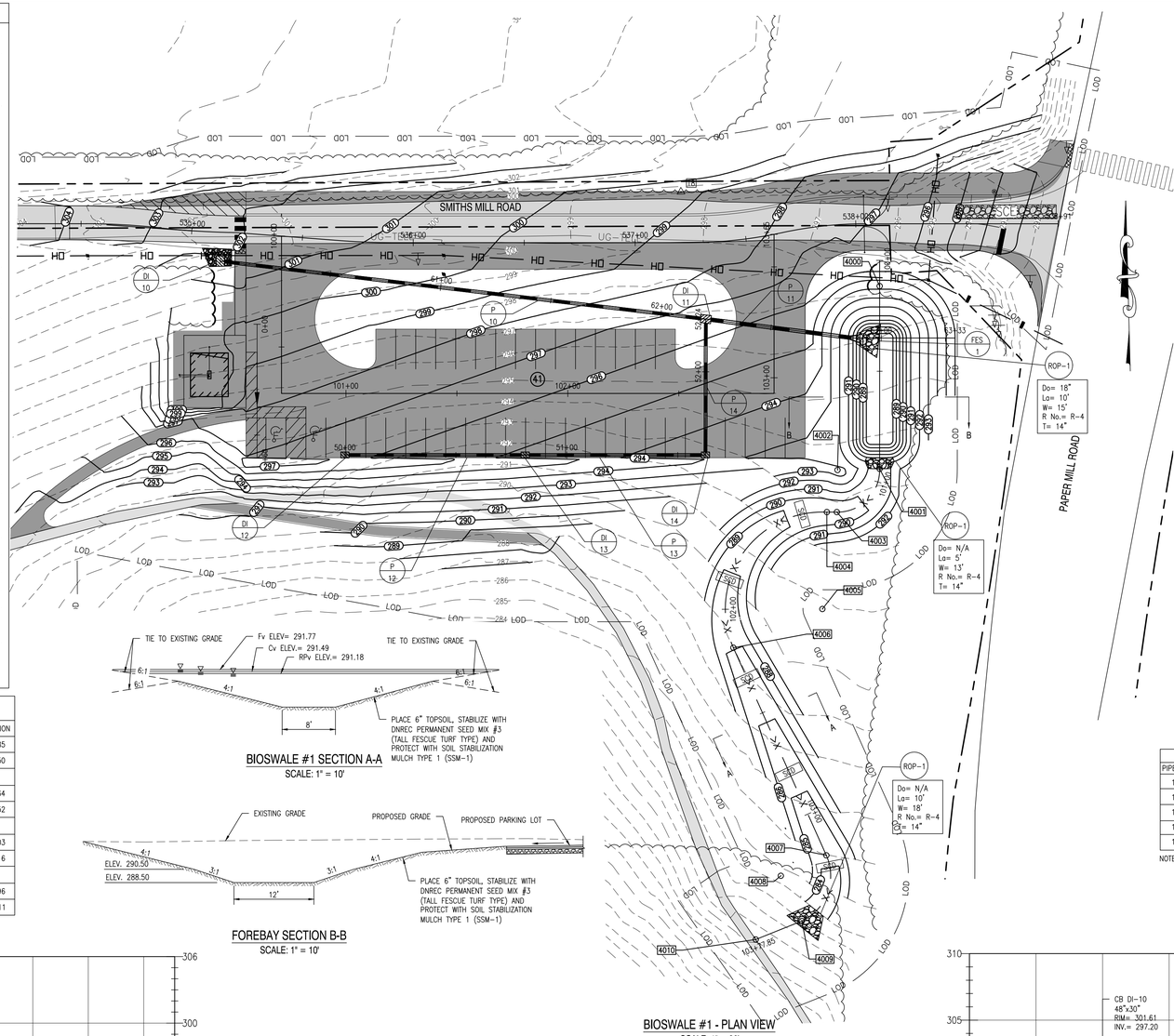
LEGEND

- EXISTING PROPERTY LINE
- EXISTING RIGHT OF WAY — EXISTING RIGHT OF WAY
- EXISTING FLOOD PLAIN — FP
- EXISTING FENCELINE — X — X
- PROPOSED SAWCUT — SAW
- EXISTING BUILDING
- EXISTING UTILITY POLE
- EXISTING MANHOLE
- PROPOSED BOLLARD
- PROPOSED SIGN
- EXISTING CONTOUR — 177
- PROPOSED CONTOUR — 177
- WETLANDS LINE
- ORDINARY HIGH WATER LINE — OHW — OHW
- 2007 TREELINE
- 2007 SINGLE FAMILY RESIDENTIAL AREA
- LIMITS OF DISTURBANCE — LOD — LOD
- SOIL GROUP BOUNDARY
- STREAM BOUNDARY
- EXISTING IMPERVIOUS
- PROPOSED IMPERVIOUS
- OVERLAY
- SILT FENCE — SF
- COMPOST FILTER LOG — CFL
- STABILIZED CONSTRUCTION ENTRANCE
- REINFORCED SILT FENCE — RSF — RSF
- SUPER SILT FENCE — SSF — SSF
- SENSITIVE AREA PROTECTION — SAP
- DRAINAGE AREA BOUNDARY
- TIME OF CONCENTRATION PATH — >TC — >TC
- FILTER STRIP LOCATION
- BIOSWALE — >X — >X
- STONE CHECK DAM — SCD
- LIDAR CONTOUR — 177

BIOSWALE LAYOUT

POINT NO.	DESCRIPTION	NORTHING	EASTING	ELEVATION
4000	POB STA. 100+00.00	629427.3777	568359.2381	296.85
4001	PVC STA. 100+82.41	629345.0014	568357.0583	290.50
4002	RADIUS – 19.00'	629344.9865	568338.0583	
4003	PVT STA. 101+13.08	629326.0041	568337.2411	289.64
4004	PVC STA. 101+17.58	629326.1238	568332.7427	289.52
4005	PVT STA. 102+06.23	629282.4979	568329.5854	
4006	PVT STA. 102+06.23	629266.1275	568289.0244	287.03
4007	PVC STA. 103+08.82	629171.4135	568328.4400	284.16
4008	RADIUS – 23.00'	629162.7503	568307.6746	
4009	PVT STA. 103+43.83	629142.1128	568316.6381	282.96
4010	POE STA. 103+66.26	629134.3280	568295.6097	280.11



BIOSWALE #1 SECTION A-A
SCALE: 1" = 10'

FOREBAY SECTION B-B
SCALE: 1" = 10'

BIOSWALE #1 - PLAN VIEW
SCALE: 1" = 30'

BIOSWALE SEQUENCE OF CONSTRUCTION

1. BEFORE SITE WORK BEGINS, BIOSWALE BOUNDARY SHOULD BE CLEARLY MARKED.
2. INSTALL ALL TEMPORARY EROSION AND SEDIMENT CONTROLS AS SHOWN ON THE SEDIMENT AND STORMWATER MANAGEMENT PLAN.
3. GRADE THE BIOSWALE AND SEDIMENT FOREBAY TO THE FINAL DIMENSIONS SHOWN ON THE PLAN. EXCAVATORS OR BACKHOES SHOULD WORK FROM THE SIDES TO GRADE AND EXCAVATE THE BIOSWALE TO THE APPROPRIATE DESIGN DIMENSIONS. EXCAVATING EQUIPMENT SHOULD HAVE SCOOPS WITH ADEQUATE REACH SO THEY DO NOT HAVE TO SIT INSIDE THE FOOTPRINT OF THE BIOSWALE CHANNEL AREA. ALL EXCAVATED MATERIAL SHOULD BE STOCKPILED AS SHOWN ON THE SEDIMENT AND STORMWATER PLANS.
4. INSTALL CHECK DAMS WITHIN THE CHANNEL AS SHOWN ON THE PLAN. THE TOP OF EACH CHECK SHOULD BE CONSTRUCTED LEVEL AT THE DESIGN ELEVATION. SEE DETAIL SHEET SWM1.4.
5. SEED THE BOTTOM AND BANKS OF THE BIOSWALE CHANNEL AND INSTALL EROSION CONTROL MATTING, SSM-1. SEED TYPE SHOULD INCLUDE SEED MIX #3 (TALL FESCUE TURF TYPE). SOD SHALL NOT BE USED IN LIEU OF SEED. SEE DETAIL SHEET SWM1.3.
6. EROSION AND SEDIMENT CONTROLS FOR THE BIOSWALE SHALL NOT BE REMOVED UNTIL THE BIOSWALE HAS ACHIEVED A MINIMUM 70% VEGETATED COVER UPON COMPLETION AND APPROVAL FROM THE SITE CCR.
7. CONDUCT THE FINAL CONSTRUCTION INSPECTION AND DEVELOP A PUNCH-LIST FOR FACILITY ACCEPTANCE.

GENERAL NOTES

1. THE DNREC SEDIMENT AND STORMWATER PROGRAM RESERVES THE RIGHT TO ENTER PRIVATE PROPERTY FOR PURPOSES OF PERIODIC SITE REVIEWS.
2. THE DNREC SEDIMENT AND STORMWATER PROGRAM SHALL BE NOTIFIED WITHIN 30 BUSINESS DAYS IF THE PROPERTY OWNERSHIP IS TRANSFERRED TO A NEW PERSON OR ENTITY.
3. THE DNREC SEDIMENT AND STORMWATER PROGRAM MAY SEEK ENFORCEMENT ACTION AGAINST ANY OWNER DEEMED NEGLIGENT IN FULFILLING THE OPERATION AND MAINTENANCE REQUIREMENTS OF THE DELAWARE SEDIMENT AND STORMWATER REGULATIONS.
4. THE DNREC SEDIMENT AND STORMWATER PROGRAM SHALL BE CONTACTED IF A CONCERN ARISES REGARDING A STORMWATER MANAGEMENT FACILITY, BEFORE ANY NON-ROUTINE MAINTENANCE, OR IF MODIFICATIONS TO THE FACILITY ARE DESIRED.
5. ANY DESIGN MODIFICATIONS MADE TO THE STORMWATER SYSTEM SHALL REQUIRE THE CREATION OF A NEW POST CONSTRUCTION STORMWATER MANAGEMENT PLAN AND/OR OPERATIONS AND MAINTENANCE PLAN, WITH APPROVAL OF THE PLAN(S) BY THE DNREC SEDIMENT AND STORMWATER PROGRAM.
6. FOR ALL STORMWATER EASEMENT AREAS (I.E., ACCESS, MAINTENANCE, OR OFFSITE) AND THE MINIMUM 10-FOOT WIDE ACCESSWAYS TO ALL STORMWATER FACILITIES AND THEIR STRUCTURAL COMPONENTS, REGULAR MOWING SHALL BE PERFORMED TO KEEP THE GRASS 6" OR LESS; NO TREES OR SHRUBS SHALL BE PLANTED, AND ANY FOUND GROWING SHALL BE REMOVED; AND NO PERMANENT STRUCTURES, SUCH AS FENCES OR SHEDS, SHALL BE LOCATED WITHIN THE EASEMENT OR ACCESSWAY.
7. TREES SHALL NOT BE PLANTED, AND SHALL BE REMOVED IF FOUND GROWING, ON AND WITHIN 15 FEET OF ALL POND EMBANKMENTS, ON POND SLOPES OR SAFETY BENCHES, AND WITHIN 10 FEET OF STRUCTURAL COMPONENTS, SUCH AS PIPE INLETS.
8. WHEN THE FACILITY IS EXCAVATED TO REMOVE ACCUMULATED SEDIMENT, THE DISPOSAL AREA SHALL BE PERMANENTLY STABILIZED SO THAT IT DOES NOT RECREATE AN EROSION PROBLEM. ANY MATERIAL TAKEN OFF-SITE SHALL STILL BE UTILIZED OR DISPOSED OF IN AN APPROVED DNREC MANNER.
9. BEFORE ANY EARTHWORK OR EXCAVATION TAKES PLACE, THE CONTRACTOR SHALL CALL MISS UTILITY AT 811 OR 1.800.282.8555 AT LEAST 48 HOURS PRIOR TO CONSTRUCTION, TO HAVE ALL EXISTING UTILITIES MARKED ONSITE.

DRAINAGE INLET SCHEDULE

INLET ID	FRAME & GRATE	TOP ELEV.	INV. ELEV.
10	48"x30"/ TYPE 3	301.61	297.20
11	48"x30"/ TYPE 3	296.50	290.71
12	34"x24"/ TYPE 1	296.27	293.05
13	34"x24"/ TYPE 1	294.83	291.67
14	34"x24"/ TYPE 1	293.39	290.89

FLARED END SECTION SCHEDULE

FES ID	SIZE TYPE	SLOPE	SAFETY GRATE
1	18" HDPE	0.0030	NO

DRAINAGE PIPE SCHEDULE

PIPE ID	LENGTH	SIZE	TYPE	CLASS	SLOPE	INLET INVERT	OUTLET INVERT
10	210 L.F.	15"	HDPE	TYPE S	0.0200	297.20	293.00
11	70 L.F.	18"	HDPE	TYPE S	0.0030	290.71	290.50
12	79 L.F.	15"	HDPE	TYPE S	0.0150	293.05	291.87
13	78 L.F.	15"	HDPE	TYPE S	0.0100	291.67	290.89
14	60 L.F.	15"	HDPE	TYPE S	0.0030	290.71	290.89

NOTE: MANUFACTURER REQUIREMENTS SHALL BE FOLLOWED FOR A WATERTIGHT CONNECTION BETWEEN THE HDPE PIPE AND CONCRETE DRAINAGE INLET. PIPE OPENING IN CONCRETE DRAINAGE INLET MAY NEED TO BE PRE-CAST LARGER THAN STANDARD TO ALLOW FOR THE CONNECTION.

BIOSWALE MAINTENANCE NOTES

FUNCTION:
SWALES CONVEY STORMWATER TO A STORMWATER FACILITY OR DOWNSTREAM. BIOSWALES ARE SPECIALLY DESIGNED TO ABSORB WATER AND REMOVE POLLUTANTS.

INSPECTION:
SEMI-ANNUAL (SPRING AND FALL) AND AFTER STORM EVENTS OF 2 INCHES OR MORE.

TRASH AND DEBRIS:
REMOVE TRASH AND DEBRIS ON A REGULAR BASIS.

SOIL:
SOIL SHOULD BE TESTED ANNUALLY TO ENSURE PROPER PH AND FERTILITY INCLUDING: ORGANIC MATTER, MAGNESIUM (MG), PHOSPHORUS (P2O5), NITROGEN (N), POTASSIUM (K2O), AND SOLUBLE SALTS. IF REQUIRED, FERTILIZER SHOULD ONLY BE APPLIED IN THE FALL.

EROSION:
STABILIZE APPLICABLE ERODED AREAS WITH ROLLED EROSION CONTROL PRODUCTS (RECP) OR TURF REINFORCING MATS (TRM), AS REQUIRED. IF RECP IS APPLIED, IT IS RECOMMENDED TO USE TRULY BIODEGRADABLE PRODUCTS TO AID IN MOWING MAINTENANCE AND DETER WILDLIFE ENTANGLEMENT. THESE PRODUCTS CAN BE RECOGNIZED AS HAVING "BN" FOR BIONETTING OR "B" FOR BIODEGRADABLE.

MOWING:
IF TURF COVER IS USED MOW REGULARLY (WEEKLY FROM APRIL TO NOVEMBER). MOW NO LOWER THAN 6 INCHES TO MAINTAIN DESIRED DESIGN HEIGHT. THE VEGETATION HEIGHT SHOULD BE 2 TIMES THE DEPTH OF FLOW DURING THE QUALITY STORM. THE VEGETATION HEIGHT SHOULD BE A MINIMUM OF 4-INCHES.

FOR NATIVE GRASSES:
CUT DOWN STANDING STALKS TO 12 INCHES IN SPRING (MID-MARCH), JUST BEFORE NEW GROWTH EMERGES. SELECTIVELY HAND-APPLY AN APPROPRIATE HERBICIDE WITH A CUT STUMP APPLICATOR OR DIRECTED FOLIAR SPRAYS. FOR LARGE PROJECTS A PROFESSIONAL CONTRACTOR IS RECOMMENDED. RESEED AND/OR REPLANT AS REQUIRED BASED UPON INSPECTION FINDINGS.

BUFFERS:
NA

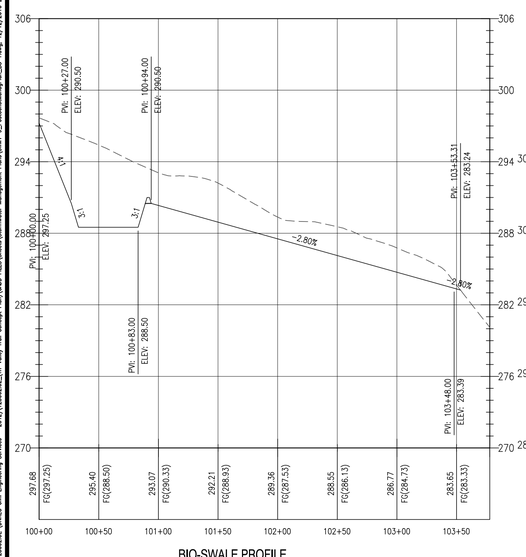
FENCING:
NA

CHECK DAMS:
REMOVE MATERIALS THAT ACCUMULATE ON THE UPSTREAM FACE OF THE CHECK DAMS. REMOVE ALL VEGETATION THAT EXTENDS ROOTS WITHIN THE CHECK DAMS MANUALLY AND APPLY HERBICIDES AS NECESSARY TO ELIMINATE HERBACEOUS SPECIES WITH PERPSISTENT ROOTS. IF FINES HAVE ACCUMULATED WITHIN THE FILTER STONE, POWER-WASHING OR PRESSURE JET EQUIPMENT SHALL BE USED TO REMOVE THE FINES. THE NOZZLE OF SUCH EQUIPMENT SHALL BE INSERTED BETWEEN THE REAR FACE STONES OF THE CHECK DAM TO FORCE THE ACCUMULATED FINES BACK OUT THE FRONT OF THE CHECK DAM. IF ACCUMULATION IS EXTENSIVE, IT MAY BE NECESSARY TO OPEN UP THE GABION TOP, REMOVE THE FACE STONE AND ENOUGH FILLER STONE TO PERMIT ACCESS BY PRESSURE WASHING EQUIPMENT.

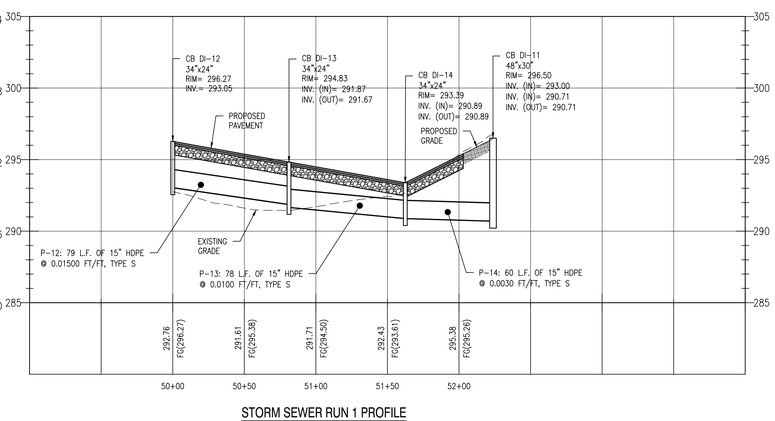
SEDIMENT FOREBAYS:
WHERE SEDIMENT FOREBAYS ARE PROVIDED, REMOVE SEDIMENTS ACCUMULATED IN THE FOREBAY ONCE THEY ARE HALF FILLED OR TO THE DESIGNATED DEPTH. A DEPTH MARKER SHOULD BE PROVIDED IN THE FOREBAY TO GUIDE THE INSPECTION REQUIREMENTS.

SPECIAL CONSIDERATIONS:
CONSULT THE DELAWARE DEPARTMENT OF AGRICULTURE FOR LICENSING REQUIREMENTS PERTAINING TO THE APPLICATION OF CHEMICALS.

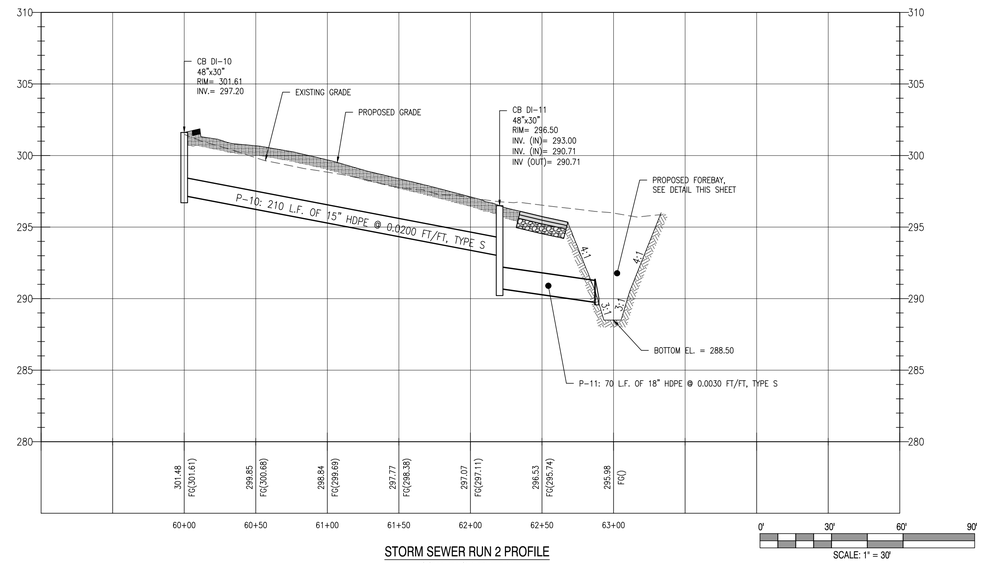
HIRE A PROFESSIONAL:
IF PONDING IS OBSERVED; IF FACILITY DOES NOT DRAIN WITHIN 48 HOURS; REPLACEMENT OF DETERIORATING PIPES OR STRUCTURAL COMPONENTS; FACILITY RECONSTRUCTION; REPAIR OF SEVERE EROSION; AQUATIC VEGETATION CONTROL (CHEMICAL APPLICATION) IF LICENSING REQUIRED BY DE DEPARTMENT OF AGRICULTURE.



BIO-SWALE PROFILE
SCALE: HORZ. 1" = 60'
VERT. 1" = 6'



STORM SEWER RUN 1 PROFILE
SCALE: HORZ. 1" = 50'
VERT. 1" = 5'



STORM SEWER RUN 2 PROFILE
SCALE: HORZ. 1" = 50'
VERT. 1" = 5'

0' 30' 60' 90'
SCALE: 1" = 30'

REVISIONS:

DATE:	DESCRIPTION:	BY:
11/7/16	REVISED PER DNREC COMMENTS	DLD/ATF
12/12/16	REVISED PER DNREC COMMENTS	ATF

WCCSP TRI-VALLEY TRAIL
SEDIMENT STORMWATER MANAGEMENT PLANS

POST CONSTRUCTION STORMWATER MANAGEMENT PLAN-BIOSWALE#1

SEAL:

CIVIL ENGINEER:
CENTURY ENGINEERING
CONSULTING ENGINEERS, SURVEYORS
4134 N. DUPONT HWY.
DOVER, DELAWARE 19901

CEI CONTRACT NO. WCCSP-7A

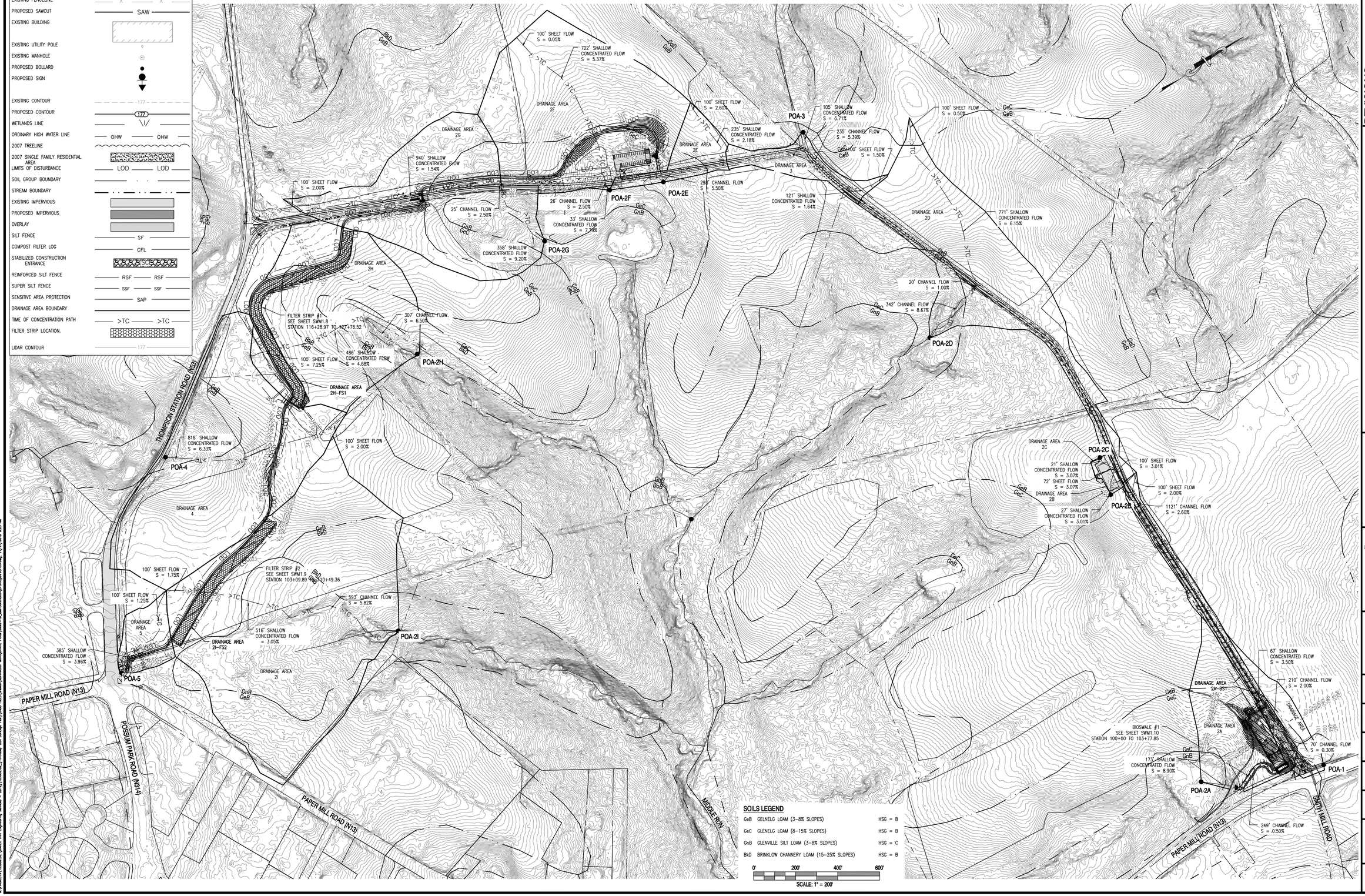
DELAWARE DEPARTMENT OF NATURAL RESOURCES AND ENVIRONMENTAL CONTROL

DESIGNED BY: ATF
DRAWN BY: ATF
CHECKED BY: AES
DATE: DECEMBER 12, 2016
SCALE: AS NOTED
SHEET NO.: SWM1.10
CONTRACT NO.: 2016-WCCSP-100

G:\PROJECTS\120002.00 (DNREC Civil Engineering Services - 2012)\120002.02_Tri-Valley Trail Concept Plan\CADD FILES\Sheets\Stormwater Management Plans\SWM1-9_PostConstMngPlan_BS 1.dwg, 12/12/2016 2:15 PM

LEGEND

EXISTING PROPERTY LINE	
EXISTING RIGHT OF WAY	EXISTING RIGHT OF WAY
EXISTING FLOOD PLAIN	FP
EXISTING FENCELINE	X X
PROPOSED SAWCUT	SAW
EXISTING BUILDING	
EXISTING UTILITY POLE	
EXISTING MANHOLE	
PROPOSED BOLLARD	
PROPOSED SIGN	
EXISTING CONTOUR	177
PROPOSED CONTOUR	177
WETLANDS LINE	
ORDINARY HIGH WATER LINE	OHW OHW
2007 TREELINE	
2007 SINGLE FAMILY RESIDENTIAL AREA	
LIMITS OF DISTURBANCE	LOD LOD
SOIL GROUP BOUNDARY	
STREAM BOUNDARY	
EXISTING IMPERVIOUS	
PROPOSED IMPERVIOUS	
OVERLAY	
SILT FENCE	SF
COMPOST FILTER LOG	CFL
STABILIZED CONSTRUCTION ENTRANCE	SCE
REINFORCED SILT FENCE	RSF RSF
SUPER SILT FENCE	SSF SSF
SENSITIVE AREA PROTECTION	SAP
DRAINAGE AREA BOUNDARY	
TIME OF CONCRETATION PATH	>TC >TC
FILTER STRIP LOCATION.	
LIDAR CONTOUR	177



REVISIONS:

DATE:	DESCRIPTION:	BY:

WCCSP TRI-VALLEY TRAIL
SEDIMENT STORMWATER MANAGEMENT PLANS

BMP CONTRIBUTING DRAINAGE AREA PLAN

SEAL:

CIVIL ENGINEER:

CENTURY ENGINEERING
CONSULTING ENGINEERS, SURVEYORS
4134 N. DUPONT HWY.
DOVER, DELAWARE 19901

CEI CONTRACT NO. WCCSP-7A

DELAWARE DEPARTMENT OF NATURAL RESOURCES AND ENVIRONMENTAL CONTROL

DESIGNED BY: ATF

DRAWN BY: ATF

CHECKED BY: AES

DATE: NOVEMBER 14, 2016

SCALE: 1" = 200'

SHEET NO.: SWM1.11

CONTRACT NO.: 2016-WCCSP-100

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