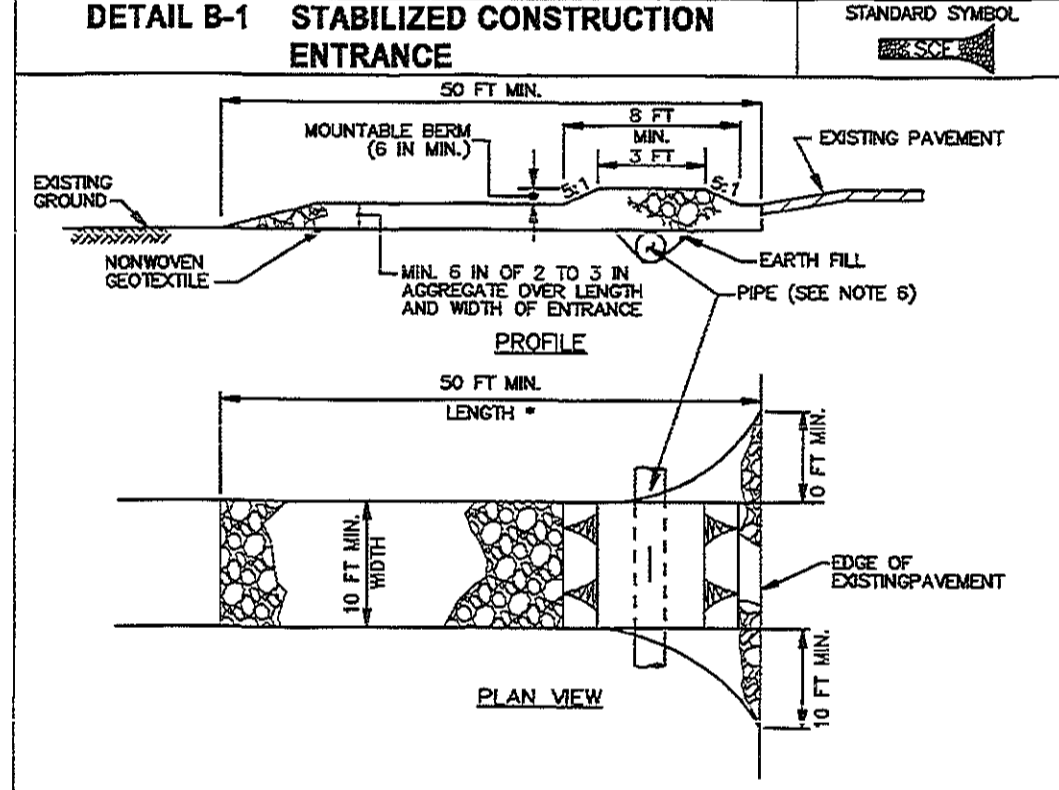
- USE WOOD POSTS 1 1/2 x 1 1/2 x 1/4 INCH (MINIMUM) SQUARE CUT OF SOUND QUALITY HARDWOOD, AS AN ALTERNATIVE TO WOODEN POST USE STANDARD "T" OR "U" SECTION STEEL POSTS WEIGHING NOT LESS THAN 1 POUND PER LINEAR FOOT.
- USE 36 INCH MINIMUM POSTS DRIVEN 16 INCH MINIMUM INTO GROUND NO MORE THAN 6 FEET APART.
- USE WOVEN SILT FILM GEOTEXTILE AS SPECIFIED IN SECTION H-1 MATERIALS AND FASTEN GEOTEXTILE SECURELY TO UPSLOPE SIDE OF FENCE POSTS WITH WIRE TIES OR STAPLES AT TOP AND MID-SECTION.
- PROVIDE MANUFACTURER CERTIFICATION TO THE AUTHORIZED REPRESENTATIVE OF THE INSPECTION/ENFORCEMENT AUTHORITY SHOWING THAT THE GEOTEXTILE USED MEETS THE REQUIREMENTS IN SECTION H-1 MATERIALS.
- EMBED GEOTEXTILE A MINIMUM OF 8 INCHES VERTICALLY INTO THE GROUND. BACKFILL AND COMPACT THE SOIL ON BOTH SIDES OF FABRIC.
- WHERE TWO SECTIONS OF GEOTEXTILE ADJOIN: OVERLAP, TWIST, AND STAPLE TO POST IN ACCORDANCE WITH THIS DETAIL.
- EXTEND BOTH ENDS OF THE SILT FENCE A MINIMUM OF FIVE HORIZONTAL FEET UPSLOPE AT 45 DEGREES TO THE MAIN FENCE ALIGNMENT TO PREVENT RUNOFF FROM GOING AROUND THE ENDS OF THE SILT FENCE.
- REMOVE ACCUMULATED SEDIMENT AND DEBRIS WHEN BULGES DEVELOP IN SILT FENCE OR WHEN SEDIMENT REACHES 25% OF FENCE HEIGHT. REPLACE GEOTEXTILE IF TORN, IF UNDERMINING OCCURS, REINSTALL FENCE.

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL		
U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE	2011	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION
F9		

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



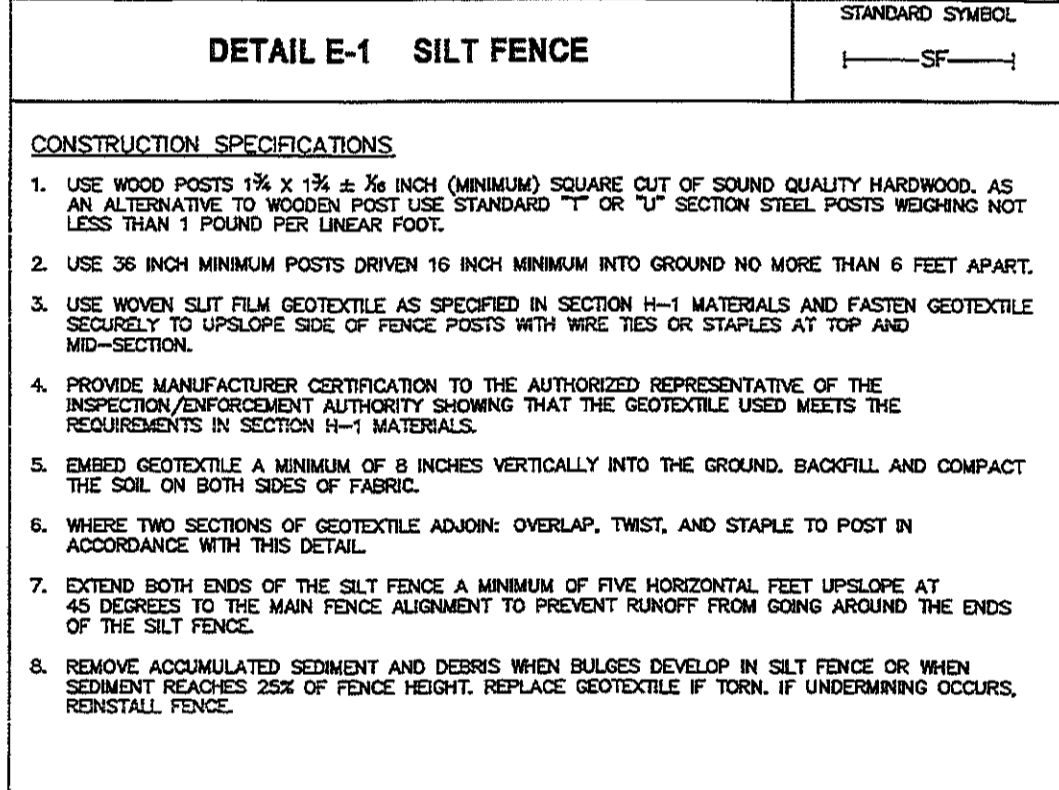
TEMPORARY STREAM CONSTRUCTION MEASURES		REVISED NOVEMBER 2000	MARYLAND DEPARTMENT OF THE ENVIRONMENT WATER MANAGEMENT ADMINISTRATION
PAGE 12 - 8			



CONSTRUCTION SPECIFICATIONS

- PLACE STABILIZED CONSTRUCTION ENTRANCE IN ACCORDANCE WITH THE APPROVED PLAN. VEHICLES MUST TRAVEL OVER THE ENTIRE LENGTH OF THE SIZE. USE MINIMUM LENGTH OF 50 FEET (100 FEET FOR SINGLE RESIDENCE LOT). USE MINIMUM WIDTH OF 10 FEET. FLARE SIZE TO FEET MINIMUM AT THE EXISTING ROAD TO PROVIDE A TURNING RADIUS.
- PIPE ALL SURFACE WATER FLOWING TO OR DIVERTED TOWARD THE SIDE UNDER THE ENTRANCE. MAINTAINING POSITIVE DRAINAGE. PROTECT PIPE INSTALLED THROUGH THE SIDE WITH A MOUNTABLE BERM WITH 5:1 SLOPES AND A MINIMUM OF 12 INCHES OF STONE OVER THE PIPE. PROVIDE PIPE AS SPECIFIED ON APPROVED PLAN. WHEN THE SIZE IS LOCATED AT A HIGH SPOT AND HAS NO DRAINAGE TO CONVEY, A PIPE IS NOT NECESSARY. A MOUNTABLE BERM IS REQUIRED WHEN SIZE IS NOT LOCATED AT A HIGH SPOT.
- PREPARE SUBGRADE AND PLACE NONWOVEN GEOTEXTILE, AS SPECIFIED IN SECTION H-1 MATERIALS.
- PLACE CRUSHED AGGREGATE (2 TO 3 INCHES IN SIZE) OR EQUIVALENT RECYCLED CONCRETE (WITHOUT REBAR) AT LEAST 6 INCHES DEEP OVER THE LENGTH AND WIDTH OF THE SIZE.
- MAINTAIN ENTRANCE IN A CONDITION THAT MINIMIZES TRACKING OF SEDIMENT. ADD STONE OR MAKE OTHER REPAIRS AS CONDITIONS DEMAND TO MAINTAIN CLEAN SURFACE. MOUNTABLE BERM, AND SPECIFIED DIMENSIONS. IMMEDIATELY REMOVE STONE AND/OR SEDIMENT SPILLED, DROPPED, OR TRACKED ONTO ADJACENT ROADWAY BY VACUUMING, SCRAPING, AND/OR SWEEPING. WASHING ROADWAY TO REMOVE MUD TRACKED ONTO PAVEMENT IS NOT ACCEPTABLE UNLESS WASH WATER IS DIRECTED TO AN APPROVED SEDIMENT CONTROL PRACTICE.

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL		
U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE	2011	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION
F9		



CONSTRUCTION SPECIFICATIONS

- USE WOOD POSTS 1 1/2 x 1 1/2 x 1/4 INCH (MINIMUM) SQUARE CUT OF SOUND QUALITY HARDWOOD, AS AN ALTERNATIVE TO WOODEN POST USE STANDARD "T" OR "U" SECTION STEEL POSTS WEIGHING NOT LESS THAN 1 POUND PER LINEAR FOOT.
- USE 36 INCH MINIMUM POSTS DRIVEN 16 INCH MINIMUM INTO GROUND NO MORE THAN 6 FEET APART.
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- PROVIDE MANUFACTURER CERTIFICATION TO THE AUTHORIZED REPRESENTATIVE OF THE INSPECTION/ENFORCEMENT AUTHORITY SHOWING THAT THE GEOTEXTILE USED MEETS THE REQUIREMENTS IN SECTION H-1 MATERIALS.
- EMBED GEOTEXTILE A MINIMUM OF 8 INCHES VERTICALLY INTO THE GROUND. BACKFILL AND COMPACT THE SOIL ON BOTH SIDES OF FABRIC.
- WHERE TWO SECTIONS OF GEOTEXTILE ADJOIN: OVERLAP, TWIST, AND STAPLE TO POST IN ACCORDANCE WITH THIS DETAIL.
- EXTEND BOTH ENDS OF THE SILT FENCE A MINIMUM OF FIVE HORIZONTAL FEET UPSLOPE AT 45 DEGREES TO THE MAIN FENCE ALIGNMENT TO PREVENT RUNOFF FROM GOING AROUND THE ENDS OF THE SILT FENCE.
- REMOVE ACCUMULATED SEDIMENT AND DEBRIS WHEN BULGES DEVELOP IN SILT FENCE OR WHEN SEDIMENT REACHES 25% OF FENCE HEIGHT. REPLACE GEOTEXTILE IF TORN, IF UNDERMINING OCCURS, REINSTALL FENCE.

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL		
U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE	2011	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION
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MGWC 1.2: PUMP-AROUND PRACTICE

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

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 rights-of-way 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 owner'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 make 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 trees within the limits of disturbance which will be removed for construction access. Trees should not be removed within the limits 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 construction 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 the pump-around removed from the channel. Work should not be conducted in the channel during rain events.
- Sanding 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 STREAM CONSTRUCTION MEASURES		REVISED NOVEMBER 2000	MARYLAND DEPARTMENT OF THE ENVIRONMENT WATER MANAGEMENT ADMINISTRATION
PAGE 12 - 1			

AS-BUILT CERTIFICATION

I HEREBY CERTIFY THAT THE FACILITY SHOWN ON THIS PLAN WAS CONSTRUCTED AS SHOWN ON THE "AS-BUILT" PLAN AND MEETS THE APPROVED PLANS AND SPECIFICATIONS.

SIGNATURE _____ DATE _____

P.E. NO. _____

CERTIFY MEANS TO STATE OR DECLARE A PROFESSIONAL OPINION BASED UPON ON-SITE INSPECTIONS AND MATERIAL TESTS WHICH ARE CONDUCTED DURING CONSTRUCTION. THE ON-SITE INSPECTIONS AND MATERIAL TESTS ARE THOSE INSPECTIONS AND TESTS DEEMED SUFFICIENT AND APPROPRIATE BY COMMONLY ACCEPTED ENGINEERING STANDARDS. CERTIFY DOES NOT MEAN OR IMPLY A GUARANTEE BY THE ENGINEER NOR DOES AN ENGINEER'S CERTIFICATION RELIEVE ANY OTHER PARTY FROM MEETING REQUIREMENTS IMPOSED BY CONTRACT, EMPLOYMENT, OR OTHER MEANS, INCLUDING MEETING COMMONLY ACCEPTED INDUSTRY PRACTICES.

ENGINEER'S CERTIFICATION

I HEREBY CERTIFY THAT THIS PLAN HAS BEEN PREPARED BY ME OR UNDER MY SUPERVISION AND MEETS THE MINIMUM STANDARDS OF THE HARFORD COUNTY DEPARTMENT OF PUBLIC WORKS AND/OR THE U.S. DEPARTMENT OF AGRICULTURE - SOIL CONSERVATION SERVICE AND/OR THE MARYLAND DEPARTMENT OF NATURAL RESOURCES, WATER RESOURCES ADMINISTRATION.

SIGNATURE _____ DATE 11-10-17

P.E. NO. 16156

DEVELOPER'S OWNER'S CERTIFICATION

I/ WE HEREBY CERTIFY THAT ALL PROPOSED WORK SHOWN ON THESE CONSTRUCTION DRAWINGS AND ON THE APPROVED SEDIMENT CONTROL DRAWINGS WILL BE ACCOMPLISHED PURSUANT TO THESE PLANS. I/ WE UNDERSTAND THAT IT IS MY/ OUR RESPONSIBILITY TO HAVE THE CONSTRUCTION SUPERVISED AND CERTIFIED INCLUDING THE SUBMITTAL AND COUNTY APPROVAL OF "AS BUILT" PLANS WITHIN 30 DAYS OF COMPLETION BY A REGISTERED CERTIFIED PROFESSIONAL ENGINEER.

SIGNATURE _____ DATE _____

PROFESSIONAL CERTIFICATION

I HEREBY CERTIFY THAT DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 16156, EXPIRATION DATE: 8/28/2018.

AECOM

CITY OF HAVRE DE GRACE

LILLY RUN WETLAND ENHANCEMENT
HARFORD COUNTY, MD
EROSION & SEDIMENT CONTROL DETAILS

Drawn By: CFD Scale: _____
Designed By: MAL Date: JULY, 2017
Reviewed By: DTM Sheet of _____ D-02

TEMPORARY VEGETATION STABILIZATION

A) SEEDBED PREPARATION:
LOOSEN UPPER THREE INCHES BY DISCING, RAKING OR OTHER ACCEPTABLE MEANS.

B) SOIL AMENDMENTS:
APPLY 600 LBS. PER ACRE OF 10-10-10 FERTILIZER AND TWO TONS PER ACRE OF LIME.

C) SEEDING:
FOR PERIOD OF MARCH 11 TO APRIL 30 AND AUGUST 15 TO NOVEMBER 15, SEED WITH 2.5 LB. PER ACRE OF GENERAL RYE PLUS 50 LBS. PER ACRE OF TALL FESCUE PLUS 10 LBS. PER ACRE OF REDTOP OR 20 LBS. PER ACRE OF PERENNIAL RYEGRASS.
FOR PERIODS OF MAY 1 TO AUGUST 14, SEED WITH 3 LBS. PER ACRE OF WEEPING LOVEGRASS OR 40 LBS. PER ACRE OF JAPANESE OR FORTAIL MILLET.
FOR PERIODS OF NOVEMBER 16 TO FEBRUARY 28, PROTECT THE SITE BY APPLYING TWO TONS PER ACRE OF WELL ANCHORED STRAW MULCH AND SEED AS SOON AS POSSIBLE IN THE SPRING, OR USE SOD.

D) MULCHING SPECIFICATIONS:
MULCH SHALL BE APPLIED TO ALL SEEDED AREAS IMMEDIATELY AFTER SEEDING.
APPLY TWO TONS PER ACRE OF STRAW OVER ALL SEEDED AREAS. IF A MULCH ANCHORING TOOL IS TO BE USED, THE RATE SHALL BE INCREASED 2.5 TONS PER ACRE.
MULCH ANCHORING SHALL BE PERFORMED IMMEDIATELY FOLLOWING MULCH APPLICATION TO MINIMIZE LOSS BY WIND AND WATER. THE MULCH ANCHORING TOOL USED MUST COMPLY WITH THE 1994 MARYLAND STANDARDS AND SPECIFICATIONS.
IF OTHER SEED MIXES ARE TO BE SUBSTITUTED, THEY MUST COMPLY WITH THE 1994 MARYLAND STANDARDS AND SPECIFICATIONS, CHAPTER 20, TABLE 25.
IF A DIFFERENT TYPE OF MULCH IS TO BE USED, IT MUST COMPLY WITH THE 1994 MARYLAND STANDARDS AND SPECIFICATIONS, CHAPTER 20.

PERMANENT VEGETATIVE STABILIZATION

A) SEEDBED PREPARATION:
LOOSEN UPPER THREE INCHES BY DISCING, RAKING OR OTHER ACCEPTABLE MEANS AFTER SPREADING FOUR INCHES OF TOP SOIL.

B) SOIL AMENDMENTS:
APPLY 500 LBS. PER ACRE OF 10-10-10 FERTILIZER AND TWO TONS PER ACRE OF LIME.

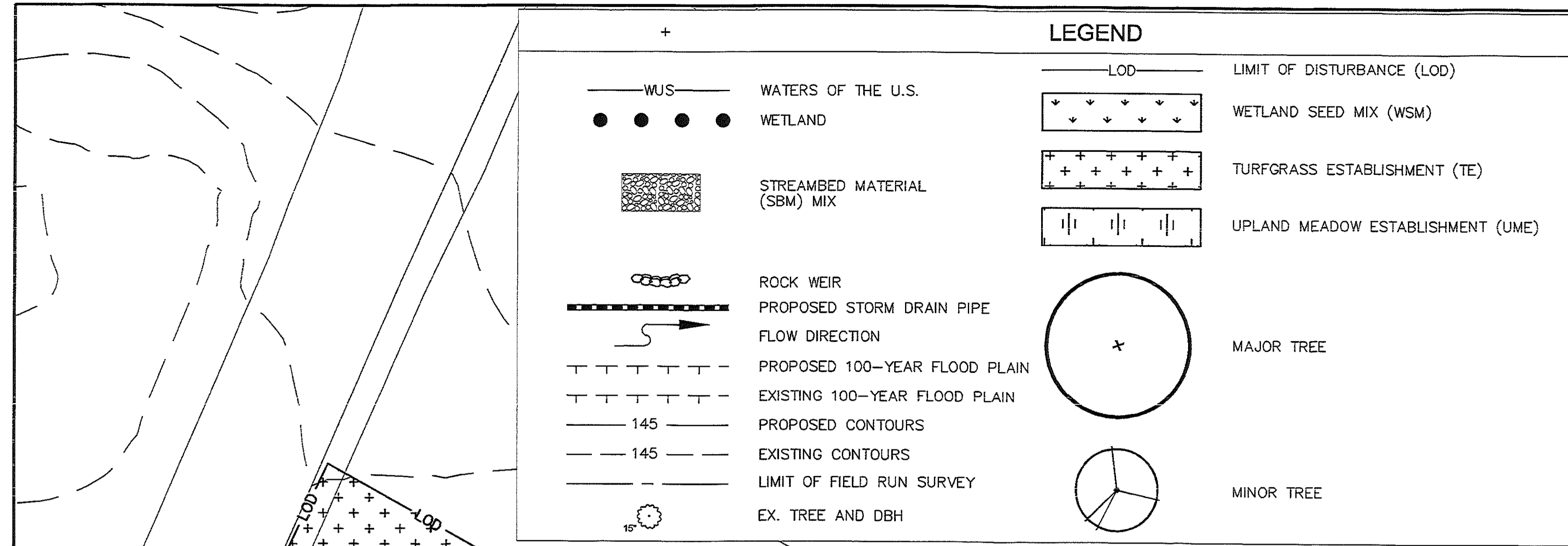
C) SEEDING:
FOR PERIOD OF MARCH 1 TO MAY 15 AND AUGUST 15 TO OCTOBER 15, SEED WITH 125 LBS. PER ACRE OF TALL FESCUE, 15 LBS. PER ACRE OF PERENNIAL RYEGRASS, AND 10 LBS. OF KENTUCKY BLUEGRASS.
FOR PERIODS OF MAY 16 TO AUGUST 14, SEED WITH 110 LBS. PER ACRE OF TALL FESCUE AND 3 LBS. PER ACRE OF WEEPING LOVEGRASS.
FOR PERIODS OF OCTOBER 16 TO FEBRUARY 28, PROTECT THE SITE BY OPTIONS (1) 2 TONS PER ACRE OF WELL ANCHORED STRAW MULCH AND SEED AS SOON AS POSSIBLE IN THE SPRING, (2) USE SOD OR (3) SEED WITH 50 LBS. PER ACRE OF TALL FESCUE AND MULCH WITH 2 TONS OF WELL ANCHORED STRAW.
NOTE: FOR QUICK COVER WITH TALL FESCUE, ADD 2 LBS. OF SMALL GRAIN PER 1000 SQ. FT.

D) MULCHING SPECIFICATIONS:
MULCH SHALL BE APPLIED TO ALL SEEDED AREAS IMMEDIATELY AFTER SEEDING.
APPLY 2 TONS PER ACRE OF STRAW OVER ALL SEEDED AREAS. IF A MULCH ANCHORING TOOL IS TO BE USED, THE RATE SHALL BE INCREASED 2.5 TONS PER ACRE.
MULCH ANCHORING SHALL BE PERFORMED IMMEDIATELY FOLLOWING MULCH APPLICATION TO MINIMIZE LOSS BY WIND AND WATER. THE TYPE OF MULCH ANCHORING TOOL USED MUST COMPLY WITH THE 1994 MARYLAND STANDARDS AND SPECIFICATIONS.
IF OTHER SEED MIXES ARE TO BE SUBSTITUTED, THEY MUST COMPLY WITH THE 1994 MARYLAND STANDARDS AND SPECIFICATIONS, CHAPTER 20, TABLE 25.
IF A DIFFERENT TYPE OF MULCH IS TO BE USED, IT MUST COMPLY WITH THE 1994 MARYLAND STANDARDS AND SPECIFICATIONS, CHAPTER 20.

**SITE ANALYSIS
(NOT FOR BIDDING PURPOSES)**

TOTAL DISTURBED AREA	<u>2.06 ACRES</u>
TOTAL AREA TO BE PAVED	<u>0.01 ACRES</u>
TOTAL CUT	<u>1300 CU. YD.</u>
TOTAL FILL	<u>100 CU. YD.</u>
HPDES I.D. POINT	<u>N 595.734 SO E 1,566,354.12</u>

EROSION AND SEDIMENT CONTROL	
PLAN#	_____
RECOMMENDED FOR APPROVAL:	
HARV DE GRACE DPW	
TECHNICAL CONCURRENCE:	
HARFORD SOIL CONSERVATION DISTRICT	
APPROVED:	
HARFORD SOIL CONSERVATION DISTRICT	

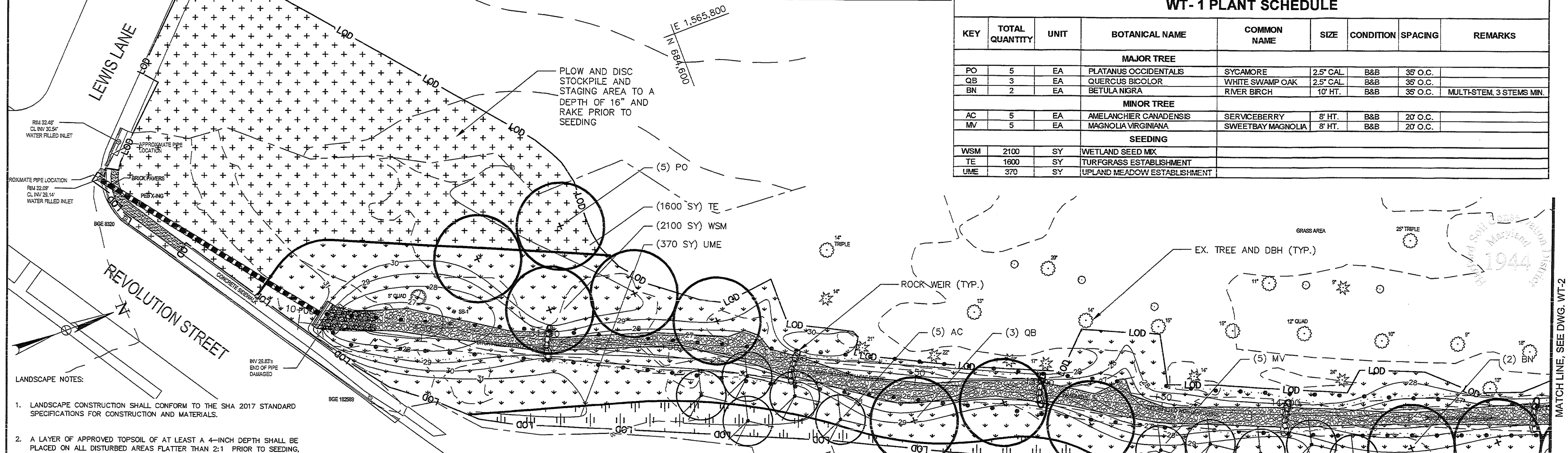


MASTER PLANT SCHEDULE

KEY	TOTAL QUANTITY	UNIT	BOTANICAL NAME	COMMON NAME	SIZE	CONDITION	SPACING	REMARKS
MAJOR TREE								
PO	11	EA	PLATANUS OCCIDENTALIS	SYCAMORE	2.5" CAL.	B&B	35' O.C.	
QB	7	EA	QUERCUS BICOLOR	WHITE SWAMP OAK	2.5" CAL.	B&B	35' O.C.	
BN	8	EA	BETULA NIGRA	RIVER BIRCH	10' HT.	B&B	35' O.C.	MULTI-STEM, 3 STEMS MIN.
MINOR TREE								
AC	16	EA	AMELANCHIER CANADENSIS	SERVICEBERRY	8' HT.	B&B	20' O.C.	
MV	17	EA	MAGNOLIA VIRGINIANA	SWEETBAY MAGNOLIA	8' HT.	B&B	20' O.C.	
SEEDING								
WSM	5400	SY	WETLAND SEED MIX					
TE	2000	SY	TURFGRASS ESTABLISHMENT					
UME	970	SY	UPLAND MEADOW ESTABLISHMENT					

WT-1 PLANT SCHEDULE

KEY	TOTAL QUANTITY	UNIT	BOTANICAL NAME	COMMON NAME	SIZE	CONDITION	SPACING	REMARKS
MAJOR TREE								
PO	5	EA	PLATANUS OCCIDENTALIS	SYCAMORE	2.5" CAL.	B&B	35' O.C.	
QB	3	EA	QUERCUS BICOLOR	WHITE SWAMP OAK	2.5" CAL.	B&B	35' O.C.	
BN	2	EA	BETULA NIGRA	RIVER BIRCH	10' HT.	B&B	35' O.C.	MULTI-STEM, 3 STEMS MIN.
MINOR TREE								
AC	5	EA	AMELANCHIER CANADENSIS	SERVICEBERRY	8' HT.	B&B	20' O.C.	
MV	5	EA	MAGNOLIA VIRGINIANA	SWEETBAY MAGNOLIA	8' HT.	B&B	20' O.C.	
SEEDING								
WSM	2100	SY	WETLAND SEED MIX					
TE	1600	SY	TURFGRASS ESTABLISHMENT					
UME	370	SY	UPLAND MEADOW ESTABLISHMENT					

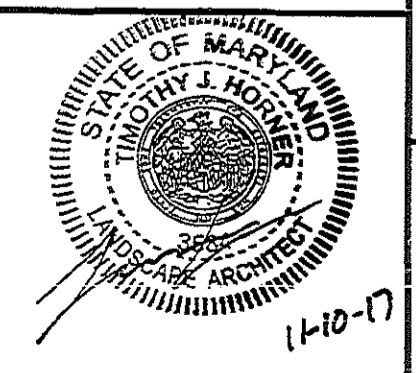
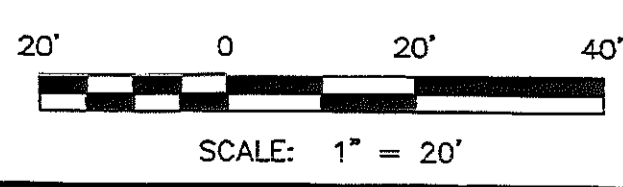


- LANDSCAPE NOTES:
- LANDSCAPE CONSTRUCTION SHALL CONFORM TO THE SHA 2017 STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MATERIALS.
 - A LAYER OF APPROVED TOPSOIL OF AT LEAST A 4-INCH DEPTH SHALL BE PLACED ON ALL DISTURBED AREAS FLATTER THAN 2:1 PRIOR TO SEEDING, UNLESS OTHERWISE SPECIFIED (SEE TYPICAL SECTIONS FOR ADDITIONAL INFORMATION).
 - TURFGRASS ESTABLISHMENT SHALL BE PERFORMED IN ALL DISTURBED AREAS, OR WITHIN THE AREAS INDICATED IN THE PLANS, IN CONFORMANCE WITH SECTION 705 OF THE SHA STANDARD SPECIFICATIONS. THE REQUIRED APPLICATION RATE OF 20-16-12 FERTILIZER SHALL BE 200 LBS PER ACRE, AND NO FERTILIZER SHALL BE APPLIED FROM NOVEMBER 15 TO MARCH 1.
 - MEADOW ESTABLISHMENT OR WETLAND SEED MIX SHALL BE PERFORMED IN AREAS AS INDICATED IN THE PLANS, IN CONFORMANCE WITH SECTIONS 706 AND 707 OF THE SHA STANDARD SPECIFICATIONS.
 - DEBRIS RELATED TO THE DEMOLITION OF SIDEWALKS, DRIVEWAYS, CURBS, TREES, STUMPS, ROOTS, FENCING, PIPES AND OTHER MATERIALS THAT MAY INTERFERE WITH LANDSCAPE INSTALLATION OR FUTURE MAINTENANCE SHALL BE EXCAVATED AS NECESSARY FOR THEIR COMPLETE REMOVAL AND DISPOSAL.
 - THE INSTALLATION OF TREES, SHRUBS, PLANTING BEDS AND OTHER LANDSCAPE CONSTRUCTION RELATED TO SECTION 710 OF THE SHA STANDARD SPECIFICATIONS SHALL CONFORM TO THE SHA BOOK OF STANDARDS FOR HIGHWAY & INCIDENTAL STRUCTURES - CATEGORY 7.
 - TREES AND OTHER PLANT MATERIAL INSTALLATION. TREES, SHRUBS, PERENNIALS, ANNUALS, BULBS, LANDSCAPE BEDS, BARK MULCH AND SIMILAR MATERIALS SHALL BE INSTALLED IN CONFORMANCE WITH SECTION 710 AND 711 OF THE SHA STANDARD SPECIFICATIONS. TREE AND SHRUBS SHALL BE PRUNED AT THE TIME OF INSTALLATION TO ENSURE SIDEWALK CLEARANCE FOR PEDESTRIANS IS MAINTAINED TO A HEIGHT OF 8 FEET. NO TREE OR SHRUB SHALL BE INSTALLED WITHIN 3 FEET OF CURBS, SIDEWALKS OR PAVEMENT EDGES.

WETLAND SEED MIX

COMMON NAME	BOTANICAL NAME	INDICATOR STATUS	RATE
SHALLOW SEDGE	CAREX LURIDA	OBL	3 LBS/AC
FOX SEDGE	CAREX VULPINOIDEA	OBL	3 LBS/AC
SWITCH GRASS	PANICUM VIRGATUM	FAC	2 LBS/AC
VIRGINIA WILDRYE	ELYMUS VIRGINICUS	FACW	2 LBS/AC
RIVERBANK WILD RYE	ELYMUS RIPARIUS	FACW	2 LBS/AC
FOWL MANNAGRASS	GLYCERIA STRIATA	OBL	2 LBS/AC
COMMON RUSH	JUNCUS EFFUSUS	FACW+	3 LBS/AC
JEWELWEED	IMPATIENS CAPENSIS	FACW	2 LBS/AC
TRUMPETWEED	EUPATORIUM DELPHIUM FISTULOSUS	FACW	2 LBS/AC
NEW YORK IRONWEED	VERNONIA NOVEBORACENSIS	FACW+	2 LBS/AC
SWAMP MILKWEED	ASCLEPIUS INCARNATA	OBL	2 LBS/AC
COMMON BONESET	EUPATORIUM PERFOLIATUM	FACW+	2 LBS/AC
CARDINALFLOWER	LOBELIA CARDINALIS	FACW+	2 LBS/AC
SEEDBOX	LUDWIGIA ALTERNIFOLIA	FACW+	2 LBS/AC

NOTE: THE CONTRACTOR SHALL NEITHER APPLY NOR EMPLOY LIME, FERTILIZER, OR OTHER AMENDMENTS.



CITY OF HAVRE DE GRACE
LILLY RUN WETLAND ENHANCEMENT
HARFORD COUNTY, MD
WETLAND PLANTING PLAN

Revisions: _____

Drawn By: _____ TH _____ Scale: _____

Designed By: _____ TH _____ Date: JULY, 2017

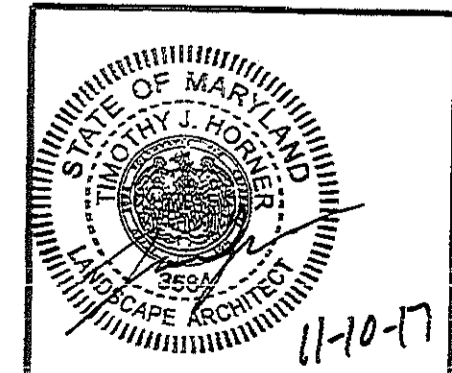
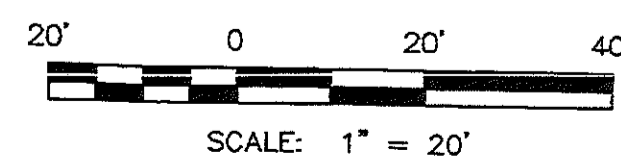
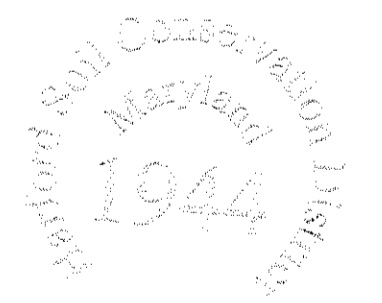
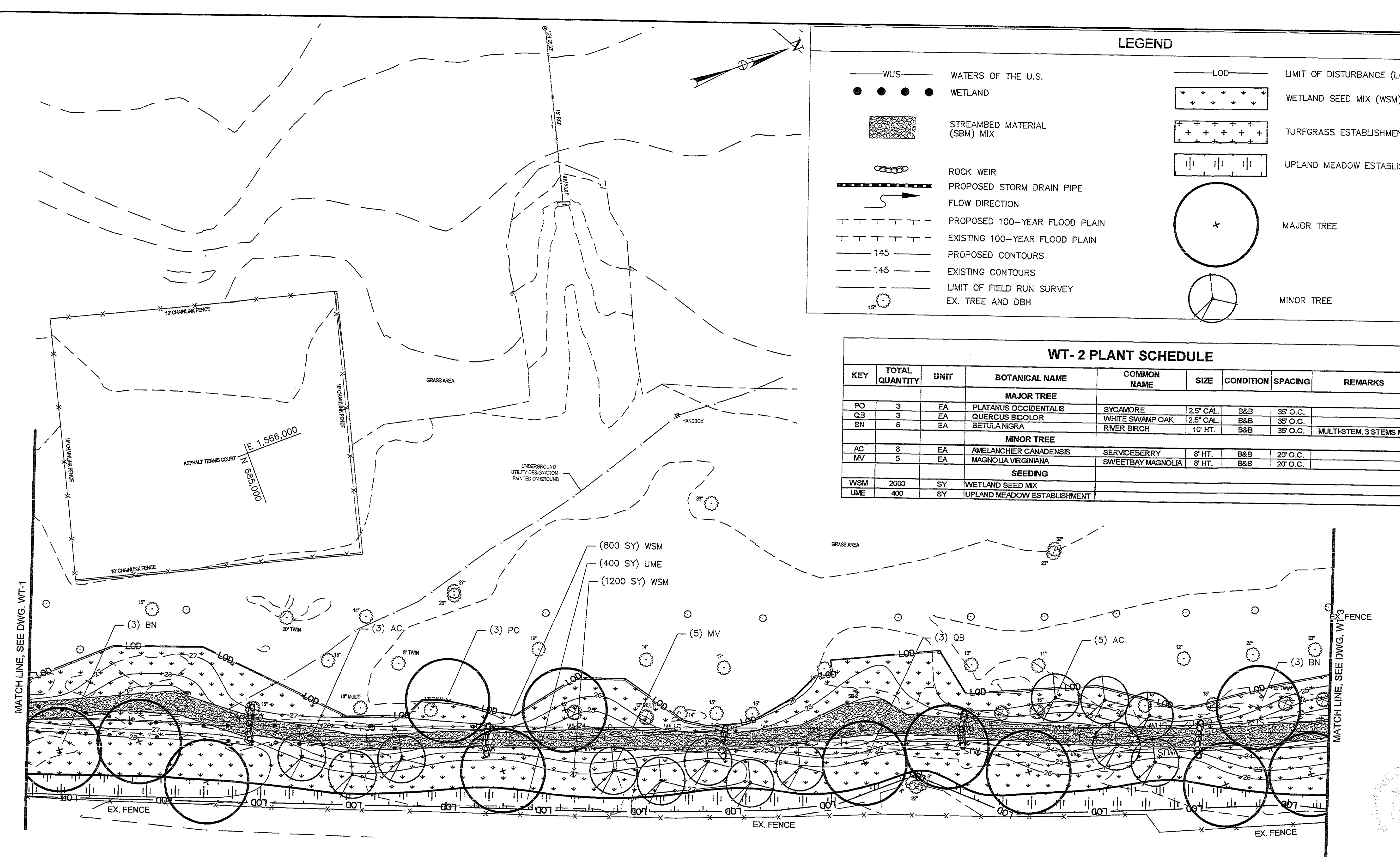
Reviewed By: _____ RK _____ Sheet _____ of _____ WT-1

LEGEND

- WUS — WATERS OF THE U.S.
- • • • WETLAND
- [Stippled Area] STREAMBED MATERIAL (SBM) MIX
- [Rock Weir Symbol] ROCK WEIR
- [Dashed Line with Arrow] PROPOSED STORM DRAIN PIPE
- [Arrow] FLOW DIRECTION
- [Dashed Line] PROPOSED 100-YEAR FLOOD PLAIN
- [Dashed Line] EXISTING 100-YEAR FLOOD PLAIN
- - - 145 - - - PROPOSED CONTOURS
- - - 145 - - - EXISTING CONTOURS
- [Dashed Line] LIMIT OF FIELD RUN SURVEY
- [Circle with 15"] EX. TREE AND DBH
- LOD — LIMIT OF DISTURBANCE (LOD)
- [Downward Arrows] WETLAND SEED MIX (WSM)
- [Plus Signs] TURFGRASS ESTABLISHMENT (TE)
- [Vertical Lines] UPLAND MEADOW ESTABLISHMENT (UME)
- [Circle with X] MAJOR TREE
- [Circle with 3 Lines] MINOR TREE

WT-2 PLANT SCHEDULE

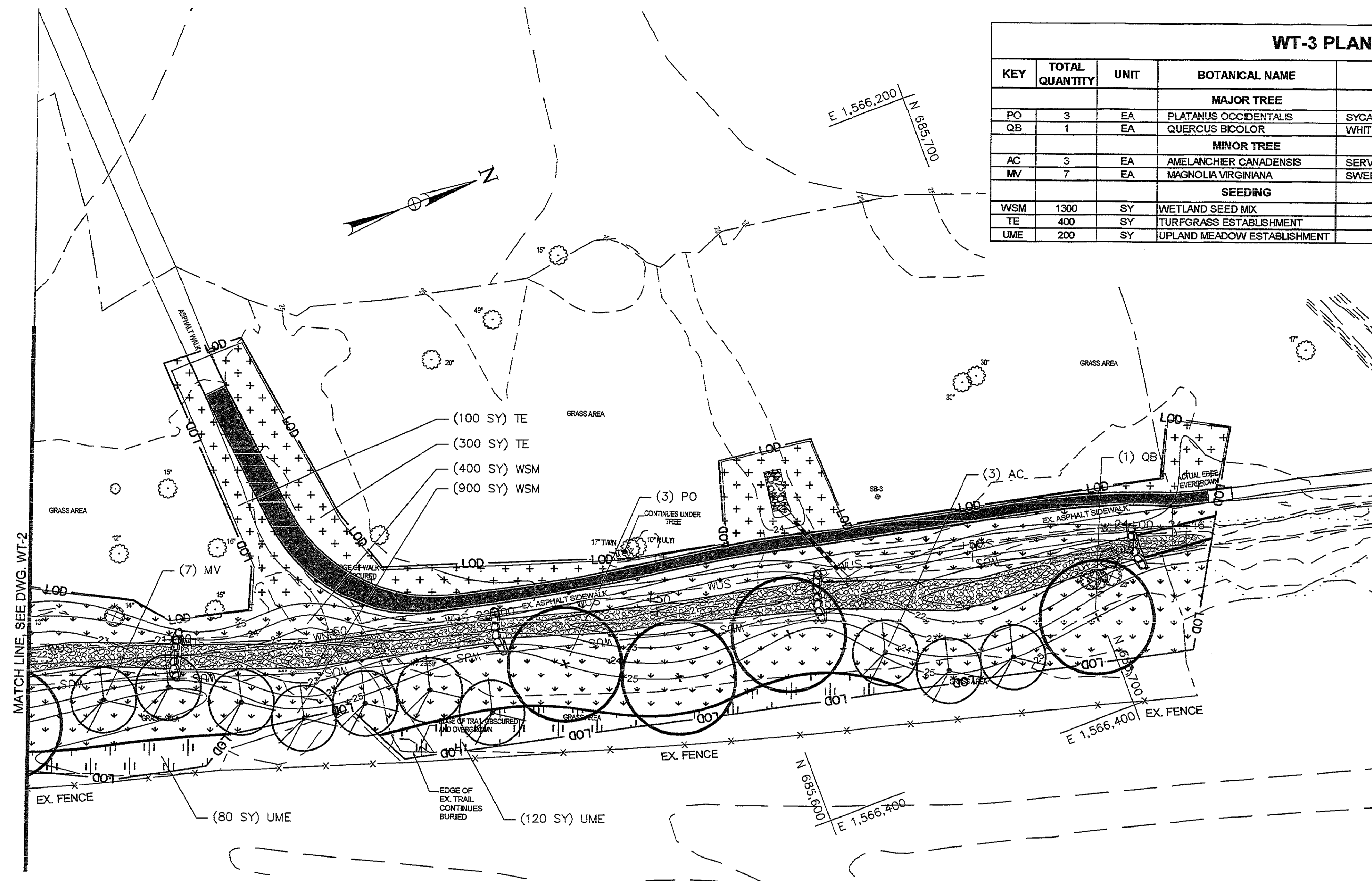
KEY	TOTAL QUANTITY	UNIT	BOTANICAL NAME	COMMON NAME	SIZE	CONDITION	SPACING	REMARKS
MAJOR TREE								
PO	3	EA	PLATANUS OCCIDENTALIS	SYCAMORE	2.5" CAL.	B&B	35' O.C.	
QB	3	EA	QUERCUS BICOLOR	WHITE SWAMP OAK	2.5" CAL.	B&B	35' O.C.	
BN	6	EA	BETULA NIGRA	RIVER BIRCH	10' HT.	B&B	35' O.C.	MULTI-STEM, 3 STEMS MIN.
MINOR TREE								
AC	8	EA	AMELANCHIER CANADENSIS	SERVICEBERRY	8' HT.	B&B	20' O.C.	
MV	5	EA	MAGNOLIA VIRGINIANA	SWEETBAY MAGNOLIA	8' HT.	B&B	20' O.C.	
SEEDING								
WSM	2000	SY	WETLAND SEED MIX					
UME	400	SY	UPLAND MEADOW ESTABLISHMENT					



AECOM

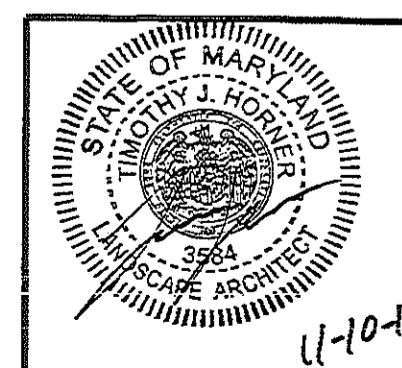
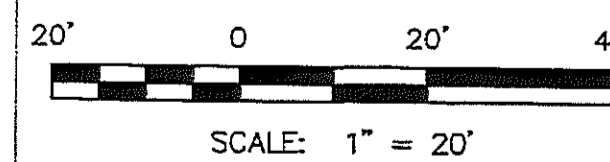
	Revisions		CITY OF HAVRE DE GRACE LILLY RUN WETLAND ENHANCEMENT HARFORD COUNTY, MD WETLAND PLANTING PLAN
Drawn By:	TH	Scale:	
Designed By:	TH	Date:	JULY, 2017
Reviewed By:	RK	Sheet	___ of ___ WT-2

WT-3 PLANT SCHEDULE									
KEY	TOTAL QUANTITY	UNIT	BOTANICAL NAME	COMMON NAME	SIZE	CONDITION	SPACING	REMARKS	
MAJOR TREE									
PO	3	EA	PLATANUS OCCIDENTALIS	SYCAMORE	2.5" CAL.	B&B	35' O.C.		
QB	1	EA	QUERCUS BICOLOR	WHITE SWAMP OAK	2.5" CAL.	B&B	35' O.C.		
MINOR TREE									
AC	3	EA	AMELANCHIER CANADENSIS	SERVICEBERRY	8' HT.	B&B	20' O.C.		
MV	7	EA	MAGNOLIA VIRGINIANA	SWEETBAY MAGNOLIA	8' HT.	B&B	20' O.C.		
SEEDING									
WSM	1300	SY	WETLAND SEED MIX						
TE	400	SY	TURFGRASS ESTABLISHMENT						
UME	200	SY	UPLAND MEADOW ESTABLISHMENT						



LEGEND

- | | | | |
|-------------|-------------------------------|---------|-----------------------------------|
| — WUS — | WATERS OF THE U.S. | LOD | LIMIT OF DISTURBANCE (LOD) |
| ● ● ● ● | WETLAND | ↓ ↓ ↓ ↓ | WETLAND SEED MIX (WSM) |
| ▨ | STREAMBED MATERIAL (SBM) MIX | + + + + | TURFGRASS ESTABLISHMENT (TE) |
| ⚙ | ROCK WEIR | | UPLAND MEADOW ESTABLISHMENT (UME) |
| —●—●—●—●— | PROPOSED STORM DRAIN PIPE | ○ | MAJOR TREE |
| → | FLOW DIRECTION | ○ | MINOR TREE |
| — T T T T — | PROPOSED 100-YEAR FLOOD PLAIN | | |
| — T T T T — | EXISTING 100-YEAR FLOOD PLAIN | | |
| — 145 — | PROPOSED CONTOURS | | |
| — 145 — | EXISTING CONTOURS | | |
| — — — — | LIMIT OF FIELD RUN SURVEY | | |
| ○ | EX. TREE AND DBH | | |



AECOM	Revisions		CITY OF HAVRE DE GRACE	
			LILLY RUN WETLAND ENHANCEMENT HARFORD COUNTY, MD WETLAND PLANTING PLAN	
Drawn By: TH	Scale: _____			
Designed By: TH	Date: JULY, 2017			
Reviewed By: RK	Sheet _____ of _____	WT-3		

Page 1 of 1

RECORD OF SOIL / ROCK EXPLORATION

Contracted With AECOM Boring # SB-1
 Project Name Lilly Run Wetland Restoration - City of Havre De Grace Job # 17-0025
 Location Havre De Grace, MD

SAMPLER

Date 5/2/17 Hammer Wt. 300 lb Hole Diameter 3 in Foreman MF
 Soil Core Dia. 3 in Hammer Drop 30 in Rock Core Dia. N/A Inspector SK
 Date Started 5/2/17 Spore Size 2 ft Boring Method HSA Date Completed 5/2/17

ELEV. (ft)	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	DEPTH (ft)	CORRELATION	SAMPLE			BORING & SAMPLE NOTES
				Blows/ft	No.	Type	
27.0	TOPSOIL	0.0					
26.0	Brown and gray, moist, silty CLAY	0.7	DI	1-1-3-3	1	DS	18
25.0	Brown and gray, moist to wet, loose, silty fine SAND	2.0	DI	1-3-5-7	2	DS	24
24.0	Brown and gray, moist, stiff, lean CLAY, fine sand	4.0	DI	3-5-5-6	3	DS	18
			DI	3-6-8-10	4	DS	24
			DI	3-7-7-6	5	DS	22
20.0	Bottom of Boring at 10.0 ft	10.0					

SAMPLER TYPE
 DS - DOWN DRIFT SPOON
 PT - PRESSURE SLEEVE TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

SAMPLE CONDITIONS
 J - JERKED
 I - INTACT
 U - UNDISTURBED
 L - LOST

GROUNDWATER DEPTH
 AT COMPLETION 2.0 ft
 AFTER 30 MIN 1.5 ft
 AFTER 1 HR 1.5 ft
 AFTER 2 HR 1.5 ft
 CAVED AT 1.5 ft

BORING METHOD
 HSA - HOLLOW STEM AUGERS
 CFA - CONTINUOUS FLIGHT AUGERS
 SC - SPINNING CABLE
 MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING: 2" OD SAMPLER 1" WITH 140# HAMMER FALLING 30". COUNT MADE AT 6" INTERVALS.

Page 1 of 1

RECORD OF SOIL / ROCK EXPLORATION

Contracted With AECOM Boring # SB-2
 Project Name Lilly Run Wetland Restoration - City of Havre De Grace Job # 17-0025
 Location Havre De Grace, MD

SAMPLER

Date 5/2/17 Hammer Wt. 300 lb Hole Diameter 3 in Foreman MF
 Soil Core Dia. 3 in Hammer Drop 30 in Rock Core Dia. N/A Inspector SK
 Date Started 5/2/17 Spore Size 2 ft Boring Method HSA Date Completed 5/2/17

ELEV. (ft)	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	DEPTH (ft)	CORRELATION	SAMPLE			BORING & SAMPLE NOTES
				Blows/ft	No.	Type	
26.5	TOPSOIL	0.0					
25.5	Brown and gray, moist, medium stiff, lean CLAY, fine to some fine sand, some moss 1.5 to 2 ft	0.5	DI	3-3-3-2	1	DS	18
22.0	Brown and red-brown, wet, dense, poorly graded coarse SAND, some gravel	4.0	DI	2-3-1-0	2	DS	17
20.0	Brown, moist, medium stiff to stiff lean CLAY, fine to fine sand	8.0	DI	8-11-20-32	3	DS	15
			DI	4-3-4-7	4	DS	15
			DI	5-4-4-4	5	DS	18
15.0	Bottom of Boring at 10.0 ft	10.0					

SAMPLER TYPE
 DS - DOWN DRIFT SPOON
 PT - PRESSURE SLEEVE TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

SAMPLE CONDITIONS
 J - JERKED
 I - INTACT
 U - UNDISTURBED
 L - LOST

GROUNDWATER DEPTH
 AT COMPLETION 2.0 ft
 AFTER 30 MIN 1.5 ft
 AFTER 1 HR 1.5 ft
 AFTER 2 HR 1.5 ft
 CAVED AT 1.5 ft

BORING METHOD
 HSA - HOLLOW STEM AUGERS
 CFA - CONTINUOUS FLIGHT AUGERS
 SC - SPINNING CABLE
 MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING: 2" OD SAMPLER 1" WITH 140# HAMMER FALLING 30". COUNT MADE AT 6" INTERVALS.

Page 1 of 1

RECORD OF SOIL / ROCK EXPLORATION

Contracted With AECOM Boring # SB-3
 Project Name Lilly Run Wetland Restoration - City of Havre De Grace Job # 17-0025
 Location Havre De Grace, MD

SAMPLER

Date 5/2/17 Hammer Wt. 300 lb Hole Diameter 3 in Foreman MF
 Soil Core Dia. 3 in Hammer Drop 30 in Rock Core Dia. N/A Inspector SK
 Date Started 5/2/17 Spore Size 2 ft Boring Method HSA Date Completed 5/2/17

ELEV. (ft)	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	DEPTH (ft)	CORRELATION	SAMPLE			BORING & SAMPLE NOTES
				Blows/ft	No.	Type	
24.5	TOPSOIL	0.0					
	Brown and gray, moist, soft to stiff, lean CLAY, with sand	0.5	DI	3-3-1-2	1	DS	18
			DI	3-5-5-6	2	DS	15
			DI	3-5-6-6	3	DS	12
12.0	Dark brown, wet, medium dense, poorly graded coarse SAND AND GRAVEL	6.0	DI	3-7-10-13	4	DS	15
10.0	Brown, moist, very stiff, sandy lean CLAY	8.0	DI	3-5-17-25	5	DS	15
5.0	Bottom of Boring at 10.0 ft	10.0					

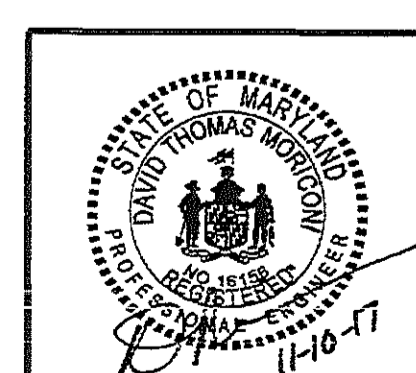
SAMPLER TYPE
 DS - DOWN DRIFT SPOON
 PT - PRESSURE SLEEVE TUBE
 CA - CONTINUOUS FLIGHT AUGER
 RC - ROCK CORE

SAMPLE CONDITIONS
 J - JERKED
 I - INTACT
 U - UNDISTURBED
 L - LOST

GROUNDWATER DEPTH
 AT COMPLETION 2.0 ft
 AFTER 30 MIN 1.5 ft
 AFTER 1 HR 1.5 ft
 AFTER 2 HR 1.5 ft
 CAVED AT 1.5 ft

BORING METHOD
 HSA - HOLLOW STEM AUGERS
 CFA - CONTINUOUS FLIGHT AUGERS
 SC - SPINNING CABLE
 MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING: 2" OD SAMPLER 1" WITH 140# HAMMER FALLING 30". COUNT MADE AT 6" INTERVALS.



PROFESSIONAL CERTIFICATION

I HEREBY CERTIFY THAT DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 16156, EXPIRATION DATE: 8/28/2018.

AECOM

CITY OF HAVRE DE GRACE

LILLY RUN WETLAND ENHANCEMENT
HARFORD COUNTY, MD
SOIL BORING LOGS

Drawn By: CDF Scale: _____
 Designed By: MAL Date: JULY, 2017
 Reviewed By: DTM Sheet Of SB-01

