

LYNDWOOD MANOR STORMWATER POND RETROFIT

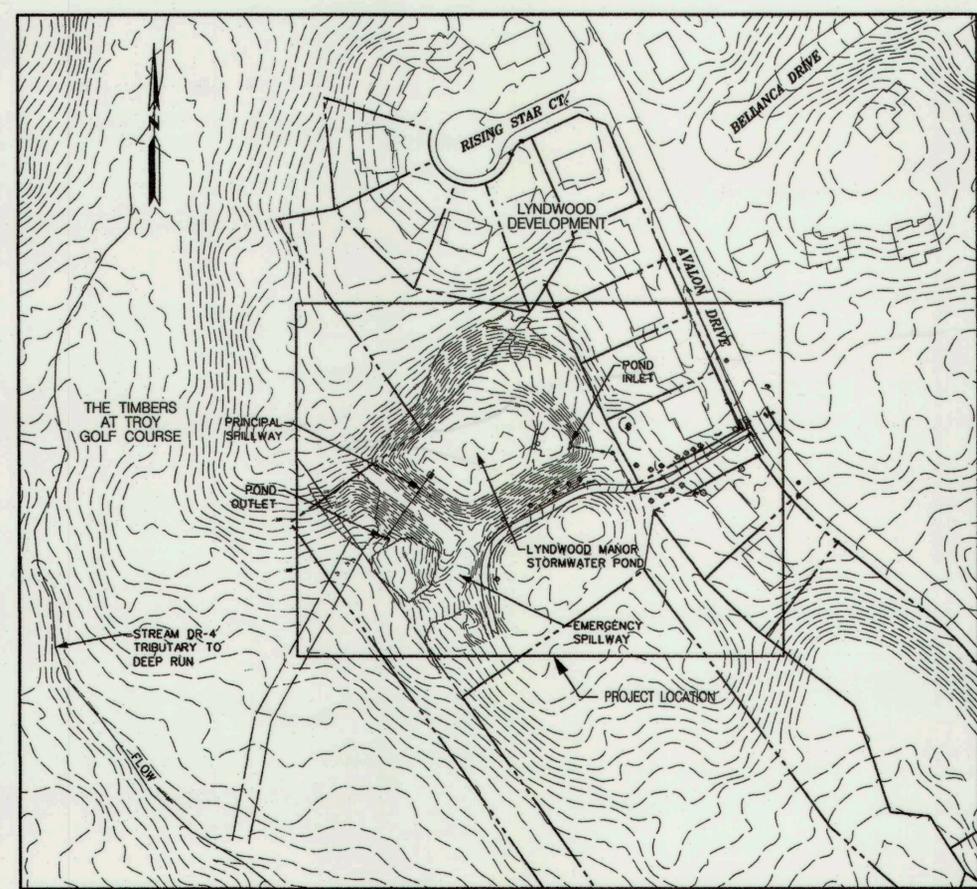
HOWARD COUNTY, MARYLAND
DEPARTMENT OF PUBLIC WORKS
CAPITAL PROJECT D-1160

INDEX OF SHEETS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	STORMWATER MANAGEMENT GRADING PLAN
3	STORMWATER MANAGEMENT PROFILES
4	STORMWATER MANAGEMENT PROFILES
5	STORMWATER MANAGEMENT DETAILS
6	STORMWATER MANAGEMENT NOTES & DETAILS
7	EROSION & SEDIMENT CONTROL PLAN
8	EROSION & SEDIMENT CONTROL DETAILS
9	EROSION & SEDIMENT CONTROL NOTES

LEGEND

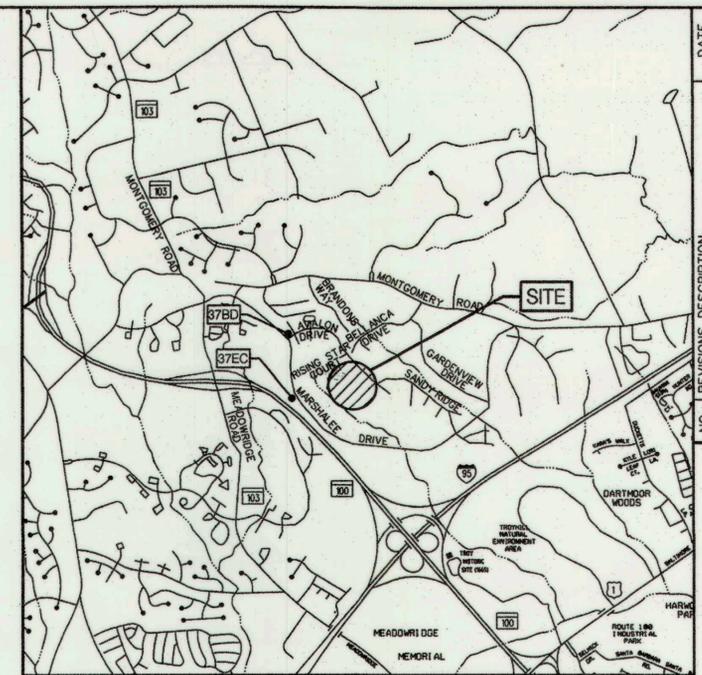
LIMIT OF DISTURBANCE	---	LOD
EXISTING MAJOR CONTOURS	---	380
EXISTING MINOR CONTOURS	---	
PROPOSED CONTOURS	---	387
EXISTING WOODSLINE	---	
PROPERTY LINE	---	
EASEMENT BOUNDARY	---	
EXISTING STORM DRAIN	---	SD
EXISTING STORM DRAIN INLET	---	
EXISTING STORM DRAIN MANHOLE	---	
EXISTING UTILITY POLE	---	
EXISTING SEWER LINE	---	S
EXISTING SEWER MANHOLE	---	
EXISTING EDGE OF PAVEMENT	---	
EXISTING RIPRAP	---	
PROPOSED RIPRAP	---	
SANDBAG DAM	---	
PUMP AROUND AND HOSES	---	
SUMP PIT	---	SP
FILTER BAG	---	FB
SILT FENCE	---	SF
ORANGE SAFETY FENCE	---	OSF
STABILIZED CONSTRUCTION ENTRANCE	---	
EXISTING WATERS OF THE U.S.	---	WUS
EXISTING 50' STREAM BUFFER	---	SB
EXISTING WETLAND BOUNDARY	---	
EXISTING 25' WETLAND BUFFER	---	WB
15' WOODY FREE ZONE	---	



SITE LOCATION
SCALE: 1" = 100'

SPECIAL CONTRACTOR NOTES

- PROJECT SITE IS NOT LOCATED WITHIN THE 100-YEAR FLOODPLAIN.
- CONTRACTOR SHALL NOT STORE EQUIPMENT, MATERIALS AND/OR SUPPLIES BEYOND THE LIMIT OF DISTURBANCE SHOWN ON THE PLANS.
- UPON COMPLETION OF THE WORK, BUT PRIOR TO DE-MOBILIZATION, THE CONTRACTOR SHALL REMOVE ALL REMNANTS OF CONSTRUCTION MATERIALS FROM THE SITE. THE CONTRACTOR SHALL RESTORE ALL DISTURBED AREAS TO A CONDITION EQUAL TO OR BETTER THAN THE PRE-CONSTRUCTION CONDITIONS.
- PRIOR TO BEGINNING ANY CONSTRUCTION ACTIVITIES, PHOTOGRAPHS OF THE PROPOSED WORK AREA AND ACCESS SHALL BE TAKEN.
- CONTRACTOR SHALL CONTINUOUSLY MONITOR WEATHER FORECASTS DURING WORK ACTIVITIES AND SCHEDULE WORK DURING FAVORABLE CONDITIONS.
- THE CONTRACTOR SHALL EXERCISE CARE IN ACTIVITIES INVOLVING EITHER CUT AND FILL OR GRADING IN THE VICINITY OF TREES THAT ARE TO REMAIN. ACTIVITIES NEAR TREES THAT ARE TO REMAIN SHALL BE DONE IN A MANNER THAT DOES NOT DISTURB THE CRITICAL ROOT ZONE OR WITHIN THE DRIPLINE OF THE TREES. ORANGE RENCING SHALL BE INSTALLED AROUND THE PERIMETER OF THE CRITICAL ROOT ZONE PRIOR TO CONSTRUCTION.
- THE EXISTING TOP OF CORE (IMPERMEABLE CLAY MATERIAL) SHALL BE FIELD-VERIFIED BY A QUALIFIED GEOTECHNICAL ENGINEER DURING CONSTRUCTION, FOR THE ENTIRE LENGTH OF THE EMBANKMENT.
- ALL TREES TO BE REMOVED SHALL BE CUT AT THE BASE WITH A SAW AND NOT PUSHED OVER. TREE STUMPS OUTSIDE THE EMBANKMENT MAY BE LEFT IN PLACE, UNLESS OTHERWISE DIRECTED ON THE PLANS OR BY THE ENGINEER.
- ALL MATERIAL SHALL BE REMOVED AND DISPOSED OF OFFSITE. REMOVED TREES AND BRUSH MAY BE REDISTRIBUTED ON SITE AT THE DISCRETION OF THE ENGINEER OR HIS/HER REPRESENTATIVE.
- THE CONTRACTOR SHALL USE EXTREME CAUTION WHEN EXITING THE PROJECT SITE AND PAY CLOSE ATTENTION TO PEDESTRIANS WALKING NEAR THE SITE.
- WORKING HOURS ARE 7 A.M. TO 7 P.M. MONDAY THROUGH FRIDAY. WITH PERMISSION CONTRACTORS MAY WORK ON WEEKENDS.
- THE CONTRACTOR SHALL AVOID TRACKING HEAVY EQUIPMENT OVER CRITICAL ROOT ZONE OF SPECIMEN TREES. IF UNAVOIDABLE LOAD MATS SHOULD BE USED WHEN TRACKING OVER THE CRITICAL ROOT ZONES.
- THE CONTRACTOR SHALL PROVIDE AND MAINTAIN ALTERNATE ACCESS FOR THE GOLF COURSE PATH, AND REMOVE AND RESTORE AT PROJECT CLOSE.



VICINITY MAP
SCALE: 1" = 2000'
ADC MAP 16, K07

GENERAL INFORMATION

- EXISTING FACILITY WAS CONSTRUCTED UNDER HOWARD COUNTY, MARYLAND STORMWATER MANAGEMENT AS-BUILT PLAN F-94-29B, DATED 01-05-1998, AS ACCEPTED BY HOWARD SOIL CONSERVATION DISTRICT.
- THERE ARE NO KNOWN BURIAL GROUNDS OR CEMETERY SITES LOCATED ON THE PROJECT SITE.
- ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE STANDARDS AND SPECIFICATIONS OF HOWARD COUNTY AND SPECIFICATIONS, AS APPLICABLE.
- THE CONTRACTOR SHALL NOTIFY THE DEPARTMENT OF PUBLIC WORKS, BUREAU OF ENGINEERING/CONSTRUCTION INSPECTION DIVISION AT (410) 313-1880 24 HOURS IN ADVANCE OF ANY WORK BEING DONE.
- THE CONTRACTOR SHALL NOTIFY "MISS UTILITY" AT 1-800-257-7777 AT LEAST 48 HOURS PRIOR TO ANY EXCAVATION WORK BEING DONE.
- THE COORDINATES SHOWN HEREON ARE BASED ON HOWARD COUNTY GEODETIC CONTROL, WHICH IS BASED UPON THE MARYLAND STATE PLANE COORDINATE SYSTEM.
- WATER IS PUBLIC.
- SEWER IS PUBLIC.
- EXISTING UTILITIES ARE BASED ON UTILITY MARKOUT OBSERVED AND FIELD SURVEYS. CONTRACTOR TO OBTAIN MISS UTILITY MARKOUT AND TO VERIFY INFORMATION TO HIS/HER OWN SATISFACTION.
- KCI PERFORMED A SITE VISIT ON NOVEMBER 21, 2014 TO VERIFY THE PRESENCE OF WETLANDS AND THE EXISTING POND WATER SURFACE LIMITS AT THE SITE.
- THE EXISTING TOPOGRAPHY IS TAKEN FROM FIELD RUN SURVEY WITH ONE FOOT CONTOUR INTERVALS IN THE NAVD83 VERTICAL DATUM PREPARED BY AB CONSULTANTS IN DECEMBER 2014.
- NO TRAFFIC STUDY IS REQUIRED FOR THIS PROJECT.
- OBSTRUCTIONS SHOWN ON THIS DRAWING ARE FOR THE CONVENIENCE OF THE CONTRACTOR ONLY AND KCI TECHNOLOGIES, INC. DOES NOT WARRANT OR GUARANTEE THE CORRECTNESS OR COMPLETENESS OF THE INFORMATION GIVEN. SHOULD THE CONTRACTOR DISCOVER ANY DISCREPANCIES BETWEEN THE PLANS AND THE FIELD CONDITIONS, THE CONTRACTOR MUST NOTIFY HIS OWN SATISFACTION. THE ENGINEER SHALL BE NOTIFIED IMMEDIATELY TO RESOLVE THE SITUATION. SHOULD THE CONTRACTOR MAKE FIELD CORRECTIONS OR ADJUSTMENTS WITHOUT NOTIFYING THE ENGINEER, THE CONTRACTOR ASSUMES ALL RESPONSIBILITY FOR THOSE CHANGES.
- THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO PROTECT THE EXISTING UTILITIES AND MAINTAIN UNINTERRUPTED SERVICE. ANY DAMAGE INCURRED DUE TO THE CONTRACTOR'S OPERATION SHALL BE REPAIRED IMMEDIATELY AT THE CONTRACTOR'S EXPENSE.
- KCI CONDUCTED SOIL BORINGS OF THE EMBANKMENT CORE AND FOR BEARING CAPACITY AT THE POND RISER IN OCTOBER 2015.
- ANTICIPATED SHOP DRAWINGS UPON CONSTRUCTION INCLUDE:
A. TYPE A CONCRETE HEADWALL (EX-R1) (SHEETS 2 AND 4).
B. CONCRETE RISER MODIFICATION (EX-R1) (SHEETS 2, 4, AND 5).
- THIS PROJECT IS NOT SUBJECT TO A STREAM CLOSURE PERIOD.

AS-BUILT
11-09-2017

HOWARD COUNTY SURVEY CONTROL

DESIGNATION	NORTHING	EASTING	ELEVATION
37EC	561099.830	1375580.410	346.146
37BD	562548.043	1375437.976	384.947

PERMIT INFORMATION CHART

SUBDIVISION NAME LYNDWOOD MANOR	SECTION/AREA SECTION 1/AREA 1	PARCEL# 173
PLAT or L/P 1514	ORIG 37	ZONING RSC
TAX MAP NO. PUBLIC	ELECT. DISTR. PUBLIC	CENSUS TRACT 1
OWNER: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS 6751 COLUMBIA GATEWAY DRIVE COLUMBIA, MD 21046 410-313-6444		

DEPARTMENT OF PUBLIC WORKS, HOWARD COUNTY, MD	
<i>Ray J. Krahe</i> DIRECTOR OF PUBLIC WORKS	9/12/16 DATE
<i>Mark S. Richmond</i> CHIEF, BUREAU OF ENVIRONMENTAL SERVICES	9/12/16 DATE
<i>Mark S. Richmond</i> CHIEF, STORMWATER MANAGEMENT DIVISION	9/16/16 DATE

ENGINEER'S CERTIFICATE
"I CERTIFY THAT THIS PLAN FOR POND CONSTRUCTION AND SEDIMENT AND EROSION CONTROL REPRESENTS A PRACTICAL AND WORKABLE PLAN BASED ON MY PERSONAL KNOWLEDGE OF THE SITE CONDITIONS. THIS PLAN WAS PREPARED IN ACCORDANCE WITH THE REQUIREMENTS OF THE HOWARD COUNTY SOIL CONSERVATION DISTRICT. I HAVE NOTIFIED THE DEVELOPER THAT HE/SHE MUST ENGAGE A REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION AND PROVIDE THE HOWARD COUNTY SOIL CONSERVATION DISTRICT WITH "AS-BUILT" PLANS OF THE POND WITHIN 30 DAYS OF COMPLETION."

Raymond J. Krahe
RAYMOND J. KRAHE, P.E. #28634
SIGNATURE OF ENGINEER (PRINT NAME BELOW SIGNATURE)
DATE: 08/03/2016

DEVELOPER'S CERTIFICATE
"I/WE CERTIFY THAT ALL DEVELOPMENT AND/OR CONSTRUCTION WILL BE DONE ACCORDING TO THESE PLANS, AND THAT ANY RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF ATTENDANCE AT A DEPARTMENT OF THE ENVIRONMENT APPROVED TRAINING PROGRAM FOR THE CONTROL OF SEDIMENT AND EROSION BEFORE BEGINNING THE PROJECT. I SHALL ENGAGE A REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION AND PROVIDE THE HOWARD COUNTY SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION. I ALSO AUTHORIZE PERIODIC ON-SITE INSPECTIONS BY THE HOWARD COUNTY SOIL CONSERVATION DISTRICT."
Mark S. Richmond
SIGNATURE OF DEVELOPER (PRINT NAME BELOW SIGNATURE)
DATE: 9/16/16

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

Raymond J. Krahe
SIGNATURE
28634
PE NO.
03/06/18
DATE

REVIEWED FOR HOWARD SCD AND MEETS TECHNICAL REQUIREMENTS
THESE PLANS FOR SMALL POND CONSTRUCTION, SOIL EROSION AND SEDIMENT CONTROL MEET THE REQUIREMENTS OF THE HOWARD COUNTY SOIL CONSERVATION DISTRICT.
Glenn Schramm
HOWARD SCD
8/8/16
DATE
EP-15-32

NO.	REVISIONS DESCRIPTION	DATE

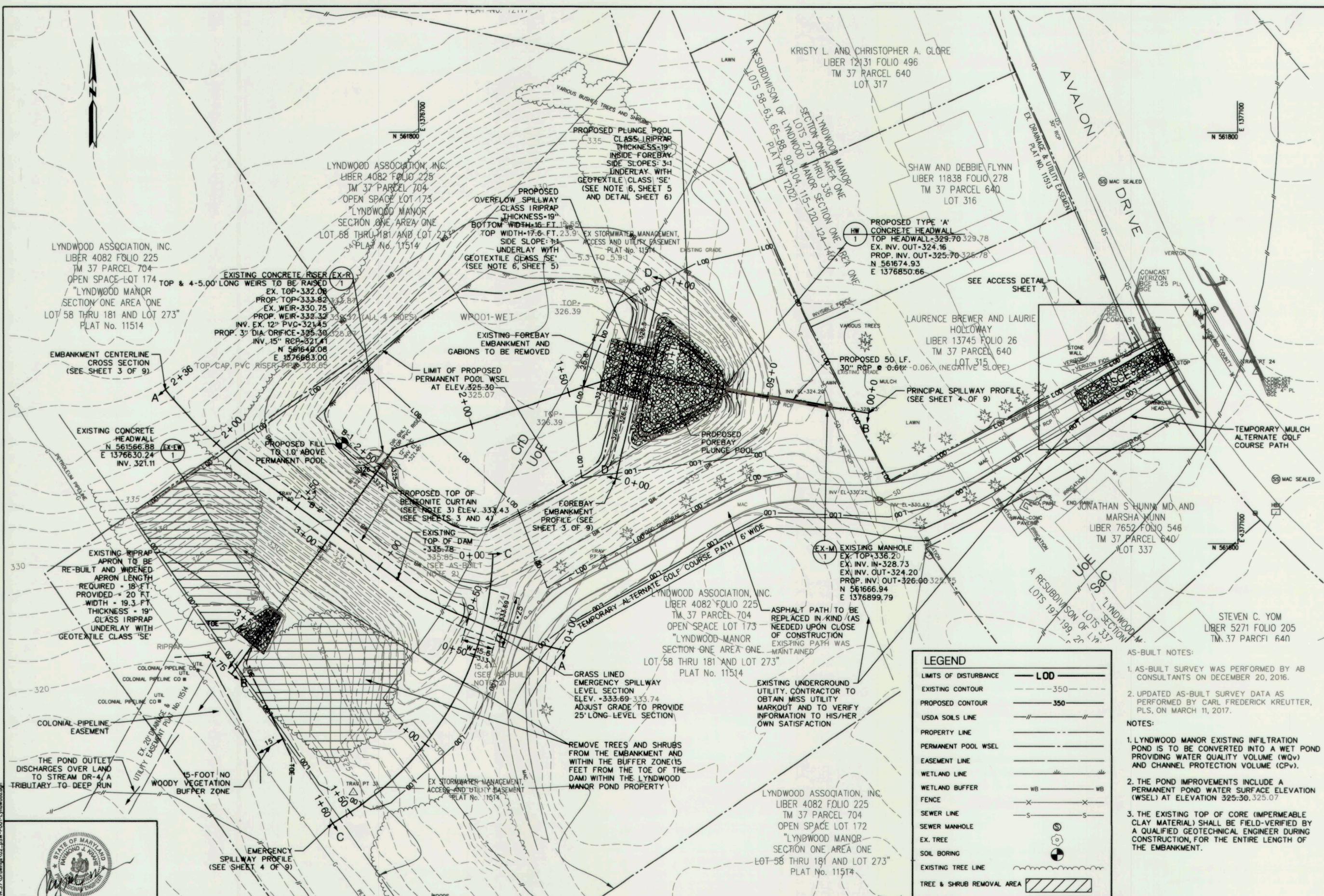
936 RIDGEBROOK ROAD
SPARKS, MARYLAND 21152
TELEPHONE: (410) 316-7800
FAX: (410) 316-7818
www.kci.com



LYNDWOOD MANOR
STORMWATER POND RETROFIT
CAPITAL PROJECT D-1160
HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS
STORMWATER MANAGEMENT DIVISION
6751 COLUMBIA GATEWAY DRIVE
COLUMBIA, MD 21046

AS-BUILT
TITLE SHEET

SCALE:	AS SHOWN
DATE:	JULY 2016
KCI JOB NO.:	17133314.37
CAPITAL PROJECT NO.:	D-1160
PERMIT ISSUE:	
CONSTRUCTION ISSUE:	
SHEET NO.:	1 OF 9



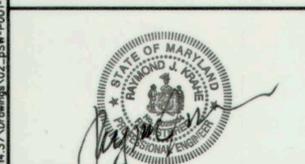
LYNDWOOD ASSOCIATION, INC.
LIBER 4082 FOLIO 225
TM 37 PARCEL 704
OPEN SPACE LOT 174
"LYNDWOOD MANOR
SECTION ONE AREA ONE
LOT 58 THRU 181 AND LOT 273"
PLAT No. 11514

EMBANKMENT CENTERLINE
CROSS SECTION
(SEE SHEET 3 OF 9)

EXISTING CONCRETE
HEADWALL
N 561566.88
E 1376630.24
INV. 321.11

EXISTING RIPRAP
APRON TO BE
RE-BUILT AND WIDENED
APRON LENGTH
REQUIRED = 18 FT.
PROVIDED = 20 FT.
WIDTH = 19.3 FT.
THICKNESS = 19"
CLASS RIPRAP
UNDERLAY WITH
GEOTEXTILE CLASS 'SE'

THE POND OUTLET
DISCHARGES OVER LAND
TO STREAM DR-4/A
TRIBUTARY TO DEEP RUN



PROFESSIONAL CERTIFICATION. I HEREBY
CERTIFY THAT THESE DOCUMENTS WERE
PREPARED OR APPROVED BY ME,
RAYMOND J. KRAHE, PE, AND THAT
I AM A DULY LICENSED PROFESSIONAL
ENGINEER UNDER THE LAWS OF THE STATE
OF MARYLAND. LICENSE NO. 28634
EXPIRATION DATE: 2017-03-26

DEPARTMENT OF PUBLIC WORKS, HOWARD COUNTY, MD
9/12/16
DATE

EXISTING CONCRETE RISER (EX-R)
TOP & 4-5.00' LONG WEIRS TO BE RAISED
EX. TOP = 332.08
PROP. TOP = 333.82
EX. WEIR = 330.75
PROP. WEIR = 332.32
PROP. 3" DIA. ORIFICE = 325.30
INV. 15" RCP = 321.41
N 561640.08
E 1376663.00

PROPOSED FILL
TO 1.0' ABOVE
PERMANENT POOL

EXISTING RIPRAP
APRON TO BE
RE-BUILT AND WIDENED
APRON LENGTH
REQUIRED = 18 FT.
PROVIDED = 20 FT.
WIDTH = 19.3 FT.
THICKNESS = 19"
CLASS RIPRAP
UNDERLAY WITH
GEOTEXTILE CLASS 'SE'

COLONIAL PIPELINE CO. #
UTIL. EASEMENT
No. 11514

15-FOOT NO
WOODY VEGETATION
BUFFER ZONE

EMERGENCY
SPILLWAY PROFILE
(SEE SHEET 4 OF 9)

LYNDWOOD ASSOCIATION, INC.
LIBER 4082 FOLIO 225
TM 37 PARCEL 704
OPEN SPACE LOT 173
"LYNDWOOD MANOR
SECTION ONE AREA ONE
LOT 58 THRU 181 AND LOT 273"
PLAT No. 11514

EXISTING FOREBAY
EMBANKMENT AND
GABIONS TO BE REMOVED

PROPOSED TOP OF
BENSONITE CURTAIN
(SEE NOTE 3) ELEV. 333.43
(SEE SHEETS 3 AND 4)

EXISTING
TOP OF DAM
= 335.78
(SEE AS-BUILT
NOTE 2)

GRASS LINED
EMERGENCY SPILLWAY
LEVEL SECTION
ELEV. = 333.69 - 333.74
ADJUST GRADE TO PROVIDE
25' LONG-LEVEL SECTION

REMOVE TREES AND SHRUBS
FROM THE EMBANKMENT AND
WITHIN THE BUFFER ZONE (15
FEET FROM THE TOE OF THE
DAM) WITHIN THE LYNDWOOD
MANOR POND PROPERTY

EX STORMWATER MANAGEMENT,
ACCESS AND UTILITY EASEMENT
PLAT No. 11514

9/12/16
DATE

PROPOSED PLUNGE POOL
CLASS RIPRAP
THICKNESS = 19"
INSIDE FOREBAY
SIDE SLOPES: 3:1
UNDERLAY WITH
GEOTEXTILE CLASS 'SE'
(SEE NOTE 6, SHEET 5
AND DETAIL SHEET 6)

PROPOSED
OVERFLOW SPILLWAY
CLASS RIPRAP
THICKNESS = 19"
BOTTOM WIDTH = 16 FT.
TOP WIDTH = 17.6 FT. 23.9'
SIDE SLOPE: 3:1
UNDERLAY WITH
GEOTEXTILE CLASS 'SE'
(SEE NOTE 6, SHEET 5)

LIMIT OF PROPOSED
PERMANENT POOL WSEL
AT ELEV. 325.30

FOREBAY
EMBANKMENT
PROFILE (SEE
SHEET 3 OF 9)

TEMPORARY ALTERNATE GOLF COURSE PATH 6' WIDE

EXISTING UNDERGROUND
UTILITY. CONTRACTOR TO
OBTAIN MISS UTILITY
MARKOUT AND TO VERIFY
INFORMATION TO HIS/HER
OWN SATISFACTION

LYNDWOOD ASSOCIATION, INC.
LIBER 4082 FOLIO 225
TM 37 PARCEL 704
OPEN SPACE LOT 172
"LYNDWOOD MANOR
SECTION ONE AREA ONE
LOT 58 THRU 181 AND LOT 273"
PLAT No. 11514

9/12/16
DATE

PROPOSED TYPE 'A'
CONCRETE HEADWALL
TOP HEADWALL = 329.70 329.78
EX. INV. OUT = 324.16
PROP. INV. OUT = 325.70 325.78
N 561674.93
E 1376850.66

PROPOSED 50 LF.
30" RCP @ 0.61% - 0.06% (NEGATIVE SLOPE)

PRINCIPAL SPILLWAY PROFILE
(SEE SHEET 4 OF 9)

EXISTING MANHOLE
EX. TOP = 336.20
EX. INV. IN = 328.73
EX. INV. OUT = 324.20
PROP. INV. OUT = 326.00 325.75
N 561666.94
E 1376899.79

ASPHALT PATH TO BE
REPLACED IN KIND (AS
NEEDED) UPON CLOSE
OF CONSTRUCTION
EXISTING PATH WAS
MAINTAINED

LYNDWOOD ASSOCIATION, INC.
LIBER 4082 FOLIO 225
TM 37 PARCEL 704
OPEN SPACE LOT 172
"LYNDWOOD MANOR
SECTION ONE AREA ONE
LOT 58 THRU 181 AND LOT 273"
PLAT No. 11514

9/12/16
DATE

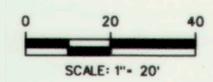
9/12/16
DATE

9/12/16
DATE

LEGEND	
LIMITS OF DISTURBANCE	LOD
EXISTING CONTOUR	-350
PROPOSED CONTOUR	350
USDA SOILS LINE	—//—//—
PROPERTY LINE	—
PERMANENT POOL WSEL	—
EASEMENT LINE	—
WETLAND LINE	—
WETLAND BUFFER	WB WB
FENCE	—X—X—
SEWER LINE	—S—S—
SEWER MANHOLE	⊙
EX. TREE	⊙
SOIL BORING	⊙
EXISTING TREE LINE	—
TREE & SHRUB REMOVAL AREA	▨
EXISTING RIPRAP	⊙
PROPOSED RIPRAP	⊙

AS-BUILT NOTES:
1. AS-BUILT SURVEY WAS PERFORMED BY AB CONSULTANTS ON DECEMBER 20, 2016.
2. UPDATED AS-BUILT SURVEY DATA AS PERFORMED BY CARL FREDERICK KREUTER, PLS, ON MARCH 11, 2017.

NOTES:
1. LYNDWOOD MANOR EXISTING INFILTRATION POND IS TO BE CONVERTED INTO A WET POND PROVIDING WATER QUALITY VOLUME (WQV) AND CHANNEL PROTECTION VOLUME (CPV).
2. THE POND IMPROVEMENTS INCLUDE A PERMANENT POND WATER SURFACE ELEVATION (WSEL) AT ELEVATION 325.30, 325.07
3. THE EXISTING TOP OF CORE (IMPERMEABLE CLAY MATERIAL) SHALL BE FIELD-VERIFIED BY A QUALIFIED GEOTECHNICAL ENGINEER DURING CONSTRUCTION, FOR THE ENTIRE LENGTH OF THE EMBANKMENT.



AS-BUILT
11-09-2017
EP-15-32

NO.	REVISIONS DESCRIPTION	DATE

936 RIDGEBROOK ROAD
SPARKS, MARYLAND 21152
TELEPHONE: (410) 316-7800
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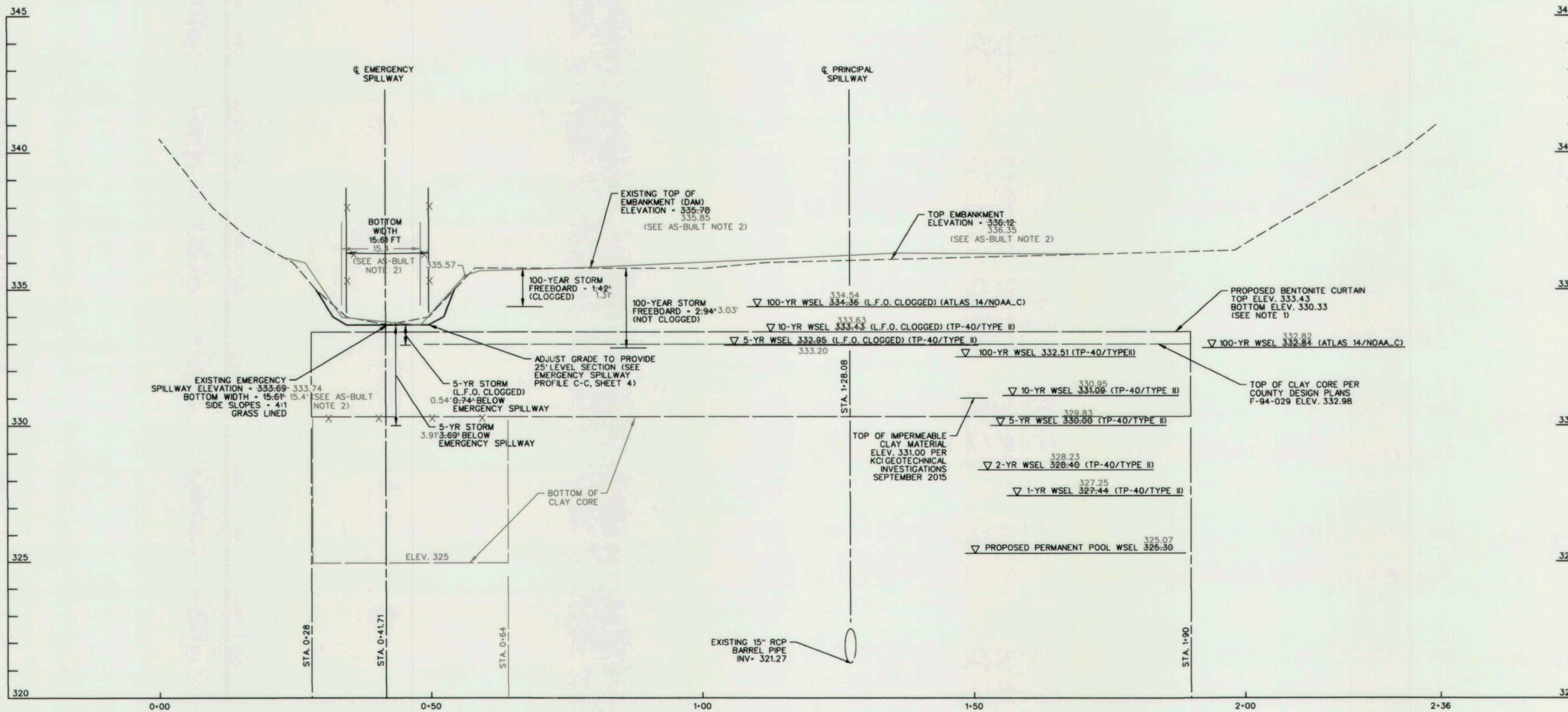


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STORMWATER POND RETROFIT
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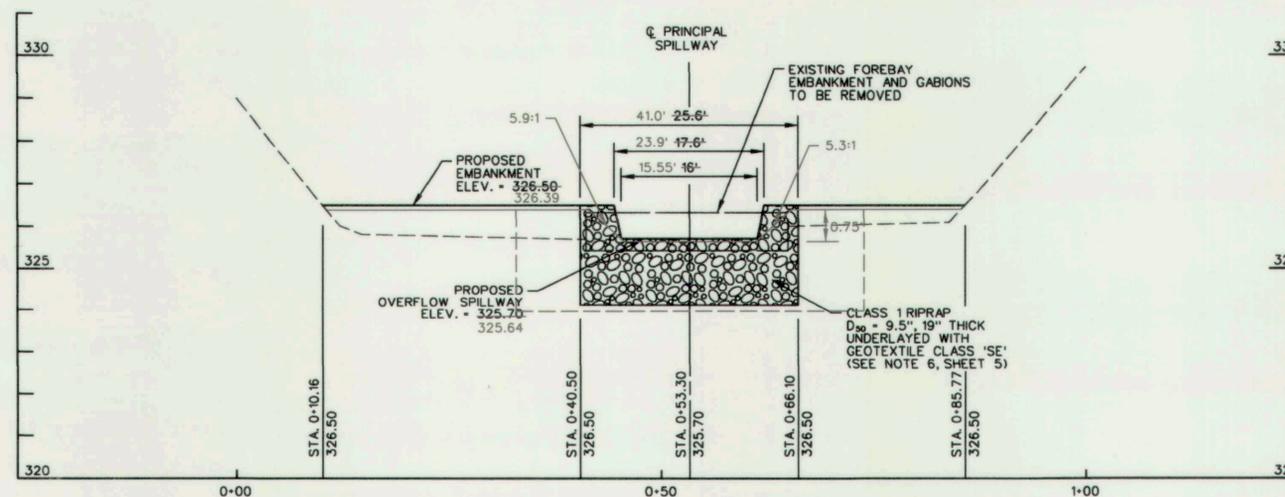
HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS
STORMWATER MANAGEMENT DIVISION
6751 COLUMBIA GATEWAY DRIVE
COLUMBIA, MD 21046

AS-BUILT
STORMWATER
MANAGEMENT
GRADING
PLAN

SCALE: 1" = 20'
DATE: JULY 2016
JOB NO.: 17133314.37
CAPITAL PROJECT NO.: D-1160
PERMIT ISSUE:
CONSTRUCTION ISSUE:



**EMBankment Centerline
CROSS SECTION A-A**
SCALE: HOR. 1" = 10'
VERT. 1" = 2'



FOREBAY EMBANKMENT PROFILE D-D
SCALE: HOR. 1" = 10'
VERT. 1" = 2'

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NOTE:

- THE EXISTING TOP OF CORE (IMPERMEABLE CLAY MATERIAL) SHALL BE FIELD-VERIFIED BY A QUALIFIED GEOTECHNICAL ENGINEER DURING CONSTRUCTION FOR THE ENTIRE LENGTH OF THE EMBANKMENT.

NO.	REVISIONS DESCRIPTION	DATE

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SPARKS, MARYLAND 21152
TELEPHONE: (410) 316-7800
FAX: (410) 316-7818
WWW.KCI.COM



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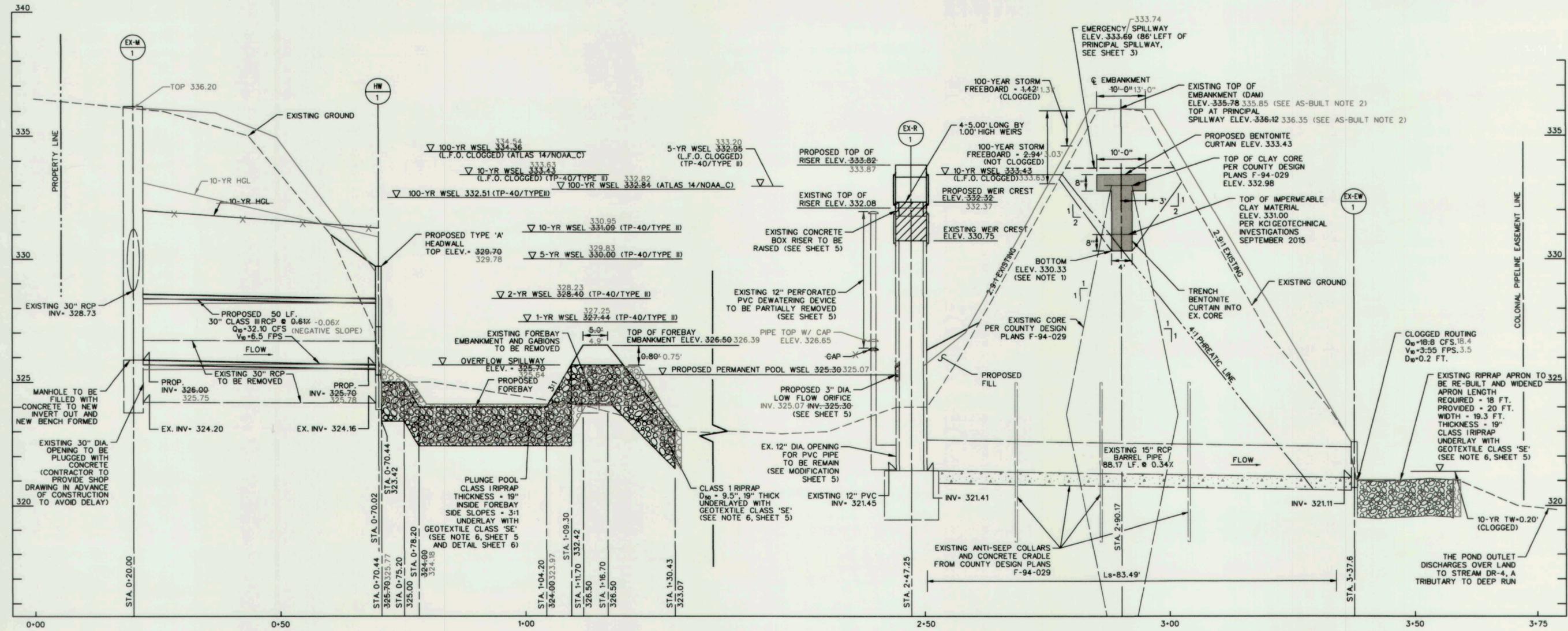
AS-BUILT
STORMWATER
MANAGEMENT
PROFILES

SCALE:	AS SHOWN
DATE:	JUNE 2016
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CAPITAL PROJECT NO.:	D-1160
PERMIT ISSUE:	
CONSTRUCTION ISSUE:	

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, RAYMOND J. KRAHE, PE, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. LICENSE NO. 28634 EXPIRATION DATE: 2017-03-26

DEPARTMENT OF PUBLIC WORKS, HOWARD COUNTY, MD
CHIEF, BUREAU OF ENVIRONMENTAL SERVICES
DATE: 6/12/16

P:\17133314\17133314_37A\DWG\epg\03_2816_0003-1_lyndwood.dgn



FREE FLOW (NOT CLOGGED) RESULTS

	PROPOSED DISCHARGE (CFS)	STORAGE (AC-FT)	WATER SURFACE ELEVATION (FT)
1-YEAR (1)	0.2	0.939	327.44
2-YEAR (1)	0.3	1.360	328.40
5-YEAR (1)	0.5	2.081	330.00
10-YEAR (1)	0.7	2.603	331.09
100-YEAR (2)	17.4	3.886	332.84

1 - TP-40/TYP II
2 - NOAA ATLAS 14/NOAA-C

CLOGGED ROUTING RESULTS

	PROPOSED DISCHARGE (CFS)	STORAGE (AC-FT)	WATER SURFACE ELEVATION (FT)
5-YEAR (1)	17.6	0.907	332.95
10-YEAR (1)	18.8	1.269	333.43
100-YEAR (2)	41.0	2.013	334.46

1 - TP-40/TYP II
2 - NOAA ATLAS 14/NOAA-C

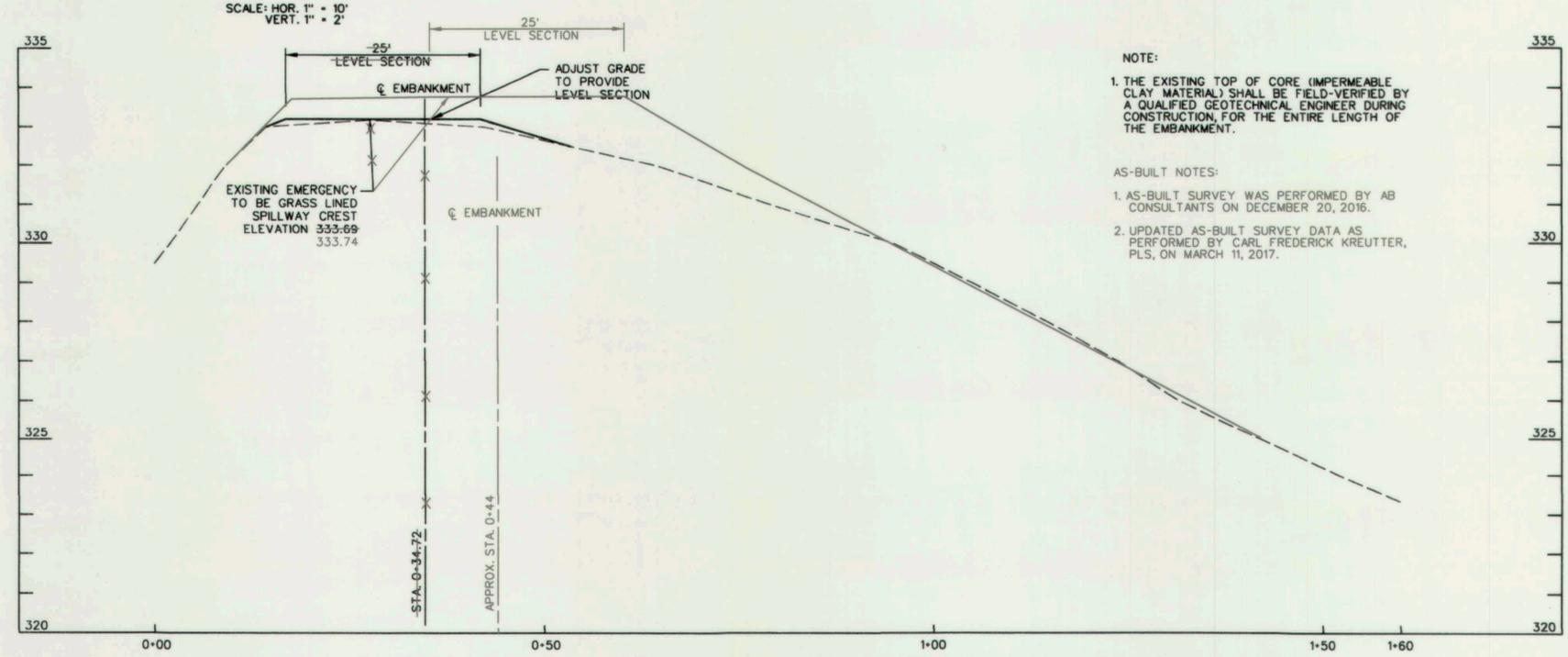
STRUCTURE TABLE

ID	STANDARD	TOP ELEV.	INVERT IN	INVERT OUT
HW-1	TYPE 'A' HEADWALL D-5.1	329.70	325.70	325.70
R-1	RAISED CONC. RISER	333.82	325.30	321.41

PIPE SCHEDULE

FROM	TO	SIZE	TYPE	INVERT IN	INVERT OUT	LENGTH
EX-M-1	HW-1	30"	RCP CLASS III	326.00	325.70	50.0'

PRINCIPAL SPILLWAY PROFILE B-B



EMERGENCY SPILLWAY PROFILE C-C

NOTE:
1. THE EXISTING TOP OF CORE (IMPERMEABLE CLAY MATERIAL) SHALL BE FIELD-VERIFIED BY A QUALIFIED GEOTECHNICAL ENGINEER DURING CONSTRUCTION FOR THE ENTIRE LENGTH OF THE EMBANKMENT.

AS-BUILT NOTES:
1. AS-BUILT SURVEY WAS PERFORMED BY AB CONSULTANTS ON DECEMBER 20, 2016.
2. UPDATED AS-BUILT SURVEY DATA AS PERFORMED BY CARL FREDERICK KREUTER, PLS, ON MARCH 11, 2017.

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DEPARTMENT OF PUBLIC WORKS, HOWARD COUNTY, MD
CHIEF, BUREAU OF ENVIRONMENTAL SERVICES

NO.	REVISIONS DESCRIPTION	DATE

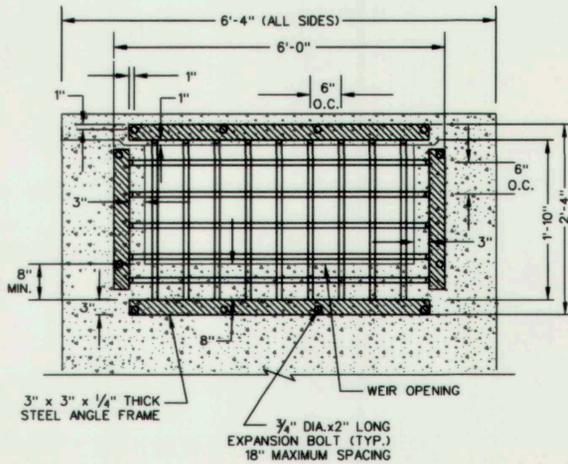
936 RIDGEBROOK ROAD
SPARKS, MARYLAND 21152
TELEPHONE: (410) 316-7800
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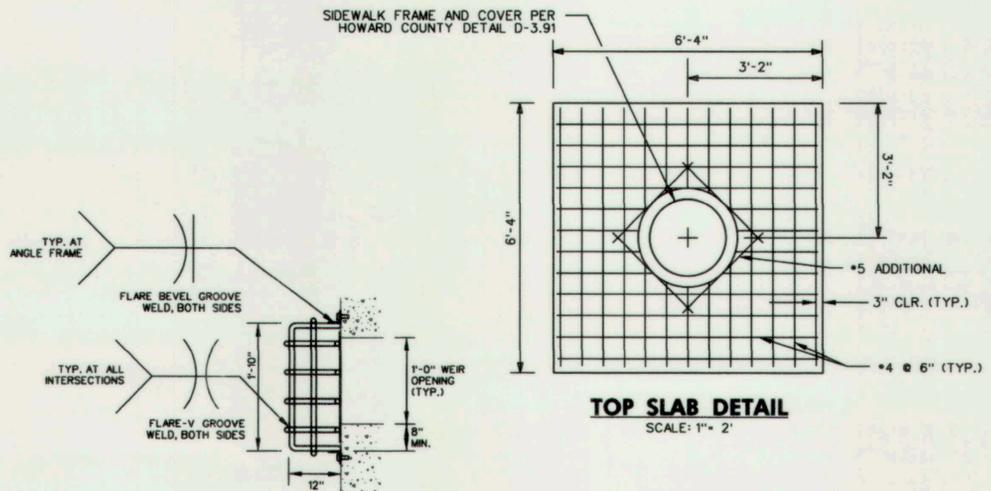
LYNDWOOD MANOR
STORMWATER POND RETROFIT
CAPITAL PROJECT D-1160
HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS
STORMWATER MANAGEMENT DIVISION
6751 COLUMBIA GATEWAY DRIVE
COLUMBIA, MD 21046

AS-BUILT
STORMWATER
MANAGEMENT
PROFILES

SCALE:	AS SHOWN
DATE:	JULY 2016
KCI JOB NO.:	17133314.37
CAPITAL PROJECT NO.:	D-1160
PERMIT ISSUE:	
CONSTRUCTION ISSUE:	



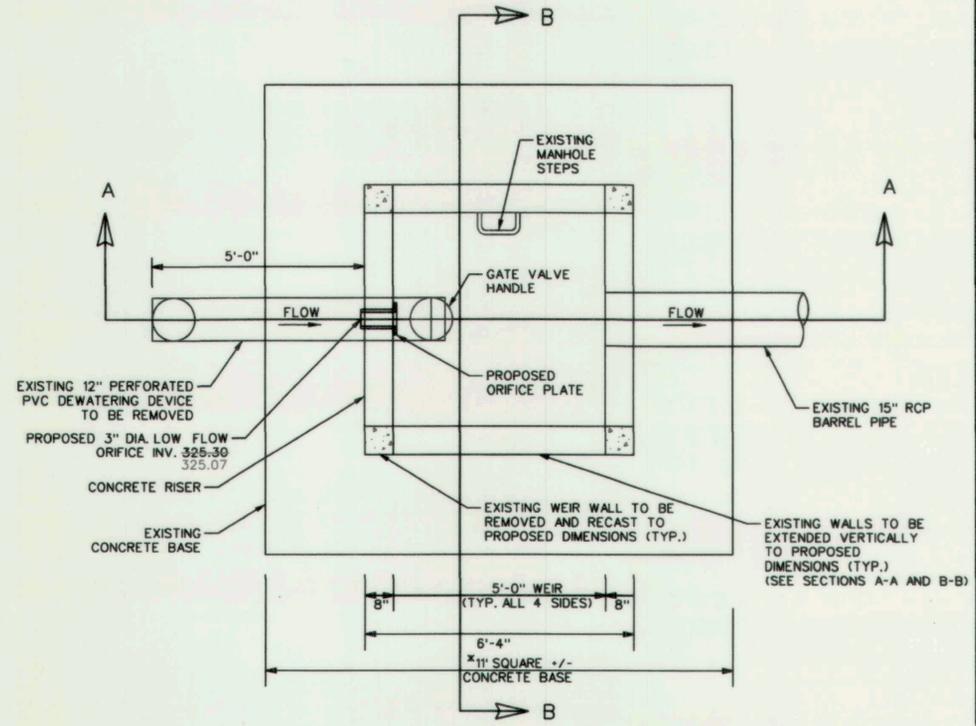
TRASH RACK FRONT VIEW
SCALE: NOT TO SCALE



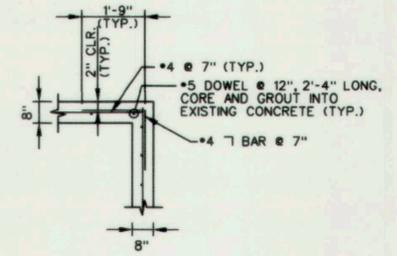
TOP SLAB DETAIL
SCALE: 1" = 2'



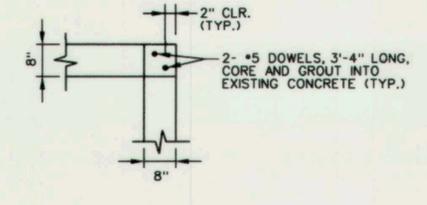
WELDING DETAIL
SCALE: NOT TO SCALE



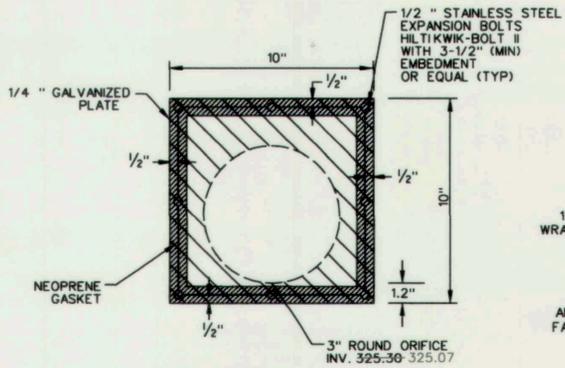
RISER PLAN VIEW
SCALE: 1" = 2'



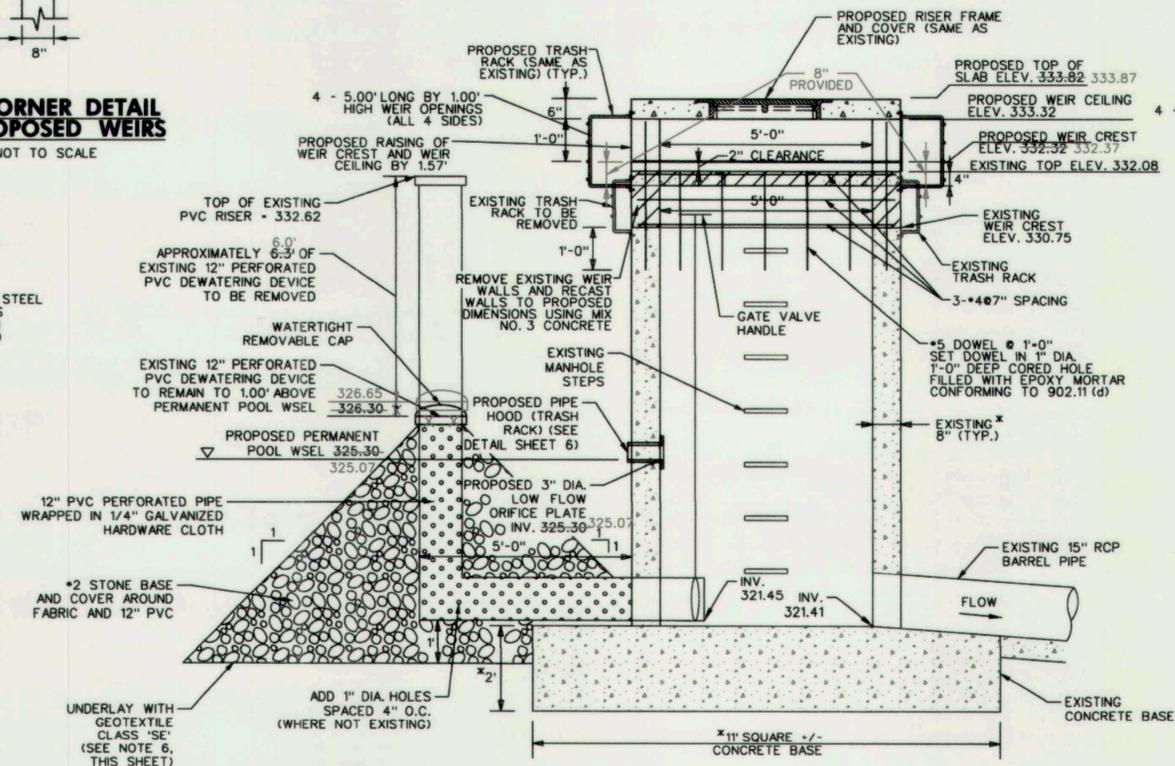
TYPICAL CORNER DETAIL ABOVE EXISTING WEIRS
SCALE: NOT TO SCALE



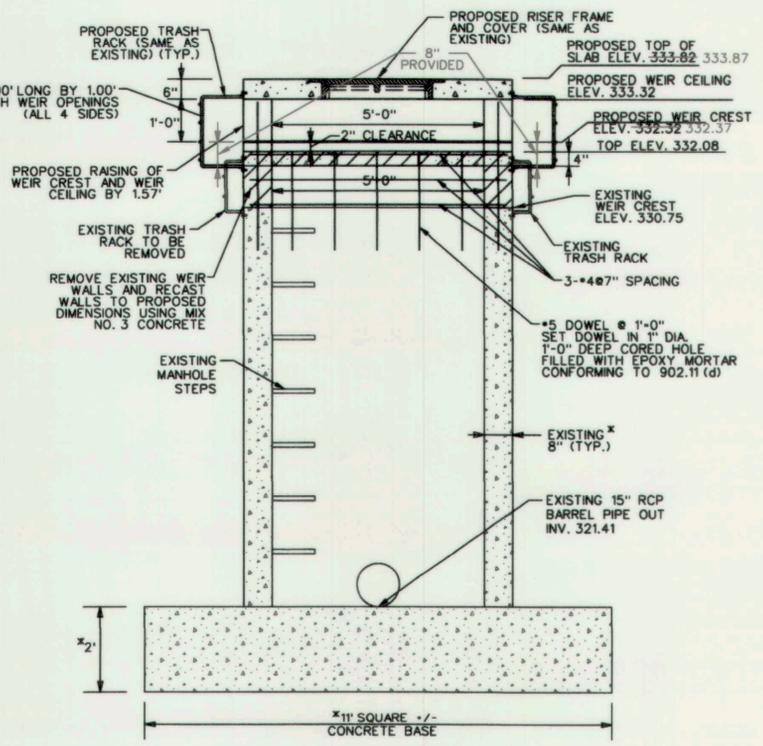
TYPICAL CORNER DETAIL ABOVE PROPOSED WEIRS
SCALE: NOT TO SCALE



RISER ORIFICE PLATE DETAIL
SCALE: NOT TO SCALE



RISER CROSS SECTION A-A
SCALE: 1" = 2'



RISER CROSS SECTION B-B
SCALE: 1" = 2'

*EXISTING DIMENSIONS, INFORMATION PER HOWARD COUNTY PLANS, F-94-29 DATED MARCH 1997.

- NOTES:**
1. ENTIRE TRASH RACK ASSEMBLY SHALL BE SHOP FABRICATED AND HOT-DIPPED GALVANIZED PER ASTM A-123 AFTER FABRICATION.
 2. STEEL SHALL CONFORM TO ASTM A-36.
 3. TRASH RACK SHALL BE CENTERED OVER EACH OPENING.
 4. REBAR SHALL BE WELDABLE STEEL CONFORMING TO ASTM A-706.
 5. CONTRACTOR SHOP DRAWINGS SHALL BE PROVIDED IN ADVANCE OF CONSTRUCTION TO AVOID DELAYS.
 6. GEOTEXTILE SHALL BE PLACED UNDER ALL RIPRAP AND SHALL MEET THE REQUIREMENTS OF MARYLAND DEPARTMENT OF TRANSPORTATION, STATE HIGHWAY ADMINISTRATION STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MATERIALS, SECTION 921.09.

NO.	REVISIONS DESCRIPTION	DATE

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AS-BUILT
STORMWATER
MANAGEMENT
DETAILS-1

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CONSTRUCTION ISSUE:	

PROFESSIONAL CERTIFICATION, I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, RAYMOND J. KRAHE, PE, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 28634 EXPIRATION DATE: 2017-03-26

DEPARTMENT OF PUBLIC WORKS, HOWARD COUNTY, MD
CHIEF, BUREAU OF ENVIRONMENTAL SERVICES
DATE: 7/2/16

STORMWATER MANAGEMENT CONSTRUCTION SPECIFICATIONS (MARYLAND CODE 378 POND - JANUARY 2000)

THESE SPECIFICATIONS ARE APPROPRIATE TO ALL PONDS WITHIN THE SCOPE OF THE STANDARD FOR PRACTICE MD-378. ALL REFERENCES TO ASTM AND AASHTO SPECIFICATIONS APPLY TO THE MOST RECENT VERSION.

SITE PREPARATION

AREAS DESIGNATED FOR BORROW AREAS, EMBANKMENT, AND STRUCTURAL WORKS SHALL BE CLEARED, GRUBBED AND STRIPPED OF TOPSOIL. ALL TREES, VEGETATION, ROOTS AND OTHER OBJECTIONABLE MATERIAL SHALL BE REMOVED. CHANNEL BANKS SHALL BE SHARP BLENDED TO NO STEEPER THAN THAT SHOWN ON THE PLANS. ALL TRENCHES SHALL BE CLEARED AND GRUBBED WITHIN 15 FEET OF THE TOE OF THE EMBANKMENT.

AREAS TO BE COVERED BY THE RESERVOIR WILL BE CLEARED OF ALL TREES, BRUSH, LOGS, FENCES, RUBBISH AND OTHER OBJECTIONABLE MATERIAL UNLESS OTHERWISE DESIGNATED ON THE PLANS. TREES, BRUSH AND STUMPS SHALL BE CUT APPROXIMATELY LEVEL WITH THE GROUND SURFACE. FOR DRY STORMWATER MANAGEMENT PONDS, A MINIMUM OF A 25-FOOT RADIUS AROUND THE INLET STRUCTURE SHALL BE CLEARED.

ALL CLEARED AND GRUBBED MATERIAL SHALL BE DISPOSED OF OUTSIDE AND BELOW THE LIMITS OF THE DAM AND RESERVOIR AS DIRECTED BY THE OWNER OR HIS REPRESENTATIVE. WHEN SPECIFIED, A SUFFICIENT QUANTITY OF TOPSOIL WILL BE STOCKPILED IN A SUITABLE LOCATION FOR USE ON THE EMBANKMENT AND OTHER DESIGNATED AREAS.

EARTH FILL

MATERIAL - THE FILL MATERIAL SHALL BE TAKEN FROM APPROVED DESIGNATED BORROW AREAS. IT SHALL BE FREE OF ROOTS, STUMPS, WOOD, RUBBISH, STONES GREATER THAN 6", FROZEN OR OTHER OBJECTIONABLE MATERIALS. FILL MATERIAL FOR THE CENTER OF THE EMBANKMENT, AND CUTOFF TRENCH SHALL CONFORM TO UNIFIED SOIL CLASSIFICATION C-22, C-19, OR C-18 AND MUST HAVE AT LEAST 50% PASSING THE #200 SIEVE. CONSIDERATION MAY BE GIVEN TO THE USE OF OTHER MATERIALS IN THE EMBANKMENT IF DESIGNED BY A GEOTECHNICAL ENGINEER. SUCH SPECIAL DESIGNS MUST HAVE BEEN APPROVED BY A GEOTECHNICAL ENGINEER. MATERIALS USED IN THE OUTER SHELL OF THE EMBANKMENT MUST HAVE THE FOLLOWING CHARACTERISTICS: VEGETATION OF THE QUALITY REQUIRED TO PREVENT EROSION OF THE EMBANKMENT.

PLACEMENT - AREAS ON WHICH FILL IS TO BE PLACED SHALL BE SCARIFIED PRIOR TO PLACEMENT OF FILL. FILL MATERIALS SHALL BE PLACED IN MAXIMUM 6 INCH THICK (BEFORE COMPACTION) LAYERS WHICH ARE TO BE CONTINUOUS OVER THE ENTIRE LENGTH OF THE FILL. THE MOST PERMEABLE MATERIAL SHALL BE PLACED IN THE DOWNSTREAM PORTIONS OF THE EMBANKMENT. THE PRINCIPAL SPILLWAY MUST BE INSTALLED CONCURRENTLY WITH FILL PLACEMENT AND NOT EXCAVATED INTO THE EMBANKMENT.

COMPACTION - THE MOVEMENT OF THE HAULING AND SPREADING EQUIPMENT OVER THE FILL SHALL BE CONTROLLED SO THAT THE ENTIRE SURFACE OF EACH LIFT SHALL BE TRAVERSED BY NOT LESS THAN ONE (1) TURN OF THE TIRE OR TRACK. COMPACTION SHALL BE ACHIEVED BY A MINIMUM OF FOUR COMPLETE PASSES OF A SHEEPSFOOT, RUBBER Tired OR VIBRATORY ROLLER. FILL MATERIAL SHALL CONTAIN SUFFICIENT MOISTURE SUCH THAT THE REQUIRED DENSITY OF COMPACTION WILL BE OBTAINED WITH THE EQUIPMENT USED. THE FILL MATERIAL SHALL CONTAIN SUFFICIENT MOISTURE SO THAT IF FORMED INTO A BALL IT WILL NOT CRUMBLE, YET NOT BE SO WET THAT WATER CAN BE SQUEEZED OUT.

WHEN REQUIRED BY THE REVIEWING AGENCY THE MINIMUM REQUIRED DENSITY SHALL NOT BE LESS THAN 95% OF THE THEORETICAL MAXIMUM DENSITY OF THE MATERIAL. THE DENSITY OF THE OPTIMUM EACH LAYER OF FILL SHALL BE COMPACTED AS NECESSARY TO OBTAIN THAT DENSITY, AND IS TO BE CERTIFIED BY THE ENGINEER AT THE TIME OF CONSTRUCTION. ALL COMPACTION IS TO BE DETERMINED BY THE AASHTO METHOD T-99 (STANDARD PROCTOR).

CUT OFF TRENCH - THE CUTOFF TRENCH SHALL BE EXCAVATED INTO IMPERVIOUS MATERIAL ALONG OR PARALLEL TO THE CENTERLINE OF THE EMBANKMENT AS SHOWN ON THE PLANS. THE BOTTOM WIDTH OF THE TRENCH SHALL BE GOVERNED BY THE EQUIPMENT USED FOR EXCAVATION WITH THE MINIMUM WIDTH BEING FOUR FEET. THE DEPTH SHALL BE AT LEAST FOUR FEET BELOW EXISTING GRADE OR AS SHOWN ON THE PLANS. THE SIDE SLOPES OF THE TRENCH SHALL BE 1 TO 1 OR FLATTER. THE BACKFILL SHALL BE COMPACTED WITH CONSTRUCTION EQUIPMENT, ROLLERS, OR HAND TAMPERS TO ASSURE MAXIMUM DENSITY AND MINIMUM PERMEABILITY.

EMBANKMENT CORE - THE CORE SHALL BE PARALLEL TO THE CENTERLINE OF THE EMBANKMENT AS SHOWN ON THE PLANS. THE TOP WIDTH OF THE CORE SHALL BE A MINIMUM OF FOUR FEET. THE HEIGHT SHALL EXTEND UP TO AT LEAST THE 10 YEAR WATER ELEVATION OR AS SHOWN ON THE PLANS. THE SIDE SLOPES SHALL BE 1 TO 1 OR FLATTER. THE CORE SHALL BE COMPACTED WITH CONSTRUCTION EQUIPMENT, ROLLERS, OR HAND TAMPERS TO ASSURE MAXIMUM PERMEABILITY. IN ADDITION THE CORE SHALL BE PLACED CONCURRENTLY WITH THE OUTER SHELL OF THE EMBANKMENT.

STRUCTURE BACKFILL

BACKFILL ADJACENT TO PIPES OR STRUCTURES SHALL BE OF THE TYPE AND QUALITY CONFORMING TO THAT SPECIFIED FOR THE ADJOINING FILL MATERIAL. THE FILL SHALL BE PLACED IN HORIZONTAL LAYERS NOT TO EXCEED FOUR INCHES IN THICKNESS AND COMPACTED BY HAND TAMPERS OR OTHER MANUALLY DIRECTED COMPACTION EQUIPMENT. THE MATERIAL NEEDS TO FILL COMPLETELY ALL SPACES UNDER AND ADJACENT TO THE PIPE. AT NO TIME DURING THE BACKFILLING OPERATION SHALL DRIVEN EQUIPMENT BE ALLOWED TO OPERATE CLOSER THAN FOUR FEET MEASURED HORIZONTALLY TO ANY PART OF A STRUCTURE. UNDER NO CIRCUMSTANCES SHALL EQUIPMENT BE DRIVEN OVER ANY PART OF A CONCRETE STRUCTURE OR PIPE UNLESS THERE IS A COMPACTED FILL OF 24" OR GREATER OVER THE STRUCTURE OR PIPE.

STRUCTURE BACKFILL MAY BE FLOWABLE FILL MEETING THE REQUIREMENTS OF MARYLAND DEPARTMENT OF TRANSPORTATION, STATE HIGHWAY ADMINISTRATION STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MATERIALS, SECTION 313 AS MODIFIED. THE MIXTURE SHALL HAVE A 100-200 PSI 28 DAY UNCONFINED COMPRESSIVE STRENGTH. THE FLOWABLE FILL SHALL HAVE A MINIMUM PH OF 4.0 AND A MINIMUM RESISTIVITY OF 2,000 OHM-CM. MATERIAL SHALL BE PLACED SUCH THAT A MINIMUM OF 6" (MEASURED PERPENDICULAR TO THE OUTSIDE OF THE PIPE) OF FLOWABLE FILL SHALL BE UNDER (BEDDING), OVER AND, ON THE SIDES OF THE PIPE. IT ONLY NEEDS TO EXTEND UP TO THE SPRING LINE FOR RIGID CONDUITS. AVERAGE SLUMP OF THE FILL SHALL BE 7" TO ASSURE FLOWABILITY OF THE MATERIAL. ADEQUATE MEASURES SHALL BE TAKEN (SAND BAGS, ETC.) TO PREVENT FLOATING THE PIPE. WHEN USING FLOWABLE FILL, ALL METAL PIPE SHALL BE BITUMINOUS COATED. ANY ADJOINING SOIL FILL SHALL BE PLACED IN HORIZONTAL LAYERS NOT TO EXCEED FOUR INCHES IN THICKNESS AND COMPACTED BY HAND TAMPERS OR OTHER MANUALLY DIRECTED COMPACTION EQUIPMENT. THE MATERIAL SHALL COMPLETELY FILL ALL SPACES ADJACENT TO THE FLOWABLE FILL ZONE. AT NO TIME DURING THE BACKFILLING OPERATION SHALL DRIVEN EQUIPMENT BE ALLOWED TO OPERATE CLOSER THAN FOUR FEET MEASURED HORIZONTALLY TO ANY PART OF A STRUCTURE. UNDER NO CIRCUMSTANCES SHALL EQUIPMENT BE DRIVEN OVER ANY PART OF A STRUCTURE OR PIPE UNLESS THERE IS A COMPACTED FILL OF 24" OR GREATER OVER THE STRUCTURE OR PIPE. BACKFILL MATERIAL OUTSIDE THE STRUCTURAL BACKFILL (FLOWABLE FILL) ZONE SHALL BE OF THE TYPE AND QUALITY CONFORMING TO THAT SPECIFIED FOR THE CORE OF THE EMBANKMENT OR OTHER EMBANKMENT MATERIALS.

PIPE CONDUITS

ALL PIPES SHALL BE CIRCULAR IN CROSS SECTION.

CORRUGATED METAL PIPE - ALL OF THE FOLLOWING CRITERIA SHALL APPLY FOR CORRUGATED METAL PIPE:

1. MATERIALS - (POLYMER COATED STEEL PIPE) - STEEL PIPES WITH POLYMERIC COATINGS SHALL HAVE A MINIMUM COATING THICKNESS OF 0.01 INCH (10 MIL) ON BOTH SIDES OF THE PIPE. THIS PIPE AND ITS APPURTENANCES SHALL CONFORM TO THE REQUIREMENTS OF AASHTO SPECIFICATIONS M-245 & M-246 WITH WATER TIGHT COUPLING BANDS OR FLANGES.

MATERIALS - (ALUMINUM COATED STEEL PIPE) - THIS PIPE AND ITS APPURTENANCES SHALL CONFORM TO THE REQUIREMENTS OF AASHTO SPECIFICATION ON M-274 WITH WATER TIGHT COUPLING BANDS OR FLANGES. ALUMINUM COATED STEEL PIPE, WHEN USED WITH FLOWABLE FILL OR WHEN SOIL AND/OR WATER CONDITIONS WARRANT THE NEED FOR INCREASED DURABILITY, SHALL BE FULLY BITUMINOUS COATED PER REQUIREMENTS OF AASHTO SPECIFICATION ON M-190 TYPE A. ANY ALUMINUM COATING DAMAGED OR OTHERWISE REMOVED SHALL BE REPLACED WITH COLD APPLIED BITUMINOUS COATING COMPOUND. ALUMINUM SURFACES THAT ARE TO BE IN CONTACT WITH CONCRETE SHALL BE PAINTED WITH ONE COAT OF ZINC CHROMATE PRIMER OR TWO COATS OF ASPHALT.

MATERIALS - (ALUMINUM PIPE) - THIS PIPE AND ITS APPURTENANCES SHALL CONFORM TO THE REQUIREMENTS OF AASHTO SPECIFICATION M-190 OR M-211 WITH WATER TIGHT COUPLING BANDS OR FLANGES. ALUMINUM PIPE, WHEN USED WITH FLOWABLE FILL OR WHEN SOIL AND/OR WATER CONDITIONS WARRANT THE NEED FOR INCREASED DURABILITY, SHALL BE FULLY BITUMINOUS COATED PER REQUIREMENTS OF AASHTO SPECIFICATION M-190 TYPE A. ALUMINUM SURFACES THAT ARE TO BE IN CONTACT WITH CONCRETE SHALL BE PAINTED WITH ONE COAT OF ZINC CHROMATE PRIMER OR TWO COATS OF ASPHALT. HOT DIP GALVANIZED BOLTS MAY BE USED FOR CONNECTIONS. THE PH OF THE SURROUNDING SOILS SHALL BE BETWEEN 4 AND 9.

2. COUPLING BANDS, ANTI-SEEP COLLARS, END SECTIONS, ETC., MUST BE COMPOSED OF THE SAME MATERIAL AND COATINGS AS THE PIPE. METALS MUST BE INSULATED FROM DISSIMILAR MATERIALS WITH USE OF RUBBER OR PLASTIC INSULATING MATERIALS AT LEAST 24 MILS IN THICKNESS.

3. CONNECTIONS - ALL CONNECTIONS WITH PIPES MUST BE COMPLETELY WATER TIGHT. THE DRAIN PIPE OR BARREL CONNECTION TO THE RISER SHALL BE WELDED ALL AROUND WHEN THE PIPE AND RISER ARE METAL. ANTI-SEEP COLLARS SHALL BE CONNECTED TO THE PIPE IN SUCH A MANNER AS TO BE COMPLETELY WATER TIGHT. DIMPLE BANDS ARE NOT CONSIDERED TO BE WATER TIGHT.

ALL CONNECTIONS SHALL USE A RUBBER OR NEOPRENE GASKET WHEN JOINING PIPE SECTIONS. THE END OF EACH PIPE SHALL BE RE-ROLLED AN ADEQUATE NUMBER OF CORRUGATIONS TO ACCOMMODATE THE BANDWIDTH. THE FOLLOWING TYPE CONNECTIONS ARE ACCEPTABLE FOR PIPES LESS THAN 24 INCHES IN DIAMETER: FLANGES ON BOTH ENDS OF THE PIPE WITH A CIRCULAR 3/4 INCH CLOSED CELL NEOPRENE GASKET. PIPE PUNCHED TO THE FLANGE BOLT CIRCLE, SANDWICHED BETWEEN ADJACENT FLANGES; A 12 INCH WIDE STANDARD LAP TYPE BAND WITH 12 INCH WIDE BY 3/4 INCH THICK CLOSED CELL CIRCULAR NEOPRENE GASKET; AND A 12 INCH WIDE HUGHER TENSILE STRENGTH BAND WITH O-RING GASKETS HAVING A MINIMUM DIAMETER OF 1/2 INCH GREATER THAN THE CORRUGATION DEPTH. PIPES 24 INCHES IN DIAMETER AND LARGER SHALL BE CONNECTED BY A 24 INCH LONG ANNULAR CORRUGATED BAND USING A MINIMUM OF FOUR RODS AND LISTS 2 FOR EACH CONNECTING PIPE END. A 24 INCH WIDE BY 3/4 INCH THICK CLOSED CELL CIRCULAR NEOPRENE GASKET WILL BE INSTALLED WITH 12 INCHES ON THE END OF EACH PIPE. FLANGED JOINTS WITH 3/4 INCH CLOSED CELL GASKETS 12 INCH WIDE WITH THE FLANGE IS ALSO ACCEPTABLE. HELICALLY CORRUGATED PIPE SHALL HAVE EITHER CONTINUOUSLY WELDED SEAMS OR HAVE LOCK SEAMS WITH INTERNAL CAULKING OR A NEOPRENE BEAD.

4. BEDDING - THE PIPE SHALL BE FIRMLY AND UNIFORMLY BEDDED THROUGHOUT ITS ENTIRE LENGTH. WHERE ROCK OR SOFT, SPONGY OR OTHER UNSUITABLE SOIL IS ENCOUNTERED, ALL SUCH MATERIAL SHALL BE REMOVED AND REPLACED WITH SUITABLE EARTH COMPACTED TO PROVIDE ADEQUATE SUPPORT.

5. BACKFILLING SHALL CONFORM TO "STRUCTURE BACKFILL".

6. OTHER DETAILS (ANTI-SEEP COLLARS, VALVES, ETC.) SHALL BE AS SHOWN ON THE DRAWINGS.

REINFORCED CONCRETE PIPE - ALL OF THE FOLLOWING CRITERIA SHALL APPLY FOR REINFORCED CONCRETE PIPE:

1. MATERIALS - REINFORCED CONCRETE PIPE SHALL HAVE BELL AND SPIGOT JOINTS WITH RUBBER GASKETS AND SHALL EQUAL OR EXCEED ASTM C-361.

2. BEDDING - REINFORCED CONCRETE PIPE CONDUITS SHALL BE LAID IN A CONCRETE BEDDING/CRADLE FOR THEIR ENTIRE LENGTH. THIS BEDDING/CRADLE SHALL CONSIST OF HIGH STRENGTH PORTLAND CEMENT MORTAR WITH 1/2" OF THE SIDES OF THE PIPE AT LEAST 50% OF ITS OUTSIDE DIAMETER WITH A MINIMUM THICKNESS OF 6 INCHES. WHERE A CONCRETE CRADLE IS NOT NEEDED FOR STRUCTURAL REASONS, FLOWABLE FILL MAY BE USED IN THE "STRUCTURE BACKFILL" SECTION OF THIS STANDARD. GRAVEL BEDDING IS NOT PERMITTED.

3. LAYING PIPE - BELL AND SPIGOT PIPE SHALL BE PLACED WITH THE BELL END UPSTREAM. JOINTS SHALL BE MADE IN ACCORDANCE WITH RECOMMENDATIONS OF THE MANUFACTURER. AFTER THE JOINTS ARE SEALED, THE ENTIRE LENGTH OF THE ENTIRE LINE THE BEDDING SHALL BE PLACED SO THAT ALL SPACES BETWEEN THE PIPE ARE FILLED. CARE SHALL BE EXERCISED TO PREVENT ANY DEVIATION FROM THE ORIGINAL LINE AND GRADE OF THE PIPE. THE FIRST JOINT MUST BE LOCATED WITHIN 4 FEET FROM THE RISER.

4. BACKFILLING SHALL CONFORM TO "STRUCTURE BACKFILL".

5. OTHER DETAILS (ANTI-SEEP COLLARS, VALVES, ETC.) SHALL BE AS SHOWN ON THE DRAWINGS.

PLASTIC PIPE - THE FOLLOWING CRITERIA SHALL APPLY FOR PLASTIC PIPE:

1. MATERIAL - PVC PIPE SHALL BE PVC-1120 OR PVC-1220 CONFORMING TO ASTM D-1785 OR ASTM D-2241. CORRUGATED HIGH DENSITY POLYETHYLENE (HDPE) PIPE, COUPLINGS AND FITTINGS SHALL CONFORM TO THE FOLLOWING: 4" TO 10" INCH PIPE SHALL MEET THE REQUIREMENTS OF AASHTO M2 52 TYPE S, AND 12" THROUGH 24" INCH SHALL MEET THE REQUIREMENTS OF AASHTO M294 TYPE S.

2. JOINTS AND CONNECTIONS TO ANTI-SEEP COLLARS SHALL BE COMPLETELY WATER TIGHT.

3. BEDDING - THE PIPE SHALL BE FIRMLY AND UNIFORMLY BEDDED THROUGHOUT ITS ENTIRE LENGTH. WHERE ROCK OR SOFT, SPONGY OR OTHER UNSUITABLE SOIL IS ENCOUNTERED, ALL SUCH MATERIAL SHALL BE REMOVED AND REPLACED WITH SUITABLE EARTH COMPACTED TO PROVIDE ADEQUATE SUPPORT.

4. BACKFILLING SHALL CONFORM TO "STRUCTURE BACKFILL".

5. OTHER DETAILS (ANTI-SEEP COLLARS, VALVES, ETC.) SHALL BE AS SHOWN ON THE DRAWINGS.

DRAINAGE DIAPHRAGMS - WHEN A DRAINAGE DIAPHRAGM IS USED, A REGISTERED PROFESSIONAL ENGINEER WILL SUPERVISE THE DESIGN AND CONSTRUCTION INSPECTION.

ROCK RIPRAP

ROCK RIPRAP SHALL MEET THE REQUIREMENTS OF MARYLAND DEPARTMENT OF TRANSPORTATION, STATE HIGHWAY ADMINISTRATION STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MATERIALS, SECTION 311. GEOTEXTILE SHALL BE PLACED UNDER ALL RIPRAP AND SHALL MEET THE REQUIREMENTS OF MARYLAND DEPARTMENT OF TRANSPORTATION, STATE HIGHWAY ADMINISTRATION STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MATERIALS, SECTION 921.09, CLASS C.

CARE OF WATER DURING CONSTRUCTION

ALL WORK ON PERMANENT STRUCTURES SHALL BE CARRIED OUT IN AREAS FREE FROM WATER. THE CONTRACTOR SHALL CONSTRUCT AND MAINTAIN ALL TEMPORARY DICES, LEVEES, COFFERDAMS, DRAINAGE CHANNELS, AND STREAM DIVERSIONS NECESSARY TO PROTECT THE WORK AND FOR MAINTAINING THE EXCAVATIONS, FOUNDATION, AND OTHER PARTS OF THE WORK FREE FROM WATER AS REQUIRED BY THE ENGINEER FOR CONSTRUCTING EACH PART OF THE WORK. AFTER HAVING SERVED THEIR PURPOSE, ALL TEMPORARY PROTECTIVE WORKS SHALL BE REMOVED OR LEVELED AND GRADED TO THE EXTENT REQUIRED TO PREVENT OBSTRUCTION IN ANY DEGREE. WHATSOEVER OF THE FLOW OF WATER TO THE SPILLWAY OR OUTLET WORKS AND SO AS NOT TO INTERFERE IN ANY WAY WITH THE OPERATION OR MAINTENANCE OF THE STRUCTURE. STREAM DIVERSIONS SHALL BE MAINTAINED UNTIL THE FILL FLOW CAN BE PASSED THROUGH THE PERMANENT WORKS. THE REMOVAL OF WATER FROM THE REQUIRED EXCAVATION AND THE FOUNDATION SHALL BE ACCOMPLISHED IN A MANNER AND TO THE EXTENT THAT WILL MAINTAIN STABILITY OF THE EXCAVATED SLOPES AND BOTTOM REQUIRED EXCAVATIONS, DURING THE PLACING AND COMPACTING OF MATERIAL IN REQUIRED EXCAVATIONS. THE WATER LEVEL AT THE LOCATIONS BEING REFILLED SHALL BE MAINTAINED BELOW THE BOTTOM OF THE PERFORMANCE OF ALL CONSTRUCTION OPERATIONS, DURING THE PLACING AND COMPACTING OF MATERIAL IN REQUIRED EXCAVATIONS. THE WATER LEVEL AT THE EXCAVATION AT SUCH LOCATIONS WHICH MAY REQUIRE DRAINING THE WATER SUMPS FROM WHICH THE WATER SHALL BE PUMPED.

STABILIZATION

ALL BORROW AREAS SHALL BE GRADED TO PROVIDE PROPER DRAINAGE AND LEFT IN A SLIGHTLY CONDITION. ALL EXPOSED SURFACES OF THE EMBANKMENT, SPILLWAY, SPOIL AND BORROW AREAS, AND BERMS SHALL BE STABILIZED BY SEEDING, LIMING, FERTILIZING AND MULCHING IN ACCORDANCE WITH THE NATURAL RESOURCES CONSERVATION SERVICE STANDARDS AND SPECIFICATIONS FOR CRITICAL AREA PLANTING (MD-342) OR AS SHOWN ON THE ACCOMPANYING DRAWINGS.

EROSION AND SEDIMENT CONTROL

CONSTRUCTION OPERATIONS WILL BE CARRIED OUT IN SUCH A MANNER THAT EROSION WILL BE CONTROLLED AND WATER AND AIR POLLUTION MINIMIZED. STATE AND LOCAL LAWS CONCERNING POLLUTION ABATEMENT WILL BE FOLLOWED. CONSTRUCTION PLANS SHALL DETAIL EROSION AND SEDIMENT CONTROL MEASURES.

WOODY VEGETATION NOTE

TREES, SHRUBS, OR OTHER WOODY VEGETATION WILL NOT BE ALLOWED WITHIN A 25' RADIUS OF THE INLET STRUCTURE IN THE POOL AREA, AND NOT ALLOWED ON, OR WITHIN 15' OF ANY PORTION OF THE EMBANKMENT.

SEQUENCE OF CONSTRUCTION

1. NOTIFY HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS, CONSTRUCTION INSPECTION DIVISION IN WRITING AND LEAST THREE (3) DAYS PRIOR TO DOING ANY WORK.
2. CONTRACTOR SHALL COORDINATE AN ONSITE PRE-CONSTRUCTION MEETING WHICH SHALL INCLUDE, BUT NOT BE LIMITED TO, THE COUNTY PROJECT MANAGER, THE ENGINEER, AND A REPRESENTATIVE FROM HOWARD COUNTY CONSTRUCTION INSPECTION. (1 DAY)
3. NOTIFY CERTIFYING ENGINEER 5 WORKING DAYS PRIOR TO BEGINNING STORMWATER MANAGEMENT CONSTRUCTION. (5 DAYS)
4. INSTALL THE PERIMETER SEDIMENT CONTROL MEASURES INCLUDING ORANGE CONSTRUCTION FENCE, SILT FENCE, SUMP PIT NEAR RISER, FILTER BAG, STABILIZED CONSTRUCTION ENTRANCE ACCORDING TO APPROVED SEDIMENT CONTROL PLAN. INSTALL THE TEMPORARY PIPE FROM THE SUMP PIT TO THE FILTER BAG. (5 DAYS)
5. NOTIFY HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS, CONSTRUCTION INSPECTION DIVISION UPON COMPLETION OF INSTALLATION. (1 DAY)
6. CLEAR WOODY VEGETATION WITHIN THE 15 FOOT NO WOODY VEGETATION ZONE. ALL TREES SHALL BE CLEARED AND GRUBBED WITHIN 15 FEET OF THE TOE OF THE EMBANKMENT. WITH 5 DAY NOAA CLEAR FORECAST, PERFORM RISER CONSTRUCTION, TASKS 7 THROUGH 9.
7. INSTALL SANDBAG DIVERSION AROUND RISER STRUCTURE AND DEWATER AREA AROUND THE RISER DURING CONSTRUCTION AS SHOWN ON ESC PLAN. (1 DAY)
8. EXCAVATE THE POND SLOPE AND BOTTOM FOR PROPOSED IMPROVEMENTS AND STOCKPILE SOIL ON SITE AS SHOWN ON THE DETAIL AND PLAN. PARTIALLY REMOVE THE EXISTING RISER STANDPIPE, AND REMOVE TOP OF RISER, AND 30" RCP INLET PIPE. (5 DAYS)
9. MAKE RISER IMPROVEMENTS. CAP THE TOP OF THE 12" PVC STANDPIPE, INSTALL THE 3" DIAMETER, LOW FLOW ORIFICE, CONSTRUCT THE NEW RAISED WEIRS (ALL 4 SIDES), FILL IN THE OLD WEIRS WITH CONCRETE WALLS AND CONSTRUCT THE TOP OF THE RISER AND ACCESS MANHOLE. (5 DAYS)
10. WITH 5 DAY NOAA CLEAR FORECAST, PERFORM POND INLET CONSTRUCTION, TASKS 10 AND 11.
11. INSTALL THE NEW HEADWALL AND 30" RCP INLET PIPE. (3 DAYS)
12. CONSTRUCT THE POND SLOPE, PLUNGE POOL, AND FOREBAY AT THE INLET. (5 DAYS)
13. MULCH AND SEED ALL DISTURBED AREAS EXCEPT FOR THE PERIMETER SEDIMENT CONTROL MEASURES. (3 DAYS)
14. UPON COMPLETION AND WITH PERMISSION FROM THE SEDIMENT CONTROL INSPECTOR, REMOVE SEDIMENT CONTROL MEASURES, INCLUDING THE TEMPORARY STOCKPILE AREAS AND STABILIZE ANY AREAS DISTURBED BY THIS PROCESS. (2 DAYS)

CONTRACTOR'S AS-BUILT NOTE

AS-BUILT PLANS AND CERTIFICATION ARE REQUIRED FOR THIS STORM WATER MANAGEMENT FACILITY. THIS MUST BE PREPARED AND SEALED BY A REGISTERED PROFESSIONAL ENGINEER. AFTER FINAL ACCEPTANCE OF THE FACILITY, THE AS-BUILT PLANS AND CERTIFICATION WILL BE PREPARED BY THE ENGINEER FOR SUBMISSION TO HOWARD COUNTY.

TO PREPARE THE REQUIRED AS-BUILT PLANS AND CERTIFICATION, THE STORM WATER MANAGEMENT FACILITY MUST BE INSPECTED BY THE ENGINEER AT SPECIFIC STAGES DURING THE CONSTRUCTION AS REQUIRED BY THE CURRENT HOWARD COUNTY STORM WATER MANAGEMENT POLICY AND DESIGN MANUAL. THE CONTRACTOR SHALL NOTIFY THE ENGINEER AT LEAST FIVE (5) WORKING DAYS PRIOR TO STARTING ANY WORK SHOWN ON THESE PLANS.

CONSTRUCTION NOTE

UNLESS OTHERWISE NOTED, ALL CONSTRUCTION AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH:

HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS STANDARD SPECIFICATIONS AND DETAILS FOR CONSTRUCTION.

MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION, 2011, STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MATERIAL.

THE EXISTING TOP OF CORE (IMPERMEABLE CLAY MATERIAL) SHALL BE FIELD-VERIFIED BY A QUALIFIED GEOTECHNICAL ENGINEER DURING CONSTRUCTION, FOR THE ENTIRE LENGTH OF THE EMBANKMENT.

OPERATION AND MAINTENANCE SCHEDULE

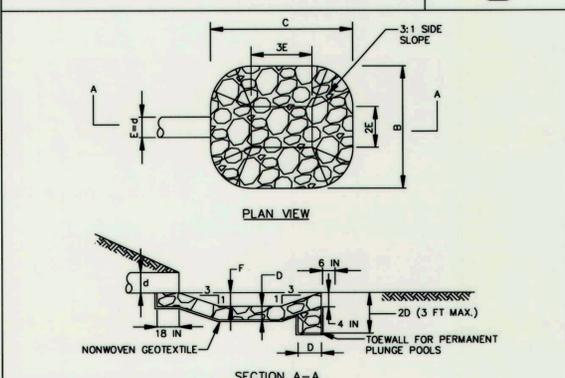
ROUTINE MAINTENANCE:

1. FACILITY SHALL BE INSPECTED ONCE EVERY THREE YEARS. INSPECTIONS SHALL BE PERFORMED DURING OR SHORTLY AFTER WET WEATHER TO DETERMINE IF THE POND IS FUNCTIONING PROPERLY.
2. TOP AND SIDE SLOPES OF THE EMBANKMENT SHALL BE MOWED A MINIMUM OF TWO (2) TIMES PER YEAR, ONCE IN JUNE AND ONCE IN SEPTEMBER. OTHER SIDE SLOPES AND MAINTENANCE ACCESS SHALL BE MOWED AS NEEDED.
3. DEBRIS AND LITTER SHALL BE REMOVED DURING REGULAR MOWING OPERATIONS AND AS NEEDED.
4. VISIBLE SIGNS OF EROSION IN THE FOREBAY, POND AND RIP-RAP OUTLET AREAS SHALL BE REPAIRED AS SOON AS IT IS NOTICED.
5. SEDIMENT SHALL BE REMOVED FROM THE FOREBAY WHEN 50% OF THE TOTAL FOREBAY CAPACITY HAS BEEN LOST.

NON-ROUTINE MAINTENANCE:

1. STRUCTURAL COMPONENTS OF THE FACILITY SUCH AS THE EMBANKMENT, DEWATERING SYSTEM, AND OVERFLOWS SHALL BE REPAIRED UPON DETECTION OF ANY DAMAGE.

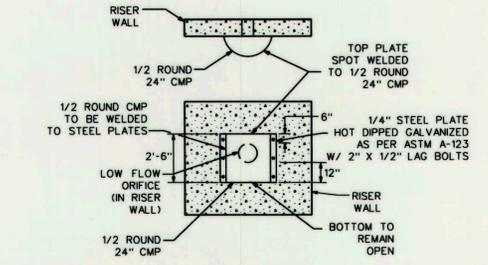
DETAIL D-4-2 PLUNGE POOL STANDARD SYMBOL (PP)



CONSTRUCTION SPECIFICATIONS

1. USE SPECIFIED CLASS OF RIPRAP.
2. USE NONWOVEN GEOTEXTILE AS SPECIFIED IN SECTION H-1 MATERIALS, AND PROTECT FROM PUNCHING, CUTTING, OR TEARING. REPAIR ANY DAMAGE OTHER THAN AN OCCASIONAL SMALL HOLE BY PLACING ANOTHER PIECE OF GEOTEXTILE OVER THE DAMAGED PART OR BY COMPLETELY REPLACING THE GEOTEXTILE. PROVIDE A MINIMUM OF ONE FOOT OVERLAP FOR ALL REPAIRS AND FOR JOINING TWO PIECES OF GEOTEXTILE.
3. PREPARE THE SUBGRADE FOR THE PLUNGE POOL TO THE REQUIRED LINES AND GRADES. COMPACT ANY FILL REQUIRED IN THE SUBGRADE TO A DENSITY OF APPROXIMATELY THAT OF THE SURROUNDING UNDISTURBED MATERIAL.
4. EMBED THE GEOTEXTILE A MINIMUM OF 4 INCHES AND EXTEND THE GEOTEXTILE A MINIMUM OF 6 INCHES BEYOND THE EDGE OF THE SCOUR HOLE.
5. STONE FOR THE PLUNGE POOL MAY BE PLACED BY EQUIPMENT. CONSTRUCT TO THE FULL COURSE THICKNESS IN ONE OPERATION AND IN SUCH A MANNER AS TO AVOID DISPLACEMENT OF UNDERLYING MATERIALS. DELIVER AND PLACE THE STONE FOR THE PLUNGE POOL IN A MANNER THAT WILL INSURE THAT IT IS REASONABLY HOMOGENEOUS WITH THE SMALLER STONES AND SPALLS FILLING THE VOIDS BETWEEN THE LARGER STONES. PLACE STONE FOR THE PLUNGE POOL IN A MANNER TO PREVENT DAMAGE TO THE GEOTEXTILE. HAND PLACE TO THE EXTENT NECESSARY.
6. AT THE PLUNGE POOL OUTLET, PLACE THE STONE SO THAT IT MEETS THE EXISTING GRADE.
7. MAINTAIN LINE, GRADE, AND CROSS SECTION. KEEP OUTLET FREE OF EROSION. REMOVE ACCUMULATED SEDIMENT AND DEBRIS. AFTER HIGH FLOWS INSPECT FOR SCOUR AND DISLODGED RIPRAP. MAKE NECESSARY REPAIRS IMMEDIATELY.

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



1/2 ROUND CMP PIPE HOOD
NOT TO SCALE

NO.	REVISIONS DESCRIPTION	DATE

936 RIDGEBROOK ROAD
SPARKS, MARYLAND 21152
TELEPHONE: (410) 316-7800
FAX: (410) 316-7818
www.kci.com



LYNWOOD MANOR
STORMWATER POND RETROFIT
CAPITAL PROJECT D-1160

HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS
STORMWATER MANAGEMENT DIVISION
6751 COLUMBIA GATEWAY DRIVE
COLUMBIA, MD 21046

STORMWATER MANAGEMENT NOTES & DETAILS

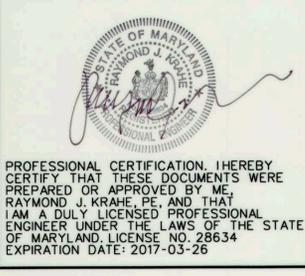
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DATE: JUNE 2016
KCI JOB NO.: 17133314.37
CAPITAL PROJECT NO.: D-1160
PERMIT ISSUE:
CONSTRUCTION ISSUE:

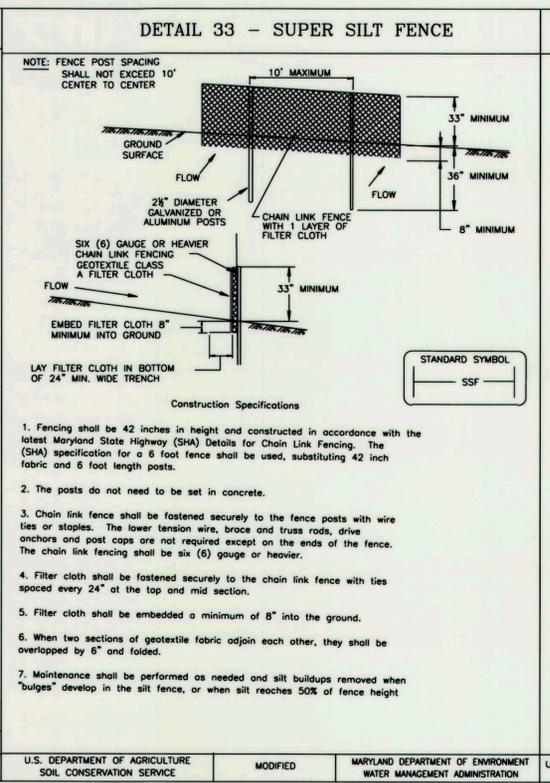
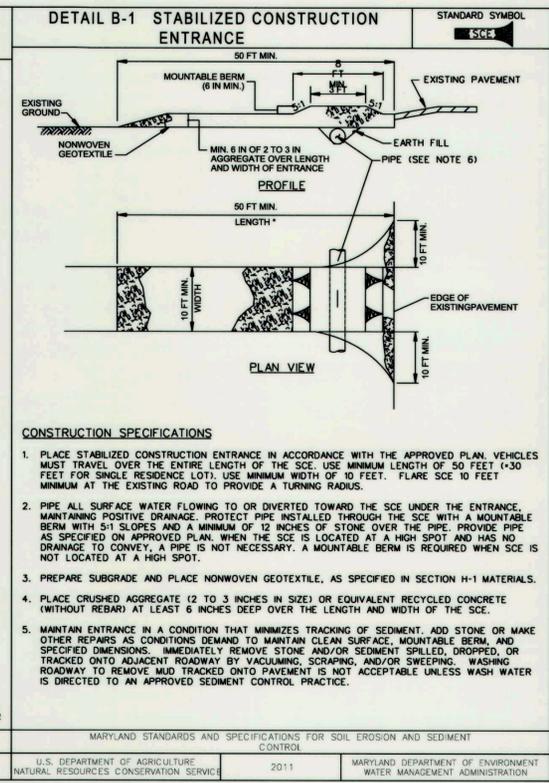
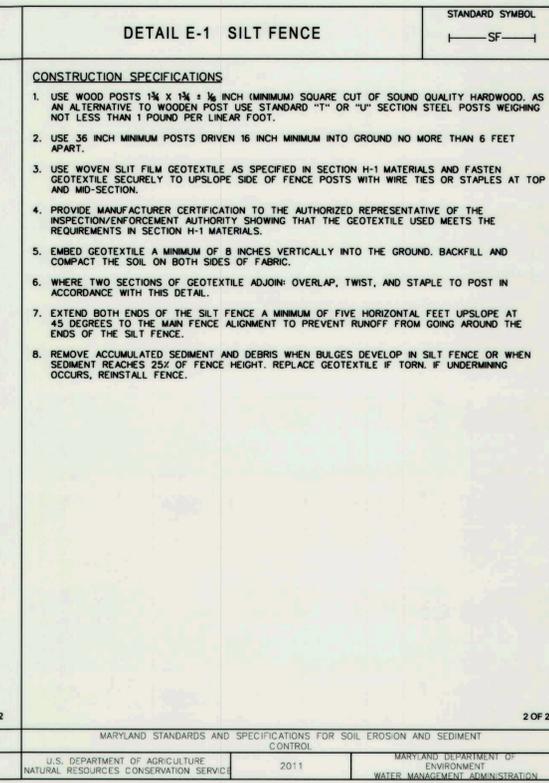
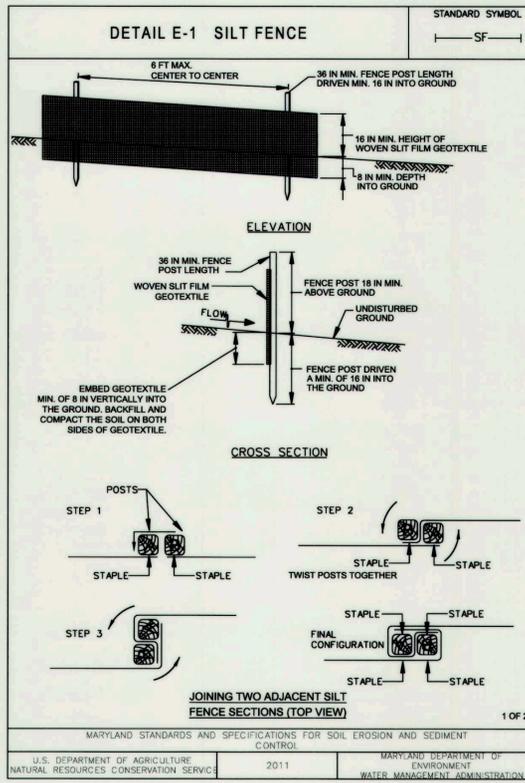
PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, RAYMOND J. KRAHE, PE, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 28634, EXPIRATION DATE: 2017-03-26.

DEPARTMENT OF PUBLIC WORKS, HOWARD COUNTY, MD

Raymond J. Krahe
CHIEF, BUREAU OF ENVIRONMENTAL SERVICES

3/12/16
DATE



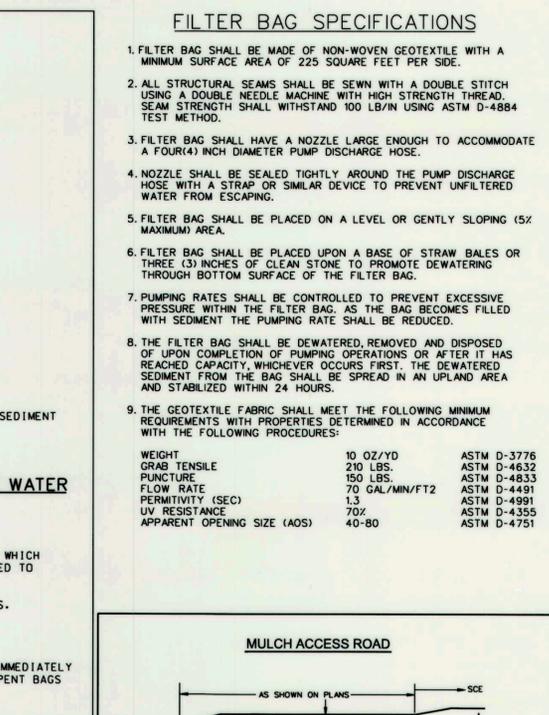
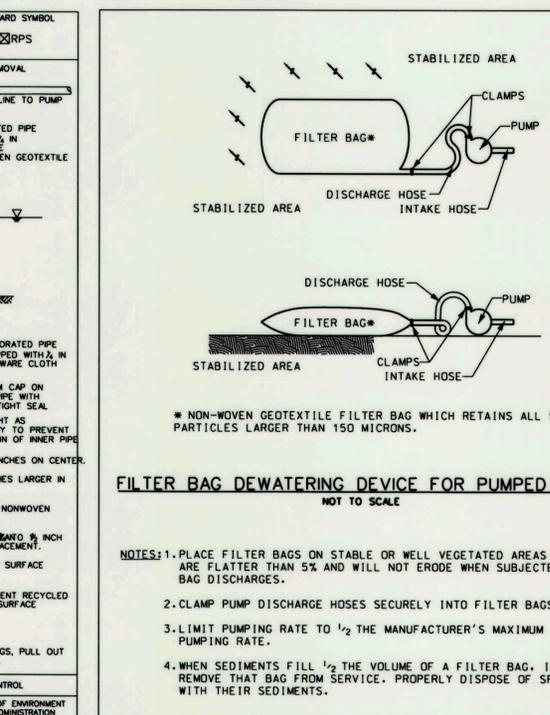
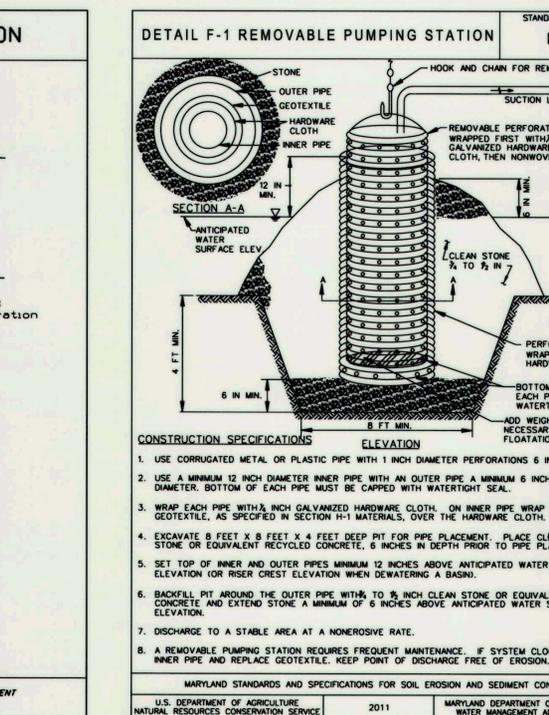
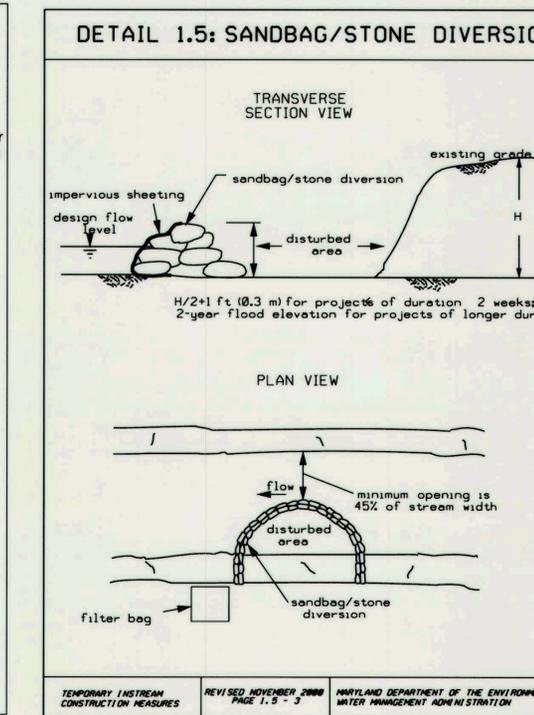
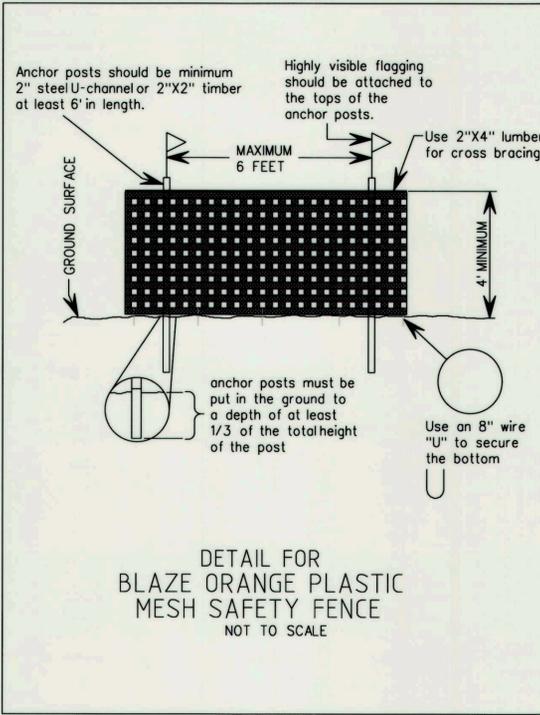


SUPER SILT FENCE

Design Criteria

Slope	Slope Steepness	Slope Length (maximum)	Silt Fence Length (maximum)
0 - 10%	0 - 10:1	Unlimited	Unlimited
10 - 20%	10:1 - 5:1	200 feet	1,500 feet
20 - 33%	5:1 - 3:1	100 feet	1,000 feet
33 - 50%	3:1 - 2:1	100 feet	500 feet
50% +	2:1 +	50 feet	250 feet

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE | MODIFIED | MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION | U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE | PAGE H - 26 - 3A | MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION



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DEPARTMENT OF PUBLIC WORKS, HOWARD COUNTY, MD

CHIEF, BUREAU OF ENVIRONMENTAL SERVICES

DATE

DATE

NO. REVISIONS DESCRIPTION

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FAX: (410) 316-7818
www.kci.com

KCI FILE: M.A. 2013 \ 17133314.37



LYNDWOOD MANOR
STORMWATER POND RETROFIT
CAPITAL PROJECT D-1160

HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS
STORMWATER MANAGEMENT DIVISION
6751 COLUMBIA GATEWAY DRIVE
COLUMBIA, MD 21046

EROSION & SEDIMENT CONTROL DETAILS

SCALE: AS SHOWN

DATE: JUNE 2016

KCI JOB NO.: 17133314.37

CAPITAL PROJECT NO.: D-1160

PERMIT ISSUE:

CONSTRUCTION ISSUE:

SHEET NO.: 8 OF 9

B-4-2 STANDARDS AND SPECIFICATIONS FOR SOIL PREPARATION, TOPSOILING, AND SOIL AMENDMENTS

Definition
The process of preparing the soils to sustain adequate vegetative stabilization.

Purpose
To provide a suitable soil medium for vegetative growth.

Conditions Where Practice Applies
Where vegetative stabilization is to be established.

Criteria
A. Soil Preparation

1. Temporary Stabilization
 - a. Seeded preparation consists of loosening soil to a depth of 3 to 5 inches by means of suitable agricultural or construction equipment, such as disc harrows or chiselplows or rippers mounted on construction equipment. After the soil is loosened, it must not be rolled or dragged smooth but left in the roughened condition. Slopes 3:1 or flatter are to be tracked with ridges running parallel to the contour of the slope.
 - b. Apply fertilizer and lime as prescribed on the plans.
 - c. Incorporate lime and fertilizer into the top 3 to 5 inches of soil by disking or other suitable means.
2. Permanent Stabilization
 - a. A soil test is required for any earth disturbance of 5 acres or more. The minimum soil conditions required for permanent vegetative establishment are:
 - i. Soil pH between 6.0 and 7.0.
 - ii. Soluble salts less than 500 parts per million (ppm).
 - iii. Soil contains less than 40 percent clay but enough fine grained material (greater than 30 percent silt plus clay) to provide the capacity to hold a moderate amount of moisture. An exception is loess soils which may contain up to 60 percent clay. Soil with less than 30 percent silt plus clay would be acceptable.
 - iv. Soil contains 1.5 percent minimum organic matter by weight.
 - v. Soil contains sufficient pore space to permit adequate root penetration.
 - b. Application of amendments as specified on the approved plan or as indicated by the results of a soil test.
 - c. Graded areas must be maintained in a true and even grade as specified on the approved plan, then scarified or otherwise loosened to a depth of 3 to 5 inches.
 - d. Apply soil amendments as specified on the approved plan or as indicated by the results of a soil test.
 - e. Mix soil amendments into the top 3 to 5 inches of soil by disking or other suitable means. Rake lawn areas to smooth the surface, remove large objects like stones and branches, and ready the area for seed application. Loosen surface soil by dragging with a heavy chain or other equipment to roughen the surface where site conditions will not permit normal seeded preparation. Track slopes 3:1 or flatter with tracked equipment leaving the soil in an irregular condition with ridges running parallel to the contour of the slope. Leave the top 1 to 3 inches of soil loose and friable. Seeded loosening may be unnecessary on newly disturbed areas.

B. Topsoiling

1. Topsoil is placed over prepared subsoil prior to establishment of permanent vegetation. The purpose is to provide a suitable soil medium for vegetative growth. Soils of concern have low moisture content, low nutrient levels, low pH, materials toxic to plants, and/or unacceptable soil gradation.
2. Topsoil salvaged from an existing site may be used provided it meets the standards set forth in these specifications. Typically, the depth of topsoil to be salvaged for a given soil type can be found in the representative soil profile section in the Soil Survey published by USDA-NRCS.
3. Topsoiling is limited to areas having 2:1 or flatter slopes where:
 - a. The texture of the exposed subsoil/parent material is not adequate to produce vegetative growth.
 - b. The soil material is so shallow that the rooting zone is not deep enough to support plants or furnish continuing supplies of moisture and plant nutrients.
 - c. The original soil to be vegetated contains material toxic to plant growth.
 - d. The soil is so acidic that treatment with limestone is not feasible.
4. Areas having slopes steeper than 2:1 require special consideration and design.
5. Topsoil Specifications: Soil to be used as topsoil must meet the following criteria:
 - a. Topsoil must be a loam, sandy loam, clay loam, silt loam, sandy clay loam, or loamy sand. Other soils may be used if recommended by an agronomist or soil scientist and approved by the appropriate approval authority. Topsoil must not be a mixture of contrasting textured subsoils and must contain less than 5 percent by volume of cinders, stones, slag, coarse fragments, gravel, sticks, roots, trash, or other materials larger than 1/2 inches in diameter.
 - b. Topsoil must be free of noxious plants or plant parts such as Bermuda grass, quack grass, Johnson grass, nut sedge, poison ivy, thistle, or others as specified.
 - c. Topsoil substitutes or amendments, as recommended by a qualified agronomist or soil scientist and approved by the appropriate approval authority, may be used in lieu of natural topsoil.

C. Soil Amendments (Fertilizer and Lime Specifications)

1. Soil tests must be performed to determine the exact ratios and application rates for both lime and fertilizer on sites having disturbed areas of 5 acres or more. Soil analysis may be performed by a recognized private or commercial laboratory. Soil samples taken for engineering purposes may also be used for chemical analysis.
2. Fertilizers must be uniform in composition, free flowing and suitable for accurate application by appropriate equipment. Manure may be substituted for fertilizer with prior approval from the appropriate approval authority. Fertilizers must all be delivered to the site fully labeled according to the applicable laws and must bear the name, trade name or trademark and warranty of the producer.
3. Lime materials must be ground limestone (hydrated or burnt lime may be substituted except when hydrosowing) which contains at least 50 percent total oxides (calcium oxide plus magnesium oxide). Limestone must be ground to such fineness that at least 50 percent will pass through a #100 mesh sieve and 98 to 100 percent will pass through a #20 mesh sieve.
4. Lime and fertilizer are to be evenly distributed and incorporated into the top 3 to 5 inches of soil by disking or other suitable means.
5. Where the subsoil is either highly acidic or composed of heavy clays, spread ground limestone at the rate of 4 to 8 tons/acre (200-400 pounds per 1,000 square feet) prior to the placement of topsoil.

B-4-3 STANDARDS AND SPECIFICATIONS FOR SEEDING AND MULCHING

Definition
The application of seed and mulch to establish vegetative cover.

Purpose
To protect disturbed soils from erosion during and at the end of construction.

Conditions Where Practice Applies
To the surface of all perimeter controls, slopes, and any disturbed area not under active grading.

Criteria
A. Seeding

1. Specifications
 - a. All seed must meet the requirements of the Maryland State Seed Law. All seed must be subject to re-testing by a recognized seed laboratory. All seed used must have been tested within the 6 months immediately preceding the date of sowing such material on any project. Refer to Table B.4 regarding the quality of seed. Seed lots must be available upon request to the inspector to verify type of seed and seeding rate.
 - b. Mulch alone may be applied between the fall and spring seeding dates only if the ground is frozen. The appropriate seeding mixture must be applied when the ground thaws.
 - c. Inoculants: The inoculant for treating legume seed in the seed mixtures must be a pure culture of nitrogen fixing bacteria prepared specifically for the species. Inoculants must not be used later than the date indicated on the container. Add fresh inoculants as directed on the package. Use four times the recommended rate when hydrosowing. Note it is very important to keep inoculants as cool as possible until used. Temperatures above 75 to 80 degrees Fahrenheit can weaken bacteria and make the inoculant less effective.
 - d. Sod or seed must not be placed on soil which has been treated with soil sterilants or chemicals used for weed control unless sufficient time has elapsed (14 days min.) to permit dissipation of phytotoxic materials.
2. Application
 - a. Dry Seeding: This includes use of conventional drop or broadcast spreaders.
 - i. Incorporate seed into the subsoil at the rates prescribed on Temporary Seeding Table B.1, Permanent Seeding Table B.3, or site-specific seeding summaries.
 - ii. Apply seed in two directions, perpendicular to each other. Apply half the seeding rate in each direction. Roll the seeded area with a weighted roller to provide good seed to soil contact.
 - b. Drill or Cultivator Seeding: Mechanized seeders that apply and cover seed with soil.
 - i. Cultivating seeders are required to bury the seed in such a fashion as to provide at least 1/4 inch of soil covering. Seeded must be firm after planting.
 - ii. Apply seed in two directions, perpendicular to each other. Apply half the seeding rate in each direction.
 - c. Hydrosowing: Apply seed uniformly with hydroseder (slurry includes seed and fertilizer).
 - i. If fertilizer is being applied at the time of seeding, the application rates should not exceed the following: nitrogen, 100 pounds per acre; total soluble nitrogen: P2O5 (phosphorous), 200 pounds per acre; K2O (potassium), 200 pounds per acre.
 - ii. Lime: Use only ground agricultural limestone (up to 3 tons per acre may be applied by hydrosowing). Normally, not more than 2 tons are applied by hydrosowing at any one time. Do not use burnt or hydrated lime when hydrosowing.
 - iii. Mix seed and fertilizer on site and seed immediately and without interruption.
 - iv. When hydrosowing do not incorporate seed into the soil.

B. Mulching

1. Mulch Materials (in order of preference)
 - a. Straw consisting of thoroughly threshed wheat, rye, oat, or barley and reasonably bright in color. Straw is to be free of noxious weed seeds as specified in the Maryland Seed Law and not musty, moldy, caked, decayed, or excessively dirty. Note: Use only sterile straw mulch in areas where one species of grass is desired.
 - b. Wood Cellulose Fiber Mulch (WCFFM) consisting of specially prepared wood cellulose processed into a uniform fibrous physical state.
 - i. WCFFM is to 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.
 - ii. WCFFM, including dye, must contain no germination or growth inhibiting factors.
 - iii. WCFFM materials are to 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 must form a blotter-like ground cover, on application, having moisture absorption and percolation properties and must cover and hold grass seed in contact with the soil without inhibiting the growth of the grass seedlings.
 - iv. WCFFM material must not contain elements or compounds at concentration levels that will be phytotoxic.
 - v. WCFFM must conform to the following physical requirements: fiber length of approximately 10 millimeters, diameter approximately 1 millimeter, pH range of 4.0 to 8.5, ash content of 1.6 percent maximum and water holding capacity of 90 percent minimum.
2. Application
 - a. Apply mulch to all seeded areas immediately after seeding.
 - b. When straw mulch is used, spread it over all seeded areas at the rate of 2 tons per acre to a uniform loose depth of 1 to 2 inches. Apply mulch to achieve a uniform distribution and depth so that the soil surface is not exposed. When using a mulch anchoring tool, increase the application rate to 2.5 tons per acre.
 - c. Wood cellulose fiber used as mulch must be applied at a net dry weight of 1500 pounds per acre. Mix the wood cellulose fiber with water to obtain a mixture with a maximum of 50 pounds of wood cellulose fiber per 100 gallons of water.
3. Anchoring
 - a. Perform mulch anchoring immediately following application of mulch to minimize loss by wind or water. This may be done by one of the following methods (listed by preference), depending upon the size of the area and erosion hazard:
 - i. A mulch anchoring tool is a tractor drawn implement designed to punch and anchor mulch into the soil surface a minimum of 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 follow the contour.
 - ii. Wood cellulose fiber may be used for anchoring straw. Apply the fiber binder at a net dry weight of 750 pounds per acre. Mix the wood cellulose fiber with water at a maximum of 50 pounds of wood cellulose fiber per 100 gallons of water.
 - iii. Synthetic binders such as Acrylic DLR (Agra-Tack), DCA-70, Petrosol, Terra Tax II, Terra Tack AR or other approved equal may be used. Follow application rates as specified by the manufacturer. Application of liquid binders needs to be heavier at the edges where wind catches mulch, such as in valleys and on crests of banks. Use of asphalt binders is strictly prohibited.
 - iv. Lightweight plastic netting may be stapled over the mulch according to manufacturer recommendations. Netting is usually available in rolls 4 to 15 feet wide and 300 to 3,000 feet long.

B-4-4 STANDARDS AND SPECIFICATIONS FOR STOCKPILE AREA

Definition
A mound or pile of soil protected by appropriately designed erosion and sediment control measures.

Purpose
To provide a designated location for the temporary storage of soil that controls the potential for erosion, sedimentation, and changes to drainage patterns.

Conditions Where Practice Applies
Stockpile areas are utilized when it is necessary to salvage and store soil for later use.

Criteria

1. The stockpile location and all related sediment control practices must be clearly indicated on the erosion and sediment control plan.
2. The footprint of the stockpile must be sized to accommodate the anticipated volume of material and based on a side slope ratio no steeper than 2:1. Benching must be provided in accordance with Section B-3 Land Grading.
3. Runoff from the stockpile area must drain to a suitable sediment control practice.
4. Access to the stockpile area from the upgrade shall be maintained.
5. Clear water runoff into the stockpile area must be minimized by use of a diversion device such as an earth dike, temporary swale or diversion fence. Provisions must be made for discharging concentrated flow in a non-erosive manner.
6. Where runoff concentrates along the toe of the stockpile fill, an appropriate erosion/sediment control practice must be used to intercept the discharge.
7. Stockpiles must be stabilized in accordance with the 3/7 day stabilization requirement as well as Standard B-4-1 Incremental Stabilization and Standard B-4-4 Temporary Stabilization.
8. If the stockpile is located on an imperious surface, a liner should be provided below the stockpile to facilitate cleanup. Stockpiles containing contaminated material must be covered with impermeable sheeting.

Maintenance

The stockpile area must continuously meet the requirements for Adequate Vegetative Establishment in accordance with Section B-4 Vegetative Stabilization. Side slopes must be maintained at no steeper than a 2:1 ratio. The stockpile area must be kept free of erosion. If the vertical height of a stockpile exceeds 20 feet for 2:1 slopes, 30 feet for 3:1 slopes, or 40 feet for 4:1 slopes, benching must be provided in accordance with Section B-3 Land Grading.

B-4-5 STANDARDS AND SPECIFICATIONS FOR PERMANENT STABILIZATION

Definition
To stabilize disturbed soils with permanent vegetation.

Purpose
To use long-lived perennial grasses and legumes to establish permanent ground cover on disturbed soils.

Conditions Where Practice Applies
Exposed soils where ground cover is needed for 6 months or more.

Criteria
A. Seed Mixtures

1. General Use
 - a. Select one or more of the species or mixtures listed in Table B.3 for the appropriate Plant Hardiness Zone (from Figure B.3) and based on the site condition or purpose found on Table B.2. Enter selected mixtures, application rates, and seeding dates in the Permanent Seeding Summary. The Summary is to be placed on the plan.
 - b. Additional planting specifications for exceptional sites such as shorelines, stream banks, or dunes or for special purposes such as wildlife or aesthetic treatment may be found in USDA-NRCS Technical Field Office Guide, Section 342 - Critical Area Planting.
 - c. For sites having disturbed area over 5 acres, use and show the rates recommended by the soil testing agency.
 - d. For areas receiving low maintenance, apply urea form fertilizer (46-0-0) at 3 1/2 pounds per 1000 square feet (150 pounds per acre) at the time of seeding in addition to the soil amendments shown in the Permanent Seeding Summary.
2. Turfgrass Mixtures
 - a. Areas where turfgrasses may be desired include lawns, parks, playgrounds, and commercial sites which will receive a medium to high level of maintenance.
 - b. Select one or more of the species or mixtures listed below based on the site conditions or purpose. Enter selected mixtures, application rates, and seeding dates in the Permanent Seeding Summary. The summary is to be placed on the plan.
 - i. Kentucky Bluegrass: Full Sun Mixture: For use in areas that receive intensive management. Irrigation required in the areas of central Maryland and Eastern Shore. Recommended Certified Kentucky Bluegrass Cultivars Seeding Rate: 1.5 to 2.0 pounds per 1000 square feet. Choose a minimum of three Kentucky Bluegrass cultivars with each ranging from 10 to 35 percent of the total mixture by weight.
 - ii. Kentucky Bluegrass/Perennial Rye: Full Sun Mixture: For use in full sun areas where

B.21

1. Seeding rates for the warm-season grasses are in pounds of Pure Live Seed (PLS). Actual planting rates shall be adjusted to reflect percent seed germination and purity, as tested. Adjustments are usually not needed for the cool-season.
2. Seeding rates listed above are for temporary seedings, when planted alone. When planted as a nurse crop with permanent seed mixes, use 1/3 of the seeding rate listed above for barley, oats, and wheat. For smaller-seeded grasses (annual ryegrass, pearl millet, foxtail millet), do not exceed more than 5/2 (by weight) of the overall permanent seed mix. Cereal rye generally should not be used as a nurse crop, unless planting will occur in very late fall beyond the seeding dates for other temporary seedings. Cereal rye has allelopathic properties that inhibit the germination and growth of other plants. If it must be used as a nurse crop, seed at 1/3 of the rate listed above.
3. Oats are the recommended nurse crop for warm-season grasses.
4. For sandy soils, plant seeds at twice the depth listed above.
5. The planting dates listed are averages for each Zone and may require adjustment to reflect local conditions, especially near the boundaries of the zone.

B-4-1 STANDARDS AND SPECIFICATIONS FOR INCREMENTAL STABILIZATION

1. Construct and stabilize fill slopes in increments not to exceed 15 feet in height. Prepare seedbed and apply seed and mulch on all slopes as the work progresses.
2. Stabilize slopes immediately when the vertical height of a lift reaches 15 feet, or when the grading operation ceases as prescribed in the plans.
3. At the end of each day, install temporary water conveyance practice(s), as necessary, to intercept surface runoff and convey it down the slope in a non-erosive manner.
4. Construction sequences example (Refer to Figure B.2):
 - a. Construct and stabilize all temporary swales or dikes that will be used to divert runoff around the fill. Construct all fences on low side of fill unless other methods shown on the plans address this area.
 - b. At the end of each day, install temporary water conveyance practice(s), as necessary, to intercept surface runoff and convey it down the slope in a non-erosive manner.
 - c. Place Phase 1 fill, prepare seedbed, and stabilize.
 - d. Place Phase 2 fill, prepare seedbed, and stabilize.
 - e. Place final phase fill, prepare seedbed, 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.

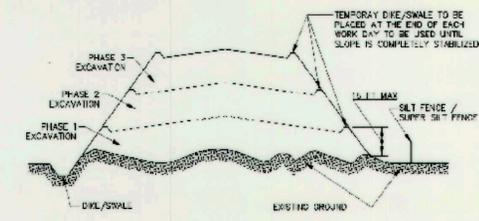


Figure B.2 Incremental Stabilization - Fill

B.11

Permanent Seeding Summary

No.	Species	Application Rate (lb/acre)	Seeding Dates	Seeding Depths	Fertilizer Rate (10-20-20)			Lime Rate
					N	P ₂ O ₅	K ₂ O	
*3	Canada Wildrye	3	Feb. 15 to Apr. 30	1/4 - 1/2 in	45 pounds per acre (1.0 lb/1000 sf)	90 lb/acre (2 lb/1000 sf)	90 lb/acre (2 lb/1000 sf)	2 tons/acre (90 lb/1000 sf)
	Red Top	1	May 1 to May 31	1/4 - 1/2 in				
	Common Lespedeza	10		1/4 - 1/2 in				

B-4-4 STANDARDS AND SPECIFICATIONS FOR TEMPORARY STABILIZATION

Definition
To stabilize disturbed soils with vegetation for up to 6 months.

Purpose
To use fast growing vegetation that provides cover on disturbed soils.

Conditions Where Practice Applies
Exposed soils where ground cover is needed for a period of 6 months or less. For longer duration of time, permanent stabilization practices are required.

Criteria

1. Select one or more of the species or seed mixtures listed in Table B.1 for the appropriate Plant Hardiness Zone (from Figure B.3), and enter them in the Temporary Seeding Summary below along with application rates, seeding dates and seeding depths. If this Summary is not put on the plan and completed, then Table B.1 plus fertilizer and lime rates must be put on the plan.
2. For sites having soil tests performed, use and show the recommended rates by the testing agency. Soil tests are not required for Temporary Seeding.
3. When stabilization is required outside of a seeding season, apply seed and mulch or straw mulch alone as prescribed in Section B-4-3.A.1.b and maintain until the next seeding season.

Temporary Seeding Summary

No.	Species	Application Rate (lb/acre)	Seeding Dates	Seeding Depths	Fertilizer Rate (10-20-20)	Lime Rate
	Annual Ryegrass	40	Feb. 15 to Apr. 30 & Aug. 15 to Nov. 30		436 lb/acre (10 lb/1000 sf)	2 tons/acre (90 lb/1000 sf)
	Barley	96				
	Foxtail Millet	30	May 1 to Aug. 15			

NOTES:

1. Seeding rates for the warm-season grasses are in pounds of Pure Live Seed (PLS). Actual planting rates shall be adjusted to reflect percent seed germination and purity, as tested. Adjustments are usually not needed for the cool-season.
2. Seeding rates listed above are for temporary seedings, when planted alone. When planted as a nurse crop with permanent seed mixes, use 1/3 of the seeding rate listed above for barley, oats, and wheat. For smaller-seeded grasses (annual ryegrass, pearl millet, foxtail millet), do not exceed more than 5/2 (by weight) of the overall permanent seed mix. Cereal rye generally should not be used as a nurse crop, unless planting will occur in very late fall beyond the seeding dates for other temporary seedings. Cereal rye has allelopathic properties that inhibit the germination and growth of other plants. If it must be used as a nurse crop, seed at 1/3 of the rate listed above.
3. Oats are the recommended nurse crop for warm-season grasses.
4. For sandy soils, plant seeds at twice the depth listed above.
5. The planting dates listed are averages for each Zone and may require adjustment to reflect local conditions, especially near the boundaries of the zone.

DEPARTMENT OF PUBLIC WORKS, HOWARD COUNTY, MD
 [Signature]
 CHIEF, BUREAU OF ENVIRONMENTAL SERVICES

9/2/16
 DATE



PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, RAYMOND J. KRAHE, PE, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. LICENSE NO. 28634 EXPIRATION DATE: 2017-03-26

NO.	REVISIONS DESCRIPTION	DATE

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LYNDWOOD MANOR
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 CAPITAL PROJECT D-1160
 HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS
 STORMWATER MANAGEMENT DIVISION
 6751 COLUMBIA GARDEN DRIVE
 COLUMBIA, MD 21048

EROSION & SEDIMENT CONTROL NOTES

SCALE:	AS SHOWN
DATE:	JUNE 2016
KCI JOB NO.:	17133314.37
CAPITAL PROJECT NO.:	D-1160
PERMIT ISSUE:	
CONSTRUCTION ISSUE:	
SHEET NO.:	9 OF 9