

**EROSION & SEDIMENT CONTROL REPORT
FOR
S.R. 0295 BOX CULVERT REPLACEMENT
OVER HAY RUN
(TRIBUTARY TO BIG CONEWAGO CREEK)
NEWBERRY TOWNSHIP, YORK COUNTY**

January 2007
(Revision #1 – February 2007)

Prepared For:



Pennsylvania Department of Transportation
Engineering District 8-0
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PENNDOT Pub 408 – Specification Section 804 – Seeding and Soil Supplements

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PENNDOT Pub 408 – Specification Section 845 – Unforeseen Water Pollution Control

PENNDOT Pub 408 – Specification Section 850 – Rock Lining

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1.0 PROJECT OVERVIEW

1.1 Project Description

The purpose of this study is to develop the Erosion & Sediment Control Plan needed for the replacement of the existing structure that carries S.R. 0295 (Cragmoor Road) over Hay Run (a tributary to Big Conewago Creek) in Newberry Township, York County. S.R. 0295 is classified as a collector roadway. The project will extend from Station 1277+25.00 to Station 1285+00.00, a length of 775 feet. The project area and total disturbed area is 0.29 acres.

The project's primary need is to replace the existing structurally deficient and functionally obsolete 48-inch & 60-inch corrugated metal pipes. The existing roadway has a total width of 20'-6" and the structure is skewed at approximately 35 degrees to the centerline of the roadway.

It is proposed to replace the existing structure with a 15'-0" wide by 6'-0" high single-cell precast reinforced concrete box culvert. The existing horizontal alignment will be maintained. The proposed roadway cross section will consist of two 11-foot lanes and two 3-foot shoulders.

The project area is located in a rural/agricultural region of York County. The project is located within the USGS York & Dover Quadrangle at N40° 06' 02" latitude and W76° 45' 39" longitude.

The stream within the project area is classified as a Warm Water Fishery (WWF) under Title 25, Environmental Protection, Chapter 93, Water Quality Standards. The bottom of the proposed replacement structure will be depressed a minimum of one (1) foot below the stream invert to establish the natural passage of the fish.

1.2 Project Duration

The project has a proposed let date of June 2007. It is expected construction will be underway in the Summer of 2007 and the project will be completed by the late Summer of 2007.

1.3 Plan Preparation

Whitney, Bailey, Cox & Magnani, LLC has prepared erosion and sedimentation control plans for numerous projects from major highway projects to bridge replacement projects and site development plans. Erosion and sedimentation control submissions have been prepared for the following recent projects:



- S.R. 3025-A01 Bridge Replacement, Juniata County
- S.R. 0116-012 Bridge Replacement, Adams County
- S.R. 0097-003 Bridge Replacement, Adams County
- S.R. 3085-40M Bridge Replacement, Chester County
- S.R. 4003-40M Culvert Replacement, Chester County
- S.R. 9900-PED Pedestrian Bridge Project, Blair County
- Salem Church Rd Culvert Replacement, Cumberland County
- Penn State University, York – Library and Classroom Addition, York County
- Penn State University, Altoona – Classroom Addition, Blair County
- West Manchester Municipal Building, York County

The narrative and plan for this project were prepared under the direction of Joseph L. O’Neil, PE. Mr. O’Neil was involved with the preparation of the erosion and sedimentation control plan for seven of the above referenced projects. His formal education consists of a Bachelors Degree in Civil Engineering from George Washington University and a Masters Degree from the University of Maryland.

2.0 SOIL INFORMATION

Soil present in the project area is Rw – Rowland silt loam. The Rowland silt loam is a nearly level, very deep, moderately well drained soil on flood plains. The Rowland silt loam slopes are smooth and range from 0 to 3 percent. Areas of this soil are long and narrow in shape and range from 5 to 200 acres in size.

In most areas this soil is used for cropland or pasture. In some small areas it is used for woodland or is idle land. The existing land use of this soil within the project area is pasture, farms and single-family homes. Permeability in this Rowland soil is moderate or moderately slow in the surface layer and subsoil and moderately rapid in the substratum. Available water capacity is moderate with a surface runoff is slow. This soil is subject to frequent flooding for brief periods, mainly in late winter and early spring. Soils information for the project area is located in Appendix C. This information was obtained from the USDA-SCS Soil Survey of York County, Pennsylvania. The type of soil present within the project area is indicated on the soils map included in Appendix C. The soil is delineated on the Erosion and Sediment Control Plan. Based on the scope of the project, there are no limitations associated with the existing soil type.

3.0 DRAINAGE FACILITIES

The proposed roadway is in a fill condition at all four corners of the bridge. The proposed roadway section is an open section with runoff dissipating down the fill slopes. A proposed Type M inlet and 24” RCP cross pipe are proposed to intercept anticipated drainage from the existing swale located right ahead station beyond the private driveway.



4.0 TEMPORARY AND PERMANENT CONTROL MEASURES

Several temporary control measures will be used for this project, which include silt barrier fence (18" high), sediment filter bags, erosion control mulch blanket, rock filter and temporary sandbag diversion dam with pump to divert the stream while the proposed box culvert is being installed.

Permanent control measures and facilities that will be used for this project include R-6 rip rap for scour protection along the edge of the box culvert end sections and seeding and mulching of all disturbed areas.

Design details and specifications for these control measures are included in Appendix D and were taken from the DEP Erosion and Sediment Pollution Control Program Manual, March 2000.

The purpose of this plan is to provide effective erosion and sedimentation pollution control procedures to minimize erosion under normal conditions and shall be construed in whole or in part to be adequate for soil stabilization during construction.

The Contractor shall be responsible for developing and submitting an erosion and sediment pollution control plan for off-site borrow and/or waste areas as per Publication 408, Section 105.14. Submit the plan to the York County Conservation District for approval. Provide a copy of the approval to the engineer prior to commencing work.

A copy of the approved erosion and sediment pollution control plan shall be available at the site during construction and until the site is stabilized.

Until the site is stabilized all erosion and sedimentation BMP's must be maintained properly. Maintenance must include inspections of all erosion and sedimentation BMP's after each runoff event and on a weekly basis. All site inspections will be documented in an inspection log kept for this purpose. The compliance actions and date, time and name of person conducting the inspection will be recorded. The inspection log will be kept on site at all times and made available to the District upon request. All preventative and remedial maintenance work, including clean out, repair, replacement, re-grading, re-seeding, re-mulching and re-netting, must be performed immediately. If E&S BMP's fail to perform as expected, replacement BMP's or modification of those installed will be needed.

The Contractor shall notify the York County Conservation District 72 hours prior to on-site earthwork operations.

Comply with the rules and regulations contained in Chapter 102 of the Clean Streams Law, 35 P.S.S. 691.1.



Disturb the minimum area required for construction activities.

All channels must be kept free of obstructions such as fill ground, fallen leaves and woody debris, accumulated sediment and construction materials/wastes. Channels should be kept mowed and/or free of all weedy, brushy or woody growth. Any underground utilities running across/through the channel(s) shall be immediately backfilled and the channel(s) repaired and stabilized per the channel cross-section detail.

Pumping of sediment laden water shall be through a sediment filter bag device or equivalent sediment removal facility, over non-disturbed vegetated areas. Discharge points shall be established to provide the maximum distance to active waterways.

Sediment removed from erosion and sediment pollution controls and facilities shall be disposed of in landscaped areas outside of steep slopes, wetlands, floodplains or drainage swales and immediately stabilized or placed in topsoil stockpiles.

Any sediment removed from BMP's during construction will be returned to upland areas on site and incorporated into the site grading.

The Operator shall remove from the site, recycle, or dispose of all building materials and wastes in accordance with the Department's Solid Waste Management Regulations at 25 PA. Code 260.1 et Seq., 271.1 et Seq. and 287.1 et Seq. The Contractor shall not illegally bury, dump, or discharge any building material or wastes at the sites.

Upon completion of all earth disturbance activities, removal of all temporary BMP's and permanent stabilization of all disturbance areas, the Owner and/or Operators shall contact the York County Conservation District for a final inspection.

The Permittee and Co-Permittee must ensure that visual site inspections are conducted weekly and after each measurable precipitation event by qualified personnel, trained and experienced in erosion and sediment control, to ascertain that the erosion and sediment control bmps are operational and effective in preventing pollution to the waters of the commonwealth. A written report of each inspection shall be kept and include: a summary of the site conditions, erosion and sediment bmps and compliance; and the date, time and name of the person conducting the inspection.



SEEDING & SOIL SUPPLEMENTS

FORMULA & SPECIES	% BY MASS	MINIMUM %		MAXIMUM % WEED SEED	SEEDING RATE LBS PER 1000 SY	REMARKS
		PURITY	GERMINATION			
FORMULA B					21.0 TOTAL	ALL DISTURBED LAWN AREAS
PERENNIAL RYEGRASS MIXTURE (LOLIUM PERENNE) *	20	98	90	0.15	4.0	
CREEPING RED FESCUE OR CHEWINGS FESCUE	30	98	85	0.15	6.0	
KENTUCKY BLUEGRASS MIXTURE (POA PRATENSIS) **	50	98	80	0.2	11.0	
FORMULA D					21.0 TOTAL	SWALES
TALL FESCUE (FESTUCA ARUNDINACEA VAR. K31)	70	98	85	0.15	15.0	
CREEPING RED FESCUE OR CHEWINGS FESCUE	30	98	85	0.15	6.0	
FORMULA E					10.0 TOTAL	TEMPORARY
ANNUAL RYEGRASS (LOLIUM MUTIFLORIUM)	100	98	90	0.15	10.0	

* A COMBINATION OF IMPROVED CERTIFIED VARIETIES WITH NO ONE VARIETY EXCEEDING 50% OF THE TOTAL RYEGRASS COMPONENT.

** A COMBINATION OF IMPROVED CERTIFIED VARIETIES WITH NO ONE VARIETY EXCEEDING 25% OF THE TOTAL BLUEGRASS COMPONENT.

*** A COMBINATION OF IMPROVED CERTIFIED VARIETIES WITH NO ONE VARIETY EXCEEDING 50% OF THE TOTAL HARD FESCUE COMPONENT.

PENNDOT Formula E will be utilized to stabilize areas temporarily. PENNDOT Formula B will be utilized to permanently seed all disturbed areas except PENNDOT Formula L will be used to stabilize slopes steeper than 3:1. Reference is made to the attached table for seed mix formulations. Seed will be applied at the rates specified in the table.

Soil supplements of the type specified below will be applied at the following application rates:

- Pulverized Agricultural Limestone at a rate of 800 lbs / 1000 SY.
- 10-20-20 Analysis Commercial Fertilizer at a rate of 140 lbs / 1000 SY.
- 38-0-0 Ureaform Fertilizer at a rate of 50 lbs / 1000 SY.
- or
- 32-0-0 to 38-0-0 Sulfur Coated Area Fertilizer at a rate of 59 to 50 lbs / 1000 SY as directed.
- or
- 31-0-0 IBDU Fertilizer at a rate of 61 lbs / 1000 SY.



Mulch consisting of straw or hay shall be applied uniformly, in a continuous blanket, at a minimum rate of 1200 lbs / 1000 SY or as otherwise indicated. If indicated, increase the rate of application, depending upon the material used, season, soil conditions, or method of application. An acceptable mechanical blower may be used to apply the mulch.

Straw and hay mulch should be anchored immediately after application to prevent being windblown.

Utilize any of the following to anchor straw and hay mulch:

- Asphalt (emulsified or cut-back) containing no solvents or other diluting agents toxic to plant or animal life, uniformly applied at the rate of 31 gallons / 1,000 SY may be used to tack mulch.
- Synthetic binders (chemical binders) may be used as recommended by the manufacturer to anchor mulch provided sufficient documentation is provided to show they are non-toxic to native plant and animal species.
- Lightweight nets (plastic, fiber or paper) may be stapled over the mulch according to manufacturer's recommendations.

Any disturbed area on which activity has ceased and which will remain exposed must be stabilized immediately. During non-germination periods, mulch must be applied at the recommended rates. Disturbed areas which are not at finished grade and which will be re-disturbed within one (1) year must be stabilized in accordance with the temporary vegetative stabilization specifications. Disturbed areas which are at final grade or which will not be re-disturbed within one (1) year must be stabilized in accordance with the permanent vegetative stabilization specifications.

An area shall be considered to have achieved final stabilization when it has a minimum 70% uniform perennial vegetative cover or other permanent non-vegetative cover with a density sufficient to resist accelerated surface erosion and subsurface characteristics sufficient to resist sliding or other movements.

Erosion control mulch blanket will be installed on all slopes greater than 3:1 and will be furnished and installed in accordance with PENNDOT Publication 408 Specifications – Section 806 – Water Course and Erosion Protection.

If there is any disagreement between the Conservation District and the Contractor as to whether or not an area requires erosion control blanketing, the opinion of the Conservation District overrides that of the Contractor's.



5.0 CONSTRUCTION SEQUENCE

At least seven (7) days before starting any earth disturbance activities, the Owner and/or Operator shall invite all Contractors involved in those activities, the landowner, all appropriate municipal officials, the erosion and sediment control plan preparer and a representative of the York County Conservation District to an on-site pre-construction meeting.

At least three (3) days before starting any earth disturbance activities, all Contractors involved in those activities shall notify the Pennsylvania One Call System, Inc. at 1-800-242-1776 for buried utilities locations. The following is the serial number for the municipality involved: Newberry Township - 2996765.

All earth disturbance activities shall proceed in accordance with the following sequence. Each stage shall be completed and immediately stabilized before any following stage is initiated. Clearing, grubbing and topsoil stripping shall be limited only to those areas described in each stage.

Immediately upon discovering unforeseen circumstances posing the potential for accelerated erosion and/or sediment pollution, the operator shall implement appropriate best management practices to eliminate the potential for accelerated erosion and/or sediment pollution.

1. Delineate all limits of disturbed area in the field. Install silt fence of the type indicated on the plans.
2. Construct Rock Construction Entrances (RCE) as indicated on the plans at Station 1282 + 25 and Station 1284 + 50.
3. Install temporary sandbag diversion dam, diversion pump, sediment filter bag and rock filter in downstream channel as indicated on the plans. Diversion pump shall be operated 24 hours a day to divert clean stream water from the disturbed area.
4. Remove existing pipes. Pump excavation into the filter bags.
5. Install culvert bedding material, proposed precast box culvert and precast end sections, and Class R-6 rip rap.
6. Remove temporary sandbag diversion dam, diversion pump, sediment filter bag and rock filter.
7. Construct east and west approach roadway embankments from Station 1282 + 25 to Station 1284 + 50. Install inlet and cross pipe at Station 1284 + 20.



8. Construct pavement section and install guide rail as shown on the plans. Install erosion control mulch blanket on all slopes steeper.
9. Install signing and pavement markings.
10. After final site stabilization has been achieved and released to PADEP, remove temporary erosion and sediment BMPS. Permanently stabilize areas disturbed during removal of erosion and sediment BMPS immediately.

Upon completion of all earth disturbance activities and permanent stabilization of all disturbance areas, the owner and/or operators shall contact the York County Conservation District for a final inspection prior to the removal of the BMPS.

6.0 MAINTENANCE PROGRAM

The Contractor is responsible for installation, maintenance and disposal of erosion and sediment pollution control devices. Perform these activities in accordance with PENNDOT Publication 408 and Special Provisions as applicable until the site is stabilized. All sediment and pollution control devices must be properly maintained including inspection and repair weekly and after storm events. Maintenance includes removal of debris and sediment from dewatering basins, repair and replacement of silt barrier fence disturbed during construction and the regrading and reseeding of washed out areas. If erosion and sediment pollution control devices do not function as intended, replacement or modification of those installed may be required.

1. Silt Barrier Fence

Inspect the silt fence weekly and after storm events. After reviewing the results of the inspection with the Engineer, immediately, clean, repair or replace silt fence found to be in unsatisfactory condition. Remove accumulated sediment when it reaches one-half the above ground height of the silt fence. Repair undercutting or erosion of the toe anchor immediately with compacted backfill.

2. Seeding and Mulching

Maintain seeding and mulching in accordance with PENNDOT Publication 408 Specifications Sections 804 and 805. Reapply soil supplement and reseed in accordance with PENNDOT Publication 408, Section 804. Reapply mulch material and replace in accordance with PENNDOT Publication 408, Section 805.

3. Rock Construction Entrance

Maintain rock construction entrance thickness to the specified dimension by adding rock. Maintain a stockpile of rock material on site for this purpose. Any mud tracked onto the open portion of the roadway must be cleaned up at the end of each day. Washing of the road with water is not permitted.

4. Sediment Filter Bag

Inspect filter bags daily. If any problem is detected, pumping shall cease immediately and not resume until the problem is corrected. Replace the filter bag when they become half full. Keep spare bags on-site for replacement of those that have failed or are filled. Place and connect filter bags as per manufacturer's recommendations for dewatering purposes. Provide bag that will handle 1,700 gpm of water discharged and filter particles down to 125 microns. Place sediment filter bags in undisturbed areas and/or where the construction of the aggregate bed is relatively level.

5. Temporary Sandbag Diversion Dam

Inspect sandbags and plastic sheeting weekly and after storm events. Initiate repairs immediately after inspection. Replace damaged sandbags and plastic sheeting as required.

6. Rock Filters

Inspect rock filter weekly and after each storm event. Remove rock filter when clogged with sediment. Materials must be washed completely free of debris or replaced with new rock when directed to rebuild the barrier. Remove and dispose of sediment so it does not erode the construction areas and/or natural waterways. Accomplish cleanout or replacement within three (3) working days of inspection.

Borrow or waste areas have not been designated. The Contractor will be responsible for acquiring all borrow and waste areas and complying with the following:

- PENNDOT Pub. 408 – Section 105.14 – Borrow Areas and Waste Areas
- PENNDOT Pub. 408 – Section 845 – Unforeseen Project Water Pollution Control

The Contractor will be responsible for securing approval for the Erosion and Sediment Control Plan for the Borrow and Waste Areas from the York County Conservation District.

It is expected that the Contractor's staging areas for job trailer, materials storage areas and equipment will be accommodated within the closed portion of the roadway on each approach. Erosion and sediment control plans for areas outside of the Permit Area shown on the plans shall be approved by the York County Conservation District prior to the initiation of work in this non-Permitted Area.

Permanent Maintenance Operations

Upon completion of the project, the maintenance of permanent erosion and sediment pollution control becomes part of the Township's regular maintenance program. This includes the periodic inspection (at least once a year) and making required repairs to facilities/devices.



7.0 RECYCLING / DISPOSAL OF MATERIALS

Comply with the requirements of Title 25 - Rules and Regulations; Part 1 - Department of Environmental Protection, Subpart C - Protection of Natural Resources, Article II - Water Resources, Chapter 102 - Erosion Control. In the event of conflict between these requirements and the pollution control laws, rules and regulations of the federal, state or local agencies, the most restrictive law, rule or regulation applies. Dispose of project construction waste.

It is anticipated that the existing bituminous roadway that is removed in conjunction with this project will be used as fill material at the project site in accordance with PENNDOT Publication 408, Section 206.

The existing bridge is to be removed in accordance with the special provisions for Item 1018-0001 - Removal of Existing Bridge. The Contractor shall remove all pieces of the existing bridge from the project site. The Contractor shall also remove the existing pipes, as indicated, from the project site.

8.0 REFERENCES

- Pennsylvania Department of Transportation, Design Manual Part 2
- Pennsylvania Department of Transportation, Design Manual Part 3
- Pennsylvania Department of Environmental Protection, Erosion and Sediment Pollution Control Program Manual, March 2000

APPENDIX "A"



Location and Vicinity Map
Drainage Design

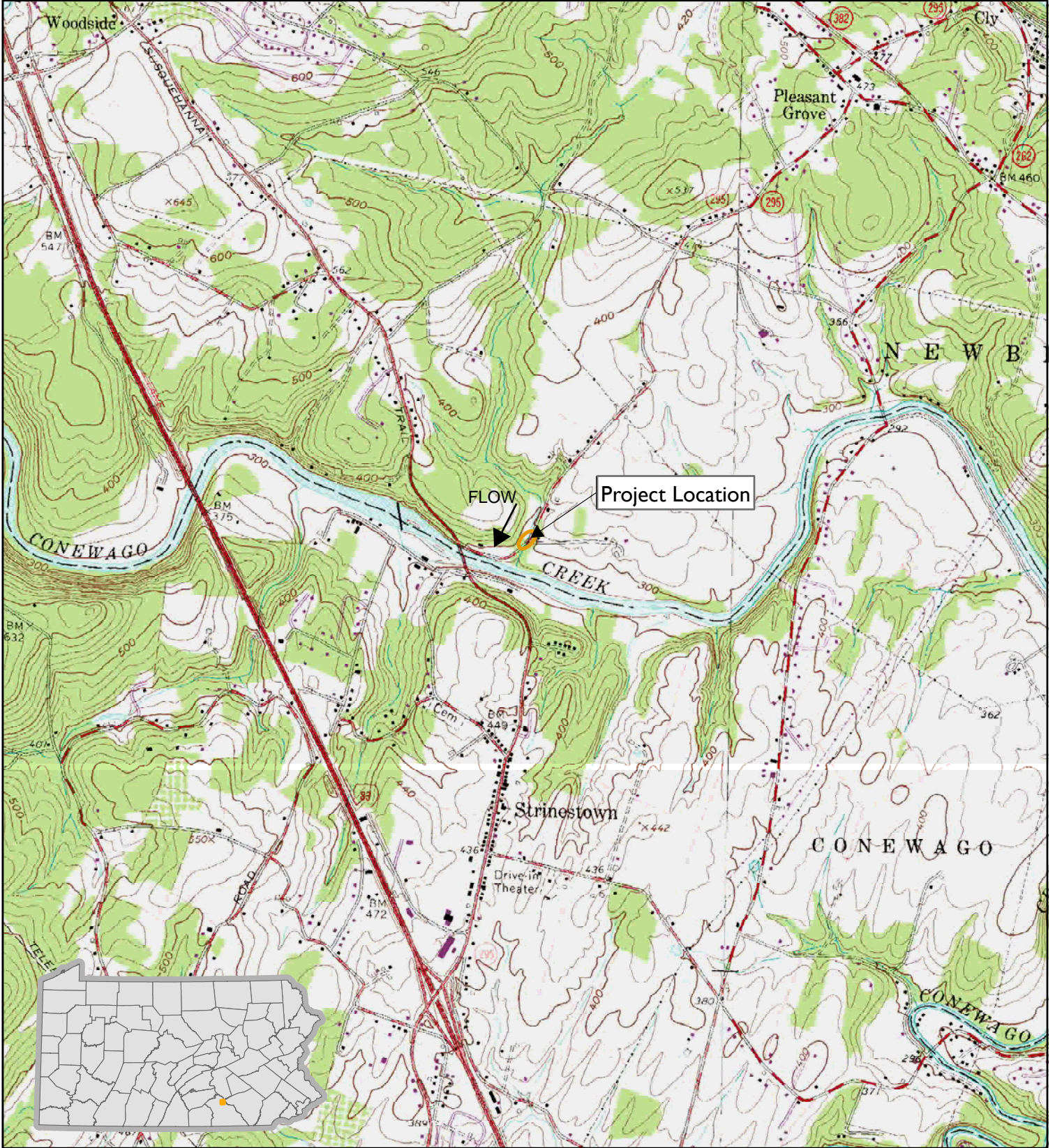


Project Location

S.R. 0295, Section 003

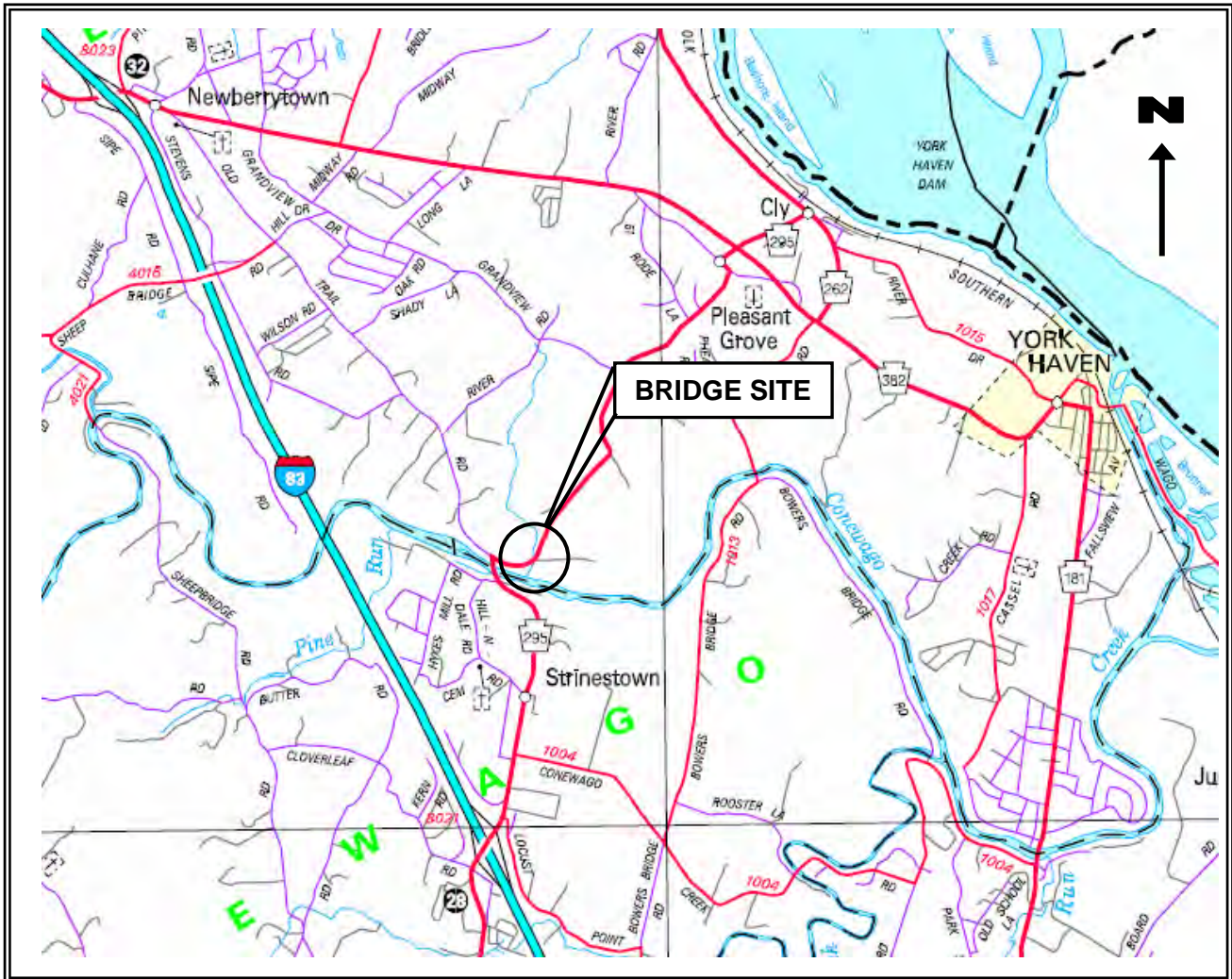
Cragmoor Road Culvert Replacement

Newberry Township, York County, Pennsylvania



 Project Location

Map Source : USGS7.5 Min Quadrangles York and Dover PA



VICINITY MAP



SCALE: 1" = 2000'

S.R. 0295, Section 003
 Segment 0070, Offset 1170
 Over Hay Run
 Newberry Township, York County




















APPENDIX "B"

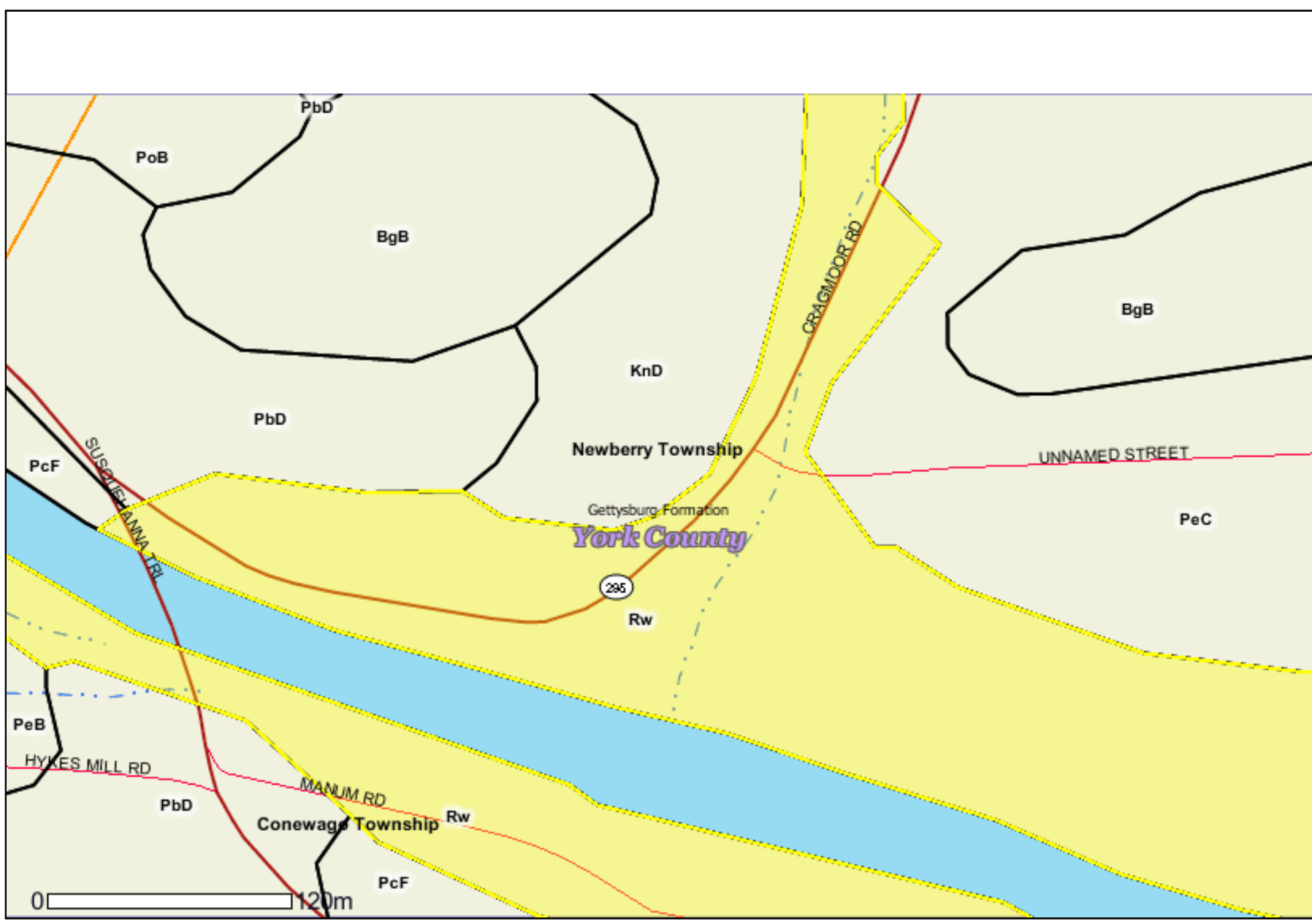


Soils Map and Information




SoilMap

-  Soils
-  Roads
-  Interstate
-  US Route
-  State Route
-  Local Roads
-  Access Ramps
-  Other
-  Water
-  Streams
-  Other
-  Intermittent
-  Perennial
-  Counties
-  Townships Text
-  Townships
-  Boroughs
-  Geology Text
-  Geology



Map Scale 1:2711, 1 inch = 226 feet
 Created by SoilMap, 12/19/2006 3:10:46 PM

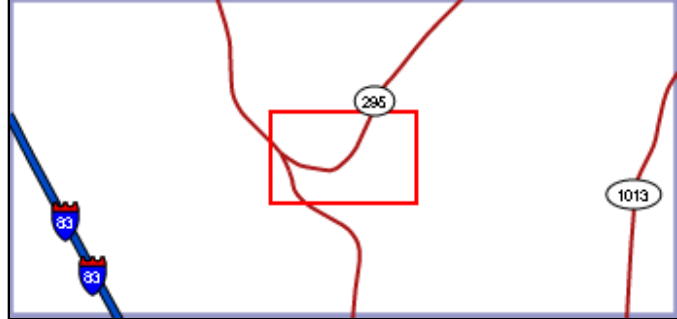
The information on SoilMap is provided 'as is' and the User assumes the entire risk as to its quality and performance. Soil maps are subject to change and may be copied without permission. Enlarging the maps may cause misunderstanding of the detail of mapping. Help in using soil surveys is available from the local office of the NRCS.



E&SC Soil Map

S.R. 0295-003 Over Hay Run
 Newberry Township, York County
 PENNDOT Engineering District 8-0

Legend:
 Rw - Rowland Silt Loam



Select a detailed NRCS soil report for this soil. Report will appear in a new window and will include a detailed description.

- Acreage and Proportionate Extent of the Soils
- Agricultural Disposal of Manure, Food-Processing Waste, and Sewage Sludge
- Agricultural Disposal of Wastewater by Irrigation and Overland Flow
- Agricultural Disposal of Wastewater by Rapid Infiltration and Slow Rate Treatment
- Camp Areas, Picnic Areas, and Playgrounds
- Chemical Soil Properties
- Component Legend
- Component Text

[Create Selected Report](#) [See Report Disclaimer](#)

Survey Area	PA133 - York County, Pennsylvania
Soil	Rw - Rowland silt loam
Farm Class	All areas are prime farmland
Drainage Class	Moderately well drained
Slope Range	0-3
Land Capability Class	2w
Hydrologic Group	C
Bedrock Depth	very deep
Seasonal Water Table	12-36 in
Flooding Potential	frequent
Bulk Density	1.55 gm/cm ³
Profile Permeability	moderately slow
Whole Soil kw factor	0.43
Rock Free kf factor	0.43
T factor	4
Leaching Potential	Low
Major Hydric	no

Open Official Series Description (where available)

Map Unit Description (Brief)

York County, Pennsylvania

[Only those map units that have entries for the selected non-technical description categories are included in this report]

Map Unit: Rw - Rowland silt loam

Description Category: AGR

Soil ROWLAND is more than 72 inches to bedrock. Permeability is MODERATE or MODERATELY SLOW in the subsoil, and MODERATELY SLOW to MODERATELY RAPID in the substratum, and available water holding capacity is MODERATE. A water table when present is 1.0 - 3 feet. The soil productivity is VERY HIGH and the capability subclass is 2W.

Description Category: SO5

THE ROWLAND SERIES CONSISTS OF VERY DEEP, MODERATELY WELL TO SOMEWHAT POORLY DRAINED SOILS ON FLOODPLAINS. THEY FORMED IN ALLUVIAL SEDIMENTS. TYPICALLY THESE SOILS HAVE A DARK REDDISH BROWN SILT LOAM SURFACE LAYER 10 INCHES THICK. THE SUBSOIL FROM 10 TO 28 INCHES IS REDDISH BROWN SILT LOAM MOTTLED IN THE LOWER PART. THE SUBSTRATUM FROM 28 TO 44 INCHES IS WEAK RED SILTY CLAY LOAM. BELOW 44 INCHES IS STRATIFIED SAND AND GRAVEL.

Map Unit Description (Brief)

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the selected area. The map unit descriptions in this report, along with the maps, can be used to determine the composition and properties of a unit. A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

The "Map Unit Description (Brief)" report gives a brief, general description of the major soils that occur in a map unit. Descriptions of nonsoil (miscellaneous areas) and minor map unit components may or may not be included. This description is written by the local soil scientists responsible for the respective soil survey area data. A more detailed description can be generated by the "Map Unit Description" report.

Additional information about the map units described in this report is available in other Soil Data Mart reports, which give properties of the soils and the limitations, capabilities, and potentials for many uses. Also, the narratives that accompany the Soil Data Mart reports define some of the properties included in the map unit descriptions.

Component Text

York County, Pennsylvania

Map unit: Rw - Rowland silt loam

Component: Rowland

Text kind/Category: SO15 description

THE ROWLAND SERIES CONSISTS OF VERY DEEP, MODERATELY WELL TO SOMEWHAT POORLY DRAINED SOILS ON FLOODPLAINS. THEY FORMED IN ALLUVIAL SEDIMENTS. TYPICALLY THESE SOILS HAVE A DARK REDDISH BROWN SILT LOAM SURFACE LAYER 10 INCHES THICK. THE SUBSOIL FROM 10 TO 28 INCHES IS REDDISH BROWN SILT LOAM MOTTLED IN THE LOWER PART. THE SUBSTRATUM FROM 28 TO 44 INCHES IS WEAK RED SILTY CLAY LOAM. BELOW 44 INCHES IS STRATIFIED SAND AND GRAVEL. SLOPES RANGE FROM 0 TO 3 PERCENT.

Component Text

This report provides a means for the customer to print out text notes that are stored in the underlying soil survey database for map unit components of the selected map units. When the report is initiated, the customer is presented with a choice list of type(s) of text notes stored. The customer must select one type at a time for the report to finish.

Component Legend

York County, Pennsylvania

Map unit symbol and name	Pct. of map unit	Component name	Component kind	Pct. slope		
				Low	RV	High
Rw:						
Rowland silt loam						
	85	Rowland	Series	0	2	3

Component Legend

This report presents general information about the map units and map unit components in the selected area. It shows map unit symbols and names and the components in each map unit. It also shows the percent of the components in the map units, the kind of component, and the slope range of each component.

Engineering Properties

York County, Pennsylvania

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percent passing sieve number--				Liquid limit	Plasticity index	
			Unified	AASHTO	>10 Inches	3-10 Inches	4	10	40	200			
				Pct		Pct		Pct				Pct	
Rw: Rowland	0-10	Silt loam	ML, SM	A-4	0	0-5	95-100	95-100	95-100	75-100	35-95	0-14	---
	10-28	Loam, Sandy clay loam, Silt loam	ML, SM	A-4, A-6, A-7	0	0-5	95-100	95-100	95-100	75-100	35-95	24-45	NP-15
	28-44	Fine sandy loam, Sandy clay, Silt loam	ML, SM	A-4, A-6, A-7	0	0-10	90-100	70-100	65-100	35-95	25-50	3-17	---
	44-60	Stratified gravel to sand	GC, GM, SC, SM	A-1, A-2	0-1	0-15	55-80	30-70	20-40	15-30	0-14	---	---

Engineering Properties

This table gives the engineering classifications and the range of engineering properties for the layers of each soil in the survey area.

"Depth" to the upper and lower boundaries of each layer is indicated.

"Texture" is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is 15 percent or more, an appropriate modifier is added, for example, "gravely."

"Classification" of the soils is determined according to the Unified soil classification system (ASTM, 2005) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO, 2004).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to particle-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of particle-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

"Rock fragments" larger than 10 inches in diameter and 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

"Percentage (of soil particles) passing designated sieves" is the percentage of the soil fraction less than 3 inches in diameter based on an oven-dry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

"Liquid limit" and "plasticity index" (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

References:

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.
American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Physical Soil Properties

York County, Pennsylvania

Map symbol and soil name	Depth In	Sand Pct	Silt Pct	Clay Pct	Moist bulk density g/cc	Saturated hydraulic conductivity micro m/sec	Available water capacity In/In	Linear extensibility Pct	Organic matter Pct	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
Rowland	0-10	---	---	10-20	1.10-1.30	1.41-14.11	0.14-0.18	0.0-2.9	2.0-4.0	43	43	4	5	56
	10-28	---	---	15-32	1.20-1.50	1.41-14.11	0.14-0.18	0.0-2.9	0.5-1.0	28	28			
	28-44	---	---	5-40	1.20-1.50	1.41-14.11	0.12-0.16	0.0-2.9	0.5-1.0	28	28			
	44-60	---	---	3-12	1.40-1.70	14.11-42.34	0.03-0.08	0.0-2.9	0.5-1.0	17	17			

Rw:

Physical Soil Properties

This table shows estimates of some physical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and or test data for these and similar soils.

"Depth" to the upper and lower boundaries of each layer is indicated.

Particle size is the effective diameter of a soil particle as measured by sedimentation, sieving, or micrometric methods. Particle sizes are expressed as classes with specific effective diameter class limits. The broad classes are sand, silt, and clay, ranging from the larger to the smaller.

"Sand" as a soil separate consists of mineral soil particles that are 0.05 millimeter to 2 millimeters in diameter. In this table, the estimated sand content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

"Silt" as a soil separate consists of mineral soil particles that are 0.002 to 0.05 millimeter in diameter. In this table, the estimated silt content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

"Clay" as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of sand, silt, and clay affects the physical behavior of a soil. Particle size is important for engineering and agronomic interpretations, for determination of soil hydrologic qualities, and for soil classification.

The amount and kind of clay affect the fertility and physical condition of the soil and the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, saturated hydraulic conductivity (Ksat), plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

"Moist bulk density" is the weight of soil (oven-dry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3- or 1/10-bar (33kPa or 10kPa) moisture tension. Weight is determined after the soil is dried at 105 degrees C. In the table, the estimated moist bulk density of each soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute linear extensibility, shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. Depending on soil texture, a bulk density of more than 1.4 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

"Saturated hydraulic conductivity (Ksat)" refers to the ease with which pores in a saturated soil transmit water. The estimates in the table are expressed in terms of micrometers per second. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Saturated hydraulic conductivity (Ksat) is considered in the design of soil drainage systems and septic tank absorption fields.

"Available water capacity" refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each soil layer. The capacity varies, depending on soil properties that affect retention of water. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

"Linear extensibility" refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. It is an expression of the volume change between the water content of the clod at 1/2- or 1/10-bar tension (33kPa or 10kPa tension) and oven dryness. The volume change is reported in the table as percent change for the whole soil. The amount and type of clay minerals in the soil influence volume change.

Linear extensibility is used to determine the shrink-swell potential of soils. The shrink-swell potential is low if the soil has a linear extensibility of less than 3 percent; moderate if 3 to 6 percent; high if 6 to 9 percent; and very high if more than 9 percent. If the linear extensibility is more than 3, shrinking and swelling can cause damage to buildings, roads, and other structures and to plant roots. Special design commonly is needed.

"Organic matter" is the plant and animal residue in the soil at various stages of decomposition. In this table, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained by returning crop residue to the soil. Organic matter has a positive effect on available water capacity, water infiltration, soil organism activity, and tilth. It is a source of nitrogen and other nutrients for crops and soil organisms.

Physical Soil Properties

"Erosion factors" are shown in the table as the K factor (Kw and Kf) and the T factor. Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and Ksat. Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

"Erosion factor Kw" indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.

"Erosion factor Kf" indicates the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size.

"Erosion factor T" is an estimate of the maximum average annual rate of soil erosion by wind and/or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

"Wind erodibility groups" are made up of soils that have similar properties affecting their susceptibility to wind erosion in cultivated areas. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible. The groups are described in the "National Soil Survey Handbook."

"Wind erodibility index" is a numerical value indicating the susceptibility of soil to wind erosion, or the tons per acre per year that can be expected to be lost to wind erosion. There is a close correlation between wind erosion and the texture of the surface layer, the size and durability of surface clods, rock fragments, organic matter, and a calcareous reaction. Soil moisture and frozen soil layers also influence wind erosion.

Reference:

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. (<http://www.soils.usda.gov>)

Soil Features

York County, Pennsylvania

Map symbol and soil name	Restrictive layer			Subsidence		Risk of corrosion			
	Kind	Depth to top in	Thickness in	Hardness	Initial in	Total in	Potential for frost action	Uncoated steel	Concrete
		72			0		High	High	Moderate

Rw:

Rowland

Soil Features

This table gives estimates of various soil features. The estimates are used in land use planning that involves engineering considerations.

A "restrictive layer" is a nearly continuous layer that has one or more physical, chemical, or thermal properties that significantly impede the movement of water and air through the soil or that restrict roots or otherwise provide an unfavorable root environment. Examples are bedrock, cemented layers, dense layers, and frozen layers. The table indicates the hardness and thickness of the restrictive layer, both of which significantly affect the ease of excavation. "Depth to top" is the vertical distance from the soil surface to the upper boundary of the restrictive layer.

"Subsidence" is the settlement of organic soils or of saturated mineral soils of very low density. Subsidence generally results from either desiccation and shrinkage, or oxidation of organic material, or both, following drainage. Subsidence takes place gradually, usually over a period of several years. The table shows the expected initial subsidence, which usually is a result of drainage, and total subsidence, which results from a combination of factors.

"Potential for frost action" is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, saturated hydraulic conductivity (Ksat), content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured, clayey soils that have a high water table in winter are the most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage to pavements and other rigid structures.

"Risk of corrosion" pertains to potential soil-induced electrochemical or chemical action that corrodes or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel or concrete in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than the steel or concrete in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as "low," "moderate," or "high," is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion also is expressed as "low," "moderate," or "high." It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Water Features

York County, Pennsylvania

Map symbol and soil name	Hydrologic group	Surface runoff	Month	Water table		Ponding			Flooding				
				Upper limit	Lower limit	Surface depth	Duration	Frequency	Duration	Frequency			
				Ft	Ft	Ft							
Rw:													
	C	Low	January	1.0-3.0	>6.0	---	---	None	Brief	Frequent			
			February	1.0-3.0	>6.0	---	---	None	Brief	Frequent			
			March	1.0-3.0	>6.0	---	---	None	Brief	Frequent			
			April	1.0-3.0	>6.0	---	---	None	---	None			
			May	1.0-3.0	>6.0	---	---	None	---	None			
			November	1.0-3.0	>6.0	---	---	None	Brief	Frequent			
			December	1.0-3.0	>6.0	---	---	None	Brief	Frequent			

Water Features

This table gives estimates of various soil water features. The estimates are used in land use planning that involves engineering considerations.

"Hydrologic soil groups" are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas.

"Surface runoff" refers to the loss of water from an area by flow over the land surface. Surface runoff classes are based on slope, climate, and vegetative cover. The concept indicates relative runoff for very specific conditions. It is assumed that the surface of the soil is bare and that the retention of surface water resulting from irregularities in the ground surface is minimal. The classes are negligible, very low, low, medium, high, and very high.

The "months" in the table indicate the portion of the year in which a water table, ponding, and/or flooding is most likely to be a concern.

"Water table" refers to a saturated zone in the soil. The water features table indicates, by month, depth to the top ("upper limit") and base ("lower limit") of the saturated zone in most years. Estimates of the upper and lower limits are based mainly on observations of the water table at selected sites and on evidence of a saturated zone, namely grayish colors or mottles (redoximorphic features) in the soil. A saturated zone that lasts for less than a month is not considered a water table.

"Ponding" is standing water in a closed depression. Unless a drainage system is installed, the water is removed only by percolation, transpiration, or evaporation. The table indicates "surface water depth" and the "duration" and "frequency" of ponding. Duration is expressed as "very brief" if less than 2 days, "brief" if 2 to 7 days, "long" if 7 to 30 days, and "very long" if more than 30 days. Frequency is expressed as none, rare, occasional, and frequent. "None" means that ponding is not probable; "rare" that it is unlikely but possible under unusual weather conditions (the chance of ponding is nearly 0 percent to 5 percent in any year); "occasional" that it occurs, on the average, once or less in 2 years (the chance of ponding is 5 to 50 percent in any year); and "frequent" that it occurs, on the average, more than once in 2 years (the chance of ponding is more than 50 percent in any year).

"Flooding" is the temporary inundation of an area caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, and water standing in swamps and marshes is considered ponding rather than flooding.

"Duration" and "frequency" are estimated. Duration is expressed as "extremely brief" if 0.1 hour to 4 hours, "very brief" if 4 hours to 2 days, "brief" if 2 to 7 days, "long" if 7 to 30 days, and "very long" if more than 30 days. Frequency is expressed as none, very rare, rare, occasional, frequent, and very frequent. "None" means that flooding is not probable; "very rare" that it is very unlikely but possible under extremely unusual weather conditions (the chance of flooding is less than 1 percent in any year); "rare" that it is unlikely but possible under unusual weather conditions (the chance of flooding is 1 to 5 percent in any year); "occasional" that it occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year); "frequent" that it is likely to occur often under normal weather conditions (the chance of flooding is more than 50 percent in any year but is less than 50 percent in all months in any year); and "very frequent" that it is likely to occur very often under normal weather conditions (the chance of flooding is more than 50 percent in all months of any year).

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater, irregular decrease in organic matter content with increasing depth; and little or no horizon development.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

Water Features

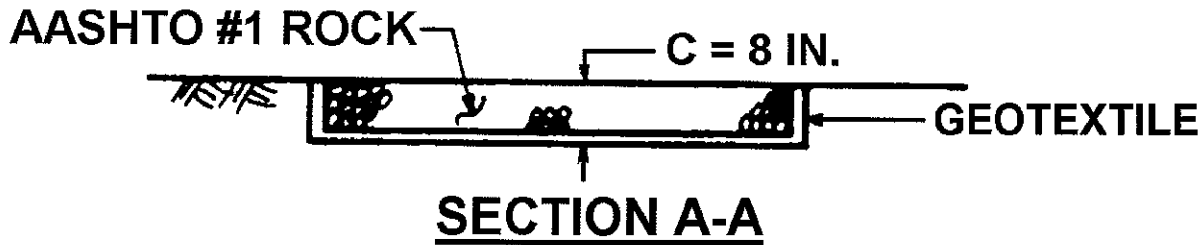
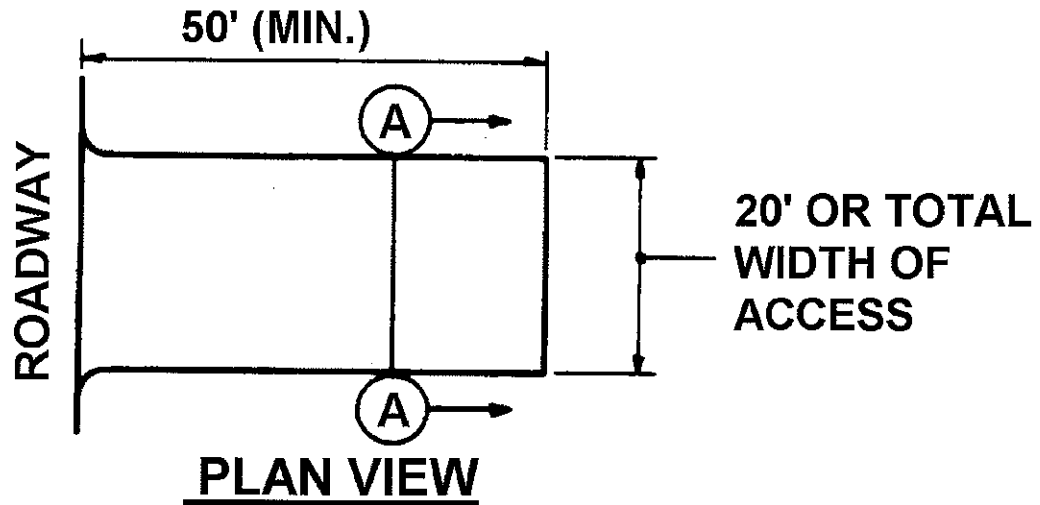
APPENDIX "C"



Details and Specifications



STANDARD CONSTRUCTION DETAIL #16
Rock Construction Entrance



MAINTENANCE: Rock Construction Entrance thickness shall be constantly maintained to the specified dimensions by adding rock. A stockpile shall be maintained on site for this purpose. At the end of each construction day, all sediment deposited on paved roadways shall be removed and returned to the construction site.

FILTER FABRIC FENCE (SILT FENCE) - Filter fabric fence may be used to control runoff from small disturbed areas when it is in the form of sheet flow, and the discharge is to a stable area. Only those fabric types specified for such use by the manufacturer should be used.

Do not use filter fabric fence in areas of concentrated flows (e.g. channels, swales, erosion gullies, across pipe outfalls, as inlet protection, etc.). **It should not be wrapped around the principal spillway risers of sediment basins.**

Filter fabric fence should not be used in areas where rock or rocky soils prevent the full and uniform anchoring of the fence.

Filter fabric fence should not be installed on uncompacted fills or in extremely loose soils (e.g. sandy loam), since this will likely result in undermining of the fence.

Filter fabric fence should be installed at level grade. Both ends of each fence section should be extended at least 8 feet upslope at 45 degrees to the main fence alignment to allow for pooling of water.

A 6" deep trench should be excavated, minimizing the disturbance on the downslope side. The bottom of the trench should be at level grade. maximum deviation from level grade should be 1%, and not extend for more than 25 ft.

Support stakes should be driven 18" below the existing ground surface at 8 foot (max.) intervals.

Filter fabric should be stretched and fastened to the upslope side of the support stakes. Wherever reinforced fabric fence is installed, the reinforcement mesh should be fastened to the stakes prior to the fabric.

At fabric ends, both ends should be wrapped around the support stake and stapled. If the fabric comes already attached to the stakes, the end stakes should be held together while the fabric is wrapped around the stakes at least one revolution prior to driving the stakes.

The bottom of the fence should be anchored by placing the fabric in the bottom of the trench, and backfilling and compacting the fill material in the trench.

Guy wires should be attached to reinforced fabric fence (see Standard Construction Detail #20). An acceptable alternative is to stake straw bales on the downslope side of the fence (see Standard Construction Detail #21).

Filter fabric fence should be inspected weekly and after each runoff event. Needed repairs should be initiated immediately after the inspection.

Straw bales generally need to be replaced every three months.

Filter fabric fence alignment should be at least 8' from the toe of fill slopes.

The maximum slope length above 18" or 30" filter fabric fence should not exceed that shown in Table 18. The slope length shown is the distance from the fence to the drainage divide or the nearest upslope channel. **NOTE: Multiple rows of Filter Fabric Fence may not be used on a continuous slope.**

TABLE 18
Maximum Slope Lengths for Filter Fabric Fence

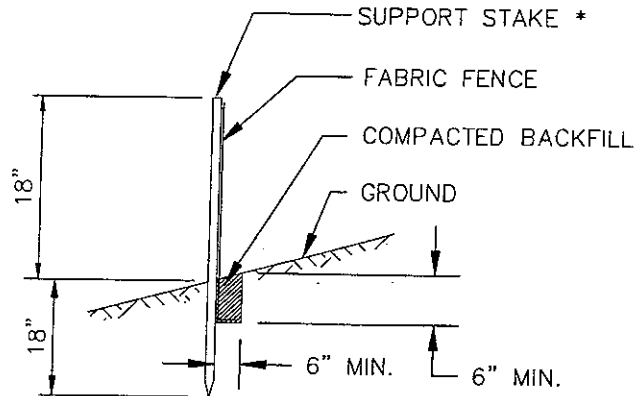
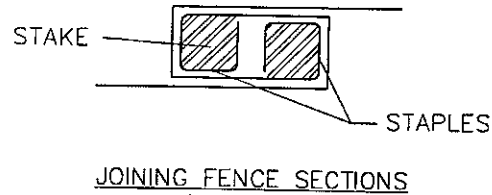
Slope - Percent	Maximum Slope Length (ft) Above Fence	
	18" High Fence	30" High Fence*
2 (or less)	150	500
5	100	250
10	50	150
15	35	100
20	25	70
25	20	55
30	15	45
35	15	40
40	15	35
45	10	30
50	10	25

*Reinforced 30" high fence. See Standard Construction Details #20 or #21.

Wherever there is a break or change in slope above the silt fence, the Maximum Allowable Slope Length should be determined by the following method:

- (a) Determine the length and percent of the slope segment immediately above the fence.
- (b) Subtract the length of this segment from the allowable slope length for that percent slope shown in Table 18. If the result is positive, find the percentage of the allowable slope length that has been used (slope length ÷ allowable slope length).
- (c) Subtract the result from 1.00 to determine the unused percentage of allowable slope length.
- (d) Determine the maximum allowable slope length for the percent slope of the remaining segment from Table 18.
- (e) Multiply this allowable slope length by the remainder from step (c) above.
- (f) Add the result from step (b) to that from step (e). This is the maximum allowable slope length for the entire slope.

STANDARD CONSTRUCTION DETAIL #19
Standard Filter Fabric Fence (18" High)



*Stakes spaced @ 8' maximum. Use 2"x 2" wood or equivalent steel stakes.

Filter Fabric Fence must be placed at level existing grade. Both ends of the barrier must be extended at least 8 feet up slope at 45 degrees to the main barrier alignment.

Sediment must be removed when accumulations reach 1/2 the above ground height of the fence.

Any section of Filter fabric fence which has been undermined or topped must be immediately replaced with a Rock Filter Outlet. See Standard Construction Detail # 18.

ROCK FILTERS - Rock filters may be used to control runoff within constructed channels until the protective lining is installed. They may also be used below construction work within an existing stream channel while flow is being diverted past the work area. In such cases, the filter should be located between the work area and the discharge from the bypass system. Rock filters may not be used in lieu of sediment basins.

Rock filters may be used to control sediment originating within a channel, either during construction of the channel (before the channel is stabilized) or during a temporary disturbance within the channel. Rock filters may not be used in collector channels in lieu of sediment basins.

Rock filters should not be used in lieu of appropriate channel linings. This practice often results in overtopping of the channel during storm events, scouring of the channel bottom below the filter, or erosion of the channel side slopes as sediment deposits build up behind the filter.

Rock filters should not be used in lieu of an adequate protective lining in sediment basin emergency spillways. This can reduce the effective discharge capacity of the spillway and, in doing so, increase the possibility of embankment failure.

Rock filters should be constructed according to the specifications shown in Standard Construction Detail #23.

Rock filters should be constructed with Riprap sized as follows:

- For channels with Total Depth > 3 feet, use R-4.
- For channels with Total Depth between 2 and 3 feet, use R-3.
- For channels with Total Depth between 1 and 2 feet, use R-2.

Rock filters should not be used in channels of less than 1 foot total depth.

The filter should be equal in height to $\frac{1}{2}$ the total depth of the channel with a 6" depression in the center.

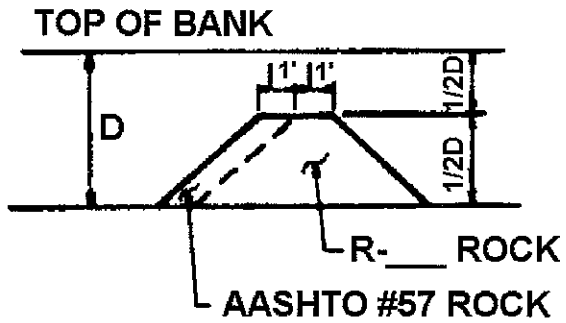
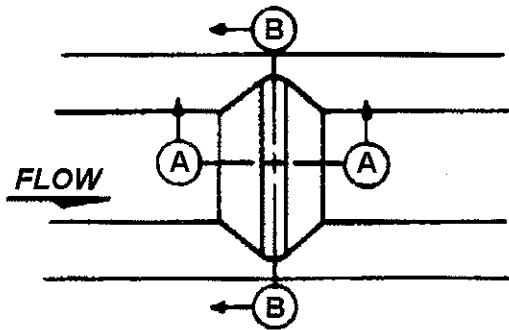
A one foot thick layer of AASHTO #57 stone should be placed on the upstream side of the filter.
NOTE: Filter fabric and straw bales should not be used in rock filters!

Rock filters should be inspected weekly and after each runoff event.

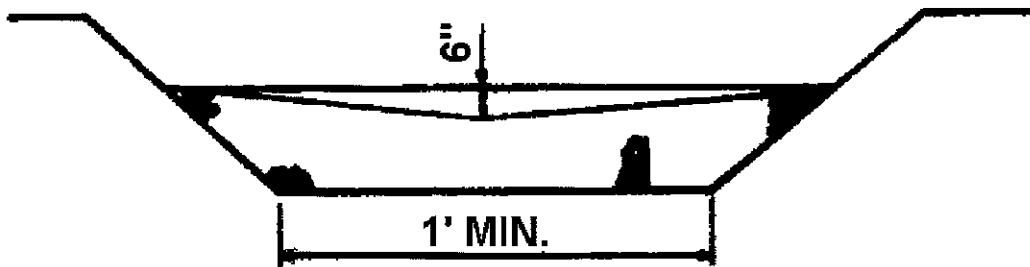
Clogged filter stone (AASHTO # 57) should be replaced.

Needed repairs should be initiated immediately after the inspection.

STANDARD CONSTRUCTION DETAIL # 23
Rock Filters



SECTION A-A



SECTION B-B

FOR 3' < D USE R-4
 FOR 2' < D < 3' USE R-3
 FOR 1' < D < 2' USE R-2

ROCK FILTER NO.	LOCATION	D (FT.)	RIPRAP SIZE
1	Station 1100 + 05 Right	2.00	R-3

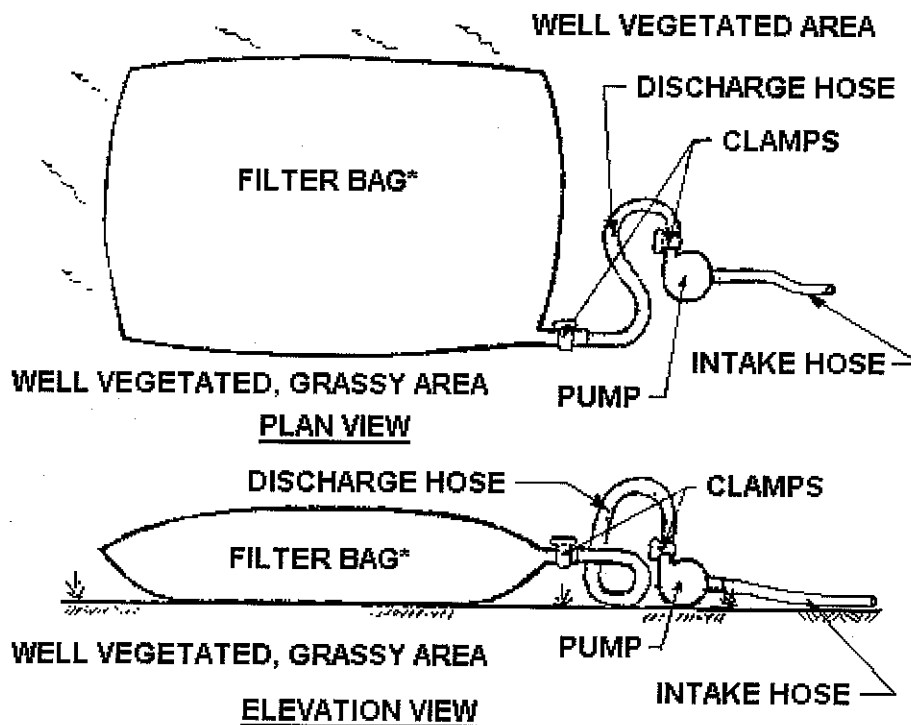
Sediment must be removed when accumulations reach 1/2 the height of the filters. Immediately upon stabilization of each channel, remove accumulated sediment, remove Rock Filter, and stabilize disturbed areas.

PUMPED WATER FILTER BAGS - Filter bags may be used to filter water pumped from disturbed areas prior to discharging to waters of the Commonwealth. They may also be used to filter water pumped from the sediment storage areas of sediment basins.

The pumping rate should be specified on the plan drawings next to the typical detail. Pumping rates will vary depending on the size of the filter bag, and the type and amount of sediment discharged to the bag.

Filter bags should be installed according to the details shown in Standard Construction Detail #26.

STANDARD CONSTRUCTION DETAIL #26
Pumped Water Filter Bag



Filter bags shall be made from non-woven geotextile material sewn with high strength, double stitched "J" type seams. They shall be capable of trapping particles larger than 150 microns.

A suitable means of accessing the bag with machinery required for disposal purposes must be provided. Filter bags shall be replaced when they become $\frac{1}{2}$ full. Spare bags shall be kept available for replacement of those that have failed or are filled.

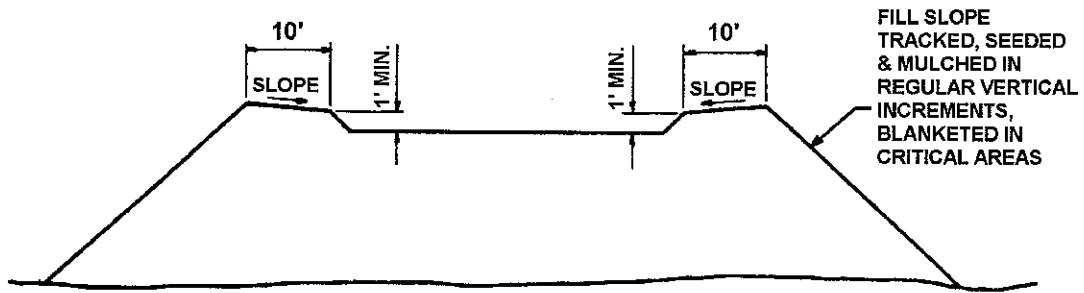
Bags shall be located in well-vegetated (grassy) area, and discharge onto stable, erosion resistant areas. Where this is not possible, a geotextile flow path shall be provided. Bags shall not be placed on slopes greater than 5%.

The pump discharge hose shall be inserted into the bags in the manner specified by the manufacturer and securely clamped.

The pumping rate shall be no greater than 750 gpm or $\frac{1}{2}$ the maximum specified by the manufacturer, whichever is less. Pump intakes should be floating and screened.

Filter bags shall be inspected daily. If any problem is detected, pumping shall cease immediately and not resume until the problem is corrected.

**STANDARD CONSTRUCTION DETAIL #27A
Top-Of-Slope Berms**



**TEMPORARY BERMS TO BE PLACED, MAINTAINED,
AND ADJUSTED CONTINUOUSLY UNTIL 90%
VEGETATIVE GROWTH IS ESTABLISHED ON THE
EXTERIOR SLOPES WITH PERMANENT STORM
DRAINAGE FACILITIES FUNCTIONING.**

**BERMS MUST OUTLET TO TEMPORARY SLOPE PIPES,
PERMANENT SLOPE PIPES, TEMPORARY CHANNELS,
OR PERMANENT CHANNELS.**

EROSION AND SEDIMENT CONTROLS FOR IN-CHANNEL WORK

Whenever possible, work should be scheduled for low flow seasons. Normal flow should be conveyed past the work area by means of a bypass channel, pipe, pump, or cofferdam. All such bypasses should be completed and stabilized prior to diverting flow.

Any in-channel excavations should be done from the top of banks wherever possible. Where this is not possible, a temporary crossing should be provided for any equipment working from within the channel. Upon completion, all channel entrances should be restored to pre-construction configurations, as much as possible, and stabilized.

All excavated channel materials that will be subsequently used as backfill should be placed in a temporary stockpile located outside the channel. A sediment barrier should be installed between the storage pile and the stream channel.

All excavated materials that will not be used on site must be immediately removed to a disposal site having an approved erosion and sediment pollution control plan.

Any pumped water from excavated areas must be filtered prior to discharging into waters of the Commonwealth. The use of filter bags is another acceptable method if located on a relatively flat (< 5% slope), well-vegetated area. The bag should be designed to trap particles larger than 150 microns. The pump discharge hose shall be inserted into the bags in the manner specified by the manufacturer and securely clamped. When the bag has been filled to ½ its total capacity, it should be replaced with a new bag and properly disposed. Wherever well-vegetated areas are not available, a geotextile underlayment should be used. Consideration should be given to how the bag will be accessed and removed once it has been 1/2 filled with sediment.

All disturbed areas within the existing channel should be completed and stabilized before flow is redirected into it. Suitable protection should be provided for the stream channel from any disturbed areas that have not yet achieved stabilization.

Small stream channels - normal flow width < 10 feet

Wherever a temporary bypass channel is used, it should conform to Figure 33. It is recommended that consideration be given to using a geotextile protective lining for temporary bypass channels.

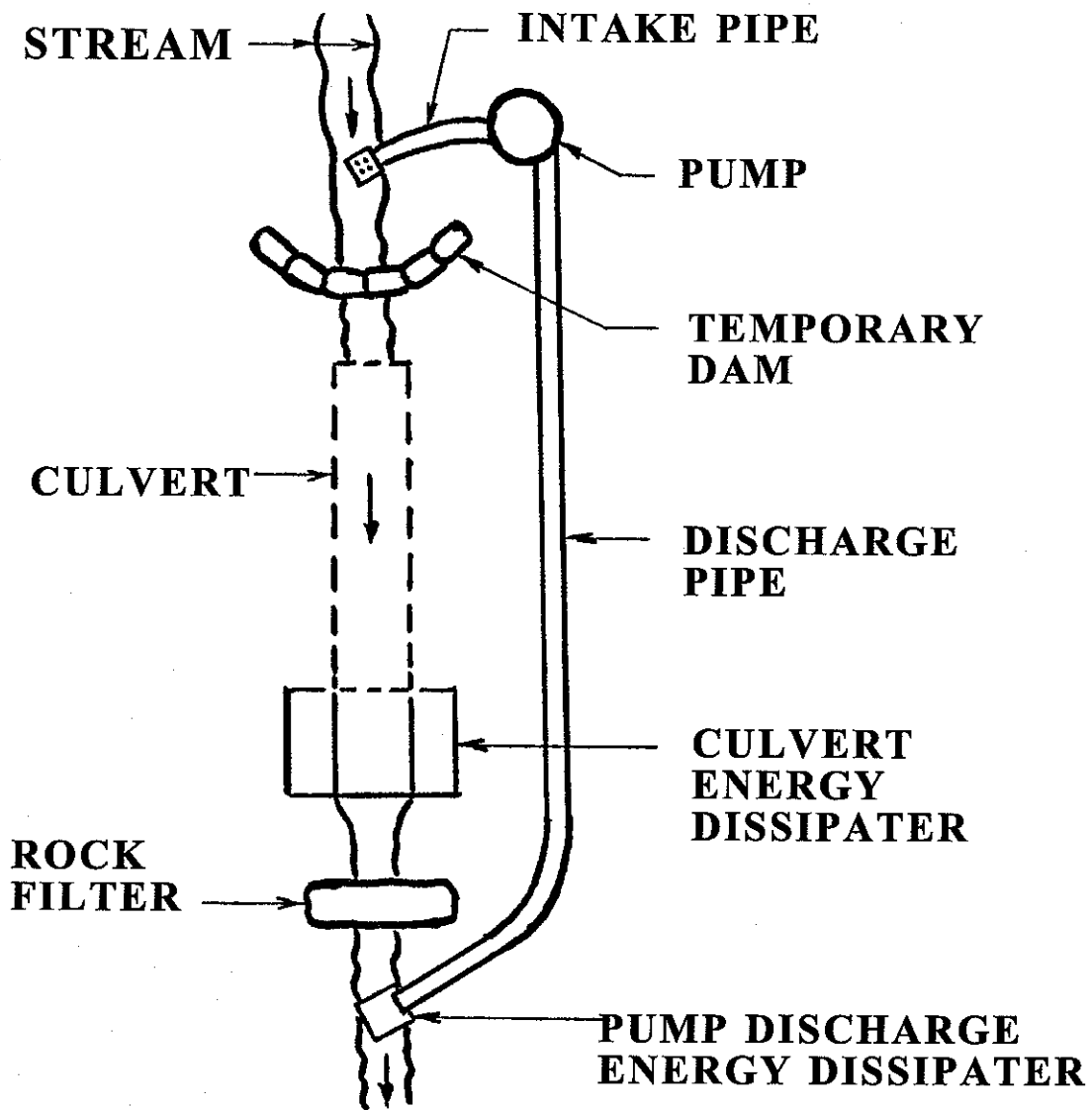
A temporary bypass channel must be designed to pass normal base flows if the crossing will be completed in one to three days, otherwise the channel must be designed to pass the one year frequency storm.

Whenever a temporary bypass pipe is used, it should conform to Figure 34.

Pumped water bypass systems should conform to Figure 35.

Whenever an in-stream cofferdam diversion is used, it should conform to Figure 35a.

FIGURE 35
Temporary Cofferdam And Pump Bypass Around In-Channel Work Areas



SECTION 212—GEOTEXTILES

212.1 DESCRIPTION—This work is furnishing and installing geotextiles for the class specified.

212.2 MATERIAL—Use geotextiles as specified in Section 735 for the specified class and type.

For bedding use open-graded stone conforming to the requirements of Type C or better aggregate, as specified in Section 703.2, except do not use No. 2-A or No. 10 coarse aggregate.

Use steel securing pins 460 mm long x 4.75 mm (18 inches long by 3/16 inch) in diameter, pointed at one end, and with a 40 mm (1 1/2-inch) washer head at the other end. If permitted, alternate securing devices may be used. Certify as specified in Section 106.03(b)3.

Use cover material as specified or indicated.

212.3 CONSTRUCTION—As shown on the Standard Drawings, and as follows:

(a) **General.** Remove and replace fabric areas damaged during construction. Lap or sew replaced fabric as specified for the class of fabric used. Do not allow traffic or construction equipment on the fabric.

(b) **Class 1—Subsurface Drainage.** Provide smooth side and bottom trench surfaces so the fabric does not bridge depressions in the soil and is not damaged by rock projections. Use fabric of a width to permit a minimum trench-width overlap across the backfill at the trench top. Lay the fabric flat in the prepared trench without stretching. Lay the top of the fabric back on the sides to allow for the placement of the aggregate backfill and pipe. Overlap ends of rolls an amount equal to the trench width before placing fabric. Fill pockets or cavities in the trench bottom or sides with acceptable granular material to prevent distortion or damage to the fabric.

Backfill aggregate and install pipe in a manner to prevent damage to the fabric. Compact aggregate and overlap the fabric across the trench top. Do not allow the fabric to be exposed for more than 2 weeks without covering with aggregate.

(c) **Class 2—Erosion Control.** Use Type A or Type B fabric as indicated or specified. Remove vegetation, large stones, and other debris from the area to be protected and grade the surface to a relatively smooth condition. Undercut areas of soft material and replace with acceptable compacted material, as directed.

Lay the fabric on the prepared area in a loose and unstretched condition to minimize shifting, puncturing, or tearing the fabric. Join adjacent edges and ends with a folded seam and sew using a single lock-type stitch seam or a double chain type stitch seam equivalent in strength to the fabric tensile strength. Sewing may be done on-site or by the manufacturer. Overlap only when directed. Provide a minimum overlap of 300 mm (1 foot). For underwater placement, overlap a minimum of 1 m (3 feet). Offset adjacent roll ends a minimum of 1.5 m (5 feet) when lapped.

Lay and overlap the fabric in the direction shown in Table A for the indicated use.

Anchor the fabric in place by securing pins or other acceptable methods, along sewn seams or overlaps, at the spacing shown in Table B. Place securing pins on a maximum 1.8 m (6 foot) grid on the unsewn or unlapped portions of the fabric.

Eliminate securing pins for slopes flatter than 1:6 (6:1), provided that aggregate, rock, or other acceptable means are used to secure the fabric.

TABLE A
Fabric Placement

Operation	Slope Stabilization Runoff Protection and Internal Seepage Piping	Stream Slope Protection	Wave Protection
Direction of fabric laying	Up and down (parallel with slope direction)	Parallel to stream flows from upstream to downstream	Up and down (parallel with slope direction)
Overlap direction	Upslope over downslope	Upstream over downstream and upslope over downslope	Upslope over downslope

TABLE B
Securing Pin Spacing *

Slope	Steeper Than 1:3 (3:1)	1:4 (4:1)	Flatter Than 1:4 (4:1)
Pin Spacing along sewn seams or overlaps	0.6 m (2 feet)	1 m (3 feet)	1.5 m (5 feet)

* Place additional pins to secure unlapped portions as specified.

Cover the fabric with the covering material as soon as possible. Do not expose the fabric for more than 4 weeks for Type A and 2 weeks for Type B. Prevent slippage of the cover material on the fabric.

Do not drop rocks, 600 mm (2 feet) or larger in dimension, directly on the fabric from a height greater than 300 mm (1 foot). Do not allow the rock placement procedure to puncture or damage the fabric. Use a minimum 150 mm (6-inch) layer of bedding stone and a greater drop-height combination if the combination produces the placement, thickness, gradation and fabric integrity requirements, and if permitted.

(d) Class 3—Sedimentation Control. Use Type A or B fabric as indicated or specified. Install as specified in Section 865.3.

(e) Class 4—Layer Separation (Type A). Use to separate the subgrade and other layers. Place the fabric on a prepared subgrade area covering the full width of the subbase layer being protected. Place fabric in a loose and unstretched condition to minimize shifting, puncture, and/or tearing of the fabric. Overlap fabric roll-ends and edges a minimum of 300 mm (12 inches) with adjacent material. Place subbase material within 2 weeks after placement of fabric to minimize exposure. Place subbase material in a manner to minimize slippage of the fabric. Use steel securing pins, as specified in Section 212.2, at a maximum spacing of 1.8 m (6 feet) if excessive slippage occurs.

(f) Class 4—Stabilization (Type B). Fine grade the subgrade as specified in Section 210.3(c), as indicated, and in compliance with the cross sections. Remove any object that may puncture the geotextile. Roll out the geotextile over the prepared subgrade as indicated. Place the geotextile free of wrinkles. Do not drag the geotextile on the ground during placement or handling. Overlap parallel rolls or intersecting rolls a minimum of 610 mm (2 feet) in the direction of fill. For curves fold and overlap the geotextile in the direction of the turn. Do not allow any equipment directly on the geotextile until it is covered to full plan depth of subbase. Do not back dump the subbase material directly onto the geotextile. Place subbase material by back dumping then spread the subbase ahead of all equipment at full plan depth. Compact the subbase material with a roller in static mode, if directed. Fill any wheel ruts that form during construction with additional subbase to maintain plan profile. Do not remove the wheel ruts by blading the wheel ruts level.

(g) Class 4—Reinforcement (Type C). Section 212.3(f) except as follows: For a subgrade with a CBR value of 0.5 or lower, overlaps must be stitched. Use a 401 lock chain stitch seam with a 100 mm (4-inch) lap.

212.4 MEASUREMENT AND PAYMENT—

(a) Geotextiles, Class 1. Meter (Linear Foot)
Measured by the length of trench.

(b) Geotextiles, Class 2. Square Meter (Square Yard)
For the type indicated or specified.

(c) Geotextiles, Class 3. Meter (Linear Foot)
For the type indicated or specified. Measured by the length of sedimentation device.

(d) Geotextiles, Class 4. Square Meter (Square Yard)
For the type indicated or specified.

SECTION 804—SEEDING AND SOIL SUPPLEMENTS

804.1 DESCRIPTION—This work is furnishing and placing of seed and soil supplements of the type indicated, application of herbicides, and mowing.

804.2 MATERIAL—The Department may require pretesting reports from the Pennsylvania Department of Agriculture for verification of analysis and legality of labeling, in addition to control of materials, as specified in Section 106.

(a) Soil Supplements.

1. Pulverized Agricultural Limestone. Conforming to the requirements of the Agricultural Liming Materials Act of 1978, P.L. 15, No. 9, as amended; The Agricultural Liming Materials Rules and Regulations (Title 7-Part V); 7 PA Code, Chapter 108 for labeling requirements; and as follows:

- | | |
|---|----|
| • % Total oxides (total calcium oxide and magnesium oxide equivalent)
(<u>ASTM C 25</u>) | 50 |
| • % Calcium carbonate equivalent (% by mass (weight)) (<u>ASTM C 25</u>) | 89 |
| • % Fineness (minimum % by mass (weight)) | |
| material passing 850 μm (No. 20 sieve) | 95 |
| material passing 250 μm (No. 60 sieve) | 60 |
| material passing 150 μm (No. 100 sieve) | 50 |

Furnish material having an effective neutralizing value (ENV) of not less than 90 when calculated according to 7 PA Code Chapter 108 as follows:

- % by mass (weight) passing 20 mesh - % passing 60 mesh x 0.4 = (a)
% by mass (weight) passing 60 mesh - % passing 100 mesh x 0.8 = (b)
% by mass (weight) passing 100 mesh x 1.0 = (c)
- Minimum Calcium Carbonate Equivalent (CCE) = % by mass (weight) of calcium carbonate
- (a) + (b) + (c) x CCE divided by 100 = ENV

2. Commercial Fertilizer. Conforming to the requirements of the Pennsylvania Soil Conditioner and Plant Growth Substance Law, Act of December 1, 1977, P.L. 258, No. 86 (3P.S.68.2), as amended.

Use dry formulations of 10-20-20 analysis for seeded and sodded areas. Use dry formulations of 20-10-5 and 16-8-16 analysis controlled release for tree, shrub, and vine type planting operations. Use dry formulations of 19-6-12 analysis controlled release for herbaceous wetland planting operations. Use other analysis as indicated or specified in the proposal.

3. Slow-Release Nitrogen Fertilizer. Conforming to the requirements of the Pennsylvania Soil Conditioner and Plant Growth Substance Law, Act of December 1, 1977, P.L. 258, No. 86 (3P.S.68.2) as amended.

Use dry formulations of either 38-0-0 ureaform, 32-0-0 to 38-0-0 sulfur coated urea, 31-0-0 IBDU, or another analysis as indicated and conform to the following requirements:

- | | |
|-------------------------------------|-----------------|
| • 38-0-0 ureaform | |
| Total Nitrogen (TN) | — 38.0% minimum |
| Cold Water Insoluble Nitrogen (WIN) | — 25.0% minimum |
| Activity Index (AI) | — 40.0% minimum |

- | | |
|--|--|
| Urea Nitrogen | — 3.5% minimum |
| • 32-0-0 to 38-0-0 sulfur coated urea with a 7-day dissolution range of 20% to 30% | |
| • 31-0-0 IBDU | — Coarse grade (0.7 mm to 2.5 mm (28 mils to 98 mils)) |
| • Water Insoluble Nitrogen (WIN) | — 27.0% minimum |

(b) Seed.

1. General. Conforming to the Pennsylvania Seed Act of 1965 (Act No. 187) and amendments, and regulations of the Pennsylvania Department of Agriculture, Bureau of Plant Industry.

Have the Pennsylvania Department of Agriculture, Bureau of Plant Industry, conduct purity and germination analysis, following the current Rules for Testing Seeds, of the Association of Official Seed Analysis.

Use Penngift certified Crownvetch, Kentucky Bluegrass, Perennial Ryegrass, Creeping Red Fescue, Chewings Fescue, Hard Fescue, and Birdsfoot Trefoil seed.

Use Crownvetch seed, pretested by the Pennsylvania Department of Agriculture, in 5.0 kg (10-pound) (net) waterproof bags, with a tag attached to each bag.

Use a premixed seed with an inspection tag, stamped, dated, and signed by the Department of Agriculture inspector sewn or stapled to the outside of each bag. Do not use seed from bags that are not sealed or that have been stored with herbicides.

Do not use seed unless it has been inspected and sampled, as specified, or sampled by individual species and lot number, and mixed on the project under Department supervision.

Do not use seed with a test date older than nine months.

2. Seed Formulas. See Table A.

(c) Inoculant. Standard acceptable commercial product, for treating leguminous seed. A product consisting of a suitable carrier, containing a culture of nitrogen-fixing bacteria specific for the seed to be inoculated.

Keep lids on containers when not in use to avoid contamination. Store containers at moderate temperature. Do not use inoculant after the expiration date shown on the container.

(d) Herbicides. Conforming to all applicable Federal and State pesticide acts and registration requirements and as specified in PCID No. 1094 – Herbicides (Weed and Brush Control) issued by the Pennsylvania Department of General Services, Bureau of Purchases, Quality Assurance Division, for the appropriate type.

Furnish herbicide in manufacturer's labeled container as follows:

1. Selective Control in Seeded Areas. In areas seeded with Formula B or D, use Type 1, Class C-2, 4-D Liquid Amine Salt Formulations (Dimethylamine) listed in PCID No. 1094, for controlling broadleaf weeds.

(e) Mow-Line Delineator Stakes. Not used.

(f) Water. Section 720.2

**TABLE A (Metric)
Seeding Requirements**

Formula and Species	% By Mass	Minimum %		Max. % Weed Seed	Seeding Rate kg/1000 m ²
		Purity	Germination		
Formula B					11.5 Total
• Perennial Ryegrass mixture (<i>Lolium perenne</i>). A combination of improved certified varieties with no one variety exceeding 50% of the total Ryegrass component.	18	98	90	0.15	2.0
• Creeping Red Fescue or Chewings Fescue	30	98	85	0.15	3.5
• Kentucky Bluegrass mixture (<i>Poa pratensis</i>). A combination of improved certified varieties with no one variety exceeding 25% of the total Bluegrass component.	52	98	80	0.20	6.0
Formula C					5.00 Total
• Crownvetch (<i>Coronilla varia</i>)	45	99	70	0.10	2.25
• Annual Ryegrass (<i>Lolium multiflorum</i>)	55	98	90	0.15	2.75
Formula D					11.5 Total
• Tall Fescue (<i>Festuca arundinacea</i> var. Kentucky 31)	70	98	85	0.15	8.0
• Creeping Red Fescue or Chewings Fescue	30	98	85	0.15	3.5
Formula E					5.5 Total
• Annual Ryegrass (<i>Lolium multiflorum</i>)	100	98	90	0.15	5.5
Formula L					13.00 Total
• Hard Fescue mixture (<i>Festuca longifolia</i>). A combination of improved certified varieties with no one variety exceeding 50% of the total Hard Fescue component.	54	98	85	0.15	7.00
• Creeping Red Fescue	36	98	85	0.15	4.75
• Annual Ryegrass (<i>Lolium Multiflorum</i>)	10	98	90	0.15	1.25
Formula W					5.5 Total
• Tall Fescue (<i>Festuca arundinacea</i> var. Kentucky 31)	73	98	85	0.15	4.0
• Birdsfoot Trefoil mixture (<i>Lotus corniculatus</i>). A combination of varieties (Viking, Empire, Conec, Dawn, Leo, Bull, Maitland) with no one variety exceeding 50% of the total Trefoil component.	18	98	80*	0.10	1.0
• Redtop (<i>Agrostis alba</i>)	9	92	80	0.15	0.5

* Recommended 10% hardseed and 70% normal sprouts.

**TABLE A (English)
Seeding Requirements**

Formula and Species	% By Weight	Minimum %		Max % Weed Seed	Seeding Rate lb/1000 yd ²
		Purity	Germination		
Formula B					21.0 Total
• Perennial Ryegrass mixture (Lolium perenne). A combination of improved certified varieties with No one variety exceeding 50% of the total Ryegrass component.	20	98	90	0.15	4.0
• Creeping Red Fescue or Chewings Fescue	30	98	85	0.15	6.0
• Kentucky Bluegrass mixture (Poa pratensis). A combination of improved certified varieties with no one variety exceeding 25% of the total Bluegrass component.	50	98	80	0.20	11.0
Formula C					9.0 Total
• Crownvetch (Coronilla varia)	45	99	70	0.10	4.0
• Annual Ryegrass (Lolium multiflorum)	55	98	90	0.15	5.0
Formula D					21.0 Total
• Tall Fescue (Festuca arundinacea var. Kentucky 31)	70	98	85	0.15	15.0
• Creeping Red Fescue or Chewings Fescue	30	98	85	0.15	6.0
Formula E					10.0 Total
• Annual Ryegrass (Lolium multiflorum)	100	98	90	0.15	10.0
Formula L					24.0 Total
• Hard Fescue mixture (Festuca longifolia). A combination of improved certified varieties with no one variety exceeding 50% of the total Hard Fescue component.	55	98	85	0.15	13.0
• Creeping Red Fescue	35	98	85	0.15	8.5
• Annual Ryegrass (Lolium Multiflorum)	10	98	90	0.15	2.5
Formula W					10.5 Total
• Tall Fescue (Festuca arundinacea var. Kentucky 31)	70	98	85	0.15	7.5
• Birdsfoot Trefoil mixture (Lotus corniculatus). A combination of varieties (Viking, Empire, Norcen, Dawn, Leo, Bull, Maitland) with no one variety exceeding 50% of the total Trefoil component.	20	98	80*	0.10	2.0
• Redtop (Agrostis alba)	10	92	80	0.15	1.0

* Recommended 10% hardseed and 70% normal sprouts.

804.3 CONSTRUCTION—

(a) **General.** Spread seeds where indicated and at the rates specified in Table A, or as otherwise indicated. Spread seeds within the following dates, or as otherwise indicated or directed.

804.3(a)

804.3(c)

- | | |
|--|--|
| <ul style="list-style-type: none"> • Formula B, D, and L • Formula C • Formula E • Formula W | <ul style="list-style-type: none"> — March 15 to June 1
August 1 to October 15 — Ryegrass Portion:
March 1 to October 15 <li style="padding-left: 20px;">Crownvetch Portion:
Anytime except September
and October — March 15 to October 15 — April 1 to June 15
August 16 to September 15 |
|--|--|

Extend seeding dates where project conditions warrant. Apply full treatment or apply only 50% of the permanent seeding and soil supplements and apply the remaining 50% within the next seeding dates, as directed in writing.

Use tillage and soil supplements before permanent seeding on topsoiled areas, where temporary seeding or mulching has been applied.

The Contractor may apply permanent seed and/or soil supplements without tilling on untoptoiled areas, where temporary seeding or mulching has been applied.

(b) Tillage. On topsoiled areas, 1:3 (3:1) and flatter, loosen the surface to a depth of at least 50 mm (2 inches) by disking, harrowing, or other acceptable methods until the tillage is satisfactory. On untoptoiled areas, 1:3 (3:1) and flatter, till only as directed. Also, till or scarify areas if the surface is glazed or crusted.

Correct surface irregularities by filling depressions and leveling rough or uneven areas. Remove metal objects, stones larger than 50 mm (2 inches) in any dimension, and other debris or objects deemed detrimental to maintenance operations.

(c) Soil Supplements. Prepare areas for seeding by uniformly applying supplements, except in areas that will receive Formula E seed. Document bulk delivery as specified in Section 804.2(a)2.

Blend the initial soil supplements into the soil at least 50 mm (2 inches), on topsoiled areas, by raking, disking, harrowing, or other acceptable methods. Blend the supplements into the soil during tillage operations.

Apply slow-release nitrogen fertilizer to the surface of Formula B, D, L, and W seeded areas before project completion. Do not apply slow-release nitrogen fertilizer supplement to Formula C seeded areas.

Apply soil supplements as follows, unless otherwise indicated:

- | | |
|--|--|
| <ul style="list-style-type: none"> • Pulverized Agricultural Limestone • 10-20-20 Analysis Commercial Fertilizer • 38-0-0 Ureaform Fertilizer <li style="padding-left: 20px;">or • 32-0-0 to 38-0-0 Sulfur Coated Urea Fertilizer <li style="padding-left: 20px;">or • 31-0-0 IBDU Fertilizer | <ul style="list-style-type: none"> — 435 kg/1000 m²
(800 lb/1000 yd²) — 80 kg/1000 m²
(140 lb/1000 yd²) — 30 kg/1000 m²
(50 lb/1000 yd²) — 35 kg/1000 m² to 30 kg/1000 m²
(59 lb/1000 yd² to 50 lb/1000 yd²)
as directed — 35 kg/1000 m²
(61 lb/1000 yd²) |
|--|--|

(d) Inoculating Legumes. Inoculate leguminous seed, such as Crownvetch and Birdsfoot Trefoil, with proper cultures, according to the manufacturer's directions. Protect inoculated seed from prolonged exposure to sunlight before sowing. Reinoculate seed not sown within 24 hours. If using hydraulic seeders, use inoculant four times the manufacturer's recommended rate.

If inoculated seed is held in a slurry with fertilizers for more than 1 hour, reinoculate or apply legumes separately.

(e) Seeding. At the rates specified in Table A, sow seeds uniformly on the prepared areas by the helicopter, hydraulic placement, broadcasting, drilling, or hand seeding methods. Inspect seeding equipment and adjust the equipment, if required, to ensure the specified application rates. Periodically perform a check on the rate and uniformity of application, as directed.

Prior to seed application of each designated seed formula, thoroughly clean-out seed tank by rinsing with clean water to prevent contamination from one seed formula to the next. Repeat rinsing cycle until tank is clean. Collect all non-applied seed derived from each clean-out event and remove as waste from the project.

(f) Rolling. After seeding, roll topsoiled areas that are to be mowed. Use a roller with a mass (weight) not more than 100 kg/m (65 pounds per foot). If soil is wet or frozen, roll only when directed.

(g) Mow-Line Delineation. Not used.

(h) Herbicides. Apply herbicides as directed, to areas that are to be mowed and where weed growth is prominent.

The Representative will designate existing plants or groups of plants to be saved within these areas before herbicide application. If directed, more than one application may be required to control undesirable growth.

Apply material with application personnel certified by the Department of Agriculture and with equipment specified in Section 108.05(c).

(i) Liability. Final acceptance of seeding and soil supplement materials will be subject to the results of official sampling and testing. If the purity or germination of any seed species does not meet the requirements of Table A, reseed with approved seed, not to exceed the original specified rate. If soil supplements do not meet the requirements, reapply with approved supplements not exceeding the original specified rates. Where directed, replace desirable vegetation damaged during mowing or herbicide application.

Redress and reapply designated seed and soil supplements to seeded areas exhibiting less than 70% coverage of the surface area with germinated grass stems after 90 days of growth. Calculate the germination and growth period from the date of the seeding operation when the seeding operations are performed within the normal specified dates. Perform this operation in the next applicable seeding date if necessary.

(j) Maintenance. Maintain grass and legume ground cover areas, within the grading limits, until the entire project has been completed. Mow as specified in Section 804.3(k).

Control any noxious weed growth found within the right of way, by herbicide spraying and cutting. These plants are defined by the Pennsylvania Weed Control Act of 1982, P.L. 228, No. 74 and as amended by further legislation. Submit, for approval, a schedule of work and list of herbicide material to be used before starting this operation.

If a slope failure occurs on a slope previously completed, and requires further excavation and redressing to reestablish the slope, reapply the seeding and soil supplement work as specified for the original slope.

(k) Mowing. Maintain turf grass areas within the grading limits, by mowing with approved equipment until the entire project has been completed.

Submit a proposed schedule of mowing operations that covers the length of the construction project for approval.

1. Roadside Turf Areas. Turf grass areas established with Formula D requires a different degree of mowing maintenance than areas established with Formulas B and L. Three mowing cycles per year, scheduled between April and October, are anticipated for mowing areas seeded with Formula D. The number of cycles may be adjusted based on the degree of turf establishment, project length, weather conditions, or other factors. Consult the District Roadside Manager for schedule, safety requirements, and mowing equipment approvals.

Schedule the first mowing cycle early in the growth flush period before all seed heads have emerged. Schedule the second mowing approximately 3 to 4 weeks after the first cut to remove the remaining seed heads. Schedule the last mowing cycle in the fall, as directed. Do not mow grass shorter than 100 mm (4 inches) to allow a low growing, competitive ground cover. Do not mow under the following conditions:

- When soil and grass blades are wet.
- During drought conditions, or during summer months when the temperatures are consistently over 32 °C (90F), and when the grass exhibits dormancy.
- Within 7 days of any scheduled herbicide application or 7 days after a herbicide treatment.

2. Lawn Turf Areas. Maintain Formula B and L turf grass areas at a desired height of 50 mm (2 inches). Initiate mowing operations when grass seedlings reach a height of 75 mm (3 inches). Continue mowing operations during the active growing season throughout the length of the project. Follow the non-mow requirements indicated for Formula D grass. Mow at a normal frequency when the grass reaches the 75 mm (3-inch) height, unless directed otherwise.

804.4 MEASUREMENTS AND PAYMENT—

(a) Seeding and Soil Supplements. Kilogram (Pound)

Measured by the number of kilograms (pounds) of seed actually incorporated into the work for the seed formula and soil supplement applications specified in this specification.

The Department will pay for reseeding and reapplying soil supplements on failed slope areas, as specified in Section 804.3(j), at the contract unit price, in addition to the original accepted application of seeding and soil supplements.

(b) Seeding. Kilogram (Pound)

Measured by the number of kilograms (pounds) of seed actually incorporated into the work for the seed formula specified in this specification.

(c) Herbicides. 1000 Liters (1000 (M) Gallons)

For the type indicated.

(d) Mowing. Hectare (Acre)

SECTION 804—SEEDING AND SOIL SUPPLEMENTS

804.1 DESCRIPTION—This work is furnishing and placing of seed and soil supplements of the type indicated, application of herbicides, and mowing.

804.2 MATERIAL—The Department may require pretesting reports from the Pennsylvania Department of Agriculture for verification of analysis and legality of labeling, in addition to control of materials, as specified in Section 106.

(a) Soil Supplements.

1. Pulverized Agricultural Limestone. Conforming to the requirements of the Agricultural Liming Materials Act of 1978, P.L. 15, No. 9, as amended; The Agricultural Liming Materials Rules and Regulations (Title 7-Part V); 7 PA Code, Chapter 108 for labeling requirements; and as follows:

- % Total oxides (total calcium oxide and magnesium oxide equivalent) (ASTM C 25) 50
- % Calcium carbonate equivalent (% by mass (weight)) (ASTM C 25) 89
- % Fineness (minimum % by mass (weight))

material passing 850 μm (No. 20 sieve)	95
material passing 250 μm (No. 60 sieve)	60
material passing 150 μm (No. 100 sieve)	50

Furnish material having an effective neutralizing value (ENV) of not less than 90 when calculated according to 7 PA Code Chapter 108 as follows:

- % by mass (weight) passing 20 mesh - % passing 60 mesh x 0.4 = (a)
 % by mass (weight) passing 60 mesh - % passing 100 mesh x 0.8 = (b)
 % by mass (weight) passing 100 mesh x 1.0 = (c)
- Minimum Calcium Carbonate Equivalent (CCE) = % by mass (weight) of calcium carbonate
- (a) + (b) + (c) x CCE divided by 100 = ENV

2. Commercial Fertilizer. Conforming to the requirements of the Pennsylvania Soil Conditioner and Plant Growth Substance Law, Act of December 1, 1977, P.L. 258, No. 86 (3P.S.68.2), as amended.

Use dry formulations of 10-20-20 analysis for seeded and sodded areas. Use dry formulations of 20-10-5 and 16-8-16 analysis controlled release for tree, shrub, and vine type planting operations. Use dry formulations of 19-6-12 analysis controlled release for herbaceous wetland planting operations. Use other analysis as indicated or specified in the proposal.

3. Slow-Release Nitrogen Fertilizer. Conforming to the requirements of the Pennsylvania Soil Conditioner and Plant Growth Substance Law, Act of December 1, 1977, P.L. 258, No. 86 (3P.S.68.2) as amended.

Use dry formulations of either 38-0-0 ureaform, 32-0-0 to 38-0-0 sulfur coated urea, 31-0-0 IBDU, or another analysis as indicated and conform to the following requirements:

- 38-0-0 ureaform

Total Nitrogen (TN)	— 38.0% minimum
Cold Water Insoluble Nitrogen (WIN)	— 25.0% minimum
Activity Index (AI)	— 40.0% minimum

Urea Nitrogen	— 3.5% minimum
• 32-0-0 to 38-0-0 sulfur coated urea with a 7-day dissolution range of 20% to 30%	
• 31-0-0 IBDU	— Coarse grade (0.7 mm to 2.5 mm (28 mils to 98 mils))
• Water Insoluble Nitrogen (WIN)	— 27.0% minimum

(b) Seed.

1. General. Conforming to the Pennsylvania Seed Act of 1965 (Act No. 187) and amendments, and regulations of the Pennsylvania Department of Agriculture, Bureau of Plant Industry.

Have the Pennsylvania Department of Agriculture, Bureau of Plant Industry, conduct purity and germination analysis, following the current Rules for Testing Seeds, of the Association of Official Seed Analysis.

Use Penngift certified Crownvetch, Kentucky Bluegrass, Perennial Ryegrass, Creeping Red Fescue, Chewings Fescue, Hard Fescue, and Birdsfoot Trefoil seed.

Use Crownvetch seed, pretested by the Pennsylvania Department of Agriculture, in 5.0 kg (10-pound) (net) waterproof bags, with a tag attached to each bag.

Use a premixed seed with an inspection tag, stamped, dated, and signed by the Department of Agriculture inspector sewn or stapled to the outside of each bag. Do not use seed from bags that are not sealed or that have been stored with herbicides.

Do not use seed unless it has been inspected and sampled, as specified, or sampled by individual species and lot number, and mixed on the project under Department supervision.

Do not use seed with a test date older than nine months.

2. Seed Formulas. See Table A.

(c) Inoculant. Standard acceptable commercial product, for treating leguminous seed. A product consisting of a suitable carrier, containing a culture of nitrogen-fixing bacteria specific for the seed to be inoculated.

Keep lids on containers when not in use to avoid contamination. Store containers at moderate temperature. Do not use inoculant after the expiration date shown on the container.

(d) Herbicides. Conforming to all applicable Federal and State pesticide acts and registration requirements and as specified in PCID No. 1094 – Herbicides (Weed and Brush Control) issued by the Pennsylvania Department of General Services, Bureau of Purchases, Quality Assurance Division, for the appropriate type.

Furnish herbicide in manufacturer's labeled container as follows:

1. Selective Control in Seeded Areas. In areas seeded with Formula B or D, use Type 1, Class C-2, 4-D Liquid Amine Salt Formulations (Dimethylamine) listed in PCID No. 1094, for controlling broadleaf weeds.

(e) Mow-Line Delineator Stakes. Not used.

(f) Water. Section 720.2

**TABLE A (Metric)
Seeding Requirements**

Formula and Species	% By Mass	Minimum %		Max. % Weed Seed	Seeding Rate kg/1000 m ²
		Purity	Germination		
Formula B					11.5 Total
• Perennial Ryegrass mixture (Lolium perenne). A combination of improved certified varieties with no one variety exceeding 50% of the total Ryegrass component.	18	98	90	0.15	2.0
• Creeping Red Fescue or Chewings Fescue	30	98	85	0.15	3.5
• Kentucky Bluegrass mixture (Poa pratensis). A combination of improved certified varieties with no one variety exceeding 25% of the total Bluegrass component.	52	98	80	0.20	6.0
Formula C					5.00 Total
• Crownvetch (Coronilla varia)	45	99	70	0.10	2.25
• Annual Ryegrass (Lolium multiflorum)	55	98	90	0.15	2.75
Formula D					11.5 Total
• Tall Fescue (Festuca arundinacea var. Kentucky 31)	70	98	85	0.15	8.0
• Creeping Red Fescue or Chewings Fescue	30	98	85	0.15	3.5
Formula E					5.5 Total
• Annual Ryegrass (Lolium multiflorum)	100	98	90	0.15	5.5
Formula L					13.00 Total
• Hard Fescue mixture (Festuca longifolia). A combination of improved certified varieties with no one variety exceeding 50% of the total Hard Fescue component.	54	98	85	0.15	7.00
• Creeping Red Fescue	36	98	85	0.15	4.75
• Annual Ryegrass (Lolium Multiflorum)	10	98	90	0.15	1.25
Formula W					5.5 Total
• Tall Fescue (Festuca arundinacea var. Kentucky 31)	73	98	85	0.15	4.0
• Birdsfoot Trefoil mixture (Lotus corniculatus). A combination of varieties (Viking, Empire, Conec, Dawn, Leo, Bull, Maitland) with no one variety exceeding 50% of the total Trefoil component.	18	98	80*	0.10	1.0
• Redtop (Agrostis alba)	9	92	80	0.15	0.5

* Recommended 10% hardseed and 70% normal sprouts.

**TABLE A (English)
Seeding Requirements**

Formula and Species	% By Weight	Minimum %		Max % Weed Seed	Seeding Rate lb/1000 yd ²
		Purity	Germination		
Formula B					21.0 Total
• Perennial Ryegrass mixture (Lolium perenne). A combination of improved certified varieties with No one variety exceeding 50% of the total Ryegrass component.	20	98	90	0.15	4.0
• Creeping Red Fescue or Chewings Fescue	30	98	85	0.15	6.0
• Kentucky Bluegrass mixture (Poa pratensis). A combination of improved certified varieties with no one variety exceeding 25% of the total Bluegrass component.	50	98	80	0.20	11.0
Formula C					9.0 Total
• Crownvetch (Coronilla varia)	45	99	70	0.10	4.0
• Annual Ryegrass (Lolium multiflorum)	55	98	90	0.15	5.0
Formula D					21.0 Total
• Tall Fescue (Festuca arundinacea var. Kentucky 31)	70	98	85	0.15	15.0
• Creeping Red Fescue or Chewings Fescue	30	98	85	0.15	6.0
Formula E					10.0 Total
• Annual Ryegrass (Lolium multiflorum)	100	98	90	0.15	10.0
Formula L					24.0 Total
• Hard Fescue mixture (Festuca longifolia). A combination of improved certified varieties with no one variety exceeding 50% of the total Hard Fescue component.	55	98	85	0.15	13.0
• Creeping Red Fescue	35	98	85	0.15	8.5
• Annual Ryegrass (Lolium Multiflorum)	10	98	90	0.15	2.5
Formula W					10.5 Total
• Tall Fescue (Festuca arundinacea var. Kentucky 31)	70	98	85	0.15	7.5
• Birdsfoot Trefoil mixture (Lotus corniculatus). A combination of varieties (Viking, Empire, Norcen, Dawn, Leo, Bull, Maitland) with no one variety exceeding 50% of the total Trefoil component.	20	98	80*	0.10	2.0
• Redtop (Agrostis alba)	10	92	80	0.15	1.0

* Recommended 10% hardseed and 70% normal sprouts.

804.3 CONSTRUCTION—

(a) **General.** Spread seeds where indicated and at the rates specified in Table A, or as otherwise indicated. Spread seeds within the following dates, or as otherwise indicated or directed.

- | | |
|--|--|
| <ul style="list-style-type: none"> • Formula B, D, and L • Formula C • Formula E • Formula W | <ul style="list-style-type: none"> — March 15 to June 1
August 1 to October 15 — Ryegrass Portion:
March 1 to October 15 <li style="padding-left: 20px;">Crownvetch Portion:
Anytime except September
and October — March 15 to October 15 — April 1 to June 15
August 16 to September 15 |
|--|--|

Extend seeding dates where project conditions warrant. Apply full treatment or apply only 50% of the permanent seeding and soil supplements and apply the remaining 50% within the next seeding dates, as directed in writing.

Use tillage and soil supplements before permanent seeding on topsoiled areas, where temporary seeding or mulching has been applied.

The Contractor may apply permanent seed and/or soil supplements without tilling on untoiled areas, where temporary seeding or mulching has been applied.

(b) Tillage. On topsoiled areas, 1:3 (3:1) and flatter, loosen the surface to a depth of at least 50 mm (2 inches) by disking, harrowing, or other acceptable methods until the tillage is satisfactory. On untoiled areas, 1:3 (3:1) and flatter, till only as directed. Also, till or scarify areas if the surface is glazed or crusted.

Correct surface irregularities by filling depressions and leveling rough or uneven areas. Remove metal objects, stones larger than 50 mm (2 inches) in any dimension, and other debris or objects deemed detrimental to maintenance operations.

(c) Soil Supplements. Prepare areas for seeding by uniformly applying supplements, except in areas that will receive Formula E seed. Document bulk delivery as specified in Section 804.2(a)2.

Blend the initial soil supplements into the soil at least 50 mm (2 inches), on topsoiled areas, by raking, disking, harrowing, or other acceptable methods. Blend the supplements into the soil during tillage operations.

Apply slow-release nitrogen fertilizer to the surface of Formula B, D, L, and W seeded areas before project completion. Do not apply slow-release nitrogen fertilizer supplement to Formula C seeded areas.

Apply soil supplements as follows, unless otherwise indicated:

- | | |
|--|--|
| <ul style="list-style-type: none"> • Pulverized Agricultural Limestone • 10-20-20 Analysis Commercial Fertilizer • 38-0-0 Ureaform Fertilizer <li style="padding-left: 40px;">or • 32-0-0 to 38-0-0 Sulfur Coated Urea Fertilizer <li style="padding-left: 40px;">or • 31-0-0 IBDU Fertilizer | <ul style="list-style-type: none"> — 435 kg/1000 m²
(800 lb/1000 yd²) — 80 kg/1000 m²
(140 lb/1000 yd²) — 30 kg/1000 m²
(50 lb/1000 yd²) — 35 kg/1000 m² to 30 kg/1000 m²
(59 lb/1000 yd² to 50 lb/1000 yd²)
as directed — 35 kg/1000 m²
(61 lb/1000 yd²) |
|--|--|

(d) Inoculating Legumes. Inoculate leguminous seed, such as Crownvetch and Birdsfoot Trefoil, with proper cultures, according to the manufacturer's directions. Protect inoculated seed from prolonged exposure to sunlight before sowing. Reinoculate seed not sown within 24 hours. If using hydraulic seeders, use inoculant four times the manufacturer's recommended rate.

If inoculated seed is held in a slurry with fertilizers for more than 1 hour, reinoculate or apply legumes separately.

(e) Seeding. At the rates specified in Table A, sow seeds uniformly on the prepared areas by the helicopter, hydraulic placement, broadcasting, drilling, or hand seeding methods. Inspect seeding equipment and adjust the equipment, if required, to ensure the specified application rates. Periodically perform a check on the rate and uniformity of application, as directed.

Prior to seed application of each designated seed formula, thoroughly clean-out seed tank by rinsing with clean water to prevent contamination from one seed formula to the next. Repeat rinsing cycle until tank is clean. Collect all non-applied seed derived from each clean-out event and remove as waste from the project.

(f) Rolling. After seeding, roll topsoiled areas that are to be mowed. Use a roller with a mass (weight) not more than 100 kg/m (65 pounds per foot). If soil is wet or frozen, roll only when directed.

(g) Mow-Line Delineation. Not used.

(h) Herbicides. Apply herbicides as directed, to areas that are to be mowed and where weed growth is prominent.

The Representative will designate existing plants or groups of plants to be saved within these areas before herbicide application. If directed, more than one application may be required to control undesirable growth.

Apply material with application personnel certified by the Department of Agriculture and with equipment specified in Section 108.05(c).

(i) Liability. Final acceptance of seeding and soil supplement materials will be subject to the results of official sampling and testing. If the purity or germination of any seed species does not meet the requirements of Table A, reseed with approved seed, not to exceed the original specified rate. If soil supplements do not meet the requirements, reapply with approved supplements not exceeding the original specified rates. Where directed, replace desirable vegetation damaged during mowing or herbicide application.

Redress and reapply designated seed and soil supplements to seeded areas exhibiting less than 70% coverage of the surface area with germinated grass stems after 90 days of growth. Calculate the germination and growth period from the date of the seeding operation when the seeding operations are performed within the normal specified dates. Perform this operation in the next applicable seeding date if necessary.

(j) Maintenance. Maintain grass and legume ground cover areas, within the grading limits, until the entire project has been completed. Mow as specified in Section 804.3(k).

Control any noxious weed growth found within the right of way, by herbicide spraying and cutting. These plants are defined by the Pennsylvania Weed Control Act of 1982, P.L. 228, No. 74 and as amended by further legislation. Submit, for approval, a schedule of work and list of herbicide material to be used before starting this operation.

If a slope failure occurs on a slope previously completed, and requires further excavation and redressing to reestablish the slope, reapply the seeding and soil supplement work as specified for the original slope.

(k) Mowing. Maintain turf grass areas within the grading limits, by mowing with approved equipment until the entire project has been completed.

Submit a proposed schedule of mowing operations that covers the length of the construction project for approval.

1. Roadside Turf Areas. Turf grass areas established with Formula D requires a different degree of mowing maintenance than areas established with Formulas B and L. Three mowing cycles per year, scheduled between April and October, are anticipated for mowing areas seeded with Formula D. The number of cycles may be adjusted based on the degree of turf establishment, project length, weather conditions, or other factors. Consult the District Roadside Manager for schedule, safety requirements, and mowing equipment approvals.

Schedule the first mowing cycle early in the growth flush period before all seed heads have emerged. Schedule the second mowing approximately 3 to 4 weeks after the first cut to remove the remaining seed heads. Schedule the last mowing cycle in the fall, as directed. Do not mow grass shorter than 100 mm (4 inches) to allow a low growing, competitive ground cover. Do not mow under the following conditions:

- When soil and grass blades are wet.
- During drought conditions, or during summer months when the temperatures are consistently over 32 °C (90F), and when the grass exhibits dormancy.
- Within 7 days of any scheduled herbicide application or 7 days after a herbicide treatment.

2. **Lawn Turf Areas.** Maintain Formula B and L turf grass areas at a desired height of 50 mm (2 inches). Initiate mowing operations when grass seedlings reach a height of 75 mm (3 inches). Continue mowing operations during the active growing season throughout the length of the project. Follow the non-mow requirements indicated for Formula D grass. Mow at a normal frequency when the grass reaches the 75 mm (3-inch) height, unless directed otherwise.

804.4 MEASUREMENTS AND PAYMENT—

(a) Seeding and Soil Supplements. Kilogram (Pound)

Measured by the number of kilograms (pounds) of seed actually incorporated into the work for the seed formula and soil supplement applications specified in this specification.

The Department will pay for reseeding and reapplying soil supplements on failed slope areas, as specified in Section 804.3(j), at the contract unit price, in addition to the original accepted application of seeding and soil supplements.

(b) Seeding. Kilogram (Pound)

Measured by the number of kilograms (pounds) of seed actually incorporated into the work for the seed formula specified in this specification.

(c) Herbicides. 1000 Liters (1000 (M) Gallons)

For the type indicated.

(d) Mowing. Hectare (Acre)

SECTION 805—MULCHING

805.1 DESCRIPTION—This work is the furnishing, placing, anchoring, and maintaining of mulch of the type indicated.

805.2 MATERIAL—

(a) **Mulches.** Free from foreign material, coarse stems, mold, substances toxic to plant growth, and mature seed bearing stalks or roots of prohibited and noxious weeds, as defined by law.

1. Seeded Areas. Either one or a combination of the following, as specified:

1.a Hay. Timothy hay, mixed clover and timothy hay, or other acceptable native or forage grasses, well-cured to less than 20% moisture content, by mass (weight).

1.b Straw. Either wheat or oat straw, reasonably free of viable seed, well cured to less than 20% moisture content, by mass (weight).

1.c Wood Fiber. Specially prepared, biodegradable, air-dried wood fibers manufactured from 100% wood chips or bark from lumber mill processing operations, tinted with nontoxic, green dye and containing an organic tackifier approved for use with wood fibers; manufactured to be applied with hydraulic seeding equipment; and conforming to the following requirements:

- | | |
|---|--------------|
| • Moisture content | 15% maximum |
| • Organic matter
(Oven-dried basis) | 95% minimum |
| • Water holding capacity
(Grams of water per 100 grams of fiber) | 1000 minimum |
| • Tackifier content
(By mass (weight)) | 2.5% to 3.5% |

Submit a certified physical analysis of the product for approval before application.

1.d Pellet Mulch. A biodegradable, water-absorbing, paper-based pellet that when wetted loses its pellet shape, breaks down and adheres to other pellets, forming a thin, protective mulch mat, and meeting the following requirements:

- | | |
|------------------------|--|
| • Paper content | 85% |
| • Fertilizer | 5% |
| • Polyacrylater | 2% to 5% |
| • Moisture content | 5% to 8% |
| • Dimensions | 3 mm (1/8-inch) diameter,
6 mm to 19 mm (1/4 inch to 3/4 inch) length |
| • Absorption potential | minimum, 3 times dry weight |

1.e Bonded Fiber Matrix (BFM). Specially prepared, water soluble, biodegradable, hydraulically applied system of long strand wood fibers held together by a bonding agent, which adheres to the soil surface and upon drying forms a continuous, insoluble, three dimensional, non-dispersible protective crust-like soil covering.

1.e.1 Polymer or Hydrocolloid Binder Matrix.

1.e.1.a Wood Fiber. Specially prepared, long strand (min. 25% 10 mm (3/8-inch) length), air-dried wood fibers (88% to 92% by mass (weight)) manufactured from wood chips, bark, or clean wood waste products, and conforming to the following requirements:

Moisture content	15% maximum
Water holding capacity	1000 minimum (Grams of water per 100 grams of fiber)

1.e.1.b Bonding Agent. High-strength tackifier of powdered polysaccharide guar gum, blended hydrocolloid-based binder, hydrophyllic, or co-polymer material 5 to 12% by mass (weight).

1.e.1.c Synthetic Fiber. System may contain up to 5% by mass (weight) of crimped, polyester fibers or other synthetic fibers with wetting and dispersion agents manufactured for use in mulching applications.

1.e.1.d Dye. System may contain a nontoxic, water soluble, colored dye to aid in the visual application coverage of the matrix.

1.e.1.e Activator. System may contain up to 1% by mass (weight) of organic and mineral fertilizers.

1.e.2 Gypsum Binder Matrix.

1.e.2.a Wood Fiber. Specially prepared, long strand (min. 25% 10 mm (3/8-inch) length), air-dried wood fibers manufactured from wood chips, bark, or clean wood waste products, and conforming to the following requirements:

Moisture content	15% maximum
Water holding capacity	1000 minimum (Grams of water per 100 grams of fiber)

1.e.2.b Bonding Agent. Naturally occurring, high purity, processed hemi-hydrate gypsum with manufacturer's system additives, which when combined with water will form a cementitious binder that will produce a crust-like soil covering within 4 to 8 hours after application. Material that has become partially air set, lumpy, or caked before use is not acceptable for use.

1.e.2.c Synthetic Fiber. Synthetic fibers manufactured for use in mulching applications, coated with wetting and dispersion agents.

1.e.2.d Dye. System may contain a nontoxic, water soluble, colored dye to aid in the visual application coverage of the matrix.

2. Planting and Other Areas. One of the following:

2.a Tanbark. Suitable fibrous shredded, ground or chunked, aged tanbark derived as a by-product of the tannin extraction process, free from insect life, not decomposed, and between 6 mm and 50 mm (1/4 inch and 2 inches) in any dimension.

2.b Shredded Bark. Suitable shredded, chunked, or ground pieces of predominantly aged, but not decomposed, hardwood or pinewood tree bark produced from lumber mill processing operations, free of excessively fine particles and having a general size range of 6 mm to 50 mm (1/4 inch to 2 inches) in any dimension.

2.c Washed Gravel. Uncrushed, washed, No. 57, as specified in Section 703.2(a)2.

2.d Coarse Aggregate. No. 67, Type C, as specified in Section 703.2(a)1.

2.e Sewage Sludge Compost. A blend of secondary dewatered sewage sludge and wood chips, aerobically composted at a DEP, Bureau of Waste Management permitted site for at least 21 days and cured for 30 to 60 days to ensure pathogen destruction. Free of foreign material and substances toxic to plant growth, nonburning, weed free, screened, and conforming to the following requirements:

- Minimum of 50% organic matter (oven dry basis)
- Minimum of 100% water holding capacity
- Particle Size—10 mm to 80 mm (3/8 inch to 3 inches)
- pH—6.0 minimum
- Heavy metals and toxic compounds (based on sewage sludge content)

	MAXIMUM PPM
Cadmium	25
Chromium	1000
Copper	1000
Lead	1000
Mercury	10
Nickel	200
Zinc	2500
PCBs	3

Submit a certified laboratory analysis with each shipment.

2.f Wood Chips. Suitable chipped or ground wood material produced from predominantly live or non-decayed trees, logs, brush including leaves or post-consumer lumber having a general size range of 15 mm to 50 mm (1/2 inch to 2 inches) in any dimension and free of excessively fine or stringy particles. Chips produced and stockpiled during clearing and grubbing operations or aged chips, at least 6 months old, from lumber mill operations of the desired size and free from foreign debris will also be accepted.

2.g Spent Mushroom Soil Compost. Organic substrate used in mushroom production that has been steam sterilized, then composted for a minimum of 90 days in well-managed windrows, and on a properly surfaced and protected composting pad and blended with ground brush (yard waste), recycled wood, and/or composted bark. Conforms to the requirements specified in Section 808.2(g)4 except as follows:

- Minimum Organic Matter (Oven Dry Basis)—40%
- Moisture Content—60% maximum
- Particle Size—10 mm to 80 mm (3/8 inch to 3 inches)
- Soluble Salt Concentration—20 dS maximum

(b) Mulch Binders. Other acceptable binder materials manufactured for this purpose or the following.

1. Recycled Cellulose Fiber. Specifically prepared, biodegradable, shredded paper particles, comprised of recycled newsprint or other recycled wood cellulose fiber, containing a surfactant and nontoxic, green dye; manufactured to be applied with hydraulic seeding equipment; and conforming to the following requirements:

- Moisture content 17% maximum
- Organic matter 80% minimum
(Oven-dried basis)
- Water holding capacity 900 minimum
(Grams of water per 100 grams of fiber)

2. Wood Fiber. Section 805.2(a)1.c

3. Nonasphaltic Emulsion. Either water soluble natural vegetable gum blended with gelling and hardening agents or a water soluble blend of hydrophyllic polymers, viscosifiers, sticking aids, and gums.

4. Polyvinyl Acetate. Emulsion resin, containing 60% ± 1% total solids by mass (weight).

5. Recycled Cellulose Fiber/Wood Fiber Mixture. Specially prepared mixture of biodegradable, air-dried wood fiber, manufactured from wood chips or bark, and shredded paper particles, comprised of recycled newsprint or other recycled cellulose fiber combined with a surfactant and a nontoxic, green dye; manufactured to be applied with hydraulic seeding equipment; and conforming to the following requirements:

- Wood fiber 45% to 55%
- Recycled cellulose fiber 45% to 55%
- Moisture content 21% maximum
- Organic matter 97% minimum
(Oven-dried basis)
- Water holding capacity 900 minimum
(Grams of water per 100 grams of fiber)

(c) Mulch Control Netting. One of the following:

1. Plastic. A uniformly extruded, rectangular, plastic mesh conforming to the following requirements:

- Mass (weight) 7.8 g/m² (0.23 ounce per square yard), minimum
- Mesh opening Nominal 19 mm x 19 mm (3/4-inch by 3/4-inch)

2. Coconut Coir. Undyed, biodegradable, coconut coir yarn woven into a mesh conforming to the following requirements:

- Mass (weight) 200 g/m² (6 ounces per square yard), minimum
- Mesh opening Nominal 50 mm x 50 mm (2-inch by 2-inch), maximum

(d) Weed Barrier and Weed Control Mats.

1. Weed Barrier Mat. Stable, evenly distributed, permeable, network of polymeric woven, non-woven or a woven/non-woven combination of polypropylene or polyester filaments or yarns manufactured for weed

barrier/soil separator use, inert to commonly encountered construction chemicals or substances and conforming to the following physical requirements:

Type	MARV*	Property
Woven or combination Non-woven fabric	0.03 sec-1 1.3 sec-1	Permittivity flow rate <u>ASTM D 4491</u>
Woven or combination Non-woven fabric	0.004 cm/sec 488 L/min/m ² (12 gal/min/sq. ft.)	Permeability coefficient Permeability flux <u>ASTM D 4491</u> Falling head test
All fabric	175 N (40 lbs.)	Puncture strength (5/16-inch flat head rod) <u>ASTM D 4833</u>
All fabric	70% after 150 hours	Ultraviolet resistance Strength retention <u>ASTM D 4355</u>

* Minimum Average Roll Value (+95% of the fabric in a lot will meet or exceed the minimum requirements).

Certify as specified in Section 106.03(b).

2. Weed Control Mat. Stable, permeable network of spunbonded, long chain synthetic polyolefins (minimum 95% by mass (weight)) filaments or yarns with nodules of trifluralin, carbon black and polyethylene compounded together utilizing time-release characteristics permanently attached to the fabric on 38 mm (1 1/2-inch) centers and conforming to the following requirements.

Physical Property	MARV*
Trifluralin (Nodule)	20%
Puncture strength (5/16-inch flat head rod) <u>ASTM D 4833</u>	175 N (39 lbs.)
Permittivity <u>ASTM D 4491</u>	0.7 sec-1
Ultraviolet resistance Strength retention <u>ASTM D 4355</u>	70% after 500 hours

* Minimum Average Roll Value (+95% of the fabric in a lot will meet or exceed the minimum requirement).

Certify as specified in Section 106.03(b).

(e) **Staples.** Section 806.2(e)1

(f) **Wood Stakes.** Section 806.2(e)3.

805.3 CONSTRUCTION—

(a) **Mulching Seeded Areas.** Place mulch, of the type indicated, immediately after seeding or within 48 hours after seeding is completed. Unless otherwise indicated, place only straw or wood fiber over topsoiled areas. Use hay, straw, or wood fiber in other areas, as indicated or specified.

Place hay or straw uniformly, in a continuous blanket, at a minimum rate of 650 kg/1000 m² (1,200 pounds per 1,000 square yards) or as otherwise indicated. If directed, increase the rate of application, depending upon the material used, season, soil conditions, or method of application. An acceptable mechanical blower may be used to apply mulch. Do not use machines that cut mulch into short pieces. Anchor mulch with specified mulch binders applied at the following rates:

- Recycled cellulose fiber—90 kg/1000 m² (160 pounds per 1,000 square yards)
- Wood fiber—90 kg/1000 m² (160 pounds per 1,000 square yards)
- Nonasphaltic emulsion—At manufacturer's recommended rate
- Polyvinyl acetate—At manufacturer's recommended rate
- Recycled cellulose fiber/wood fiber mixture—90 kg/1000 m² (160 pounds per 1,000 square yards)

The mulch binder application is incidental to the application of straw and hay mulch.

Apply wood fiber mulch hydraulically according to the manufacturer's tank-mixing instructions. It may be incorporated as an integral part of the slurry after the seed and soil supplements have been thoroughly mixed. Apply uniformly at the rate of 175 kg/1000 m² (320 pounds per 1,000 square yards) unless otherwise indicated.

Mulch temporary seeded areas with hay.

1. **Median Areas.** On slopes 1:6 (6:1) or flatter, place pellet mulch by hand or using a mechanical spreader immediately after seeding. Apply uniformly at application rate of 293 kg/1000 m² (540 pounds per 1,000 square yards). Thoroughly wet pellet mulch with water without dislodging mulch.

(b) Mulch Control Netting.

1. **Plastic.** Install netting over designated mulch surface. Staple upslope ends, edges, bottom, and overlaps at 600 mm (24-inch) intervals. Overlap adjacent fabric to outside edges. Secure remaining fabric areas by putting in approximately 1 staple per 1.0 m² (1 staple per 1 square yard) of area.

2. **Coconut Coir.** Install netting over designated mulch surface. Stretch fabric tightly and anchor with wood stakes along all edges at 2.2 m (7-foot) maximum interval. Overlap adjacent fabric widths by not less than 200 mm (8 inches).

(c) Mulching Planted Areas.

1. **Individual Plant Pits.** Uniformly apply a designated mulch specified in Section 805.2(a)2 to the entire plant pit to a loose depth of 75 mm (3 inches) and as shown on the Standard Drawing. Apply mulch within 48 hours after completion of the planting operation.

2. **Planting Beds.** Cover designated shrub beds with mulch or mulch and weed barrier mat or mulch and weed control mat as indicated. Cut mat around the plant stem to ensure mat will not extend above the mulch. Secure mat to the soil surface with staples or other approved anchoring devices at a maximum interval spacing of 1.0 m (3 feet) and along all edges and overlaps. Overlap mat edge with 50 mm (2-inch) minimum.

Uniformly apply a designated mulch specified in Section 805.2(a)2 over the entire bed area to a loose depth of 75 mm (3 inches). Redistribute excessive mulch depth. Taper mulch depth at plant pit as shown on the Standard Drawing. Apply mat and mulch within 48 hours after completion of the planting operation.

(d) Maintenance. Properly maintain mulched areas until the entire project has been completed. Promptly reapply mulch materials, which become dislodged or lost due to wind, rain, or other causes, at initial or modified rates, as directed.

After mulching work on a slope has been satisfactorily completed, if a slope failure occurs, one that requires redressing, excavation, or the establishment of a new slope, replace the mulch, as directed.

(e) Bonded Fiber Matrix.

1. General. Prepare surfaces as specified in Section 804.3(b). Scarify all slopes greater than 1:3 (3:1) to ensure a rough texture for lodging of seed and BFM. Apply seed at twice the rate specified in Section 804.2(b)2 Table A. Apply soil supplements as specified in Section 804.3(c).

2. Application. Apply bonded fiber matrix components hydraulically with hydromulching (hydroseed) equipment manufactured for this purpose. Follow manufacturer's mixing and application instructions.

The bonded fiber matrix components may be incorporated as an integral part of the seeding and soil supplement application if seeding and soil supplements are applied hydraulically.

Apply polymer binder or hydrocolloid binder matrixes at an application rate of 337.5 kg/1000 m² (3,000 pounds per acre) or as indicated to provide a uniform soil surface coverage thickness of 4 mm (0.16 inch) maximum after drying. Test application procedures to ensure a uniform application rate. Do not apply within 24 hours of anticipated rainfall.

Mix gypsum binder matrix components in a homogenous slurry in the following proportions for each 379 L (100 gallons) of water: gypsum binder—69 kg (150 pounds); wood fiber—18 kg (40 pounds); and synthetic fiber—0.3 kg (0.6 pounds). Apply gypsum binder matrix at an application rate of 675 kg/1000 m² (6,000 pounds per acre) or as indicated so that the soil surface is covered uniformly. Do not apply within 12 hours of anticipated rainfall.

Place BFM material at least 450 mm (18 inches) beyond the toe and top of all slopes. Apply material in at least two different directions to provide as much uniform coverage with no gaps or spaces greater than 1 mm (0.04 inch).

805.4 MEASUREMENT AND PAYMENT—

(a) Seeded Areas. Tonne (Ton)

For the type indicated. Measured by the number of tonnes (tons) of mulch actually incorporated into the work, at the specified rates.

(b) Planted Areas. Square Meter (Square Yard)

For the type indicated.

(c) Mulch Replacement. The Department will pay for replacing mulch on failed slope areas, as specified in Section 805.3(c), at the contract unit price, in addition to the original accepted mulch application.

(d) Mulching and Weed Barrier Mat. Square Meter (Square Yard)

For the type indicated.

(e) Mulching and Weed Control Mat. Square Meter (Square Yard)

For the type indicated.

(f) Mulching - Bonded Fiber Matrix. Square Meter (Square Yard)

(g) Mulch Control Netting. Square Meter (Square Yard)

SECTION 845—UNFORESEEN WATER POLLUTION CONTROL

845.1 DESCRIPTION—This work is construction of temporary or permanent control measures, as ordered during the contract life, to control unforeseen pollution of surface water and groundwater.

845.2 MATERIAL—

- As specified in applicable parts of Sections 804, 805, and 806.
- Erosion and sediment pollution control devices—as shown on the Standard Drawings.
- Other water pollution control measures and devices as directed.

845.3 CONSTRUCTION—As directed during construction, provide water pollution control measures to prevent or abate unforeseen pollution of surface water and groundwater resources. These measures are separate from those temporary and permanent water pollution control features designed for the project.

Coordinate control measures with the Erosion and Sediment Control Plan and permanent features to ensure economical, effective, and continuous pollution control throughout the construction and post-construction periods. Also comply with the requirements specified in Section 107.28.

If directed, place pollution control measures for authorized construction areas outside the right of way.

Comply with all applicable Federal, State, and local laws, rules, or regulations.

845.4 MEASUREMENT AND PAYMENT—The proposal will indicate a predetermined amount (PDA) of money for this item. The Department will pay for all items of work, identified and not identified in the contract, performed as water pollution control, under this item as follows:

(a) Contract Items. The Department will pay for performance of work, identified as having similar items listed in the contract, at the contract unit price.

(b) Non-Contract Items. The Department will pay for items of work not identified in the contract as follows:

1. Negotiated Price. At price agreed upon with the Department before performing the work. If applicable, agreement is also required with FHWA.

2. Force Account Basis. Section 110.03(d)

SECTION 850—ROCK LINING

850.1 DESCRIPTION—This work is construction of rock lining of the class indicated.

850.2 MATERIAL—

(a) Rock.

1. General. Acceptable quality; sound; free from structural defects and foreign substances, such as soil, shale, and organic materials. Unless the rock comes from material providing an approved Type A aggregate, submit samples to the MTD for petrographic examination for durability before use.

Use rock conforming to the following requirements:

- No shale seams.
- Hard and angular shaped rock with neither width nor thickness less than one-third its length.
- Minimum specific gravity of 2.5, as determined according to AASHTO T 85, bulk-saturated, but surface-dry basis.
- Each load of rock well-graded, from the smallest to the largest size.

2. Size and Gradation.

Class, Size No. (NCSA)	Percent Passing (Square Openings)					
	R-8**	R-7**	R-6	R-5	R-4	R-3
Rock Size, millimeters (inches)						
1070 (42)	100*					
760 (30)		100*				
610 (24)	15-50		100*			
460 (18)		15-50		100*		
380 (15)	0-15					
300 (12)		0-15	15-50		100*	
230 (9)				15-50		
150 (6)			0-15		15-50	100*
100 (4)				0-15		
75 (3)					0-15	15-50
50 (2)						0-15
Nominal Placement Thickness, millimeters (inches)	1220 (48)	915 (36)	800 (30)	610 (24)	460 (18)	305 (12)

* Maximum allowable rock size.

** Use Class 2, Type A geotextile

Acceptance of gradation will be based upon visual inspection and certification. Provide two samples of rock, at least 4.5 tonnes (5 tons) each or each one-half the total project quantity, whichever is smaller. Provide one sample in place at the construction site and provide the other sample at the quarry. The construction site sample may be incorporated into the work. These samples will be used as a reference for judging the size and gradation of the rock supplied and placed. Certify as to gradation, as specified in Section 106.03(b)3.

(b) Geotextiles. Class 2, for the type required. Section 735.

850.3 CONSTRUCTION—As shown on the Standard Drawings and as follows:

Prepare the area required for placing the geotextile and rock.

This preparation may include, but not be limited to excavating, removing unsuitable material, backfilling, placing embankment, and clearing and grubbing, as specified in Section 201.3. Place the geotextiles, as specified in Section 212.3(c).

Carefully place the rock on the geotextiles to produce an even distribution of pieces, with a minimum of voids and without tearing the geotextile. Place the full course thickness in one operation in a manner to prevent segregation and to avoid displacement of the underlying material. Do not place rock in layers, by dumping into chutes, or by similar methods likely to cause segregation or geotextile damage. Rearrange individual rocks, if necessary, to ensure uniform distribution.

850.4 MEASUREMENT AND PAYMENT—

(a) **Rock.** Square Meter (Square Yard) or Cubic Meter (Cubic Yard)

(b) **Geotextile.** Square Meter (Square Yard)
Section 212.4(b).

(c) **Excavation.** Cubic Meter (Cubic Yard)
Section 203.4 or 204.4, for the class indicated.

SECTION 861—CLEANING SEDIMENTATION STRUCTURES

861.1 DESCRIPTION—This work is removal and disposal of sediment deposited in erosion and sedimentation control structures and/or devices.

861.3 CONSTRUCTION—When sediment accumulation has reached a point one-third the depth of the sediment structure or device, remove and dispose of the sediment so it does not erode into the construction areas and/or natural waterways. Do not damage the structure or device.

861.4 MEASUREMENT AND PAYMENT—Cubic Meter (Cubic Yard)

The sediment removed will normally be measured by the number of full loads hauled multiplied by the rated capacity of the hauling equipment, in cubic meters (cubic yards). Cross-sectional measurements will be used for large quantities and when not using hauling equipment.

SECTION 865—SILT BARRIER FENCE

865.1 DESCRIPTION—This work is construction of silt barrier fences of the height indicated.

865.2 MATERIAL—

(a) **Geotextiles, Class 3, Type A or B**—Section 735

(b) **Mesh Support.** Metallic coated steel, 2.0 mm (14.5 gage) wire mesh, arranged in a maximum grid of 150 mm x 150 mm (6 inches by 6 inches), or an acceptable, equivalent plastic mesh.

(c) **Posts.** Of sufficient length for 460 mm (18-inch) embedment in the ground. Either wood, nominal 51 mm (2.0 inches) square; or steel, 31.8 mm x 25.4 mm (1.25-inch by 1.00-inch) T-section or equivalent; or acceptable plastic, with an equivalent section.

(d) **Fasteners.** No. 9 staples, 38 mm (1.5 inches) long, or tie wires, 1.37 mm (17 gage) steel, of appropriate length, acceptably metallic coated.

(e) **Ground Anchors.** Install for ditch or swale condition, as directed.

(f) **Guy Wires.** 3.30 mm² (No. 12 gage), galvanized, according to ASTM A 392, Class II. Install for ditch or swale condition, as directed.

(g) **Wood Strips.** Of sufficient length and measuring 50 mm x 50 mm (2 inches by 2 inches) in size. Place around the silt barrier fence for inlet protection, as shown on the Standard Drawings.

865.3 CONSTRUCTION—As shown on the Standard Drawings, with or without mesh support fencing, and as follows:

Install posts and excavate the trench. Fasten the geotextile fabric securely to the top of the mesh, at a maximum spacing of 760 mm (30 inches), and to the posts, ensuring that sag is kept to a minimum. Extend the geotextile fabric a minimum of 150 mm (6 inches) into the excavated trench, backfill the trench with the excavated soil, and compact.

After installation, satisfactorily maintain the barrier fence. The fence fabric may require periodic cleaning by tapping the dry fabric from the downstream side. If directed, remove and replace barrier fence not functioning due to clogging, damage, or deterioration.

When the barrier fence is no longer needed, remove the fence and restore the area as specified in Section 105.14.

865.4 MEASUREMENT AND PAYMENT—

(a) **Silt Barrier Fence.** Meter (Linear Foot)

(b) **Silt Barrier Fence Replacement.** If silt barrier fence is required to be replaced, the Department will pay for it at the contract unit price for Silt Barrier Fence.

ITEM 9858-0001 - SEDIMENT FILTER BAG

Provision Body:

1. DESCRIPTION - This work is furnishing, installing, maintaining and disposing of a Sediment Filter Bag (bag).

2. MATERIAL -

Sediment Filter Bag. Provide straw as specified in Section 805.2(a)1.b geotextile, Class 4 (Type A), 340 g/m² (10 ounces/yard) as listed in Section 735.1. Construct a 4.6 m (15 feet) x 4.6 m (15 feet)(+/- 80 mm (3 inches)) bag using heat bonded seam or 401 lock chain stitch seam with a 98 kg (216 pounds) minimum breaking strength, tested in accordance with ASTM-D4632. Label each bag indicating maximum flowrate of bag in liters (gallons) per minute.

3. CONSTRUCTION -

Place bag over straw on a stabilized area. Distribute straw at the rate of 1 bale per 3 m² (30 square feet). Filter bags may be used in low volume dewatering operations not to exceed 3785 liters (1000 gallons) per minute. Pump flowrate not to exceed 50% of maximum flow rate indicated on bag label. Double clamp bag firmly to pump discharge hose. Monitor and evaluate entire pumping operation to assure that bag continues to function properly. Replace bag when contained silt reduces flow to approximately 50% of initial bag discharge, or when directed by the Inspector-In-Charge. Dispose of sediment in a manner satisfactory to the Engineer. Restore area as specified in Section 105.14.

4. MEASUREMENT AND PAYMENT - Each

Includes straw, replacement, and disposal of filter bag and contained sediment as required.

DIVERSION DIKE SYSTEM

Provision Body:

DESCRIPTION - This work is furnishing, placing, maintaining, and removing a temporary diversion dike system as indicated and as directed.

MATERIAL -

- Precast Concrete Median Barrier - Section 714.
- Polyethylene, 6 Mil - AASHTO - M171.
- Fine Aggregate - Section 703.1.
- Bags - Polypropylene or Acrylic Material.

CONSTRUCTION - Maintain the dike system as required to construct the project. Relocate dike during construction operations as required. Upon notification, remove the dike, restore the dike area to its original condition, and suitably dispose of material removed.

The dike system indicated is not intended to address dewatering requirements because of different soil conditions. Be responsible for investigating the site and review borings for these requirements.

Pumping or other methods of dewatering are incidental to the Class 3 excavation contained on the Component Item Schedule or as a bid item.

Present any proposed alternate diversion dike system plan at the pre-construction conference for approval by the Department.

MEASUREMENT AND PAYMENT - Each

APPENDIX "D"



Checklists



CHECKLISTS

The Complete Plan Checklist is used to determine if an erosion and sediment control plan includes all required elements. This checklist is intended to serve as a tool to determine whether an erosion and sediment control plan addresses all eleven items required by Section 102.4(b)(5). It need not be included as part of the plan submittal.

The E&S Control Plan Technical Review Checklist is used to determine the technical adequacy of an erosion and sediment control plan. Information contained elsewhere in this manual provides additional guidance for preparing and reviewing the various Best Management Practices (BMPs) used in a plan. This checklist is to be used by the reviewing agency to ensure the erosion and sediment control plan meets the requirements of Chapter 102 and the standards of the Department's Erosion and Sediment Pollution Control Program Manual, No. 363-2134-008 (January 2000), as amended and updated. It should not be included as part of the plan submittal.

COMPLETE PLAN CHECKLIST

Project: S.R. 0295-003 Over Hay Run

- I. Existing topographic features of the project site.
 - A. The existing topographic features of the project site and the immediate surrounding area are shown on maps included in the drawings
 - B. A location map has been provided (8½" x 11" copy of a USGS map with the outline of the project area)

- II. The Types, depth, slope, locations and limitations of the soils
 - A. A soils map with the project area outlined has been provided
 - B. Physical characteristics of the soil types and their limitations are addressed in the narrative
 - C. Construction techniques or special considerations to address the soil(s) limitations are noted on the drawings.....

- III. Characteristics of the earth disturbance activity
 - A. Limits of the project are shown on the plan map(s)
 - B. Original and final contours are shown on the plan map(s).....
 - C. Past, present and proposed land uses are addressed in the narrative

- IV. The amount of runoff from the project area and its upstream watershed area
 - A. Drainage areas to hydraulic BMPs are shown on plan map(s) N/A
 - B. Calculations are provided which show anticipated peak flows for the design storms... N/A

- V. The location of waters of the Commonwealth which may receive runoff within or from the project site.
 - A. The location(s) of streams or other waterbodies which may receive site runoff are shown on the plan map(s).....
 - B. The Chapter 93 classification of streams or other waterbodies which may receive site runoff is addressed in the narrative.....

- VI. Locations and types of perimeter and on site BMPs
 - A. Plan map(s) show locations of proposed temporary BMPs to control runoff and provide sediment removal.....
 - B. Plan map(s) show locations of proposed permanent BMPs to control erosion
 - C. Construction details and specifications for all proposed BMPs are shown on the plan map(s).....
- VII. Sequence of BMPs installation & removal
 - A. A construction sequence has been provided on the plan map(s)
- VIII. Supporting calculations
 - A. Supporting calculations for all proposed BMPs are included in the narrative.....
- IX. Plan drawings
 - A. Plan drawings are complete and legible.....
- X. Maintenance Program
 - A. A maintenance program has been provided.....
- XI. Measures for the recycling or disposal of materials from the project site.
 - A. A program for the recycling or disposal of materials associated with or from the project site has been provided

E & S CONTROL PLAN TECHNICAL REVIEW CHECKLIST

Project: S.R. 0295-003 Over Hay Run NPDES/Project No.: ---

Project Location: Newberry Township, York County Date: January 2007

Check-off: c = Complies, d = Deficient, n/a = Not applicable
 Item Location: D = E&S Drawings, N = E&S Narrative, D&N = Drawings & Narrative

102.4(b)(3) "The Erosion and Sediment Control Plan shall be prepared by a person trained and experienced in erosion and sediment control methods and techniques, and shall be designed to minimize the potential for accelerated erosion and sedimentation".

Name: Michael S. Waleski, P.E.
 Company: Whitney, Bailey Cox & Magnani, LLC
 Address: 355 N. 21st Street, Suite 100, Camp Hill, PA 17011
 Phone No.: (717)730-6032
 Qualifications: BSCE University of Pittsburgh (1997), 9 Years Experience Bridge Engineer

102.4(b)(5)(i) "The existing topographic features of the project site and the immediate surrounding area."

<u> c </u>	Legible mapping	D
<u> c </u>	Existing contours	D
<u> c </u>	Existing improvements, i.e. roads, buildings, utilities , etc.	D
<u> c </u>	Existing streams, wetlands, receiving watercourses, etc.	D
<u> c </u>	Sufficient surrounding area	D
<u> c </u>	Location map, i.e. USGS	D or N

102.4(b)(5)(ii) "The types, depth, slope, locations and limitations of the soils"

<u> c </u>	Types, slopes, & locations of soil types	D
<u> c </u>	Soil type use limitations and resolutions	N
<u> n/a </u>	Hydric soils	N

102.4(b)(5)(iii) "The characteristics of the earth disturbance activity, including the past, present, and proposed land uses and the proposed alteration to the project site."

<u> c </u>	Proposed NPDES boundary and limits of construction	D
<u> c </u>	Proposed contours/grades	D
<u> c </u>	Proposed waterways & stormwater management facilities	D
<u> c </u>	Proposed improvements, i.e., roads, buildings, utilities, etc.	D
<u> c </u>	Complete mapping symbols legend and north arrow	D
<u> c </u>	Past, present and proposed land uses	N

102.4(b)(5)(iv) "The amount of runoff from the project area and its upstream watershed area."

<u> c </u>	Maximum during construction drainage areas	D
<u> n/a </u>	Offsite drainage area(s) on USGS quadrangle map	N
<u> n/a </u>	Peak flow calculations for all channels	N

102.4(b)(5)(v) "The location of waters of the Commonwealth which may receive runoff within or from the project site and their classification pursuant to Chapter 93 of this title."

<u> c </u>	Existing streams, wetlands, floodway, etc.	D
<u> c </u>	Receiving watercourses	D
<u> c </u>	Chapter 93 classification of streams or other waterbodies	N

102.4(b)(5)(vi) "A written depiction of the location and type of perimeter and on site BMPs used before, during, and after the earth disturbance activity."

102.4(b)(5)(vii) "A sequence of BMP installation and removal in relation to the scheduling of earth disturbance activities, prior to, during and after earth disturbance activities".

<u> c </u>	Complete and site specific sequence of BMPs installation	D
<u> c </u>	Activities planned to limit exposed areas	D&N
<u> c </u>	Removal of temporary BMPs	D&N

102.4(b)(5)(viii) "Supporting calculations"

102.4(b)(5)(ix) "Plan Drawings"

Channels

<u> n/a </u>	Locations <u> n/a </u> Contours and Grades <u> n/a </u> Complete details	D
<u> n/a </u>	Capacity & freeboard calculations	N
<u> n/a </u>	Protective lining calculations	N

Sediment Basins

<u> n/a </u>	Locations <u> n/a </u> Contours	D
<u> n/a </u>	Complete berm & outlet details <u> n/a </u> Cleanout information	D&N
<u> n/a </u>	Capacity info <u> n/a </u> Discharge calculations	N
<u> n/a </u>	Dewatering calculations	N
<u> n/a </u>	Discharge to waters of the Commonwealth or approved alternative	D
<u> n/a </u>	Structurally sound	D&N

Sediment Traps

<u> n/a </u>	Locations <u> n/a </u> Contours	D
<u> n/a </u>	Complete berm & outlet details <u> n/a </u> Cleanout information	D&N
<u> n/a </u>	Capacity information <u> n/a </u> Discharge calculations	N
<u> n/a </u>	Discharge to waters of the Commonwealth or approved alternative	D

Silt Fencing

<u> c </u>	Locations <u> c </u> Complete Details	D
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Outlet Protection						
<u> n/a </u>	Locations	<u> n/a </u>	Complete Details			D
<u> n/a </u>	Design Calculations					N

Other BMPs (specify)	<u>Sediment Filter Bag, Rock Filter, Temporary Sandbag Diversion Dam</u>					
<u> c </u>	Locations	<u> c </u>	Complete Details			D
<u> c </u>	Design Calculations					N

Temporary Stabilization

	Seed	Lime	Fertilizer	Mulch	Others	
Types	<u> c </u>	<u> n/a </u>	<u> c </u>	<u> c </u>	<u> n/a </u>	D
Rates	<u> c </u>	<u> n/a </u>	<u> c </u>	<u> c </u>	<u> n/a </u>	D

Permanent Stabilization

	Seed	Lime	Fertilizer	Mulch	Others	
Types	<u> c </u>	<u> n/a </u>	<u> c </u>	<u> c </u>	<u> n/a </u>	D
Rates	<u> c </u>	<u> n/a </u>	<u> c </u>	<u> c </u>	<u> n/a </u>	D

102.4(b)(5)(x) "A maintenance program which provides for inspection of BMPs on a weekly basis and after each measurable rainfall event, including the repair of the BMPs to ensure effective and efficient operation."

<u> c </u>	Inspection schedule		D
<u> c </u>	Maximum sediment storage elevation/level in BMPs		D
<u> c </u>	Time frames for completing specific maintenance & repairs for each type of BMP proposed.		D
<u> c </u>	Site stabilization repair parameters & directions		D
<u> c </u>	Disposal directions for sediment removed from BMPs		D

102.4(b)(5)(xi) "Procedures which ensure that the proper measures for the recycling or disposal of materials associated with or from the project site will be undertaken in accordance with Department regulations."

<u> c </u>	Project construction wastes are identified		N
<u> c </u>	Directions for recycling/disposal of construction wastes		D
<u> n/a </u>	Soil/rock disposal areas provided with BMPs		D&N