

Module 14: Streams/Wetlands

[Chapter 105/§77.504/§77.523]

Note: The United States Army Corp of Engineers (Corps) authorizes a Pennsylvania State Programmatic General Permit – 4 (PASPGP-4) when there will be a discharge of dredged or fill materials, or the placement of both temporary and/or permanent structures, which individually or cumulatively result in impacts to 1.0 acre or less of waters including wetlands. Projects will be sent to the Corps as a Category III activity for review. The Commonwealth has issued 401 Water Quality Certification for projects eligible under PASPGP-4.

If there will be a discharge of dredged or fill materials, or the placement of both temporary and/or permanent structures, which individually or cumulatively result in impacts to more than 1.0 acre of waters including wetlands, or such activities are otherwise ineligible for a PASPGP-4, the Corps may require an individual permit in accordance with Section 404 of the Clean Water Act and separate 401 Water Quality Certification.

Stream/Wetland encroachments may also require authorization from the US Army Corps of Engineers (Corps) under Section 404 of the Clean Water Act. If this project requires a federal permit, you may be eligible for either PASPGP-4 authorization or you must file a separate application with the Corps. If you require a permit and are not eligible under the PASPGP-4 you must request a Section 401 Water Quality Certification from the Department using module 14A "Request for Federal Clean Water Act (CWA) Section 401 Certification for Mining Activities."

Does this project require a permit from the Corps? Yes No

If no, explain why not

Corps authorization was already issued for the original Neiswonger Construction, Inc. surface mine activity permit SMP #63100401. This new encompassing permit contains no revisions, additions or deletions to what was approved under the SMP #63100401 permit. As such additional Corps permits/authorizations should not be required.

14.1 Mining Activities Within 100 Feet of a Stream/Stream Relocation/Channel Change

If the mining activities are proposed within 100 feet of an intermittent or perennial stream, including haul road crossings, or the relocation or channel change of an intermittent or perennial stream provide the following information: (**Note:** Variance request for these and the expansion of pits must be included in the proof of publication. A separate Module 14.1 should generally be completed for each proposed encroachment.)

- a) Name and location of the stream; and location, length, and acreage disturbed by the proposed activities (Identify the location of the proposed activities on Exhibits 9 and 18);

In the existing Maggie Lynn surface mine permit, SMP #63100401, and the modifications that have been made to it, Neiswonger Construction, Inc. was granted variances to conduct surface mining activities within 100 feet of streams. These variances are proposed to carry over to this new permit:

- Tenmile Creek beginning approximately 2,360 feet upstream from the Pump Station Road Bridge on the east side of the stream and extending upstream approximately 1,660 feet on properties owned by John Kosky Contracting, Inc. and by Clyde Holdings Inc. Please see Exhibit 14.1.A.
- Unnamed tributary D to Tenmile Creek located in Deemston Borough. The encroachment is located approximately 540 feet due west Of Morey Road. The encroachment is approximately 150' long. The activity was placement of fill to allow construction of a haul road including a stream crossing. Approximately 0.8 acres of the 22-acre watershed was affected. Please see Exhibit 14.1.B.
- Unnamed tributary E South Branch to Tenmile Creek located in Deemston Borough. The encroachment begins approximately 700 upstream from its confluence with Unnamed Tributary E and extends upstream approximately 370 feet. The activity is construction and maintenance of a haul road. Approximately 1.6 acres of the 22-acre watershed was affected. Please see Exhibit 14.1.C.

- Unnamed tributary E to Tenmile Creek in Deemston Borough. The encroachment is located approximately 1,860 upstream from its confluence with Tenmile Creek. The activity was placement of fill to allow construction of a haul road including a stream crossing. Approximately 0.7 acres of the 78-acre watershed will be affected. Please see Exhibit 14.1.D.
- Unnamed tributary E to Tenmile Creek below the 48" culvert in Deemston Borough. The encroachment begins approximately 1,400 feet upstream from the stream's confluence with Tenmile Creek and extends upstream approximately 400 feet. The activity was the relocation / reconstruction of the stream. The entire reconstructed channel is approximately 1,820 feet long, approximately 400 feet of which was permitted under SMP #63100101 and the remainder under SMP #63813210. The affected acreage was 1.1 acres of the 93.7 acres at this point in the stream. Please see Exhibits 14.1.E.1., 14.1.E.2. & 14.1.E.3.

b) A narrative giving a description and the purpose and justification of the proposed activities;

- The encroachment on Tenmile Creek will allow for the removal of an old quarry highwall, the establishment of E&S controls (CD #1 and the installation of super filter fence, as needed), and the removal of a portion of the cropline of the Benwood Limestone.
- The proposed activity on Unnamed tributary D to Tenmile Creek is a stream crossing consisting of a 36" culvert for the haul road. The installation of the haul road and culvert are necessary to gain access to the mining area and allow for the transport of stone to market via Morey Road.
- The proposed activity on Unnamed tributary E South Branch to Tenmile Creek is placement of fill to allow construction of a haul road. The construction of the haul road is necessary to gain access to Morey Road for ingress to and egress from the site.
- The proposed activity on Unnamed tributary E to Tenmile Creek is a stream crossing consisting of a 48" culvert for the haul road. The installation of the haul road and culvert are necessary to gain access to the mining area and allow for the transport of stone to market via Morey Road.
- This variance on Unnamed tributary E to Tenmile Creek below the 48" culvert will allow the placement of fill to construct a haul road and reconstruction of a non-erosive stream channel. Previous work carried out on gas lines in this area have impounded water from parts of the stream, obliterating parts of the original channel.

c) A description of the character of the stream bed and banks, and a profile of the stream for a reasonable distance above and below the proposed site showing bed slopes, normal and flood water surfaces and a description of the riparian vegetation including a characterization of the resident aquatic community, a description of the riparian vegetation and an assessment of the probable hydrologic consequences of the proposed activities on the water quality and quantity and the resident aquatic community. Provide the name(s), address(es) and telephone number(s) of the individual(s) responsible for the collection and analysis of this data and provide a description of the methodologies used to collect and analyze the data;

- Tenmile Creek watershed is greater than 10 square miles in size at this point. The mining activities will not result in any stream enclosures or channel constrictions which would affect the hydraulic capacity of the stream or the floodway. The bed and banks are forested. The primary species are yellow oak, redbud, red maple, sycamore and black maple. See attached Cross Sections.
- The intermittent stream Unnamed tributary D to Tenmile Creek is incised in a steep ravine.

- Unnamed tributary E South Branch to Tenmile Creek originates as a discharge from a punch mine. It is wooded in this area. The primary species are ferns, grasses, and red maple, white oak and black locust.
 - Unnamed tributary E to Tenmile Creek originates as a discharge from a punch mine and an old sediment pond. It is wooded in that area. The primary species are ferns, grasses, and red maple, white oak and black locust.
 - Unnamed tributary E to Tenmile Creek below the 48" culvert originates as a discharge from a punch mine and an old sedimentation pond. The stream banks are wooded in the vicinity of the punch mine with red maple, white oak, and black locust. The understory is predominately ferns and grasses. The watershed to the old sedimentation pond is generally open fields with various field grasses as the dominant species. The stream below the wetland to the Equitrans gas line can best be described as ephemeral.
- d) A stream profile for the existing and proposed channel for a reasonable distance upstream, downstream and within the proposed change, showing bed slopes, pool-riffle ratios, normal and flood water surfaces, and existing obstructions;
- Stream cross sections that show the 100-year floodplain are attached.
- e) A hydrologic and hydraulic analysis which shall include:
1. data on size, shape and characteristics of the watershed;
 2. the size and frequency of the design storm;
 3. the hydraulic capacity of any structures or replacement channel;
 4. the hydraulic capacity of the channel upstream and downstream of the structure or the relocation/channel change;
- Tenmile Creek watershed is greater than 10 square miles in size at this point. The mining activities will not result in any stream enclosures or channel constrictions which would affect the hydraulic capacity of the stream or the floodway.
 - Refer to Module 12 for culvert capacity calculations for Unnamed tributary D to Tenmile Creek.
 - See attachment for this information on unnamed tributary E South Branch to Tenmile Creek.
 - Unnamed tributary E to Tenmile Creek has previously been cut off by construction of a gas line. The stream is impounded and is currently infiltrating in to the subsurface. Therefore, it has no hydraulic capacity.
 - Previous work carried out on gas lines in the area of Unnamed tributary E to Tenmile Creek below the 48" culvert has impounded water from parts of the stream and obliterated parts of the original channel. The stream is infiltrating into the subsurface where it is impounded except during extreme storm events.
 - Mapping of the stream cross sections now include the 100-year floodplain as it was obtained from panel 0545E from the flood insurance rate maps for Washington County.

f) Where a bridge, culvert or other water obstruction is proposed, provide the following information:

(Note: General Permit (BMR-GP-102) is available for construction of access roads.)

- 1) Plans and details showing the location, type, size, and height of the structure;
 - Tenmile Creek - N/A
 - Unnamed tributary D to Tenmile Creek - See Attachment Module 12.
 - unnamed tributary E South Branch to Tenmile Creek - N/A
 - Unnamed tributary E to Tenmile Creek - See attachment
 - Unnamed tributary E to Tenmile Creek below the 48" culvert - N/A
- 2) A narrative description of the construction methods and sequence including water handling during construction, and erosion and sedimentation controls;
 - The culvert for unnamed tributary D to Tenmile Creek has already been constructed. The fill has been placed.
 - The culvert for unnamed tributary E to Tenmile Creek has already been constructed. The fill has been placed.
- 3) Indicate if the structure will be temporary or permanent (include plans for removal of temporary structures).
 - The structure in unnamed tributary D to Tenmile Creek will be permanent.
 - The structure in unnamed tributary E to Tenmile Creek will be permanent.

g) For a Channel Change or Stream Relocation:

A detailed plan and cross-sections of the existing and proposed channel upstream, downstream and within the proposed channel change showing the limits and configuration of the proposed activities, dimensions, channel linings, and normal and flood water surfaces;

Tributary E reconstruction / relocation was completed under existing permits #63813210 and #63100401 and is shown on the enclosed drawings.

A description of the construction methods and sequence including: water handling during construction, erosion and sedimentation controls, and measures to be taken to prevent adverse impacts to water quality and quantity, water users and the aquatic communities.

Unnamed Tributary 'E' is an intermittent stream. All work within the stream channel was carried out during a time of no flow, when no storm events were predicted. Therefore, no rerouting of stream flow was planned or necessary. The channel relocation was constructed on the adjacent Hawkins Refuse Site, SMP 63813210.

The channel change will reconnect Unnamed Tributary "E" with Tenmile Creek in a stable channel.

h) A characterization of the existing water quality and quantity of the stream including downstream water uses, and 25 Pa Code Chapter 93 Protected Water Use Classification.

Unnamed tributary E to Tenmile Creek below the 48" culvert is classified as TSF. Monitoring points 14, 18 and 23 are representative of unnamed Tributary 'E'. Except for recreational uses there are no downstream water uses for unnamed Tributary 'E' or Tenmile Creek.

14.2 Wetland Related Information

- a) Provide the name(s), address(es), telephone number(s) and qualifications of the person(s) who made the determination if wetlands exist within the proposed permit area.

Original determination was made by:
 Amanda J. Deal
 336 Bloomfield Street, Suite 201, Johnstown, PA 15904
 B.S. Environmental Science, Alderson Broaddus College, Philippi, WV, 2003
 M.S. Applied Ecology & Conservation Biology, Frostburg State University, 2006

- b) Show the location of wetlands on Exhibits 6.2, 9 and 18.
- c) What is the total wetland acreage (which will be affected) for the proposed permit area?

0.25 _____ acres.

- d) Provide responses to the following for each wetland which will be affected by the proposed mining activities:

Exceptional Value Wetland Characteristics

1) Does the wetland serve as habitat for flora and fauna listed as "threatened" or "endangered" under the Endangered Species Act of 1973, Wild Resource Conservation Act, Fish and Boat Code, or Game and Wildlife Code? yes no

2) Is the wetland hydrologically connected to or located within 1/2 mile of the wetlands identified in d)1) and does it maintain the habitat of the "threatened" or "endangered" species within the wetlands identified in d)1) above)? yes no

NOTE: If this wetland is located more than 1000 feet from the permit area, show its location (and the location of the wetland that is hydrologically connected to or located within 1/2 mile of) on the Exhibit 6.1 Map.

3) Is the wetland located in or along the floodplain of a wild trout stream (as designated by the Pennsylvania Fish and Boat Commission), or the floodplain of a tributary to a wild trout stream? yes no

4) Is the wetland located in or along the floodplain of a stream listed as exceptional value (under 25 Pa Code Chapter 93) or the floodplain of a tributary to an exceptional value stream? yes no

5) Is the wetland within the corridor of a waterway which has been designated as a wild or scenic river in accordance with the Wild and Scenic Rivers Act of 1968 or the PA Scenic Rivers Act? yes no

6) Is the wetland part of, or located along, an existing public or private drinking water supply and does it maintain the quality or quantity of the drinking water supply? yes no

7) Is the wetland located in areas designated by the Department as "natural" or "wild" areas within state forest or park lands? yes no

8) Is the wetland located in areas designated as Federal wilderness areas under the Wilderness Act or the Federal Eastern Wilderness Act of 1975? yes no

9) Is the wetland located in areas designated as National natural landmarks by the Secretary of the Interior under the Historic Sites Act of 1935? yes no

NOTE: If a "yes" response is indicated for any question in d)1) through d)9), the wetlands would be "exceptional value" (as defined in 25 Pa Code Section 105.17) and a demonstration must be made that the requirements of subsection (a) of 25 Pa Code Section 105.18(a) have been met.

Wetland Functions

- 10) Does the wetland serve natural biological functions, including food chain production; general habitat; and nesting, spawning, or resting sites for aquatic or land species? yes no
 - 11) Does the wetland provide areas for study of the environment, or as sanctuaries or refuges? yes no
 - 12) Does the wetland aid in, or maintain natural drainage characteristics, natural water filtration processes, current (flow) patterns or other environmental characteristics? yes no
 - 13) Does the wetland serve as storage areas for flood and storm waters, or does it shield other areas from erosion or storm damage? yes no
 - 14) Does the wetland provide a groundwater recharge area that maintains minimum baseflows? yes no
 - 15) Does the wetland serve as a prime natural recharge area where surface water and groundwater are directly connected? yes no
 - 16) Does the wetland aid in the prevention of pollution? yes no
 - 17) Is the wetland used for, or does it provide the opportunity to be used for recreation? yes no
- e) If a "yes" response is indicated for the question in d)1) or d)2), identify how the determination was made and indicate any contacts with state or federal agency personnel.
- Not Applicable

14.3 Wetland Impact Analysis/Assessment

- a) Describe the alternatives to the proposed mining activities that have been considered to avoid or minimize impacts on wetlands. An alternative analysis should include alternatives to the proposed mining activities, including alternative locations, routings or designs to avoid adverse impacts on the wetlands (e.g. relocating spoil/topsoil storage areas, rerouting haul roads).

The wetland has already been disturbed therefore alternatives are not available.
- b) Discuss whether any of the alternatives are practical to achieve the basic purposes of the project taking into account availability, cost, technology and logistics of the other possible project sites which would not affect the wetlands.

The wetland has already been disturbed therefore alternatives are not available.
- c) For any wetlands within the proposed permit area, provide the following:
 - 1) Identify and delineate the wetland and the areal extent of the impact (wetlands must be identified and delineated in accordance with 25 Pa Code Section 105.451 Identification and delineation of wetlands – statement of policy).

See Exhibit 9.
 - 2) Submit a cross-sectional view showing the wetland and the proposed mining area.

Refer to attachment.

3) Explain how the proposed mining activities will directly affect the wetlands.

aa) If the proposed mining activities will affect less than 1.0 acre of wetland and the wetland is not an exceptional value wetland (in accordance with 25 Pa Code Section 105.17), provide a description of the wetland functions which will be impacted by the proposed mining activities. **Note:** If a "yes" response is indicated for any question in Module 14.2 d)1) through d)9), the wetlands would be exceptional value (as defined in Section 105.17).

The wetland was damaged by the initial haul road construction prior to Neiswonger Construction Inc.'s acquisition of the current permit on the Maggie Lynn site. The construction of the haul road resulted in the toe of the fill encroaching on the edge of the wetland.

bb) If the proposed mining activities will affect 1.0 or more acres of wetlands or may affect an exceptional value wetland, provide a detailed assessment of the wetland functions identified in Module 14.2 d)10) through d)17).

Not Applicable

d) If any wetlands within the proposed permit or adjacent area will be indirectly affected (e.g. altering the wetland hydrology), provide the following:

1) Identify and delineate the wetland and provide an estimate of the total wetland acreage affected (wetlands must be identified and delineated in accordance with 25 Pa Code Section 105.451 Identification and Delineation of Wetlands – statement of policy).

Not Applicable

2) A description of how the proposed mining activities will indirectly affect the wetlands.

Not Applicable

e) Will the cumulative impact of the proposed and anticipated mining activities result in a major impairment of the wetland resource in the general area? yes no

Provide an explanation of the determination and identify any contacts with state or federal agencies involved in making the determination.

14.4 Wetland Mitigation/Replacement

Note: If a total of one-half (.5) acres or less of wetlands will be affected, participation in Pennsylvania's Wetlands Replacement Project may be authorized by the Department in lieu of onsite replacement of the wetlands.

a) If wetland mitigation measures or wetland replacement are proposed, address the following:

1) Identify the wetlands where mitigation measures will be employed.

The hydrology of the wetland is produced by the impoundment of Unnamed Tributary "E" which occurred during the construction of the gas line. The sediment loading produced from the road construction damaged the in-place vegetation. Vegetation has re-established itself in portions of the wetland.

Since the wetland is partially revegetated it is felt that completely regrading and then replanting the site will do more harm than good. We are proposing that limited excavation be done within the wetland area where there is little or no growth. This excavation will help maintain the hydrology of the wetland and allow for collection and deposition of sediment, improving the downstream water quality in Unnamed Tributary "E" and Tenmile Creek. The exposed soil that is not covered with vegetation will be planted with the attached seed mixture.

2) Identify the wetlands that will be replaced and the location of the replacement wetland site. Provide the number of acres for each wetland to be replaced and the acreage of the replacement wetland.

The wetland will be replaced on-site, the acreage involved is 0.25 acres.

3) Provide a plan for mitigation/replacement following the guidelines in the Department's technical guidance titled "Design Criteria - Wetlands Replacement Monitoring" document 363-0300-001. This guidance is available from the Division of Waterways, Wetlands and Erosion Control, Post Office Box 8854, Harrisburg, Pennsylvania 17105-8554 or through the Department's website.

The wetland will be replaced in its original location. As the disturbance to the wetlands has ceased the wetland has partially "healed". A berm will be constructed to maintain a minimum water level in the wetland area. The unvegetated portion of the wetland will be seeded with the attached seed mix to re-establish cover throughout the wetland.

Show the location of replacement wetland sites on the Operations Map (Exhibit 9) and the Land Use and Reclamation Map (Exhibit 18).

Note: At a minimum, wetland replacement must be at a 1:1 ratio (replacement acres: affected acres). The Department may require the ratio to exceed 1:1 based on the functions and values of the wetlands to be affected. Wetland replacement sites will generally not be approved unless the site is located within the same general area as the existing wetland to be replaced.

14.5 United States Army Corp of Engineers Permits

- a) If the United States Army Corp of Engineers (Corps) requires a Pennsylvania State Programmatic General Permit – 4 (PASPGP-4) for your proposed activity:
Completed and attach the “PASPGP-4 Cumulative Impacts Project Screening Form (3150-PM-BWEW0050)” and supporting documents listed below.
- 1) the PASPGP-4 Cumulative Impact Project Screening Form (3150-PM-BWEW0050);
 - 2) Exhibits (pdf format):
 - a) U.S.G.S. Map 6.1 (site location map),
 - b) Environmental Resources Map 6.2,
 - c) Operations Map 9,
 - d) Land Use and Reclamation Map 18, and
 - e) a CD or DVD with any plans that are larger than 8 ½ by 11 inches.
 - 3) Module 1: Large Noncoal (Industrial Minerals) Mine Permit Application
 - 4) Module 14 and any detail drawings for stream / wetland encroachment activities (including Form 14A, Request for Federal Clean Water Act (CWA) Section 401 Certification For Mining / Coal Refuse Disposal Activities).
 - 5) the Endangered Species Act /Pennsylvania Natural Diversity Inventory receipt,
 - 6) the Pennsylvania Historical and Museum Commission correspondence (Section 106 coordination)

FORM 14A - Request for Federal Clean Water Act (CWA) Section 401 Certification For Mining / Coal Refuse Disposal Activities

General requirements: A mining or coal refuse disposal activity that involves encroachment into a stream or wetland requires a DEP mining activity permit and a US Army Corps of Engineers (Corps) permit issued pursuant Section 404 of the Federal Clean Water Act (FWPCA). An applicant proposing this type of activity must file a state mining activity permit application with the DEP district mining office and a separate federal permit application with the Corps district office.

Need for a Section 401 certification: As a matter of coordination, the Corps district office will not issue the federal Section 404 permit until DEP issues an Individual Water Quality Certification pursuant to Section 401 of the FWPCA, certifying that the activity will comply with the provisions of sections 301-303, 306 and 307 of the FWPCA and will not violate applicable federal and state water quality standards. The DEP district mining office issues this certification based on the information presented in the state permit application, public comments received with respect to the state permit application, and consultation with the Corps district office in regard to the federal permit application.

To ensure timely processing of both state and federal permit applications, the applicant is encouraged to:

- Contact the Corps district office to determine if a Section 404 permit is required for the proposed activity, and what type of permit is needed (an individual permit or nationwide permit).
- Complete and submit this form with the state mining activity permit application to the DEP district mining office.

Applicant _____	Application No. _____
Address _____	Operation Name _____

Telephone _____	Municipality _____
	County _____

Section 1: Corps Determination:

This project requires 401 certification for:

- An individual 404 permit
- Modification to an existing 404 permit
- Authorization to operate under Nationwide Permit No. _____

Section 2: Activity Description:

Please describe the activities that are the subject of this request:

Stream encroachment, reconstruction, wetland replacement and culvert installation. Corps authorization was already issued under the Neiswonger Construction, Inc. permit SMP #63100401. This new permit contains no revisions, additions or deletions to what is approved and authorized under that permit. As such no additional Corps permits/authorizations should be required.

If the scope of activities (including any mitigation to be performed as compensation for the unavoidable impacts of fill placement) proposed under the federal permit application is the same as the scope of activities proposed under the state permit application, check here and provide the application number assigned by the Corps _____ and the date on which the application was filed _____.

If the scope of activities described under the federal permit application differs from the scope of activities described under the state permit application, attach a copy of the federal permit application.

Note that any substantial revisions required as part of the federal application review process must be provided to the DEP district mining office.

Section 3: Signature(s)

I (am the applicant) (am an officer of the applicant) (have the authority to file a Section 404 application for this project) and certify that the plans, reports and documents submitted as part of the application are true and correct to the best of my knowledge and belief, I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. **(Note: Cross out inapplicable portions in parenthesis).**

Signature of Applicant or Responsible Official

Name (typed)

Title

UNT 'E' 1 2-yr
Worksheet for Irregular Channel

Project Description	
Project File	untitled.fm2
Worksheet	UNT 'E' Brnch 1
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data				
Channel Slope	0.196700 ft/ft			
Elevation range: 913.60 ft to 916.00 ft.				
Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	916.00	0.00	14.70	0.035
6.90	914.20			
8.30	913.80			
9.00	913.60			
11.30	914.00			
14.70	916.00			
Discharge	43.33	cfs		

Results		
Wtd. Mannings Coefficient	0.035	
Water Surface Elevation	914.55	ft
Flow Area	3.59	ft ²
Wetted Perimeter	7.00	ft
Top Width	6.68	ft
Height	0.95	ft
Critical Depth	915.12	ft
Critical Slope	0.020286	ft/ft
Velocity	12.07	ft/s
Velocity Head	2.26	ft
Specific Energy	916.81	ft
Froude Number	2.90	
Flow is supercritical.		

JAN 10 2012

UNT 'E' Branch 2 2-yr
Worksheet for Irregular Channel

Project Description	
Project File	untitled.fm2
Worksheet	UNT 'E' Branch 2
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data				
Channel Slope	0.163200 ft/ft			
Elevation range: 964.50 ft to 973.00 ft.				
Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	973.00	0.00	31.50	0.035
1.80	972.00			
10.50	966.00			
14.80	964.80			
16.50	964.50			
21.00	966.00			
31.50	972.00			
Discharge	28.04	cfs		

Results	
Wtd. Mannings Coefficient	0.035
Water Surface Elevation	965.35 ft
Flow Area	2.84 ft ²
Wetted Perimeter	6.48 ft
Top Width	6.24 ft
Height	0.85 ft
Critical Depth	965.77 ft
Critical Slope	0.021509 ft/ft
Velocity	9.88 ft/s
Velocity Head	1.52 ft
Specific Energy	966.87 ft
Froude Number	2.59
Flow is supercritical.	

JAN 19 2012

UNT 'E' 1 25-yr
Worksheet for Irregular Channel

Project Description	
Project File	untitled.fm2
Worksheet	UNT 'E' Brnch 1
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data				
Channel Slope	0.196700 ft/ft			
Elevation range: 913.60 ft to 916.00 ft.				
Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	916.00	0.00	14.70	0.035
6.90	914.20			
8.30	913.80			
9.00	913.60			
11.30	914.00			
14.70	916.00			
Discharge	124.63	cfs		

Results	
Wtd. Mannings Coefficient	0.035
Water Surface Elevation	915.07 ft
Flow Area	7.84 ft ²
Wetted Perimeter	10.10 ft
Top Width	9.57 ft
Height	1.47 ft
Critical Depth	916.01 ft
Critical Slope	0.017691 ft/ft
Velocity	15.90 ft/s
Velocity Head	3.93 ft
Specific Energy	919.00 ft
Froude Number	3.10
Flow is supercritical.	

3481011

UNT 'E' Branch 2 25-yr
Worksheet for Irregular Channel

Project Description	
Project File	untitled.fm2
Worksheet	UNT 'E' Branch 2
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data	
Channel Slope	0.163200 ft/ft
Elevation range: 964.50 ft to 973.00 ft.	
Station (ft)	Elevation (ft)
0.00	973.00
1.80	972.00
10.50	966.00
14.80	964.80
16.50	964.50
21.00	966.00
31.50	972.00
Discharge	78.62 cfs

Start Station	End Station	Roughness
0.00	31.50	0.035

Results	
Wtd. Mannings Coefficient	0.035
Water Surface Elevation	965.78 ft
Flow Area	6.12 ft ²
Wetted Perimeter	9.43 ft
Top Width	9.07 ft
Height	1.28 ft
Critical Depth	966.44 ft
Critical Slope	0.018600 ft/ft
Velocity	12.85 ft/s
Velocity Head	2.57 ft
Specific Energy	968.35 ft
Froude Number	2.76
Flow is supercritical.	

10/10/12

UNT 'E' Branch 3 - 2yr
Worksheet for Irregular Channel

Project Description	
Project File	untitled.fm2
Worksheet	UNT 'E' Branch 3
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data					
Channel Slope	0.127500 ft/ft				
Elevation range: 1,028.00 ft to 1,036.00 ft.					
Station (ft)	Elevation (ft)	Start Station	End Station	Roughness	
0.00	1,036.00	0.00	33.50	0.035	
10.50	1,030.00				
13.60	1,028.00				
17.00	1,028.00				
22.50	1,032.00				
28.80	1,034.00				
33.50	1,036.00				
Discharge	10.29	cfs			

Results			
Wtd. Mannings Coefficient	0.035		
Water Surface Elevation	1,028.37	ft	
Flow Area	1.48	ft ²	
Wetted Perimeter	4.72	ft	
Top Width	4.49	ft	
Height	0.37	ft	
Critical Depth	1,028.60	ft	
Critical Slope	0.024707	ft/ft	
Velocity	6.98	ft/s	
Velocity Head	0.76	ft	
Specific Energy	1,029.13	ft	
Froude Number	2.15		
Flow is supercritical.			

JAN 10 2012

UNT 'E' Branch 3 25-yr
Worksheet for Irregular Channel

Project Description	
Project File	untitled.fm2
Worksheet	UNT 'E' Branch 3
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data				
Channel Slope	0.127500 ft/ft			
Elevation range: 1,028.00 ft to 1,036.00 ft.				
Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	1,036.00	0.00	33.50	0.035
10.50	1,030.00			
13.60	1,028.00			
17.00	1,028.00			
22.50	1,032.00			
28.80	1,034.00			
33.50	1,036.00			
Discharge	29.13	cfs		

Results	
Wtd. Mannings Coefficient	0.035
Water Surface Elevation	1,028.68 ft
Flow Area	2.99 ft ²
Wetted Perimeter	5.81 ft
Top Width	5.39 ft
Height	0.68 ft
Critical Depth	1,029.11 ft
Critical Slope	0.021568 ft/ft
Velocity	9.74 ft/s
Velocity Head	1.47 ft
Specific Energy	1,030.15 ft
Froude Number	2.30
Flow is supercritical.	

JAN 10 2012

SCS TR-55 Tabular Method

Watershed Title: UNT 'E' Branch #
2 Year Type II Storm: Precipitation = 2.6 inches

Summary of Input Parameters

Subarea	Area (acres)	Curve Number	IA/P	Runoff (in)	Tc (min)	Adj. Tc (min)	Tt (min)	Adj. Tt (min)
1	1.000	90	0.100	1.62	6.000	6.000	2.800	2.820
2	55.100	76	0.243	0.76	6.000	6.000	8.000	7.980
Composite	56.100	76		0.77				

Individual Subarea and Composite Hydrographs

Subarea	Time (hrs)											
	11.0	11.9	12.2	12.5	12.8	13.2	13.6	14.0	15.0	17.0	20.0	26.0
1	0.06	0.61	1.85	0.43	0.22	0.15	0.12	0.10	0.07	0.05	0.03	0.00
2	0.37	2.63	41.48	19.56	8.42	5.30	4.19	3.48	2.62	1.79	1.22	0.00
Composite	0.43	3.24	43.33	19.99	8.63	5.46	4.31	3.58	2.70	1.84	1.26	0.00

The peak flow is 43.33 cfs at 12.2 hrs.

11/10/2012

SCS TR-55 Tabular Method

Watershed Title: UNT 'E' Branch #
25 Year Type II Storm: Precipitation = 4.4 inches

Summary of Input Parameters

Subarea	Area (acres)	Curve Number	IA/P	Runoff (in)	Tc (min)	Adj. Tc (min)	Tt (min)	Adj. Tt (min)
1	1.000	90	0.100	3.30	6.000	6.000	2.800	2.820
2	55.100	76	0.144	2.05	6.000	6.000	8.000	7.980
Composite	56.100	76		2.07				

Individual Subarea and Composite Hydrographs

Subarea	Time (hrs)											
	11.0	11.9	12.2	12.5	12.8	13.2	13.6	14.0	15.0	17.0	20.0	26.0
1	0.12	1.24	3.77	0.88	0.45	0.31	0.25	0.20	0.15	0.10	0.07	0.00
2	2.76	15.67	120.86	54.27	21.13	12.60	9.76	8.03	5.89	3.97	2.65	0.00
Composite	2.88	16.90	124.63	55.15	21.57	12.91	10.01	8.23	6.04	4.08	2.71	0.00

The peak flow is 124.63 cfs at 12.2 hrs.

APR 10 2012

SCS TR-55 Tabular Method

**Watershed Title: UNT 'E' Branch 2
2 Year Type II Storm: Precipitation = 2.6 inches**

Summary of Input Parameters

Subarea	Area (acres)	Curve Number	IA/P	Runoff (in)	Tc (min)	Adj. Tc (min)	Tt (min)	Adj. Tt (min)
1	1.000	90	0.100	1.62	6.000	6.000	2.800	2.820
2	28.200	76	0.243	0.76	6.000	6.000	6.000	6.000
Composite	29.200	76		0.79				

Individual Subarea and Composite Hydrographs

Subarea	Time (hrs)											
	11.0	11.9	12.2	12.5	12.8	13.2	13.6	14.0	15.0	17.0	20.0	26.0
1	0.06	0.61	1.85	0.43	0.22	0.15	0.12	0.10	0.07	0.05	0.03	0.00
2	0.20	1.73	26.19	7.60	3.76	2.61	2.09	1.75	1.33	0.90	0.62	0.00
Composite	0.26	2.33	28.04	8.03	3.98	2.76	2.21	1.85	1.41	0.95	0.66	0.00

The peak flow is 28.04 cfs at 12.2 hrs.

2016-11-22

SCS TR-55 Tabular Method

**Watershed Title: UNT 'E' Branch 2
25 Year Type II Storm: Precipitation = 4.4 inches**

Summary of Input Parameters

Subarea	Area (acres)	Curve Number	IA/P	Runoff (in)	Tc (min)	Adj. Tc (min)	Tt (min)	Adj. Tt (min)
1	1.000	90	0.100	3.30	6.000	6.000	2.800	2.820
2	28.200	76	0.144	2.05	6.000	6.000	6.000	6.000
Composite	29.200	76		2.09				

Individual Subarea and Composite Hydrographs

Subarea	Time (hrs)											
	11.0	11.9	12.2	12.5	12.8	13.2	13.6	14.0	15.0	17.0	20.0	26.0
1	0.12	1.24	3.77	0.88	0.45	0.31	0.25	0.20	0.15	0.10	0.07	0.00
2	1.48	9.84	74.85	20.35	9.27	6.18	4.87	4.02	2.99	2.00	1.33	0.00
Composite	1.60	11.08	78.62	21.23	9.71	6.49	5.12	4.22	3.14	2.11	1.40	0.00

The peak flow is 78.62 cfs at 12.2 hrs.

10/12

SCS TR-55 Tabular Method

Watershed Title: UNT 'E' Branch
2 Year Type II Storm: Precipitation = 2.6 inches

Summary of Input Parameters

Subarea	Area (acres)	Curve Number	IA/P	Runoff (in)	Tc (min)	Adj. Tc (min)	Tt (min)	Adj. Tt (min)
1	1.000	90	0.100	1.62	6.000	6.000	2.800	2.820
2	10.300	74	0.270	0.67	6.000	6.000	2.000	1.980
Composite	11.300	75		0.75				

Individual Subarea and Composite Hydrographs

Subarea	Time (hrs)											
	11.0	11.9	12.2	12.5	12.8	13.2	13.6	14.0	15.0	17.0	20.0	26.0
1	0.06	0.61	1.85	0.43	0.22	0.15	0.12	0.10	0.07	0.05	0.03	0.00
2	0.04	1.42	6.61	1.85	1.08	0.81	0.66	0.56	0.44	0.31	0.21	0.00
Composite	0.09	2.03	8.46	2.28	1.30	0.96	0.79	0.66	0.51	0.36	0.24	0.00

The peak flow is 10.29 cfs at 12.1 hrs.

10/10/2012

SCS TR-55 Tabular Method

Watershed Title: UNT 'E' Branch
25 Year Type II Storm: Precipitation = 4.4 inches

Summary of Input Parameters

Subarea	Area (acres)	Curve Number	IA/P	Runoff (in)	Tc (min)	Adj. Tc (min)	Tt (min)	Adj. Tt (min)
1	1.000	90	0.100	3.30	6.000	6.000	2.800	2.820
2	10.300	74	0.160	1.90	6.000	6.000	2.000	1.980
Composite	11.300	75		2.02				

Individual Subarea and Composite Hydrographs

Subarea	Time (hrs)											
	11.0	11.9	12.2	12.5	12.8	13.2	13.6	14.0	15.0	17.0	20.0	26.0
1	0.12	1.24	3.77	0.88	0.45	0.31	0.25	0.20	0.15	0.10	0.07	0.00
2	0.49	6.73	20.48	4.95	2.73	1.99	1.60	1.33	1.02	0.70	0.46	0.00
Composite	0.61	7.97	24.24	5.83	3.18	2.30	1.85	1.53	1.17	0.80	0.53	0.00

The peak flow is 29.13 cfs at 12.1 hrs.



DEPARTMENT OF THE ARMY
PITTSBURGH DISTRICT, CORPS OF ENGINEERS
WILLIAM S. MOORHEAD FEDERAL BUILDING
1000 LIBERTY AVENUE
PITTSBURGH, PA 15222-4186

November 17, 2011

John A. Kosky
PA Coal Reclamation
P.O. Box 136
Cuddy, PA 15031

Charles Lightfoot
Earthtech Inc.
P.O. Box 4-A
Lemont Furnace, PA 15456

NOV 17 2011

Jared Pritts, Regulatory Specialist

We received your request on November 7, 2011 and your project; **Bugger No. 1 Surface Mine/Maggie Lynn Quarry, Unnmaed Tributaries D & E to Tenmile Creek, Deemston Borough, Washington County, Pennsylvania**, has been assigned to **Jared Pritts** on the date of this letter. **Jared** can be contacted at *(412) 395-7251* or via e-mail at:

Jared.N.Pritts@usace.army.mil

Your Corps of Engineers **File Number** is **2011-1848**. Please contact Jared with any questions and reference this file number in all correspondence with our office concerning this site.

Sincerely,

/signed/

Karen A. Kochenbach
Chief, South Section, Regulatory Branch
Pittsburgh District USACE

RECEIVED
NOV 18 2011
ETI - U'TOWN

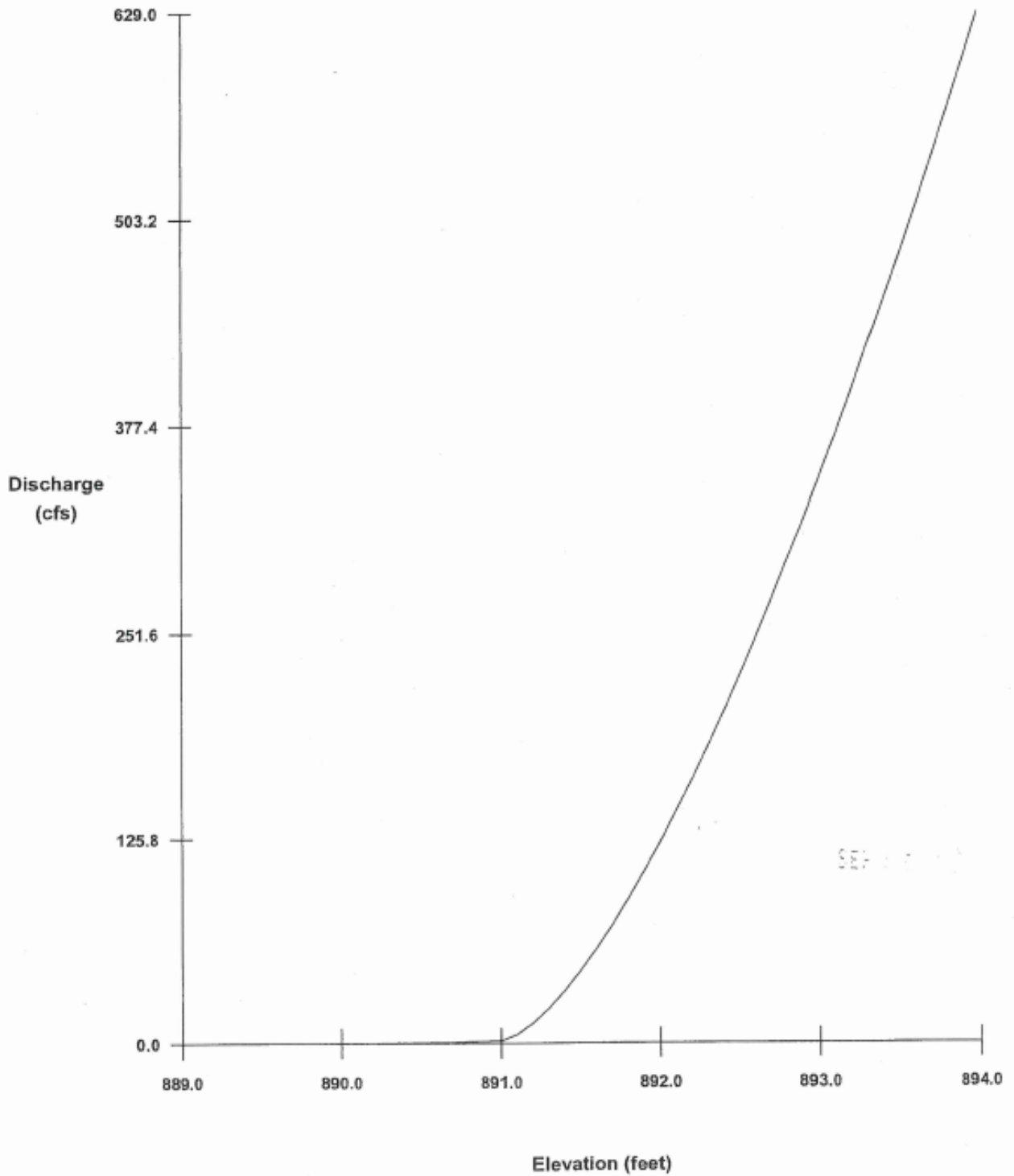
Storage/Elevation Curve: D:\Maggie Lynn\Chan Redesign\MagLy channel wk file\WLES

Basin Storage/Elevation Input

Elevation (ft)	Storage (acre-ft)
889.00	0.0000
894.00	4.5000

SEP 25 2014

Wetland Elev. / Discharge Curve



Project Files:

Outlet Structure Configuration: D:\Maggie Lynn\Chan Redesign\MagLy channel wk file\WL.OSC
 Discharge/Elevation Curve: D:\Maggie Lynn\Chan Redesign\MagLy channel wk file\WL.EO

Outlet Structure Configuration for: Maggie Lynn Wet Land

Stage 1: Discharge Pipe

Invert Elevation = 890 feet
 Pipe Diameter = 0.667 feet
 Pipe Length = 20 feet
 Pipe Slope = 0.02 ft/ft
 Manning n = 0.012
 Entrance Condition = SEP

SEP 2 9 2011

Stage 2: Emergency Spillway

Crest Elevation = 891 feet
 Crest Length = 43 feet
 Discharge Coefficient = 2.8

Basin Rating Curve

Basin Water Elevation	Basin Outflow (cfs)	Riser Box Water Elevation	Tailwater Elevation (ft)	Outfall Culvert Control	Outfall Culvert Override?
889.00	0.00	N/A	N/A	INLET	N/A
889.10	0.00	N/A	N/A	INLET	N/A
889.20	0.00	N/A	N/A	INLET	N/A
889.30	0.00	N/A	N/A	INLET	N/A
889.40	0.00	N/A	N/A	INLET	N/A
889.50	0.00	N/A	N/A	INLET	N/A
889.60	0.00	N/A	N/A	INLET	N/A
889.70	0.00	N/A	N/A	INLET	N/A
889.80	0.00	N/A	N/A	INLET	N/A
889.90	0.00	N/A	N/A	INLET	N/A
890.00	0.00	N/A	N/A	INLET	N/A
890.10	0.03	N/A	N/A	INLET	N/A
890.20	0.10	N/A	N/A	INLET	N/A
890.30	0.22	N/A	N/A	INLET	N/A
890.40	0.37	N/A	N/A	INLET	N/A
890.50	0.51	N/A	N/A	INLET	N/A
890.60	0.67	N/A	N/A	INLET	N/A
890.70	0.86	N/A	N/A	INLET	N/A
890.80	1.06	N/A	N/A	INLET	N/A
890.90	1.27	N/A	N/A	INLET	N/A
891.00	1.45	N/A	N/A	INLET	N/A
891.10	5.37	N/A	N/A	OUTLET	N/A
891.20	12.41	N/A	N/A	OUTLET	N/A
891.30	21.50	N/A	N/A	OUTLET	N/A
891.40	32.25	N/A	N/A	OUTLET	N/A
891.50	44.43	N/A	N/A	OUTLET	N/A
891.60	57.89	N/A	N/A	OUTLET	N/A
891.70	72.51	N/A	N/A	OUTLET	N/A
891.80	88.21	N/A	N/A	OUTLET	N/A
891.90	104.92	N/A	N/A	OUTLET	N/A
892.00	122.58	N/A	N/A	OUTLET	N/A
892.10	141.15	N/A	N/A	OUTLET	N/A
892.20	160.57	N/A	N/A	OUTLET	N/A
892.30	180.82	N/A	N/A	OUTLET	N/A
892.40	201.86	N/A	N/A	OUTLET	N/A
892.50	223.66	N/A	N/A	OUTLET	N/A
892.60	246.19	N/A	N/A	OUTLET	N/A

Basin Water Elevation	Basin Outflow (cfs)	Riser Box Water Elevation	Tailwater Elevation (ft)	Outfall Culvert Control	Outfall Culvert Override?
892.70	269.44	N/A	N/A	OUTLET	N/A
892.80	293.38	N/A	N/A	OUTLET	N/A
892.90	318.00	N/A	N/A	OUTLET	N/A
893.00	343.27	N/A	N/A	OUTLET	N/A
893.10	369.17	N/A	N/A	OUTLET	N/A
893.20	395.70	N/A	N/A	OUTLET	N/A
893.30	422.84	N/A	N/A	OUTLET	N/A
893.40	450.57	N/A	N/A	OUTLET	N/A
893.50	478.88	N/A	N/A	OUTLET	N/A
893.60	507.77	N/A	N/A	OUTLET	N/A
893.70	537.21	N/A	N/A	OUTLET	N/A
893.80	567.20	N/A	N/A	OUTLET	N/A
893.90	597.74	N/A	N/A	OUTLET	N/A
894.00	628.80	N/A	N/A	OUTLET	N/A

SEP 27 2011

Modified Puls Routing

Inflow Hydrograph: D:\Maggie Lynn\Chan Redesign\MagLy channel wk file\total to wf\Total to WL 25y.HYD
 Storage/Elevation Curve: D:\Maggie Lynn\Chan Redesign\MagLy channel wk file\WLES
 Discharge/Elevation Curve: D:\Maggie Lynn\Chan Redesign\MagLy channel wk file\WL.EO

SEP 22 2011

Basin Bypass Capacity = 0.00 cfs
 Starting Pool Elevation = 889.00 feet
 Time Interval = 0.1 hours

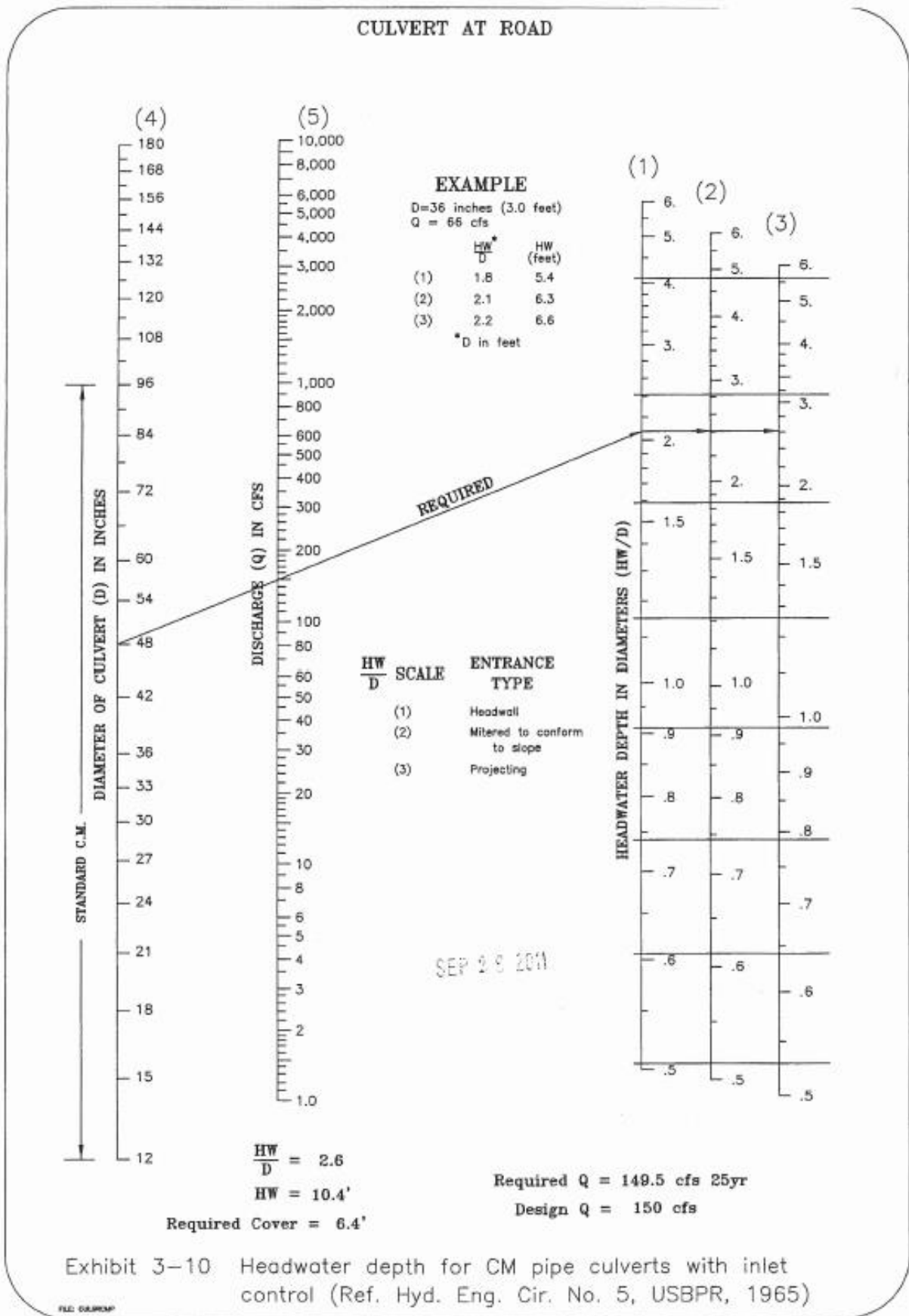
Event Time (hours)	Hydrograph Inflow (cfs)	Basin Inflow (cfs)	Storage Used (acre-ft)	Elevation Above MSL (feet)	Basin Outflow (cfs)	Outflow Total (cfs)
0.00	0.00	0.00	0.0000	889.00	0.000	0.000
0.10	3.75	3.75	0.0155	889.02	0.000	0.000
0.20	4.17	4.17	0.0482	889.05	0.000	0.000
0.30	4.59	4.59	0.0844	889.09	0.000	0.000
0.40	5.29	5.29	0.1252	889.14	0.000	0.000
0.50	5.98	5.98	0.1718	889.19	0.000	0.000
0.60	6.67	6.67	0.2241	889.25	0.000	0.000
0.70	10.47	10.47	0.2949	889.33	0.000	0.000
0.80	14.25	14.25	0.3971	889.44	0.000	0.000
0.90	18.04	18.04	0.5305	889.59	0.000	0.000
1.00	37.13	37.13	0.7585	889.84	0.000	0.000
1.10	82.14	82.14	1.2498	890.39	0.357	0.357
1.20	158.65	158.65	2.1266	891.36	28.26	28.26
1.30	171.76	171.76	2.7910	892.10	141.36	141.36
1.40	128.24	128.24	2.8287	892.14	149.51	149.51
1.50	85.69	85.69	2.6384	891.93	110.49	110.49
1.60	58.76	58.76	2.4585	891.73	77.49	77.49
1.70	43.90	43.90	2.3297	891.59	56.35	56.35
1.80	34.37	34.37	2.2415	891.49	43.28	43.28
1.90	29.29	29.29	2.1808	891.42	35.07	35.07
2.00	24.46	24.46	2.1364	891.37	29.43	29.43
2.10	22.14	22.14	2.1025	891.34	25.38	25.38
2.20	20.00	20.00	2.0786	891.31	22.53	22.53
2.30	18.54	18.54	2.0601	891.29	20.50	20.50
2.40	17.19	17.19	2.0447	891.27	18.95	18.95
2.50	16.19	16.19	2.0315	891.26	17.62	17.62
2.60	15.23	15.23	2.0204	891.24	16.49	16.49
2.70	14.47	14.47	2.0108	891.23	15.53	15.53
2.80	13.72	13.72	2.0025	891.23	14.68	14.68
2.90	13.07	13.07	1.9950	891.22	13.92	13.92
3.00	12.45	12.45	1.9882	891.21	13.24	13.24
3.10	11.91	11.91	1.9820	891.20	12.62	12.62
3.20	11.40	11.40	1.9762	891.20	12.11	12.11
3.30	10.88	10.88	1.9701	891.19	11.64	11.64
3.40	10.55	10.55	1.9643	891.18	11.19	11.19
3.50	10.22	10.22	1.9593	891.18	10.80	10.80
3.60	9.90	9.90	1.9547	891.17	10.44	10.44
3.70	9.69	9.69	1.9507	891.17	10.12	10.12
3.80	9.49	9.49	1.9474	891.16	9.86	9.86
3.90	9.28	9.28	1.9444	891.16	9.63	9.63
4.00	9.07	9.07	1.9416	891.16	9.41	9.41
4.10	8.89	8.89	1.9389	891.15	9.20	9.20
4.20	8.71	8.71	1.9364	891.15	9.00	9.00
4.30	8.54	8.54	1.9341	891.15	8.82	8.82
4.40	8.37	8.37	1.9318	891.15	8.64	8.64
4.50	8.18	8.18	1.9295	891.14	8.46	8.46
4.60	8.01	8.01	1.9272	891.14	8.28	8.28
4.70	7.82	7.82	1.9249	891.14	8.10	8.10
4.80	7.64	7.64	1.9226	891.14	7.92	7.92

Event Time (hours)	Hydrograph Inflow (cfs)	Basin Inflow (cfs)	Storage Used (acre-ft)	Elevation Above MSL (feet)	Basin Outflow (cfs)	Outflow Total (cfs)
4.90	7.45	7.45	1.9202	891.13	7.74	7.74
5.00	7.29	7.29	1.9179	891.13	7.56	7.56
5.10	7.12	7.12	1.9157	891.13	7.39	7.39
5.20	6.94	6.94	1.9135	891.13	7.21	7.21
5.30	6.78	6.78	1.9113	891.12	7.04	7.04
5.40	6.63	6.63	1.9092	891.12	6.88	6.88
5.50	6.47	6.47	1.9072	891.12	6.72	6.72
5.60	6.40	6.40	1.9054	891.12	6.58	6.58
5.70	6.33	6.33	1.9041	891.12	6.47	6.47
5.80	6.25	6.25	1.9029	891.11	6.38	6.38
5.90	6.18	6.18	1.9019	891.11	6.30	6.30
6.00	6.12	6.12	1.9009	891.11	6.23	6.23
6.10	6.03	6.03	1.9000	891.11	6.15	6.15
6.20	5.96	5.96	1.8990	891.11	6.08	6.08
6.30	5.89	5.89	1.8980	891.11	6.00	6.00
6.40	5.81	5.81	1.8971	891.11	5.93	5.93
6.50	5.74	5.74	1.8961	891.11	5.85	5.85
6.60	5.68	5.68	1.8952	891.11	5.78	5.78
6.70	5.61	5.61	1.8944	891.10	5.72	5.72
6.80	5.56	5.56	1.8936	891.10	5.65	5.65
6.90	5.51	5.51	1.8928	891.10	5.59	5.59
7.00	5.44	5.44	1.8921	891.10	5.54	5.54
7.10	5.38	5.38	1.8913	891.10	5.47	5.47
7.20	5.33	5.33	1.8906	891.10	5.42	5.42
7.30	5.25	5.25	1.8897	891.10	5.36	5.36
7.40	5.21	5.21	1.8888	891.10	5.32	5.32
7.50	5.13	5.13	1.8878	891.10	5.28	5.28
7.60	5.07	5.07	1.8865	891.10	5.22	5.22
7.70	5.02	5.02	1.8853	891.09	5.17	5.17
7.80	4.95	4.95	1.8840	891.09	5.11	5.11
7.90	4.88	4.88	1.8826	891.09	5.05	5.05
8.00	4.83	4.83	1.8813	891.09	4.99	4.99
8.10	4.75	4.75	1.8798	891.09	4.93	4.93
8.20	4.68	4.68	1.8783	891.09	4.86	4.86
8.30	4.60	4.60	1.8768	891.09	4.80	4.80
8.40	4.52	4.52	1.8751	891.08	4.72	4.72
8.50	4.46	4.46	1.8735	891.08	4.65	4.65
8.60	4.38	4.38	1.8718	891.08	4.58	4.58
8.70	4.30	4.30	1.8701	891.08	4.51	4.51
8.80	4.23	4.23	1.8684	891.08	4.43	4.43
8.90	4.15	4.15	1.8667	891.07	4.36	4.36
9.00	4.08	4.08	1.8650	891.07	4.28	4.28
9.10	4.05	4.05	1.8635	891.07	4.22	4.22
9.20	4.03	4.03	1.8622	891.07	4.16	4.16
9.30	4.01	4.01	1.8612	891.07	4.12	4.12
9.40	3.99	3.99	1.8604	891.07	4.08	4.08
9.50	3.97	3.97	1.8597	891.07	4.05	4.05
9.60	3.94	3.94	1.8590	891.07	4.02	4.02
9.70	3.92	3.92	1.8584	891.06	3.99	3.99
9.80	3.89	3.89	1.8577	891.06	3.97	3.97
9.90	3.87	3.87	1.8571	891.06	3.94	3.94
10.00	3.86	3.86	1.8566	891.06	3.92	3.92
10.10	3.84	3.84	1.8561	891.06	3.90	3.90
10.20	3.82	3.82	1.8557	891.06	3.88	3.88
10.30	3.81	3.81	1.8552	891.06	3.86	3.86
10.40	3.78	3.78	1.8548	891.06	3.84	3.84
10.50	3.76	3.76	1.8543	891.06	3.82	3.82
10.60	3.75	3.75	1.8539	891.06	3.80	3.80

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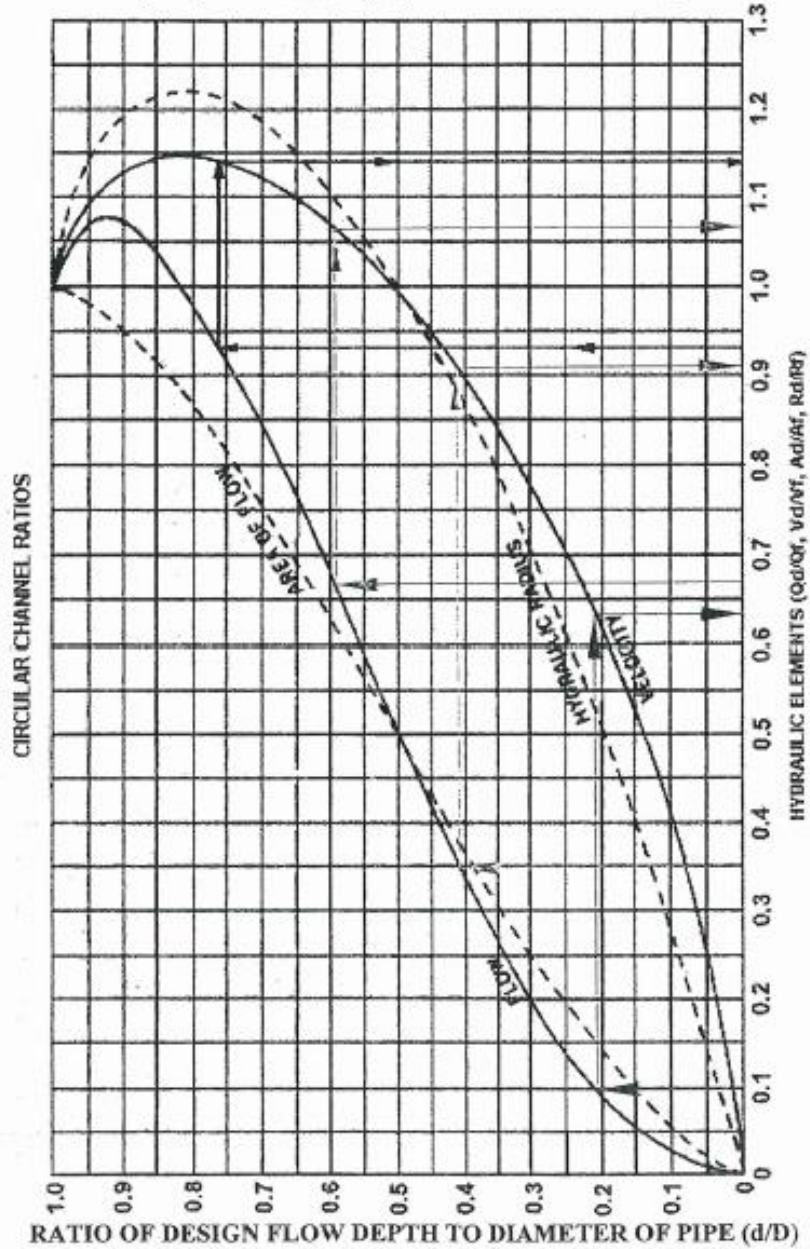
Event Time (hours)	Hydrograph Inflow (cfs)	Basin Inflow (cfs)	Storage Used (acre-ft)	Elevation Above MSL (feet)	Basin Outflow (cfs)	Outflow Total (cfs)
10.70	3.73	3.73	1.8535	891.06	3.78	3.78
10.80	3.70	3.70	1.8530	891.06	3.76	3.76
10.90	3.68	3.68	1.8525	891.06	3.74	3.74
11.00	3.66	3.66	1.8520	891.06	3.72	3.72
11.10	3.59	3.59	1.8514	891.06	3.69	3.69
11.20	3.49	3.49	1.8503	891.06	3.64	3.64
11.30	3.43	3.43	1.8490	891.05	3.59	3.59
11.40	3.32	3.32	1.8475	891.05	3.52	3.52
11.50	3.25	3.25	1.8459	891.05	3.45	3.45
11.60	3.14	3.14	1.8441	891.05	3.37	3.37
11.70	3.06	3.06	1.8422	891.05	3.29	3.29
11.80	2.96	2.96	1.8402	891.04	3.20	3.20
11.90	2.87	2.87	1.8382	891.04	3.12	3.12
12.00	2.79	2.79	1.8362	891.04	3.03	3.03
12.10	2.70	2.70	1.8342	891.04	2.94	2.94
12.20	2.59	2.59	1.8321	891.04	2.85	2.85
12.30	2.51	2.51	1.8300	891.03	2.76	2.76
12.40	2.41	2.41	1.8279	891.03	2.67	2.67
12.50	2.33	2.33	1.8258	891.03	2.58	2.58
12.60	2.23	2.23	1.8238	891.03	2.49	2.49
12.70	2.16	2.16	1.8217	891.02	2.40	2.40
12.80	2.05	2.05	1.8197	891.02	2.31	2.31
12.90	1.96	1.96	1.8175	891.02	2.22	2.22
13.00	1.86	1.86	1.8154	891.02	2.12	2.12
13.10	1.79	1.79	1.8133	891.01	2.03	2.03
13.20	1.69	1.69	1.8113	891.01	1.94	1.94
13.30	1.60	1.60	1.8092	891.01	1.85	1.85
13.40	1.49	1.49	1.8070	891.01	1.76	1.76
13.50	1.42	1.42	1.8049	891.01	1.67	1.67
13.60	1.31	1.31	1.8028	891.00	1.57	1.57
13.70	1.24	1.24	1.8007	891.00	1.48	1.48
13.80	1.14	1.14	1.7985	891.00	1.45	1.45
13.90	1.05	1.05	1.7956	891.00	1.44	1.44
14.00	0.95	0.95	1.7919	890.99	1.43	1.43
14.10	0.86	0.86	1.7876	890.99	1.43	1.43
14.20	0.77	0.77	1.7826	890.98	1.42	1.42
14.30	0.69	0.69	1.7770	890.97	1.40	1.40
14.40	0.59	0.59	1.7707	890.97	1.39	1.39
14.50	0.51	0.51	1.7638	890.96	1.38	1.38
14.60	0.40	0.40	1.7562	890.95	1.36	1.36
14.70	0.32	0.32	1.7480	890.94	1.35	1.35
14.80	0.21	0.21	1.7391	890.93	1.33	1.33
14.90	0.15	0.15	1.7297	890.92	1.31	1.31
15.00	0.04	0.04	1.7198	890.91	1.29	1.29
15.10	0.00	0.00	1.7094	890.90	1.27	1.27
15.20	0.00	0.00	1.6990	890.89	1.24	1.24

Total Routing Mass Balance Discrepancy is 0.04%



PA Coal Reclamation
Maggie Lynn

FIGURE 9.1
Velocity Adjustment Nomograph for Less Than Full Pipe Flow



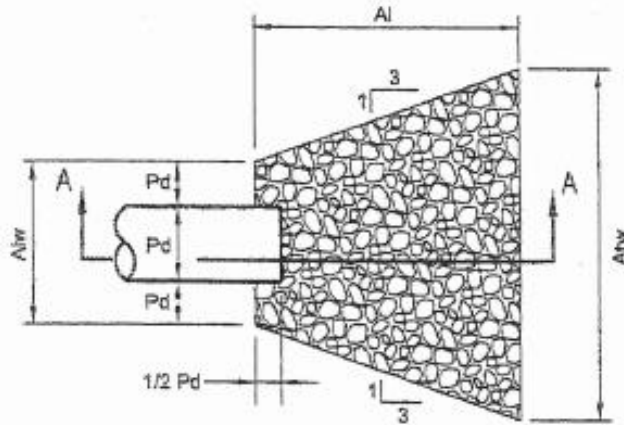
C-1
C-2
C-3

SEP 27 2009

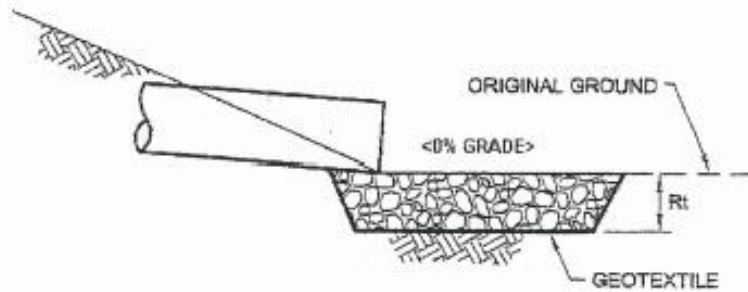
Adapted from *Design and Construction of Sanitary and Storm Sewers*, p. 87, ASCE, 1969

Do not use this nomograph to determine "equivalent pipe sizes" for discharges (Q_d) which do not intersect curves corresponding to proposed pipe sizes on Figures 9.3 and 9.4.

**STANDARD CONSTRUCTION DETAIL # 9-2
Riprap Apron at Pipe Outlet Without Flared Endwall**



PLAN VIEW



SECTION A - A

Adapted from USDOT, FHA HEC-14

OUTLET NO.	PIPE DIA Pd (IN)	RIPRAP			APRON	
		SIZE (R-)	THICK. Rt (IN)	LENGTH Al (FT)	INITIAL WIDTH Aiw (FT)	TERMINAL WIDTH Aitw (FT)
C-1	36	R-3	9	10	9	19
C-2	30	R-3	9	10	7.5	17.5
C-3	36	R-3	9	10	9	19

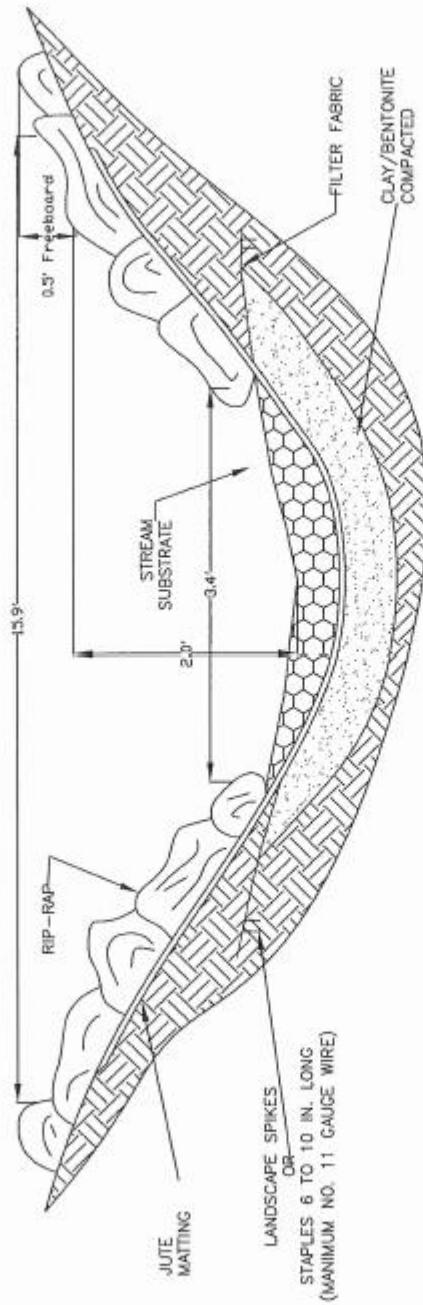
Construct all aprons to the dimensions shown. Adjust terminal widths as necessary to match receiving channels.

Extend riprap on back side of apron to at least 1/2 depth of pipe on both sides to prevent scour around the pipe.

Inspect all aprons on at least a weekly basis and after each runoff event.

Replace displaced riprap within the apron immediately.

CROSS SECTION
STREAM RECONSTRUCTION
UNIT "E"



VEGETATED WITH GRASS AND SHRUBS

The stream channel should include a clay liner covered with filter cloth. Substrate material composed of the following particle sizes should be then placed upon the filter fabric:

- 25% coarse silt/clay (1/16 in. to 1/8 in. diameter)
- 25% coarse gravel (1/4 in. to 3/8 in. diameter)
- 25% coarse gravel (3/8 in. to 1 in. diameter)
- 25% fine gravel (0.12 in. to 1/8 in. diameter)

Rip rap provided above. The low flow channel is based on the flow velocity:
 100 cfs flow velocity = 1200 ft/min
 800 cfs flow velocity = 2400 ft/min (24 in. w/ 12in. average)

DRAWN BY: cak DATE: 6-21-12 DWG. NO.: stream SCALE: NTS	REVISIONS	NEISWONGER CONSTRUCTION, INC. MAGGIE LYNN MINE DEEMSTON BOROUGH WASHINGTON COUNTY	SHIT. NO.  Hiser Engineering, Inc. PO Box 239 Huntington, PA 15882 Phone: 724.287.0377 Fax: 724.287.0462 Email: hisereng@hisereng.com
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