

EROSION CONTROL PLAN NARRATIVE

Plum Run Trail & Outdoor Heritage Center East Bradford Township, Chester County

February 2022



prepared by:



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EROSION AND SEDIMENT POLLUTION CONTROL PLAN

PROJECT NAME: PLUM RUN TRAIL & OUTDOOR HERITAGE CENTER

LOCATION: East Bradford Township, Chester County

OWNER: East Bradford Township
676 Copeland School Road
West Chester, PA 19380

TELEPHONE: (610) 436-5108 (ext. 108)
Rich Phifer

PERSON(S) RESPONSIBLE FOR CONSTRUCTION AND MAINTENANCE OF EARTHMOVING OPERATIONS AND EROSION AND SEDIMENT POLLUTION CONTROLS:

ADDRESS: East Bradford Township, and its selected contractor, will be responsible for construction and implementation of the erosion and sediment pollution control plan.

TELEPHONE: (610) 436-5108 (ext. 108)
Rich Phifer

EROSION AND SEDIMENTATION CONTROL PLAN PREPARER:

Joseph V. Civitella, Jr.
McTish, Kunkel & Associates
3500 Winchester Road, Suite 300
Allentown, PA 18104
Phone: 610.841.2700

EROSION AND SEDIMENT POLLUTION CONTROL PLAN

102.4(b)(3) RECORD OF TRAINING AND EXPERIENCE IN EROSION AND SEDIMENT CONTROL METHODS AND TECHNIQUES

NAME OF PLAN PREPARER: Joseph V. Civitella, Jr.

FORMAL EDUCATION: Northampton County Area Community College
Curriculum or program: Engineering
Dates of attendance: From: 1978 to 1980
Degree received: Associates

OTHER TRAINING:

Chapter 102 Update Training for the Regulated Community, November 2010

Erosion & Sediment Pollution Control Plan Designers Seminar
Pennsylvania Department of Environmental Protection, March 2005

Erosion & Sediment Pollution Control Plan Design Training
Pennsylvania Department of Environmental Protection, October 2000

Erosion & Sediment Pollution Control Plan Design Training
Pennsylvania Department of Environmental Protection, February 1998

EMPLOYMENT HISTORY:

Current Employer: McTish, Kunkel & Associates
610.841.2700

EROSION AND SEDIMENT POLLUTION CONTROL PLANS PREPARED:

- UGI – Gas Line Extension SR 611, Monroe County, Coolbaugh Twp., PAI024513015
- UGI – Gas Line Extension Airport to SR 314, Monroe County, Coolbaugh Twp. & Mount Pocono Borough, PAI024514003-1

LOCATION/DESCRIPTION:

The project consists of the construction of a universally accessible, off-road, multi-use trail (“Plum Run Trail”) that will connect the Strode's Mill Historic District to the Plum Run Preserve, adjacent neighborhoods, and the southern section of the West Chester University campus located on properties owned by East Bradford Township and West Chester University. The project area consists of three discontinuous areas along the Plum Run corridor within which project construction-related impacts may occur:

1. a western paved portion along Lenape Road between Birmingham and Tigie Roads, on which the historic Strode’s Barn is located
2. a central portion south of Tigie Road in which a gravel trail is proposed to tie into an existing paved trail near Tigie Road and extend to the embankment of the unnamed tributary to the Plum Run Creek,
3. an eastern paved portion along Tigie Road near its intersection with South New Street adjacent to the West Chester University athletic fields.

At present all three discontinuous areas consist of meadow and forest areas, with the most eastern portion of the trail being placed on lawn areas on the lands of West Chester University parallel to the existing athletic field along Tigie Road. Along with the trail construction, improvements will be made to the Strode’s barn for use as an outdoor heritage center. Along with the trail and Strode’s Barn improvements, the project will require grading, new pavement for a trail head parking lot, and construction of stormwater management facilities. There will be no need for sanitary or water service as part of this development. The proposed disturbed project area is 6.26 acres. The proposed project will result in a 0.79 acre increase in impervious area and 0.18 acres of meadow/forest area will be converted for use a gravel trail. Two proposed infiltration beds will be constructed to maintain peak rate and volume control. Water Quality BMPs include soil amendments, water quality filters, street sweeping, and the subsurface infiltration beds.

The site is located on the West Chester, PA USGS quadrangle map at latitude 39° 55’ 52” and longitude 75° 36’ 41”. A location map is included in the Appendix.

This project will require a new NPDES General Permit.

1. THE EXISTING TOPOGRAPHIC FEATURES OF THE PROJECT AND THE IMMEDIATE SURROUNDING AREA.

Existing topographic features of the project site and immediate surrounding area are shown on the plan drawings. The mapping is legible and includes a north arrow, covers a sufficient surrounding area, includes existing contours, existing improvements, existing streams, wetlands, and receiving watercourses. The map scale is 1"= 30' and is shown on the plans. A location map is provided on the plans (a copy of a USGS map; the project area is indicated).

2. THE TYPES, DEPTH, SLOPE, LOCATIONS AND LIMITATIONS OF THE SOILS.

The soils identified on the plans are as taken from the NRCS Website. Soil types and boundaries are provided on the Erosion and Sediment Pollution Control Plans. Soil use limitations were studied in

relation to the scope of this project. The re-vegetation strategy of the project was based on these soil conditions. The seed mixtures specified for permanent stabilization will propagate in these soils.

SOIL CLASSIFICATION AND CHARACTERISTICS				
Name	Soil Group	Hydric Soil or Component	Depth to Water (in)	Depth to Bedrock (in)
Co – Codorus Silt Loam 0-3% slopes	C	No	18-36	72-99
GdB – Gladstone Gravelly Loam 3-8% slopes	B	No	>80	60-80
GdC – Gladstone Gravelly Loam 8-15% slopes	B	No	>80	65-67
GgC – Glenelg Silt Loam 8-15% slopes	B	No	>80	>80
Ha – Hatboro Silt Loam	B	Yes	0-6	60-99
PaC – Parker Gravelly Loam 8-15% slopes	A	No	>80	60-118
PaD – Parker Gravelly Loam 15-25% slopes	A	No	>80	60-118
PaE – Parker Gravelly Loam 25-35% slopes	A	No	>80	60-118

SOILS RESOLUTIONS	
Cutbanks Cave	Utilize applicable OSHA standard regulations for excavation and pipe trenching operations. Embankment construction will utilize compaction techniques and stabilization to prevent erosion and slope failures
Corrosive to Concrete	Install proper coatings on surfaces exposed to soils
Depth to Seasonal High Water Table (Co, Ha)	Obtain fill material from other area of site, obtain fill material from off-site location, select appropriate seed mixture, provide drainage channels or underdrains, dewater using pump water filter bag

Droughty	To ensure moisture retention, apply mulch immediately to areas where vegetation is to be established
Easily Erodible	Immediate stabilization and install perimeter controls
Frost Action	Limit dates of earthmoving. Obtain fill material from other area of the site. Obtain fill material from an off-site location.
Hydric/Hydric Inclusions (Ha)	Delineate and protect wetlands
Low Strength/Landslide Prone	Precaution should be taken to prevent oversteepening and overloading of slopes, removal of lateral supports, and failure to prevent saturation of slopes. Obtain fill material from an off-site location.
Piping	Utilize soil additives and/or use collars to prevent piping
Poor Source of Topsoil	Obtain topsoil from off-site location Test site soils to determine appropriate soil amendments. Amend site soils to increase organic components and nutrients and improve topsoil structure. Select appropriate seed mixture.
Sinkholes	Mitigate sinkhole (see detail) Avoid impact to those areas.
Slow Percolation	Limit use of infiltration BMP's, fix existing sinkholes with known BMP's.
Wetness	Obtain fill material from other area of site, obtain fill material from off-site location, select appropriate seed mixture, provide drainage channels or underdrains, dewater using pump water filter bag

3. THE CHARACTERISTICS OF THE EARTH DISTURBANCE ACTIVITY, INCLUDING THE PAST, PRESENT AND PROPOSED LAND USES AND THE PROPOSED ALTERATION TO THE PROJECT SITE.

The total NPDES Permit area is equal to the limit of disturbance, 6.26 acres. The limits of construction activities are clearly delineated on the plans. There will be no earthmoving outside of the project limits. No offsite vegetated areas will be utilized for filtration. There are no facilities outside the project limits that will be utilized for erosion and sediment pollution control. It will be the responsibility of the

selected contractor to have an approved E&S plan for any and all proposed spoil or borrow areas outside the limits of this project. Existing and proposed contours are shown on the plans at one (1) foot intervals.

Existing waterways are shown on the plans. The site is located on a natural drainage divide, and currently sheet flows into either the Plum Run Creek or an unnamed tributary to the Plum Run Creek. The project will maximize protection of existing drainage features. The proposed drainage plan will maintain the existing drainage pattern and utilize existing drainage features. The infiltration beds are designed to retain and infiltrate up to the 2 year/24hour stormwater volume. Overflow from the infiltration beds will flow through amended soil and heavily vegetated areas prior to reaching either of the waterways. To protect the proposed stormwater facilities during construction, inlet protection will be used for the inlets. In addition, filter sock will be used as a perimeter control BMP to protect wetlands and offsite drainage features during construction. The proposed infiltration bed areas will be protected from heavy vehicular/equipment traffic and compaction during and after construction.

Proposed site improvements and E&S controls are shown on the plans.

The plans include complete mapping symbols, including a north arrow, and a legend. The legend depicts existing and proposed features relevant to the E&S plan.

The past and present land uses are meadow and forested lands just upslope of the Plum Run Creek. All land uses have been the same for over 60 years. Proposed Land use is recreation/trail use.

4. THE VOLUME AND RATE OF RUNOFF FROM THE PROJECT SITE AND ITS UPSTREAM WATERSHED AREA.

The drainage area to each BMP was determined and is in accordance with Chapter 102 rules and regulations.

5. THE LOCATION OF ALL SURFACE WATERS WHICH MAY RECEIVE RUNOFF WITHIN OR FROM THE PROJECT SITE AND THEIR CLASSIFICATION UNDER CHAPTER 93.

All site runoff will drain to Plum Run Creek or an unnamed tributary to Plum Run Creek within the Brandywine Creek Watershed. The existing and designated uses of the Plum Run Creek and the unnamed tributary to Plum Run Creek are classified in Pennsylvania Code Title 25, Chapter 93 as Warm Water Fishery (WWF) with Migratory Fishes (MF). No wetlands are located within the proposed project limits. However, wetlands were located outside the project limits on the subject tract; a wetlands delineation report is provided. The proposed project is located within the Act 167 Stormwater Management Plan for the Brandywine Creek.

To minimize the generation of increased stormwater runoff, infiltration beds and soil amendments are proposed to maintain stormwater rates and volume, and to improve stormwater quality in the post construction condition. During construction, inlet protection and filter socks will be used to minimize sediment laden stormwater entering the stormwater system and/or leaving the site.

6. A NARRATIVE DESCRIPTION OF THE LOCATION AND TYPE OF PERIMETER AND ON-SITE BMP'S USED BEFORE, DURING AND AFTER THE EARTH DISTURBANCE ACTIVITY.

The following temporary BMPs which may be utilized during construction of this project include compost filter sock, temporary seeding, rock construction entrance, concrete washout facilities, inlet protection, and if necessary, pumped water filter bag.

Permanent BMPs include permanent seeding and soil supplements, erosion control blanket, and mulching to provide permanent stabilization.

Standard worksheets or detailed drawings have been provided for all temporary and permanent BMPs incorporated into this plan. The locations of these facilities have been identified on the plan drawings. Construction specifications and installation procedures are located in the detail sheets of the plan drawings. Specifications for temporary and permanent vegetative surface stabilization are listed in the following tables.

TEMPORARY SEEDING SPECIFICATIONS		
Seed Type	Seeding Date	Seeding Rate Lbs. per 1000 SY
Formula E *	March 15 to October 15	10
Hay or Straw Mulch **	October 15 to March 1	1200

*This seed type shall not be used in areas needing erosion protection after October 15, since it will die with the first frosted and cease to protect.

**Hay or straw shall be used in areas needing erosion protection during the winter months as specified.

Topsoil stockpiles must be seeded immediately with Formula E. Any disturbed area on which activity has ceased stabilization is to occur immediately, during germinating periods, must be mulched at the recommended rates. Disturbed areas that are not at finished grade and which will be re-disturbed within one year may be stabilized in accordance with temporary seeding specifications. Disturbed areas which are either at finished grade or will not be re-disturbed within one year must be stabilized with permanent seeding.

Recommended permanent seeding mixes for this site are Formula B & Ernst Seed Low Growing Flower & Grass Mix for all areas of amended soils being returned to a meadow condition. Permanent seeding shall occur immediately after fine grading is completed. The schedule of seeding shall be as follows:

PERMANENT SEEDING SPECIFICATIONS		
Seed Type	Acceptable Seeding Dates	Seeding Rate Lbs. per 1000 SY
Formula B	March 15 to June 1 August 1 to October 15	42

Ernst Seed Low Growing Flower & Grass Mix	March 15 to June 1 August 1 to October 15	42
Hay or Straw Mulch **	October 15 to March 1	1200

Note: Apply soil supplements and mulch as indicated on the detail sheets. The cutoff date for hydroseeding is November 15th.

SOIL SUPPLEMENTS AND MULCHING RATES		
Limestone Lbs. per 1000 SY	Fertilizer Lbs. per 1000 SY	Mulching Straw Lbs. per 1000 SY
800	140	1200 or 3 tons per acre

7. A SEQUENCE OF BMP INSTALLATION AND REMOVAL IN RELATION TO THE SCHEDULING OF EARTH DISTURBANCE ACTIVITIES, PRIOR TO, DURING AND AFTER EARTH DISTURBANCE ACTIVITIES THAT ENSURE THE PROPER FUNCTIONING OF ALL BMPS.

Construction sequence
Pre-Construction

1. All applicable permits and approvals required for this project shall be secured prior to the start of construction. Copies of permits, plans and approvals shall be kept on-site at all times.
2. At least 7 days prior to starting any earth disturbance activities, including clearing and grubbing, Owner and/or the operator shall invite all contractors, the township, appropriate municipal officials, the E&S plan preparer, and County Conservation District to an on-site preconstruction meeting.
3. At least 3 days prior to starting any earth disturbance activities, or expanding into an area previously unmarked, the Pennsylvania One Call System Inc. shall be notified at 1-800-242-1776 for the location of existing underground utilities.
4. All earth disturbance activities shall proceed in accordance with the following sequence. Each step shall be completed before any following step is initiated. Clearing and grubbing shall be limited to those areas described.
5. Immediately upon discovering unforeseen circumstances posing the potential for accelerated erosion/sediment pollution, operator shall implement appropriate best management practices to eliminate potential for accelerated erosion/sediment pollution.
6. Before initiating any revision to the approved erosion and sediment control plan or revisions to other plans, which may affect the effectiveness of the approved erosion control plan, the operator must receive approval of the revisions from the county conservation district/PA DEP.
7. Immediately after earth disturbance activities cease, the operator shall stabilize any area disturbed by the activities. During non-germinating periods, mulch must be applied at the specified rates. Disturbed areas which are not at finished grade and which will be redisturbed within one year must be stabilized in accordance with the temporary vegetative stabilization specifications. Disturbed areas which are at

finished grade or which will not be redisturbed within one year must be stabilized in accordance with the permanent vegetative stabilization specifications.

8. All structures associated with the construction of sediment removal facilities must be on-site prior to construction.
9. This project is designed as a balanced site. However, if necessary, excess and/or unusable soils excavated on this project will be loaded into trucks and hauled off-site. The contractor is responsible for having an approved erosion and sedimentation control plan for all such waste sites. Non-designated waste/borrow areas must have an approved erosion and sedimentation control plan.
10. All limits of disturbance (LOD) must be clearly marked prior to disturbance activities. The use of survey stakes, posts and rope, or construction fence is an acceptable delineation technique.
11. The pndi search indicated the project site may have areas where the Broad-headed skinks are located. If so the contractor must follow the outline below:

The Broad-headed skinks are described as arboreal and semi-fossorial in habitat use. Key habitat features include large trees and snags with exfoliating bark or crevices; logs/log piles, rock piles, shed bark; stumps; root wads; ground burrows. Broad-headed skinks hibernate under stumps/roots below the frostline. In order to avoid disturbance to hibernating individuals, the project excavation and tree-clearing should be conducted between April 15 and October 15 (April 15 to June 30, preferred), during the active period of broad-headed skinks. Trail construction should avoid removal of large trees (>10" dbh), to minimize disturbance to nests. Where allowable, stumps/roots should be left intact. Potential habitat features (logs, debris, rocks, bark, etc.) should be removed from the trail site prior to excavation activities during the non-breeding season (October 15 to June 15) to avoid impacts to eggs/guarding females. In order to further minimize impacts to broad-headed skink, habitat features should be established in wooded areas, outside of the proposed trail ROW. These include log piles, rock piles, snags, coarse woody debris, etc. If any species of concern are found during project activities, the animal should be moved no farther than necessary out of the immediate project area (no farther than 0.25 miles away within appropriate habitat in the same watershed). Threatened and endangered species observed in the survey should be photographed and areas they were observed/captured should be mapped accordingly. The surveyor should also report other herpetofauna seen while conducting the surveys.

Construction

Throughout all phases and stages of construction, cessation of activity for four (4) days or longer requires temporary stabilization. All outfalls to infiltration beds shall be capped upon installation and remain capped until the site has reached final stabilization. To minimize the extent and duration of earth disturbance, the proposed earth disturbance activities shall be completed within 9 months from the start construction date. A separate construction sequence for the three discontinuous sections of the trail is provided. Work on these sections may be done concurrently.

STRODE SECTION

Stage 1

Install the rock construction entrances #1 and #2, compost filter socks #1 thru #8. Concrete washouts shall be provided near both construction entrances. Provide a pumped water filter bag on the site in the event water is encountered during excavation operations. Any/all sediment that may be tracked off the construction area onto either Lenape Road or Tigie Road pavement areas must be swept up immediately. During construction, street sweeping shall be provided during earth moving activities.

Stage 2

Begin clearing and grubbing of site. Upon completion, begin stripping/stockpiling topsoil within the area of infiltration BMP's. Immediately stabilize the stockpile area utilizing the temporary seeding schedule. Place compost filter sock on the downhill side of said stockpile. Construct infiltration beds. Place inlet protection over the nyoplast inlets provided within the infiltration beds. Upon completion of above, temporarily stabilize all non-paved areas by placing amended soils where required and planting annual ryegrass, utilizing the temporary seeding schedule, and placing erosion control mat on any areas having a slope of 3:1 or greater. Installation of amended soil is a critical stage and shall require a licensed professional or designee present on site during amended soil placement. Any excavated material that will not be reused as backfill shall be immediately hauled off the site to a site having an approved NPDES or ES plan as applicable.

Stage 3

Begin stripping/stockpiling topsoil for the new trail/parking lot pavement, Lenape Road shoulder improvements, heritage center retaining wall, and concrete area for the outdoor heritage center. Immediately stabilize the stockpile area utilizing the temporary seeding schedule. Place compost filter sock on the downhill side of said stockpiles. Provide inlet protection over existing inlet EX-1. Begin rough grading for area of new trail/parking lot pavement and Lenape Road shoulder improvements. Concurrently, construct the retaining wall in the heritage center area. Any excavated material that will not be reused as backfill shall be immediately hauled off the site to a site having either an approved NPDES or ES plan.

Stage 4

Upon completion of the rough grading, final grade and stabilize the paved areas by placement of the stone subbase. Upon completion of above temporarily stabilize all non-paved areas by placing amended soils where required and providing an annual ryegrass, utilizing the temporary seeding schedule placing erosion control mat on any areas having a slope of 3:1 or greater. Installation of amended soil is a critical stage and shall have a licensed professional or designee present on site during soil placement.

Stage 5

Concurrent with Stage 4, begin construction of bridge over Plum Run by excavating for and pouring concrete footings. Upon footings being completed, install the prefabricated bridge. At no time shall work on the bridge structure be done from the creek. All work shall be done from the embankment area. Upon completion of above, temporarily stabilize all non-paved areas by placing amended soils where required and providing an annual ryegrass, utilizing the temporary seeding schedule placing erosion control mat on any areas having a slope of 3:1 or greater. Installation of amended soil is a critical stage and shall have a licensed professional or designee present on site during soil placement.

Stage 6

Concurrent with Stages 4 and 5 above, begin installation of any/all necessary underground utilities. Once installed, begin pouring of concrete for the slabs for the heritage center and placing of final pavement layers for both the trail and roadway improvements. Upon completion of above temporarily stabilize all non-paved areas by placing amended soils where required and providing an annual ryegrass, utilizing the temporary seeding schedule placing erosion control mat on any areas having a slope of 3:1 or greater. Installation of amended soil is a critical stage and shall have a licensed professional or designee present on site during soil placement.

Stage 7

Concurrent with Stages 4, 5 and 6 above, construct ADA ramp at southeast corner of Birmingham Road and Lenape Road. Any excavated material which will not be reused as backfill shall be immediately hauled off the site to a site having either an approved NPDES or ES plan.

Stage 8

Once all the above is complete, install the periphery items such as trail/outdoor heritage center/traffic signage and pavement markings.

Stage 9

Upon completion of above final grade and stabilize all non-paved areas by placing amended soils where required and providing the permanent seeding schedule placing erosion control mat on any areas having a slope of 3:1 or greater.

GRAVEL SECTION

Stage 1

Install the rock construction entrance #3 and compost filter socks #9 thru #11. Provide on the site a pumped water filter bag in the event water is encountered on the site during excavation operations. Any/all sediment which may be tracked off the construction area onto Tigie Road pavement areas must be swept up immediately. During construction street sweeping shall be provided during earth moving activities.

Stage 2

Begin stripping/stockpiling topsoil for the new gravel trail. Immediately stabilize the stockpile area utilizing the temporary seeding schedule. Place compost filter sock on the downhill side of said stockpiles. Begin rough grading for area of new trail. Any excavated material which will not be reused as backfill shall be immediately hauled off the site to a site having either an approved NPDES or ES plan.

Stage 3

Upon completion of the rough grading, temporarily stabilize all non-paved areas the paved areas by placement of the stone subbase. Upon completion of above temporarily stabilize all non-paved areas by placing amended soils where required and providing an annual ryegrass, utilizing the temporary seeding schedule placing erosion control mat on any areas having a slope of 3:1 or greater. Installation of amended soil is a critical stage and shall have a licensed professional or designee present on site during soil placement.

Stage 4

Once all the above is complete, install gravel top layer for trail, install the periphery items such as trail signage and bollards. Provide a ford across the unnamed tributary to the Plum Run Creek.

Stage 5

Upon completion of above final grade and stabilize all non-paved areas by placing amended soils where required and providing the permanent seeding schedule placing erosion control mat on any areas having a slope of 3:1 or greater. Installation of amended soil is a critical stage and shall have a licensed professional or designee present on site during soil placement.

UNIVERSITY SECTION

Stage 1

Install the rock construction entrances #4 and #5, compost filter socks #9 thru #11 and inlet protection over existing inlets EX-2, EX-3, and EX-4. Provide on the site a pumped water filter bag in the event water is encountered on the site during excavation operations. Any/all sediment which may be tracked off the construction area onto Tigie Road pavement areas must be swept up immediately. During construction street sweeping shall be provided during earth moving activities.

Stage 2

Begin stripping/stockpiling topsoil for the new paved trail. Immediately stabilize the stockpile area utilizing the temporary seeding schedule. Place compost filter sock on the downhill side of said stockpiles. Immediately install storm piping/structures necessary to extend existing Tigie Road 36" cross pipe. Provide riprap at downstream end of pipe extension. Once piping is done, begin rough grading for area of new trail. Any excavated material which will not be reused as backfill shall be immediately hauled off the site to a site having either an approved NPDES or ES plan.

Stage 3

Upon completion of the rough grading, temporarily stabilize all non-paved areas the paved areas by placement of the stone subbase. Upon completion of above temporarily stabilize all non-paved areas by providing an annual ryegrass, utilizing the temporary seeding schedule placing erosion control mat on any areas having a slope of 3:1 or greater.

Stage 4

Once all the above is complete, install final pavement layer for trail, install the periphery items such as trail signage and bollards.

Stage 5

Upon completion of above final grade and stabilize all non-paved areas by providing the permanent seeding schedule placing erosion control mat on any areas having a slope of 3:1 or greater.

Stage 6

Once all the above is complete, remove the inlet protection from EX-3 and EX-4, Install Kraken filters within Grate Inlets for permanent BMPs.

FINAL SEQUENCING FOR ALL TRAIL SECTIONS

Stage A

Upon completion of all the above, once uniform 70% perennial vegetative cover is established, contact the Chester County Conservation District for a site inspection prior to conversion and removal of primary E&S BMP's and have a the licensed professional or designee do a final inspection of the critical stage PCSM permanent BMPs installed. Upon Chester County Conservation District approval, remove all temporary erosion and sediment control measures. Upon removal of all erosion control devices, immediately stabilize these areas utilizing the permanent seeding schedule. After all erosion control devices have been removed and the pavement areas have been swept clean, apply pavement markings.

Stage B

Upon permanent stabilization of earth disturbance activities, the permittee and/or co-permittee shall submit a Notice of Termination (NOT) to the Department or authorized conservation district.

Design information for all temporary and permanent BMP's is included in the narrative. Standard worksheets are included where applicable.

8. SUPPORTING CALCULATIONS AND MEASUREMENTS.

All supporting calculations and measurements have been performed according to the most current PADEP Best Management Practice (BMP) Manual, Erosion and Sediment Pollution Control Program Manual, PennDOT Drainage Manual. All standard worksheets and supplemental calculations have been included in the appendix.

9. PLAN DRAWINGS.

Plan drawings are provided with this narrative which indicate the location of all proposed temporary and permanent BMPs. Construction details and specifications for the proposed BMPs are included on the E&S detail sheets. The drawings include a complete legend.

10. A MAINTENANCE PROGRAM THAT PROVIDES FOR THE OPERATION AND MAINTENANCE OF BMPs AND THE INSPECTION ON A WEEKLY BASIS AND AFTER EACH STORMWATER EVENT, INCLUDING THE REPAIR OR REPLACEMENT OF BMPs TO ENSURE EFFECTIVE AND EFFICIENT OPERATION.

The program must provide the completion of a written report documenting each inspection and all BMP repair or replacement and maintenance activities.

The contractor is responsible for the installation and maintenance of all permanent and temporary erosion and sedimentation control facilities until final stabilization has been achieved. A maintenance program for E&S control facilities is provided below as well as on the detail sheets.

During the life of the contract, comply with all requirements outlined within the approved erosion and sediment pollution control plan (E&SPCP). Maintain, replace, reinstall and/or clean all BMPs called for in the E&SPCP.

Rock Construction Entrance:

The structure thickness will be constantly maintained to the specified dimensions by adding rock. A stockpile of rock will be maintained on the site or be readily accessible for this purpose at the end of each construction day. All sediment deposited on the roadways will be removed and returned to the construction site.

Compost Filter Sock:

Collected sediments must be removed and disposed of as directed when accumulation reaches one third the height of the sock. Repair or replace damaged areas as directed. Remove and replace sock with new material when clogged with sediment. At completion of project, if directed to leave filter sock in place, slit open sock to expose compost.

Rock Filter Outlet:

The rock filter outlet shall be used where any compost filter sock has been undermined or topped in areas of concentrated flows immediately. Sediment must be removed where accumulations reach 1/3 the above ground height of the filter outlet. The rock filter outlet should be inspected daily and following

each measurable rain event. The R-3 and No. 57 coarse aggregate must be maintained to prevent overtopping of the rock filter. Remove the accumulated sediment within the disturbance area or stockpile. Stabilize disturbed areas as per the stabilization specification.

Pumped Water Filter Bag:

Replace the bag when 50% of the sediment capacity has been filled and/or when there is a failure. The additional bags will be paid as each.

Concrete Washout Facility:

Remove sediments when the facility has reached 50% capacity. Replace plastic liners with each cleaning of the facility. Damaged or leaking washouts should be deactivated and repaired or replaced immediately.

Replanting and Overseeding:

If vegetation covers less than 40% of the soil surface, lime, fertilize and seed in accordance with current recommendations for new seedings. If vegetation covers more than 40% but less than 70% of the soil surface, lime, fertilize and overseed in accordance with current recommendations.

Mowing:

Mow all grasses, except wetland plants, at least twice each year. Mow grasses such as tall fescue in early summer after emergence of the heads on cool season grasses. Mow again in the early fall to prevent seeds of annual weeds from maturing. Mowing of legumes such as seicea lespedeza can be less frequent.

Should any measures contained within this plan prove incapable of adequately removing sediment from on-site flows prior to discharge, additional measures must be immediately implemented by the contractor. In this event, the contractor shall contact the County Conservation District.

Until the site is stabilized, all erosion and sedimentation controls must be maintained properly. Maintenance must include inspection of all erosion and sedimentation controls after each storm event and on a weekly basis. All preventative and remedial maintenance work, including clean out, replacement, regrading, re-seeding etc., must be performed immediately.

East Bradford Township, is responsible for the maintenance of the disturbed area until final stabilization is achieved.

11. 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.

The contractor shall remove from the site, recycle, or disposed 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 site.

12. IDENTIFICATION OF THE NATURAL OCCURING GEOLOGIC FORMATIONS OR SOIL CONDITIONS THAT MAY HAVE THE POTENTIAL TO CAUSE POLLUTION DURING EARTH DISTURBANCE ACTIVITIES AND INCLUDE BMPs TO AVOID OR MINIMIZE POTENTIAL POLLUTION AND ITS IMPACTS FROM SUCH FORMATIONS.

Site is located in the Glenarm Wissahickon formation which is described as a pelitic schist and gneiss with interlayers of quartzite. Color is highly variable as is the mineralogy. The site is located where depth to seasonal high-water table is prevalent. Precautions shall be taken to concentrate and pond runoff in locations where the soils support infiltration. Design of infiltration facilities shall meet the loading ratios specified by the Pennsylvania Department of Environmental Resources.

13. IDENTIFICATION OF THE POTENTIAL THERMAL IMPACTS TO SURFACE WATERS OF THIS COMMONWEALTH FROM THE EARTH DISTURBANCE ACTIVITY INCLUDING BMPs TO AVOID, MINIMIZE AND MITIGATE POTENTIAL POLLUTION FROM THERMAL IMPACTS.

The appropriate erosion and sediment control BMPs for have been specified. The project has been sequenced to reduce construction time and earth disturbances. To mitigate any potential for thermal pollution, where possible, stormwater will be directed to vegetated areas and/or infiltration beds to reduce thermal impacts. Other BMPs provided to control pollution are, water quality filters and street sweeping. Overall, this project will protect the Waters of the Commonwealth to the greatest degree practicable.

14. THE E&S PLAN SHALL BE PLANNED, DESIGNED AND IMPLEMENTED TO BE CONSISTANT WITH PCSM PLAN.

The proposed project has been designed to minimize the increase in impervious cover. The current rate and volume of runoff from the project site will be maintained in the post construction condition. Summary of stormwater runoff rate and volume are included in this report.

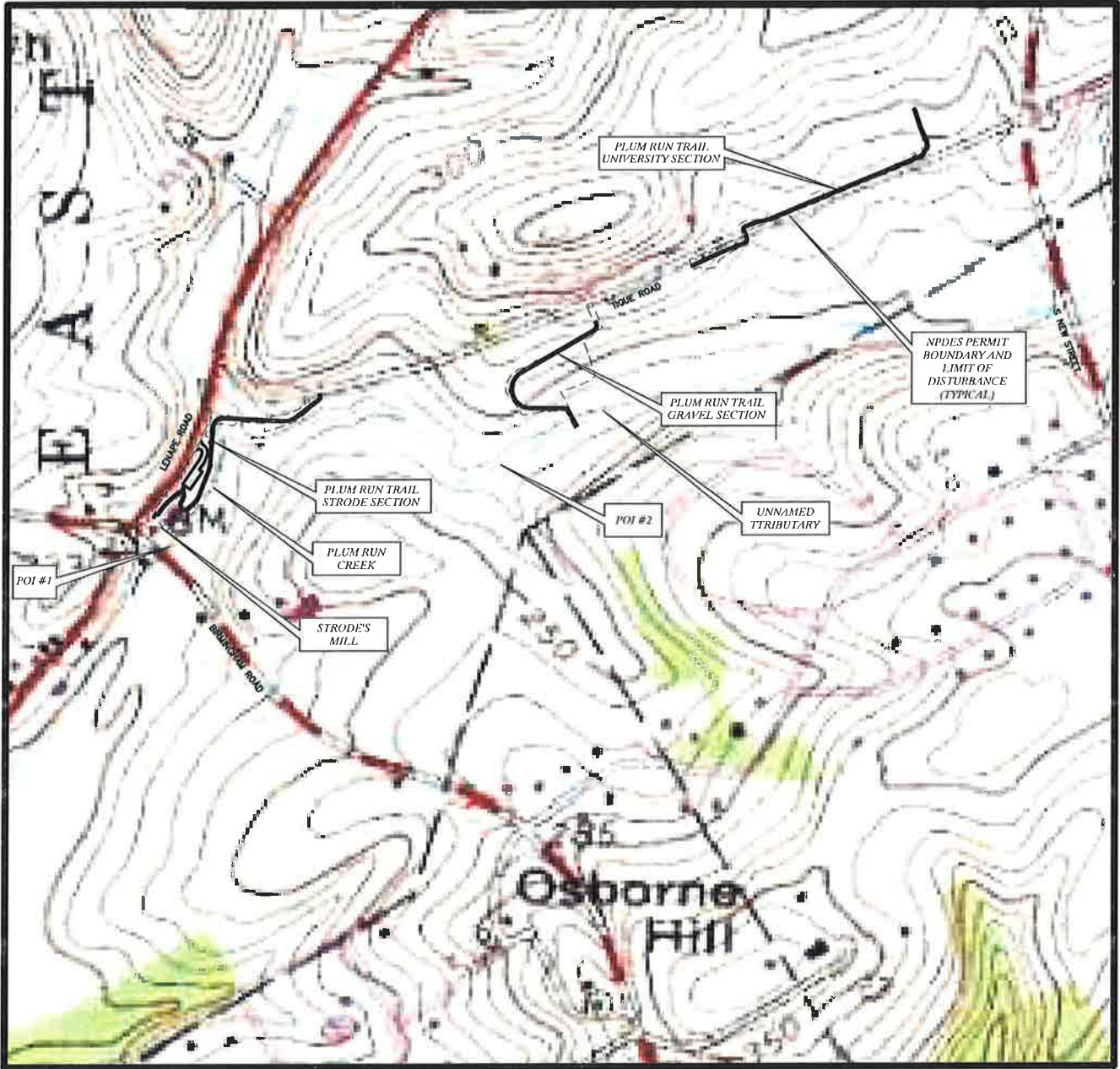
15. IDENTIFICATION OF EXISTING AND PROPOSED RIPARIAN FOREST BUFFERS.

Per Pennsylvania Code Chapter 102.14(a)(1) riparian buffer requirements do not apply. The site is not located in an exceptional value or high-quality watershed. Wetlands on property, but outside of NPDES boundary, are not hydraulically connected to a natural trout producing stream.

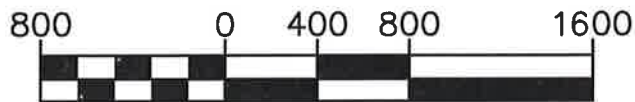
These plans and narrative have been prepared by McTish, Kunkel & Associates, Consulting Engineers, Allentown, PA. in accordance with the Pennsylvania Department of Environmental Protection Erosion and Sediment Pollution Control Program Manual, March 2012.

NOTE: A copy of this Narrative and the Erosion and Sedimentation Control Plan shall remain on site at all times.

APPENDIX



USGS QUADRANGLE: WEST CHESTER, PA
LOCATION/KEY PLAN



EXIST 36" SCLPP

Capacity of Circular pipe using Manning's Equation

Input Information

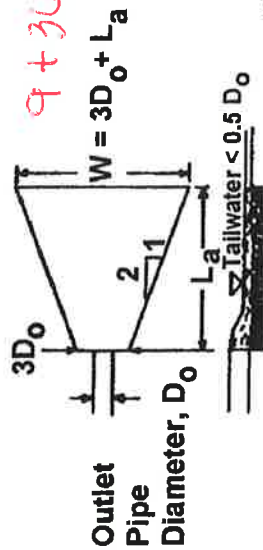
Pipe Diameter = 3 feet
Manning's n = .012
Slope = .0387 f t/ft

Solution Output

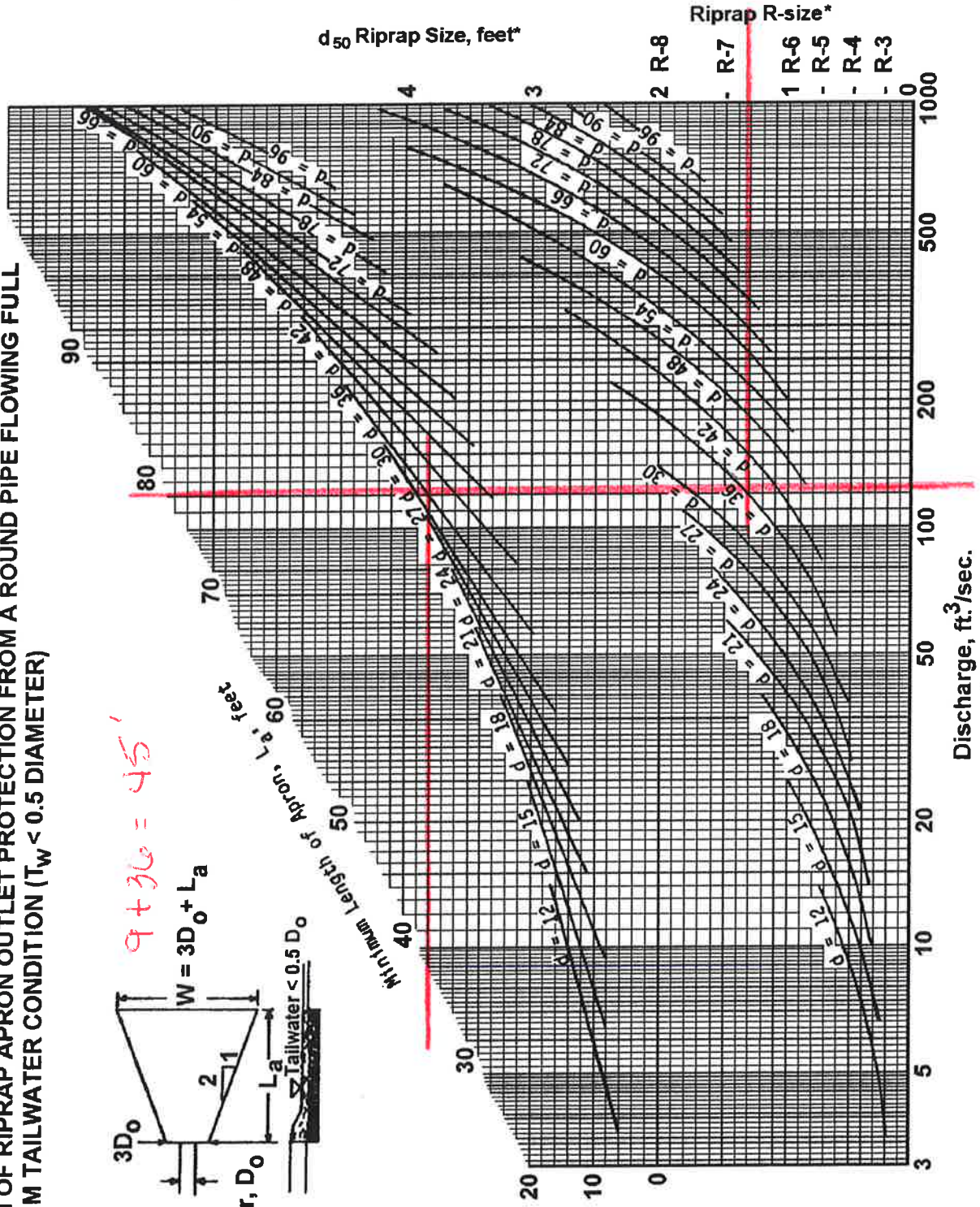
Pipe Full Capacity = 142.145 cfs
Velocity = 20.11 Ft/Sec
Wetted Area = 7.069 sq. feet
Wetted Perimeter = 9.425 feet
Hydraulic Radius = 0.750 feet

FIGURE 9.3
Riprap Apron Design, Minimum Tailwater Condition

**DESIGN OF RIPRAP APRON OUTLET PROTECTION FROM A ROUND PIPE FLOWING FULL
 MINIMUM TAILWATER CONDITION ($T_w < 0.5$ DIAMETER)**



Adapted from USDA - NRCS



NOTE: Do not extrapolate

Not to be used for Box Culverts

* For discharge velocities exceeding Maximum Allowable for Riprap indicated, increase d_{50} stone size and/or provide velocity reduction device.

Connection to EXIST 36" SLURP

*CFS = 147
 L_a = 36'*

Normal & Critical Depth of a Circular Section

Input Information

Flow = 142.145 CFS
Pipe Diameter = 3feet
Manning's n = .012
Slope = .0387 ft/ft

Solution Output

Uniform Depth = 2.452 Feet
Velocity = 22.99 Ft/Sec
Wetted Area = 6.184 sq. feet
Wetted Perimeter = 6.774 feet
Hydraulic Radius = 0.913 feet
Pipe Full Capacity = 142.528 cfs
Maximum Discharge (at .938*D) = 153.318 cfs
Critical Depth = 2.974 Feet

Project: Plum Run Trail - Strode Section

Project Location: East Bradford Township, Chester County

Sock 1

Filter Sock Location: Lenape Road

Filter Sock Size: 18

Slope Length Above Sock: 75

Segment 1 Slope: 5%

Segment 1 Slope Length: 75

Allowable Slope Length: 550

Difference = 475

Percentage of Slope Used = 14%

Unused Percentage of Allowable Slope Length = 86%

Segment 2 Slope: 0%

Segment 2 Slope Length: 0

Allowable Slope Length: #N/A

Adjusted Allowable Slope Length = #N/A

Difference Slope Length/Design Slope Length = #N/A

Project: Plum Run Trail - Strode Section

Project Location: East Bradford Township, Chester County

Sock 2

Filter Sock Location: Birmingham Road

Filter Sock Size: 18

Slope Length Above Sock: 87

Segment 1 Slope: 5%

Segment 1 Slope Length: 87

Allowable Slope Length: 700

Difference = 613

Percentage of Slope Used = 12%

Unused Percentage of Allowable Slope Length = 88%

Segment 2 Slope: 0%

Segment 2 Slope Length: 0

Allowable Slope Length: #N/A

Adjusted Allowable Slope Length = #N/A

Difference Slope Length/Design Slope Length = #N/A

Project: Plum Run Trail - Strode Section

Project Location: East Bradford Township, Chester County

Sock 3

Filter Sock Location: Work Limits - Above Plum Creek

Filter Sock Size: 18

Slope Length Above Sock: 252

Segment 1 Slope: 13%

Segment 1 Slope Length: 84

Allowable Slope Length: 240

Difference = 156

Percentage of Slope Used = 35%

Unused Percentage of Allowable Slope Length = 65%

Segment 2 Slope: 2%

Segment 2 Slope Length: 168

Allowable Slope Length: 1000

Adjusted Allowable Slope Length = 650

Difference Slope Length/Design Slope Length = 398

Project: Plum Run Trail - Strode Section

Project Location: East Bradford Township, Chester County

Sock 4

Filter Sock Location: West Bridge Abutment

Filter Sock Size: 18

Slope Length Above Sock: 85

Segment 1 Slope: 8%

Segment 1 Slope Length: 50

Allowable Slope Length: 400

Difference = 350

Percentage of Slope Used = 13%

Unused Percentage of Allowable Slope Length = 88%

Segment 2 Slope: 26%

Segment 2 Slope Length: ED

Allowable Slope Length: 110

Adjusted Allowable Slope Length = 96

Difference Slope Length/Design Slope Length = 11

Project: Plum Run Trail - Strode Section

Project Location: East Bradford Township, Chester County

Sock 5

Filter Sock Location: East Bridge Abutment

Filter Sock Size: 18

Slope Length Above Sock: 75

Segment 1 Slope: 3%

Segment 1 Slope Length: 35

Allowable Slope Length: 1000

Difference = 965

Percentage of Slope Used = 4%

Unused Percentage of Allowable Slope Length = 97%

Segment 2 Slope: 22%

Segment 2 Slope Length: 40

Allowable Slope Length: 128

Adjusted Allowable Slope Length = 124

Difference Slope Length/Design Slope Length = 49

Project: Plum Run Trail - Strode Section

Project Location: East Bradford Township, Chester County

Sock 6

Filter Sock Location: East- Above Unnamed Tributary

Filter Sock Size: 18

Slope Length Above Sock: 236

Segment 1 Slope: 11%

Segment 1 Slope Length: 90

Allowable Slope Length: 280

Difference = 190

Percentage of Slope Used = 32%

Unused Percentage of Allowable Slope Length = 68%

Segment 2 Slope: 2%

Segment 2 Slope Length: 146

Allowable Slope Length: 1000

Adjusted Allowable Slope Length = 679

Difference Slope Length/Design Slope Length = 443

Project: Plum Run Trail - Strode Section

Project Location: East Bradford Township, Chester County

Sock 7A

Filter Sock Location: Middle- Above Unnamed Tributary

Filter Sock Size: 18

Slope Length Above Sock: 266

Segment 1 Slope: 12%

Segment 1 Slope Length: 105

Allowable Slope Length: 280

Difference = 175

Percentage of Slope Used = 38%

Unused Percentage of Allowable Slope Length = 63%

Segment 2 Slope: 2%

Segment 2 Slope Length: 161

Allowable Slope Length: 1000

Adjusted Allowable Slope Length = 625

Difference Slope Length/Design Slope Length = 359

Project: Plum Run Trail - Strode Section

Project Location: East Bradford Township, Chester County

Sock 7

Filter Sock Location: Middle- Above Unnamed Tributary

Filter Sock Size: 18

Slope Length Above Sock: 189

Segment 1 Slope: 11%

Segment 1 Slope Length: 94

Allowable Slope Length: 300

Difference = 206

Percentage of Slope Used = 31%

Unused Percentage of Allowable Slope Length = 69%

Segment 2 Slope: 3%

Segment 2 Slope Length: 95

Allowable Slope Length: 1000

Adjusted Allowable Slope Length = 687

Difference Slope Length/Design Slope Length = 498

Project: Plum Run Trail - Strode Section

Project Location: East Bradford Township, Chester County

Sock 8

Filter Sock Location: Work Limits West- Above Unnamed Tributary

Filter Sock Size: 18

Slope Length Above Sock: 76

Segment 1 Slope: 7%

Segment 1 Slope Length: 76

Allowable Slope Length: 500

Difference = 424

Percentage of Slope Used = 15%

Unused Percentage of Allowable Slope Length = 85%

Segment 2 Slope: 0%

Segment 2 Slope Length: 0

Allowable Slope Length: #N/A

Adjusted Allowable Slope Length = #N/A

Difference Slope Length/Design Slope Length = #N/A

Project: Plum Run Trail - Gravel Section

Project Location: East Bradford Township, Chester County

Sock 9

Filter Sock Location: Downslope Trail

Filter Sock Size: 32

Slope Length Above Sock: 310

Segment 1 Slope: 7%

Segment 1 Slope Length: 137

Allowable Slope Length: 700

Difference = 563

Percentage of Slope Used = 20%

Unused Percentage of Allowable Slope Length = 80%

ED

Segment 2 Slope: 20%

Segment 2 Slope Length: 173

Allowable Slope Length: 400

Adjusted Allowable Slope Length = 322

Difference Slope Length/Design Slope Length = 12

Project: Plum Run Trail - Gravel Section

Project Location: East Bradford Township, Chester County

Sock 10

Filter Sock Location: Downslope Amended Soils Area

Filter Sock Size: 32

Slope Length Above Sock: 300

Segment 1 Slope: 7%

Segment 1 Slope Length: 147

Allowable Slope Length: 650

Difference = 503

Percentage of Slope Used = 23%

Unused Percentage of Allowable Slope Length = 77%

Segment 2 Slope: 20%

Segment 2 Slope Length: 153

Allowable Slope Length: 410

Adjusted Allowable Slope Length = 317

Difference Slope Length/Design Slope Length = 17

Project: Plum Run Trail - Gravel Section

Project Location: East Bradford Township, Chester County

Sock 11

Filter Sock Location: Downslope RCE #3

Filter Sock Size: 18

Slope Length Above Sock: 152

Segment 1 Slope: 14%

Segment 1 Slope Length: 152

Allowable Slope Length: 240

Difference = 88

Percentage of Slope Used = 63%

Unused Percentage of Allowable Slope Length = 37%

Segment 2 Slope: 0%

Segment 2 Slope Length: 0

Allowable Slope Length: #N/A

Adjusted Allowable Slope Length = #N/A

Difference Slope Length/Design Slope Length = #N/A

Project: Plum Run Trail - University Section

Project Location: East Bradford Township, Chester County

Sock 12

Filter Sock Location: West of Headwall

Filter Sock Size: 18

Slope Length Above Sock: 65

Segment 1 Slope: 21%

Segment 1 Slope Length: 39

Allowable Slope Length: 140

Difference = 101

Percentage of Slope Used = 28%

Unused Percentage of Allowable Slope Length = 72%

Segment 2 Slope: 15%

Segment 2 Slope Length: 26

Allowable Slope Length: 200

Adjusted Allowable Slope Length = 144

Difference Slope Length/Design Slope Length = 79

Project: Plum Run Trail - University Section

Project Location: East Bradford Township, Chester County

Sock 13

Filter Sock Location: East of Headwall

Filter Sock Size: 24

Slope Length Above Sock: 181

Segment 1 Slope: 7%

Segment 1 Slope Length: 100

Allowable Slope Length: 550

Difference = 450

Percentage of Slope Used = 18%

Unused Percentage of Allowable Slope Length = 82%

Segment 2 Slope: 20%

Segment 2 Slope Length: 81

Allowable Slope Length: 273

Adjusted Allowable Slope Length = 223

Difference Slope Length/Design Slope Length = 42

Project: Plum Run Trail - University Section

Project Location: East Bradford Township, Chester County

Sock 14

Filter Sock Location: West of RCE #5

Filter Sock Size: 18

Slope Length Above Sock: 50

Segment 1 Slope: 19%

Segment 1 Slope Length: 50

Allowable Slope Length: 152

Difference = 102

Percentage of Slope Used = 33%

Unused Percentage of Allowable Slope Length = 67%

Segment 2 Slope: 0%

Segment 2 Slope Length: 0

Allowable Slope Length: #N/A

Adjusted Allowable Slope Length = #N/A

Difference Slope Length/Design Slope Length = #N/A

Project: Plum Run Trail - University Section

Project Location: East Bradford Township, Chester County

Sock 15

Filter Sock Location: East of RCE #5

Filter Sock Size: 18

Slope Length Above Sock: 55

Segment 1 Slope: 18%

Segment 1 Slope Length: 55

Allowable Slope Length: 164

Difference = 109

Percentage of Slope Used = 34%

Unused Percentage of Allowable Slope Length = 66%

Segment 2 Slope: 0%

Segment 2 Slope Length: 0

Allowable Slope Length: #N/A

Adjusted Allowable Slope Length = #N/A

Difference Slope Length/Design Slope Length = #N/A

Project: Plum Run Trail - University Section

Project Location: East Bradford Township, Chester County

Sock 16

Filter Sock Location: East of RCE #5 - Along Tigue Road

Filter Sock Size: 32

Slope Length Above Sock: 155

Segment 1 Slope: 2%

Segment 1 Slope Length: 106

Allowable Slope Length: 1650

Difference = 1544

Percentage of Slope Used = 6%

Unused Percentage of Allowable Slope Length = 94%

Segment 2 Slope: 34%

Segment 2 Slope Length: 49

Allowable Slope Length: 170

Adjusted Allowable Slope Length = 159

Difference Slope Length/Design Slope Length = 4

Project: Plum Run Trail - University Section

Project Location: East Bradford Township, Chester County

Sock 17

Filter Sock Location: East of Athletic Field

Filter Sock Size: 18

Slope Length Above Sock: 340

Segment 1 Slope: 2%

Segment 1 Slope Length: 340

Allowable Slope Length: 1000

Difference = 660

Percentage of Slope Used = 34%

Unused Percentage of Allowable Slope Length = 66%

Segment 2 Slope: 0%

Segment 2 Slope Length: 0

Allowable Slope Length: #N/A

Adjusted Allowable Slope Length = #N/A

Difference Slope Length/Design Slope Length = #N/A