LOVE CREEK ELEMENTARY SCHOOL

SEDIMENT AND STORMWATER MANAGEMENT PLANS

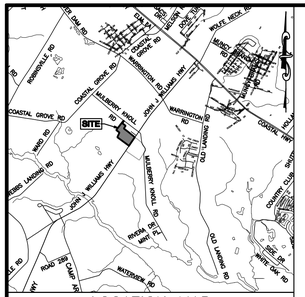
REHOBOTH BAY WATERSHED

LEWES REHOBOTH HUNDRED, SUSSEX COUNTY

TAX MAP ID: 3-34-12.00-45.01

DBF # 0774A019

NOVEMBER 18, 2015



LOCATION MAP
1" = 1 MILE

SITE DATA

TOTAL SITE AREA: 25.26 Ac.±

TAX MAP
Sussex County Tax District 3-34, Map 12, Parcel: 45.01

DNREC SWM PROGRAM NUMBER: 2015-033

PLUS NUMBER: 2013-07-09

ZONING INFORMATION

Present Zoning:	Agricultural Residential (AR1)
Present Use:	Agriculture
Proposed Use:	Proposed School

SETBACK REQUIREMENTS

Front:	40'
Rear:	15'
Side:	20'

BUILDING HEIGHT: 42'±

BUILDING AREA:

Elementary School:	95,620 Sq. Ft.
1st Floor:	94,720 Sq. Ft.
2nd Floor:	71,562 Sq. Ft.
Maintenance Building:	19,849 Sq. Ft.
	900 Sq. Ft.

PARKING:

Administration:	18
Classrooms:	52
Accessible Parking:	8
Assembly Space:	89
Total parking spaces required:	167
Total parking spaces provided:	177
Bus parking provided:	14

Water Provider:	Tidewater Utilities
Sewer Provider:	Sussex County
Sewer District:	West Rehoboth Sanitary Sewer District
Sussex County Agreement Number:	1043
Posted speed limit:	50mph
State Strategies:	Level II
Vertical Datum:	NAVD 88
Horizontal Datum:	DELAWARE STATE PLANE, NAD 83

AMENITIES
Athletic Fields, Multi-Use Trail, Parking Areas, Open Spaces / Storm Water management Areas.

FLOOD ZONE
This site is not impacted by the 100 year flood zone per FEMA map numbers 1005C00332K, 1005C00333K, and 1005C00334K, effective date March 16, 2015.

FIRE PROTECTION
Building will be protected by automatic sprinklers and equipped with a lock box system for fire department accessibility

All fire lanes, fire hydrants, exits, and standpipe will be marked in accordance with state fire prevention regulations.

WETLANDS
Environmental Resources, Inc. (ERI) completed a wetland walk-through of this agricultural field, on the west side of John J. Williams Highway (SR 24) south of Mulberry Knoll Road in Sussex County, Delaware, on May 29, 2015. Background information for this portion of parcel 3-34-12.00-45.01 of about 25 acres indicated that wetlands were unlikely on this site. ERI inspected this site for the presence of jurisdictional waters, including nontidal wetlands, according to the Corps of Engineers Wetlands Delineation Manual (1987), the Atlantic and Gulf Coastal Plain Supplement (2010), associated guidance in affect at that time and best professional judgment. Onsite soil observations found well drained soil conditions throughout this active farm field similar to USDA mapping in the vicinity. Well drained soils are not an indicator of wetlands. As a result of this visit, ERI did not identify any Corps jurisdictional waters or wetlands on this parcel. As of this date no jurisdictional determination verification has been requested from Corps of Engineers.

Parking spaces reserved for use by the handicapped and related accessible routes shall be constructed in accordance ADA Standards for Accessible Design (latest addition).

All facilities shall meet Sussex County Engineering Department's Standard and Specifications.

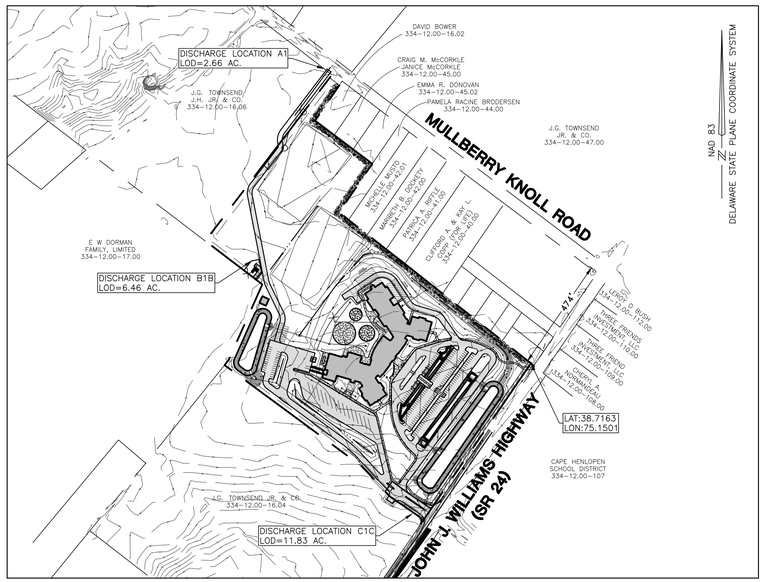
OWNER	ENGINEER/SURVEYOR
J G TOWNSEND, JR & CO. P.O. BOX 430 GEORGETOWN, DE 19947	DAVIS, BOWEN, & FRIEDEL, INC. 23 NORTH WALNUT STREET MILFORD, DELAWARE 19963 (302)-424-1441
EQUITABLE OWNER	**AGENCY CONTACT INFORMATION**
CAPE HENLOPEN SCHOOL DISTRICT BRIAN BASSETT DIRECTOR OF ADMIN. SERVICES 1270 KINGS HIGHWAY LEWES, DE 19958 302-645-6686	DNREC SEDIMENT & STORMWATER PROGRAM MICHAEL FALKOWSKI 89 KINGS HIGHWAY DOVER, DE 19901 302-739-9921

OWNER'S CERTIFICATION

"I, THE UNDERSIGNED, CERTIFY THAT ALL LAND CLEARING, CONSTRUCTION AND DEVELOPMENT SHALL BE DONE PURSUANT TO THE APPROVED PLAN AND THAT RESPONSIBLE PERSONNEL (I.E., BLUE CARD HOLDER) INVOLVED IN THE LAND DISTURBANCE WILL HAVE A CERTIFICATION OF TRAINING PRIOR TO INITIATION OF THE PROJECT, AT A DNREC SPONSORED OR APPROVED TRAINING COURSE FOR THE CONTROL OF EROSION AND SEDIMENT DURING CONSTRUCTION. IN ADDITION, I GRANT THE DNREC SEDIMENT AND STORMWATER PROGRAM AND/OR THE RELEVANT DELEGATED AGENCY THE RIGHT TO CONDUCT ON-SITE REVIEWS, AND I UNDERSTAND MY RESPONSIBILITIES UNDER THE NPDES CONSTRUCTION GENERAL PERMIT, AS REFERENCED ON THIS COVERSHEET."

_____DATE_____

BRIAN BASSETT
DIRECTOR OF ADMINISTRATIVE SERVICES,
CAPE HENLOPEN SCHOOL DISTRICT,



SCALE: 1" = 300'

SHEET INDEX

ENGINEER'S STATEMENT

I, W. ZACHARY CROUCH, P.E., HEREBY STATE THAT I AM A REGISTERED ENGINEER IN THE STATE OF DELAWARE, THAT THE INFORMATION SHOWN HEREON HAS BEEN PREPARED UNDER MY SUPERVISION AND TO MY BEST KNOWLEDGE AND BELIEF REPRESENTS GOOD ENGINEERING PRACTICES AS REQUIRED BY STATE AND LOCAL REGULATIONS AND ORDINANCES.

_____
DAVIS, BOWEN & FRIEDEL, INC.
by W. ZACHARY CROUCH, P.E.

DAVIS, BOWEN & FRIEDEL, INC.
ENGINEERS & SURVEYORS
SALISBURY, MARYLAND (410) 543-9091
MILFORD, DELAWARE (302) 424-1441
EASTON, MARYLAND (410) 770-4744

LEGEND

SF — SILT FENCE
LOD — LIMIT OF DISTURBANCE
LOD/SF — LIMIT OF DISTURBANCE / SILT FENCE
PHASE LINE
DI 103 — MH 103 — P 103 — CATCH BASIN, STORM DRAIN, FLOW ARROW, MANHOLE & LABELS
SWALE
TEMPORARY STOCKPILE AREA — TEMPORARY STOCKPILE AREA
IP1 — INLET PROTECTION TYPE-1
IP2 — INLET PROTECTION TYPE-2
CIP — CULVERT INLET PROTECTION
SCE — STABILIZED CONSTRUCTION ENTRANCE
SCD — STONE CHECK DAM
CWS — CONCRETE WASHOUT STATION
SST — STONE OUTLET SEDIMENT TRAP
RST — RIPRAP OUTLET SEDIMENT TRAP
ROP-2 — RIPRAP OUTLET PROTECTION TYPE-2
SM-S — STABILIZATION MATTING - SLOPE
SM-C — STABILIZATION MATTING - CHANNEL
PP-1 — PUMPING PITS
GB — GEOTEXTILE DEWATERING BAGS

EROSION AND SEDIMENT CONTROL NOTES

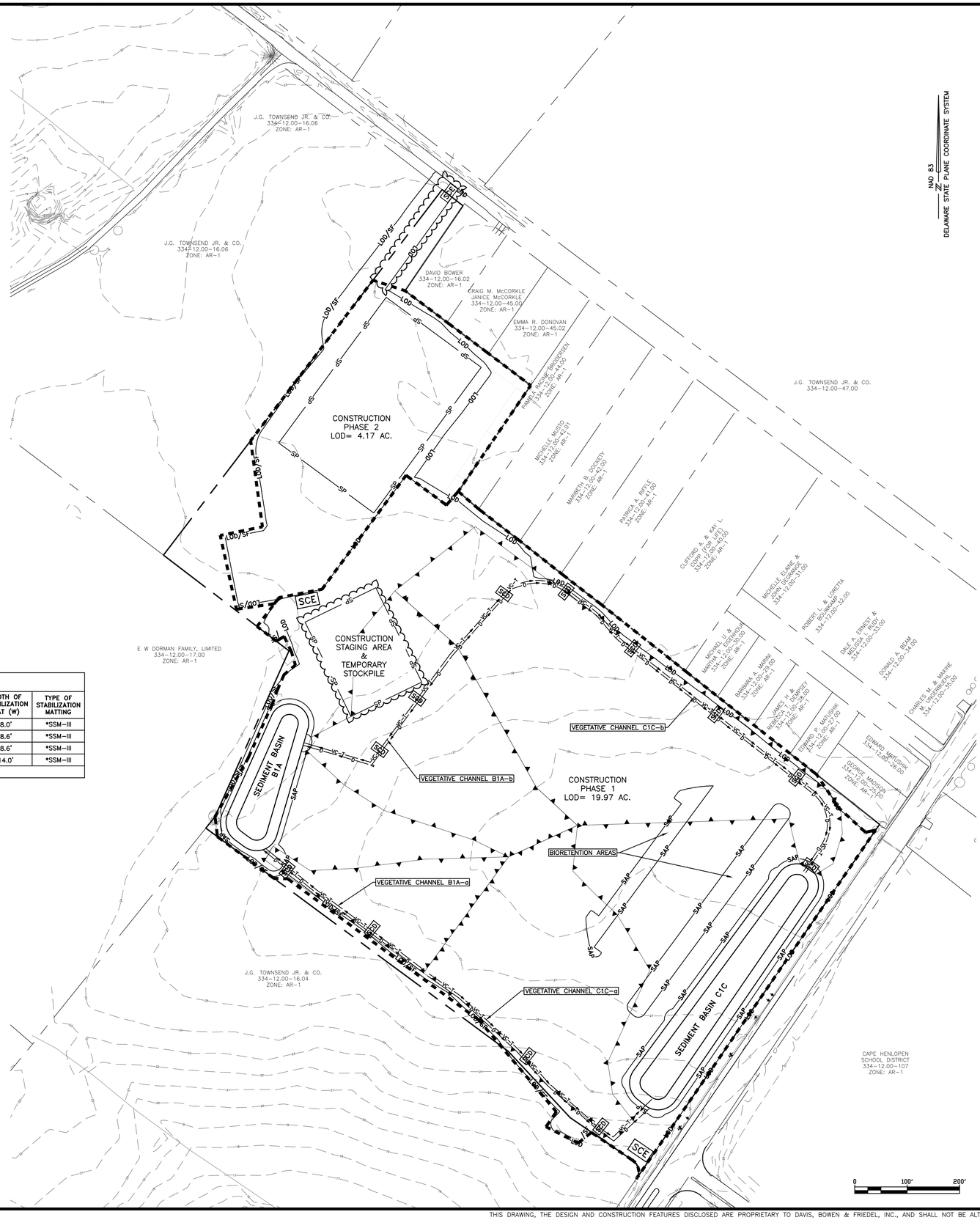
1. The DNREC Sediment and Stormwater Program must be notified in writing five (5) days prior to commencing with construction. Failure to do so constitutes a violation of the approved Sediment and Stormwater Management Plan.
2. Review and or approval of the Sediment and Stormwater Management Plan shall not relieve the contractor from his or her responsibilities for compliance with the requirements of the Delaware Sediment and Stormwater Regulations, nor shall it relieve the contractor from errors or omissions in the approved plan.
3. If the approved plan needs to be modified, additional sediment and stormwater control measures may be required as deemed necessary by DNREC or the Delegated Agency.
4. Following soil disturbance or redisturbance, permanent or temporary stabilization shall be completed for all perimeter sediment controls, soil stockpiles, and all other disturbed or graded areas on the project site within 14 calendar days unless more restrictive Federal requirements apply.
5. All erosion and sediment control practices shall comply with the Delaware Erosion and Sediment Control Handbook, latest edition.
6. At any time a dewatering operation is used, it shall be previously approved by the Agency Construction Site Reviewer for a non-erosive point of discharge, and a dewatering permit shall be approved by the DNREC Well Permitting Branch.
7. Approved plans remain valid for 3 years from the date of approval.
8. Post construction verification documents are to be submitted to the DNREC Sediment and Stormwater Program within 60-days of stormwater management facility completion.
9. Approval of a Sediment and Stormwater Management Plan does not grant or imply a right to discharge stormwater runoff. The owner/developer is responsible for acquiring any and all agreements, easements, etc., necessary to comply with State drainage and other applicable laws.
10. The Notice of Intent for Storm Water Discharges Associated with Construction Activity under a NPDES General Permit for this project is #4960 . At any time the ownership for this project changes, a Transfer of Authorization or a Co-Permittee Application must be submitted to DNREC. The permittee of record shall not be relieved of their responsibilities until a Notice of Termination has been processed by DNREC.
11. The owner shall be familiar with and comply with all aspects of the NPDES Construction General Permit associated with the project, including, but not limited to, performing weekly site inspections during construction and after rain events, and maintaining written logs of these inspections.
12. 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.
13. The contractor shall at all times protect against sediment or debris laden runoff or wind from leaving the site. Perimeter controls shall be checked daily and adjusted and/or repaired to fully contain and control sediment from leaving the site. Accumulated sediment shall be removed when it has reached half of the effective capacity of the control. In addition, the contractor may need to adjust or alter measures in times of adverse weather conditions, or as directed by the Agency Construction Site Reviewer.
14. Best available technology (BAT) shall be employed to manage turbid discharges in accordance with requirements of 7. Del C. Ch 60, Regulations Governing the Control of Water Pollution, Section 9.1.02, known as Special Conditions for Stormwater Discharges Associated with Construction Activities, and Department policies, procedures, and guidance.
15. Documentation of soil testing and materials used for temporary or permanent stabilization including but not limited to soil test results, seed tags, soil amendment tags, etc. shall be provided to the Department or Delegated Agency to verify that the permanent or temporary stabilization has been completed in accordance with the approved plan. The Department or Delegated Agency may require additional soil testing and reapplication of permanent or temporary stabilization in accordance with specifications provided in the Delaware Erosion and Sediment Control Handbook, or alternative measures that provide functional equivalency.
16. It shall be the sole responsibility of the contractor to maintain and repair all erosion, sediment control and stormwater management practices during utility installation and site construction.
17. It shall be the sole responsibility of the owner to maintain and repair all erosion, sediment control and stormwater management practices after completion and approval of all stormwater management practices.
18. Unless otherwise specified, temporary vegative stabilization shall use seed mix no. 5 and permanent vegatvie stabilization shall use seed mix no. 7.
19. Temporary vegetative cover, mulching and/or sprinkling with water shall be the methods used as necessary to control dust.
20. Stabilization matting shall be North American Green SC150BN or DNREC type SSM-III.
21. All Riprap shall be underlain with Mirafi 600X Geotextile or DNREC type GS-1.
22. There is an estimated 5,000 CY. of spoil material. Excess material shall be removed from the site and disposed of in a DNREC approved manner.

DISTURBED AREA: 25.4 ACRES

DNREC APPROVAL BOX

PRE CONSTRUCTION EROSION AND SEDIMENT CONTROL NOTES

1. SEDIMENT BASINS AREAS ARE FUTURE INFILTRATION AREAS AND SHALL BE SURROUNDED WITH ORANGE SAFETY FENCE.
2. NO HEAVY CONSTRUCTION EQUIPMENT SHALL TRAVERSE THE FUTURE INFILTRATION AREA.
3. SEDIMENT BASINS SHALL BE EXCAVATED FROM THE PERIMETER OF THE BASIN SO THAT EQUIPENT DOES NOT TRAVERSE THE BASIN AREA.
4. SEDMIENT BASINS SHALL NOT BE EXCAVATED BELOW THE BOTTOM ELEVATIONS NOTED IN THE SCHEDULE ON THIS SHEET.



VEGETATED CHANNEL DATA

CHANNEL	DISCHARGE (Qd)	TOP WIDTH (TW)	DEPTH (D)	BOTTOM WIDTH (B)	SIDE SLOPE (Z)	CHANNEL SLOPE (S)	WIDTH OF STABILIZATION MAT (W)	TYPE OF STABILIZATION MATTING
B1A–a	4.90	8.0'	1.0'	2.0'	3:1	0.5%	8.0'	*SSM–III
B1A–b	10.88	8.6'	1.2'	2.0'	3:1	0.5%	8.6'	*SSM–III
C1C–a	13.17	8.6'	1.2'	2.0'	3:1	0.5%	8.6'	*SSM–III
C1C–b	18.13	14.0'	1.25'	4.0'	4:1	0.3%	14.0'	*SSM–III
*NA GREEN SC150BN OR APPROVED EQUIVALENT								

SEDIMENT TRAP DATA

TRAP	Drainage Area	Required Storage	Top of Basin El.	Bottom of Basin El.	Storage Provided El.
B1A	12.95 ac.	46,609 cf	24.50	21.00	23.25
C1C	23.30 ac.	83,880 cf	25.00	22.00	23.92
SEE FIG. 5 OF THE SSM REPORT FOR SEDIMENT TRAP DRAINAGE AREAS					

STONE CHECK DAM DATA

SLOPE	0.3%–0.5%
SPACING	80'
LENGTH OF WEIR (L)	4'
HEIGHT OF STONE (Y)	18"

LEGEND

- LOD — LIMIT OF DISTURBANCE
- SCE — STABILIZED CONSTRUCTION ENTRANCE
- SF — SILT FENCE
- dS / SP — SOIL STOCKPILE
- VC-T — VEGETATED CHANNEL DIVERSION
- SCD — STONE CHECK DAM
- SAP — SENSITIVE AREA PROTECTION
- LOD/SF — LIMIT OF DISTURBANCE AND SILT FENCE
- PHASE LINES
- DRAINAGE AREA LINES

DAVIS, BOWEN & FRIEDEL, INC.
ENGINEERS & SURVEYORS
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MILFORD, DELAWARE (302) 424-1441

PRE CONSTRUCTION SWM PLAN

LOVE CREEK ELEMENTARY SCHOOL
CAPE HENLOPEN SCHOOL DISTRICT
SUSSEX COUNTY, DELAWARE

REVISED	
10/02/15	TIDEWATER, SUSSEX CO. ENG. COMMENTS
10/05/15	DELDOT COMMENTS
10/08/15	WATER EASEMENT
10/13/15	DNREC COMMENTS
10/23/15	RT. 24 TRANSITION FOR 45 MPH
10/29/15	SUSSEX CO. ENG. & SWM COMMENTS
11/20/15	DELDOT COMMENTS
01/29/16	SEQ. OF CONST., SCE, STOCKPILES

Date: November 20, 2015
Scale: 1" = 100'
Dwn.By: TPS/RAK/JEB
Proj.No.: 0774A019
Dwg.No.:

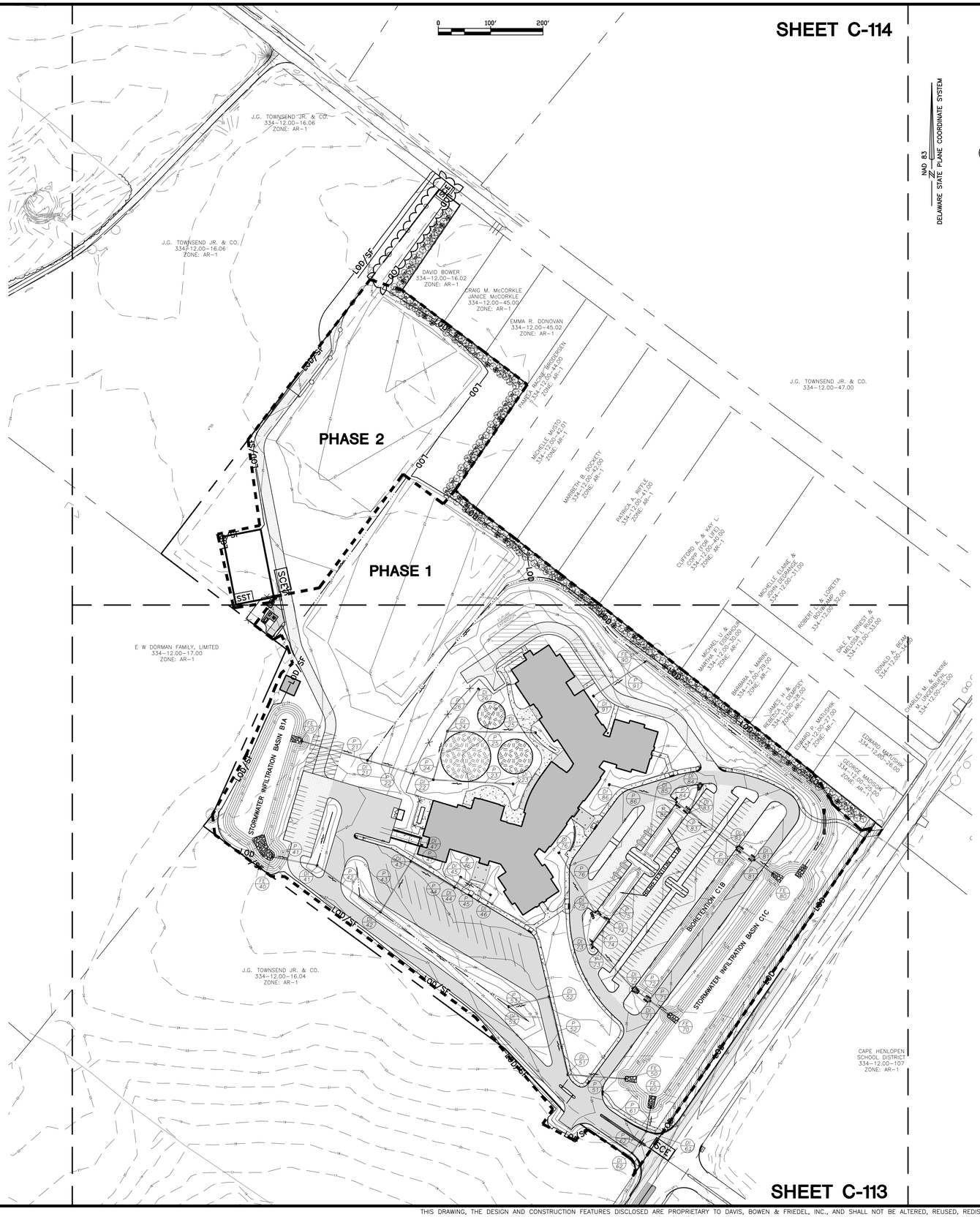
C-111

SEQUENCE OF CONSTRUCTION

A. NOTIFY THE DNREC SEDIMENT AND STORMWATER PROGRAM IN WRITING AT LEAST FIVE (5) DAYS PRIOR TO THE START OF CONSTRUCTION. FAILURE TO DO SO CONSTITUTES A VIOLATION OF THE APPROVED SEDIMENT AND STORMWATER MANAGEMENT PLAN.
B. PRIOR TO ANY CLEARING, INSTALLATION OF SEDIMENT CONTROL MEASURES OR GRADING, A PRECONSTRUCTION MEETING MUST BE SCHEDULED AND CONDUCTED WITH THE AGENCY CONSTRUCTION SITE REVIEWER. THE LANDOWNER/DEVELOPER, CONTRACTOR, AND CERTIFIED CONSTRUCTION REVIEWER ARE REQUIRED TO BE IN ATTENDANCE AT THE PRE-CONSTRUCTION MEETING; THE DESIGNER IS RECOMMENDED TO ATTEND.

PHASE 1&2 (24.18 AC.)

1. THE CONTRACTOR SHALL CONTACT MISS UTILITY OF DELMARVA AT 1-800-282-8555 FOR UTILITY LOCATIONS WITHIN AND SURROUNDING CONSTRUCTION AREAS NOT LESS THAN 3 DAYS BEFORE PERFORMING ANY EXCAVATION.
2. ESTABLISH TWO (2) STABILIZED CONSTRUCTION ENTRANCES, ONE (1) ON RT. 24 AND ONE (1) ON MULBERRY KNOLL RD. INSTALL ORANGE SAFETY FENCE AROUND ALL INFILTRATION AREAS. NO HEAVY CONSTRUCTION EQUIPMENT SHALL TRAVERSE THE FUTURE INFILTRATION AREAS.
3. ESTABLISH CONSTRUCTION STAGING AREA, AND INSTALL PERIMETER SILT FENCE.
4. ALL PERIMETER CONTROLS ARE TO BE REVIEWED BY THE AGENCY CONSTRUCTION SITE REVIEWER AND APPROVED PRIOR TO PROCEEDING WITH FURTHER SITE DISTURBANCE OR CONSTRUCTION.
5. MINIMIZE CLEARING AND GRADING OPERATIONS TO AREAS NECESSARY FOR IMMEDIATE CONSTRUCTION ACTIVITY. CONTRACTOR SHALL NOT DISTURB MORE THAN TWENTY (20) ACRES AT ANY TIME BETWEEN BOTH PHASE I AND PHASE II.
6. THE CONTRACTOR SHALL AT ALL TIMES PROTECT AGAINST SEDIMENT OR DEBRIS LADEN RUNOFF OR WIND FROM LEAVING THE SITE. PERIMETER CONTROLS SHOULD BE CHECKED DAILY AND ADJUSTED AND/OR REPAIRED TO FULLY CONTAIN AND CONTROL SEDIMENTATION ON THE SITE. ACCUMULATED SEDIMENT SHALL BE REMOVED WHEN IT HAS REACHED HALF OF THE EFFECTIVE CAPACITY OF THE CONTROL. IN ADDITION, THE CONTRACTOR MAY NEED TO ADJUST OR REPAIR MEASURES IN TIMES OF ADVERSE WEATHER CONDITIONS, OR AS DIRECTED BY THE AGENCY CONSTRUCTION SITE REVIEWER.
7. CONSTRUCT SEDIMENT TRAPS (SEE SHEETS C-114, C-411 & C-413). PROVIDE OPENINGS IN SAP AROUND SEDIMENT TRAPS B1A AND C1C AS NECESSARY AT INFLOW LOCATIONS.
8. CONSTRUCT PERMANENT CHANNELS AND TEMPORARY DIVERSION CHANNELS TO SEDIMENT TRAPS. AND STABILIZE.
9. INSTALL STORM DRAIN SYSTEM FROM DI62 TO FE60 TO FACILITATE ACCESS TO THE SITE FROM ROUTE 24.
10. ROUGH GRADE PHASE I & PHASE II. CONTRACTOR SHALL NOT DISTURB MORE THAN TWENTY (20) ACRES AT ANY TIME BETWEEN BOTH PHASE I AND PHASE II.
11. STABILIZE AREAS OF PHASE TWO DISTURBED DURING ROUGH GRADING.
12. INSTALL UTILITIES AS NOTED IN PHASE I & PHASE II AREAS.
13. INSTALL STORM DRAIN SYSTEM. INSTALL INLET PROTECTION ON ALL STORM INLETS.
14. FINE GRADE BUILDING AND PAVED AREAS. INSTALL AGGREGATE BASE COURSE, CURB, SIDEWALKS, AND BEGIN BUILDING CONSTRUCTION WITHIN LIMITS OF PHASE I & PHASE II.
15. STABILIZE ALL DISTURBED AREAS IN ACCORDANCE WITH THE EROSION AND SEDIMENT CONTROL NOTES (SHEET C-502 & C-512)
16. INSPECT STORM DRAIN SYSTEM AND SEDIMENT TRAPS FOR MAINTENANCE. REMOVE SEDIMENT AS NECESSARY.
17. CONTACT THE AGENCY CONSTRUCTION SITE REVIEWER FOR SITE STABILIZATION INSPECTION AND APPROVAL TO PROCEED WITH BIORETENTION CONSTRUCTION.
18. CONSTRUCT BIORETENTION FACILITIES (SEE SHEET C-412).
19. INSTALL BASE PAVING IN ROADWAYS.
20. CONTACT THE AGENCY CONSTRUCTION SITE REVIEWER FOR SITE STABILIZATION INSPECTION AND APPROVAL TO PROCEED WITH SEDIMENT TRAP CONVERSION TO INFILTRATION BASINS.
21. CONVERT SEDIMENT TRAPS B1A & C1C TO INFILTRATION BASINS (SEE SHEET C-411 & C-413)
22. REMOVE SEDIMENT TRAP B1B AND STABILIZE THE AREA IT OCCUPIED.
23. INSTALL FINAL PAVING SURFACE IN PHASE 1 & 2.
24. CONTACT DNREC FOR INSPECTION.
25. EROSION AND SEDIMENT CONTROL DEVICES SHOULD BE REMOVED ONLY AFTER WORK IN AN AREA HAS BEEN COMPLETED AND STABILIZED, WITH WRITTEN APPROVAL FROM THE AGENCY CONSTRUCTION SITE REVIEWER.
26. THE TERMINATION OF THE CONSTRUCTION GENERAL PERMIT WILL REQUIRE SUBMISSION AND ACCEPTANCE OF THE POST CONSTRUCTION VERIFICATION DOCUMENTS, INCLUDING FINAL STABILIZATION THROUGHOUT THE SITE. ALL ELEMENTS OF THE SEDIMENT AND STORMWATER MANAGEMENT PLAN IMPLEMENTED, AND ACCEPTANCE OF THE FINAL OPERATIONS AND MAINTENANCE PLAN.



LEGEND

- PHASE 1 / PHASE 2 — PHASE LINE
- SF — SILT FENCE
- LOD/SF — LIMIT OF DISTURBANCE AND SILT FENCE
- LOD — LIMIT OF DISTURBANCE
- DRAINAGE INLET, STORM DRAIN, FLOW ARROW, MANHOLE, FLARED END SECTION
- DI 207 / P 207 / MH 207 / P 207 / FE 207 — STORM IDENTIFICATION LABELS

DAVIS, BOWEN & FRIEDEL, INC.
ENGINEERS & SURVEYORS
SALISBURY, MARYLAND (410) 543-9091
MILFORD, DELAWARE (302) 424-1441

OVERAL CONSTRUCTION SITE SWM PLAN

LOVE CREEK ELEMENTARY SCHOOL
CAPE HENLOPEN SCHOOL DISTRICT
SUSSEX COUNTY, DELAWARE

REVISED	
10/02/15	TIDEWATER, SUSSEX CO. ENG. COMMENTS
10/05/15	DELDOT COMMENTS
10/08/15	WATER EASEMENT
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11/20/15	DELDOT COMMENTS
01/29/16	SEQ. OF CONST., SCE, STOCKPILES

Date:	November 20, 2015
Scale:	1" = 100'
Dwn.By:	TPS/RAK/JEB
Proj.No.:	0774A019
Dwg.No.:	C-112

LEGEND

PHASE 1
PHASE 2 — PHASE LINE

SF — SILT FENCE

LOD — LIMIT OF DISTURBANCE

DRAINAGE INLET, STORM DRAIN, FLOW ARROW, MANHOLE, FLARED END SECTION

DI 207 | P 207 | MH 207 | P 207 | FE 207 — STORM IDENTIFICATION LABELS

4 — ROOF DRAINS, SIZE LABEL (INCHES)

IP1 | IP2 — DRAINAGE INLET PROTECTION TYPE-1 AND TYPE-2

ROP-2 — RIP-RAP OUTLET PROTECTION TYPE-2

RSB — RIP-RAP STILLING BASIN

PP-1 — PUMPING PIT – TYPE 1

GB — GEOTEXTILE DEWATERING BAG

CIP — CULVERT INLET PROTECTION

SCD — STONE CHECK DAM

RRC — RIPRAP CHUTE

CW — CONCRETE WASHOUT STATION

SST — STORM SEDIMENT TRAP

SM-S | SM-C — STABILIZATION MATTING, SLOPE & CHANNEL

SCE — STABILIZED CONSTRUCTION ENTRANCE

dS / SP — TEMPORARY STOCKPILE AREA

MATCH SHEET C-114

E. W. DORMAN FAMILY 334-12.00-17.00

CONSTRUCTION STAGING AREA & TEMPORARY STOCKPILE AREA

ELEMENTARY SCHOOL ENTRY

STORMWATER INFILTRATION BASIN B1A

STORMWATER INFILTRATION BASIN C1C

BIORETENTION C1A

BIORETENTION C1B

CLIFFORD A. & KAY L. COPP (FOR LIFE) 334-12.00-40.00

MICHAEL U. & MARTHA P. ESERNIO 334-12.00-30.00

BARBARA A. MARINI 334-12.00-29.00

JAMES A. & REBECCA L. DEMPSEY 334-12.00-28.00

EDWARD P. MATUSIK 334-12.00-27.00

GEORGE MADISON 334-12.00-25.00

J.G. TOWNSEND JR. & CO. 334-12.00-16.04

NAD 83 DELAWARE STATE PLANE COORDINATE SYSTEM

ROP-2 DATA TABLE

LABEL	PIPE SIZE (Do)	APRON LENGTH (La)	APRON WIDTH (W)	BOTTOM WIDTH (b)	RIPRAP DEPTH (d)	RIPRAP SIZE (R No.)	RIPRAP THICKNESS (T)
FE-20	15"	20'	12'	6'	12"	R-4 (6")	18"
FE-50	15"	20'	12'	6'	12"	R-4 (6")	18"
FE-70	24	20'	12'	6'	12"	R-4 (6")	18"
FE-80	24	20'	12'	6'	12"	R-4 (6")	18"

RIPRAP STILLING BASIN DATA TABLE

LABEL	PIPE SIZE (Wo)	DEPTH OF BASIN FROM INVERT (hs)	POOL LENGTH	APRON LENGTH	RIPRAP SIZE (R No.)	RIPRAP THICKNESS (T)
FE-40	15"	2.0'	36'	10'	R-4 (6")	18"
FE-50	15"	1.5'	15'	5'	R-4 (6")	18"
FE-60	15"	1.5'	15'	7.5'	R-4 (6")	18"

SEDIMENT TRAP DATA

TRAP	Drainage Area	Required Storage	Provided Storage	L	W	D	H	a	b
B1A	12.947 ac.	46,609 cf	52,760 cf	287'	89'	4'	5'	2'	16'
C1C	23.300 ac.	83,880 cf	87,989 cf	550'	89'	4'	5'	2'	18'

RIPRAP CHUTE DATA TABLE

DESIGN DISCHARGE (Q)	BOTTOM WIDTH (b)	SIDE SLOPE (Z)	DEPTH (d)	RIPRAP SIZE (d50)	RIPRAP THICKNESS (T)	SLOPE (s)
11 CFS	4'	4:1	1.0'	12"	29"	4:1

0 50' 100'

DAVIS, BOWEN & FRIEDEL, INC.
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CONSTRUCTION SITE SWM PLANS

LOVE CREEK ELEMENTARY SCHOOL
CAPE HENLOPEN SCHOOL DISTRICT
SUSSEX COUNTY, DELAWARE

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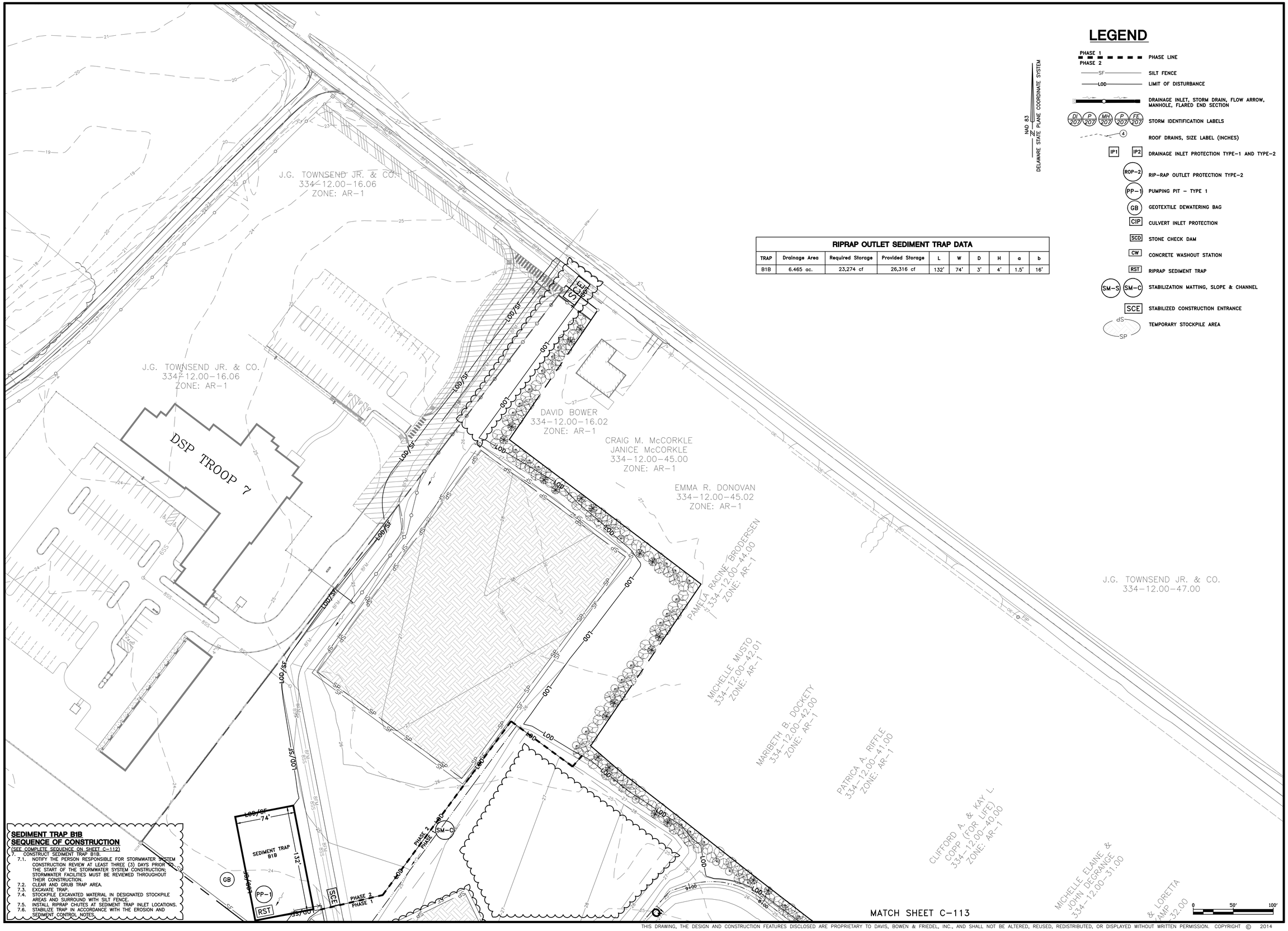

LEGEND

NAD 83
DELAWARE STATE PLANE COORDINATE SYSTEM

- PHASE 1 / PHASE 2 — PHASE LINE
- SF — SILT FENCE
- LOD — LIMIT OF DISTURBANCE
- DRAINAGE INLET, STORM DRAIN, FLOW ARROW, MANHOLE, FLARED END SECTION
- DI 207 / P 207 / MH 207 / P 207 / FE 207 — STORM IDENTIFICATION LABELS
- 4 — ROOF DRAINS, SIZE LABEL (INCHES)
- IP1 / IP2 — DRAINAGE INLET PROTECTION TYPE-1 AND TYPE-2
- ROP-2 — RIP-RAP OUTLET PROTECTION TYPE-2
- PP-1 — PUMPING PIT – TYPE 1
- GB — GEOTEXTILE DEWATERING BAG
- CIP — CULVERT INLET PROTECTION
- SCD — STONE CHECK DAM
- CW — CONCRETE WASHOUT STATION
- RST — RIPRAP SEDIMENT TRAP
- SM-S / SM-C — STABILIZATION MATTING, SLOPE & CHANNEL
- SCE — STABILIZED CONSTRUCTION ENTRANCE
- dS / SP — TEMPORARY STOCKPILE AREA

RIPRAP OUTLET SEDIMENT TRAP DATA

TRAP	Drainage Area	Required Storage	Provided Storage	L	W	D	H	a	b
B1B	6.465 ac.	23,274 cf	26,316 cf	132'	74'	3'	4'	1.5'	16'

SEDIMENT TRAP B1B SEQUENCE OF CONSTRUCTION

(SEE COMPLETE SEQUENCE ON SHEET C-112)

7. CONSTRUCT SEDIMENT TRAP B1B.
   - 7.1. NOTIFY THE PERSON RESPONSIBLE FOR STORMWATER SYSTEM CONSTRUCTION REVIEW AT LEAST THREE (3) DAYS PRIOR TO THE START OF THE STORMWATER SYSTEM CONSTRUCTION; STORMWATER FACILITIES MUST BE REVIEWED THROUGHOUT THEIR CONSTRUCTION.
   - 7.2. CLEAR AND GRUB TRAP AREA.
   - 7.3. EXCAVATE TRAP.
   - 7.4. STOCKPILE EXCAVATED MATERIAL IN DESIGNATED STOCKPILE AREAS AND SURROUND WITH SILT FENCE.
   - 7.5. INSTALL RIPRAP CHUTES AT SEDIMENT TRAP INLET LOCATIONS.
   - 7.6. STABILIZE TRAP IN ACCORDANCE WITH THE EROSION AND SEDIMENT CONTROL NOTES.

DAVIS, BOWEN & FRIEDEL, INC.
ENGINEERS & SURVEYORS
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MILFORD, DELAWARE (302) 424-1441

CONSTRUCTION SITE SWM PLANS

LOVE CREEK ELEMENTARY SCHOOL
CAPE HENLOPEN SCHOOL DISTRICT
SUSSEX COUNTY, DELAWARE

REVISED	
10/02/15	TIDEWATER, SUSSEX CO. ENG. COMMENTS
10/05/15	DELDOT COMMENTS
10/08/15	WATER EASEMENT
10/13/15	DNREC COMMENTS
10/23/15	RT. 24 TRANSITION FOR 45 MPH
10/29/15	SUSSEX CO. ENG. & SWM COMMENTS
11/20/15	DELDOT COMMENTS
01/29/16	SEQ. OF CONST., SCE, STOCKPILES

Date:	November 20, 2015
Scale:	1" = 50'
Dwn.By:	TPS/RAK/JEB
Proj.No.:	0774A019
Dwg.No.:	C-114

LEGEND

DRAINAGE INLET, STORM DRAIN, FLOW ARROW, MANHOLE, FLARED END SECTION

DI 207 | P 207 | MH 207 | P 207 | FE 207 — STORM IDENTIFICATION LABELS

MAINTENANCE SET ASIDE AREA — MAINTENANCE SET ASIDE AREA

NAD 83
DELAWARE STATE PLANE COORDINATE SYSTEM

GENERAL OPERATION AND MAINTENANCE NOTES

1. THE DNREC SEDIMENT AND STORMWATER PROGRAM AND/OR THE RELEVANT DELEGATED AGENCY 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 AND/OR THE RELEVANT DELEGATED AGENCY 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.
10. 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.

DAVIS, BOWEN & FRIEDEL, INC.
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MILFORD, DELAWARE (302) 424-1441

POST CONSTRUCTION SWM PLAN

LOVE CREEK ELEMENTARY SCHOOL
CAPE HENLOPEN SCHOOL DISTRICT
SUSSEX COUNTY, DELAWARE

REVISED	
08/14/15	FIRE MARSHAL & SSM SUBMITTAL
09/01/15	FIRE MARSHAL COMMENTS
10/02/15	TIDEWATER, SUSSEX CO. ENG. COMMENTS
10/05/15	DELDOT COMMENTS
10/08/15	WATER EASEMENT
10/13/15	DNREC COMMENTS
10/23/15	RT. 24 TRANSITION FOR 45 MPH
10/29/15	SUSSEX CO. ENG. & SWM COMMENTS

Date:	November 18, 2015
Scale:	1" = 100'
Dwn.By:	TPS/RAK/JEB
Proj.No.:	0774A019
Dwg.No.:	C-115

GENERAL OPERATION AND MAINTENANCE NOTES

1. THE DNREC SEDIMENT AND STORMWATER PROGRAM AND/OR THE RELEVANT DELEGATED AGENCY 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 AND/OR THE RELEVANT DELEGATED AGENCY 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.
10. 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.

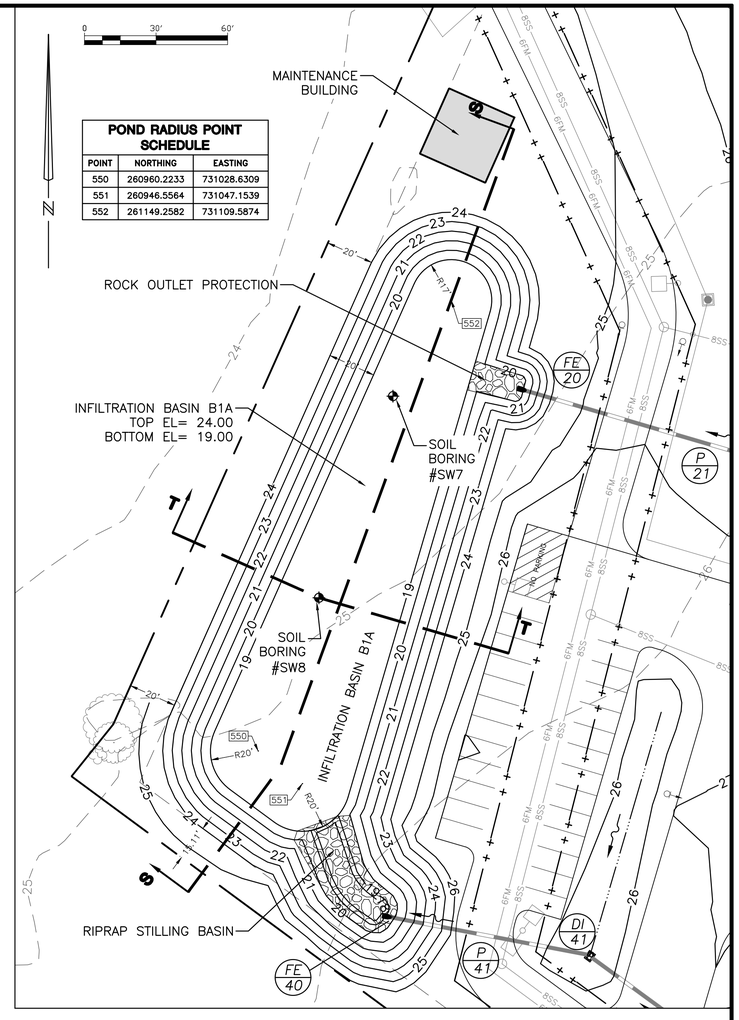
INFILTRATION BASIN OPERATION & MAINTENANCE NOTES

Function:	These stormwater facilities are designed to infiltrate stormwater and should not hold water for more than 48 hours.
Inspection:	Self inspect semi-annually (Spring and Fall) and after storm events of 2 inches or more.
Trash and Debris:	Remove trash and debris on a regular basis. It is especially important to remove debris from all inlets and outfall structures.
Stilling Basins:	Remove sediment from stilling basins when sediment accumulation levels reach 50% of the stilling basin capacity. Sediment shall be removed from the site and disposed of in a DNREC approved manner.
Soil:	Soils on side slopes of pond should be tested annually to ensure proper pH and fertility including: organic matter, magnesium (Mg), phosphorus (P205), nitrogen (N), Potassium (K20), and soluble salts. If required, fertilizers should only be applied in the fall.
Erosion:	If bare soil exists on pond side slopes or embankment, reseed and/or replant as required based upon inspection findings. Stabilize applicable eroded areas with reinforcing 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:	Mow around basin weekly during peak growing season (April - November). Mow 10-foot wide access path to all inlet and outlet structures, also mowing around these structures regularly. Use mulching mower to ensure that nutrients are recycled. For warm season grasses, the previous season's stalks should be cut down to 8-12 inches in early spring (mid March), before new season's growth emerges.
Fencing:	Fencing is not recommended and not required; however, if a fence is preferred, ensure that it is in good repair and provides access for maintenance and inspections.
Special considerations:	Infiltration basins are designed to infiltrate water and remove pollutants from stormwater. Do not compact facility in any way. This includes the use of heavy equipment or machinery. Compaction may lead to system failure.
Hire a professional:	If facility does not drain within 48 hours; repair of severe erosion; replacement of deteriorating pipes or structural components; if mosquitoes are suspected to be problematic; reconstruction of embankment and outlet structure; removal of accumulated sediment; aquatic vegetation control chemical application) if licensing required by DE Department of Agriculture; if dredging (sediment removal) is required.

BASIN B1A SEQUENCE OF CONSTRUCTION

PHASE 1 (SEE COMPLETE SEQUENCE ON SHEET C-112)

7. CONSTRUCT SEDIMENT TRAP B1A.
   - 7.1. NOTIFY THE PERSON RESPONSIBLE FOR STORMWATER SYSTEM CONSTRUCTION REVIEW AT LEAST THREE (3) DAYS PRIOR TO THE START OF THE STORMWATER SYSTEM CONSTRUCTION; STORMWATER FACILITIES MUST BE REVIEWED THROUGHOUT THEIR CONSTRUCTION.
   - 7.2. CLEAR AND GRUB TRAP AREA.
   - 7.3. EXCAVATE TRAP.
     - 7.3.1. EXCAVATION OF THE SEDIMENT TRAP SHALL BE PERFORMED SO THAT EQUIPMENT DOES NOT TRACK UPON THE EXCAVATED SURFACE. LOW GROUND PRESSURE EQUIPMENT MAY BE USED TO SHAPE THE SIDE SLOPES OF THE FACILITY.
     - 7.3.2. SEDIMENT TRAP SHALL NOT BE EXCAVATED BELOW THE BOTTOM ELEVATIONS NOTED IN THE SEDIMENT TRAP SCHEDULE.
   - 7.4. STOCKPILE EXCAVATED MATERIAL IN DESIGNATED STOCKPILE AREAS AND SURROUND WITH SILT FENCE.
   - 7.5. INSTALL RIPRAP CHUTES AT SEDIMENT TRAP INLET LOCATIONS.
   - 7.6. STABILIZE TRAP IN ACCORDANCE WITH THE EROSION AND SEDIMENT CONTROL NOTES.
21. CONVERT SEDIMENT TRAP B1A TO INFILTRATION BASIN
   - 21.1. INSPECT STORM DRAIN SYSTEMS AND FOREBAYS FOR MAINTENANCE. REMOVE SEDIMENT AS NECESSARY.
   - 21.2. NOTIFY THE PERSON RESPONSIBLE FOR STORMWATER SYSTEM CONSTRUCTION REVIEW AT LEAST THREE (3) DAYS PRIOR TO THE START OF THE STORMWATER SYSTEM CONSTRUCTION; STORMWATER FACILITIES MUST BE REVIEWED THROUGHOUT THEIR CONSTRUCTION.
   - 21.3. EXCAVATE BASIN.
     - 21.3.1. EXCAVATION OF THE BASIN SHALL BE PERFORMED SO THAT EQUIPMENT DOES NOT TRACK UPON THE EXCAVATED SURFACE. LOW GROUND PRESSURE EQUIPMENT MAY BE USED TO SHAPE THE SIDE SLOPES OF THE FACILITY.
   - 21.4. STOCKPILE EXCAVATED MATERIAL IN DESIGNATED STOCKPILE AREAS AND SURROUND WITH SILT FENCE.
   - 21.5. INSTALL RIPRAP CHUTES, OUTLET PROTECTION AND STILLING BASINS AT BASIN INLET LOCATIONS.
   - 21.6. STABILIZE BASIN IN ACCORDANCE WITH THE EROSION AND SEDIMENT CONTROL NOTES.
     - 21.6.1. BOTTOM OF INFILTRATION FACILITY SHALL REMAIN NATIVE SOIL.
     - 21.6.2. STABILIZE SIDE SLOPES OF BASIN WITH PERMANENT SEED MIX NO. 4 (SHEET C-512).
   - 21.7. CONTACT DNREC FOR INSPECTION.
   - 21.8. SUBMIT AS-BUILT SURVEY OF FACILITY TO DNREC.



POND RADIUS POINT SCHEDULE		
POINT	NORTHING	EASTING
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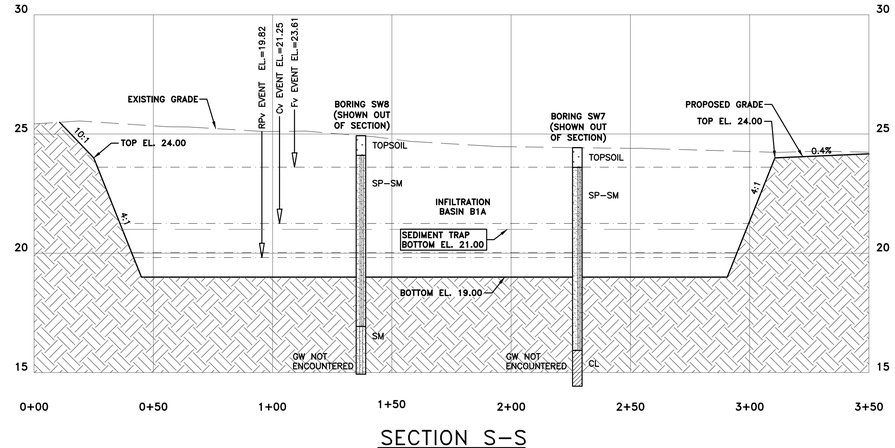
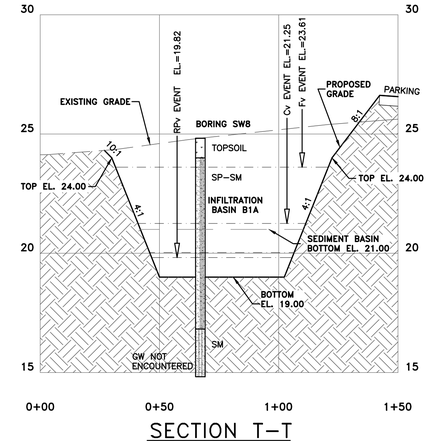
551	260946.5564	731047.1539
552	261149.2582	731109.5874



SECTION S-S



SECTION T-T

DAVIS, BOWEN & FRIEDEL, INC.
ENGINEERS & SURVEYORS
SALISBURY, MARYLAND (410) 543-9091
MILFORD, DELAWARE (302) 424-1441

LOVE CREEK ELEMENTARY SCHOOL
CAPE HENLOPEN SCHOOL DISTRICT
SUSSEX COUNTY, DELAWARE

STORMWATER FACILITY DETAILS

REVISED		
10/02/15	TIDEWATER, SUSSEX CO. ENG. COMMENTS
10/05/15	DELDOT COMMENTS
10/08/15	WATER EASEMENT
10/13/15	DNREC COMMENTS
10/23/15	RT. 24 TRANSITION FOR 45 MPH
10/29/15	SUSSEX CO. ENG. & SWM COMMENTS
11/20/15	DELDOT COMMENTS
01/29/16	SEQ. OF CONST., SCE, STOCKPILES

Date: November 20, 2015
Scale: H: 1"=30' V: 1"=3'
Dwn.By: TPS/RAK
Proj.No.: 0774A019
Dwg.No.: C-411

GENERAL OPERATION AND MAINTENANCE NOTES

1. THE DNREC SEDIMENT AND STORMWATER PROGRAM AND/OR THE RELEVANT DELEGATED AGENCY RESERVES THE RIGHT TO ENTER PRIVATE PROPERTY FOR PURPOSES OF PERIODIC SITE REVIEWS.
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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.
10. 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.

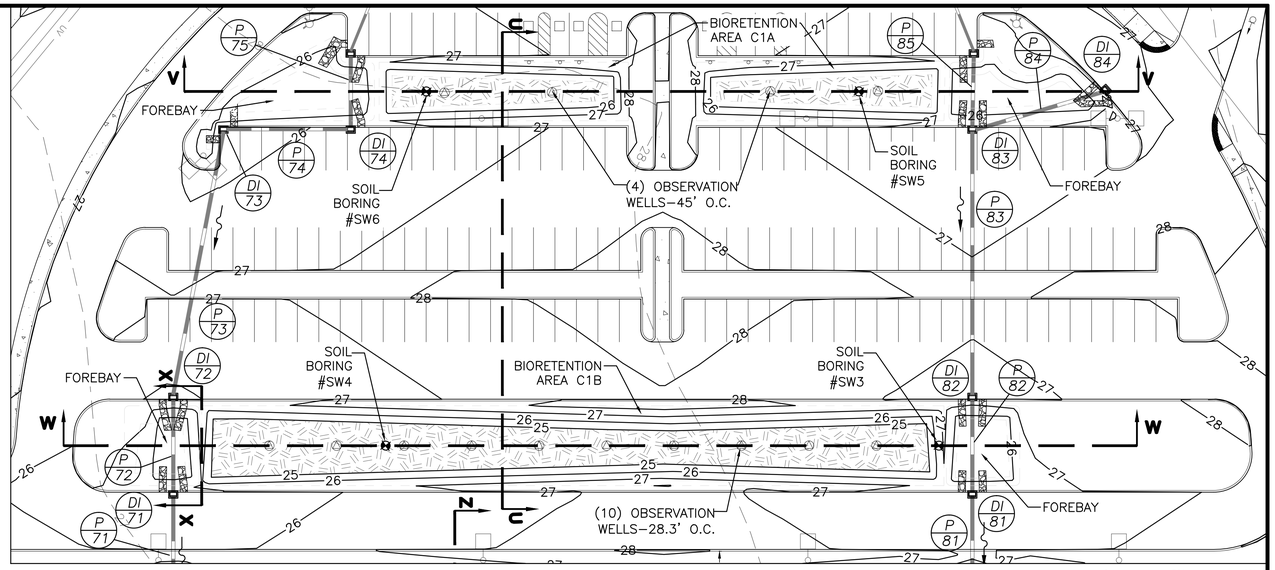
BIORETENTION OPERATION & MAINTENANCE NOTES

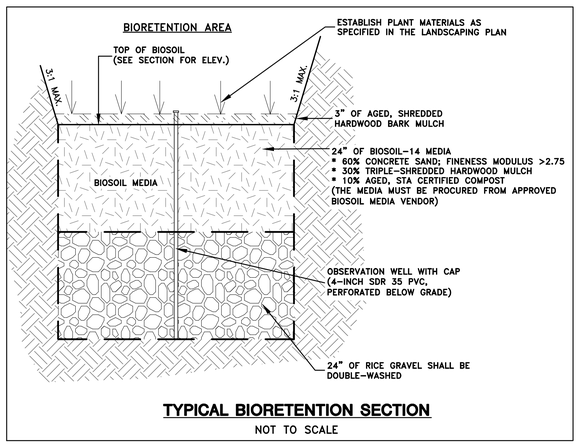
Function:	Bioretention facilities remove contaminants from runoff by filtering through an engineered media and infiltrate water into the ground.
Inspection:	Semi-annual (Spring and Fall) & after storm events of 2 inches or more.
Trash and Debris:	Remove trash and debris on a regular basis. It is especially important to remove debris from all inlets and outfall structures.
Forebays:	Remove sediment from forebays when sediment accumulation levels reach 50% of the forebay capacity. Sediment shall be removed from the site and disposed of in a DNREC approved manner.
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:	If bare soil exists on side slopes, reseed and/or replant as required based upon inspection findings. 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:	Mow around facility weekly during peak growing season (April - November). Mow 10-foot wide access path to all inlet and outlet structures, also mowing around these structures regularly. Use mulching mower to ensure that nutrients are recycled. For warm season grasses, the previous season's stalks should be cut down to 8-12 inches in early spring (mid March), before new season's growth emerges.
Landscape vegetation:	Maintain as a landscape island and manage vegetation accordingly. Cut down standing stalks of herbaceous materials to 12 inches just before growth emerges in Spring (mid-March). Selective application of herbicides may require licensed professional. Reseed or replant as required based upon inspection findings. Inspect woody material for pest and ice damage. Prune variable conditions such as severe drought and flooding, in addition to salty conditions as a result of road salt (winter conditions). Replace plantings as necessary.
Mulch:	Add double or triple-shredded hardwood mulch, as needed, to maintain 3 inch depth for facilities with mulch topdressing.
Special considerations:	Bioretention facilities are designed to infiltrate water and remove pollutants from stormwater. Do not compact facility in any way. This includes the use of heavy equipment or machinery. Compaction may lead to system failure.
Hire a professional:	If facility does not drain within 48 hours; removal of accumulated sediment is needed; replacement of biosoil mix (every 15-20 years); repair of severe erosion; vegetation control (chemical application) if licensing required by DE Department of Agriculture.

C1A & C1B SEQUENCE OF CONSTRUCTION

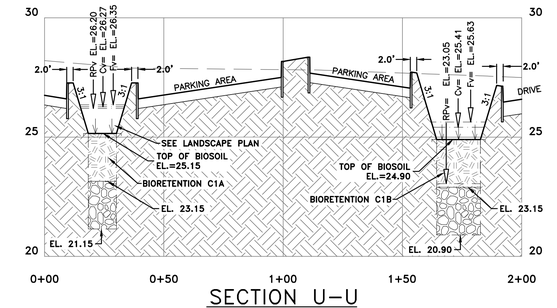
PHASE 1 (SEE COMPLETE SEQUENCE ON SHEET C-112)

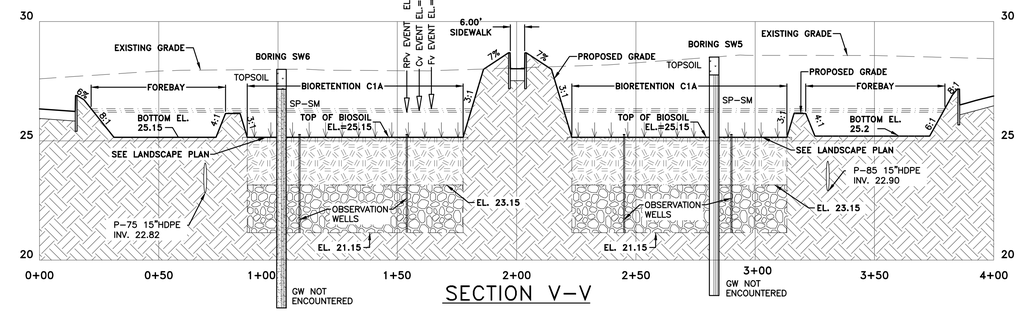
16. CONSTRUCT BIORETENTION FACILITIES
16.1. NOTIFY THE PERSON RESPONSIBLE FOR STORMWATER SYSTEM CONSTRUCTION REVIEW AT LEAST THREE (3) DAYS PRIOR TO THE START OF THE STORMWATER SYSTEM CONSTRUCTION; STORMWATER FACILITIES MUST BE REVIEWED THROUGHOUT THEIR CONSTRUCTION.
16.2. CONSTRUCTION OF THE BIORETENTION FACILITY MAY ONLY BEGIN AFTER THE ENTIRE CONTRIBUTING DRAINAGE AREA HAS BEEN STABILIZED.
16.3. BLOCK CURB CUT INLETS TO BIORETENION FOREBAYS AND DIVERT FLOW TO ADJOINING INLETS UNTIL FACILITY CONSTRUCTION IS COMPLETE.
16.4. EXCAVATE BIORETENTION FOREBAYS AND STABILIZE IN ACCORDANCE WITH THE EROSION AND SEDIMENT CONTROL NOTES.
16.5. EXCAVATE BIORETENTION AREAS FROM OUTSIDE OF THE PERIMETER OF THE FACILITY SO THAT EQUIPMENT DOES NOT TRAVERSE THE FACILITY AREA. THE CONTRACTOR SHALL NOT EXCAVATE OR DISTURB THE AREA BETWEEN THE BIORETENTION EXCAVATION AND THE FOREBAYS.
16.6. IF A BUCKET WITHOUT TEETH IS USED FOR EXCAVATION, RIP OR TILL THE BOTTOM SOILS TO A DEPTH OF 6 TO 12 INCHES.
16.7. PLACE 24" OF DOUBLE WASHED RICE GRAVEL IN BOTTOM OF FACILITY.
16.8. PLACE BIOSOIL-14 MEDIA ON TOP OF STONE IN 12" LIFTS TO DESIGN ELEVATION.
16.9. STABILIZE PERIMETER AREAS AND FACILITY SLOPES IN ACCORDANCE WITH THE EROSION AND SEDIMENT CONTROL NOTES WITH PERMANENT SEED MIX NO. 4 (SHEET C-512).
16.10. WAIT 2 DAYS FOR BIOSOIL-14 MEDIA TO SETTLE AND PLACE ADDITIONAL MEDIA AS NECESSARY TO ACHIEVE DESIGN ELEVATION.
16.11. PLACE 3" LAYER OF AGED, SHREDDED, HARDWOOD BARK MULCH
16.12. INSTALL PLANTINGS AS DIRECTED ON LANDSCAPE PLANS AND WATER ACCORDINGLY.
16.13. ONCE GOOD VEGETATIVE COVER IS ESTABLISHED IN FOREBAYS, REMOVE BLOCKING OF CURB CUT INLETS TO FOREBAYS.
16.14. CONTACT DNREC FOR INSPECTION.
16.15. SUBMIT AS-BUILT SURVEY OF FACILITIES TO DNREC.

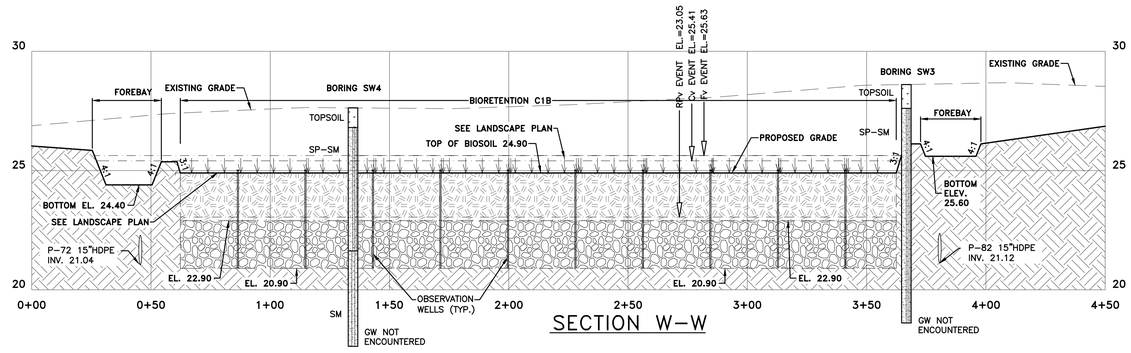


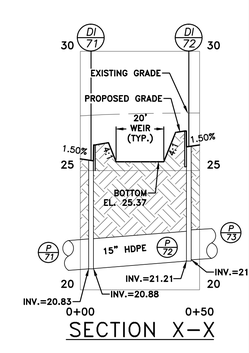


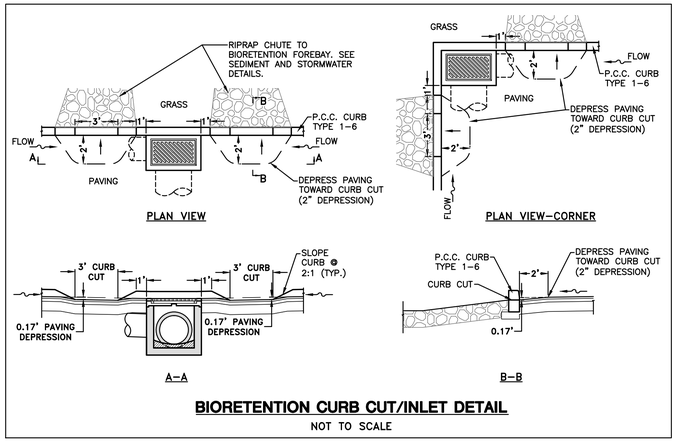
TYPICAL BIORETENTION SECTION
NOT TO SCALE











BIORETENTION CURB CUT/INLET DETAIL
NOT TO SCALE

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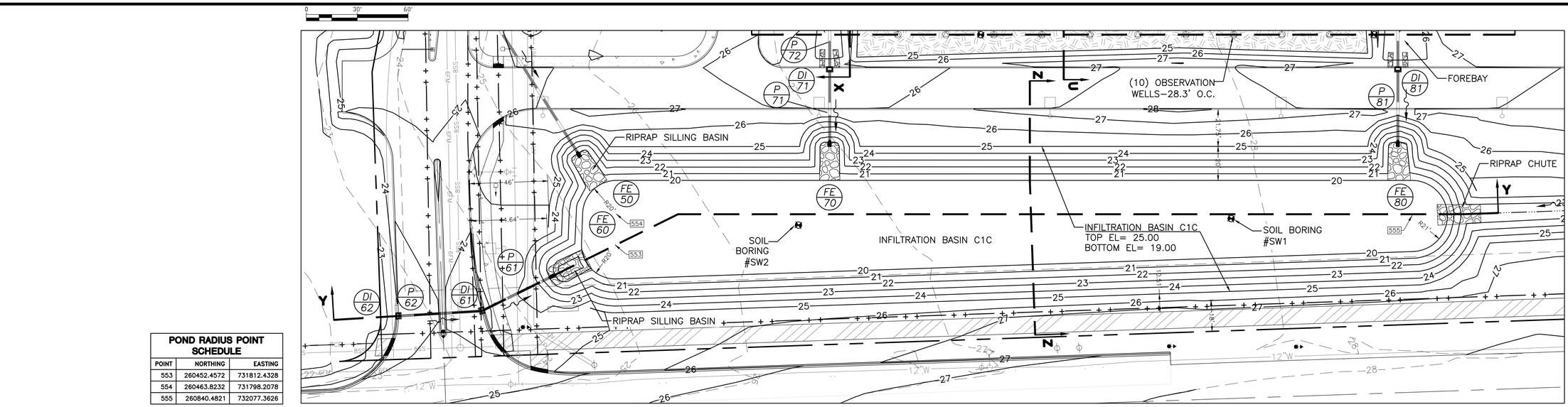
STORMWATER FACILITY DETAILS

LOVE CREEK ELEMENTARY SCHOOL
CAPE HENLOPEN SCHOOL DISTRICT
SUSSEX COUNTY, DELAWARE

REVISED	
08/14/15	FIRE MARSHAL & SSM SUBMITTAL
09/01/15	FIRE MARSHAL COMMENTS
10/02/15	TIDEWATER, SUSSEX CO. ENG. COMMENTS
10/05/15	DELDOT COMMENTS
10/08/15	WATER EASEMENT
10/13/15	DNREC COMMENTS
10/23/15	RT. 24 TRANSITION FOR 45 MPH
10/29/15	SUSSEX CO. ENG. & SWM COMMENTS

Date:	November 18, 2015
Scale:	H: 1"=30' V: 1"=3'
Dwn.By:	TPS/RAK
Proj.No.:	0774A019
Dwg.No.:	C-412



POND RADIUS POINT SCHEDULE		
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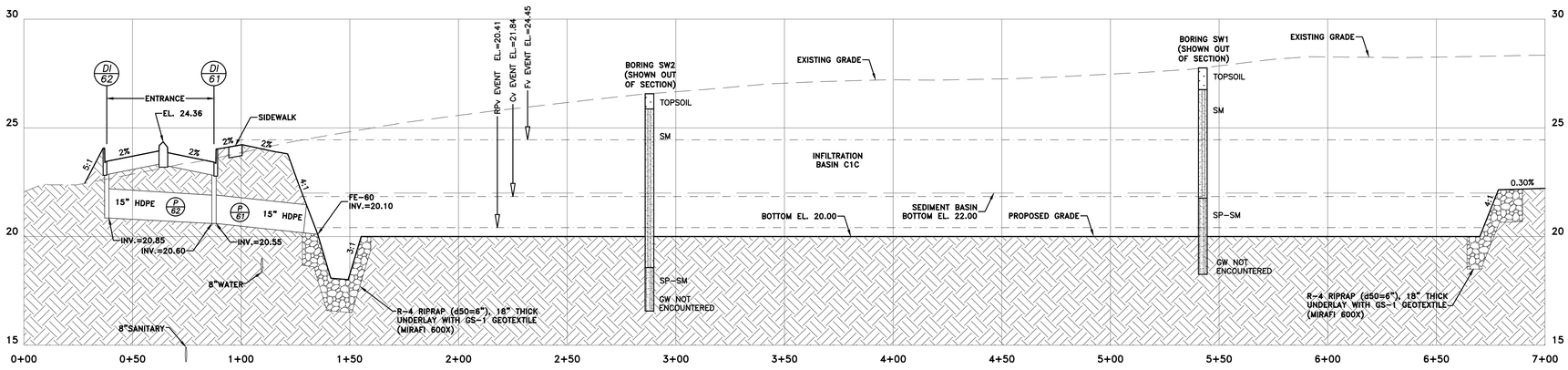
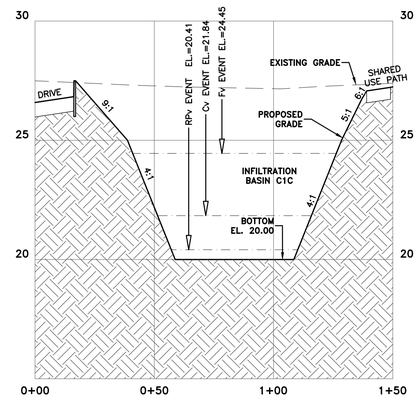


SECTION Y-Y



SECTION Z-Z

BASIN C1C SEQUENCE OF CONSTRUCTION

PHASE 1 (SEE COMPLETE SEQUENCE ON SHEET C-112)

7. CONSTRUCT SEDIMENT TRAP B1A.
   - 7.1. NOTIFY THE PERSON RESPONSIBLE FOR STORMWATER SYSTEM CONSTRUCTION REVIEW AT LEAST THREE (3) DAYS PRIOR TO THE START OF THE STORMWATER SYSTEM CONSTRUCTION; STORMWATER FACILITIES MUST BE REVIEWED THROUGHOUT THEIR CONSTRUCTION.
   - 7.2. CLEAR AND GRUB TRAP AREA.
   - 7.3. EXCAVATE TRAP.
     - 7.3.1. EXCAVATION OF THE SEDIMENT TRAP SHALL BE PERFORMED SO THAT EQUIPMENT DOES NOT TRACK UPON THE EXCAVATED SURFACE. LOW GROUND PRESSURE EQUIPMENT MAY BE USED TO SHAPE THE SIDE SLOPES OF THE FACILITY.
     - 7.3.2. SEDIMENT TRAP SHALL NOT BE EXCAVATED BELOW THE BOTTOM ELEVATIONS NOTED IN THE SEDIMENT TRAP SCHEDULE.
   - 7.4. STOCKPILE EXCAVATED MATERIAL IN DESIGNATED STOCKPILE AREAS AND SURROUND WITH SILT FENCE.
   - 7.5. INSTALL RIPRAP CHUTES AND STILLING BASINS AT SEDIMENT TRAP INLET LOCATIONS.
   - 7.6. STABILIZE TRAP IN ACCORDANCE WITH THE EROSION AND SEDIMENT CONTROL NOTES.

21. CONVERT SEDIMENT TRAP B1A TO INFILTRATION BASIN
   - 21.1. INSPECT STORM DRAIN SYSTEMS AND FOREBAYS FOR MAINTENANCE. REMOVE SEDIMENT AS NECESSARY.
   - 21.2. NOTIFY THE PERSON RESPONSIBLE FOR STORMWATER SYSTEM CONSTRUCTION REVIEW AT LEAST THREE (3) DAYS PRIOR TO THE START OF THE STORMWATER SYSTEM CONSTRUCTION; STORMWATER FACILITIES MUST BE REVIEWED THROUGHOUT THEIR CONSTRUCTION.
   - 21.3. EXCAVATE BASIN.
     - 21.3.1. EXCAVATION OF THE BASIN SHALL BE PERFORMED SO THAT EQUIPMENT DOES NOT TRACK UPON THE EXCAVATED SURFACE. LOW GROUND PRESSURE EQUIPMENT MAY BE USED TO SHAPE THE SIDE SLOPES OF THE FACILITY.
   - 21.4. STOCKPILE EXCAVATED MATERIAL IN DESIGNATED STOCKPILE AREAS AND SURROUND WITH SILT FENCE.
   - 21.5. INSTALL RIPRAP CHUTES, OUTLET PROTECTION AND STILLING BASINS AT BASIN INLET LOCATIONS.
   - 21.6. STABILIZE BASIN IN ACCORDANCE WITH THE EROSION AND SEDIMENT CONTROL NOTES.
     - 21.6.1. BOTTOM OF INFILTRATION FACILITY SHALL REMAIN NATIVE SOIL.
     - 21.6.2. STABILIZE SIDE SLOPES OF BASIN WITH PERMANENT SEED MIX NO. 4 (SHEET C-512).
   - 21.7. CONTACT DNREC FOR INSPECTION.
   - 21.8. SUBMIT AS-BUILT SURVEY OF FACILITY TO DNREC.

GENERAL OPERATION AND MAINTENANCE NOTES

1. THE DNREC SEDIMENT AND STORMWATER PROGRAM AND/OR THE RELEVANT DELEGATED AGENCY 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 AND/OR THE RELEVANT DELEGATED AGENCY 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.
10. 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.

INFILTRATION BASIN OPERATION & MAINTENANCE NOTES

Function: These stormwater facilities are designed to infiltrate stormwater and should not hold water for more than 48 hours.

Inspection: Self inspect semi-annually (Spring and Fall) and after storm events of 2 inches or more.

Trash and Debris: Remove trash and debris on a regular basis. It is especially important to remove debris from all inlets and outfall structures.

Stilling Basins: Remove sediment from stilling basins when sediment accumulation levels reach 50% of the stilling basin capacity. Sediment shall be removed from the site and disposed of in a DNREC approved manner.

Soil: Soils on side slopes of pond 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, fertilizers should only be applied in the fall.

Erosion: If bare soil exists on pond side slopes or embankment, reseed and/or replant as required based upon inspection findings. Stabilize applicable eroded areas with reinforcing 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: Mow around basin weekly during peak growing season (April – November). Mow 10-foot wide access path to all inlet and outlet structures, also mowing around these structures regularly. Use mulching mower to ensure that nutrients are recycled. For warm season grasses, the previous season's stalks should be cut down to 8-12 inches in early spring (mid March), before new season's growth emerges.

Fencing: Fencing is not recommended and not required; however, if a fence is preferred, ensure that it is in good repair and provides access for maintenance and inspections.

Special considerations: Infiltration basins are designed to infiltrate water and remove pollutants from stormwater. Do not compact facility in any way. This includes the use of heavy equipment or machinery. Compaction may lead to system failure.

Hire a professional: If facility does not drain within 48 hours; repair of severe erosion; replacement of deteriorating pipes or structural components; if mosquitoes are suspected to be problematic; reconstruction of embankment and outlet structure; removal of accumulated sediment; aquatic vegetation control chemical application) if licensing required by DE Department of Agriculture; if dredging (sediment removal) is required.

DAVIS, BOWEN & FRIEDEL, INC.
ENGINEERS & SURVEYORS
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MILFORD, DELAWARE (302) 424-1441

STORMWATER FACILITY DETAILS

LOVE CREEK ELEMENTARY SCHOOL
CAPE HENLOPEN SCHOOL DISTRICT
SUSSEX COUNTY, DELAWARE

REVISED	
10/02/15	TIDEWATER, SUSSEX CO. ENG. COMMENTS
10/05/15	DELDOT COMMENTS
10/08/15	WATER EASEMENT
10/13/15	DNREC COMMENTS
10/23/15	RT. 24 TRANSITION FOR 45 MPH
10/29/15	SUSSEX CO. ENG. & SWM COMMENTS
11/20/15	DELDOT COMMENTS
01/29/16	SEQ. OF CONST., SCE, STOCKPILES

Date:	November 20, 2015
Scale:	H: 1"=30' V: 1"=3'
Dwn.By:	TPS/RAK
Proj.No.:	0774A019
Dwg.No.:	C-413

Standard Detail & Specifications

Stabilization Matting - Slope

0.7 Staples per Sq. Yd.

1.2 Staples per Sq. Yd.

1.75 Staples per Sq. Yd.

3.5 Staples per Sq. Yd.

3.75 Staples per Sq. Yd.

NOTE: These patterns are provided for general guidance only. They shall not be used as a substitute for manufacturer's recommendations.

Stapling Patterns

Source:	Symbol:	Detail No.
Adapted from North American Green, Inc.	SM-S	**DE-ESC-3.4.6.1** Sheet 2 of 2

Effective October 2015

Standard Detail & Specifications

Vegetative Stabilization

TEMPORARY SEEDING BY RATES, DEPTHS AND DATES

Mix #	Species[6]	Seeding Rate	Optimum Seeding Dates [1] O = Optimum Planting Period; A = Acceptable Planting Period								Planting Depth[7]
			Coastal Plain			Piedmont			All		
	Certified Seed	lb/Ac[4]	lb/1000 sq.ft.	2/1-4/30	3/1-8/14	8/15-10/31	3/1-4/30	8/1-7/31	10/31-2/1		
1	Barley	125	4	O	A	O	O	A	O		1-2 inches 2-3" sandy soils
2	Oats	125	4	O	A	A	O	A	A		1-2 inches 2-3" sandy soils
3	Rye	125	4	O	A	O	O	A	O	A	1-2 inches 2-3" sandy soils
4	Perennial Ryegrass	125	4	O	A	O	O	A	O		0.5 inches 1-2" sandy soils
5	Annual Ryegrass	125	4	O	A	O	O	A	O	A	0.5 inches 1-2" sandy soils
6	Winter Wheat	125	4	O	A	O	O	A	O	A	1-2 inches 2-3" sandy soils
7	Foxtail Millet	30 PLS	0.7			O			O		0.5 inches 1-2" sandy soils
8	Pearl Millet	20 PLS	0.5			O			O		0.5 inches 1-2" sandy soils

1. Winter seeding requires 3 tons per acre of straw mulch for proper stabilization.
2. May be planted throughout summer if soil moisture is adequate or seeded area can be irrigated.
3. Applicable on slopes 3:1 or less.
4. Fifty pounds per acre of Annual Lespedeza may be added to 1/2 the seeding rate of any of the above species.
5. Uses varieties currently recommended for Delaware. Contact a County Extension Office for information.
6. Warm season grasses such as Millet or Weeping Lovegrass may be used between 5/1 and 9/1 if desired. Seed at 3-5 lbs. per acre. Good on low fertility and acid areas. Seed after frost through summer at a depth of 0.5".

Source:	Symbol:	Detail No.
Delaware ESC Handbook		**DE-ESC-3.4.3** Sheet 1 of 4

Effective October 2015

Standard Detail & Specifications

Vegetative Stabilization

PERMANENT SEEDING AND SEEDING DATES

Mix No.	Seeding Mixtures	Seeding Rate[1]	Optimum Seeding Dates [2] O = Optimum Planting Period; A = Acceptable Planting Period							Remarks
			Coastal Plain			Piedmont			All[3]	
	Well Drained Soils	lb/Ac	lb/1000 sq.ft.	2/1-4/30	3/1-8/14	8/15-10/31	3/1-4/30	8/1-7/31	10/31-2/1	
1	Tall Fescue	140	3.2	A	O	A	A	O	A	Add 100 lbs./ac Winter Rye	Good erosion control mix Tolerant of low fertility soils Lovegrass very difficult to mow; Not recommended for residential
2	Deertongue Sheep Fescue Common Lespedeza[5] Inoculated	30 30 15	0.69 0.69 0.35	A	O	A	A	O	A	Add 100 lbs./ac Winter Rye	Good erosion control mix Tolerant of low fertility soils Good wildlife cover and food
3	Tall Fescue (Turf-type) **or** Strong Creeping Red Fescue **or** Perennial Ryegrass **plus** Flatpea[5]	50 50 50 15	1.15 1.15 1.15 0.34	O	A	O	O	A	O	Add 100 lbs./ac. Winter Rye	Good erosion control mix Tall Fescue for droughty conditions. Creeping Red Fescue for heavy shade. Flatpea to suppress woody vegetation.
4	Strong Creeping Red Fescue Kentucky Bluegrass Perennial Ryegrass **or** Redtop **plus** White Clover[5]	100 75 15 5 3	2.3 1.7 0.35 0.11 0.07	O	A	O	O	A	O	Add 100 lbs./ac Winter Rye	Suitable waterway mix. Combination is drought tolerant. Use Redtop for increased drought tolerance.
5	Switchgrass[5] **or** Coastal Panicgrass Big Bluestem Little Bluestem Indian Grass	10 10 5 5 5	0.23 0.23 0.11 0.11 0.11		O			O			Native warm-season mixture. Tolerant of low fertility soils. Drought tolerant. Poor shade tolerance. N fertilizer discouraged - weeds
6	Tall Fescue (turf-type) Flatpea (Lathyrus sylvestris)	150	3.5	O	A	O	O	A	O		Managed filter strip for wildlife habitat
7	Tall Fescue Ky. Bluegrass (Blend) Perennial Ryegrass	130 20 20	3.0 0.46 0.46	O	A	O	O	A	O		Three cultivars of Kentucky Bluegrass. Traffic tolerant.
8	Big Bluestem[5] Indian Grass[5] Little Bluestem[5] Creeping Red Fescue **plus one of:** Partridge Pea Bush Clover Wild Indigo Showy Tick-Trefoil	10 10 8 30 5 3 3 2	0.23 0.23 0.18 0.69 0.11 0.07 0.07 0.05	O	A		O	A			All species are native. Indian Grass and Bluestem have fluffy seeds. Plant with a specialized native seed drill. Creeping Red Fescue will provide erosion protection while the warm season grasses get established.

Source:	Symbol:	Detail No.
Delaware ESC Handbook		**DE-ESC-3.4.3** Sheet 2 of 4

Effective October 2015

Standard Detail & Specifications

Vegetative Stabilization

PERMANENT SEEDING AND SEEDING DATES (cont.)

Mix No.	Seeding Mixtures	Seeding Rate[1]	Optimum Seeding Dates [2] O = Optimum Planting Period; A = Acceptable Planting Period							Remarks
			Coastal Plain			Piedmont			All[3]	
	Poorly Drained Soils	lb/Ac	lb/1000 sq.ft.	2/1-4/30	3/1-8/14	8/15-10/31	3/1-4/30	8/1-7/31	10/31-2/1	
9	Redtop Creeping Bentgrass Sheep Fescue Rough Bluegrass	75 25 30 45	1.72 0.8 0.69 1	O	A	O	O	A	O	Add 100 lbs./ac Winter Rye	Quick stabilization of disturbed sites and waterways
10	Reed Canarygrass[5]	10	0.23	A		O	A		O		Good erosion control, wildlife cover and wetland revegetation.
	Residential Lawns										
11	Tall Fescue Perennial Ryegrass Kentucky Bluegrass Blend	100 25 50	2.3 0.57 0.69	O	A	O	O	A	O		High value, high maintenance, light traffic, irrigation necessary. Well drained soils, full sun.
12	Tall Fescue Perennial Ryegrass Sheep Fescue	100 25 25	2.3 0.57 0.57	O	A	O	O	A	O		Moderate value, low maintenance, traffic tolerant
13	Creeping Red Fescue Chewings Fescue Rough Bluegrass Kentucky Bluegrass	50 50 20 30	1.15 1.15 0.4 0.69	O	A	O	O	A	O		Shade tolerant, moderate traffic tolerance, moderate maintenance.
14	Creeping Red Fescue Rough Bluegrass **or** Chewings Fescue	50 90	1.15 2.1	O	A	O	O	A	O		Shade tolerant, moisture tolerant.
15	K-31 Tall Fescue	150	3.5	O	A	O	O	A	O		Monocultures, but performs well alone in lawns. Discouraged

1. When hydroseeding is the chosen method of application, the total rate of seed should be increased by 25%.
2. Winter seeding requires 3 tons per acre of straw mulch. Planting dates listed above are average for Delaware. These dates may require adjustment to reflect local conditions.
3. All seed shall meet the minimum purity and minimum germination percentages recommended by the Delaware Department of Agriculture. The maximum % of weed seeds shall be in accordance with Section 1, Chapter 24, Title 3 of the Delaware Code.
4. Cool season species may be planted throughout summer if soil moisture is adequate or seeded area can be irrigated.
5. All leguminous seed must be inoculated.
6. Warm season grass mix and Reed Canary Grass cannot be mowed more than 4 times per year.
7. Warm season grasses require a soil temperature of at least 50 degrees in order to germinate, and will remain dormant until then.

Source:	Symbol:	Detail No.
Delaware ESC Handbook		**DE-ESC-3.4.3** Sheet 3 of 4

Effective October 2015

Standard Detail & Specifications

Vegetative Stabilization

Construction Notes:

1. Site Preparation
   a. Prior to seeding, install needed erosion and sediment control practices such as diversions, grade stabilization structures, berms, dikes, grassed waterways, and sediment basins.
   b. Final grading and shaping is not necessary for temporary seedings.
2. Seedbed Preparation

   It is important to prepare a good seedbed to insure the success of establishing vegetation. The seedbed should be well prepared, loose, uniform, and free of large clods, rocks, and other objectionable material. The soil surface should not be compacted or crusted.
3. Soil Amendments
   a. Lime - Apply liming materials based on the recommendations of a **soil test** in accordance with the approved nutrient management plan. If a nutrient management plan is not required, apply dolomitic limestone at the rate of 1 to 2 tons per acre. Apply limestone uniformly and incorporate into the top 4 to 6 inches of soil.
   b. Fertilizer - Apply fertilizer based on the recommendations of a **soil test** in accordance with the approved nutrient management plan. If a nutrient management plan is not required, apply a formulation of 10-10-10 at the rate of 600 pounds per acre. Apply fertilizer uniformly and incorporate into the top 4 to 6 inches of soils.
4. Seeding
   a. For **temporary stabilization**, select a mixture from **Sheet 1 .** For a **permanent stabilization**, select a mixture from **Sheet 2** or **Sheet 3** depending on the conditions.
   b. Apply seed uniformly with a broadcast seeder, drill, cultipacker seeder or hydroseeder. All seed will be applied at the recommended rate and planting depth.
   c. Seed that has been broadcast should be covered by raking or dragging and then lightly tamped into place using a roller or cultipacker. If hydroseeding is used and the seed and fertilizer is mixed, they will be mixed on site and the seeding shall be done immediately and without interruption.
5. Mulching

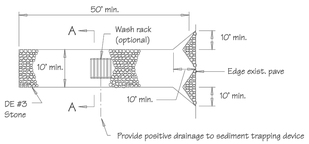
   All mulching shall be done in accordance with detail **DE-ESC-3.4.5**.

Source:	Symbol:	Detail No.
Delaware ESC Handbook		**DE-ESC-3.4.3** Sheet 4 of 4

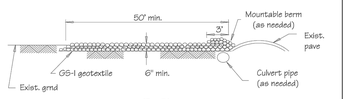
Effective October 2015

Standard Detail & Specifications

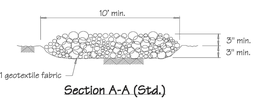
Stabilized Construct. Entrance



Plan



Profile



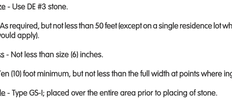
Section A-A (Std.)

Source:	Symbol:	Detail No.
Adapted from VA ESC Handbook	SCE	**DE-ESC-3.4.7** Sheet 1 of 2

Effective October 2015

Standard Detail & Specifications

Stabilized Construct. Entrance



Section A-A (Opt.)

Construction Notes:

1. Stone size - Use DE #3 stone.
2. Length - As required, but not less than 50 feet lexcept on a single residence lot where a 30 foot minimum length would apply.
3. Thickness - Not less than size (6) inches.
4. Width - Ten (10) foot minimum, but not less than the full width at points where ingress or egress occurs.
5. Geotextile - Type GS-I; placed over the entire area prior to placing of stone.
6. Surface Water - All surface water flowing or diverted toward construction entrances shall be piped across the entrance. If piping is impractical, a mountable berm with 5:1 slopes will be permitted.
7. Maintenance - The entrance shall be maintained in a condition which will prevent tracking or flowing of sediment onto public rights-of-way. This may require periodic top dressing with additional stone as conditions demand and repair and/or cleanout of any measures used to trap sediment. All sediment spilled, dropped, washed or tracked onto public rights-of-way must be removed immediately.
8. Washing - Vehicle wheels shall be cleaned to remove sediment prior to entrance onto public rights-of-way. When washing is required, it shall be done on an area stabilized with stone and which drains into an approved sediment trapping device.
9. Inspection - Periodic inspection and needed maintenance shall be provided after each rain.

Source:	Symbol:	Detail No.
Adapted from VA ESC Handbook	SCE	**DE-ESC-3.4.7** Sheet 2 of 2

Effective October 2015

Standard Detail & Specifications

Mulching

1. Materials and Amounts

a. *Straw* - Straw shall be unrotted small grain straw applied at the rate of 1-1/2 to 2 tons per acre, or 70 to 90 pounds (two bales) per 1,000 square feet. Mulch materials shall be relatively free of weeds and shall be free of noxious weeds such as; thistles, Johnsongrass, and quackgrass. Spread mulch uniformly by hand or mechanically. For uniform distribution of hand spread mulch, divide area into approximately 1,000 square feet sections and place 70-90 pounds (two bales) of mulch in each section.

b. *Wood chips* - Apply at the rate of approximately 6 tons per acre or 275 pounds per 1,000 square feet when available and when feasible. These are particularly well suited for utility and road rights-of-way. If wood chips are used, increase the application rate of nitrogen fertilizer by 20 pounds of N per acre (200 pounds of 10-10-10 or 66 pounds of 30-0-0 per acre).

c. *Hydraulically applied mulch* -The following conditions apply to hydraulically applied mulch:

i. Definitions:

a. Wood fiber mulch shall consist of specially prepared wood that has been processed to a uniform state, is packaged for sale as a hydraulic mulch for use with hydraulic seeding equipment, and consists of a minimum of 70% virgin or recycled wood fiber combined with 30% paper fiber and additives.

b. Blended fiber mulch shall consist of any hydraulic mulch that contains greater than 30% paper fiber. The paper component must consist of specially prepared paper that has been processed to a uniform fibrous state and is packaged for sale as a hydraulic mulch for use with hydraulic seeding equipment.

c. A bonded fiber matrix (BFM) consists of long strand, specially prepared wood fibers that have been processed to a uniform state held together by a water resistant bonding agent. BFMs shall contain no paper (cellulose) mulch but may contain small percentages of synthetic fibers to enhance performance.

d. Refer to **Figure 3.4.5a** for conditions and limitations of use for each of the above categories of hydraulic mulch.

ii. All components of the hydraulically applied mulches shall be pre-packaged by the manufacturer to assure material performance. Field mixing of the mulch components is acceptable, but must be done per manufacturers recommendations to ensure the proper results.

iii. Hydraulic mulches shall be applied with a viable seed and at manufacturer's recommended rates. Increased rates may be necessary based on site conditions.

iv. Hydraulically applied mulches and additives shall be mixed according to manufacturers recommendations.

iv. Materials within this category shall only be used when hydraulically applied mulch has been specified for use on the approved Sediment and Stormwater Plan, or supplemental approval from the plan approval agency has been obtained in writing for a specific area.

Source:	Symbol:	Detail No.
Delaware ESC Handbook & Filtrexx[SM] International		**DE-ESC-3.4.5** Sheet 1 of 3

Effective October 2015

Standard Detail & Specifications

Mulching

v. Application:
   a. Apply product to geotechnically stable slopes that have been designed and constructed to divert runoff away from the face of the slope.
   b. Do not apply to saturated soils, or if precipitation is anticipated within 24-48 hours.
   c. During the spring (March 1 to May 31) and fall (September 1 to November 30) seasons, hydraulic mulches may be applied in a one-step process where all components are mixed together in single-tank loads. It is recommended that the product be applied from opposing directions to achieve optimum soil coverage.
   d. During the summer (June 1 to August 31) and winter (December 1 to February 28) seasons, the following two-step process is required:
      Step One– *Mix* and apply seed and soil amendments with a small amount of mulch for visual metering.
      Step Two – *Mix* and apply mulch at manufacturers recommended rates over freshly seeded surfaces. Apply from opposing directions to achieve optimum soil coverage.
   e. Minimum curing temperature is 40º F (4º C). The best results and more rapid curing are achieved at temperatures exceeding 60º F (15º C). Curing times may be accelerated in high temperatures, low humidity conditions on dry soils.

vi. Recommended application rates are for informational purposes only. Conformance with this standard and specification shall be performance-based and requires **100% soil coverage**. Any areas with bare soil showing shall be top dressed until full coverage is achieved.

d. *Compost blanket (CB)* - Loosely applied with a pneumatic blower so that a 1" compost blanket uniformly covers the **soil with 100% coverage**. This application can be used with seed to promote germination by applying the approved seed mix directly into the loosely blown compost. The compost blanket performs best on slopes less than 2:1 and requires no mulch anchoring.

2. Anchoring mulch - Mulch must be anchored immediately to minimize loss by wind or water. This may be done by one of the following methods, depending upon size of area, erosion hazard, and cost.
   a. *Crimping* - A crimper is a tractor drawn implement designed to punch and anchor mulch into the top two (2) inches of soil. This practice affords maximum erosion control but is limited to flatter slopes where equipment can operate safely. On sloping land, crimping should be done on the contour whenever possible.
   b. *Tracking* – Tracking is the process of cutting mulch (usually straw) into the soil using a bulldozer or other equipment that runs on cleated tracks. Tracking is used primarily on slopes 3:1 or steeper and should be done up and down the slope with cleat marks running across the slope.
   c. *Liquid mulch binders* - Applications of liquid mulch binders should be heavier at edges, in valleys, and at crests of banks and other areas where the mulch will be moved by wind or water. All other areas should have a uniform application of binder. The use of synthetic binders is the preferred method of mulch binding and should be applied at the rates recommended by the manufacturer.
   d. *Paper fiber* - The fiber binder shall be applied at a net dry weight of 750 lbs/ac. The wood cellulose fiber shall be mixed with water, and the mixture shall contain a maximum of 50 lbs. of wood cellulose fiber per 100 gallons.
   e. *Nettings* - Synthetic or organic nettings may be used to secure straw mulch. Install and secure according to the manufacturers recommendations.

Source:	Symbol:	Detail No.
Delaware ESC Handbook & Filtrexx[SM] International		**DE-ESC-3.4.5** Sheet 2 of 3

Effective October 2015

Standard Detail & Specifications

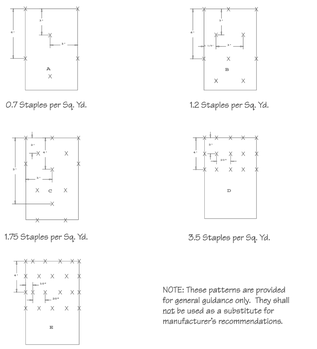
Mulching

MULCHING MATERIAL SELECTION GUIDE

Type of Mulch / App. Rate*	Dec. 1 to Feb. 28/29	March 1 to May 31	June 1 to Aug. 31	Sept. 1 to Nov. 30
Wood Fiber @ 2000 lbs/ac. min. Blown @ 2" Thickness Min. Blown @ 2" Thickness Min. + Compost Blanket (CB)	xxxxxxxxxx OK OK OK	OK OK OK OK	OK OK OK OK	OK OK OK OK
Wood Fiber @ 2000-2500 lbs/ac. min. Stabilization Matting** Blown @ 2" Thickness Min. + Compost Blanket (CB)	xxxxxxxxxx OK OK OK	OK OK OK OK	OK OK OK OK	OK OK OK OK
Wood Fiber @ 2500-3000 lbs/ac. min. Stabilization Matting** Blown @ 2" Thickness Min. + Compost Blanket (CB)	xxxxxxxxxx OK OK OK	OK OK OK OK	OK OK OK OK	OK OK OK OK
BFM @ 3000-3500 lbs/ac. min. Stabilization Matting** Blown @ 2" Thickness Min. + Compost Blanket (CB)	xxxxxxxxxx OK OK OK	OK OK OK OK	OK OK OK OK	OK OK OK OK
BFM @ 4000 lbs/ac. min. + COMPOST @ 2000 lbs/ac. min. BFM @ 4000 lbs/ac. min. Stabilization Matting**	xxxxxxxxxx OK OK OK	OK OK OK OK	OK OK OK OK	OK OK OK OK
375 lbs/ac. min. BFM @ 4000 lbs/ac. min. Stabilization Matting**	xxxxxxxxxx OK OK	OK OK OK	OK OK OK	OK OK 2 Lifts

Percent Slope	Least than 2%	2% to 5.9%	6% to 10.9%	11% to 24.9%	25% to 33%	33% and up

* Rate: Manufacturers Recommended Rates for informational purposes only. Performance standard requires 100% soil coverage.
** Note: Stabilization Matting must be applied in accordance with Section 3.4.6 of the Delaware ESC Handbook.
OK = Acceptable to use during the time period.
All application rates are minimums



NOTE: These patterns are provided for general guidance only. They shall not be used as a substitute for manufacturer's recommendations.

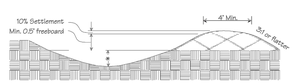
Stapling Patterns

Source:	Symbol:	Detail No.
Delaware ESC Handbook & Filtrexx[SM] International		**DE-ESC-3.4.5** Sheet 3 of 3

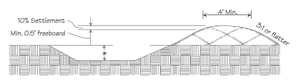
Effective October 2015

Standard Detail & Specifications

Diversion



Typical Section (Parabolic)



Typical Section (Trapazoidal)

Typical Section (Triangular)

*Flow section to be designed and constructed in accordance with Standard & Specification for Vegetated Channel or Lined Channel. (See separate detail.)

Source:	Symbol:	Detail No.
Adapted from VA ESC Handbook	(VC/LC)- (P/T) → D	**DE-ESC-3.3.5** Sheet 1 of 2

Effective October 2015

Standard Detail & Specifications

Diversion

Construction Notes

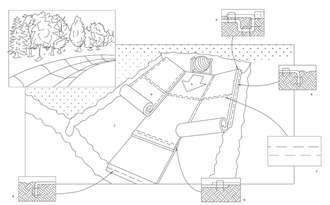
1. All trees, brush, stumps, obstructions, and other objectionable material shall be removed and disposed of so as not to interfere with the proper functioning of the diversion.
2. The diversion shall be excavated or shaped to line, grade, and cross section as required to meet the criteria specified herein, and be free of irregularities which will impede normal flow.
3. Fills shall be compacted as needed to prevent unequal settlement that would cause damage in the completed diversion.
4. All earth removed and not needed in construction shall be spread or disposed of so that it will not interfere with the functioning of the diversion.
5. Flow section shall be installed in accordance with the Standard and Specifications for Vegetated Channel or Lined Channel, as appropriate.
6. Stabilization shall be done according to the appropriate Standard and Specifications for Vegetative Stabilization.

Source:	Symbol:	Detail No.
Adapted from VA ESC Handbook	(VC/LC)- (P/T) → D	**DE-ESC-3.3.5** Sheet 2 of 2

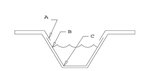
Effective October 2015

Standard Detail & Specifications

Stabilization Matting - Channel



Perspective



CRITICAL POINTS

A. Overlaps and seams
B. Projected waterline
C. Channel bottom/side slope vertices

Note: Horizontal staple spacing should be altered if necessary to allow staples to secure the critical points along the channel surface.

Use manufacturer's recommendations for stapling patterns for channel installations.

Source:	Symbol:	Detail No.
Adapted from North American Green, Inc.	SM-C	**DE-ESC-3.4.6.2** Sheet 1 of 3

Effective October 2015

Standard Detail & Specifications

Stabilization Matting - Channel

Construction Notes:

1. Prepare soil before installing matting, including application of lime, fertilizer, and seed.
2. Begin at the top of the channel by anchoring the mat in a 6" deep X 6" wide trench. Backfill and compact the trench after stapling.
3. Roll center mat in direction of water flow on bottom of channel.
4. Place mats end over end (shingle style) with a 6" overlap, use a double row of staggered staples 4" apart to secure mats.
5. Full Length edge of mats at top of side slopes must be anchored in 6" deep X 6" wide trench; backfill and compact the trench after stapling.
6. Mats on side slopes must be overlapped 4" over the center mat and stapled.
7. In high flow channel applications, a staple check slot is recommended at 30 to 40 foot intervals. Use a row of staples 4" apart over entire width of the channel. Place a second row 4" below the first row in a staggered pattern.
8. The terminal end of the mats must be anchored in a 6" X 6" wide trench. Backfill and compact the trench after stapling.

Source:	Symbol:	Detail No.
Adapted from North American Green, Inc.	SM-C	**DE-ESC-3.4.6.2** Sheet 2 of 3

Effective October 2015

Standard Detail & Specifications

Stabilization Matting - Channel

NOTE: These patterns are provided for general guidance only. They shall not be used as a substitute for manufacturer's recommendations.

Stapling Patterns

Source:	Symbol:	Detail No.
Adapted from North American Green, Inc.	SM-C	**DE-ESC-3.4.6.2** Sheet 3 of 3

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SEDIMENT & STORMWATER DETAILS

LOVE CREEK ELEMENTARY SCHOOL
CAPE HENLOPEN SCHOOL DISTRICT
SUSSEX COUNTY, DELAWARE

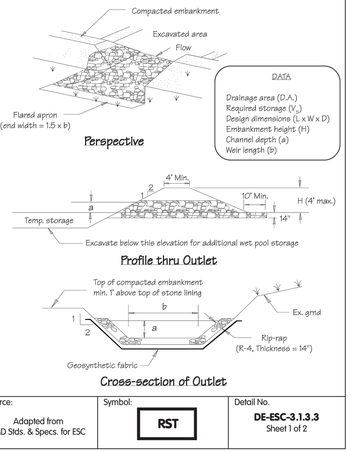
REVISED	
08/14/15	FIRE MARSHAL & SSM SUBMITTAL
09/01/15	FIRE MARSHAL COMMENTS
10/02/15	TIDEWATER, SUSSEX CO. ENG. COMMENTS
10/05/15	DELDOT COMMENTS
10/08/15	WATER EASEMENT
10/13/15	DNREC COMMENTS
10/23/15	RT. 24 TRANSITION FOR 45 MPH
10/29/15	SUSSEX CO. ENG. & SWM COMMENTS

Date: November 18, 2015
Scale: 1" = 30'
Dwn.By: TPS/RAK
Proj.No.: 0774A019
Dwg.No.:

C-512

Standard Detail & Specifications

Riprap Outlet Sediment Trap



Source:	Symbol:	Detail No.
Adapted from MD Stds. & Specs. for ESC	RST	**DE-ESC-3.1.3.3** Sheet 1 of 2

Effective October 2015

Standard Detail & Specifications

Riprap Outlet Sediment Trap

Construction Notes:

1. The area under embankment shall be cleared, grubbed and stripped of any vegetation and root mat. The pool area shall be cleared.
2. The fill material for the embankment shall be free of roots or other woody vegetation as well as over-sized stones, rocks, organic material or other objectionable material. The embankment shall be compacted by traversing with equipment while it is being constructed. Maximum height of embankment shall be four (4) feet, measured at centerline of the embankment.
3. All fill slopes shall be 2:1 or flatter; cut slopes 1:1 or flatter.
4. Elevation of the top of any dike directing water into trap must equal or exceed the height of embankment.
5. Storage area provided shall be figured by computing the volume available behind the outlet channel up to the elevation of the crest of the outlet weir channel.
6. Filter cloth shall be placed over the bottom and sides of the outlet channel prior to placement of stone. Sections of fabric must overlap at least one (1) foot with section nearest the entrance placed on top. Fabric shall be embedded at least six (6) inches into existing ground at entrance of outlet channel.
7. Stone used in the outlet shall be R-4 riprap with a thickness of 14".
8. **An approved dewatering device shall be considered an integral part of the trap. Dewatering operations shall be conducted in accordance with any and all regulatory requirements.**
9. Sediment shall be removed and trap restored to its original dimensions when the sediment has accumulated to 1/2 the design depth of the trap. Removed sediment shall be deposited in a suitable area and in such a manner that it will not erode.
10. The structure shall be inspected after each rain and repaired as needed.
11. Construction operations shall be carried out in such a manner that erosion and water pollution are minimized. Disturbed areas shall be stabilized in accordance with the Standards and Specifications for vegetative Stabilization contained in this Handbook.
12. The structure shall be removed and the area stabilized when the contributing drainage area has been properly stabilized.

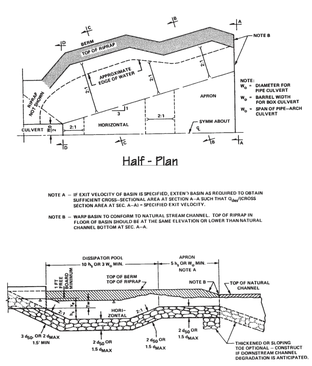
MAXIMUM DRAINAGE AREA: 15 ACRES

Source:	Symbol:	Detail No.
Adapted from MD Stds. & Specs. for ESC	RST	**DE-ESC-3.1.3.3** Sheet 2 of 2

Effective October 2015

Standard Detail & Specifications

Riprap Stilling Basin

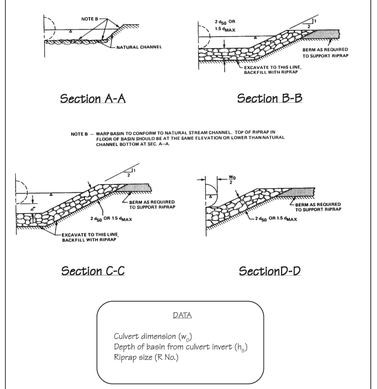


Source:	Symbol:	Detail No.
Adapted from FHWA HEC-14	RSB	**DE-ESC-3.3.11** Sheet 1 of 3

Effective October 2015

Standard Detail & Specifications

Riprap Stilling Basin



Source:	Symbol:	Detail No.
Adapted from FHWA HEC-14	RSB	**DE-ESC-3.3.11** Sheet 2 of 3

Effective October 2015

Standard Detail & Specifications

Riprap Stilling Basin

Construction Notes:

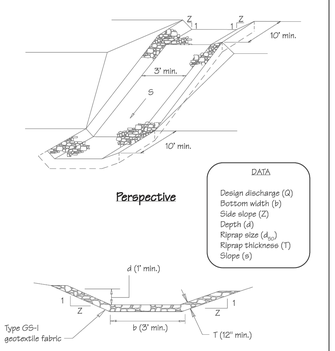
1. The subgrade for the riprap shall be prepared to the required lines and grades as shown on the plan. Any fill required in the subgrade shall be compacted to a density of approximately that of the surrounding undisturbed material.
2. The riprap shall conform to the grading limits as shown on the plan.
3. Geotextile shall be a Type GS-I. Fabric shall be protected from punching, cutting or tearing. Any damage other than an occasional small hole shall be repaired by placing another piece of cloth over the damaged area. All connecting joints should overlap a minimum of 1 ft. If the damage is extensive, replace the entire section.
4. Stone for the riprap or gabion outlets may be placed by equipment. Riprap shall be placed in a manner to prevent damage to the geotextile fabric. Hand placement will be required to the extent necessary to prevent damage to the conduits, structures, etc.

Source:	Symbol:	Detail No.
Adapted from FHWA HEC-14	RSB	**DE-ESC-3.3.11** Sheet 3 of 3

Effective October 2015

Standard Detail & Specifications

Riprap Chute



Source:	Symbol:	Detail No.
Adapted from MD Stds. & Specs. for ESC	RRC	**DE-ESC-3.3.9.1** Sheet 1 of 2

Effective October 2015

Standard Detail & Specifications

Riprap Chute

Construction Notes:

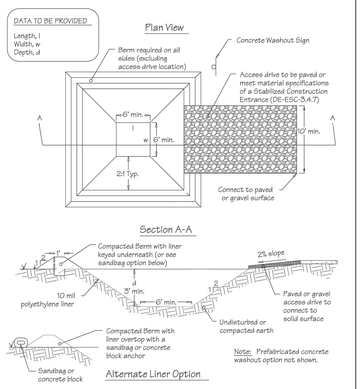
1. Riprap chutes shall have a trapezoidal cross section with side slopes of 2:1 or flatter. Minimum flow depth shall be 1' with a minimum bottom width of 3'.
2. Entrance and exit aprons shall be provided as transition areas. Aprons shall be a minimum of 10' in length.
3. The riprap layer thickness shall be 1.5 X Dmax, with a minimum of 12".
4. All riprap shall be underlain with Type GS-I geotextile fabric.

Source:	Symbol:	Detail No.
Adapted from MD Stds. & Specs. for ESC	RRC	**DE-ESC-3.3.9.1** Sheet 2 of 2

Effective October 2015

Standard Detail & Specifications

Concrete Washout



Source:	Symbol:	Detail No.
Adapted from Colorado Urban Storm Drainage Criteria Manual, Vol 3	CW	**DE-ESC-3.6.2** Sheet 1 of 2

Effective October 2015

Standard Detail & Specifications

Concrete Washout

Construction Notes:

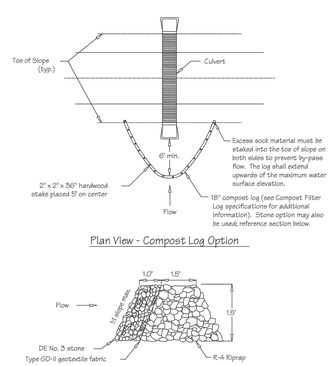
1. Locate washout area a minimum of 50 feet from open channels, stormdrain inlets, wetlands or waterbodies.
2. Locate washout area so that it is accessible to concrete equipment (service with a minimum 10 foot wide gravel accessway), but so it is not in a highly active construction area causing accidental damage.
3. Minimum dimensions for prefabricated units are 4 feet by 4 feet by 1 foot deep with a minimum 4mil polyethylene plastic liner. Minimum dimensions for constructed concrete washout areas are 6 feet by 6 feet by 3 feet deep, with a minimum 10mil polyethylene liner, 2:1 side slopes, and a 1 foot high by 1 foot wide compacted fill berm.
4. The liner must be free of tears or holes and placed over smooth surfaces to prevent puncturing. For excavated washouts, anchor the liner underneath the berm or overtop with sandbags or concrete blocks to hold in place.
5. Provide a sign designating the washout area, and for large construction sites, provide signs throughout directing traffic to its location.
6. Allow washed out concrete mixture to harden through evaporation of the wastewater. Once the facility has reached 75 percent of its capacity, remove the hardened concrete by reusing the broken aggregate onsite, recycling, or disposing of offsite. The hardened material can be buried on site with minimum of 1 foot of clean, compacted fill.
7. Apply a new liner before reusing the station for additional washouts after maintenance has occurred.

Source:	Symbol:	Detail No.
Adapted from Colorado Urban Storm Drainage Criteria Manual, Vol 3	CW	**DE-ESC-3.6.2** Sheet 2 of 2

Effective October 2015

Standard Detail & Specifications

Culvert Inlet Protection



Source:	Symbol:	Detail No.
Adapted from VA ESC Handbook & Filtrexx(TM) International	CIP	**DE-ESC-3.1.6** Sheet 1 of 2

Effective October 2015

Standard Detail & Specifications

Culvert Inlet Protection

Construction Notes

1. Compost logs shall be designed and installed in accordance with the Standard Detail and Specifications for Compost Logs (DE-ES-3.1.7).
2. If compost logs can not be installed properly or flow conditions exceed the design capabilities of the compost logs, the stone option shall be employed. Additional filtration may be provided by using a Type GD-II geotextile incorporated into the design as an option.
3. Placement of the compost log or stone barrier should be in a "horseshoe" shape and provide a minimum of 6 feet of clearance from the culvert inlet.

Materials

1. Stakes: 2" x 2" x 36" hardwood.
2. Compost media : See requirements in Standard Detail and Specifications for Compost Logs (DE-ES-3.1.7).
3. Filter sock: See requirements in Standard Detail and Specifications for Compost Logs (DE-ES-3.1.7).
4. Geotextile: Type GD-II for stone/riprap option.
5. Stone: DE No. 3 for stone/riprap option.
6. Riprap: R-6 for stone/riprap option.

Source:	Symbol:	Detail No.
Adapted from VA ESC Handbook & Filtrexx(TM) International	CIP	**DE-ESC-3.1.6** Sheet 2 of 2

Effective October 2015

Standard Detail & Specifications

Sensitive Area Protection

Source:	Symbol:	Detail No.
Adapted from VA ESC Handbook	SAP	**DE-ESC-3.7.2** Sheet 1 of 3

Effective October 2015

Standard Detail & Specifications

Sensitive Area Protection

Construction Notes:

Fencing shall be installed at the extents of all sensitive areas. For trees, the fencing shall be installed outside the dripline (mature canopy) and at no time within 5 feet of the trunk. Personnel must be instructed to honor protective devices. The devices described are suggested only, and are not intended to exclude the use of other devices which will protect the trees to be retained. If silt fence is to be used for demarcation purposes, appropriate signage shall be provided a minimum of every 20 feet denoting the area as a sensitive area protection zone.

Materials:

1. Snow Fence - Standard 40-inch high snow fence shall be placed at the limits of clearing or construction on standard steel posts set 6 feet apart.
2. Board Fence - Board fencing consisting of 4-inch square posts set securely in the ground and protruding at least 4 feet above the ground shall be placed at the limits of clearing with a minimum of two horizontal boards between posts. For tree protection, if it is not practical to erect a fence at the drip line, construct a triangular fence nearer the trunk. The limits of clearing will still be located at the drip line, since the root zone within the drip line will still require protection.
3. Plastic Fencing - 40-inch high "international orange" plastic (polyethylene) web fencing secured to conventional metal "T" or "U" posts driven to a minimum depth of 18 inches on 6-foot minimum centers shall be installed at the limits of clearing. The fence should have the following minimum physical qualities:

a.	Tensile yield:	Average 2,000 lbs. per 4-foot width (ASTM D638)
b.	Ultimate tensile yield:	Average 2,900 lbs. per 4-foot width (ASTM D638)
c.	Elongation at break (%):	Greater than 1000% (ASTM D638)
d.	Chemical resistance:	Inert to most chemicals and acids

Source:	Symbol:	Detail No.
Adapted from VA ESC Handbook	SAP	**DE-ESC-3.7.2** Sheet 2 of 3

Effective October 2015

Standard Detail & Specifications

Sensitive Area Protection

4. Cord Fence - Posts with a minimum size of 2 inches square or 2 inches in diameter set securely in the ground and protruding at least 4 feet above the ground shall be placed at the limits of clearing with two rows of cord 1/4-inch or thicker at least 2 feet apart running between posts with strips of colored surveyor's flagging tied securely to the string at intervals no greater than 3 feet.
5. Earth Berms - Temporary earth berms shall be constructed according to specifications for a Temporary Earth Dike with the base of the berm on the sensitive area side located along the limits of clearing. Earth berms may not be used for this purpose if their presence will conflict with drainage patterns.
6. Trunk Armoring (Tree Protection Only) - As a last resort, a tree trunk can be armored with burlap wrapping and 2-inch studs wired vertically no more than 2 inches apart to a height of 5 feet encircling the trunk. If this alternative is used, the root zone within the drip line will still require protection. Nothing should ever be nailed to a tree.

Maintenance:

Fencing and armoring devices shall be in place before any excavation or grading is begun, shall be kept in good repair for the duration of construction activities, and shall be the last items removed during the final cleanup after the completion of the project.

Source:	Symbol:	Detail No.
Adapted from VA ESC Handbook	SAP	**DE-ESC-3.7.2** Sheet 3 of 3

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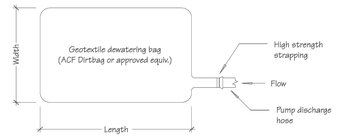
SEDIMENT & STORMWATER DETAILS

LOVE CREEK ELEMENTARY SCHOOL
CAPE HENLOPEN SCHOOL DISTRICT
SUSSEX COUNTY, DELAWARE

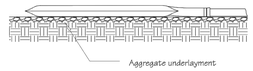
REVISED	
08/14/15	FIRE MARSHAL & SSM SUBMITTAL
09/01/15	FIRE MARSHAL COMMENTS
10/02/15	TIDEWATER, SUSSEX CO. ENG. COMMENTS
10/05/15	DELDOT COMMENTS
10/08/15	WATER EASEMENT
10/13/15	DNREC COMMENTS
10/23/15	RT. 24 TRANSITION FOR 45 MPH
10/29/15	SUSSEX CO. ENG. & SWM COMMENTS

Date:	November 18, 2015
Scale:	1" = 30'
Dwn.By:	TPS/RAK
Proj.No.:	0774A019
Dwg.No.:	C-513

Standard Detail & Specifications
Geotextile Dewatering Bag



Plan



Profile

Source:	Symbol:	Detail No.
Adapted from ACF Products, Inc.	GB	**DE-ESC-3.2.1.2** Sheet 1 of 2

Effective October 2015

Standard Detail & Specifications
Geotextile Dewatering Bag

Construction Notes:

1. The dewatering bag should be placed so the incoming water flows into and through the bag, and then flow off the site without creating more erosion. The neck should be tied off tightly to stop the water from flowing out of the bag without going through the walls. The dewatering bag should be placed on a gravel bed to allow water to flow in all directions.
2. The dewatering bag is considered full and should be disposed when it is impractical for the bag to filter the sediment out at a reasonable flow rate. At this point, it should be replaced with a new bag.
3. Disposal may be accomplished as directed by the construction reviewer. If the site allows, the bag may be buried on site and seeded, visible fabric removed and seeded or removed from site to a proper disposal area.

Materials:

1. The geotextile fabric shall be a Type GD-IV.
2. The dewatering bag shall be sewn with a double needle machine using high strength thread. All structural seams will be sewn with high strength, double stitched "J" type. Seam strength test will have the following minimum average roll values:

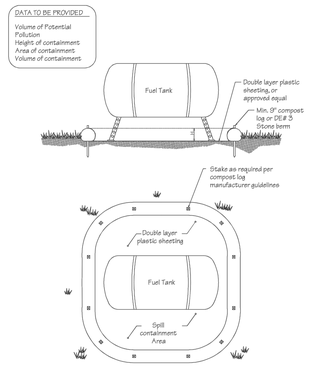
Type	TEST METHOD	TEST RESULT
Heavy duty	ASTM D-4884	100 lb / in

3. The dewatering bag shall have an opening large enough to accommodate a four (4) inch discharge hose with attached strap to tie off the hose to prevent the pumped water from escaping from the bag without being filtered.

Source:	Symbol:	Detail No.
Adapted from ACF Products, Inc.	GB	**DE-ESC-3.2.1.2** Sheet 2 of 2

Effective October 2015

Standard Detail & Specifications
Construction Site Waste Mgt & Spill Control



Source:	Symbol:	Detail No.
Delaware ESC Handbook		**DE-ESC-3.6.1** Sheet 1 of 5

Effective October 2015

Standard Detail & Specifications
Construction Site Waste Mgt & Spill Control

Pollution Prevention – Spill Prevention

1. Fueling should only take place in signed designated areas, away from downstream drainage facilities and watercourses.
2. Fueling must be with nozzles equipped with automatic shut-off to control drips. Do not top off.
3. Protect the areas where equipment or vehicles are being repaired, maintained, fueled or parked from storm water run-on and runoff.
4. Use barriers such as berms to prevent storm water run-on and runoff, and to contain spills.
5. Place a "Fueling Area" sign next to each fueling area.
6. Store hazardous materials such as fuel, solvents, oil and chemicals in secondary containment.
7. Inspect vehicles and equipment for leaks on each day of use. Repair fluid and oil leaks immediately.
8. Absorbent spill clean-up materials and spill kits must be available in fueling areas and on fuel trucks.
9. If fueling is to take place at night, make sure the fueling area is sufficiently illuminated.
10. Properly dispose of used oil, fluids, lubricants and spill clean-up materials.

CLEAN UP SPILLS

1. If it is safe to do so, immediately contain and clean up any chemical and/or hazardous material spills.
2. Properly dispose of used oil, fluids, lubricants and spill clean-up materials.
3. Do not bury spills or wash them down with water.

LEAKS AND DRIPS

1. Use drip pans or absorbent pads at all times. Place under and around leaky equipment.
2. Do not allow oil, grease, fuel or chemicals to drip onto the ground.
3. Have spill kits and clean up material on-site.
4. Repair leaky equipment promptly or remove problem vehicles and equipment from the site. Clean up contaminated soil immediately.
5. Store contaminated waste in sealed containers constructed of suitable material. Label these containers properly.
6. Clean up all spills and leaks. Promptly dispose of waste and spent clean up materials.

Source:	Symbol:	Detail No.
Delaware ESC Handbook		**DE-ESC-3.6.1** Sheet 2 of 5

Effective October 2015

Standard Detail & Specifications
Construction Site Waste Mgt & Spill Control

Notes:

The Construction Site Pollution Prevention Plan should include the following elements:

1. **Material Inventory**

   Document the storage and use of the following materials:
   a. Concrete
   b. Detergents
   c. Paints (enamel and latex)
   d. Cleaning solvents
   e. Pesticides
   f. Wood scraps
   g. Fertilizers
   h. Petroleum based products
2. **Good housekeeping practices**
   a. Store only enough product required to do the job.
   b. All materials shall be stored in a neat, orderly manner in their original labeled containers and covered.
   c. Substances shall not be mixed.
   d. When possible, all of a product shall be used up prior to disposal of the container.
   e. Manufacturers' instructions for disposal shall be strictly adhered to.
   f. The site foreman shall designate someone to inspect all BMPs daily.
3. **Waste management practices**
   a. All waste materials shall be collected and stored in securely lidded dumpsters in a location that does not drain to a waterbody.
   b. Waste materials shall be salvaged and/or recycled whenever possible.
   c. The dumpsters shall be emptied a minimum of twice per week, or more if necessary. The licensed trash hauler is responsible for cleaning out dumpsters.

Source:	Symbol:	Detail No.
Adapted from USEPA Pub. 840-B-92-002		**DE-ESC-3.6.1** Sheet 3 of 5

Effective October 2015

Standard Detail & Specifications
Construction Site Waste Mgt & Spill Control

Notes (cont.)

   d. Trash shall be disposed of in accordance with all applicable Delaware laws.
   e. Trash cans shall be placed at all lunch spots and littering is strictly prohibited. Recycle bins shall be placed near the construction trailer.
   f. If fertilizer bags can not be stored in a weather-proof location, they shall be kept on a pallet and covered with plastic sheeting which is overlapped and anchored.
4. **Equipment maintenance practices**
   a. If possible, equipment should be taken to off-site commercial facilities for washing and maintenance.
   b. If performed on-site, vehicles shall be washed with high-pressure water spray without detergents in an area contained by an impervious berm.
   c. Drip pans shall be used for all equipment maintenance.
   d. Equipment shall be inspected for leaks on a daily basis.
   e. Washout from concrete trucks shall be disposed of in a temporary pit for hardening and proper disposal.
   f. Fuel nozzles shall be equipped with automatic shut-off valves.
   g. All used products such as oil, antifreeze, solvents and tires shall be disposed of in accordance with manufacturers' recommendations and local, state and federal laws and regulations.
5. **Spill prevention practices**
   a. Potential spill areas shall be identified and contained in covered areas with no connection to the storm drain system.
   b. Warning signs shall be posted in hazardous material storage areas.
   c. Preventive maintenance shall be performed on all tanks, valves, pumps, pipes and other equipment as necessary.
   d. Low or non-toxic substances shall be prioritized for use.

Source:	Symbol:	Detail No.
Adapted from USEPA Pub. 840-B-92-002		**DE-ESC-3.6.1** Sheet 4 of 5

Effective October 2015

Standard Detail & Specifications
Construction Site Waste Mgt & Spill Control

Notes (cont.)

   e. Contact information for reporting spills through the DNREC 24-Hour Toll Free Number shall be prominently posted.
6. **Education**
   a. Best management practices for construction site pollution control shall be a part of regular progress meetings.
   b. Information regarding waste management, equipment maintenance and spill prevention shall be prominently posted in the construction trailer.

CONTACT INFORMATION

DNREC 24-Hour Toll Free Number	**800-662-8802**
DNREC Solid & Hazardous Waste Branch	**302-739-9403**

Source:	Symbol:	Detail No.
Adapted from USEPA Pub. 840-B-92-002		**DE-ESC-3.6.1** Sheet 5 of 5

Effective October 2015

DAVIS, BOWEN & FRIEDEL, INC.
ENGINEERS & SURVEYORS
SALISBURY, MARYLAND (410) 543-9091
MILFORD, DELAWARE (302) 424-1441

SEDIMENT & STORMWATER DETAILS

LOVE CREEK ELEMENTARY SCHOOL
CAPE HENLOPEN SCHOOL DISTRICT
SUSSEX COUNTY, DELAWARE

REVISED	
08/14/15	FIRE MARSHAL & SSM SUBMITTAL
09/01/15	FIRE MARSHAL COMMENTS
10/02/15	TIDEWATER, SUSSEX CO. ENG. COMMENTS
10/05/15	DELDOT COMMENTS
10/08/15	WATER EASEMENT
10/13/15	DNREC COMMENTS
10/23/15	RT. 24 TRANSITION FOR 45 MPH
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