SECTION K: COLOR PHOTOGRAPHS WITH MAP

Color Photographs with Map

Color photographs of the waterbodies and wetlands located within the Project area are located in the Stream Identification and Wetland Delineation Report included as a separate binder with this permit application. Please see Appendix B of the attached Stream Identification and Wetland Delineation Report (Attachment 2).

SECTION L: ENVIRONMENTAL ASSESSMENT

Environmental Assessment

An Environmental Assessment report (EA) has been prepared in association with this project and is included as Attachment 3, in a separate binder.

Attached is the five page Environmental Assessment Form. The requested items in the Environmental Assessment Form are included in the EA, as noted on the entries in the Environmental Assessment Form.

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
and
U.S. ARMY CORPS OF ENGINEERS

ENVIRONMENTAL ASSESSMENT FORM (E.A. Form)

PART 1 - RESOURCE IDENTIFICATION

1. Indicate water resources which exist on the project site.

Name of streams(s) and/or body of water (including wetlands) See Lake Erie Connector Environmental Assesment (Attachment 3) for a detailed discussion of environmental resources and associated project impacts. Also, see Table 1: Proposed Wetland Impacts for the Project, and Table 2: Proposed Waterbody Impacts for the Project included at the end of Section J of the Joint Permit Application.

Size of body of water (in acres) See Table 1 & 2 included at the end of Section J of the Joint Permit Application for Details

Provide a table detailing all proposed aquatic resource impacts including type of structure or activity, length and width of streams or floodways, and acreage of wetlands or other bodies of water. All structures or activities must also include latitude and longitude for each proposed location.

Wetland - If wetlands are present at the project site, provide the following information relative to the person(s) or organization performing the wetland identification, delineation and related work (attach additional sheets if needed):

Last Name	First Name	MI	Telephone
Schawalder	Kristen	A	(412) 497-6247
Mailing Address	City	State	Zip + 4
11 Stanwix St, Suite 800	Pittsburgh	PA	15222
Email Address kristen.schawalder@hdrinc.com			

QUALIFICATIONS

HDR Engineering is the lead consultant in the preparation of the Environmental Assessment. HDR staff conducted stream identification, wetland delineation, Pennsylvania and USACE permitting, cultural resources coordination, development of the EA, and water quality and fisheries assessments.

Diess & Halmi Engineering, Inc is the lead consultant on the developing the National Pollution Discharge Elimination System Permit for Stormwater Discharge Associated with Construction Activities, Erosion and Sedimentation Control Plan, Post-Construction Stormwater Management Plan, local outreach, and is the lead for the local permitting efforts.

Black & Veatch is a global leader in engineering, procurement and construction services for energy, water, and telecommunications. Black & Veatch is the owner's engineer, providing details regarding schedule, scope, and additional technical expertise.

Environmental Solutions & Innovations, Inc. is an industry leader for terrestrial ecological services, and conducted rare plant surveys for the LEC Projects. Hartgen Archeological Associates, a cultural resource management firm, conducted Phase 1A and Phase 1B archaeological surveys. HGC Engineering specializes in noise, vibration and acoustical engineering and conducted an assessment of sound levels associated with the proposed Erie Converter Station. Exponent Engineering and Scientific Consultancy evaluated electromagenetic and thermal effects of the project. Canadian Subsea Research, LTD conducted geophysical and geotechnical surveys of the proposed route in Lake Erie.

A number of other experts have provided technical expertise including Caldwell Marine International, LLC, Chivers Construction Company, Geotherm USA, LLC, , K&L Gates, Prysmian Group, and Siemens Energy Inc.

If wetlands are present, attach a copy of the wetland delineation report identified and labeled as **Enclosure A**. Include all field data sheets, denote the size (in acres) of the wetland. If this information details any physical information or features not shown in the "site plan" please attach additional plans which illustrate these features.

Enclosure A

Please see the Stream Identification and Wetland Delineation Report included as Attachment 2, under a separate binder.

PART 1 - RESOURCE IDENTIFICATION (continued)	YES	NO
2. **Is the site located within or adjacent to any of the following? Please mark either the "yes" or "no" column for each question.** ***See Section 4.1.2.2 Recreation and Table 4.1-3 of the EA***		
A. National, state or local park, forest or recreation area **(Adjacent to Erie Bluffs State Park)**	☒	☐
B. Natural, wild, or wilderness area	☐	☒
C. National natural landmark	☐	☒
D. National wildlife refuge, or Federal, state, local or private wildlife or plant sanctuaries	☐	☒
E. State Game Lands	☐	☒
F. Areas identified as prime farmland ***See Sections 4.1.2.3, Table 4.1-4, and Section 4.2.2.4 of the EA***	☒	☐
If not included in the permit application package, please attach a map (e.g. 1:2400 scale or greater) indicating the location of the project, all water resources and the features identified above. Label the map as Enclosure B. ***See Figure 2.1-1 located in Section 2.1 of the EA and Section J of the JPA***	**ENCLOSURE B**	
3. Is the water resource listed as trout stocked waters by the Pennsylvania Fish and Boat Commission? ***See Table 4.3-3 in Section 4.3.2.2 of the EA***	☒	☐
4. Is the water resource designated as a wild trout stream by the Pennsylvania Fish and Boat Commission? ***See Table 4.3-3 in Section 4.3.2.2 of the EA***	☐	☒
5. Is the water resource listed as High Quality or Exceptional Value in Title 25 Pa. Code Chapter 93? ***See Table 4.3-2 & 4.3-3 in Section 4.3.2.1 and 4.3.2.2 of the EA***	☒	☐
Indicate the stream classification found in Chapter 93. Classification ***See Table 4.3-3 included in Section 4.3.2.2 of the EA and Table 2 at the end of Section J of the Joint Permit Application***		
6. Is the water resource designated as a National Wild or Scenic River or as part of the Commonwealth's Scenic Rivers System or classified as priority 1-A for inclusion in the system? ***See Table 4.3-3 of the EA***	☐	☒
7. Is the water resource part of or located along a private or public water supply? ***See Section 4.3 of the EA***	☐	☒
(IF COMPLETING A SMALL PROJECT APPLICATION ADVANCE TO PART 3)		
8. Provide a written narrative, identified and labeled as "Enclosure C - Description of Aquatic Habitat," discussing the following ecological functions: ***Section 4.0 Affected Environment of the Environmental Assessment has been designed to address the following items.***		
A. Aquatic habitats including: ***See Section 4.4.1 and 4.4.2 of the EA***		
(1) Food chain production		
(2) General habitat a. Nesting e. Migration b. Spawning f. Feeding c. Rearing g. Escape Cover d. Resting h. Other		

ENCLOSURE C

(3) Habitat for threatened and endangered plant and animal species (Discuss results of the Pennsylvania Natural Diversity Inventory (PNDI) form and Bog Turtle Habitat Screening) ***See Section 4.6 and 5.6 of the EA***	
(4) Environmental Study Areas a. Sanctuaries b. Refuges	
(5) If project proposes a stream relocation, a stream enclosure, or dredging, provide a description of the instream macroinvertebrate community.	

PART 1 - RESOURCE IDENTIFICATION (continued)	**ENCLOSURE C Description of Aquatic Habitat**
B. Water Quantity and Streamflow ***See Sections 4.3 and 5.3 of the EA***	
(1) Natural drainage patterns	
(2) Flushing characteristics	
(3) Current patterns	
(4) Groundwater discharge for baseflow	
(5) Natural recharge area for ground and surface waters	
(6) Storm and floodwater storage and control	
C. Water Quality ***See Section 4.3 of the EA for a summary of the report attached in Appendix E – Lake Erie Water Quality Modeling Report***	
(1) Preventing Pollution	
(2) Sedimentation control and patterns	
(3) Salinity distribution	
(4) Natural water filtration	
D. Recreation ***See Sections 4.1.1.1, 4.1.2.2, and 4.4.1.1 of the EA***	
(1) Game Species	
(2) Non Game Species	
(3) Fishing	
(4) Hiking	
(5) Observation (plant/wildlife)	
(6) Other	
E. Upstream and Downstream Property ***See Table 3 Adjoining Property Owner List located at the end of Section J of the JPA***	
F. Other Environmental Factors Determined by Site Investigation ***See Section 4 of the EA for Additional Site Information***	
PART 2 - PROJECT DESCRIPTION	
9. **Project Impacts** ***See Section 5 of the Environmental Assessment*** For impacts to regulated waters of the Commonwealth, answer fully, completely and in detail the following questions; attach and label as **Enclosure D**.	**ENCLOSURE D**
A. Discuss the impacts on: ***See Section 5.1.1.1 of the EA***	
(1) National, state or local park, forest or recreation area	
(2) Natural, wild, or wilderness area	
(3) National, state, or local historic site	
(4) National natural landmark	
(5) National wildlife refuge	
(6) Cultural or archaeological landmarks ***See Section 4.7 and 5.7 of the EA***	
(7) State Game Lands	

PART 2 - PROJECT DESCRIPTION (continued)	ENCLOSURE D Project Impacts
(8) Federal, state, local or private plant or wildlife sanctuaries	
(9) Areas identified as prime farmland ***See Section 5.2.2.4 of the EA***	
B. Discuss the environmental impacts on:	
(1) Aquatic habitats including: ***See Section 5.4 of the EA***	
a. Food Chain production	
b. General habitat (1) Nesting (5) Migration (2) Spawning (6) Feeding (3) Rearing (7) Escape Cover (4) Resting (8) Other	
c. Habitat for threatened and endangered plant and animal species ***See Section 5.6 of the EA***	
d. Environmental Study Areas (1) Sanctuaries (2) Refuges	
(2) Water Quantity and Streamflow ***See Section 5.3 of the EA***	
a. Natural drainage patterns	
b. Flushing characteristics	
c. Current patterns	
d. Groundwater discharge for baseflow	
e. Natural recharge area for ground and surface waters	
f. Storm and floodwater storage and control	
(3) Water Quality ***See Section 5.3 and Appendix E of the EA – Lake Erie Water Quality Modeling Report***	
a. Preventing Pollution	
b. Sedimentation control and patterns	
c. Salinity distribution	
d. Natural water filtration	
(4) Recreation ***See Section 5.1.1.1 of the EA***	
a. Game Species	
b. Non Game Species	
c. Fishing	
d. Hiking	
e. Observation (wildlife)	
f. Other	
(5) Upstream and downstream property ***See Table 3 Adjoining Property Owner List located at the end of Section J of the JPA***	
(6) Other Environmental Factors ***See Section 5 of the EA for Additional Site Information***	

PART 2 - PROJECT DESCRIPTION (continued)	ENCLOSURED
C. Identify all environmental impacts on other adjacent land and water resources associated with the construction, modification or operation of the dam, reservoir, water obstruction, or encroachment in the area of the project.	
D. Identify and evaluate the potential cumulative environmental impacts of this project and other potential or existing projects like it, and the impacts that may result through numerous piecemeal changes to the resource. **See Section 6.2 of the EA**	
E. Identify and describe all other dams, water obstructions or encroachments which may or will be needed, in addition to those described in this Application, to fulfill the purpose of the current project.	

PART 3 – CERTIFICATION AND FEE

I certify that the above statements, attachments including those labeled and identified as Enclosures, and all conclusions are true, correct, and based upon current environmental principles and science, to the best of my knowledge and belief.

☒ Application Fee & Chapter 105 Fee(s) Calculation Worksheet enclosed

Signature of Person Completing the Environmental Assessment Form

1/26/16
Date

The Department may waive a specific information requirement in writing, at the request of the Applicant, during the pre-application review process if the Department determines that specific information is not necessary to review the application.

Please see the Environmental Assessment in Attachment 3 for additional details requested in this form.

SECTION M: EROSION AND SEDIMENTATION CONTROL PLAN

- M-1: Erosion and Sedimentation Control Plan – Cable Route
- M-2: Erosion and Sedimentation Control Plan – Erie Converter Station

Erosion and Sedimentation Control Plan

The Erosion and Sedimentation Control Plan associated with the Erie Converter Station, and the Erosion and Sedimentation Control Plan associated with the cable route were submitted to the Erie County Conservation District for review and approval on January 29, 2016. These plans were designed to comply with 25 Pa. Code Chapter 102. A copy of the Erosion and Sedimentation Control Plan is provided in this Section M.

EROSION AND SEDIMENTATION CONTROL PLAN

FOR

ITC LAKE ERIE CONNECTOR LLC
PENNSYLVANIA CABLE ROUTE

CONNEAUT, GIRARD, AND SPRINGFIELD TOWNSHIPS
ERIE COUNTY, PENNSYLVANIA

PREPARED BY:

STEVEN R. HALMI, P.E.

DEISS & HALMI ENGINEERING, INC.
EDINBORO, PENNSYLVANIA

JANUARY 22, 2016

TABLE OF CONTENTS **Section**

1.1 INTRODUCTION

1.1.1 Purpose of Erosion and Sedimentation Control Plan

This Erosion and Sedimentation Control Plan (E&SC Plan) is required by Pennsylvania Department of Environmental Protection (PaDEP) regulations at 25 Pa. Code Chapter 102, and related to requirements for an NPDES Permit for Stormwater Discharges Associated with Construction Activities (NPDES Permit). Those regulations include the implementation of certain best management practices (BMPs) for erosion and sedimentation control in relation to earth disturbance activities and the Site Restoration Plan (reference is made to the separate Site Restoration Plan document which accompanies this E&SC Plan as part of the NPDES Permit application). PaDEP, with the assistance of the Erie County Conservation District (ECCD), will review this plan as part of the process for issuance of the NPDES Permit.

1.1.2 Overall Project Description

The proposed Project is an approximately 72.4 mile (116.5 km) 1,000 megawatt (MW) +/-320 kilovolt (kV) high-voltage direct current (HVDC) bi-directional electric transmission interconnection to transfer electricity between Canada and the United States (refer to Figure 2.3). The Project will consist of one 1,000-MW HVDC transmission line and two HVDC converter stations with ancillary aboveground facilities. One converter station will be located in Canada, the other in the United States (U.S.). The HVDC transmission line consists of two transmission cables, one positively charged and the other negatively charged, along with a fiber optic cable for communications between the converter stations. The HVDC transmission line consists of underground portions in Canada and the U.S. and an underwater portion through Lake Erie, having the following approximate lengths:

- Terrestrial 500 kV AC Cable Route – Haldimand County, Ontario - 0.8 mi (1.3 km)
- Canada, Underground HVDC Cable Route - 0.8 mi (1.3 km)
- Canada, Underwater HVDC Cable Route - 29.1 mi (46.8 km)
- U.S., Underwater HVDC Cable Route - 35.4 mi (58.0 km)
- U.S., Underground HVDC Cable Route - 7.1 mi (11.4 km)
- Terrestrial 500 kV AC Cable Route – Erie County, Pennsylvania - 0.4 mi (0.7 km)

For the purposes of this plan, only the U.S. portion of the Project is subject to Pa. DEP Chapter 102 regulations / NPDES Permit requirements. In the U.S. the cable will make landfall in Springfield Township in Erie County, Pennsylvania and will occur primarily along existing roadways to a new HVDC converter station (Erie Converter Station) to be constructed in Conneaut Township in Erie County, Pennsylvania. The Erie Converter Station will convert +/-320 kV direct current (DC) power to 345 kV alternating current (AC) power or vice-versa and connect to a nearby Point of Interconnection (POI) at the existing Penelec Erie West Substation that is part of the PJM Grid [1]. The route of the 345 kV AC interconnection between the Erie

[1] PJM Grid is the regional transmission organization that coordinates electricity movement in 13 U.S. states and the District of Columbia.

Converter Station property and the Erie West Substation is approximately 1,600 feet in length.

This Erosion and Sedimentation Control Plan applies to the cable route between the Lake Erie shoreline and the Erie Converter Station. The cable route passes through Springfield Township, Girard Township, and Conneaut Township, all in Erie County, Pennsylvania. A separate Erosion and Sedimentation Control Plan has been prepared for the Erie Converter Station site in Conneaut Township.

1.1.3 Pennsylvania Cable Route Site Description

The Pennsylvania cable route includes that portion of the HVDC transmission line that is not under Lake Erie as well as the AC cables that connect the Erie Converter Station to the Erie West Substation. Both the HVDC cables and the AC cables will be installed underground, except where the ends of the cables come out of the ground at the Erie Converter Station and Erie West Substation.

The HVDC underground transmission line consists of two +/- 320 kV transmission cables, one positively charged and the other negatively charged, along with a fiber optic communications cable. Each HVDC cable is approximately 5 inches in diameter, consisting of a stranded copper conductor, extruded solid dielectric insulation, metallic screen, and polyethylene jacket. The AC underground transmission line consists of six +/- 345 kV transmission cables, each approximately 5 inches in diameter, consisting of a segmental copper conductor, cross-linked polyethylene insulation, metallic sheath, and polyethylene jacket.

Both the HVDC and AC transmission lines will typically be installed in a concrete encased PVC conduit with a minimum 3 feet (0.9 m) of cover. The trenches will be backfilled with low thermal resistivity material, such as well-graded sand, stone dust, or fluidized thermal backfill (controlled density low strength concrete). A protective cover of high-density polyethylene (HDPE), concrete, or polymer blocks may be placed above the cable or duct bank (a package of conduits). A marker tape will then be placed 1 foot to 2 feet (0.3 m to 0.6 m) above the cables in the trench. The top 1 foot to 2 feet (0.3 m to 0.6 m) of the trench will be backfilled to match the surrounding area. A representative cross section of a typical duct bank installations is shown on the E&SC Plan drawings.

Trenchless construction methods will be utilized in locations where open trenching is inappropriate due to either physical constraints (roadway or railroad crossings), environmental constraints (certain wetland and stream crossings), and at the transition from the on-land route to the underwater portion of the transmission line at the Lake Erie shoreline. There are two types of trenchless installation that could be used in construction of the Project: Jack & Bore (J&B) and Horizontal Direction Drill (HDD) methods. J&B installations begin by excavating a launching and receiving pit on either side of an obstacle. Once the excavations are open, a hydraulic ram is used to push a steel casing through soil under the obstacle while removing soil inside the casing with an auger. A cutting head on the casing opens the hole; the auger is not advanced ahead of the casing or used for boring. Depending on installation conditions, the steel casing will either be left in place or pushed out by a replacement casing of reinforced concrete pipe or other

material. Once the permanent casing is in place, PVC conduits are installed into the casing on rolling spacers. The annular space between the conduits and the casing is filled using a thermally acceptable free-flowing grout before tying the casing installation into the adjacent trench-installed sections. HDD is accomplished by using a guided drill rig to open a pilot bore, followed by multiple reaming passes of the pilot bore to open the hole to the diameter required to install the pipe bundle into the borehole, typically 50 percent larger than the pipe bundle. Drilling fluid, a combination of water, bentonite clay, and other additives, is used to stabilize the sides of the borehole and carry the cuttings out of the borehole. Bentonite clay is a naturally occurring mineral that is nontoxic. Once the borehole is open and stable, a heat fused length of HDPE is pulled into the borehole.

Along the route, the segments of the cables will be spliced together at intervals not more than 2,500 feet. Splices will typically occur within underground concrete splice vaults, which will have inside dimensions of approximately 28 feet long by 8 feet wide by 6 to 8 feet deep. A representative sketch of a typical splice vault is shown on the E&SC Plan drawings.

The location of the proposed Pennsylvania cable route is shown on the E&SC Plan drawings. The majority of the underground HVDC transmission system will be installed within existing roadway right-of-ways and adjacent to private roads. The anticipated locations of J&B and HDD installed portions of the cables, particularly at stream and wetland crossings, are also shown on the E&SC Plan drawings.

The limit of disturbance associated with the Pennsylvania cable route is shown on the E&SC Plan drawings. Along roads, the cable may be installed within the roadway itself, or outside the roadway but typically within the road right-of-way. The limit of disturbance along roads typically includes the roadway itself (to accommodate any roadway restoration that may be required) as well as applicable portions of the right-of-way outside the roadway itself. Along many roads, the limit of disturbance extends beyond the road right-of-way to accommodate vegetation management areas. Vegetation management areas are necessary for the removal of trees to prevent their root systems from drying out the soils surrounding the cables, which decreases the ability of the soils to conduct heat away from the cables. The width of vegetation management areas varies, depending on soil and groundwater conditions, from 10 feet to 25 feet on either side of the cables. There is not expected to be a great deal of earthwork in most vegetation management areas, since many of these areas already have no trees, and where trees are removed, the roots may remain. But it is conservatively assumed that all vegetation management areas are also disturbed areas in the event that grubbing of the tree stumps is desired.

The limit of disturbance associated with the Pennsylvania cable route also includes six construction laydown areas that will be used to store and assemble materials and equipment. These areas are identified on the E&SC Plan drawings.

The public right-of-ways and private properties in which the Pennsylvania cable route will be constructed (not including vegetation management easements or construction laydown areas) are as follows:

Public Right-of-Ways:
Lexington Road (PennDOT)
Springfield Road (Girard Township and Springfield Township)
Interstate 90 (PennDOT – crossing only)
U.S. Route 20 (PennDOT – crossing only)
Townline Road (Girard Township and Springfield Township)
Pa. Route 5 / West Lake Road (PennDOT)

Private Properties:
(Note: ITC Lake Erie Connector LLC has an executed option agreement to acquire right-of-way on the following properties.)

Tax ID No.:	Owner Name:
04-005-009.0-004.00	Sithe Pennsylvania Holdings LLC
04-005-010.0-011.00	Material Recovery Group Erie
04-005-010.0-006.00	Mary M. Gloskey
04-005-010.0-004.00	Andrew, Jr. and Alice Hazer
04-005-010.0-003.00	Terry A. Lavery
24-021-076.0-001.00	Sedler Trust
24-020-068.0-006.00	Bradley T. Carr
24-020-068.0-008.00	Bradley T. Carr
39-040-014.0-001.00	Thomas S. and Diane M. Newman
24-020-066.0-008.00	William S. Stewart
24-008-066.0-001.00	Patricia K. Puline
24-008-064.0-005.00	Fairview Evergreen Nurseries Inc.
39-005-006.0-005.01	Fairview Evergreen Nurseries Inc.
39-005-004.0-007.00	Carolyn M., Edward L., and Emily M Beck
39-005-003.0-006.00	Carolyn M., Edward L., and Emily M Beck

The applicant for the project is as follows:

ITC Lake Erie Connector LLC
27175 Energy Way
Novi, MI 48377

1.1.4 Plan Preparer, Training, and Experience

This plan has been prepared by Deiss & Halmi Engineering, Inc. Contact information for the plan preparer is as follows:

Steven R. Halmi, P.E.
Deiss & Halmi Engineering, Inc.
105 Meadville Street
Edinboro, PA 16412
Phone: (814) 734-3640
Fax: (814) 734-3643
Email: shalmi@deisshalmi.com

Mr. Halmi is a licensed professional engineer in Pennsylvania. He has a B.S. degree in Civil and Environmental Engineering from Penn State University, and a M.S. degree in Civil and Environmental Engineering from Cornell University. Formal training includes college, graduate, and post-graduate courses in soils, hydrology and hydraulics, stormwater management, erosion and sedimentation control, environmental engineering, and other relevant subjects. Mr. Halmi has prepared numerous erosion and sedimentation control plans of similar scope throughout northwestern Pennsylvania. As such, he is trained and experienced in erosion and sedimentation control design methods and techniques applicable to the size and scope of the project.

Other firms participating in the preparation of this Erosion and Sedimentation Control Plan include HDR Engineering, Inc. and David Laird Associates.

1.2 E&SC PLAN REQUIREMENTS PER 25 PA CODE CHAPTER 102

25 Pa. Code §102.4(b)(5) requires the following items to be described within the narrative and drawings of the E&SC Plan.

1.2.1 The existing topographic features of the project site and the immediate surrounding area.

The topographic features of the project site and the surrounding area are shown on the E&SC Plan drawings. A USGS location map is included in Figure 2.1. The entire project is within the Lake Erie watershed, which slopes very generally from south to north toward Lake Erie.

1.2.2 The types, depth, slope, locations and limitations of the soils.

Soil types have been plotted on the E&SC Plan drawings using shapefiles available on the Pennsylvania Spatial Data Access (PASDA). Soil descriptions are excerpted from the 1960 "Soil Survey for Erie County Pennsylvania" prepared by the United States Department of Agriculture (USDA) Soil Conservation Service. The 1960 soil survey was used for the soil descriptions this report as the data is consistent with the soil mapping available on the PASDA database. Newer soil maps, descriptions, and limitations available from other sources such as the USDA Natural Resources Conservation Service (NRCS) Web Soil Survey are not consistent with the data available on PASDA, limitations identified in the March 2012 Pa. DEP "Erosion and Sediment Pollution Control Manual," nor are they consistent with the soil hydrologic soil group data contained in Exhibit A of NRCS TR-55 which is the most generally accepted modeling method for stormwater management calculations. For these reasons, the PASDA and 1960 "Soil Survey for Erie County Pennsylvania" were used to maintain consistency of data.

Section 3.1 includes soils descriptions and a discussion of soil use limitations for each of the soil types along the Pennsylvania cable route. Soils limitations are excerpted from Appendix E of the March 2012 PaDEP "Erosion and Sediment Pollution Control Manual."

1.2.3 The characteristics of the earth disturbance activity, including the past, present and proposed land uses and the proposed alteration to the project site.

The historical (past 50 years) and current land use of the project area consist of agricultural and rural residential properties. There are two wooded corridors where the cable route is not proposed to follow an existing public road: across Crooked Creek south of U.S. Route 20, and between the CSX Railroad tracks and the Lake Erie shoreline. The future land use, as identified in the 2003 Erie County Land Use and Community Facilities Plan, for the cable route consists of "Rural Resource Area," which indicates that the future land use is projected to be similar to existing.

The proposed transmission lines are underground, and the surface will be restored to existing conditions, except where vegetation management areas require clearing of trees. Because the majority of the route follows existing public right-of-ways, trees along the route for the most part have already been cleared, and further clearing would not bisect wooded areas. For the wooded area that crosses Crooked Creek south of U.S. Route 20, the clearing of trees will be limited to be no closer than 150 feet from the top of the stream bank, which will preserve the existing riparian forested buffer, and will prevent bisection of the wooded corridor along Crooked Creek. For the wooded area between the CSX Railroad and the Lake Erie shoreline, the cable route follows a private driveway, along which trees have already been cleared, although the width of cleared trees will be widened to 50 feet.

As required for the NPDES Permit, the owner as permittee and/or contractor as co-permittee will prepare and implement a Preparedness, Prevention, and Contingency (PPC) Plan when storing, using or transporting materials including: fuels, chemicals, solvents, pesticides, fertilizers, lime, petrochemicals, wastewater, wash water, core drilling wastewater, cement, sanitary wastes, solid wastes or hazardous materials onto, on or from the project site during earth disturbance activities. The PPC Plan will be prepared in accordance with the PaDEP "Guidelines for the Development and Implementation of Environmental Emergency Response Plans." The PPC Plan will be made available upon request by the PaDEP or ECCD.

1.2.4 The volume and rate of runoff from the project site and its upstream watershed area.

Along most of the cable route, the ground surface will be restored to existing condition, which will not alter the volume of runoff from the project site. However, some parts of the cable route through wooded areas will be restored to meadow rather than woods. For this reason, the cable route is divided into the following segments for the purpose of runoff volume calculations:

Segment 1: AC Cable Route and HVDC Cable Route along Lexington Road and Springfield Road

Segment 2: Private R/W between Springfield Road and U.S. Route 20

Segment 3: Townline Road south of the Crooked Creek watershed boundary

Segment 4: Townline Road north of the Crooked Creek watershed boundary, and also Pa. Route 5

Segment 5: Private R/W between Pa. Route 5 and Lake Erie Shoreline

For each of the above segments, separate NPDES Permit Application Worksheets 1 through 4 are provided. These worksheets are in Section 4 of this E&SC Plan.

1.2.5 The location of all surface waters of this Commonwealth which may receive runoff within or from the project site and their classification under Chapter 93.

Surface waters which may receive runoff within or from the project site, and their classification under 25 Pa. Code Chapter 93, are as follows:

Waterbody	Chapter 93 Classification
Lake Erie	CWF
Unnamed Tributaries to Lake Erie	CWF; MF
Crooked Creek (Main Stem)	HQ-CWF; MF
Unnamed Tributaries to Crooked Creek	HQ-CWF; MF

In the above listing, CWF refers to Cold Water Fishes, MF refers to Migratory Fishes, and HQ refers to High Quality.

Development in a High Quality watershed requires certain special protections per the provisions of 25 Pa. Code Chapter 102, including more stringent criteria to be used to design the BMPs for the site, and the use of BMPs considered to be Antidegradation Best Available Combination of Technologies (ABACT) BMPs. A discussion of the proposed erosion and sedimentation control BMPs is in the following section. A discussion of each of the impacted streams and their associated riparian buffers is in Section 1.2.15.

1.2.6 A narrative description of the location and type of perimeter and onsite BMPs used before, during and after the earth disturbance activity.

The following best management practices (BMPs) are proposed for erosion and sedimentation control before, during, and after earth disturbance activities. In the following descriptions, disturbed areas are considered to be stabilized when a uniform 70 percent perennial vegetative cover has been achieved, or the surface has been otherwise covered with a durable, mud free driving surface.

1.2.6.1 Minimize length of open excavation. On many HVDC underground cable projects, cables are direct buried in open trenches, and since the cables can be up to 2,500 feet long, up to 2,500 feet of open trench must be kept open until the cable can be laid. For this project, cables will be installed in concrete encased duct banks. The length of open trench necessary for the installation of the duct bank will typically be less than 200 feet. For each construction day, the length of construction will be limited to that which can be backfilled in that day. The length of time for an excavation to remain open is therefore minimized. As such, the erosion, sediment transport, and dewatering associated with open trenches will also be minimized. This does not preclude the installation of certain short lengths of cable by direct burial. This also does not preclude leaving the ends of the duct bank exposed overnight, provided proper safety measures are used to protect the open excavation.

1.2.6.2 Horizontal directional drilling. At certain streams, HDD will be used to construct the cable conduits across the streams, maintaining a minimum 4 foot cover between the conduit and the stream (or culvert) bottom. An Inadvertent Fluid Release Prevention, Monitoring, and Contingency Plan has been developed to address the inadvertent release of drilling fluids to the surface or due to weak spots in the soil.

1.2.6.3 Avoid construction during stream flow. At certain ephemeral or intermittent streams, construction across the stream will be limited to occur only when there is no stream flow.

1.2.6.4 Culvert bypass. At certain streams where an existing roadway crosses the stream over an existing culvert, the cable duct bank will be placed a minimum of 4 feet underneath the culvert. To the extent possible, the culvert will remain in place during construction to convey the stream across the duct bank excavation.

1.2.6.5 Rock construction entrance with wash rack. A rock construction entrance with wash rack will be constructed where construction vehicles access certain areas of the project, particularly construction laydown areas. The purpose of a rock construction entrance with wash rack is to prevent soil loss from traffic leaving the construction site. Wash racks in construction entrances are for washing of tires only – where it is necessary to wash an entire vehicle prior to leaving the site, this should be done at a site designed to prevent untreated nutrient-enriched wastewater or hazardous wastes from being discharged to surface or ground waters. The location and details for the rock construction entrance with wash rack are shown on the E&SC Plan drawings. The rock construction entrance with wash rack will be installed before significant earth disturbance is to occur at the site, and will remain in place until the site is stabilized such that no significant soil loss onto adjacent roadways is expected.

1.2.6.6 Compost filter sock. Compost filter sock will be placed downgradient of certain disturbed areas to prevent the transport of sediment offsite. Details of the compost filter sock as well as locations for placement are shown on the E&SC Plan drawings. Sediment will be removed from the filter sock when accumulations reach one half the height of the sock. Compost filter socks will be installed before significant earth disturbance occurs upgradient of the compost filter sock, and will remain in place until upgradient disturbed areas have been stabilized.

1.2.6.7 Rock filter. Rock filters will be used in certain existing channels and roadside ditches downgradient of disturbed areas. Details of rock filters as well as locations for placement are shown on the E&SC Plan drawings. Rock filters will include a 6 inch layer of compost on the upgradient side. Rock filters will be installed before significant earth disturbance occurs upgradient of the rock filter, and will remain in place until upgradient disturbed areas have been stabilized, including the channel lining itself, if necessary.

1.2.6.8 Erosion control mulch blanket. Erosion control mulch blankets will be installed on disturbed slopes 3H:1V and steeper. Specifications for erosion control mulch blankets

are presented on the E&SC Plan drawings. Erosion control mulch blankets will be installed as soon as practical after final grade has been achieved, and will remain in place as the permanent vegetative cover is established.

1.2.6.9 Pumped water filter bags. Pumped water filter bags will be connected to the discharge end of all dewatering pumps. Pumped water filter bags will be surrounded by a compost filter sock ring for all dewatering operations within the Crooked Creek watershed. Bags shall be located in a well-vegetated (grassy) area, and discharge onto stable, erosion resistant areas. Where this is not possible, a geotextile underlayment and flow path shall be provided. Bags may be placed on filter stone to increase discharge capacity. Bags shall not be placed on slopes greater than 5%. For slopes exceeding 5%, clean rock or other non-erodible and non-polluting material may be placed under the bag to reduce slope steepness. The pump discharge hose shall be inserted into the bags in the manner specified by the manufacturer and securely clamped. A piece of PVC pipe is recommended for this purpose. The pumping rate shall be no greater than 750 gpm or 1/2 the maximum specified by the manufacturer, whichever is less. Pump intakes shall be floating and screened.

1.2.6.10 Vegetative stabilization. Vegetative stabilization consists of final grading, topsoil placement, seeding, and mulching. If weather conditions are favorable, permanent seeding will take place within 7 days of the completion of the earth disturbance activities. Otherwise, temporary seeding and mulching will be implemented until conditions become favorable for the establishment of permanent vegetative cover. Temporary seeding and mulching will be applied to earth-exposed areas where earthwork is delayed or stopped for a period of 4 or more days. Temporary vegetative stabilization will be maintained until earthmoving recommences, or until the temporary vegetative stabilization is replaced by permanent vegetative stabilization. Specifications for vegetative stabilization are included on the E&SC Plan drawings.

1.2.6.11 Inlet filter bags. Storm sewer inlets are present only in the vicinity of Route 20 and Townline Road. Inlet filter bags will be placed in those inlets downgradient of construction activities. The filter bags shall be capable of trapping all particles not passing a No. 40 sieve. Typical installation details are shown on the E&SC Plan drawings. Inlet filter bags shall be installed according to the manufacturer's specifications.

1.2.6.12 Wetland crossings. Wetland crossings must be avoided wherever possible. Where that is not possible, the location of the crossing and its orientation must be selected so as to have the least possible impact upon the wetland. Movement of vehicles across the wetland must be minimized. Where vehicles need to cross wetlands, the use of a temporary corduroy crossing shall be used due to the potential for rutting. A detail of temporary corduroy crossings is presented on the E&SC Plan drawings.

1.2.7 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.

BMP installation and removal in relation to earth disturbance activities are projected to proceed in accordance with the following relative sequence. This sequence may be repeated for different work areas as the project progresses.

1. Site preparation.
    a. Install rock construction entrance with wash rack at required entrances to construction laydown areas and the site.
    b. In the vicinity of the work area, install compost filter sock as noted on the plans.
    c. In ditches or channels downgradient of work areas, as noted on the plans, install rock filters.
    d. Implement traffic control where necessary.
    e. Install temporary corduroy crossings where wetland crossings cannot be avoided.
2. Typical jack and bore installation.
    a. Excavate bore pit and receiving pit.
    b. Place and align boring equipment.
    c. Commence boring. Add additional casing material as boring progresses.
    d. Remove cuttings from borehole and temporarily stockpile within limits of disturbance.
    e. Remove boring equipment. Leave casing in place.
    f. Insert conduit and spacers through casing.
    g. Backfill bore pit and receiving pit.
3. Typical on-land HDD operation.
    a. Align drill rig at location necessary to achieve proper HDD depth and alignment.
    b. At opposite end of boring, assemble length of conduit to be pulled through borehole.
    c. Excavate small pits at drill entry and exit points as necessary to contain drilling fluid expected to normally discharge from borehole.
    d. Commence drilling operation.
    e. Contain and collect drilling fluids that normally discharge from either end of the borehole.
    f. Monitor for inadvertent returns of drilling fluid at the ground surface. Collect using hand tools, vacuum truck, or similar means. Contain larger inadvertent returns using sandbags or pits for later cleanup.
    g. When borehole is properly sized, pull conduit back through borehole.
    h. Clean any remaining spilt drilling fluids.
4. Typical cable duct bank installation.
    a. Excavate the trench for the duct bank. The length of open excavation for the duct bank will typically be less than 200 feet. Only excavate for what can be constructed and backfilled in the same day.
    b. Prepare trench foundation; install crushed aggregate base if necessary.
    c. Install PVC conduits and conduit spacers as shown on typical section.
    d. Pour thermal duct bank concrete as shown on typical section.

    e. Backfill remaining trench with acceptable backfill, compacted per specifications.
5. Typical splice pit vault placement.
    a. Excavate for vault.
    b. Prepare foundation per specifications.
    c. Install spice pit vault (typically these are precast structures).
    d. Backfill and compact per specifications.
6. Temporary surface restoration.
    a. For roadways, improved shoulders, and driveways, surface will be restored temporarily with a minimum of 18 inches of compacted PennDOT 2A coarse aggregate. Final restoration of roadways and shoulders may occur later in accordance with Township specifications.
    b. For non-roadway areas, surface will be rough graded to be slightly higher than adjacent grade.
7. Pull cable through the duct bank once duct bank is completed. Splice cables at splice locations. Except for vehicles traveling off roadways, the cable pulling operation should not involve a significant earth disturbance.
8. Demobilize the site and construction laydown areas.
9. Remove rock construction entrances and wash racks.
10. Apply permanent vegetative stabilization to all remaining disturbed areas; apply erosion control mulch blanket to all permanent slopes of 3:1 or greater.
11. After all upgradient disturbed areas have been stabilized with permanent vegetation, remove compost filter socks and rock filters.

1.2.8 Supporting calculations and measurements.

1.2.8.1 Stormwater Calculations. Calculations for stormwater runoff volumes are presented in Worksheet 4 in Section 4.1.

1.2.8.2 Compost filter sock. Standard E&S Worksheet #1 for compost filter sock is included in Section 5.1.

1.2.9 Plan drawings.

The E&SC Plan drawings show the location, details, and specifications for all BMPs. The E&SC Plan drawings also show existing contours. Proposed contours will be similar to existing over the entire cable route, except where retentive grading is proposed per the Site Restoration Plan.

1.2.10 A maintenance program which provides for the operation and maintenance of BMPs and the inspection of BMPs 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 for completion of a written report documenting each inspection and all BMP repair, or replacement and maintenance activities.

A maintenance program for erosion and sedimentation control facilities will be implemented, consisting of inspections by the contractor to occur weekly, as well as after any stormwater event, or more frequently where indicated below. Each inspection must be documented in writing as to the date of the inspection, the person performing the inspection, and any BMP repairs, replacement or maintenance activities that occur. Records of these inspections will be kept on site by the contractor, and will be made available upon request to inspectors from PaDEP or the Erie County Conservation District. Inspections will cover all aspects of the BMPs, particularly with regard to the following:

1.2.10.1 Rock construction entrance with wash rack. The rock construction size and thickness will be maintained to the specified dimensions by adding additional rock as necessary. A stockpile will be maintained on site for this purpose. The drain space under the wash rack will be kept open at all times. Damage to the wash rack will be repaired prior to further use of the wash rack. At the end of each construction day, all sediment deposited from the site onto adjacent roadways will be removed and returned to the construction site. Washing the roadway or sweeping deposits into roadside ditches, storm sewers, culverts, or other drainage courses is not acceptable.

1.2.10.2 Compost filter sock. Accumulated sediment shall be removed when it reaches half the aboveground height of the sock. Compost filter socks will be reset as necessary, and repaired according to the manufacturer's specifications. Biodegradable filter socks will be replaced after six months; photodegradable socks after one year. Polypropylene socks will be replaced according to the manufacturer's recommendations. Upon removal, the compost filter socks may be cut open and the mulch spread as a soil supplement.

1.2.10.3 Rock filter. Compost and filter stone that becomes clogged with sediment will be replaced. Damaged rock filters will be repaired immediately after inspection.

1.2.10.4 Erosion control mulch blanket. Areas covered by erosion control mulch blankets will be inspected weekly and after each runoff event until perennial vegetation is established to a minimum uniform 70 percent coverage throughout the blanketed area. Damaged or displaced blankets will be restored or replaced within 4 calendar days.

1.2.10.5 Pumped water filter bags. Filter bags shall be inspected daily. If any problem is detected, pumping shall cease immediately and not resume until the problem is corrected. Filter bags shall be replaced when they become 1/2 full of sediment. Spare bags shall be kept available for replacement of those that have failed or are filled. Bags shall be placed on straps to facilitate removal unless bags come with lifting straps already

attached. A suitable means of accessing the bag with machinery required for disposal purposes shall be provided.

1.2.10.6 Vegetative Stabilization. Seeded areas will be maintained in accordance with the specifications until perennial vegetation is established to a minimum uniform 70 percent coverage.

1.2.10.7 Inlet filter bags. Inlet filter bags shall be inspected on a weekly basis and after each runoff event. Needed repairs should be initiated immediately after the inspection. Filter bags should be cleaned and/or replaced when the bag is half full or when flow capacity has been reduced so as to cause flooding or bypassing of the inlet. Accumulated sediment should be disposed in the approved manner. Bags that will be reused should be rinsed at a location where the rinse water will enter a sediment trap or sediment basin. Damaged filter bags should be replaced.

1.2.11 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 this title.

Excess excavated material and sediments removed from BMPs may be used as fill in a non-wetland upland area. All building materials and wastes (demolition debris, concrete washout, excess building materials, etc.) must be removed from the site and recycled or disposed of in accordance with PaDEP and other applicable regulations. No building materials or wastes will be burned, buried, dumped, or discharged at the site. All applicable federal, state, and local laws and regulations must be followed in the use, handling, and disposal of potentially hazardous materials.

For concrete operations, a suitable washout facility must be provided for the cleaning of chutes, mixers, and hoppers of the delivery vehicles unless such a facility will be used at the source of the concrete. Wash water from these vehicles will not be allowed to enter any surface waters. Proper signage will be provided to drivers so that they are aware of the presence of washout facilities. Washout facilities should not be placed within 50 feet of storm drains, open ditches or surface waters. They should be in a convenient location for the trucks, preferably near the place where the concrete is being poured, but far enough from other vehicular traffic to minimize the potential for accidental damage or spills. Wherever possible, they should be located on slopes not exceeding a 2 percent grade. Self-installed, earthen washouts should be excavated below grade to prevent runoff of the wash water and minimize the potential for breaching. They should be sized to handle solids, wash water, and rainfall. A below-grade washout should be a minimum of 10 feet wide and provide at least 12 inches of freeboard above the liquid and solid waste anticipated between cleanout intervals. The pit should be lined with plastic sheeting of at least 10-mil thickness (with no holes or tears) to prevent leaching of liquids into the ground. Sediment basins and sediment traps may not be used as concrete washout devices, since they discharge directly to surface waters. All concrete washout facilities should be inspected daily. Damaged or leaking washouts should be deactivated and repaired or replaced immediately.

Accumulated materials should be removed when they reach 75 percent capacity. Plastic liners should be replaced with each cleaning of the washout facility.

1.2.12 Identification of the naturally occurring 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 the formations.

There are no known naturally occurring geological formations or soil conditions at the site expected to have the potential to cause pollution during earth disturbance activities. Although fill imported to the site and excess fill removed from the site are not anticipated to be impacted by releases of hazardous or regulated substances, the responsibility for performing environmental due diligence and the determination of clean fill in accordance with the PaDEP Management of Fill policy will reside with the contractor.

1.2.13 Identification of potential thermal impacts to surface waters of this Commonwealth from the earth disturbance activity including BMPs to avoid, minimize or mitigate potential pollution from thermal impacts.

All disturbed areas will be restored to existing conditions, or otherwise revegetated. There are no impervious surfaces associated with the cable route to be constructed. As such, thermal impacts to downstream surface waters are expected to be negligible.

1.2.14 The E&S Plan shall be planned, designed and implemented to be consistent with the PCSM Plan under §102.8 (relating to PCSM requirements). Unless otherwise approved by the Department, the E&S Plan must be separate from the PCSM Plan and labeled ''E&S'' or ''Erosion and Sediment Control Plan'' and be the final plan for construction.

This E&SC Plan has been planned and designed to be consistent with the separate Site Restoration Plan for the cable route.

1.2.15 Identification of existing and proposed riparian forest buffers.

Portions of the Project involve the placement of underground transmission line facilities across (under) waterways within the Crooked Creek watershed that are classified as High Quality (HQ) waters and therefore potentially subject to the provisions of 25 Pa. Code §102.14 relating to riparian buffers. Within the Crooked Creek watershed, with limited exceptions, the Project has been designed to avoid disturbance within 150 feet of Crooked Creek and tributary streams within the Crooked Creek watershed.

The following is a listing of HQ perennial and intermittent streams, ponds, and lakes which are within 150 feet of the proposed transmission line route. The stream identifiers refer to the Lake Erie Connector Project Waterbody Identification and Wetland Delineation Report prepared by HDR Engineering, Inc. Also included is a description of the proposed means to protect the riparian buffers associated with those water bodies.

- Stream SPA-KAS-016 is the perennial stream Crooked Creek. The cables are proposed to be constructed by HDD under the existing pipe culvert which carries Lexington Road across this stream. Using HDD to cross this stream avoids impacts to both the existing roadway crossing and the adjacent riparian buffer areas on either side of the roadway. No earth disturbance is proposed within 150 feet of the stream.

- Pond PPA-KAS-002 is a pond located in the front of a residential house along Lexington Road. The pond appears to be manmade. The limit of disturbance for the cable route is downgradient of this pond, and as such this pond should not be subject to the §102.14 requirements.

- Stream SPA-KAS-017 is an intermittent unnamed tributary (UNT) to Crooked Creek. The cables are proposed to be constructed by HDD under the existing pipe culvert which carries Lexington Road across this stream. Using HDD to cross under this stream and stream culvert avoids impacts to both the existing roadway crossing and the adjacent riparian buffer areas on either side of the roadway. No earth disturbance is proposed within 150 feet of the stream.

- Stream SPA-KAS-018 is an intermittent UNT to Crooked Creek. The cables are proposed to be constructed within the roadway under the existing pipe culvert which carries Springfield Road across this stream. Although temporary earth disturbance is proposed within 150 feet of the stream, the roadway, culvert, and adjacent roadside area will be restored to existing conditions. Since the land surface will not be permanently altered, no riparian buffer equivalency demonstration or offsetting is required.

- Stream SPA-KAS-026 is a perennial UNT to Crooked Creek. The cables are proposed to be constructed within the roadway under the existing pipe culvert which carries Springfield Road across this stream. Although temporary earth disturbance is proposed within 150 feet of the stream, the roadway, culvert, and adjacent roadside area will be restored to existing conditions. Since the land surface will not be permanently altered, no riparian buffer equivalency demonstration or offsetting is required.

- Stream SPA-KAS-031 is an ephemeral UNT to Crooked Creek. Riparian buffer requirements do not apply to ephemeral streams. The cables are not proposed to cross this stream, but do cross upstream of this stream. The existing land cover consists of meadow and a driveway. The restored land cover will also be a meadow and driveway.

- Stream SPA-KAS-025 is an intermittent UNT to Crooked Creek. The cables are proposed to be constructed by HDD under an existing pipe culvert which carries an existing private farm lane across this stream. Using HDD to cross under this stream at the existing culvert location avoids impacts to the stream's riparian buffer. The only earth disturbance proposed within 150 feet of the stream is within a corridor of approximately 15 feet wide consisting of an existing farm lane, which may be maintained for use as an access route for cable construction and maintenance; such road maintenance activities are exempt from the prohibition of earth disturbance within riparian buffers.

- Stream SPA-KAS-016 is the perennial stream Crooked Creek. The cables are proposed to be constructed by HDD to avoid impact to the stream bed and banks and the adjacent riparian buffer areas. No earth disturbance is proposed within 150 feet of the stream.
- Stream SPA-KAS-022 is a perennial UNT to Crooked Creek. This stream conveys water from roadside ditches and storm sewers near the intersection of Cross Station Road and U.S. Route 20. Although temporary earth disturbance is proposed within 150 feet of the stream, no earth disturbance is proposed within 100 feet of the stream. The proposed temporary earth disturbance between 100 and 150 feet of the stream is within an existing graveled parking area constructed on existing fill, which will be restored to existing conditions. Since the land surface will not be permanently altered, no riparian buffer equivalency demonstration is required, and because no disturbance is occurring within 100 feet of the stream or any other body of water, no offsetting is required.

- Stream SPA-KAS-030 is an ephemeral UNT to Crooked Creek. This stream conveys water from roadside ditches and culverts near the intersection of Cross Station Road and U.S. Route 20. The area around this stream has been previously disturbed and filled, and the vegetative cover is not thick. Riparian buffer requirements do not apply to ephemeral streams.

- Stream SPA-KAS-020 is a perennial UNT to Crooked Creek. The cables are proposed to be constructed within the roadway under the existing pipe culvert which carries Townline Road across this stream. Although temporary earth disturbance is proposed within 150 feet of the stream, the roadway, culvert, and adjacent roadside area will be restored to existing conditions. Since the land surface will not be permanently altered, no riparian buffer equivalency demonstration or offsetting is required.

- Stream SPA-KAS-021 is a perennial UNT to Crooked Creek. The cables are proposed to be constructed within the roadway under the existing pipe culvert which carries Townline Road across this stream. Although temporary earth disturbance is proposed within 150 feet of the stream, the roadway, culvert, and adjacent roadside area will be restored to existing conditions. Since the land surface will not be permanently altered, no riparian buffer equivalency demonstration or offsetting is required.

In addition to the above listed HQ perennial and intermittent streams, ponds, and lakes, the following perennial and intermittent streams, ponds, and lakes are not within special protection (HQ or EV) waters and therefore are not subject to 25 Pa. Code §102.14. These areas are listed here for completeness in describing how impacts to waterbodies and their riparian buffers are proposed to be minimized:

- Stream SPA-KAS-006 is a perennial UNT to Lake Erie that flows through wetland adjacent to Townline Road. The stream then crosses Townline Road through an existing pipe culvert. The cables are proposed to be constructed within the roadway itself in order to minimize impacts to the adjacent wetlands. The cables will also pass under the existing culvert which carries Townline Road across this stream. The roadway and culvert will be restored to existing conditions, and construction within the roadway itself minimizes impacts to the adjacent wetlands and riparian buffer areas on either side of the roadway.

- Stream SPA-KAS-005 is a perennial UNT to Lake Erie. The cables are proposed to be constructed under the existing pipe culvert which carries Townline Road across this stream. The roadway and culvert will be restored to existing conditions, and construction within the roadway itself minimizes impacts to the adjacent riparian buffer areas on either side of the roadway.

- Stream SPA-KAS-004 is a perennial UNT to Lake Erie. The cables are proposed to be constructed under the existing pipe culvert which carries Townline Road across this stream. The roadway and culvert will be restored to existing conditions, and construction within the roadway itself minimizes impacts to the adjacent riparian buffer areas on either side of the roadway.

- Stream SPA-KAS-002 is a perennial UNT to Lake Erie. The cables are proposed to be constructed by HDD under the existing box culvert which carries Pa. Route 5 across this stream. Using HDD to cross this stream avoids impacts to both the existing roadway crossing and the adjacent riparian buffer areas on either side of the roadway.

- Stream SPA-KAS-001 is a perennial UNT to Lake Erie. The cables will be installed across the upper reach of this stream by trenching, followed by restoration of the stream bed and banks to existing conditions. The cables are also proposed to be constructed parallel to much of this stream within an existing private gravel road. The private gravel road will be temporarily widened to approximately 15 feet wide. Although trees within 25 feet of the cables will be removed, construction within the existing gravel road minimizes the impacts to the adjacent riparian buffer through which the existing private road passes.

- Lake Erie is a perennial surface water body. The cables are proposed to enter Lake Erie using HDD from the bluff. All HDD drilling operations will be set back over

450 feet from the shoreline and over 300 feet from the bluff crest. As such, the existing riparian buffer will be maintained.

1.3 ANTIDEGRADATION ANALYSIS

For watersheds designated as High Quality (HQ), an antidegradation analysis is required to demonstrate how designated and existing water quality uses will be maintained and protected. The analysis is a multi-step process. First, environmentally sound nondischarge BMPs must be evaluated. If the net change in stormwater discharge during or after construction is not fully eliminated by nondischarge BMPs, the applicant must utilize ABACT BMPs to manage the change. ABACT stands for Antidegradation Best Available Combination of Technologies. If it is not possible to use ABACT BMPs to achieve no net change in stormwater discharge and assure that existing or designated surface water uses are protected, the applicant must provide Social or Economic Justification (SEJ) to demonstrate why any associated reduction in water quality is necessary to accommodate important economic or social development in the area in which the waters are located.

Nondischarge BMP Evaluation. The first non-discharge BMP to consider is alternative project siting such that the development does not impact HQ waters. For this project, selection of an alternative project location which completely avoids earth disturbance to the Crooked Creek watershed is not possible because the Erie West POI with the PJM Grid is itself located within the Crooked Creek watershed.

The restoration of the Pennsylvania cable route to existing conditions is a nondischarge alternative. There are no new impervious surfaces proposed to be constructed as part of the Pennsylvania cable route, and the surface of the site will be restored to be similar to existing conditions. Any impervious surfaces (i.e. gravel driveways) in construction laydown areas will be temporary only; construction laydown areas will be restored to existing conditions. Thus there will generally be no increase in the rate or volume of stormwater runoff. The only exceptions will be where existing wooded areas will be replaced with meadow areas. In those areas, retentive grading will be used to mitigate the increase in volume of stormwater runoff for the 2-year, 24-hour storm. Retentive grading is a nondischarge infiltration BMP.

Protection of riparian buffers and riparian forest buffers must be evaluated as a nondischarge BMP. Section 1.2.15 of this E&SC Plan presents a discussion of the riparian buffers and riparian forest buffers in the project area, and how impacts to those riparian buffers are minimized.

ABACT BMPs. Because the nondischarge BMPs described above are not in themselves sufficient to manage the entire change in stormwater associated with construction activities, ABACT BMPs are necessary. As detailed in the Site Restoration Plan, the BMPs being implemented at this project collectively manage the difference in the net change in stormwater volume, rate, and quality for storm events up to and including the 2-year, 24-hour storm when compared to the stormwater rate, volume and quality prior to earth disturbance activities, and as a result protect the existing quality of the receiving waters within the Crooked Creek and Lake Erie watersheds. For BMPs to be implemented during construction, design features have been

included to meet ABACT guidelines per the PaDEP Erosion and Sediment Pollution Program Manual. BMPs including ABACT design features include rock construction entrances with wash racks, compost filter socks, rock filters with compost layer, and pumped water filter bags with compost filter sock rings.

1.4 CONCLUSION

The project site has been selected to be as straight as possible between the Lake Erie shoreline and the point of interconnection with the existing Erie West Substation. It is in the best interest of the project owner to minimize the duration of construction. For these reasons, the E&SC Plan minimizes the extent and duration of earth disturbance. To the extent practicable, the E&SC Plan avoids disturbance of wooded areas, wetlands, and waterways along the route. Soil compaction will be minimized to be within the limits of disturbance. As the cable route does not propose new impervious surfaces, the generation of increased stormwater runoff is minimized.

This Erosion and Sedimentation Control Plan meets the requirements of the PaDEP at 25 Pa. Code Chapter 102, including the enhanced BMPs and ABACT requirements applicable to projects in high quality watersheds.

Maps and Figures

2.1 Location Map/USGS Quad Map

ERIE WEST SUBSTATION

AC CABLE ROUTE

CONVERTER STATION SITE

DC CABLE ROUTE

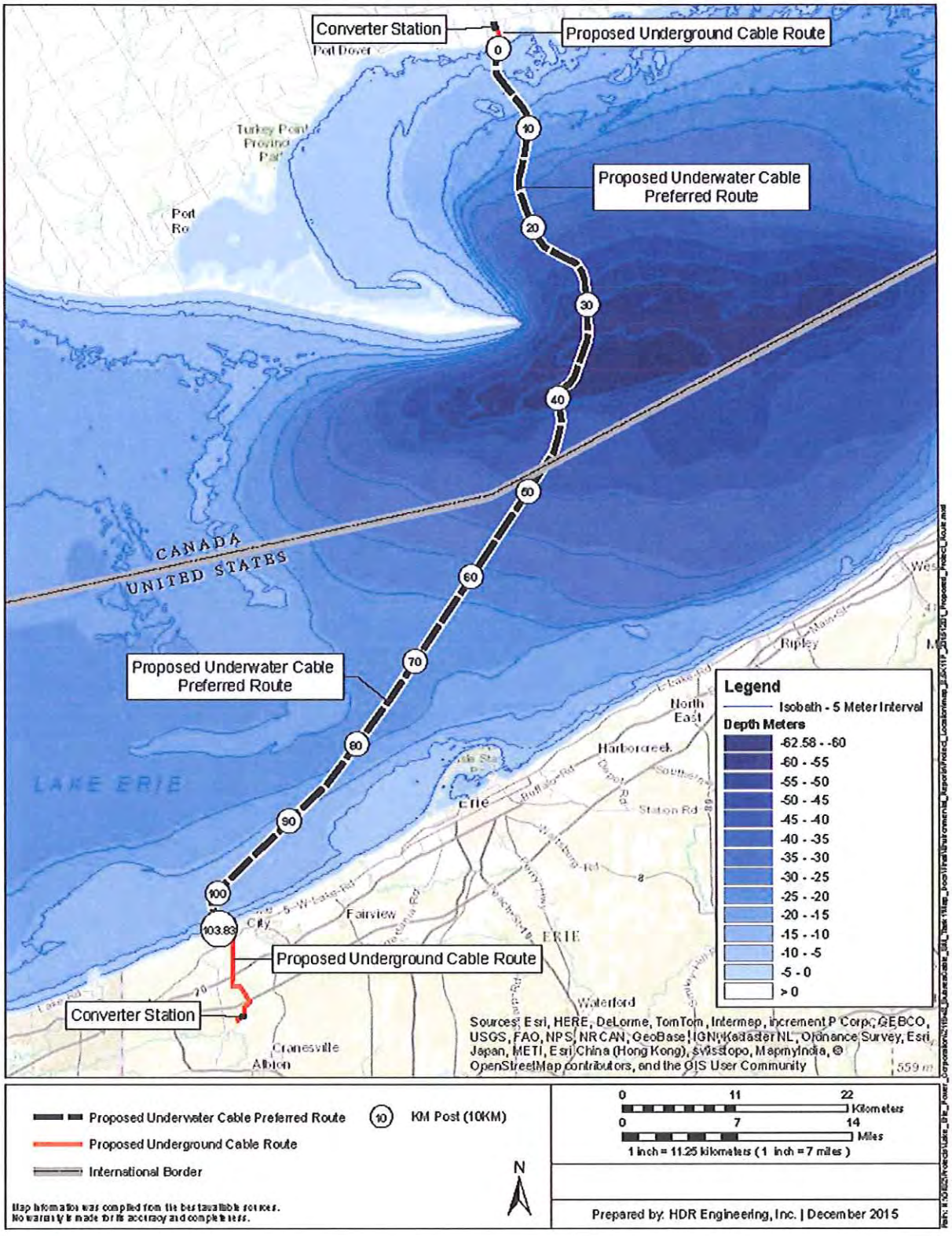
LANDFALL LOCATION

SCALE:
0 2,000 4,000 feet

DATE: 12/23/2015	SCALE: 1"=2,000'	ITC LAKE ERIE CONNECTOR LLC
DRAWN BY: JEFFREY T. BERNOSKY		GIRARD TWP., SPRINGFIELD TWP., CONNEAUT TWP., ERIE COUNTY, PENNSYLVANIA
APPROVED BY:		
DRAWING No.:		

Deiss & Halmi Engineering, Inc.
ENVIRONMENTAL AND CIVIL ENGINEERING
105 Meadville Street, Edinboro PA 16412 Ph. 814-734-3640 Fax 814-734-3643

2.2 Overall Project Map


Converter Station
Proposed Underground Cable Route
Proposed Underwater Cable Preferred Route
Proposed Underwater Cable Preferred Route
Proposed Underground Cable Route
Converter Station
CANADA
UNITED STATES
LAKE ERIE
Legend
Isobath - 5 Meter Interval
Depth Meters
-62.58 - -60
-60 - -55
-55 - -50
-50 - -45
-45 - -40
-40 - -35
-35 - -30
-30 - -25
-25 - -20
-20 - -15
-15 - -10
-10 - -5
-5 - 0
> 0
Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community
Proposed Underwater Cable Preferred Route
Proposed Underground Cable Route
International Border
KM Post (10KM)
Map information was compiled from the best available sources. No warranty is made for its accuracy and completeness.
N
0 11 22 Kilometers
0 7 14 Miles
1 inch = 11.25 kilometers (1 inch = 7 miles)
Prepared by: HDR Engineering, Inc. | December 2015

3.1 Soils Descriptions and Soils Limitations

Soil types have been plotted on the site plan using shape files available on the Pennsylvania Spatial Data Access (PASDA). PASDA is the official public access geospatial information clearinghouse for the Commonwealth of Pennsylvania and has served for fifteen years as Pennsylvania's node on the National Spatial Data Infrastructure, Geospatial One-Stop, and the National Biological Information Infrastructure. PASDA was developed by the Pennsylvania State University as a service to the citizens, governments, and businesses of the Commonwealth. PASDA is a cooperative project of the Governor's Office of Administration, Office for Information Technology, Geospatial Technologies Office and the Penn State Institutes of Energy and the Environment of the Pennsylvania State University.

Soil descriptions are excerpted from the 1960 "Soil Survey for Erie County Pennsylvania" prepared by the United States Department of Agriculture (USDA) Soil Conservation Service. The 1960 soil survey was used for the soil descriptions this report as the data is consistent with the soil mapping available on the PASDA database. Newer soil maps, descriptions, and limitations available from other sources such as the USDA Natural Resources Conservation Service (NRCS) Web Soil Survey are not consistent with the data available on PASDA, limitations identified in the March 2012 Pa. DEP "Erosion and Sediment Pollution Control Manual," nor are they consistent with the soil hydrologic soil group data contained in Exhibit A of NRCS TR-55 which is the most generally accepted modeling method for stormwater management calculations. For these reasons, the PASDA and 1960 "Soil Survey for Erie County Pennsylvania" were used to maintain consistency of data.

Soil use limitations for each of the soil types identified on the site are excerpted from Appendix E of the March 2012 Pa. DEP "Erosion and Sediment Pollution Control Manual."

Soil types identified on the site are as follows:

- BcA - Berrien Fine Sandy Loam, HSG C
- BcB - Berrien Fine Sandy Loam, HSG C
- BdA - Birdsall Silt Loam, HSG D
- BdB - Birdsall Silt Loam, HSG D
- CaB - Canadice Silt Loam, HSG D
- CbC - Canadice Silt Loam, HSG D
- CgB - Conotton Coarse Sandy Loam, HSG B
- CgC - Conotton Coarse Sandy Loam, HSG B
- CgD - Conotton Coarse Sandy Loam, HSG B
- ChA - Conotton Gravelly Loam, HSG B
- ChB - Conotton Gravelly Loam, HSG B
- ChC3 - Conotton Gravelly Loam, Severely Eroded, HSG B
- CkB - Conotton Gravelly Sandy Loam, HSG B
- CkD - Conotton Gravelly Sandy Loam, HSG B
- CmA - Conotton Gravelly Sandy Loam, Moderately Well Drained Variant, HSG B
- CmB - Conotton Gravelly Sandy Loam, Moderately Well Drained Variant ,HSG B
- FaA - Fredon Loam, HSG C
- FaB - Fredon Loam, HSG C
- HaA - Halsey Loam, HSG C/D
- OaA - Ottawa Fine Sandy Loam, HSG B
- OaB - Ottawa Fine Sandy Loam, HSG B
- OaB3 - Ottawa Fine Sandy Loam, Severely Eroded, HSG B
- ObA -Ottawa Loamy Fine Sand, HSG B
- PbA - Platea Silt Loam, HSG C
- PbB - Platea Silt Loam, HSG C
- PcB - Platea Silt Loam, HSG C
- PcC3 - Platea Silt Loam, Severely Eroded and Well Drained, HSG C
- PcD - Platea Silt Loam, Well Drained, HSG C
- RaA - Rimer Fine Sandy Loam, HSG C
- WaA - Wallington Fine Sandy Loam, HSG C
- WaB - Wallington Fine Sandy Loam, HSG C
- WbB3 - Wallington Silt Loam, Severely Eroded, HSG C
- WcA - Wauseon Fine Sandy Loam, HSG B/D
- WdA - Wayland Silt Loam, HSG C/D

The location and boundaries of the mapped soil types in the project area are shown on the drawings. Representative profiles of the soil types present at the site are as follows (adapted from the USDA SCS, Official Series Description):

Berrien Series (BcA and BcB): This is a deep, moderately well drained soil that is sandy and acidic. The following profile is representative of this soil:

0 to 7 inches	Dark-brown fine sandy loam; strong, medium, granular structure; friable when moist; pH 6.2; abrupt, smooth lower boundary.
7 to 9 inches	Yellowish-brown very fine sandy loam; moderate, coarse, subangular blocky structure; friable when moist; pH 6.0; clear, smooth lower boundary.
9 to 20 inches	Yellowish-brown very fine sandy loam; moderate, medium, subangular blocky structure; friable when moist; pH 6.0; clear smooth lower boundary.
20 to 28 inches	Dark yellowish-brown very fine sandy loam with common, coarse, prominent mottles of reddish brown and olive brown; moderate, medium, subangular blocky structure; friable to firm when moist; pH 5.8; clear, smooth lower boundary.
28 to 34 inches	Variegated dark reddish-brown and dark yellowish-brown fine sandy loam; strong coarse, block subangular structure; hard when dry, firm when moist, and nonsticky when wet; pH 5.8; clear, wavy lower boundary.
34 to 40 inches	Dark-brown loamy sand; single grain (structureless) ; pH 6.0; abrupt, wavy lower boundary.
40 to 60 inches+	Gray sandy clay; massive (structureless) ; very hard when dry, plastic when wet; calcareous.

Birdsall series (BdA and BdB): This is a deep, very poorly drained to poorly drained soil derived from lacustrine deposits of glacial origin. The following profile is representative of this soil:

0 to 10 inches	Very dark grayish-brown silt loam; moderate, fine, granular structure; friable when moist
10 to 18 inches	yellowish-brown silt loam with many, fine, distinct mottles of grayish brown; moderate, medium, granular structure; friable when moist
18 to 26 inches	yellowish-brown silty clay loam with common, coarse, distinct mottles of grayish brown; moderate, medium, subangular blocky structure; hard when dry, firm when moist, and sticky when wet
26 to 36 inches	dark grayish-brown silty clay loam with common medium, distinct mottles of yellowish brown; weak, medium, subangular blocky structure; hard when dry, firm when moist, and nonsticky when wet

Canadice Series (CaB and CbC): This is a deep, poorly drained silty soil that's has a subsoil of silty clay loam or silty clay with strong well developed structure. The following profile is representative of this soil:

0 to 8 inches	Brown to dark-brown silt loam; moderate, medium, granular structure; friable when moist; pH 5.6; abrupt smooth lower boundary.
8 to 14 inches	Yellowish-brown silty clay loam with common, medium, distinct mottles of grayish brown and dark brown; strong, thick, platy structure; friable when moist; pH 5.4; clear, smooth lower boundary.
14 to 24 inches	Silty clay loam with a prominent coating od gray clay peds; interiors are light olive brown with many fine, distinct mottles of dark brown to strong brown with strong medium, block structure; firm when moist; pH 5.8, clear smooth lower boundary.
24 to 30 inches	Silty clay with a prominent coating of gray clay on peds; olive-brown interiors; strong coarse, blocky structure; firm when moist, hard when dry, and plastic when wet; pH 6.5; diffuse, wavy lower boundary.
30 to 38 inches	Silty clay with a gray clay coating on peds; olive-brown interiors; strong, very coarse blocky structure; hard when dry, firm when moist and plastic when wet; pH 7.2; diffuse, wavy boundary layer.
38 to 48 inches+	Olive-brown silty clay; strong, very coarse, blocky structure; hard when dry, firm when moist, and plastic when wet; soil material contains free lime and effervesces with dilute hydrochloric acid.

Connotton coarse sandy loam (CgB, CgC, CgD): This soil has a surface layer of coarse sandy loam that's is deep and well drained. The following profile is representative of this soil:

0 to 12 inches	Dark-brown coarse sandy loam; weak, medium, granular structure; friable when moist; pH 5.4; abrupt, smooth lower boundary.
12 to 30 inches	Dark-brown coarse sandy loam; single grain (structureless) friable when moist; pH 5.2; diffuse, wavy lower boundary.
30 to 60 inches	Dark-brown coarse sand and fine gravel; single grain (structureless); friable when moist; pH 5.0; diffuse, wavy lower boundary.
60 to 72 inches+	Dark-brown coarse sand and gravel of mixed size; single grain (structureless; friable when moist; pH 5.0.

Connotton gravely loam (ChA, ChB, ChC3, CkB, and CkD): This is a deep, well-drained, moderately coarse textured to medium textured soil derived from acid shale bedrock and from sandstone and granite of glacial origin sorted and deposited by wave action. Surface drainage is somewhat poorly drained to poorly drained. The following profile is representative of this soil:

0 to 8 inches	dark-brown gravelly loam; weak, fine, granular structure; friable when moist
8 to 11 inches	brown loam; weak, medium, subangular blocky structure; slightly hard when dry, friable when moist, and nonsticky when wet
11 to 18 inches	reddish-brown coarse sandy loam; weak, medium, subangular blocky structure; slightly hard when dry, very friable when moist, and nonsticky when wet
18 to 24 inches	dark-brown loamy coarse sand; weak, medium, subangular blocky structure; friable when moist
24 to 26 inches	strong-brown loamy fine sand; moderate, medium, subangular blocky structure; slightly hard when dry, very friable when moist, and nonsticky when wet
26 to 56 inches+	brown loamy fine sand and gravel; stratified; structureless; friable when moist

Connotton moderately well drained variants (CmA and CmB): This is a deep, moderately well-drained, moderately coarse textured to medium textured soil derived from acid shale bedrock and from sandstone and granite of glacial origin sorted and deposited by wave action. The soils have a firm, compact layer that is moderately permeable to air and water. The following profile is representative of this soil:

0 to 7 inches	dark-brown gravelly sandy loam; weak, coarse, granular structure; friable when moist
7 to 12 inches	reddish-brown coarse sandy loam; moderate, coarse, granular structure; friable when moist
12 to 20 inches	yellowish-red coarse sandy loam; moderate, medium, subangular blocky structure; friable when moist
20 to 28 inches	dark-brown coarse sandy loam; moderate, thick, platy structure; friable when moist
28 to 33 inches	dark grayish-brown coarse sandy loam with common, fine, distinct mottles of light olive brown and strong brown; strong, coarse, subangular blocky structure; hard when dry, firm when moist
33 to 72 inches+	dark-brown loamy, sandy gravel; stratified; single grain (structureless); friable when moist

Fredon loam (FaA and FaB): The Fredon series consists of deep, somewhat poorly drained to poorly drained soils. The soils are on flats and in depressions of the gravelly beach ridges of the lake plain and are also on gravelly outwash terraces along stream valleys in the upland. The parent material consisted of alternate layers of sand, silt, and gravel mixed with some clay. It was derived from acid shale bedrock and sediments of sandstone and granite of glacial origin. This material was sorted and deposited by water.

0 to 10 inches	very dark brown to dark yellowish-brown loam; moderate, medium, granular structure; friable when moist; pH 5.8; clear, smooth lower boundary.
10 to 20 inches	dark-brown silt loam; weak, medium, subangular blocky structure; friable when moist, slightly sticky when wet; pH 6.0; clear, smooth lower boundary.
20 to 28 inches	yellowish-brown silt loam with many coarse distinct mottles of grayish brown; moderate, thin, platy structure; hard when dry, firm when moist; pH 5.8; gradual, wavy lower boundary.
28 to 35 inches	grayish-brown silt loam with many, fine, distinct mottles of yellowish brown; moderate, medium, subangular blocky structure; loose when dry, friable when moist; pH 6.0; clear, smooth lower boundary.
35 to 48+ inches	yellowish-brown stratified sand and gravel; single grain (structureless); pH 6.2.

Halsey Series (HaA: The Halsey soils are deep and are very poorly drained. They occur in depressions on the gravelly beach ridges along the lake plain and also on gravelly outwash terraces along stream valleys in the upland. The parent material consisted of alternate layers of sand, silt, and gravel mixed with some clay. It was derived from acid shale bedrock and sediments of sandstone and granite of glacial origin. This material was sorted and deposited by water.

0 to 7 inches	very dark grayish-brown loam; moderate, fine, granular structure; friable when moist; pH 5.8; gradual, smooth lower boundary
7 to 12 inches	dark-brown silt loam with many, medium, distinct mottles of strong brown; moderate, coarse, granular structure; friable when moist; pH 6.0; clear, smooth lower boundary
12 to 15 inches	very dark grayish-brown silty clay loam with many, medium, distinct mottles of gray and dark reddish brown; strong, medium, granular structure; friable when moist, slightly sticky when wet; pH 5.8; abrupt, smooth lower boundary
15 to 25 inches	grayish-brown silt loam with many, coarse, distinct mottles of dark brown; moderate, medium, subangular blocky structure; friable when moist, slightly sticky when wet; pH 6.2; gradual, smooth lower boundary.
25 to 30 inches	yellowish-brown loam with many, coarse, distinct mottles of gray; weak, medium, subangular blocky structure; friable when moist, slightly sticky when wet; pH 6.6; gradual, smooth lower boundary.
30 to 42 inches +	variegated brownish-yellow and dark yellowish-brown, stratified loamy sand to sandy loam; single grain (structureless) to weak, medium, subangular blocky structure; friable when moist; pH 7.0

Ottawa Series (OaA, OaB, OaB3, and ObA): This is a deep and well-drained soil. It is acidic and sandy. The following profile is representative of this soil:

0 to 7 inches	Very dark yellowish-brown loam fine sand; weak, fine, granular structure; friable when moist; pH 5.5; abrupt, smooth lower boundary.
7 to 14 inches	Yellowish-brown fine sandy loam; weak, medium, subangular blocky structure; friable when moist; pH 5.6; clear, smooth lower boundary.
14 to 24 inches	Dark yellowish-brown loamy sand with a reddish-brown coating on the soil particles; strong, coarse, blocky structure; friable when moist; pH 5.8; gradual, wavy lower boundary.
24 to 36 inches	Brownish-yellow and dark yellowish-brown loamy sand with a reddish-brown coating on coarse sand grains; weak, thick, platy structure; hard when dry, friable when moist; pH 6.0; gradual, wavy lower boundary.
36 to 52 inches	Variegated gray and dark grayish-brown loamy sand; weak, thick, platy structure to single grain (structureless) ; friable when moist; pH 6.2; abrupt smooth lower boundary.
52 to 144 inches+	Gray silt loam; strong medium, platy structure to massive (structureless) ; very firm when moist, plastic when wet; pH 7.0 as a depth of 54 inches; violent effervescence with dilute hydrochloric acid at a depth of 72 inches.

Platea series (PbA, PbB, PcC3, and PcD): The Platea series consists of deep, somewhat poorly drained soils on the upland. The parent material was silty glacial till containing a few rounded pebbles of granite and sandstone. Moderately well drained variants of the Platea series occupy sites having favorable internal drainage.

0 to 8 inches	dark-brown silt loam; weak, fine, granular structure; friable when moist; pH 4.8; clear, wavy lower boundary.
8 to 15 inches	brown silt loam with common, medium, distinct mottles of light brownish gray and strong brown; compound structure—weak, medium, platy and weak, medium, subangular blocky; friable when moist, nonplastic when wet; pH 4.8; clear, wavy lower boundary.
15 to 28 inches	yellowish-brown silt loam with common, medium, distinct mottles of gray and strong brown; moderate, medium, blocky structure; hard when dry, firm when moist, and slightly plastic when wet; pH 5.6; clear, irregular lower boundary.
28 to 38 inches	dark yellowish-brown silt loam with common, coarse, distinct mottles of gray and dark brown; very coarse prisms that break to moderate, medium, blocky or platy structure; thick coating of clay on the structural units; hard when dry, firm when moist, and slightly plastic when wet; pH 5.8; gradual, wavy lower boundary.
38 to 48 inches	dark-brown silt loam with medium, distinct, mottles of gray; very coarse prisms that break to moderate, medium, platy structure; thick coating of clay on the structural units; firm when moist, slightly plastic when wet; pH 5.8; gradual, wavy lower boundary.
48 to 60 inches	dark yellowish-brown silt loam with a few, medium, distinct mottles of gray; very coarse prisms that break to moderate, medium, platy structure; distinct, thin coating of clay on the structural units; firm when moist, slightly plastic when wet; pH 6.8; gradual, wavy lower boundary.
60 to 80 inches	olive-brown silt loam; moderate, thick, platy structure; firm when moist, slightly plastic when wet; pH 7.2.

Rimer series (RaA): This is made up of deep, somewhat poorly drained to poorly drained, sandy soils. The soils are acid, but are among the most important soils of the lake plain for vineyards. The following profile is representative of this soil:

0 to 9 inches	very dark brown to dark brown fine sandy loam with weak, medium, faint mottles of gray; very weak, medium fine, granular structure; very friable to friable when moist; pH 5.6; abrupt, smooth lower boundary.
9 to 15 inches	yellowish-brown fine sandy loam with common, medium, distinct mottles of grayish brown and strong brown and a few black concretions with dark reddish-brown centers; weak, medium, subangular blocky to platy structure; friable when moist; pH 6.0; abrupt, irregular lower boundary.
15 to 19 inches	strong-brown fine sandy loam with common, coarse, distinct mottles of yellowish brown and yellowish red and streaks and concretions of iron and manganese; weak, coarse, blocky structure; very hard when dry, very firm when moist, and nonplastic when wet; pH 6.2; clear, irregular lower boundary.
19 to 22 inches	dark yellowish-brown to yellowish-brown loamy fine sand with common, medium, distinct mottles of yellowish red; massive (structureless); hard when dry, firm when moist, and nonplastic when wet; pH 6.8; clear, irregular lower boundary.
22 to 32 inches	dark yellowish-brown loamy sand with reddish-brown streaks; single grain (structureless); friable when moist; pH 6.8; clear, irregular lower boundary.
32 to 38 inches	very dark grayish-brown to dark-brown gravelly sand; single grain (structureless); friable when moist; pH 7.2; abrupt, smooth lower boundary with oil material containing some cobblestones and boulders.
38 to 48 inches+	gray silt loam; weak, medium, platy structure; very firm when moist, plastic when wet; effervesces with dilute hydrochloric acid.

Wayland silt loam (WdA): The Wayland series consists of deep, somewhat poorly drained to poorly drained soils on the flood plains of streams. In spring the soils are covered by water for long periods. The parent material was made up of sediments of silt and clay washed down from the upland. This material was derived from acid shale bedrock and from sandstone and limestone of glacial origin.

0 to 10 inches	dark-gray silt loam with common, coarse, distinct mottles of yellowish brown; moderate, medium, granular structure; friable when moist; pH 5.8; clear, smooth lower boundary.
10 to 25 inches	light brownish-gray silty clay loam with common, coarse, distinct mottles of olive brown and strong brown; moderate, coarse, granular structure; firm when moist, nonsticky when wet; pH 6.4; gradual, smooth lower boundary.
25 to 35+ inches	light yellowish-brown silty clay loam with common, coarse, distinct mottles of olive brown and strong brown; moderate, medium, granular structure; firm when moist, slightly sticky when wet; pH 6.8.

Wallington fine sandy loam (WaA, WaB and WbB3): This is a deep, somewhat poorly drained to poorly drained soil consisting of lacustrine deposits derived from acid shale bedrock and from sandstone and limestone of glacial origin. A firm layer (fragipan) that is slowly permeable to air and water begins at depths of 10 to 18 inches. The following profile is representative of this soil:

0 to 8 inches	dark yellowish-brown silt loam; moderate, coarse, granular structure; friable when moist.
8 to 11 inches	dark yellowish-brown silt loam; moderate, medium, granular structure; friable when moist.
11 to 16 inches	very pale brown silt loam with common, coarse, distinct mottles of dark yellowish brown and brownish yellow; weak, fine, subangular blocky structure; slightly hard when dry, firm when moist, and nonplastic when wet.
16 to 25 inches	yellowish-brown loam; light brownish-gray clay forms a thin coat on the soil particles and fills the cracks; very coarse prisms that break to strong, coarse, subangular blocky structure; hard when dry, firm when moist, and nonplastic when wet.
25 to 35 inches	dark yellowish-brown silt loam with many, coarse, distinct mottles of olive brown and grayish brown; very coarse prisms that break to moderate, medium, subangular blocky structure; hard when dry, firm when moist, and nonplastic when wet.
35 to 41 inches	olive-brown, heavy silt loam with common coarse, distinct mottles of grayish brown; weak, coarse, subangular blocky structure; firm when moist, slightly plastic when wet.
41 to 60 inches+	olive-brown, heavy silt loam with a few, coarse, distinct mottles of grayish brown; weak, coarse, subangular blocky structure; firm when moist, slightly plastic when wet.

Wauseon Series (WcA): The Wauseon soils are deep, very poorly drained, acid, and sandy. The parent material consisted of acid lacustrine sands that were sorted and deposited by water. The following profile is representative of Wauseon soils:

0 to 9 inches	very dark brown to very dark grayish-brown very fine sandy loam to fine sandy loam; moderate, medium, granular structure; friable when moist; pH 5.6; clear, smooth lower boundary.
9 to 18 inches	light olive-brown sandy loam with many, coarse, distinct mottles of yellowish brown; weak, medium, subangular blocky structure; hard when dry, firm when moist, and slightly sticky when wet; pH 6.0; gradual, smooth lower boundary.
18 to 26 inches	yellowish-red loamy sand; soil particles coated with light olive brown; moderate, medium, subangular blocky structure; hard when dry, firm when moist, and nonplastic when wet; pH 6.4; gradual, smooth lower boundary.
26 to 48 inches	light olive-brown loamy sand with many coarse, distinct mottles of yellowish brown; stratified; single grain (structureless); friable when moist; pH 6.6; clear, wavy lower boundary.
48 to 72 inches+	gray silt loam; massive (structureless); hard when dry, very firm when moist, and plastic to fluid when wet; pH 7.2 at a depth of 48 inches; effervesces with dilute hydrochloric acid at a depth of 60 inches.

Soil Name	Cutbanks Cave	Corrosive to Concrete/Steel	Droughty	Easily Erodible	Flooding	Depth to Saturated Zone/ Seasonal High Water Table	Hydric/Hydric Inclusions	Low Strength/ Landslide Prone	Slow Percolation	Piping	Poor Source of Topsoil	Frost Action	Shrink-Swell	Potential Sinkhole	Ponding	Wetness
Berrien	X	S		X		X	X		X	X		X			X	
Birdsall	X	c/s				X	X	X	X	X	X	X	X		X	X
Canadice	X	S		X		X	X	X	X		X	X	X		X	X
Conotton	X	c/s	X	X		X	X	X	X	X	X	X				
Fredon	X	c/s	X	X		X	X	X	X		X	X				X
Halsey	X	c/s		X	X	X	X	X	X	X	X	X				X
Ottawa	X	C	X						X			X				
Platea	X	c/s		X		X	X	X	X	X		X				X
Rimer	X	c/s	X	X		X	X		X	X	X	X	X			X
Wallington	X	c/s		X		X	X	X	X	X	X	X				X
Wauseon	X	c/s				X	X	X	X	X	X	X			X	X
Wayland	X	S		X	X	X	X	X	X	X	X	X			X	X

Summary of soil limitations

Proposed measures to address soil limitations:

1. Cutbanks Cave. There will be no exposed cutbanks upon completion of the project. The contractor shall adhere to all OSHA regulations regarding excavation and shoring/bracing or sloping trench walls.

2. Corrosive to Concrete/Steel. Concrete and steel structures shall be designed by the supplier for direct burial.

3. Droughty. Vegetation management areas have been established to protect the cables from dryout.

4. Easily Erodible. All disturbed surfaces will be stabilized either with vegetation to prevent erosion. Slopes of 3H:1V and steeper will be stabilized using an erosion control mulch blanket until a uniform 70% vegetative cover has been established.

5. Flooding. Flooding is not expected to have an adverse impact on this project.

6. Depth to Saturated Zone/Seasonal High Water Table. Soil borings have been investigated and the seasonal high water table is not expected to cause problems for this project. Appropriate dewatering BMPs are provided for during construction.

7. Hydric/Hydric Inclusions. Wetlands have been delineated within the project area. The area proposed for development on the site has been located to protect the delineated wetlands.

8. Low Strength/Landslide Prone. The proposed grades and construction activities located in these areas are not subject to landslides.

9. Slow Percolation. Slow percolation is not expected to have an adverse impact on this project.

10. Piping. Piping is not expected to have an adverse impact on this project.

11. Poor Source of Topsoil. The project is not dependent upon a significant depth of topsoil. What topsoil is available on site will be stockpiled and redistributed on areas that are to be seeded. Any additional topsoil that is required beyond what is available on site will be imported from a supplier.

12. Frost Action. This limitation will not have an adverse effect on the proposed activity.

13. Shrink/Swell. This limitation will not have an adverse effect on the proposed activity.

14. Ponding. Ponding is not expected to have an adverse impact on this project.

15. Wetness. Wetness is not expected to have an adverse impact on this project.

4.1 PaDEP NPDES Permit Worksheets

Worksheet 4. Change in Runoff Volume for 2-YR Storm Event

PROJECT: Lake Erie Connector - Pennsylvania Cable Route
Drainage Area: Segment 1: Lexington and Springfield roads (Crooked Creek Watershed)
2-Year Rainfall: 2.56 in

Total Site Area: 32.95 acres
Protected Site Area: 10.66 acres
Managed Site Area: 22.29 acres

Existing Conditions:

Cover Type/Condition	Soil Type	Area (sf)	Area (ac)	CN	S	Ia (0.2*S)	Q Runoff[1] (in)	Runoff Volume[2] (ft3)
Woods (good condition)	B	34412	0.79	55	8.18	1.64	0.09	269
Meadow (good condition)	B	215186	4.94	58	7.24	1.45	0.15	2653
Meadow (good condition)	C	436907	10.03	71	4.08	0.82	0.52	18983
Meadow (good condition)	D	23522	0.54	78	2.82	0.56	0.83	1621
Impervious	N/A	260924	5.99	98	0.20	0.04	2.33	50671
TOTAL:		970952	22.29					74197

Developed Conditions:

Cover Type/Condition	Soil Type	Area (sf)	Area (ac)	CN	S	Ia (0.2*S)	Q Runoff[1] (in)	Runoff Volume[2] (ft3)
Woods (good condition)	B	34412	0.79	55	8.18	1.64	0.09	269
Meadow (good condition)	B	215186	4.94	58	7.24	1.45	0.15	2653
Meadow (good condition)	C	436907	10.03	71	4.08	0.82	0.52	18983
Meadow (good condition)	D	23522	0.54	78	2.82	0.56	0.83	1621
Impervious	N/A	260924	5.99	98	0.20	0.04	2.33	50671
TOTAL:		970952	22.29					74197

2-Year Volume Increase (ft^3): 0

2-Year Volume Increase = Developed Conditions Runoff Volume - Existing Conditions Runoff Volume

1. Runoff (in) = $Q = (P-0.2S)^2 / (P+0.8S)$ where
   P = 2-Year Rainfall (in)
   S = (1000/CN) - 10

2. Runoff Volume (CF) = Q x Area x 1/12
   Q = Runoff (in)
   Area = Land use area (sq. ft.)

Note: Runoff Volume must be calculated for EACH land use type/condition and HSGl. The use of a weighted CN value for volume calculations is not acceptable.

Worksheet 4. Change in Runoff Volume for 2-YR Storm Event

PROJECT: Lake Erie Connector - Pennsylvania Cable Route
Drainage Area: Segment 2 : Between Springfield Rd. and Rte. 20 (Crooked Creek Watershed)
2-Year Rainfall: 2.56 in

Total Site Area: 15.01 acres
Protected Site Area: 4.63 acres
Managed Site Area: 10.38 acres

Existing Conditions:

Cover Type/Condition	Soil Type	Area (sf)	Area (ac)	CN	S	Ia (0.2*S)	Q Runoff[1] (in)	Runoff Volume[2] (ft3)
Woods (good condition)	B	105851	2.43	55	8.18	1.64	0.09	826
Woods (good condition)	C	436	0.01	70	4.29	0.86	0.48	18
Meadow (good condition)	B	312325	7.17	58	7.24	1.45	0.15	3851
Meadow (good condition)	C	8712	0.20	71	4.08	0.82	0.52	379
Impervious (gravel drive and farm lane)	N/A	24829	0.57	98	0.20	0.04	2.33	4822
TOTAL:		452153	10.38					9895

Developed Conditions:

Cover Type/Condition	Soil Type	Area (sf)	Area (ac)	CN	S	Ia (0.2*S)	Q Runoff[1] (in)	Runoff Volume[2] (ft3)
Meadow (good condition)	B	418176	9.60	58	7.24	1.45	0.15	5156
Meadow (good condition)	C	9148	0.21	71	4.08	0.82	0.52	397
Impervious (gravel drive and farm lane)	N/A	24829	0.57	98	0.20	0.04	2.33	4822
TOTAL:		452153	10.38					10375

2-Year Volume Increase (ft^3): 480

2-Year Volume Increase = Developed Conditions Runoff Volume - Existing Conditions Runoff Volume

1. Runoff (in) = $Q = (P-0.2S)^2 / (P+0.8S)$ where
   P = 2-Year Rainfall (in)
   S = (1000/CN) - 10

2. Runoff Volume (CF) = Q x Area x 1/12
   Q = Runoff (in)
   Area = Land use area (sq. ft.)

Note: Runoff Volume must be calculated for EACH land use type/condition and HSGI. The use of a weighted CN value for volume calculations is not acceptable.

Worksheet 4. Change in Runoff Volume for 2-YR Storm Event

PROJECT: Lake Erie Connector - Pennsylvania Cable Route
Drainage Area: Segment 3 : Townline Road (Crooked Creek Watershed)
2-Year Rainfall: 2.56 in

Total Site Area: 10.80 acres
Protected Site Area: 0.54 acres
Managed Site Area: 10.26 acres

Existing Conditions:

Cover Type/Condition	Soil Type	Area (sf)	Area (ac)	CN	S	Ia (0.2*S)	Q Runoff[1] (in)	Runoff Volume[2] (ft3)
Impervious	N/A	107158	2.46	98	0.20	0.04	2.33	20810
Meadow (good condition)	B	228254	5.24	58	7.24	1.45	0.15	2814
Meadow (good condition)	C	86249	1.98	71	4.08	0.82	0.52	3747
Meadow (good condition)	D	25265	0.58	78	2.82	0.56	0.83	1741
TOTAL:		446926	10.26					29113

Developed Conditions:

Cover Type/Condition	Soil Type	Area (sf)	Area (ac)	CN	S	Ia (0.2*S)	Q Runoff[1] (in)	Runoff Volume[2] (ft3)
Impervious	N/A	107158	2.46	98	0.20	0.04	2.33	20810
Meadow (good condition)	B	228254	5.24	58	7.24	1.45	0.15	2814
Meadow (good condition)	C	86249	1.98	71	4.08	0.82	0.52	3747
Meadow (good condition)	D	25265	0.58	78	2.82	0.56	0.83	1741
TOTAL:		446926	10.26					29113

2-Year Volume Increase (ft^3): 0

2-Year Volume Increase = Developed Conditions Runoff Volume - Existing Conditions Runoff Volume

1. Runoff (in) = $Q = (P-0.2S)^2 / (P+0.8S)$ where
   P = 2-Year Rainfall (in)
   S = (1000/CN) - 10

2. Runoff Volume (CF) = Q x Area x 1/12
   Q = Runoff (in)
   Area = Land use area (sq. ft.)

Note: Runoff Volume must be calculated for EACH land use type/condition and HSGI. The use of a weighted CN value for volume calculations is not acceptable.

Worksheet 4. Change in Runoff Volume for 2-YR Storm Event

PROJECT: Lake Erie Connector - Pennsylvania Cable Route
Drainage Area: Segment 4 : Townline Rd. and Rte 5 (UNT to Lake Erie)
2-Year Rainfall: 2.56 in

Total Site Area: 12.49 acres
Protected Site Area: 1.26 acres
Managed Site Area: 11.23 acres

Existing Conditions:

Cover Type/Condition	Soil Type	Area (sf)	Area (ac)	CN	S	Ia (0.2*S)	Q Runoff[1] (in)	Runoff Volume[2] (ft3)
Woods (good condition)	B	9148	0.21	55	8.18	1.64	0.09	71
Woods (good condition)	C	19602	0.45	70	4.29	0.86	0.48	791
Woods (good condition)	D	6534	0.15	77	2.99	0.60	0.78	424
Meadow (good condition)	B	143748	3.30	58	7.24	1.45	0.15	1772
Meadow (good condition)	C	64904	1.49	71	4.08	0.82	0.52	2820
Meadow (good condition)	D	14810	0.34	78	2.82	0.56	0.83	1021
Impervious	N/A	230432	5.29	98	0.20	0.04	2.33	44750
TOTAL:		489179	11.23					51649

Developed Conditions:

Cover Type/Condition	Soil Type	Area (sf)	Area (ac)	CN	S	Ia (0.2*S)	Q Runoff[1] (in)	Runoff Volume[2] (ft3)
Woods (good condition)	B	9148	0.21	55	8.18	1.64	0.09	71
Woods (good condition)	C	19602	0.45	70	4.29	0.86	0.48	791
Woods (good condition)	D	6534	0.15	77	2.99	0.60	0.78	424
Meadow (good condition)	B	143748	3.30	58	7.24	1.45	0.15	1772
Meadow (good condition)	C	64904	1.49	71	4.08	0.82	0.52	2820
Meadow (good condition)	D	14810	0.34	78	2.82	0.56	0.83	1021
Impervious	N/A	230432	5.29	98	0.20	0.04	2.33	44750
TOTAL:		489179	11.23					51649

2-Year Volume Increase (ft^3): 0

2-Year Volume Increase = Developed Conditions Runoff Volume - Existing Conditions Runoff Volume

1. Runoff (in) = $Q = (P-0.2S)^2 / (P+0.8S)$ where
   P = 2-Year Rainfall (in)
   S = (1000/CN) - 10

2. Runoff Volume (CF) = Q x Area x 1/12
   Q = Runoff (in)
   Area = Land use area (sq. ft.)

Note: Runoff Volume must be calculated for EACH land use type/condition and HSGI. The use of a weighted CN value for volume calculations is not acceptable.

Worksheet 4. Change in Runoff Volume for 2-YR Storm Event

PROJECT: Lake Erie Connector - Pennsylvania Cable Route
Drainage Area: Segment 5 : North of Rte. 5 (UNT to Lake Erie)
2-Year Rainfall: 2.56 in

Total Site Area: 14.95 acres
Protected Site Area: 8.82 acres
Managed Site Area: 6.13 acres

Existing Conditions:

Cover Type/Condition	Soil Type	Area (sf)	Area (ac)	CN	S	Ia (0.2*S)	Q Runoff[1] (in)	Runoff Volume[2] (ft3)
Woods (good condition)	B	110207	2.53	55	8.18	1.64	0.09	860
Woods (good condition)	C	59677	1.37	70	4.29	0.86	0.48	2408
Woods (good condition)	D	19602	0.45	77	2.99	0.60	0.78	1271
Meadow	B	47045	1.08	58	7.24	1.45	0.15	580
Impervious (gravel driveway)	N/A	30492	0.70	98	0.20	0.04	2.33	5922
TOTAL:		267023	6.13					11041

Developed Conditions:

Cover Type/Condition	Soil Type	Area (sf)	Area (ac)	CN	S	Ia (0.2*S)	Q Runoff[1] (in)	Runoff Volume[2] (ft3)
Meadow	B	157252	3.61	58	7.24	1.45	0.15	1939
Meadow	C	59677	1.37	71	4.08	0.82	0.52	2593
Meadow	D	19602	0.45	78	2.82	0.56	0.83	1351
Impervious (gravel driveway)	N/A	30492	0.70	98	0.20	0.04	2.33	5922
TOTAL:		267023	6.13					11804

2-Year Volume Increase (ft^3): 763

2-Year Volume Increase = Developed Conditions Runoff Volume - Existing Conditions Runoff Volume

1. Runoff (in) = $Q = (P-0.2S)^2 / (P+0.8S)$ where
   P = 2-Year Rainfall (in)
   S = (1000/CN) - 10

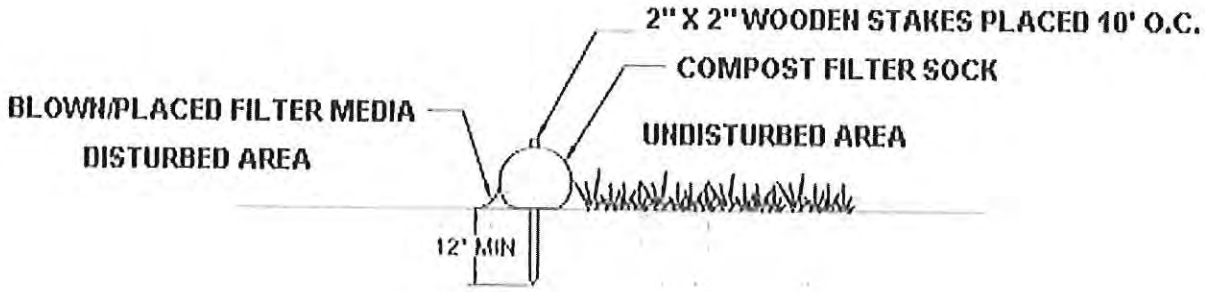
2. Runoff Volume (CF) = Q x Area x 1/12
   Q = Runoff (in)
   Area = Land use area (sq. ft.)

Note: Runoff Volume must be calculated for EACH land use type/condition and HSGI. The use of a weighted CN value for volume calculations is not acceptable.

5.1 Compost Filter Sock Design Worksheets

STANDARD E&S WORKSHEET #1
Compost Filter Socks

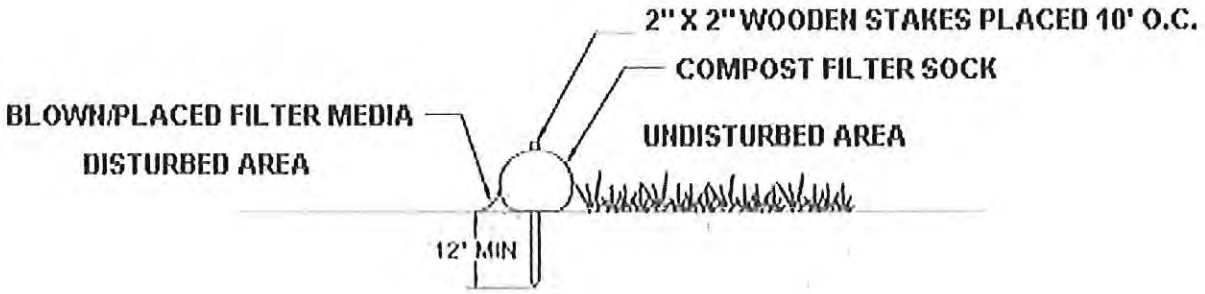
PROJECT NAME: LAKE ERIE CONNECTOR
LOCATION: PA CABLE ROUTE
PREPARED BY: ABH DATE: 12/23/2015
CHECKED BY: SRH DATE: 12/23/2015



SOCK NO.	Dia. In.	LOCATION	SLOPE PERCENT	SLOPE LENGTH ABOVE BARRIER (FT)
	18"	Sta. 119+50 left	7%	275'
	12"	Sta. 125+50 right	2%	300'
	12"	Sta. 165+50 Center	2%	400'
	12"	Sta. 170+00 left	1.5%	500'
	12"	Sta. 189+00 left	1%	>50'
	12"	Sta. 203+33 right	2%	100'
	12"	Sta. 208+50 left	2%	>50'
	12"	Sta. 209+00 right	2%	>50'
	12"	Sta. 218+50 left	1%	>50'
	12"	Sta. 218+50 right	1%	>50'
	12"	Sta. 243+00 right	1%	500'
	12"	Sta. 243+00 left (CCA)	1%	400'
	12"	Sta. 269+23 left	1%	500'
	24"	Sta. 272+00 Center	19%	300'
	12"	Sta. 277+33 Center	4%	250'
	12"	Sta. 295+00 left	2%	>50'
	12"	Sta. 295+00 right	2%	>50'
	12"	Sta. 313+50 left	2%	>50'
	12"	Sta. 313+50 right	2%	>50'
	12"	Sta. 330+00 to 336+00 left (CCA)	>1%	300'
	12"	Sta. 334+00 to 362+00 left	2%	>50'
	12"	Sta. 334+00 to 362+00 right	2%	>50'
	12"	Sta. 366+00 left	2%	>50'
	12"	Sta. 366+00 right	2%	>50'
	12"	Sta. 394+66 left	2%	>50'
	12"	Sta. 394+66 right	2%	>50'
		see next page		

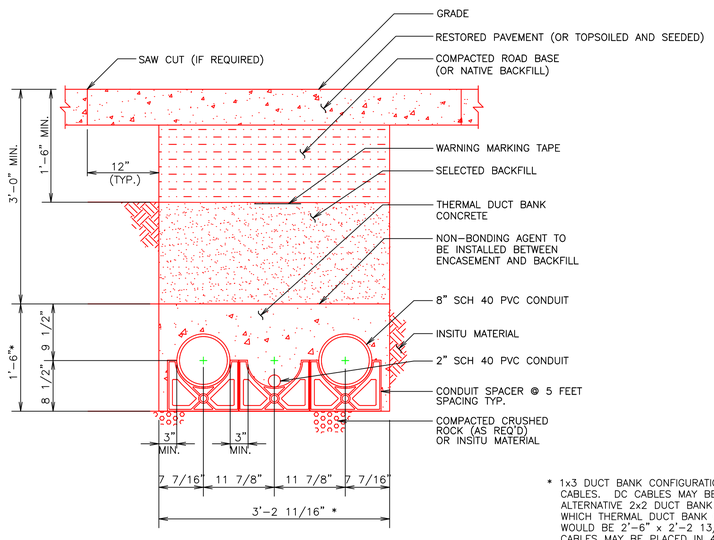
STANDARD E&S WORKSHEET #1
Compost Filter Socks

PROJECT NAME: _____
LOCATION: _____
PREPARED BY: _____ DATE: _____
CHECKED BY: _____ DATE: _____



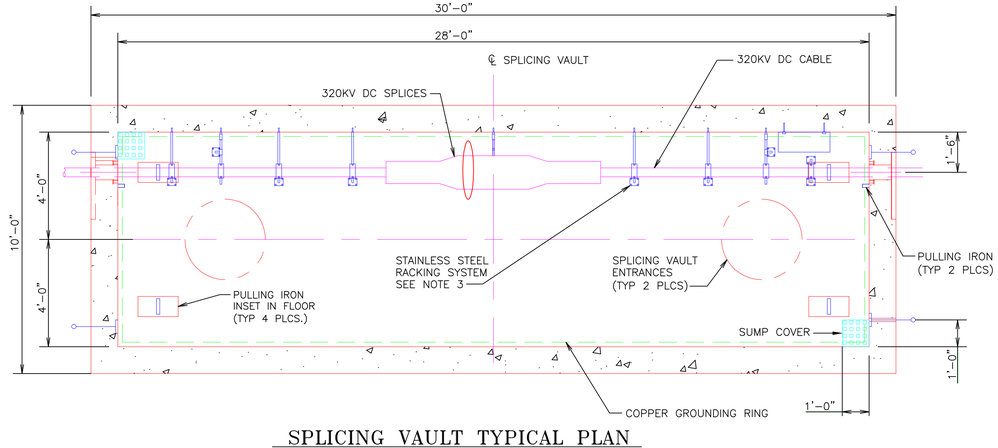
SOCK NO.	Dia. In.	LOCATION	SLOPE PERCENT	SLOPE LENGTH ABOVE BARRIER (FT)
	12"	Sta. 416+00 left	1%	>50'
	12"	Sta 446+06 to Sta 464+00 left	1%	106'

ITC LAKE ERIE CONNECTOR LLC
PENNSYLVANIA CABLE ROUTE
EROSION AND SEDIMENTATION CONTROL PLAN
SPRINGFIELD TWP., GIRARD TWP., CONNEAUT TWP.,
ERIE COUNTY, PENNSYLVANIA



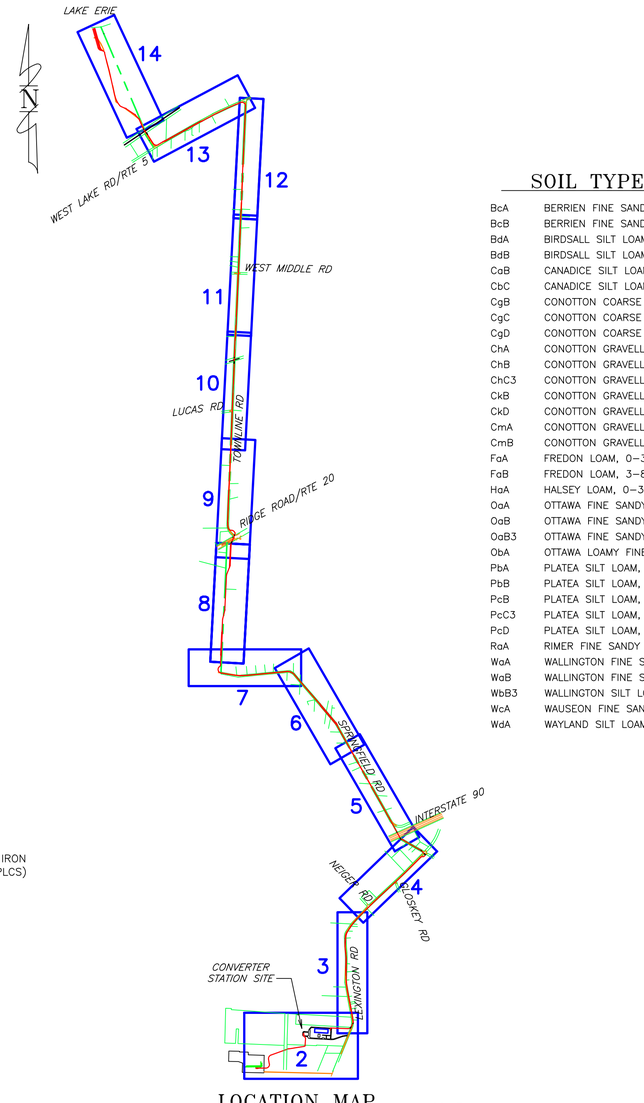
CABLE TYPICAL SECTION
SCALE: 1"=1'-0"

* 1x3 DUCT BANK CONFIGURATION SHOWN FOR DC CABLES. DC CABLES MAY BE PLACED IN ALTERNATIVE 2x2 DUCT BANK CONFIGURATION FOR WHICH THERMAL DUCT BANK CONCRETE DIMENSIONS WOULD BE 2'-6" x 2'-2 13/16" WIDE. AC CABLES MAY BE PLACED IN 4x2 DUCT BANK CONFIGURATION FOR WHICH THERMAL DUCT BANK CONCRETE DIMENSION WOULD BE 2'-6" HIGH x 4'-2 5/8" WIDE.



SPLICING VAULT TYPICAL PLAN
SCALE: 1"=1'-0"

NOTE: SPLICING VAULT LOCATIONS TO BE DETERMINED. SPLICING VAULTS TO BE PLACED WITHIN LIMIT OF DISTURBANCE. APPROXIMATELY 20 SPLICING VAULTS REQUIRED ALONG PA CABLE ROUTE AT SPACING NOT GREATER THAN 2,500 FEET.



LOCATION MAP
SCALE: 1"=2000'

SCALE: 0 2,000 4,000 feet

SHEET INDEX

SOIL TYPE LEGEND

BcA	BERRIEN FINE SANDY LOAM, 0-2% SLOPES
BcB	BERRIEN FINE SANDY LOAM, 2-8% SLOPES
BdA	BIRDSALL SILT LOAM, 0-3% SLOPES
BdB	BIRDSALL SILT LOAM, 3-8% SLOPES
CaB	CANADICE SILT LOAM, 2-8% SLOPES
CbC	CANADICE SILT LOAM, 8-15% SLOPES
CgB	CONOTTON COARSE SANDY LOAM, 0-8% SLOPES
CgC	CONOTTON COARSE SANDY LOAM, 8-15% SLOPES
CgD	CONOTTON COARSE SANDY LOAM, 15-25% SLOPES
ChA	CONOTTON GRAVELLY LOAM, 0-3% SLOPES
ChB	CONOTTON GRAVELLY LOAM, 3-8% SLOPES
ChC3	CONOTTON GRAVELLY LOAM, 8-15% SLOPES
CkB	CONOTTON GRAVELLY SANDY LOAM, 3-8% SLOPES
CkD	CONOTTON GRAVELLY SANDY LOAM, 15-25% SLOPES
CmA	CONOTTON GRAVELLY SANDY LOAM, 0-3% SLOPES, MODERATELY WELL DRAINED
CmB	CONOTTON GRAVELLY SANDY LOAM, 3-8% SLOPES, MODERATELY WELL DRAINED
FaA	FREDON LOAM, 0-3% SLOPES
FaB	FREDON LOAM, 3-8% SLOPES
HaA	HALSEY LOAM, 0-3% SLOPES
OaA	OTTAWA FINE SANDY LOAM. 0-2% SLOPES
OaB	OTTAWA FINE SANDY LOAM. 2-8% SLOPES
OaB3	OTTAWA FINE SANDY LOAM. 2-8% SLOPES, SEVERELY ERODED
ObA	OTTAWA LOAMY FINE SAND. 0-2% SLOPES
PbA	PLATEA SILT LOAM, 0-2% SLOPES
PbB	PLATEA SILT LOAM, 2-8% SLOPES
PcB	PLATEA SILT LOAM, 0-2% SLOPES, WELL DRAINED,
PcC3	PLATEA SILT LOAM, 8-15% SLOPES, WELL DRAINED, SEVERERLY ERODED
PcD	PLATEA SILT LOAM, 15-25% SLOPES
RaA	RIMER FINE SANDY LOAM, 0-2% SLOPES
WaA	WALLINGTON FINE SANDY LOAM, 0-2% SLOPES
WaB	WALLINGTON FINE SANDY LOAM, 2-8% SLOPES
WbB3	WALLINGTON SILT LOAM, 2-8% SLOPES, SEVERELY ERODED
WcA	WAUSEON FINE SANDY LOAM, 0-2% SLOPES
WdA	WAYLAND SILT LOAM, 0-3% SLOPES

LEGEND

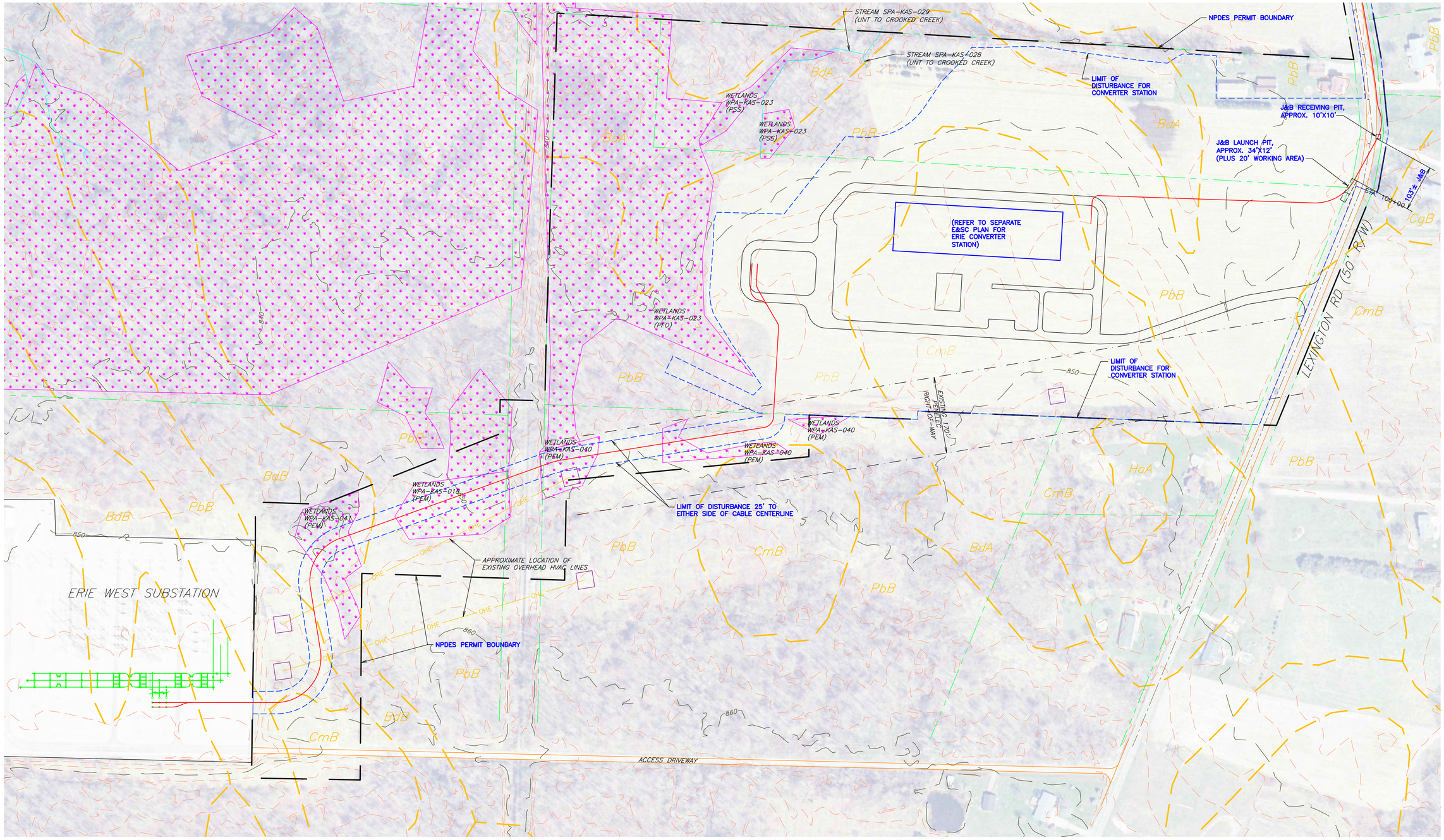
- PROPOSED CABLES
- PROPERTY BOUNDARY
- FLOODPLAIN BOUNDARY
- NPDES PERMIT BOUNDRY
- LIMIT OF DISTURBANCE
- OHE — OVERHEAD ELECTRIC LINES
- SOIL TYPE BOUNDARY
- 1005 — EXISTING CONTOURS
- 1005 — PROPOSED CONTOURS
- COMPOST FILTER SOCK
- STREAMS (FIELD DELINEATED BY HDR, PER SHAPEFILE DATED 1/7/2016)
- PONDS (FIELD DELINEATED BY HDR, PER SHAPEFILE DATED 10/5/2015)
- WETLANDS (FIELD DELINEATED BY HDR, PER SHAPEFILE DATED 1/7/2016)

NOTES

1. PROPERTY AND RIGHT-OF-WAY LINES PLOTTED FROM SURVEY BY DAVID A. LAIRD ASSOCIATES, DRAWING REVISED 10/7/2015.
2. AERIAL IMAGERY AND CONTOURS FROM PA SPATIAL DATA ACCESS, CONTOUR INTERVAL 2 FEET.
3. FLOODPLAINS PLOTTED FROM FEMA FLOOD INSURANCE RATE MAPS 42049C0330D, 42049C0309D, 42049C0307D, 42049C0144D.

PREPARED BY:
DEISS & HALMI ENGINEERING, INC.
EDINBORO, PENNSYLVANIA

JANUARY 22, 2016



SCALE:
0 100 200 feet

No.	Date	Revisions	By

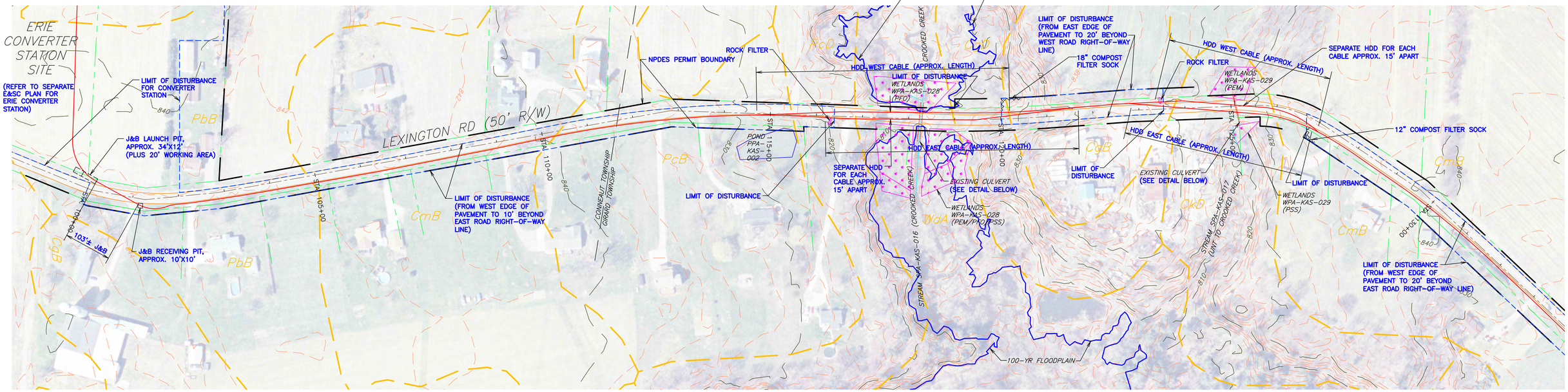
EROSION AND SEDIMENTATION CONTROL PLAN
ITC LAKE ERIE CONNECTOR LLC
PENNSYLVANIA CABLE ROUTE

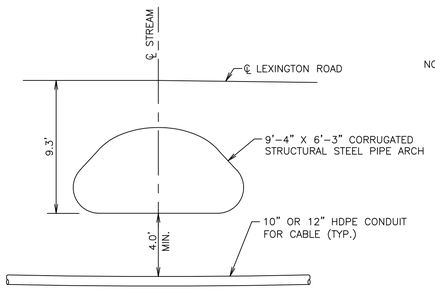
SCALE: AS SHOWN
DATE: 1/22/2016
APPROVED BY:
DRAWN BY: JEFFREY T. BERNOSKY

SPRINGFIELD TWP., GIRARD TWP., CONNEAUT TWP., ERIE COUNTY, PENNSYLVANIA

Deiss & Halmi Engineering, Inc.
ENVIRONMENTAL AND CIVIL ENGINEERING
105 Meadville Street, Edinboro PA 16412 PH: 814-734-3640 Fax 814-734-3643

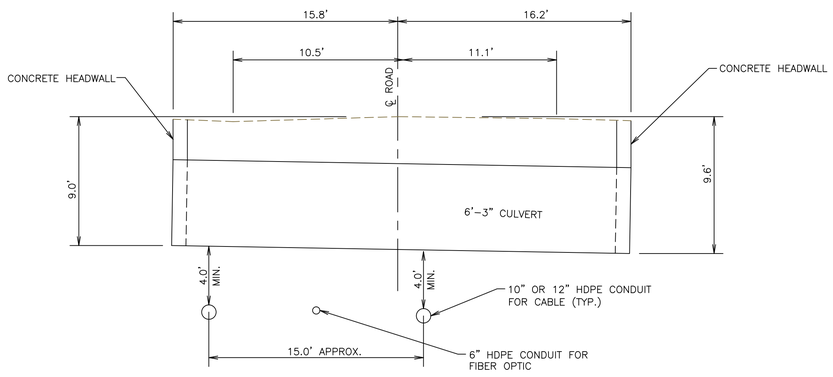
DRAWING NO.: 2080215-2



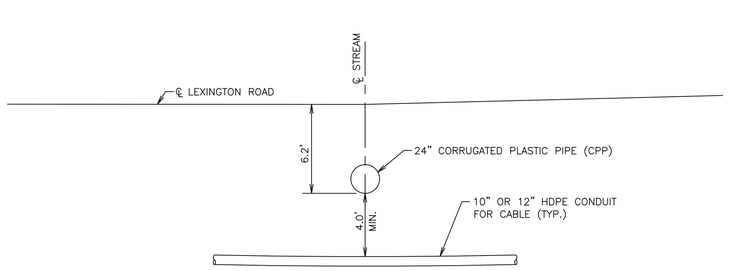


NOTE: THE LOCATION OF CABLES/CONDUITS SHOWN ON THE CROSS SECTIONS AND/OR PROFILES IS APPROXIMATE, ALTHOUGH THE MINIMUM COVER WILL BE PROVIDED.

CROSS SECTION OF STREAM SPA-KAS-016 (STA 118+26)
N.T.S.

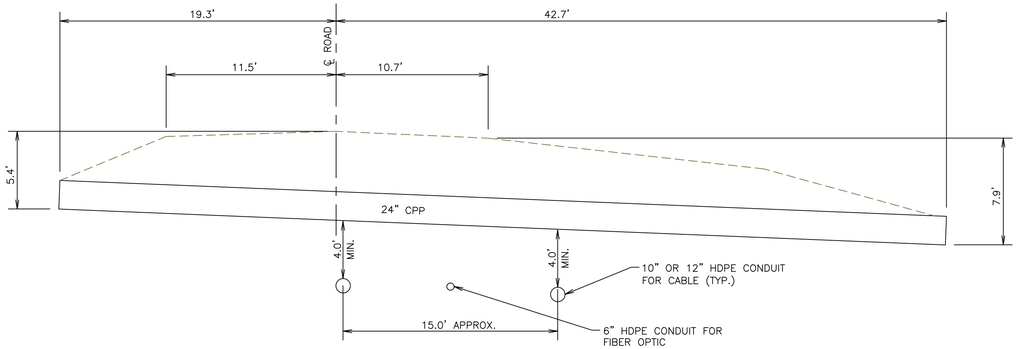


PROFILE OF STREAM SPA-KAS-016 (STA 118+26)
N.T.S.



NOTE: THE LOCATION OF CABLES/CONDUITS SHOWN ON THE CROSS SECTIONS AND/OR PROFILES IS APPROXIMATE, ALTHOUGH THE MINIMUM COVER WILL BE PROVIDED.

CROSS SECTION OF STREAM SPA-KAS-017 (STA 125+10)
N.T.S.



PROFILE OF STREAM SPA-KAS-017 (STA 125+10)
N.T.S.

SCALE: 0 100 200 feet

No.	Date	Revisions	By

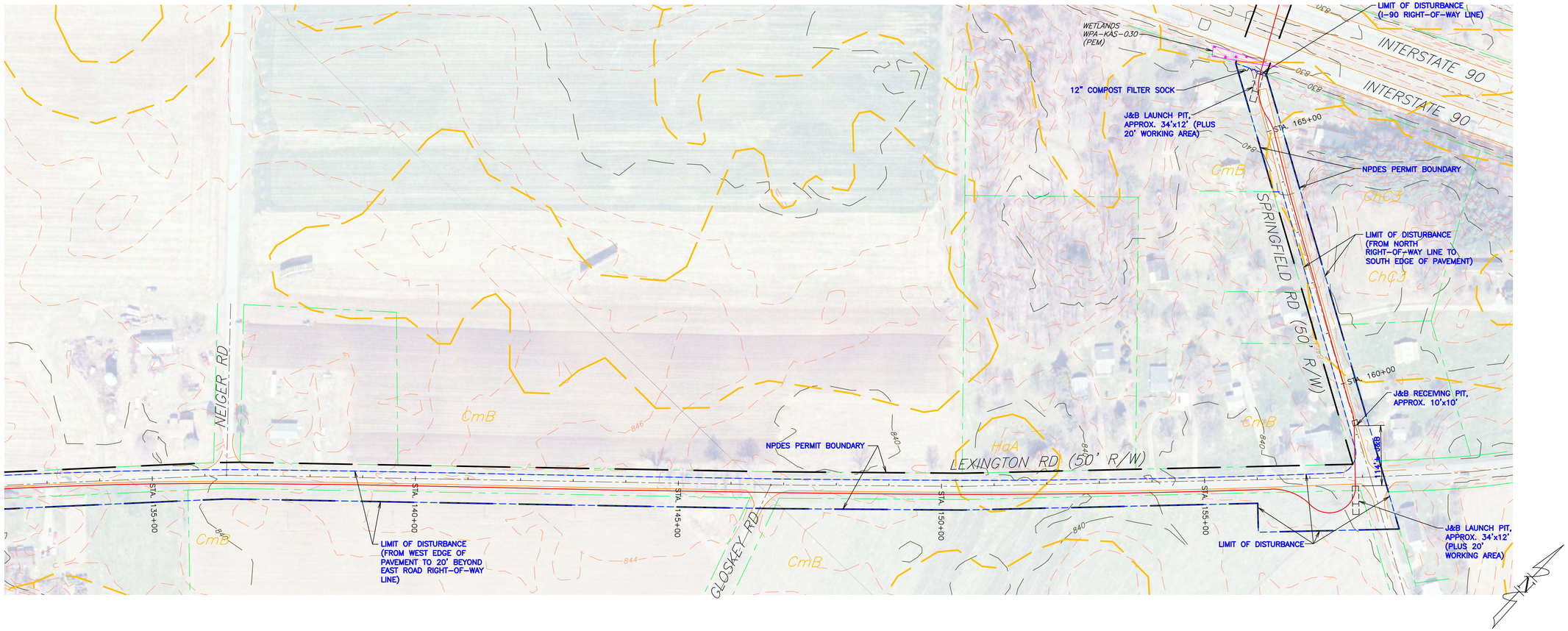
EROSION AND SEDIMENTATION CONTROL PLAN
ITC LAKE ERIE CONNECTOR LLC
PENNSYLVANIA CABLE ROUTE

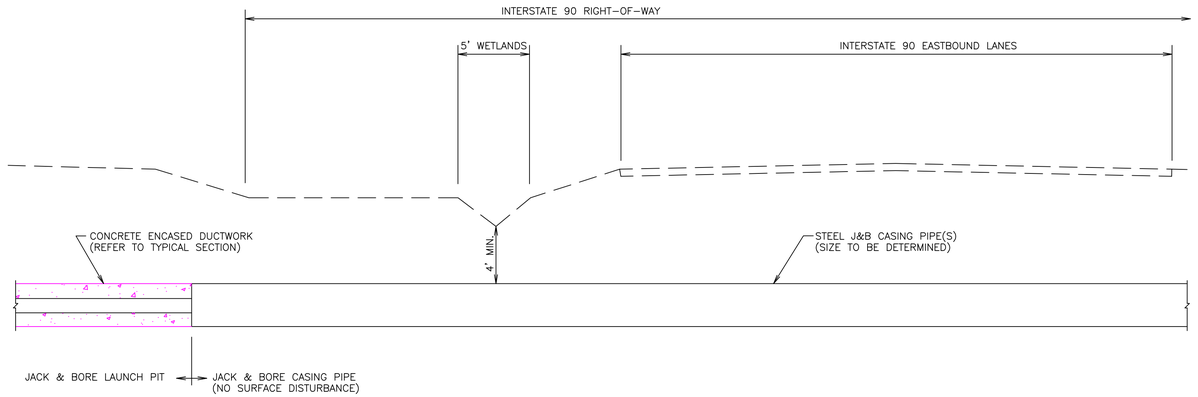
SCALE: AS SHOWN
DATE: 1/22/2016
APPROVED BY:
DRAWN BY: JEFFREY T. BERNOSKY

SPRINGFIELD TWP., GIRARD TWP., CONNEAUT TWP., ERIE COUNTY, PENNSYLVANIA

Deiss & Halmi Engineering, Inc.
ENVIRONMENTAL AND CIVIL ENGINEERING
105 Meadville Street, Edinboro PA 16412 PH. 814-734-3640 Fax 814-734-3643

DRAWING NO.: 2080215-3





NOTE: THE LOCATION OF CABLES/CONDUITS SHOWN ON THE CROSS SECTIONS AND/OR PROFILES IS APPROXIMATE, ALTHOUGH THE MINIMUM COVER WILL BE PROVIDED.

PROFILE OF CABLE AT WETLANDS WPA-KAS-030 CROSSING (STA 166+40)

N.T.S.

SCALE: 0 100 200 feet

No.	Date	Revisions	By

EROSION AND SEDIMENTATION CONTROL PLAN

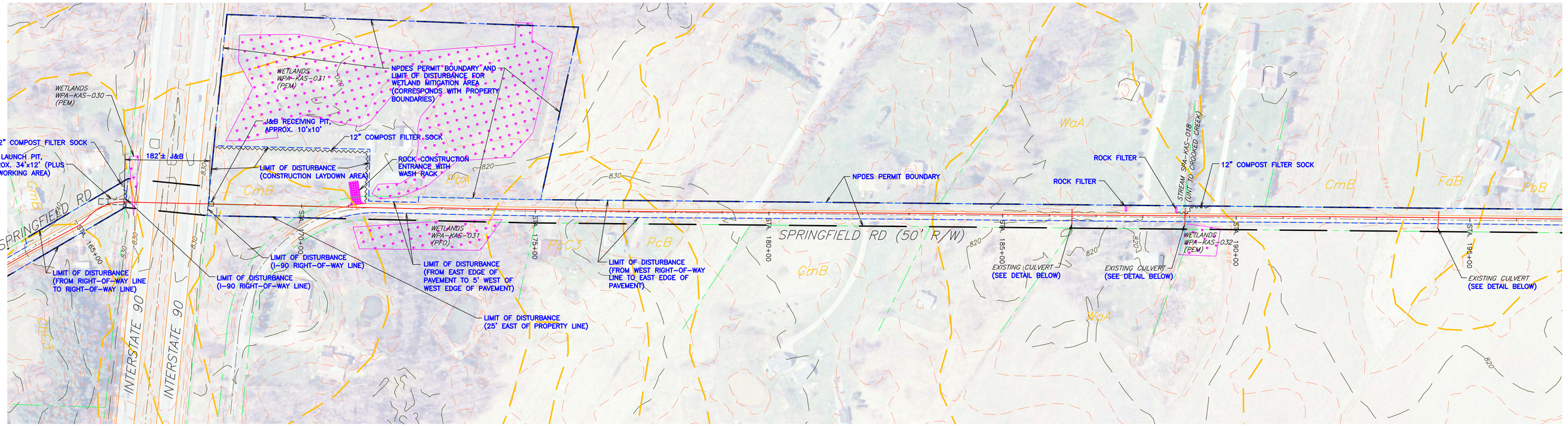
ITC LAKE ERIE CONNECTOR LLC PENNSYLVANIA CABLE ROUTE

SCALE: AS SHOWN
DATE: 1/22/2016
APPROVED BY:
DRAWN BY: JEFFREY T. BERNOSKY

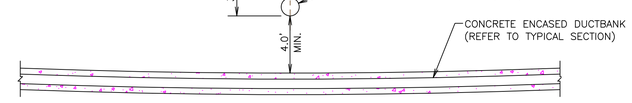
SPRINGFIELD TWP., GIRARD TWP., CONNEAUT TWP., ERIE COUNTY, PENNSYLVANIA

Deiss & Halmi Engineering, Inc.
ENVIRONMENTAL AND CIVIL ENGINEERING
105 Meadville Street, Edinboro PA 16412 PH. 814-734-3640 Fax 814-734-3643

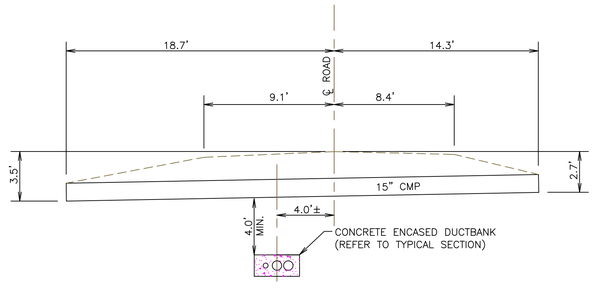
DRAWING NO.: 2080215-4



NOTES:
1. THE CABLE MAY BE INSTALLED UNDER CULVERT BY EITHER OPEN CUT, HDD, OR JACK AND BORE METHODS.
2. THE LOCATION OF CABLES/CONDUITS SHOWN ON THE CROSS SECTIONS AND/OR PROFILES IS APPROXIMATE, ALTHOUGH THE MINIMUM COVER WILL BE PROVIDED.

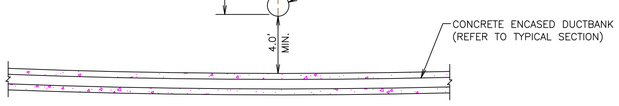


PROFILE OF SPRINGFIELD ROAD AT CULVERT CROSSING (STA 186+48)
N.T.S.

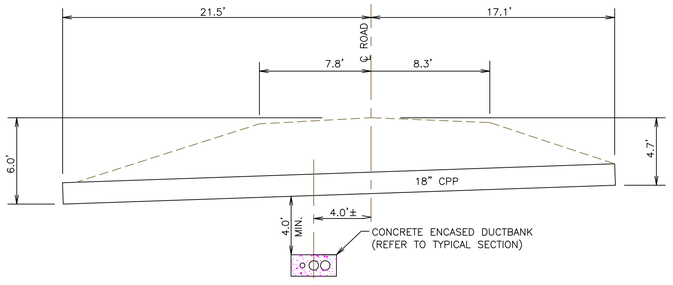


PROFILE OF CULVERT CROSSING (STA 186+48)
N.T.S.

NOTES:
1. THE CABLE MAY BE INSTALLED UNDER CULVERT BY EITHER OPEN CUT, HDD, OR JACK AND BORE METHODS.
2. THE LOCATION OF CABLES/CONDUITS SHOWN ON THE CROSS SECTIONS AND/OR PROFILES IS APPROXIMATE, ALTHOUGH THE MINIMUM COVER WILL BE PROVIDED.

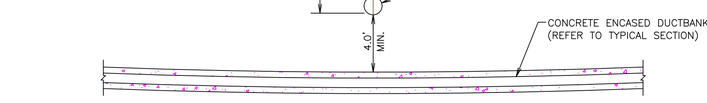


CROSS SECTION OF STREAM SPA-KAS-018 (STA 188+90)
N.T.S.

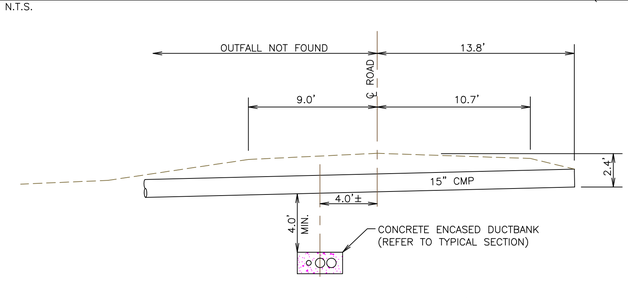


PROFILE OF STREAM SPA-KAS-018 (STA 188+90)
N.T.S.

NOTES:
1. THE CABLE MAY BE INSTALLED UNDER CULVERT BY EITHER OPEN CUT, HDD, OR JACK AND BORE METHODS.
2. THE LOCATION OF CABLES/CONDUITS SHOWN ON THE CROSS SECTIONS AND/OR PROFILES IS APPROXIMATE, ALTHOUGH THE MINIMUM COVER WILL BE PROVIDED.



PROFILE OF SPRINGFIELD ROAD AT CULVERT CROSSING (STA 194+32)
N.T.S.



PROFILE OF CULVERT CROSSING (STA 194+32)
N.T.S.

SCALE:
0 100 200 feet

No.	Date	Revisions	By

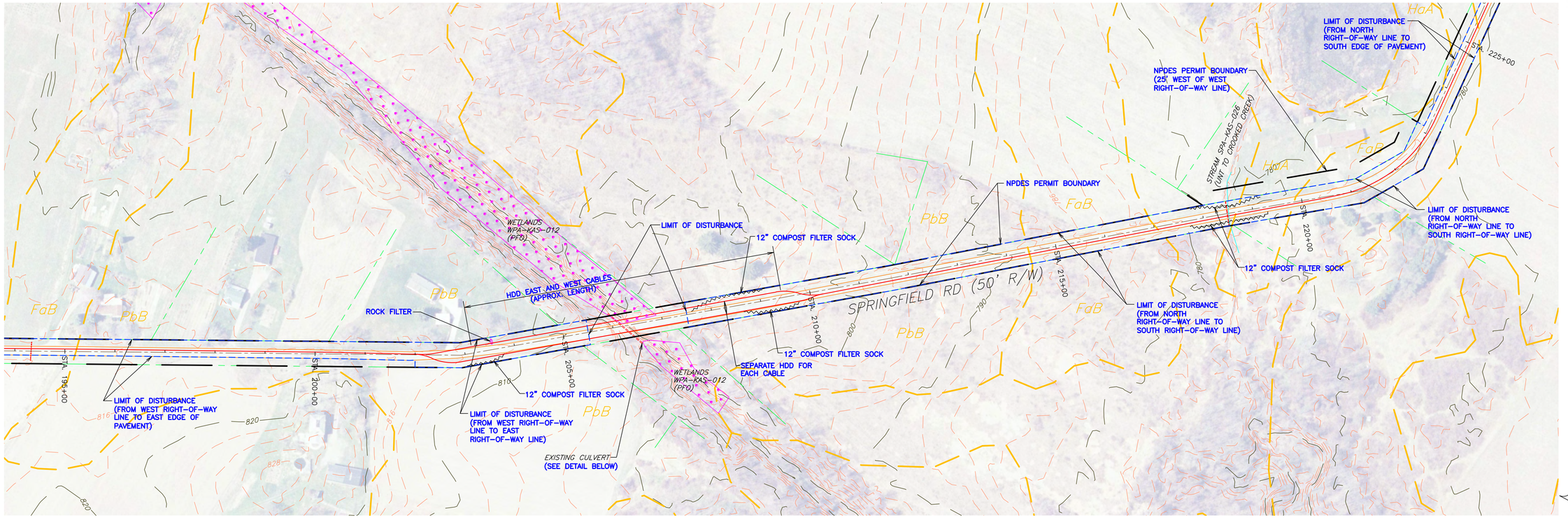
EROSION AND SEDIMENTATION CONTROL PLAN
ITC LAKE ERIE CONNECTOR LLC PENNSYLVANIA CABLE ROUTE

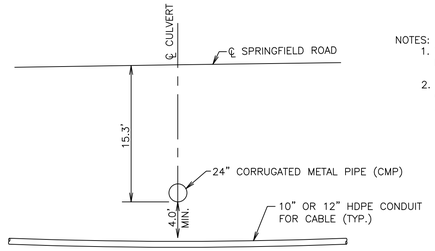
SCALE: AS SHOWN
DATE: 1/22/2016
APPROVED BY:
DRAWN BY: JEFFREY T. BERNOSKY

SPRINGFIELD TWP., GIRARD TWP., CONNEAUT TWP., ERIE COUNTY, PENNSYLVANIA

Deiss & Halmi Engineering, Inc.
ENVIRONMENTAL AND CIVIL ENGINEERING
105 Meadville Street, Edinboro PA 16412 PH: 814-734-3640 Fax 814-734-3643

DRAWING NO.: 2080215-5





NOTES:
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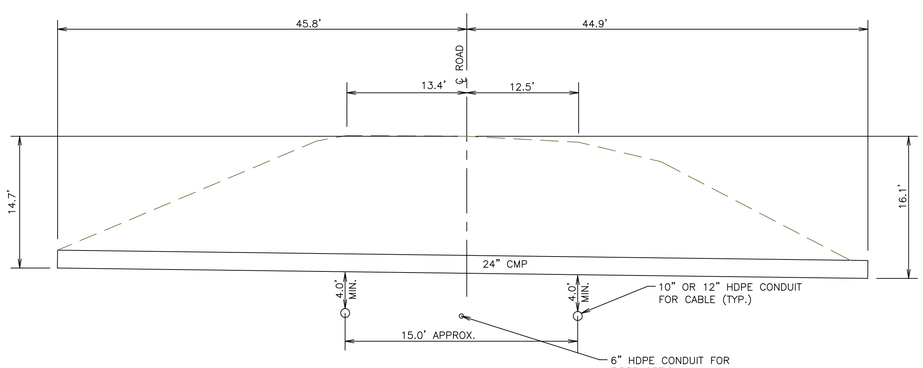
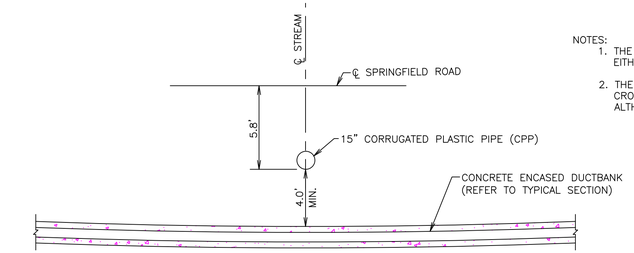
2. THE LOCATION OF CABLES/CONDUITS SHOWN ON THE CROSS SECTIONS AND/OR PROFILES IS APPROXIMATE, ALTHOUGH THE MINIMUM COVER WILL BE PROVIDED.

PROFILE OF SPRINGFIELD ROAD AT CULVERT CROSSING (STA 206+19)
N.T.S.



PROFILE OF CULVERT CROSSING (STA 206+19)
N.T.S.



NOTES:
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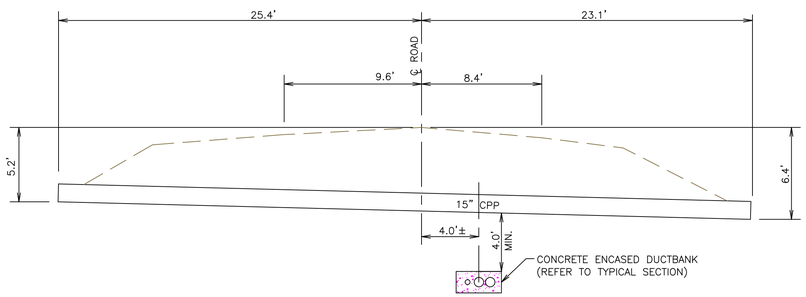
CROSS SECTION OF STREAM SPA-KAS-026 (STA 218+49)
N.T.S.



PROFILE OF STREAM SPA-KAS-026 (STA 218+49)
N.T.S.

SCALE:
0 100 200 feet

No.	Date	Revisions	By

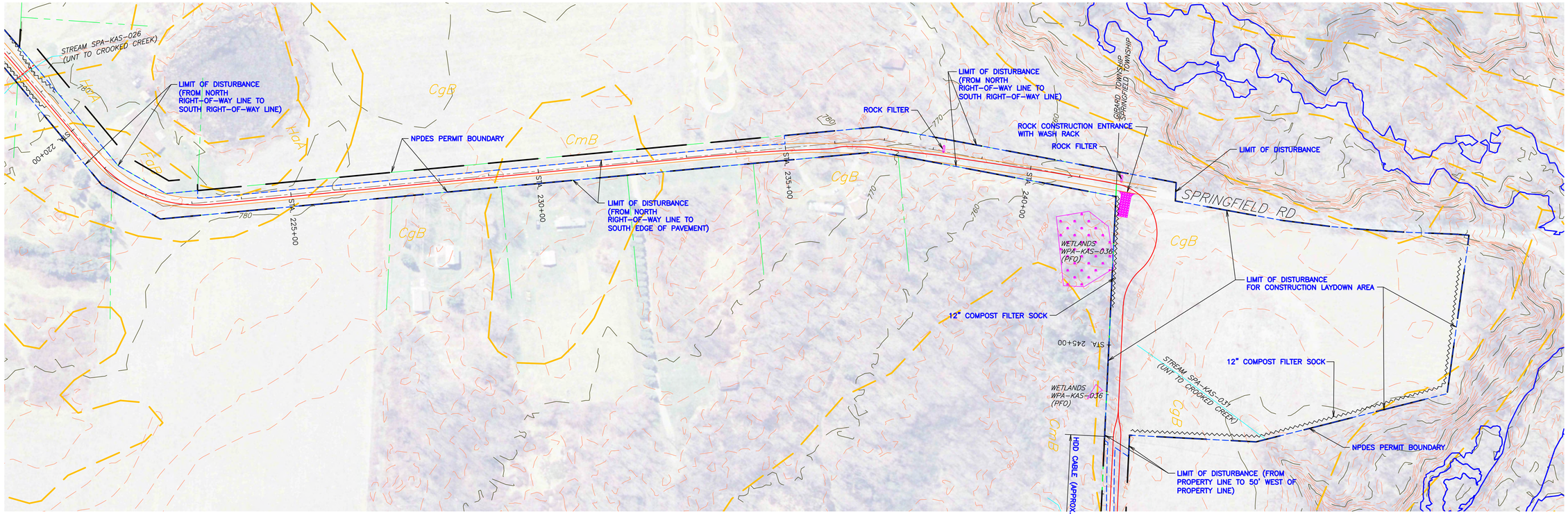
EROSION AND SEDIMENTATION CONTROL PLAN
ITC LAKE ERIE CONNECTOR LLC
PENNSYLVANIA CABLE ROUTE

SCALE: AS SHOWN
DATE: 1/22/2016
APPROVED BY:
DRAWN BY: JEFFREY T. BERNOSKY

SPRINGFIELD TWP., GIRARD TWP., CONNEAUT TWP., ERIE COUNTY, PENNSYLVANIA

Deiss & Halmi Engineering, Inc.
ENVIRONMENTAL AND CIVIL ENGINEERING
105 Meadville Street, Edinboro PA 16412 PH: 814-734-3640 Fax 814-734-3643

DRAWING NO.: 2080215-6



SCALE:
0 100 200 feet

No.	Date	Revisions	By

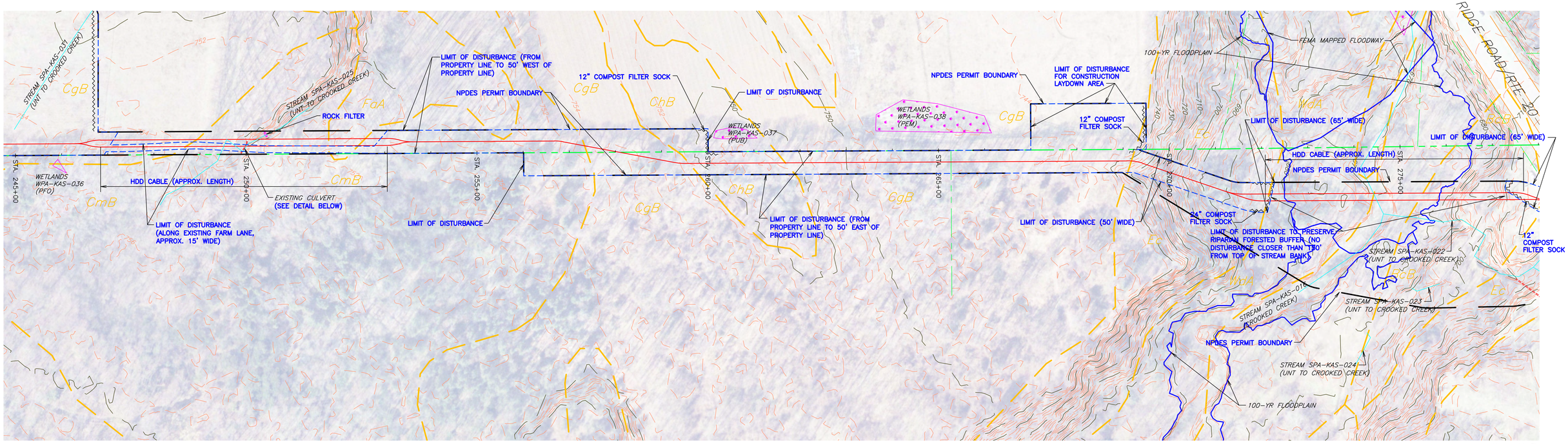
EROSION AND SEDIMENTATION CONTROL PLAN
ITC LAKE ERIE CONNECTOR LLC
PENNSYLVANIA CABLE ROUTE

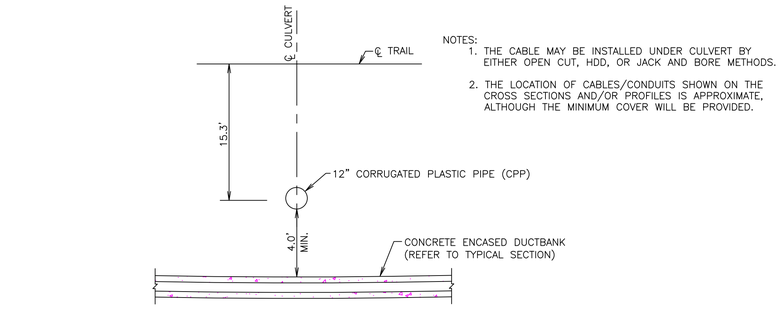
SCALE: AS SHOWN
DATE: 1/22/2016
APPROVED BY:
DRAWN BY: JEFFREY T. BERNOSKY

SPRINGFIELD TWP., GIRARD TWP., CONNEAUT TWP.,
ERIE COUNTY, PENNSYLVANIA

Deiss & Halmi Engineering, Inc.
ENVIRONMENTAL AND CIVIL ENGINEERING
105 Meadville Street, Edinboro PA 16412 PH. 814-734-3640 Fax 814-734-3643

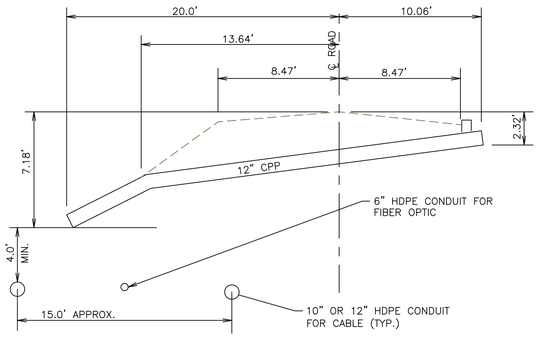
DRAWING NO.: 2080215-7



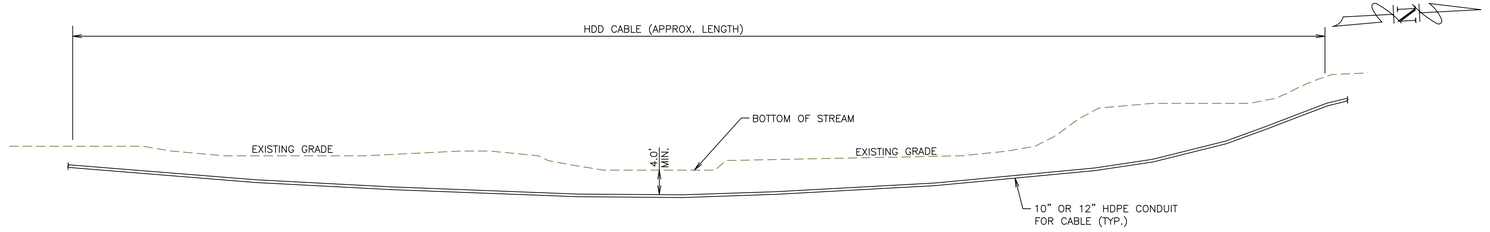


NOTES:
1. THE CABLE MAY BE INSTALLED UNDER CULVERT BY EITHER OPEN CUT, HDD, OR JACK AND BORE METHODS.
2. THE LOCATION OF CABLES/CONDUITS SHOWN ON THE CROSS SECTIONS AND/OR PROFILES IS APPROXIMATE, ALTHOUGH THE MINIMUM COVER WILL BE PROVIDED.

CROSS SECTION OF STREAM SPA-KAS-025 (STA 250+01)
N.T.S.

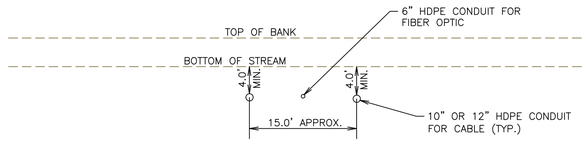


PROFILE OF STREAM SPA-KAS-025 (STA 250+01)
N.T.S.



CROSS SECTION OF STREAM SPA-KAS-016 (STA 274+50)
N.T.S.

NOTE: THE LOCATION OF CABLES/CONDUITS SHOWN ON THE CROSS SECTIONS AND/OR PROFILES IS APPROXIMATE, ALTHOUGH THE MINIMUM COVER WILL BE PROVIDED.



PROFILE OF STREAM SPA-KAS-016 (STA 274+50)
N.T.S.

SCALE:
0 100 200 feet

No.	Date	Revisions	By

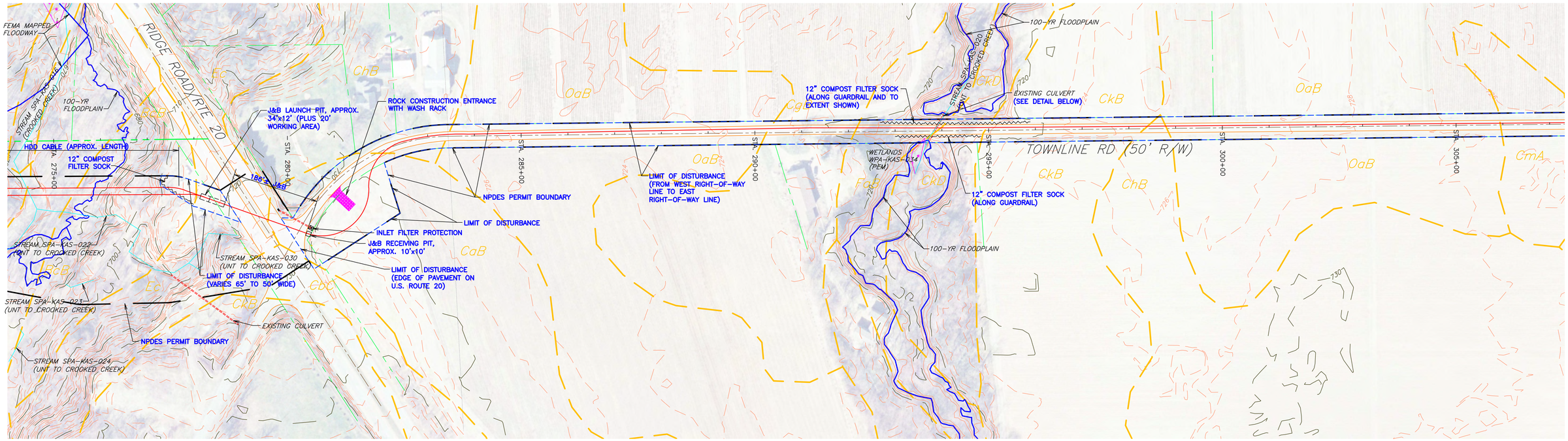
EROSION AND SEDIMENTATION CONTROL PLAN
ITC LAKE ERIE CONNECTOR LLC PENNSYLVANIA CABLE ROUTE

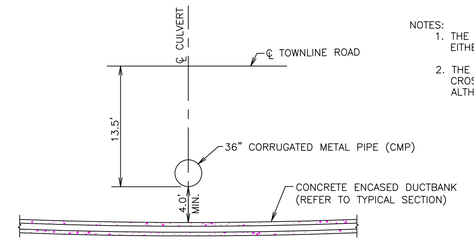
SCALE: AS SHOWN
DATE: 1/22/2016
APPROVED BY:
DRAWN BY: JEFFREY T. BERNOSKY

SPRINGFIELD TWP., GIRARD TWP., CONNEAUT TWP., ERIE COUNTY, PENNSYLVANIA

Deiss & Halmi Engineering, Inc.
ENVIRONMENTAL AND CIVIL ENGINEERING
105 Meadville Street, Edinboro PA 16412 PH: 814-734-3640 Fax 814-734-3643

DRAWING NO.: 2080215-8





NOTES:
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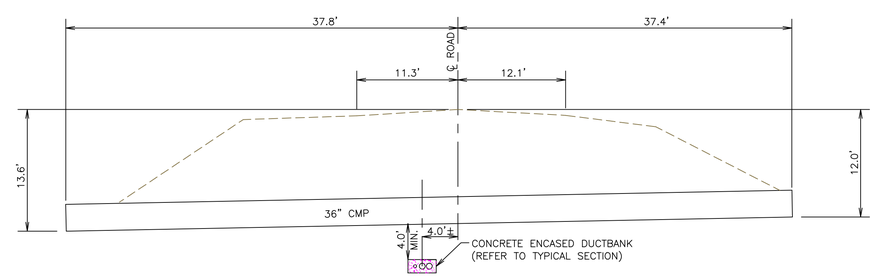
CROSS SECTION OF STREAM SPA-KAS-020 (STA 293+88)
N.T.S.



PROFILE OF STREAM SPA-KAS-020 (STA 293+88)
N.T.S.

SCALE: 0 100 200 feet

No.	Date	Revisions	By

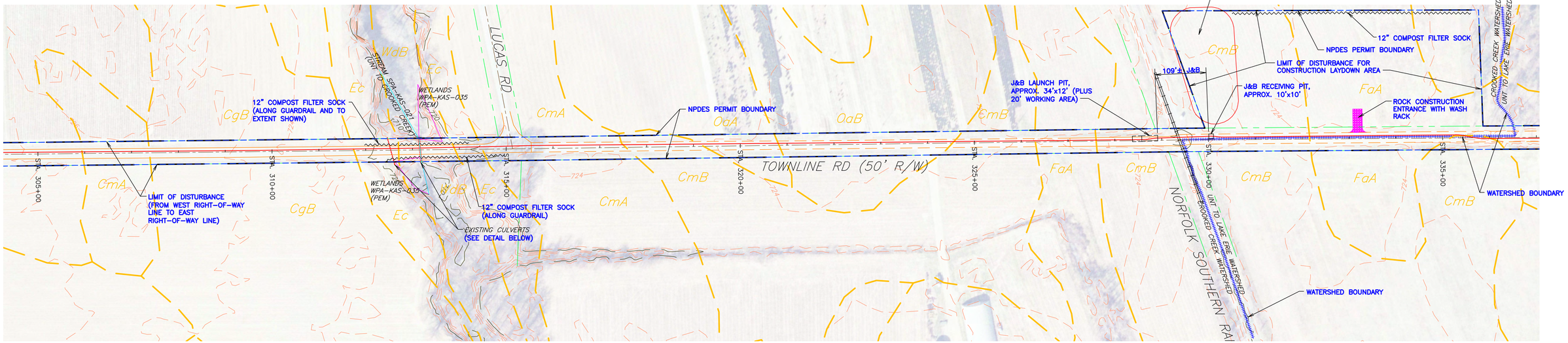
EROSION AND SEDIMENTATION CONTROL PLAN
ITC LAKE ERIE CONNECTOR LLC
PENNSYLVANIA CABLE ROUTE

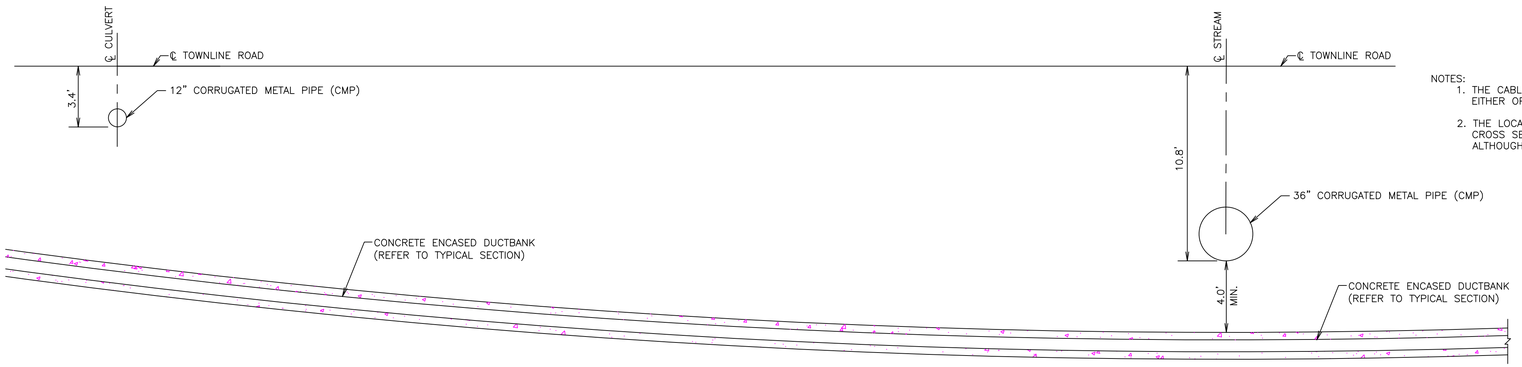
SCALE: AS SHOWN
DATE: 1/22/2016
APPROVED BY:
DRAWN BY: JEFFREY T. BERNOSKY

SPRINGFIELD TWP., GIRARD TWP., CONNEAUT TWP., ERIE COUNTY, PENNSYLVANIA

Deiss & Halmi Engineering, Inc.
ENVIRONMENTAL AND CIVIL ENGINEERING
105 Meadville Street, Edinboro PA 16412 PH. 814-734-3640 Fax 814-734-3643

DRAWING NO.: 2080215-9





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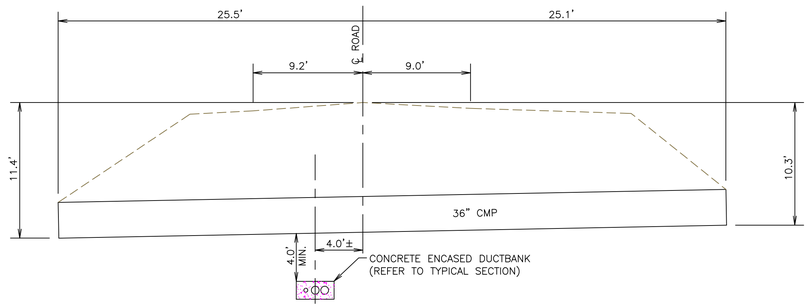
CROSS SECTION OF STREAM SPA-KAS-021 (STA 313+16)
N.T.S.



PROFILE OF STREAM SPA-KAS-021 (STA 313+16)
N.T.S.

SCALE: 0 100 200 feet

No.	Date	Revisions	By

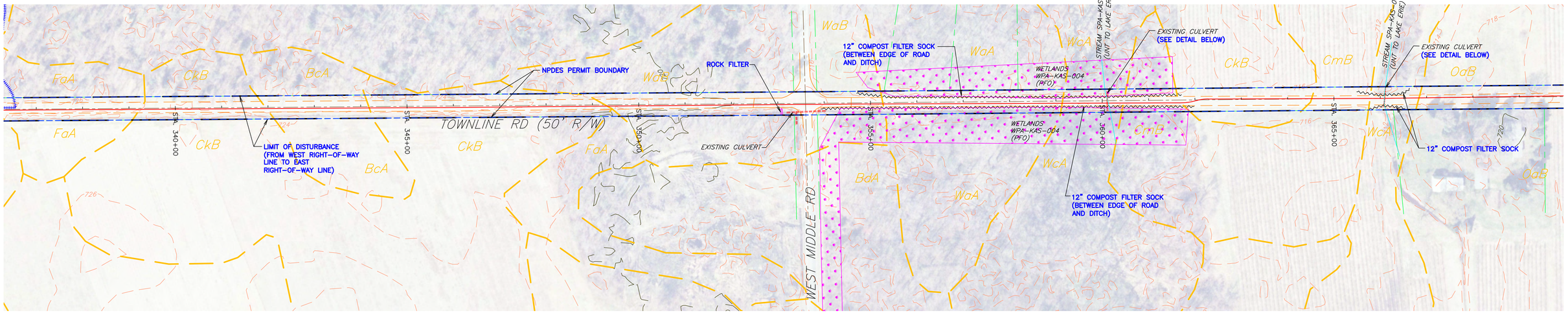
EROSION AND SEDIMENTATION CONTROL PLAN
ITC LAKE ERIE CONNECTOR LLC PENNSYLVANIA CABLE ROUTE

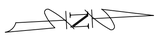
SCALE: AS SHOWN | APPROVED BY: | DRAWN BY: JEFFREY T. BERNOSKY
DATE: 1/22/2016

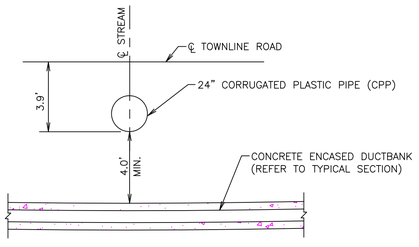
SPRINGFIELD TWP., GIRARD TWP., CONNEAUT TWP., ERIE COUNTY, PENNSYLVANIA

Deiss & Halmi Engineering, Inc.
ENVIRONMENTAL AND CIVIL ENGINEERING
105 Meadville Street, Edinboro PA 16412 PH. 814-734-3640 Fax 814-734-3643

DRAWING NO.: 2080215-10







CROSS SECTION OF STREAM SPA-KAS-006 (STA 360+11)
N.T.S.

NOTES:
1. THE CABLE MAY BE INSTALLED UNDER CULVERT BY EITHER OPEN CUT, HDD, OR JACK AND BORE METHODS.
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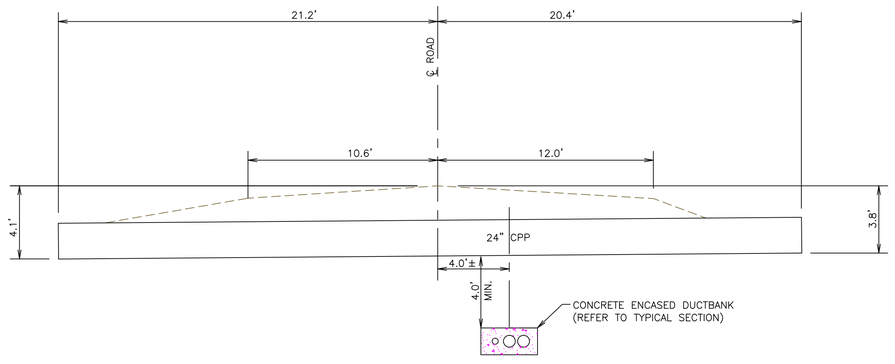
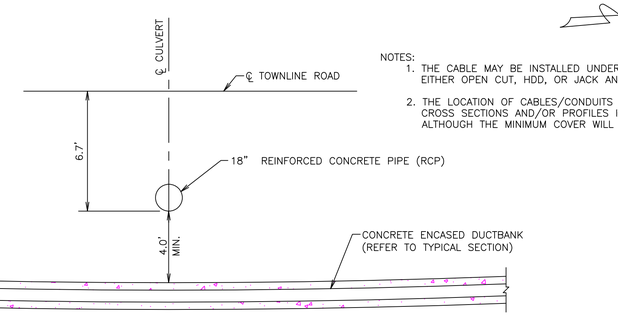


PROFILE OF STREAM SPA-KAS-006 (STA 360+11)
N.T.S.



CROSS SECTION OF STREAM SPA-KAS-005 (STA 366+09)
N.T.S.

NOTES:
1. THE CABLE MAY BE INSTALLED UNDER CULVERT BY EITHER OPEN CUT, HDD, OR JACK AND BORE METHODS.
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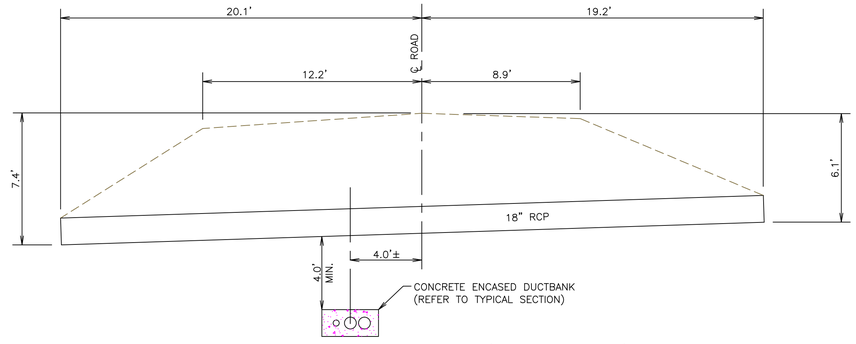


PROFILE OF STREAM SPA-KAS-005 (STA 366+09)
N.T.S.

SCALE:
0 100 200 feet

EROSION AND SEDIMENTATION CONTROL PLAN
ITC LAKE ERIE CONNECTOR LLC
PENNSYLVANIA CABLE ROUTE

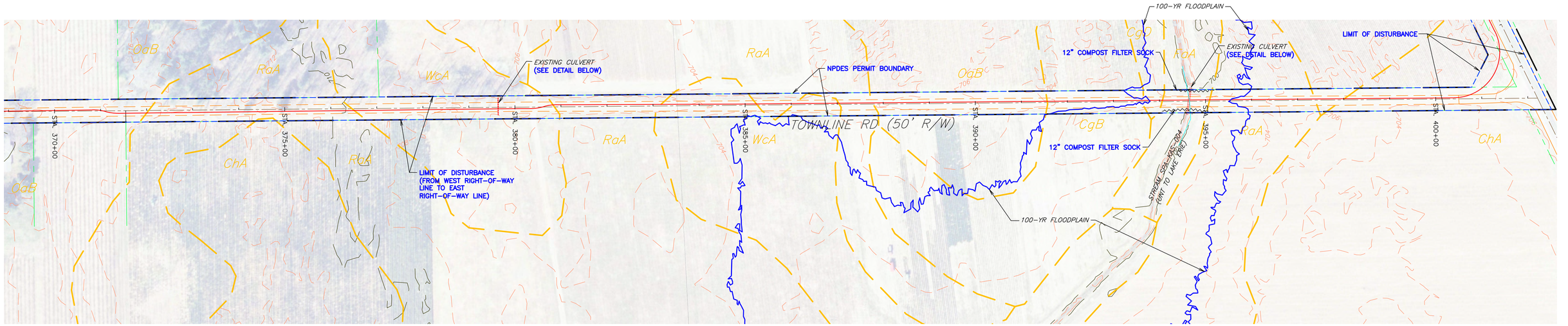
SCALE: AS SHOWN
DATE: 1/22/2016
APPROVED BY:
DRAWN BY: JEFFREY T. BERNOSKY

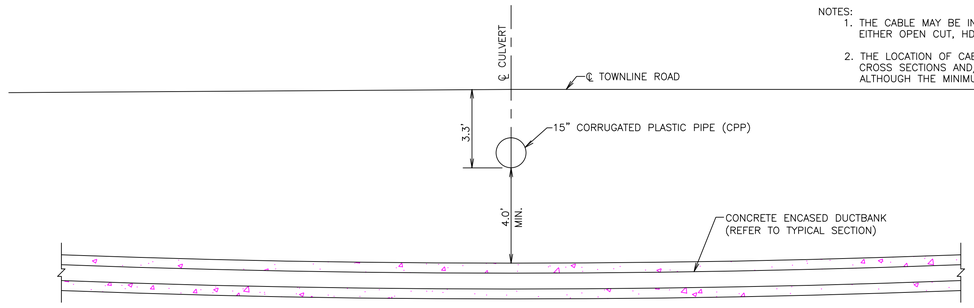
SPRINGFIELD TWP., GIRARD TWP., CONNEAUT TWP., ERIE COUNTY, PENNSYLVANIA

No.	Date	Revisions	By

Deiss & Halmi Engineering, Inc.
ENVIRONMENTAL AND CIVIL ENGINEERING
105 Meadville Street, Edinboro PA 16412 PH: 814-734-3640 Fax 814-734-3643

DRAWING NO.: 2080215-11





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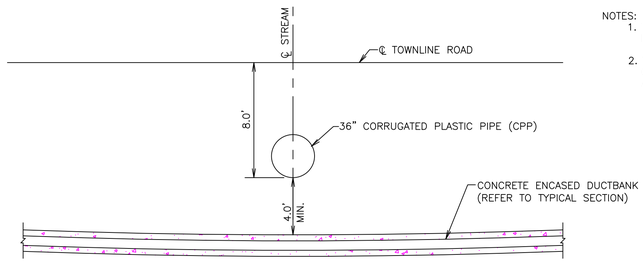
PROFILE OF TOWNLINE ROAD AT CULVERT CROSSING (STA 379+64)
N.T.S.



NOTES:
1. THE CABLE MAY BE INSTALLED UNDER CULVERT BY EITHER OPEN CUT, HDD, OR JACK AND BORE METHODS.
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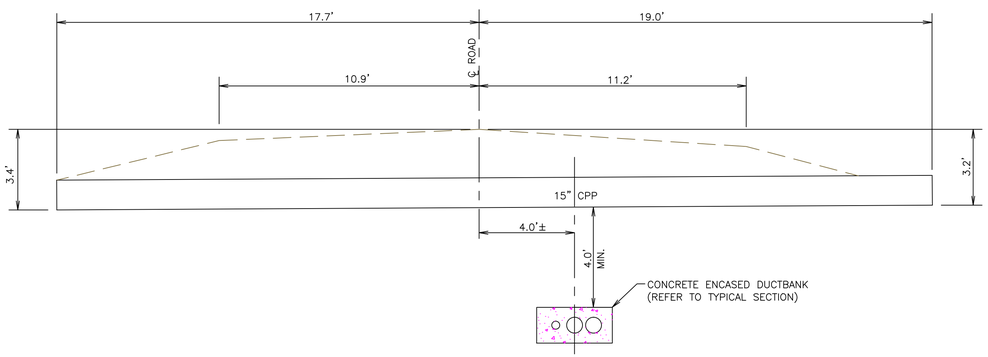
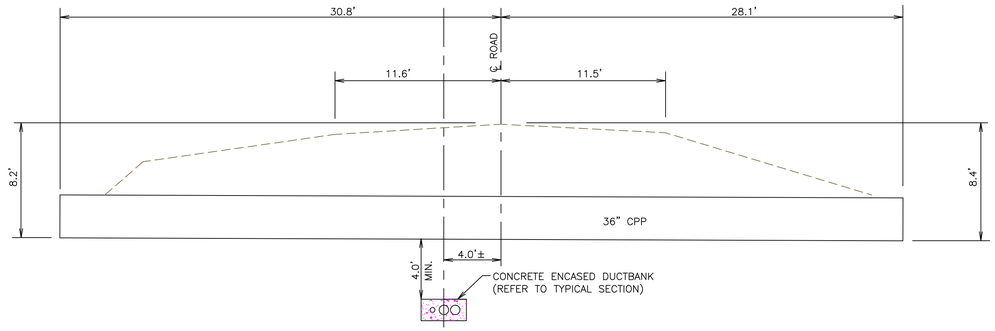
CROSS SECTION OF STREAM SPA-KAS-004 (STA 394+64)
N.T.S.



PROFILE OF CULVERT CROSSING (STA 379+64)
N.T.S.



PROFILE OF STREAM SPA-KAS-004 (STA 394+64)
N.T.S.

SCALE: 0 100 200 feet

No.	Date	Revisions	By

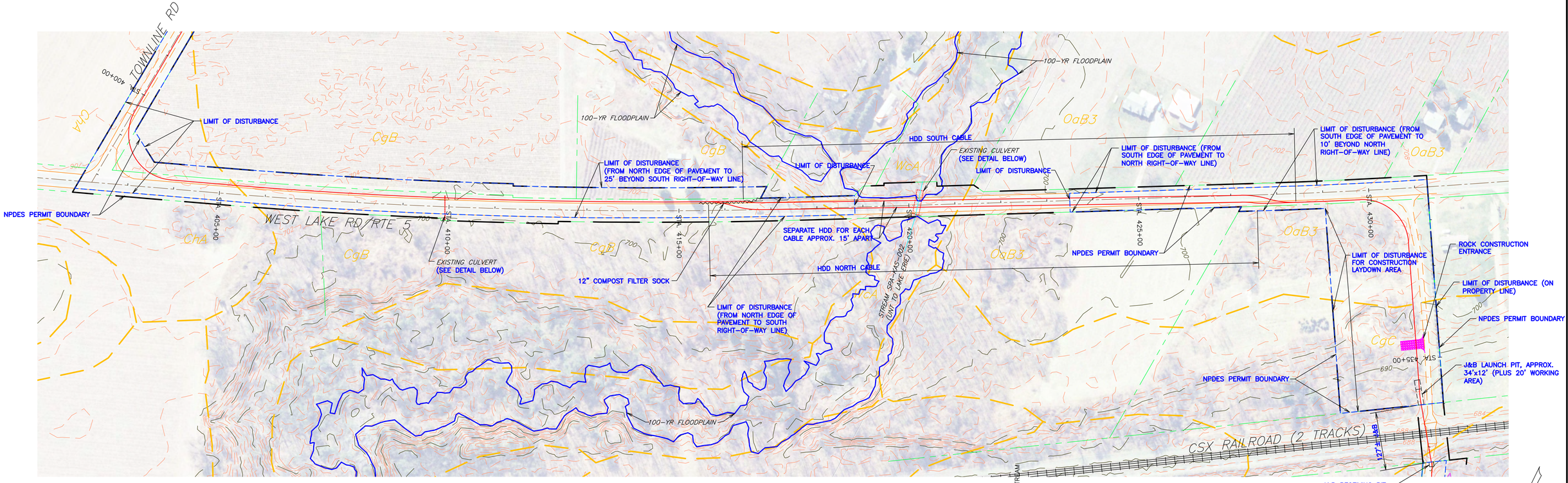
EROSION AND SEDIMENTATION CONTROL PLAN
ITC LAKE ERIE CONNECTOR LLC PENNSYLVANIA CABLE ROUTE

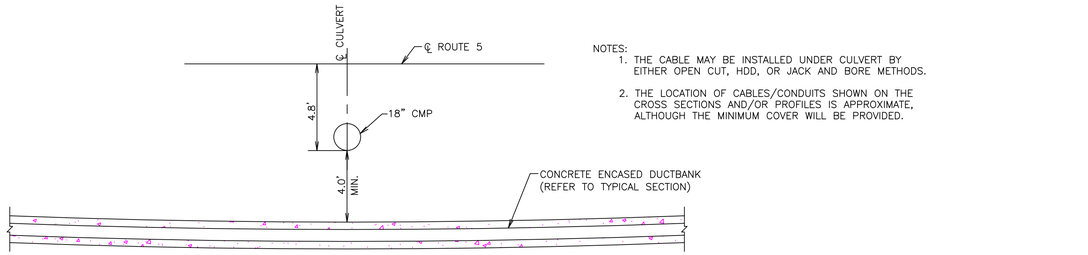
SCALE: AS SHOWN
APPROVED BY:
DRAWN BY: JEFFREY T. BERNOSKY
DATE: 1/22/2016

SPRINGFIELD TWP., GIRARD TWP., CONNEAUT TWP., ERIE COUNTY, PENNSYLVANIA

Deiss & Halmi Engineering, Inc.
ENVIRONMENTAL AND CIVIL ENGINEERING
105 Meadville Street, Edinboro PA 16412 PH. 814-734-3640 Fax 814-734-3643

DRAWING NO.: 2080215-12





PROFILE OF ROUTE 5 AT CULVERT CROSSING (STA 409+90)
N.T.S.

NOTES:
1. THE CABLE MAY BE INSTALLED UNDER CULVERT BY EITHER OPEN CUT, HDD, OR JACK AND BORE METHODS.
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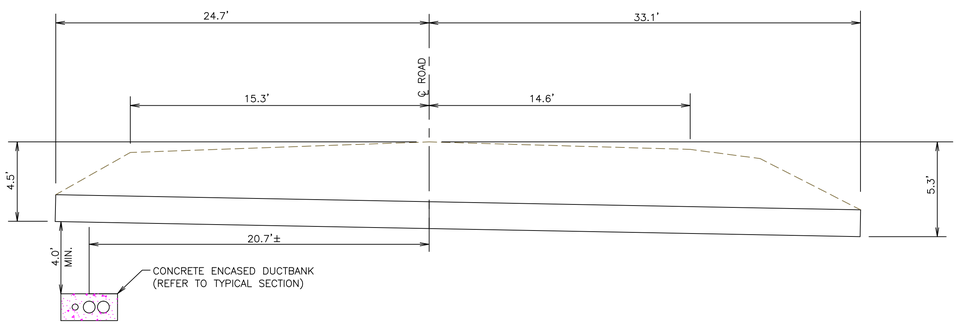
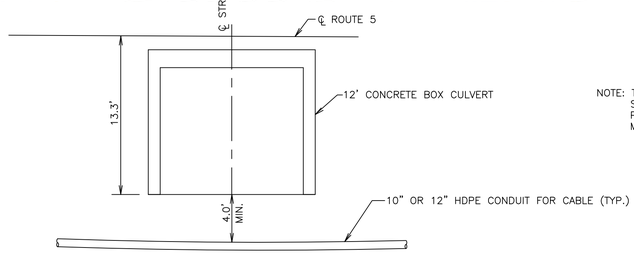
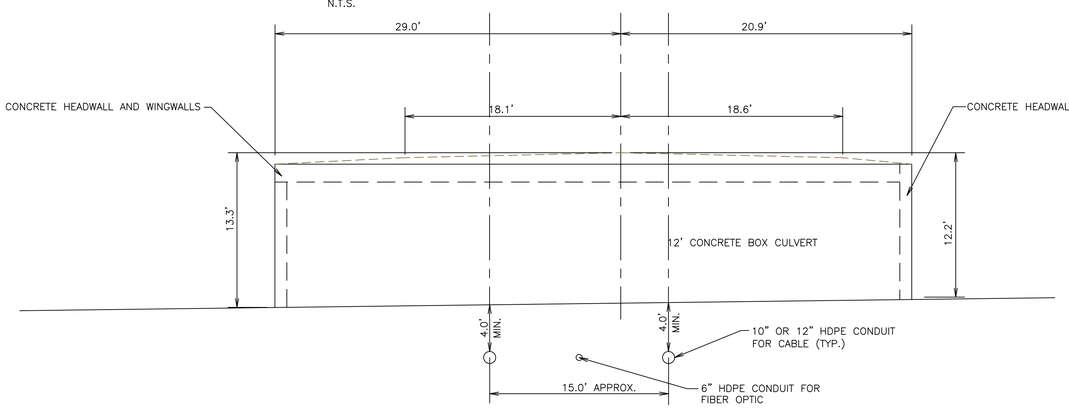


PROFILE OF CULVERT CROSSING (STA 409+90)
N.T.S.



CROSS SECTION OF STREAM SPA-KAS-002 (STA 419+85)
N.T.S.

NOTE: THE LOCATION OF CABLES/CONDUITS SHOWN ON THE CROSS SECTIONS AND/OR PROFILES IS APPROXIMATE, ALTHOUGH THE MINIMUM COVER WILL BE PROVIDED.



PROFILE OF STREAM SPA-KAS-002 (STA 419+85)
N.T.S.

SCALE: 0 100 200 feet

No.	Date	Revisions	By

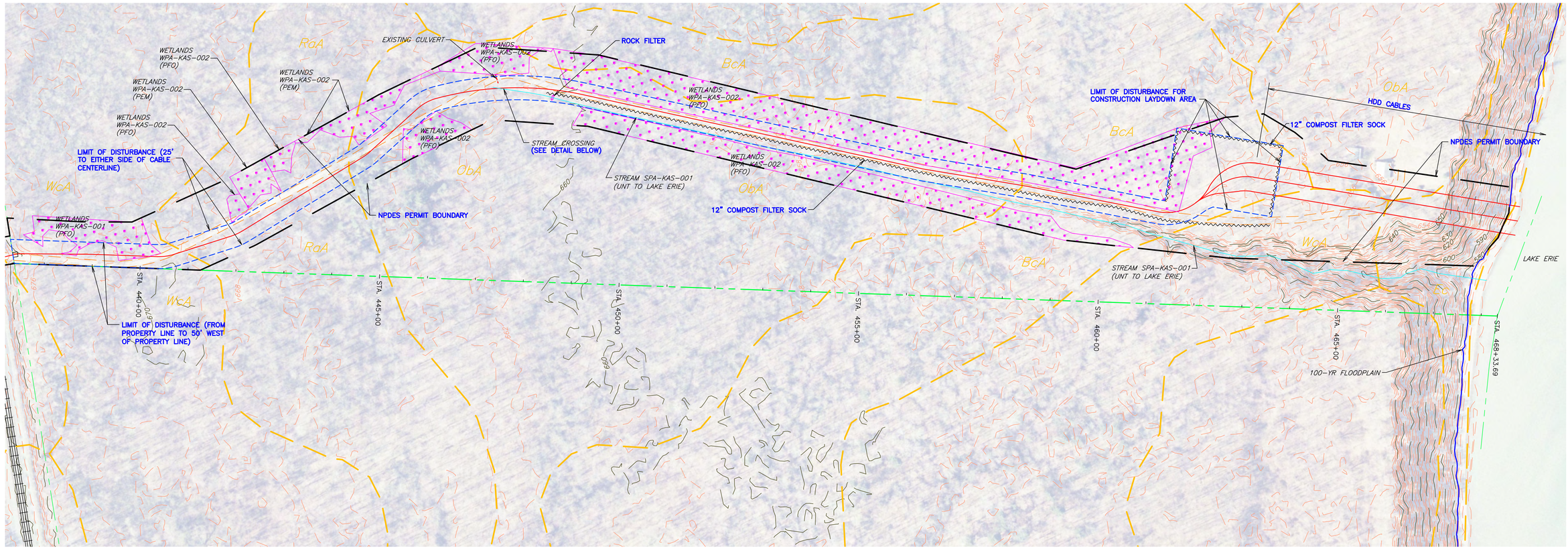
EROSION AND SEDIMENTATION CONTROL PLAN
ITC LAKE ERIE CONNECTOR LLC
PENNSYLVANIA CABLE ROUTE

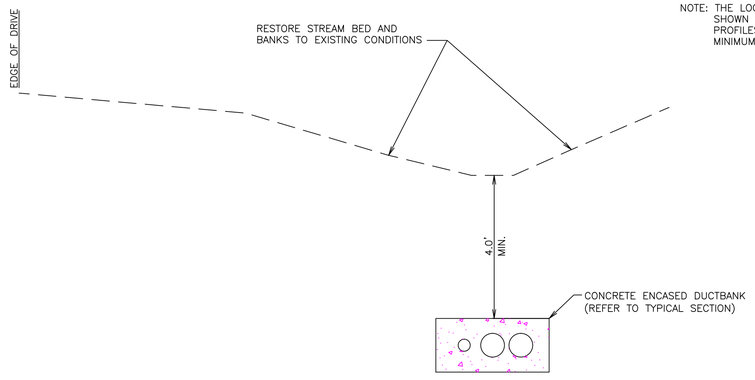
SCALE: AS SHOWN
DATE: 1/22/2016
APPROVED BY:
DRAWN BY: JEFFREY T. BERNOSKY

SPRINGFIELD TWP., GIRARD TWP., CONNEAUT TWP., ERIE COUNTY, PENNSYLVANIA

Deiss & Halmi Engineering, Inc.
ENVIRONMENTAL AND CIVIL ENGINEERING
105 Meadville Street, Edinboro PA 16412 PH. 814-734-3640 Fax 814-734-3643

DRAWING NO.: 2080215-13





NOTE: THE LOCATION OF CABLES/CONDUITS SHOWN ON THE CROSS SECTIONS AND/OR PROFILES IS APPROXIMATE, ALTHOUGH THE MINIMUM COVER WILL BE PROVIDED.

CROSS-SECTION OF STREAM SPA-KAS-001 (STA 447+35)
N.T.S.

SCALE: 0 100 200 feet

No.	Date	Revisions	By

EROSION AND SEDIMENTATION CONTROL PLAN
ITC LAKE ERIE CONNECTOR LLC
PENNSYLVANIA CABLE ROUTE

SCALE: AS SHOWN
DATE: 1/22/2016
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DRAWN BY: JEFFREY T. BERNOSKY

SPRINGFIELD TWP., GIRARD TWP., CONNEAUT TWP., ERIE COUNTY, PENNSYLVANIA

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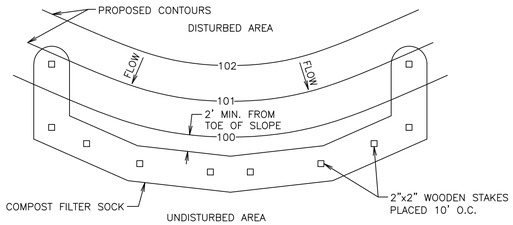
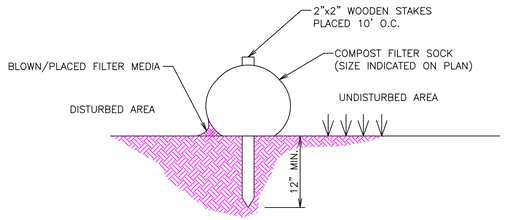
105 Meadville Street, Edinboro PA 16412 PH. 814-734-3640 Fax 814-734-3643

DRAWING NO.: 2080215-14



PLAN VIEW



SECTION VIEW

NOTES:

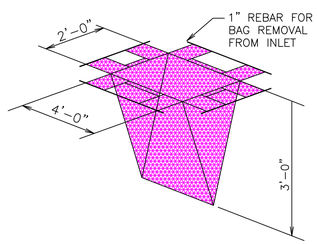
1. COMPOST SHALL MEET THE FOLLOWING STANDARDS:

ORGANIC MATTER CONTENT	25%–100% (DRY WEIGHT BASIS)
ORGANIC PORTION	FIBROUS AND ELONGATED
pH	5.5–8.5
MOISTURE CONTENT	30%–60%
PARTICLE SIZE	30%–50% PASS THROUGH 3/8" SIEVE
SOLUBLE SALT CONCENTRATION	5.0 dS MAXIMUM

2. COMPOST FILTER SOCK SHALL BE PLACED AT EXISTING LEVEL GRADE. BOTH ENDS OF THE SOCK SHALL BE EXTENDED AT LEAST 8 FEET UP SLOPE AT 45 DEGREES TO THE MAIN SOCK ALIGNMENT.
3. TRAFFIC SHALL NOT BE PERMITTED TO CROSS FILTER SOCKS.
4. ACCUMULATED SEDIMENT SHALL BE REMOVED WHEN IT REACHES ½ THE ABOVE GROUND HEIGHT OF THE SOCK AND DISPOSED IN THE MANNER DESCRIBED ELSEWHERE THE PLAN.
5. SOCKS SHALL BE INSPECTED WEEKLY AND AFTER EACH RUNOFF EVENT. DAMAGED SOCK SHALL BE REPAIRED ACCORDING TO MANUFACTURER'S SPECIFICATIONS OR REPLACED WITHIN 24 HOURS OF INSPECTION.
6. BIODEGRADABLE FILTER SOCK SHALL BE REPLACED AFTER 6 MONTHS; PHOTODEGRADABLE SOCKS AFTER 1 YEAR. POLYPROPYLENE SOCKS SHALL BE REPLACED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS.
7. UPON STABILIZATION OF THE AREA TRIBUTARY TO THE SOCK, STAKES SHALL BE REMOVED. THE SOCK MAY BE LEFT IN PLACE AND VEGETATED OR REMOVED. IN THE LATTER CASE, THE MESH SHALL BE CUT OPEN AND THE MULCH SPREAD AS A SOIL SUPPLEMENT.

COMPOST FILTER SOCK

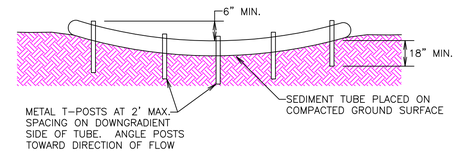
N.T.S.



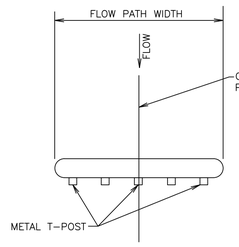
NOTE: TO BE INSTALLED ON ALL CATCH BASINS DOWNGRADIENT OF EARTH DISTURBANCE. TO BE REMOVED AFTER SITE IS STABILIZED. INLET FILTER BAGS SHALL BE SILTSACK AS MANUFACTURED BY ACF ENVIRONMENTAL, INC. OR EQUAL.

INLET FILTER BAG

NOT TO SCALE



FRONT VIEW



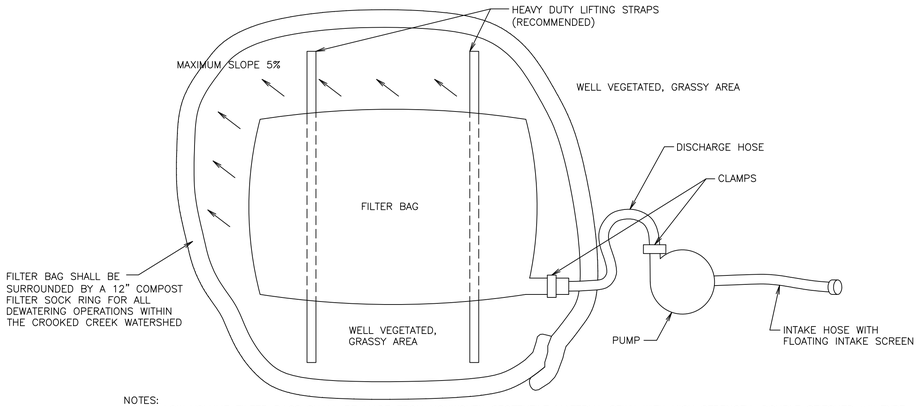
PLAN VIEW

NOTES:

1. THIS DETAIL APPLICABLE TO FLOW PATHS WITH WIDTHS ≤ ONE TUBE LENGTH.
2. METAL T–POSTS SHALL BE INSTALLED AT THE CENTER AND AT EACH END OF THE TUBE. ADDITIONAL T–POSTS SHALL BE INSTALLED AS NEEDED TO MEET THE MAXIMUM 2–FOOT SPACING.
3. SEDIMENT TUBES SHALL BE INSPECTED WEEKLY AND AFTER EACH RUNOFF EVENT.
4. ACCUMULATED SEDIMENT SHALL BE REMOVED WHEN IT REACHES HALF THE HEIGHT OF THE TUBE AND DISPOSED AS DIRECTED ELSEWHERE IN THE E&S PLAN.
5. DAMAGED TUBES SHALL BE REPAIRED OR REPLACED WITHIN 24 HOURS OF INSPECTION. A SUPPLY OF TUBES SHALL BE KEPT ON SITE FOR THIS PURPOSE.

WEIGHTED SEDIMENT FILTER TUBE

N.T.S.



NOTES:

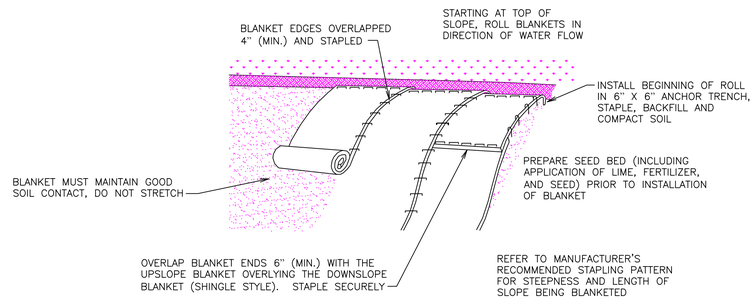
1. LOW VOLUME FILTER BAGS SHALL BE MADE FROM NONWOVEN GEOTEXTILE MATERIAL SEWN WITH HIGH STRENGTH, DOUBLE STITCHED "U" TYPE SEAMS. THEY SHALL BE CAPABLE OF TRAPPING PARTICLES LARGER THAN 150 MICRONS. HIGH VOLUME FILTER BAGS MAY BE MADE FROM WOVEN GEOTEXTILES THAT MEET THE FOLLOWING STANDARDS:

PROPERTY	TEST METHOD	MINIMUM STANDARD
AVG. WIDE WIDTH STRENGTH	ASTM D–4884	60 LB/IN
GRAB TENSILE	ASTM D–4632	205 LB
PUNCTURE	ASTM D–4833	110 LB
MULLEN BURST	ASTM D–3786	350 PSI
UV RESISTANCE	ASTM D–4355	70%
AOS 5% RETAINED	ASTM D–4751	80 SIEVE

2. A SUITABLE MEANS OF ACCESSING THE BAG WITH MACHINERY REQUIRED FOR DISPOSAL PURPOSES MUST BE PROVIDED. FILTER BAGS SHALL BE REPLACED WHEN THEY BECOME ½ FULL. SPARE BAGS SHALL BE KEPT AVAILABLE FOR REPLACEMENT OF THOSE THAT HAVE FAILED OR ARE FILLED. IT IS RECOMMENDED THAT BAGS BE PLACED ON STRAPS TO FACILITATE REMOVAL.
3. BAGS SHALL BE LOCATED IN WELL–VEGETATED (GRASSY) AREA, AND DISCHARGE ONTO STABLE, EROSION RESISTANT AREAS. WHERE THIS IS NOT POSSIBLE, A GEOTEXTILE UNDERLAYMENT AND FLOW PATH SHALL BE PROVIDED. BAGS MAY BE PLACED ON FILTER STONE TO INCREASE DISCHARGE CAPACITY. BAGS SHALL NOT BE PLACED ON SLOPES GREATER THAN 5%. FOR SLOPES EXCEEDING 5%, CLEAN ROCK OR OTHER NON–ERODIBLE AND NONPOLLUTING MATERIAL MAY BE PLACED UNDER THE BAG TO REDUCE SLOPE STEEPNESS.
4. NO DOWNSLOPE SEDIMENT BARRIER IS REQUIRED FOR MOST INSTALLATIONS. COMPOST BERM OR COMPOST FILTER SOCK SHOULD BE INSTALLED BELOW BAGS LOCATED WITHIN 50 FEET OF RECEIVING STREAM OR WHERE GRASSY AREA IS NOT AVAILABLE. A COMPOST BERM OR COMPOST FILTER SOCK SHALL BE PLACED BELOW ANY BAG DISCHARGING TO A SPECIAL PROTECTION SURFACE WATER.
5. THE PUMP DISCHARGE HOSE SHALL BE INSERTED INTO THE BAGS IN THE MANNER SPECIFIED BY THE MANUFACTURER AND SECURELY CLAMPED. A PIECE OF PVC PIPE IS RECOMMENDED FOR THIS PURPOSE.
6. THE PUMPING RATE SHALL BE NO GREATER THAN 750 GPM OR ½ THE MAXIMUM SPECIFIED BY THE MANUFACTURER, WHICHEVER IS LESS. PUMP INTAKES SHOULD BE FLOATING AND SCREENED.
7. FILTER BAGS SHALL BE INSPECTED DAILY. IF ANY PROBLEM IS DETECTED, PUMPING SHALL CEASE IMMEDIATELY AND NOT RESUME UNTIL THE PROBLEM IS CORRECTED.

PUMPED WATER FILTER BAG DETAIL

N.T.S.

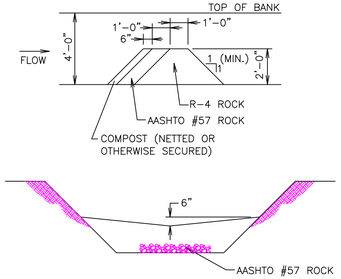


NOTES:

1. SEED AND SOIL AMENDMENTS SHALL BE APPLIED ACCORDING TO THE RATES IN THE PLAN DRAWINGS PRIOR TO INSTALLING THE BLANKET.
2. PROVIDE ANCHOR TRENCH AT TOE OF SLOPE IN SIMILAR FASHION AS AT TOP OF SLOPE.
3. SLOPE SURFACE SHALL BE FREE OF ROCKS, CLODS, STICKS, AND GRASS.
4. BLANKET SHALL HAVE GOOD CONTINUOUS CONTACT WITH UNDERLYING SOIL THROUGHOUT ENTIRE LENGTH. LAY BLANKET LOOSELY AND STAKE OR STAPLE TO MAINTAIN DIRECT CONTACT WITH SOIL.
5. STAPLING OF THE BLANKET SHALL BE DONE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
6. BLANKETED AREAS SHALL BE INSPECTED WEEKLY AND AFTER EACH RUNOFF EVENT UNTIL PERENNIAL VEGETATION IS ESTABLISHED TO A MINIMUM UNIFORM 70% COVERAGE THROUGHOUT THE BLANKETED AREA. DAMAGED OR DISPLACED BLANKETS SHALL BE RESTORED OR REPLACED WITHIN 5 CALENDAR DAYS.
7. PROVIDE EROSION CONTROL MULCH BLANKET IN ACCORDANCE WITH PENNDOT PUB. 408, SEC. 806.2(A)2.A

EROSION CONTROL MULCH BLANKET INSTALLATION

N.T.S.

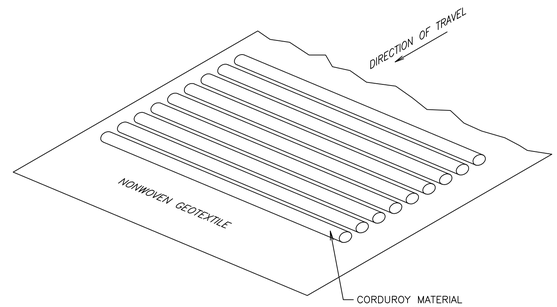


NOTES:

1. SEDIMENT MUST BE REMOVED WHEN ACCUMULATIONS REACH 1/2 THE HEIGHT OF THE FILTER.
2. CLOGGED FILTER STONE MUST BE REPLACED.

ROCK FILTER

SCALE: 1"=4'



NOTES APPLICABLE TO WETLAND CROSSINGS:

1. WETLAND CROSSINGS MUST BE AVOIDED WHEREVER POSSIBLE. WHERE THAT IS NOT POSSIBLE, THE LOCATION OF THE CROSSING AND ITS ORIENTATION MUST BE SELECTED SO AS TO HAVE THE LEAST POSSIBLE IMPACT UPON THE WETLAND.
2. STAGING AREAS SHOULD BE LOCATED AT LEAST 50 FEET FROM THE EDGE OF THE WETLAND.
3. MOVEMENT OF VEHICLES ACROSS THE WETLAND MUST BE MINIMIZED.
4. WHERE VEHICLES NEED TO CROSS WETLANDS, THE USE OF A TEMPORARY CORDUROY CROSSING, AS SHOWN ABOVE, SHALL BE USED DUE TO THE POTENTIAL FOR RUTTING.
5. EXCAVATED TOPSOIL WITH THE VEGETATIVE ROOT MASS SHALL BE CAREFULLY REMOVED AND STOCKPILED SEPARATELY FROM THE SUBSOIL, UNLESS THERE IS STANDING WATER OR THE SOIL IS TOO SATURATED TO SEGREGATE.
6. THE PROPOSED SELECTED THERMAL BACKFILL MATERIAL IN THE TRENCH IS EXPECTED TO BE TIGHTLY COMPACTED AND SUFFICIENTLY IMPERMEABLE SO AS TO PREVENT THE TRENCH FROM DRAINING THE WETLANDS OR CHANGING ITS HYDROLOGY.

NOTE ON TEMPORARY CORDUROY CROSSINGS:

1. COVER CROSSING AREA WITH NONWOVEN GEOTEXTILE.
2. LAY PIECES OF ROUNDWOOD, MILL SLABWOOD, BRUSH, OR SLASH ONTO THE GEOTEXTILE, PERPENDICULAR TO THE DIRECTION OF TRAVEL. EACH PIECE OF CORDUROY SHOULD BE AS LONG AS ANY WEAK AREAS (OR AT LEAST AS LONG AS THE EQUIPMENT USING THE CROSSING) TO PROVIDE MAXIMUM FLOATATION. LAYER THE MATERIAL FOR ADDITIONAL STRENGTH IF NEEDED.
3. SIZE INDIVIDUAL PIECES OF CORDUROY TO MEET ANTICIPATED LOADS, SOIL STRENGTH, AND INSTALLATION EQUIPMENT. USE LONGER CORDUROY ON VERY WEAK SOILS THAT HAVE A LOW BEARING STRENGTH (E.G. MUCK OR PEAT), TO SPREAD THE WEIGHT OVER A LARGER AREA.
4. ADD MORE CORDUROY TO REPAIR DAMAGED SECTIONS OR IF MATERIAL DOESN'T ADEQUATELY SUPPORT TRAFFIC.
5. COMPLETELY REMOVE TEMPORARY CORDUROY CROSSING MATERIALS WHEN NO LONGER NEEDED.

TYPICAL TEMPORARY CORDUROY WETLAND CROSSING

N.T.S.

DETAILS

No.	Date	Revisions	By

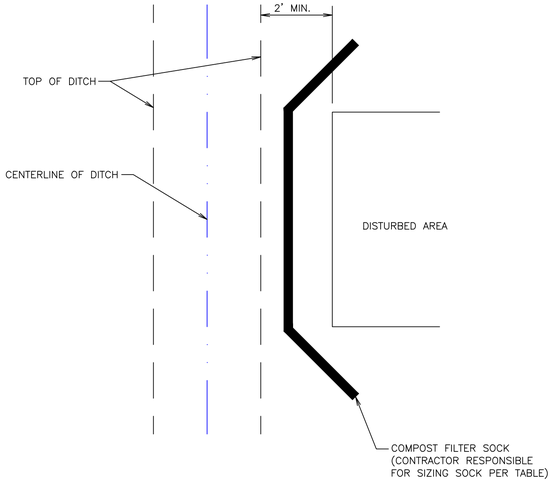
EROSION AND SEDIMENTATION CONTROL PLAN
ITC LAKE ERIE CONNECTOR LLC
PENNSYLVANIA CABLE ROUTE

SCALE: AS SHOWN
DATE: 1/22/2016
APPROVED BY:
DRAWN BY: JEFFREY T. BERNOSKY

SPRINGFIELD TWP., GIRARD TWP., CONNEAUT TWP., ERIE COUNTY, PENNSYLVANIA

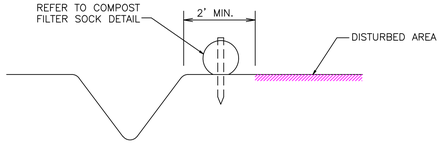
Deiss & Halmi Engineering, Inc.
ENVIRONMENTAL AND CIVIL ENGINEERING
105 Meadville Street, Edinboro PA 16412 PH: 814-734-3640 Fax 814-734-3643

DRAWING NO.: 2080215–15



SLOPE %	MAXIMUM SLOPE LENGTH (FEET)				
	8 IN. (200 MM)	12 IN. (300 MM)	18 IN. (450 MM)	24 IN. (600 MM)	32 IN. (800 MM)
2(OR LESS)	400	520	690	1,000	1,300
5	200	250	340	500	650
10	100	150	250	300	400
15	50	100	190	250	350
20	30	70	140	200	250
25	20	60	100	150	180
30	20	40	80	100	130
35	20	40	70	90	100
40	15	35	55	75	90
45	10	30	45	60	80
50	10	30	35	45	60

TABLE CREATED FROM DATA IN FIGURE 4.2 OF THE MARCH 2012, "PA. DEP EROSION AND SEDIMENTATION POLLUTION CONTROL MANUAL."



DISTURBANCE ADJACENT TO DITCHES (TYP.)

N.T.S.

SEEDING SPECIFICATIONS

SPECIES:	TEMPORARY PENNDOT FORMULA E MIX (ANNUAL RYEGRASS)	GENERAL SITE (INCLUDING INFILTRATION BASINS) PENNDOT FORMULA B MIX (PERENNIAL RYEGRASS/CREEPING RED OR CHEWINGS FESCUE/KENTUCKY BLUEGRASS)
% PURITY	95	97/97/97
% GERMINATION	90	90/85/80
APPL. RATE (LB/ACRE)	48	203 TOTAL (41/60/102)

SOW SEEDS UNIFORMLY ON THE PREPARED AREAS BY HYDRAULIC PLACEMENT, BROADCASTING, DRILLING, OR HAND SEEDING METHODS. INSPECT SEEDING EQUIPMENT AND ADJUST THE EQUIPMENT, IF REQUIRED, TO ENSURE THE SPECIFIED APPLICATION RATES. PERIODICALLY PERFORM A CHECK ON THE RATE AND UNIFORMITY OF APPLICATION, AS DIRECTED. SEEDING MAY BE APPLIED MARCH 15 TO OCTOBER 15 FOR TEMPORARY; MARCH 15 – JUNE 1, AUGUST 1 – OCTOBER 15 FOR PERMANENT.

1. COMMERCIAL FERTILIZER SHALL BE 10–20–20 APPLIED AT 678 LB/ACRE AND BLENDED INTO THE TOPSOIL
2. LIMING RATE SHALL BE 1.9 TON/ACRE
3. A SLOW RELEASE NITROGEN FERTILIZER SHALL BE APPLIED TO THE SURFACE AND SHALL BE 38–0–0 UREAFORM FERTILIZER APPLIED AT 242 LB/ACRE OR 32–0–0 TO 38–0–0 SULFER COATED UREA FERTILIZER APPLIED AT 286 LB/ACRE TO 242 LB/ACRE OR 31–0–0 IBDU FERTILIZER APPLIED AT 295 LB/ACRE

MULCH SHALL BE FREE FROM NOXIOUS WEEDS, MOLD, AND OTHER DELETERIOUS MATERIALS.

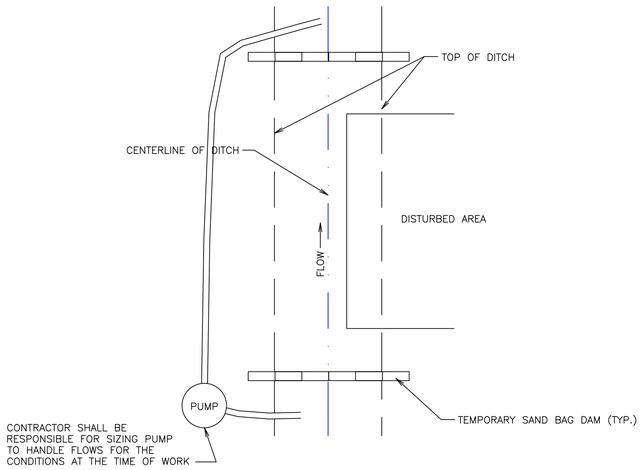
1. STRAW – EITHER WHEAT OR OAT STRAW, REASONABLY FREE OF VIABLE SEED, WELL CURED TO LESS THAN 20% MOISTURE CONTENT, BY WEIGHT AND OF PROPER CONSISTENCY FOR PLACING WITH COMMERCIAL MULCH BLOWING EQUIPMENT.

2. HAY – TIMOTHY HAY, MIXED CLOVER AND TIMOTHY HAY, OR OTHER ACCEPTABLE NATIVE OR FORAGE GRASSES, WELL–CURED TO LESS THAN 20% MOISTURE CONTENT, BY WEIGHT AND OF PROPER CONSISTENCY FOR PLACING WITH COMMERCIAL MULCH BLOWING EQUIPMENT.

APPLICATION: HAY OR STRAW MULCH SHALL BE SPREAD UNIFORMLY AT THE RATE OF 3.0 TONS PER ACRE TO PRODUCE A LAYER 1.0 TO 1.5 INCHES DEEP. MULCH SHALL BE SPREAD BY HAND, BLOWER–TYPE MULCH SPREADER, OR OTHER APPROVED METHOD. MULCHING SHALL BE STARTED ON THE WINDWARD SIDE OF RELATIVELY FLAT AREAS OR ON THE UPPER PART OF STEEP SLOPES, AND CONTINUED UNIFORMLY UNTIL THE AREA IS COVERED. THE MULCH SHALL NOT BE BUNCHED OR CLUMPED. SUNLIGHT SHALL NOT BE COMPLETELY EXCLUDED FROM PENETRATING TO THE GROUND SURFACE. ALL AREAS INSTALLED WITH SEED SHALL BE MULCHED ON THE SAME DAY AS THE SEEDING. MULCH SHALL BE ANCHORED IMMEDIATELY FOLLOWING SPREADING.

PROPERLY MAINTAIN MULCHED AREAS UNTIL THE ENTIRE PROJECT HAS BEEN COMPLETED. PROMPTLY REAPPLY MULCH MATERIALS WHICH BECOME DISLODGED OR LOST DUE TO WIND, RAIN, OR OTHER CAUSES, AT INITIAL OR MODIFIED RATES, AS DIRECTED. AFTER MULCHING WORK ON A SLOPE HAS BEEN SATISFACTORILY COMPLETED, IF A SLOPE FAILURE OCCURS THAT REQUIRES REDRESSING, EXCAVATION, OR THE ESTABLISHMENT OF A NEW SLOPE, REPLACE THE SEED AND MULCH, AS DIRECTED.

SPECIAL WETLAND AREA SEEDING NOTES: LIME AND FERTILIZER ARE NOT TO BE APPLIED TO THE BACKFILLED TRENCH. ANNUAL RYEGRASS MAY BE APPLIED AT THE RATE OF 40 LB/ACRE WHERE NEEDED TO AREAS WITHOUT STANDING WATER. STRAW MULCH SHOULD BE USED AT THE RATE OF 3 TON/ACRE AND WITHOUT BINDING AGENTS.

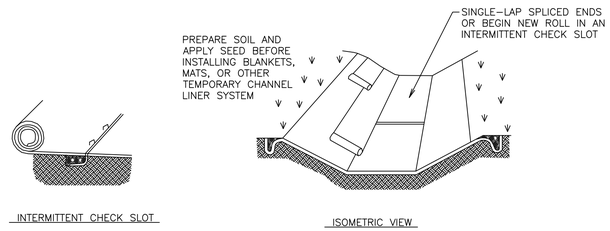


NOTES:

1. INSTALL TEMPORARY DAM UPSTREAM AND DOWNSTREAM OF DISTURBED AREA.
2. PUMP FLOW AROUND WORK AREA AND DISCHARGE DOWNSTREAM OF WORK AREA.
3. RESTORE DITCH TO ITS ORIGINAL ALIGNMENT, WIDTH, AND GRADE.
4. INSTALL EROSION CONTROL MULCH BLANKET WITHIN DITCH AND APPLY SEEDING (REFER TO DITCH LINING DETAIL).
5. REMOVE TEMPORARY DAMS AND PUMP ONLY AFTER EROSION CONTROL MULCH BLANKET HAS BEEN INSTALLED.

DISTURBANCE WITHIN DITCHES (TYP.)

N.T.S.



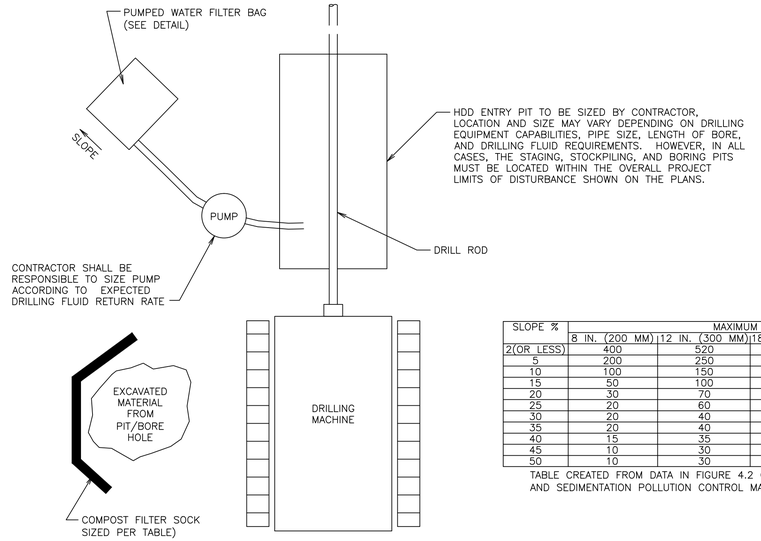
* SEE MANUFACTURER'S LINING INSTALLATION DETAIL FOR STAPLE PATTERNS, AND VEGETATIVE STABILIZATION SPECIFICATIONS FOR SOIL AMENDMENTS, SEED MIXTURES AND MULCHING INFORMATION.

NOTES:

1. FOR ALL DISTURBED DITCHES (UNLESS OTHERWISE INDICATED ON DRAWINGS) PROVIDE EROSION CONTROL MULCH CONTROL BLANKET IN ACCORDANCE WITH PENNDOT PUB. 408, SEC. 806.2(A)2.A.
2. ANCHOR TRENCHES SHALL BE INSTALLED AT BEGINNING AND END OF CHANNEL IN THE SAME MANNER AS LONGITUDINAL ANCHOR TRENCHES.
3. CHANNEL DIMENSIONS SHALL BE CONSTANTLY MAINTAINED. SEDIMENT DEPOSITS SHALL BE REMOVED WITHIN 24 HOURS OF DISCOVERY.
4. DAMAGED LINING SHALL BE REPAIRED OR REPLACED WITHIN 48 HOURS OF DISCOVERY.

DITCH RESTORATION

N.T.S.



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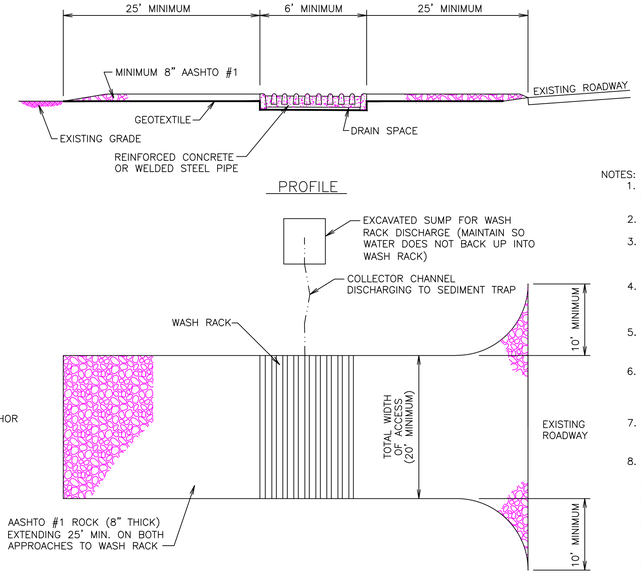
15	50	100	190	250	350
20	30	70	140	200	250
25	20	60	100	150	180
30	20	40	80	100	130
35	20	40	70	90	100
40	15	35	55	75	90
45	10	30	45	60	80
50	10	30	35	45	60

TABLE CREATED FROM DATA IN FIGURE 4.2 OF THE MARCH 2012, "PA. DEP EROSION AND SEDIMENTATION POLLUTION CONTROL MANUAL."

NOTE: CONTRACTOR SHALL ADHERE TO TYPICAL DETAIL UNLESS CONTRACTOR SUBMITS A REVISED EROSION & SEDIMENTATION CONTROL PLAN FOR REVIEW.

HORIZONTAL DIRECTIONAL DRILLING PIT (TYP.)

N.T.S.



ROCK CONSTRUCTION ENTRANCE WITH WASH RACK

N.T.S.

NOTES:

1. TOPSOIL SHOULD BE REMOVED PRIOR TO INSTALLATION OF ROCK CONSTRUCTION ENTRANCE.
2. EXTEND ROCK OVER FULL WIDTH OF ENTRANCE.
3. RUNOFF SHALL BE DIVERTED FROM ROADWAY TO A SUITABLE SEDIMENT REMOVAL BMP PRIOR TO ENTERING ROCK CONSTRUCTION ENTRANCE.
4. MOUNTABLE BERM SHOULD BE INSTALLED WHEREVER OPTIONAL CULVERT PIPE IS USED. PIPE TO BE SIZED APPROPRIATELY FOR SIZE OF DITCH BEING CROSSED.
5. WASH RACK SHALL BE 20 FEET (MIN.) WIDE OR TOTAL WIDTH OF ACCESS.
6. WASH RACK SHALL BE DESIGNED AND CONSTRUCTED TO ACCOMMODATE ANTICIPATED CONSTRUCTION VEHICULAR TRAFFIC.
7. A WATER SUPPLY SHALL BE MADE AVAILABLE TO WASH THE WHEELS OF ALL VEHICLES EXITING THE SITE.
8. MAINTENANCE: ROCK CONSTRUCTION ENTRANCE THICKNESS SHALL BE CONSTANTLY MAINTAINED TO THE SPECIFIED DIMENSIONS BY ADDING ROCK. A STOCKPILE OF ROCK MATERIAL SHALL BE MAINTAINED ON SITE FOR THIS PURPOSE. DRAIN SPACE UNDER WASH RACK SHALL BE KEPT OPEN AT ALL TIMES. DAMAGE TO THE WASH RACK SHALL BE REPAIRED PRIOR TO FURTHER USE OF THE RACK. ALL SEDIMENT DEPOSITED ON ROADWAYS SHALL BE REMOVED AND RETURNED TO THE CONSTRUCTION SITE IMMEDIATELY. WASHING THE ROADWAY OR SWEEPING THE DEPOSITS INTO ROADWAY DITCHES, SEWER, CULVERTS, OR OTHER DRAINAGEWAYS IS NOT ACCEPTABLE.

DETAILS

No.	Date	Revisions	By

EROSION AND SEDIMENTATION CONTROL PLAN

ITC LAKE ERIE CONNECTOR LLC PENNSYLVANIA CABLE ROUTE

SCALE: AS SHOWN
DATE: 1/22/2016
APPROVED BY:
DRAWN BY: JEFFREY T. BERNOSKY

SPRINGFIELD TWP., GIRARD TWP., CONNEAUT TWP., ERIE COUNTY, PENNSYLVANIA

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BMPS TO BE USED:

THE FOLLOWING BEST MANAGEMENT PRACTICES (BMPS) ARE PROPOSED FOR EROSION AND SEDIMENTATION CONTROL BEFORE, DURING, AND AFTER EARTH DISTURBANCE ACTIVITIES. IN THE FOLLOWING DESCRIPTIONS, DISTURBED AREAS ARE CONSIDERED TO BE STABILIZED WHEN A UNIFORM 70 PERCENT PERENNIAL VEGETATIVE COVER HAS BEEN ACHIEVED, OR THE SURFACE HAS BEEN OTHERWISE COVERED WITH A DURABLE, MUD FREE DRIVING SURFACE.

MINIMIZE LENGTH OF OPEN EXCAVATION. ON MANY HVDC UNDERGROUND CABLE PROJECTS, CABLES ARE DIRECT BURIED IN OPEN TRENCHES, AND SINCE THE CABLES CAN BE UP TO 2,500 FEET LONG, UP TO 2,500 FEET OF OPEN TRENCH MUST BE KEPT OPEN UNTIL THE CABLE CAN BE LAID. FOR THIS PROJECT, CABLES WILL BE INSTALLED IN CONCRETE ENCASED DUCT BANKS. THE LENGTH OF OPEN TRENCH NECESSARY FOR THE INSTALLATION OF THE DUCT BANK WILL TYPICALLY BE LESS THAN 60 FEET, AND NO MORE THAN 150 FEET. FOR EACH CONSTRUCTION DAY, THE LENGTH OF CONSTRUCTION WILL BE LIMITED TO THAT WHICH CAN BE BACKFILLED IN THAT DAY. THE LENGTH OF TIME FOR AN EXCAVATION TO REMAIN OPEN IS THEREFORE MINIMIZED. AS SUCH, THE EROSION, SEDIMENT TRANSPORT, AND DEWATERING ASSOCIATED WITH OPEN TRENCHES WILL ALSO BE MINIMIZED. THIS DOES NOT PRECLUDE THE INSTALLATION OF CERTAIN SHORT LENGTHS OF CABLE BY DIRECT BURIAL. THIS ALSO DOES NOT PRECLUDE LEAVING THE ENDS OF THE DUCT BANK EXPOSED OVERNIGHT, PROVIDED PROPER SAFETY MEASURES ARE USED TO PROTECT THE OPEN EXCAVATION.

HORIZONTAL DIRECTIONAL DRILLING. AT CERTAIN STREAMS, HDD WILL BE USED TO CONSTRUCT THE CABLE CONDUITS ACROSS THE STREAMS, MAINTAINING A MINIMUM 3 FOOT COVER BETWEEN THE CONDUIT AND THE STREAM BOTTOM. AN INADVERTENT FLUID RELEASE PREVENTION, MONITORING, AND CONTINGENCY PLAN HAS BEEN DEVELOPED TO ADDRESS THE INADVERTENT RELEASE OF DRILLING FLUIDS TO THE SURFACE OR DUE TO WEAK SPOTS IN THE SOIL.

AVOID CONSTRUCTION DURING STREAM FLOW. AT CERTAIN EPHEMERAL OR INTERMITTENT STREAMS, CONSTRUCTION ACROSS THE STREAM WILL BE LIMITED TO OCCUR ONLY WHEN THERE IS NO STREAM FLOW.

CULVERT BYPASS. AT CERTAIN STREAMS WHERE AN EXISTING ROADWAY CROSSES THE STREAM OVER AN EXISTING CULVERT, THE CABLE DUCT BANK WILL BE PLACED A MINIMUM OF 3 FEET UNDERNEATH THE CULVERT. THE CULVERT WILL REMAIN IN PLACE DURING CONSTRUCTION TO CONVEY THE STREAM ACROSS THE DUCT BANK EXCAVATION.

ROCK CONSTRUCTION ENTRANCE WITH WASH RACK. A ROCK CONSTRUCTION ENTRANCE WITH WASH RACK WILL BE CONSTRUCTED WHERE CONSTRUCTION VEHICLES ACCESS CERTAIN AREAS OF THE PROJECT, PARTICULARLY CONSTRUCTION LAYDOWN AREAS. THE PURPOSE OF A ROCK CONSTRUCTION ENTRANCE WITH WASH RACK IS TO PREVENT SOIL LOSS FROM TRAFFIC LEAVING THE CONSTRUCTION SITE. WASH RACKS IN CONSTRUCTION ENTRANCES ARE FOR WASHING OF TIRES ONLY – WHERE IT IS NECESSARY TO WASH AN ENTIRE VEHICLE PRIOR TO LEAVING THE SITE, THIS SHOULD BE DONE AT A SITE DESIGNED TO PREVENT UNTREATED NUTRIENT–ENRICHED WASTEWATER OR HAZARDOUS WASTES FROM BEING DISCHARGED TO SURFACE OR GROUND WATERS. THE LOCATION AND DETAILS FOR THE ROCK CONSTRUCTION ENTRANCE WITH WASH RACK ARE SHOWN ON THE E&SC PLAN DRAWINGS. THE ROCK CONSTRUCTION ENTRANCE WITH WASH RACK WILL BE INSTALLED BEFORE SIGNIFICANT EARTH DISTURBANCE IS TO OCCUR AT THE SITE, AND WILL REMAIN IN PLACE UNTIL THE SITE IS STABILIZED SUCH THAT NO SIGNIFICANT SOIL LOSS ONTO ADJACENT ROADWAYS IS EXPECTED.

COMPOST FILTER SOCK. COMPOST FILTER SOCK WILL BE PLACED DOWNGRADIENT OF CERTAIN DISTURBED AREAS TO PREVENT THE TRANSPORT OF SEDIMENT OFFSITE. DETAILS OF THE COMPOST FILTER SOCK AS WELL AS LOCATIONS FOR PLACEMENT ARE SHOWN ON THE E&SC PLAN DRAWINGS. SEDIMENT WILL BE REMOVED FROM THE FILTER SOCK WHEN ACCUMULATIONS REACH ONE HALF THE HEIGHT OF THE SOCK. COMPOST FILTER SOCKS WILL BE INSTALLED BEFORE SIGNIFICANT EARTH DISTURBANCE OCCURS UPGRADIENT OF THE COMPOST FILTER SOCK, AND WILL REMAIN IN PLACE UNTIL UPGRADIENT DISTURBED AREAS HAVE BEEN STABILIZED.

ROCK FILTER. ROCK FILTERS WILL BE USED IN EXISTING CHANNELS AND ROADSIDE DITCHES DOWNGRADIENT OF DISTURBED AREAS. DETAILS OF ROCK FILTERS AS WELL AS LOCATIONS FOR PLACEMENT ARE SHOWN ON THE E&SC PLAN DRAWINGS. ROCK FILTERS WILL INCLUDE A 6 INCH LAYER OF COMPOST ON THE UPGRADIENT SIDE. ROCK FILTERS WILL BE INSTALLED BEFORE SIGNIFICANT EARTH DISTURBANCE OCCURS UPGRADIENT OF THE ROCK FILTER, AND WILL REMAIN IN PLACE UNTIL UPGRADIENT DISTURBED AREAS HAVE BEEN STABILIZED, INCLUDING THE CHANNEL LINING ITSELF, IF NECESSARY.

EROSION CONTROL MULCH BLANKET. EROSION CONTROL MULCH BLANKETS WILL BE INSTALLED ON DISTURBED SLOPES 3H:1V AND STEEPER. SPECIFICATIONS FOR EROSION CONTROL MULCH BLANKETS ARE PRESENTED ON THE E&SC PLAN DRAWINGS. EROSION CONTROL MULCH BLANKETS WILL BE INSTALLED AS SOON AS PRACTICAL AFTER FINAL GRADE HAS BEEN ACHIEVED, AND WILL REMAIN IN PLACE AS THE PERMANENT VEGETATIVE COVER IS ESTABLISHED.

PUMPED WATER FILTER BAGS. PUMPED WATER FILTER BAGS WILL BE CONNECTED TO THE DISCHARGE END OF ALL DEWATERING PUMPS. PUMPED WATER FILTER BAGS WILL BE SURROUNDED BY A COMPOST FILTER SOCK RING FOR ALL DEWATERING OPERATIONS WITHIN THE CROOKED CREEK WATERSHED. BAGS SHALL BE LOCATED IN A WELL–VEGETATED (GRASSY) AREA, AND DISCHARGE ONTO STABLE, EROSION RESISTANT AREAS. WHERE THIS IS NOT POSSIBLE, A GEOTEXTILE UNDERLAYMENT AND FLOW PATH SHALL BE PROVIDED. BAGS MAY BE PLACED ON FILTER STONE TO INCREASE DISCHARGE CAPACITY. BAGS SHALL NOT BE PLACED ON SLOPES GREATER THAN 5%. FOR SLOPES EXCEEDING 5%, CLEAN ROCK OR OTHER NON–ERODIBLE AND NON–POLLUTING MATERIAL MAY BE PLACED UNDER THE BAG TO REDUCE SLOPE STEEPNESS. THE PUMP DISCHARGE HOSE SHALL BE INSERTED INTO THE BAGS IN THE MANNER SPECIFIED BY THE MANUFACTURER AND SECURELY CLAMPED. A PIECE OF PVC PIPE IS RECOMMENDED FOR THIS PURPOSE. THE PUMPING RATE SHALL BE NO GREATER THAN 750 GPM OR 1/2 THE MAXIMUM SPECIFIED BY THE MANUFACTURER, WHICHEVER IS LESS. PUMP INTAKES SHALL BE FLOATING AND SCREENED.

VEGETATIVE STABILIZATION. VEGETATIVE STABILIZATION CONSISTS OF FINAL GRADING, TOPSOIL PLACEMENT, SEEDING, AND MULCHING. IF WEATHER CONDITIONS ARE FAVORABLE, PERMANENT SEEDING WILL TAKE PLACE WITHIN 7 DAYS OF THE COMPLETION OF THE EARTH DISTURBANCE ACTIVITIES. OTHERWISE, TEMPORARY SEEDING AND MULCHING WILL BE IMPLEMENTED UNTIL CONDITIONS BECOME FAVORABLE FOR THE ESTABLISHMENT OF PERMANENT VEGETATIVE COVER. TEMPORARY SEEDING AND MULCHING WILL BE APPLIED TO EARTH–EXPOSED AREAS WHERE EARTHWORK IS DELAYED OR STOPPED FOR A PERIOD OF 4 OR MORE DAYS. TEMPORARY VEGETATIVE STABILIZATION WILL BE MAINTAINED UNTIL EARTHMOVING RECOMMENCES, OR UNTIL THE TEMPORARY VEGETATIVE STABILIZATION IS REPLACED BY PERMANENT VEGETATIVE STABILIZATION. SPECIFICATIONS FOR VEGETATIVE STABILIZATION ARE INCLUDED ON THE E&SC PLAN DRAWINGS.

INLET FILTER BAGS. STORM SEWER INLETS ARE PRESENT ONLY IN THE VICINITY OF ROUTE 20 AND TOWNLINE ROAD. INLET FILTER BAGS WILL BE PLACED IN THOSE INLETS DOWNGRADIENT OF CONSTRUCTION ACTIVITIES. THE FILTER BAGS SHALL BE CAPABLE OF TRAPPING ALL PARTICLES NOT PASSING A NO. 40 SIEVE. TYPICAL INSTALLATION DETAILS ARE SHOWN ON THE E&SC PLAN DRAWINGS. INLET FILTER BAGS SHALL BE INSTALLED ACCORDING TO THE MANUFACTURER'S SPECIFICATIONS.

WETLAND CROSSINGS. WETLAND CROSSINGS MUST BE AVOIDED WHEREVER POSSIBLE. WHERE THAT IS NOT POSSIBLE, THE LOCATION OF THE CROSSING AND ITS ORIENTATION MUST BE SELECTED SO AS TO HAVE THE LEAST POSSIBLE IMPACT UPON THE WETLAND. MOVEMENT OF VEHICLES ACROSS THE WETLAND MUST BE MINIMIZED. WHERE VEHICLES NEED TO CROSS WETLANDS, THE USE OF A TEMPORARY CORDUROY CROSSING SHALL BE USED DUE TO THE POTENTIAL FOR RUTTING.

MAINTENANCE PROVISIONS

A MAINTENANCE PROGRAM FOR EROSION AND SEDIMENTATION CONTROL FACILITIES WILL BE IMPLEMENTED, CONSISTING OF INSPECTIONS BY THE CONTRACTOR TO OCCUR WEEKLY, AS WELL AS AFTER ANY STORMWATER EVENT, OR MORE FREQUENTLY WHERE INDICATED BELOW. EACH INSPECTION MUST BE DOCUMENTED IN WRITING AS TO THE DATE OF THE INSPECTION, THE PERSON PERFORMING THE INSPECTION, AND ANY BMP REPAIRS, REPLACEMENT OR MAINTENANCE ACTIVITIES THAT OCCUR. RECORDS OF THESE INSPECTIONS WILL BE KEPT ON SITE BY THE CONTRACTOR, AND WILL BE MADE AVAILABLE UPON REQUEST TO INSPECTORS FROM PADEP OR THE ERIE COUNTY CONSERVATION DISTRICT. INSPECTIONS WILL COVER ALL ASPECTS OF THE BMPS, PARTICULARLY WITH REGARD TO THE FOLLOWING:

ROCK CONSTRUCTION ENTRANCE WITH WASH RACK. THE ROCK CONSTRUCTION SIZE AND THICKNESS WILL BE MAINTAINED TO THE SPECIFIED DIMENSIONS BY ADDING ADDITIONAL ROCK AS NECESSARY. A STOCKPILE WILL BE MAINTAINED ON SITE FOR THIS PURPOSE. THE DRAIN SPACE UNDER THE WASH RACK WILL BE KEPT OPEN AT ALL TIMES. DAMAGE TO THE WASH RACK WILL BE REPAIRED PRIOR TO FURTHER USE OF THE WASH RACK. AT THE END OF EACH CONSTRUCTION DAY, ALL SEDIMENT DEPOSITED FROM THE SITE ONTO ADJACENT ROADWAYS WILL BE REMOVED AND RETURNED TO THE CONSTRUCTION SITE. WASHING THE ROADWAY OR SWEEPING DEPOSITS INTO ROADSIDE DITCHES, STORM SEWERS, CULVERTS, OR OTHER DRAINAGE COURSES IS NOT ACCEPTABLE.

COMPOST FILTER SOCK. ACCUMULATED SEDIMENT SHALL BE REMOVED WHEN IT REACHES HALF THE ABOVEGROUND HEIGHT OF THE SOCK. COMPOST FILTER SOCKS WILL BE RESET AS NECESSARY, AND REPAIRED ACCORDING TO THE MANUFACTURER'S SPECIFICATIONS. BIODEGRADABLE FILTER SOCKS WILL BE REPLACED AFTER SIX MONTHS; PHOTODEGRADABLE SOCKS AFTER ONE YEAR. POLYPROPYLENE SOCKS WILL BE REPLACED ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS. UPON REMOVAL, THE COMPOST FILTER SOCKS MAY BE CUT OPEN AND THE MULCH SPREAD AS A SOIL SUPPLEMENT.

ROCK FILTER. COMPOST AND FILTER STONE THAT BECOMES CLOGGED WITH SEDIMENT WILL BE REPLACED. DAMAGED ROCK FILTERS WILL BE REPAIRED IMMEDIATELY AFTER INSPECTION.

EROSION CONTROL MULCH BLANKET. AREAS COVERED BY EROSION CONTROL MULCH BLANKETS WILL BE INSPECTED WEEKLY AND AFTER EACH RUNOFF EVENT UNTIL PERENNIAL VEGETATION IS ESTABLISHED TO A MINIMUM UNIFORM 70 PERCENT COVERAGE THROUGHOUT THE BLANKETED AREA. DAMAGED OR DISPLACED BLANKETS WILL BE RESTORED OR REPLACED WITHIN 4 CALENDAR DAYS.

PUMPED WATER FILTER BAGS. FILTER BAGS SHALL BE INSPECTED DAILY. IF ANY PROBLEM IS DETECTED, PUMPING SHALL CEASE IMMEDIATELY AND NOT RESUME UNTIL THE PROBLEM IS CORRECTED. FILTER BAGS SHALL BE REPLACED WHEN THEY BECOME 1/2 FULL OF SEDIMENT. SPARE BAGS SHALL BE KEPT AVAILABLE FOR REPLACEMENT OF THOSE THAT HAVE FAILED OR ARE FILLED. BAGS SHALL BE PLACED ON STRAPS TO FACILITATE REMOVAL UNLESS BAGS COME WITH LIFTING STRAPS ALREADY ATTACHED. A SUITABLE MEANS OF ACCESSING THE BAG WITH MACHINERY REQUIRED FOR DISPOSAL PURPOSES SHALL BE PROVIDED.

VEGETATIVE STABILIZATION. SEEDED AREAS WILL BE MAINTAINED IN ACCORDANCE WITH THE SPECIFICATIONS UNTIL PERENNIAL VEGETATION IS ESTABLISHED TO A MINIMUM UNIFORM 70 PERCENT COVERAGE.

INLET FILTER BAGS. INLET FILTER BAGS SHALL BE INSPECTED ON A WEEKLY BASIS AND AFTER EACH RUNOFF EVENT. NEEDED REPAIRS SHOULD BE INITIATED IMMEDIATELY AFTER THE INSPECTION. FILTER BAGS SHOULD BE CLEANED AND/OR REPLACED WHEN THE BAG IS HALF FULL OR WHEN FLOW CAPACITY HAS BEEN REDUCED SO AS TO CAUSE FLOODING OR BYPASSING OF THE INLET. ACCUMULATED SEDIMENT SHOULD BE DISPOSED IN THE APPROVED MANNER. BAGS THAT WILL BE REUSED SHOULD BE RINSED AT A LOCATION WHERE THE RINSE WATER WILL ENTER A SEDIMENT TRAP OR SEDIMENT BASIN. DAMAGED FILTER BAGS SHOULD BE REPLACED.

SOIL LIMITATIONS

SOIL NAME	CUTBANKS CAVE	CORROSIVE TO CONCRETE/STEEL	DROUGHTY	EASILY ERODIBLE	FLOODING	DEPTH TO SATURATED ZONE/ SEASONAL HIGH WATER TABLE	HYDRIC/HYDRIC INCLUSIONS	LOW STRENGTH/ LANDSLIDE PRONE	SLOW PERCOLATION	PIPING	POOR SOURCE OF TOPSOIL	FROST ACTION	SHRINK–SWELL	POTENTIAL SINKHOLE	PONDING	WETNESS
BARRIEN	X	s		X		X	X		X	X		X			X	
BIRDSALL	X	c/s				X	X	X	X	X	X	X	X		X	X
CANADICE	X	s		X		X	X	X	X		X	X	X		X	X
CONOTTON	X	c/s	X	X		X	X	X	X	X	X	X				
FREDON	X	c/s	X	X		X	X	X	X		X	X				X
HALSEY	X	c/s		X	X	X	X	X	X	X	X	X				X
OTTAWA	X	c	X						X			X				
PLATEA	X	c/s		X		X	X	X	X	X		X				X
RIMER	X	c/s	X	X		X	X		X	X	X	X	X			X
WALLINGTON	X	c/s		X		X	X	X	X	X	X	X				X
WAUSEON	X	c/s				X	X	X	X	X	X	X			X	X
WAYLAND	X	s		X	X	X	X	X	X	X	X	X			X	X

PROPOSED MEASURES TO ADDRESS SOIL LIMITATIONS

1. CUTBANKS CAVE. THERE WILL BE NO EXPOSED CUTBANKS UPON COMPLETION OF THE PROJECT. THE CONTRACTOR SHALL ADHERE TO ALL OSHA REGULATIONS REGARDING EXCAVATION AND SHORING/BRACING OR SLOPING TRENCH WALLS.
2. CORROSIVE TO CONCRETE/STEEL. CONCRETE AND STEEL STRUCTURES SHALL BE DESIGNED BY THE SUPPLIER FOR DIRECT BURIAL.
3. DROUGHTY. VEGETATION MANAGEMENT AREAS HAVE BEEN ESTABLISHED TO PROTECT THE CABLES FROM DRYOUT.
4. EASILY ERODIBLE. ALL DISTURBED SURFACES WILL BE STABILIZED EITHER WITH VEGETATION TO PREVENT EROSION. SLOPES OF 3H:1V AND STEEPER WILL BE STABILIZED USING AN EROSION CONTROL MULCH BLANKET UNTIL A UNIFORM 70% VEGETATIVE COVER HAS BEEN ESTABLISHED.
5. FLOODING. FLOODING IS NOT EXPECTED TO HAVE AN ADVERSE IMPACT ON THIS PROJECT.
6. DEPTH TO SATURATED ZONE/SEASONAL HIGH WATER TABLE. SOIL BORINGS HAVE BEEN INVESTIGATED AND THE SEASONAL HIGH WATER TABLE IS NOT EXPECTED TO CAUSE PROBLEMS FOR THIS PROJECT. APPROPRIATE DEWATERING BMPS ARE PROVIDED FOR DURING CONSTRUCTION.
7. HYDRIC/HYDRIC INCLUSIONS. WETLANDS HAVE BEEN DELINEATED WITHIN THE PROJECT AREA. THE THE AREA PROPOSED FOR DEVELOPMENT ON THE SITE HAS BEEN LOCATED TO PROTECT THE DELINEATED WETLANDS.
8. LOW STRENGTH/LANDSLIDE PRONE. THE PROPOSED GRADES AND CONSTRUCTION ACTIVITIES LOCATED IN THESE AREAS ARE NOT SUBJECT TO LANDSLIDES.
9. SLOW PERCOLATION. SLOW PERCOLATION IS NOT EXPECTED TO HAVE AN ADVERSE IMPACT ON THIS PROJECT.
10. PIPING. PIPING IS NOT EXPECTED TO HAVE AN ADVERSE IMPACT ON THIS PROJECT.
11. POOR SOURCE OF TOPSOIL. THE PROJECT IS NOT DEPENDENT UPON A SIGNIFICANT DEPTH OF TOPSOIL. WHAT TOPSOIL IS AVAILABLE ON SITE WILL BE STOCKPILED AND REDISTRIBUTED ON AREAS THAT ARE TO BE SEEDED. ANY ADDITIONAL TOPSOIL THAT IS REQUIRED BEYOND WHAT IS AVAILABLE ON SITE WILL BE IMPORTED FROM A SUPPLIER.
12. FROST ACTION. THIS LIMITATION WILL NOT HAVE AN ADVERSE EFFECT ON THE PROPOSED ACTIVITY.
13. SHRINK/SWELL. THIS LIMITATION WILL NOT HAVE AN ADVERSE EFFECT ON THE PROPOSED ACTIVITY.
14. PONDING. PONDING IS NOT EXPECTED TO HAVE AN ADVERSE IMPACT ON THIS PROJECT.
15. WETNESS. WETNESS IS NOT EXPECTED TO HAVE AN ADVERSE IMPACT ON THIS PROJECT.

STAGING OF CONSTRUCTION ACTIVITIES

BMP INSTALLATION AND REMOVAL IN RELATION TO EARTH DISTURBANCE ACTIVITIES ARE PROJECTED TO PROCEED IN ACCORDANCE WITH THE FOLLOWING RELATIVE SEQUENCE. THIS SEQUENCE MAY BE REPEATED FOR DIFFERENT WORK AREAS AS THE PROJECT PROGRESSES.

1. SITE PREPARATION.
   a. INSTALL ROCK CONSTRUCTION ENTRANCE WITH WASH RACK AT REQUIRED ENTRANCES TO CONSTRUCTION LAYDOWN AREAS AND THE SITE.
   b. IN THE VICINITY OF THE WORK AREA, INSTALL COMPOST FILTER SOCK AS NOTED ON THE PLANS.
   c. IN DITCHES OR CHANNELS DOWNGRADIENT OF WORK AREAS, AS NOTED ON THE PLANS, INSTALL ROCK FILTERS.
   d. IMPLEMENT TRAFFIC CONTROL WHERE NECESSARY.
2. TYPICAL JACK AND BORE INSTALLATION.
   a. EXCAVATE BORE PIT AND RECEIVING PIT.
   b. PLACE AND ALIGN BORING EQUIPMENT.
   c. COMMENCE BORING. ADD ADDITIONAL CASING MATERIAL AS BORING PROGRESSES.
   d. REMOVE CUTTINGS FROM BOREHOLE AND TEMPORARILY STOCKPILE WITHIN LIMITS OF DISTURBANCE.
   e. REMOVE BORING EQUIPMENT. LEAVE CASING IN PLACE.
   f. INSERT CONDUIT AND SPACERS THROUGH CASING.
   g. BACKFILL BORE PIT AND RECEIVING PIT.
3. TYPICAL ON–LAND HDD OPERATION.
   a. ALIGN DRILL RIG AT LOCATION NECESSARY TO ACHIEVE PROPER HDD DEPTH AND ALIGNMENT.
   b. AT OPPOSITE END OF BORING, ASSEMBLE LENGTH OF CONDUIT TO BE PULLED THROUGH BOREHOLE.
   c. EXCAVATE SMALL PITS AT DRILL ENTRY AND EXIT POINTS AS NECESSARY TO CONTAIN DRILLING FLUID EXPECTED TO NORMALLY DISCHARGE FROM BOREHOLE.
   d. COMMENCE DRILLING OPERATION.
   e. CONTAIN AND COLLECT DRILLING FLUIDS THAT NORMALLY DISCHARGE FROM EITHER END OF THE BOREHOLE.
   f. MONITOR FOR INADVERTENT RETURNS OF DRILLING FLUID AT THE GROUND SURFACE. COLLECT USING HAND TOOLS, VACUUM TRUCK, OR SIMILAR MEANS. CONTAIN LARGER INADVERTENT RETURNS USING SANDBAGS OR PITS FOR LATER CLEANUP.
   g. WHEN BOREHOLE IS PROPERLY SIZED, PULL CONDUIT BACK THROUGH BOREHOLE.
   h. CLEAN ANY REMAINING SPILT DRILLING FLUIDS.
4. TYPICAL CABLE DUCT BANK INSTALLATION.
   a. EXCAVATE THE TRENCH FOR THE DUCT BANK. THE LENGTH OF OPEN EXCAVATION FOR THE DUCT BANK WILL TYPICALLY BE LESS THAN 60 FEET, AND NO MORE THAN 150 FEET. ONLY EXCAVATE FOR WHAT CAN BE CONSTRUCTED AND BACKFILLED IN THE SAME DAY.
   b. PREPARE TRENCH FOUNDATION; INSTALL CRUSHED AGGREGATE BASE IF NECESSARY.
   c. INSTALL PVC CONDUITS AND CONDUIT SPACERS AS SHOWN ON TYPICAL SECTION.
   d. POUR THERMAL DUCT BANK CONCRETE AS SHOWN ON TYPICAL SECTION.
   e. BACKFILL REMAINING TRENCH WITH ACCEPTABLE BACKFILL, COMPACTED PER SPECIFICATIONS.
5. TYPICAL SPLICE PIT VAULT PLACEMENT.
   a. EXCAVATE FOR VAULT.
   b. PREPARE FOUNDATION PER SPECIFICATIONS.
   c. INSTALL SPICE PIT VAULT (TYPICALLY THESE ARE PRECAST STRUCTURES).
   d. BACKFILL AND COMPACT PER SPECIFICATIONS.
6. TEMPORARY SURFACE RESTORATION.
   a. FOR ROADWAYS, IMPROVED SHOULDERS, AND DRIVEWAYS, SURFACE WILL BE RESTORED TEMPORARILY WITH A MINIMUM OF 18 INCHES OF COMPACTED PENNDOT 2A COARSE AGGREGATE. FINAL RESTORATION OF ROADWAYS AND SHOULDERS MAY OCCUR LATER IN ACCORDANCE WITH TOWNSHIP SPECIFICATIONS.
   b. FOR NON–ROADWAY AREAS, SURFACE WILL BE ROUGH GRADED TO BE SLIGHTLY HIGHER THAN ADJACENT GRADE.
7. PULL CABLE THROUGH THE DUCT BANK ONCE DUCT BANK IS COMPLETED. SPLICE CABLES AT SPLICE LOCATIONS. EXCEPT FOR VEHICLES TRAVELING OFF ROADWAYS, THE CABLE PULLING OPERATION SHOULD NOT INVOLVE A SIGNIFICANT EARTH DISTURBANCE.
8. DEMOBILIZE THE SITE AND CONSTRUCTION LAYDOWN AREAS.
9. REMOVE ROCK CONSTRUCTION ENTRANCES AND WASH RACKS.
10. APPLY PERMANENT VEGETATIVE STABILIZATION TO ALL REMAINING DISTURBED AREAS; APPLY EROSION CONTROL MULCH BLANKET TO ALL PERMANENT SLOPES OF 3:1 OR GREATER.
11. AFTER ALL UPGRADIENT DISTURBED AREAS HAVE BEEN STABILIZED WITH PERMANENT VEGETATION, REMOVE COMPOST FILTER SOCKS AND ROCK FILTERS.

RECYCLING MATERIAL AND WASTE/BORROW AREAS

EXCESS EXCAVATED MATERIAL AND SEDIMENTS REMOVED FROM BMPS MAY BE USED AS FILL IN A NON–WETLAND UPLAND AREA. ALL BUILDING MATERIALS AND WASTES (DEMOLITION DEBRIS, CONCRETE WASHOUT, EXCESS BUILDING MATERIALS, ETC.) MUST BE REMOVED FROM THE SITE AND RECYCLED OR DISPOSED OF IN ACCORDANCE WITH PADEP AND OTHER APPLICABLE REGULATIONS. NO BUILDING MATERIALS OR WASTES WILL BE BURNED, BURIED, DUMPED, OR DISCHARGED AT THE SITE. ALL APPLICABLE FEDERAL, STATE, AND LOCAL LAWS AND REGULATIONS MUST BE FOLLOWED IN THE USE, HANDLING, AND DISPOSAL OF POTENTIALLY HAZARDOUS MATERIALS.

FOR CONCRETE OPERATIONS, A SUITABLE WASHOUT FACILITY MUST BE PROVIDED FOR THE CLEANING OF CHUTES, MIXERS, AND HOPPERS OF THE DELIVERY VEHICLES UNLESS SUCH A FACILITY WILL BE USED AT THE SOURCE OF THE CONCRETE. WASH WATER FROM THESE VEHICLES WILL NOT BE ALLOWED TO ENTER ANY SURFACE WATERS. PROPER SIGNAGE WILL BE PROVIDED TO DRIVERS SO THAT THEY ARE AWARE OF THE PRESENCE OF WASHOUT FACILITIES. WASHOUT FACILITIES SHOULD NOT BE PLACED WITHIN 50 FEET OF STORM DRAINS, OPEN DITCHES OR SURFACE WATERS. THEY SHOULD BE IN A CONVENIENT LOCATION FOR THE TRUCKS, PREFERABLY NEAR THE PLACE WHERE THE CONCRETE IS BEING POURED, BUT FAR ENOUGH FROM OTHER VEHICULAR TRAFFIC TO MINIMIZE THE POTENTIAL FOR ACCIDENTAL DAMAGE OR SPILLS. WHEREVER POSSIBLE, THEY SHOULD BE LOCATED ON SLOPES NOT EXCEEDING A 2 PERCENT GRADE. SELF–INSTALLED, EARTHEN WASHOUTS SHOULD BE EXCAVATED BELOW GRADE TO PREVENT RUNOFF OF THE WASH WATER AND MINIMIZE THE POTENTIAL FOR BREACHING. THEY SHOULD BE SIZED TO HANDLE SOLIDS, WASH WATER, AND RAINFALL. A BELOW–GRADE WASHOUT SHOULD BE A MINIMUM OF 10 FEET WIDE AND PROVIDE AT LEAST 12 INCHES OF FREEBOARD ABOVE THE LIQUID AND SOLID WASTE ANTICIPATED BETWEEN CLEANOUT INTERVALS. THE PIT SHOULD BE LINED WITH PLASTIC SHEETING OF AT LEAST 10–MIL THICKNESS (WITH NO HOLES OR TEARS) TO PREVENT LEACHING OF LIQUIDS INTO THE GROUND. SEDIMENT BASINS AND SEDIMENT TRAPS MAY NOT BE USED AS CONCRETE WASHOUT DEVICES, SINCE THEY DISCHARGE DIRECTLY TO SURFACE WATERS. ALL CONCRETE WASHOUT FACILITIES SHOULD BE INSPECTED DAILY. DAMAGED OR LEAKING WASHOUTS SHOULD BE DEACTIVATED AND REPAIRED OR REPLACED IMMEDIATELY. ACCUMULATED MATERIALS SHOULD BE REMOVED WHEN THEY REACH 75 PERCENT CAPACITY. PLASTIC LINERS SHOULD BE REPLACED WITH EACH CLEANING OF THE WASHOUT FACILITY.

INVASIVE SPECIES CONTROL

PER THE RECOMMENDATIONS OF PA. DCNR, THE FOLLOWING STEPS SHOULD BE TAKEN TO HELP PREVENT THE SPREAD OF INVASIVE SPECIES:

1. THE AREA OF DISTURBANCE SHOULD BE MINIMIZED TO THE FULLEST EXTENT THAT WOULD ALLOW FOR CONSTRUCTION. THIS WILL HELP TO LESSEN THE AREA OF SOIL AND VEGETATION DISTURBANCE ASSOCIATED WITH THIS PROJECT.
2. IF POSSIBLE, CLEAN ALL CONSTRUCTION EQUIPMENT AND VEHICLES THOROUGHLY (ESPECIALLY THE UNDERCARRIAGE AND WHEELS) BEFORE THEY ARE BROUGHT ON SITE. THIS WILL REMOVE INVASIVE PLANT SEEDS FROM THE EQUIPMENT AND UNDERCARRIAGES OF THE VEHICLES THAT MAY HAVE BEEN PICKED UP AT OTHER SITES.
3. AVOID USING SEED MIXES THAT INCLUDE INVASIVE PLANT SPECIES (E.G. CROWN VETCH) TO RE–VEGETATE THE AREA. USE WEED–FREE STRAW OR HAY MIXES WHEN POSSIBLE.

GENERAL NOTES:

IN THE FOLLOWING NOTES, "DEPARTMENT" REFERS TO THE PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL PROTECTION, NORTHWEST REGIONAL OFFICE, 230 CHESTNUT STREET, MEADVILLE PA 16335, AND "LOCAL CONSERVATION DISTRICT" REFERS TO THE ERIE COUNTY CONSERVATION DISTRICT, 1927 WAGER ROAD, ERIE PA 16509.

1. ALL EARTH DISTURBANCES, INCLUDING CLEARING AND GRUBBING AS WELL AS CUTS AND FILLS SHALL BE DONE IN ACCORDANCE WITH THE APPROVED E&S PLAN. A COPY OF THE APPROVED DRAWINGS (STAMPED, SIGNED AND DATED BY THE REVIEWING AGENCY) MUST BE AVAILABLE AT THE PROJECT SITE AT ALL TIMES. THE REVIEWING AGENCY SHALL BE NOTIFIED OF ANY CHANGES TO THE APPROVED PLAN PRIOR TO IMPLEMENTATION OF THOSE CHANGES. THE REVIEWING AGENCY MAY REQUIRE A WRITTEN SUBMITTAL OF THOSE CHANGES FOR REVIEW AND APPROVAL AT ITS DISCRETION.
2. AT LEAST 7 DAYS PRIOR TO STARTING ANY EARTH DISTURBANCE ACTIVITIES, INCLUDING CLEARING AND GRUBBING, THE OWNER AND/OR OPERATOR SHALL INVITE ALL CONTRACTORS, THE LANDOWNER, APPROPRIATE MUNICIPAL OFFICIALS, THE E&S PLAN PREPARER, THE PCSM PLAN PREPARER, THE LICENSED PROFESSIONAL RESPONSIBLE FOR OVERSIGHT OF CRITICAL STAGES OF IMPLEMENTATION OF THE PCSM PLAN, AND A REPRESENTATIVE FROM THE LOCAL 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. THE SERIAL NUMBERS FOR THIS PROJECT ARE 20152940877, 20152941001, 20152941002, 20152941042, 20152941043, 20152941104, 20152941105, 20152941193, 20152941245, 20152941277, 20152941278, 20152941342, 20152941567, 20152941568, 20152941661, 20152941788, AND 20152941789.
4. ALL EARTH DISTURBANCE ACTIVITIES SHALL PROCEED IN ACCORDANCE WITH THE SEQUENCE PROVIDED ON THE PLAN DRAWINGS. DEVIATION FROM THAT SEQUENCE MUST BE APPROVED IN WRITING FROM THE LOCAL CONSERVATION DISTRICT OR BY THE DEPARTMENT PRIOR TO IMPLEMENTATION.
5. AREAS TO BE FILLED ARE TO BE CLEARED, GRUBBED, AND STRIPPED OF TOPSOIL TO REMOVE TREES, VEGETATION, ROOTS AND OTHER OBJECTIONABLE MATERIAL.
6. CLEARING, GRUBBING, AND TOPSOIL STRIPPING SHALL BE LIMITED TO THOSE AREAS DESCRIBED IN EACH STAGE OF THE CONSTRUCTION SEQUENCE. GENERAL SITE CLEARING, GRUBBING AND TOPSOIL STRIPPING MAY NOT COMMENCE IN ANY STAGE OR PHASE OF THE PROJECT UNTIL THE E&S BMPS SPECIFIED BY THE BMP SEQUENCE FOR THAT STAGE OR PHASE HAVE BEEN INSTALLED AND ARE FUNCTIONING AS DESCRIBED IN THIS E&S PLAN.
7. AT NO TIME SHALL CONSTRUCTION VEHICLES BE ALLOWED TO ENTER AREAS OUTSIDE THE LIMIT OF DISTURBANCE BOUNDARIES SHOWN ON THE PLAN MAPS. THESE AREAS MUST BE CLEARLY MARKED AND FENCED OFF BEFORE CLEARING AND GRUBBING OPERATIONS BEGIN.
8. TOPSOIL REQUIRED FOR THE ESTABLISHMENT OF VEGETATION SHALL BE STOCKPILED AT THE LOCATION(S) SHOWN ON THE PLAN MAPS(S) IN THE AMOUNT NECESSARY TO COMPLETE THE FINISH GRADING OF ALL EXPOSED AREAS THAT ARE TO BE STABILIZED BY VEGETATION. EACH STOCKPILE SHALL BE PROTECTED IN THE MANNER SHOWN ON THE PLAN DRAWINGS. STOCKPILE HEIGHTS SHALL NOT EXCEED 35 FEET. STOCKPILE SLOPES SHALL BE 2H:1V OR FLATTER.
9. IMMEDIATELY UPON DISCOVERING UNFORESEEN CIRCUMSTANCES POSING THE POTENTIAL FOR ACCELERATED EROSION AND/OR SEDIMENT POLLUTION, THE OPERATOR SHALL IMPLEMENT APPROPRIATE BEST MANAGEMENT PRACTICES TO MINIMIZE THE POTENTIAL FOR EROSION AND SEDIMENT POLLUTION AND NOTIFY THE LOCAL CONSERVATION DISTRICT AND/OR THE REGIONAL OFFICE OF THE DEPARTMENT.
10. ALL BUILDING MATERIALS AND WASTES SHALL BE REMOVED FROM THE SITE AND RECYCLED OR DISPOSED OF IN ACCORDANCE WITH THE DEPARTMENT'S SOLID WASTE MANAGEMENT REGULATIONS AT 25 PA. CODE 260.1 ET SEQ., 271.1, AND 287.1 ET. SEQ. NO BUILDING MATERIALS OR WASTES OR UNUSED BUILDING MATERIALS SHALL BE BURNED, BURIED, DUMPED, OR DISCHARGED AT THE SITE.
11. ALL OFF–SITE WASTE AND BORROW AREAS MUST HAVE AN E&S PLAN APPROVED BY THE LOCAL CONSERVATION DISTRICT OR THE DEPARTMENT FULLY IMPLEMENTED PRIOR TO BEING ACTIVATED.
12. THE CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT ANY MATERIAL BROUGHT ON SITE IS CLEAN FILL. FORM FP–001 MUST BE RETAINED BY THE PROPERTY OWNER FOR ANY FILL MATERIAL AFFECTED BY A SPILL OR RELEASE OF A REGULATED SUBSTANCE BUT QUALIFYING AS CLEAN FILL DUE TO ANALYTICAL TESTING.
13. ALL PUMPING OF WATER FROM ANY WORK AREA SHALL BE DONE ACCORDING TO THE PROCEDURE DESCRIBED IN THIS PLAN, OVER UNDISTURBED VEGETATED AREAS.
14. VEHICLES AND EQUIPMENT MAY NEITHER ENTER DIRECTLY NOR EXIT DIRECTLY FROM CONSTRUCTION LAYDOWN AREAS ONTO ADJACENT ROADWAYS EXCEPT AT DESIGNATED ROCK CONSTRUCTION ENTRANCES.
15. UNTIL THE SITE IS STABILIZED, ALL EROSION AND SEDIMENT BMPS SHALL BE MAINTAINED PROPERLY. MAINTENANCE SHALL INCLUDE INSPECTIONS OF ALL EROSION AND SEDIMENT BMPS AFTER EACH RUNOFF EVENT AND ON A WEEKLY BASIS. ALL PREVENTATIVE AND REMEDIAL MAINTENANCE WORK, INCLUDING CLEAN OUT, REPAIR, REPLACEMENT, REGRADING, RESEEDING, REMULCHING AND RENETTING MUST BE PERFORMED IMMEDIATELY. IF THE E&S BMPS FAIL TO PERFORM AS EXPECTED, REPLACEMENT BMPS, OR MODIFICATIONS OF THOSE INSTALLED WILL BE REQUIRED.
16. A LOG SHOWING DATES THAT E&S BMPS WERE INSPECTED AS WELL AS ANY DEFICIENCIES FOUND AND THE DATE THEY WERE CORRECTED SHALL BE MAINTAINED ON THE SITE AND BE MADE AVAILABLE TO REGULATORY AGENCY OFFICIALS AT THE TIME OF INSPECTION.
17. SEDIMENT TRACKED ONTO ANY PUBLIC ROADWAY OR SIDEWALK SHALL BE RETURNED TO THE CONSTRUCTION SITE BY THE END OF EACH WORK DAY AND DISPOSED IN THE MANNER DESCRIBED IN THIS PLAN. IN NO CASE SHALL THE SEDIMENT BE WASHED, SHOVELED, OR SWEPT INTO ANY ROADSIDE DITCH, STORM SEWER, OR SURFACE WATER.
18. ALL SEDIMENT REMOVED FROM BMPS SHALL BE DISPOSED OF IN THE MANNER DESCRIBED ON THE PLAN DRAWINGS.
19. AREAS WHICH ARE TO BE TOPSOILED SHALL BE SCARIFIED TO A MINIMUM DEPTH OF 3 TO 5 INCHES — 6 TO 12 INCHES ON COMPACTED SOILS — PRIOR TO PLACEMENT OF TOPSOIL. AREAS TO BE VEGETATED SHALL HAVE A MINIMUM 4 INCHES OF TOPSOIL IN PLACE PRIOR TO SEEDING AND MULCHING. FILL OUTSLOPES SHALL HAVE A MINIMUM OF 2 INCHES OF TOPSOIL.
20. ALL FILLS SHALL BE COMPACTED AS REQUIRED TO REDUCE EROSION, SLIPPAGE, SETTLEMENT, SUBSIDENCE OR OTHER RELATED PROBLEMS. FILL INTENDED TO SUPPORT BUILDINGS, STRUCTURES AND CONDUITS, ETC. SHALL BE COMPACTED IN ACCORDANCE WITH LOCAL REQUIREMENTS OR CODES.
21. ALL EARTHEN FILLS SHALL BE PLACED IN COMPACTED LAYERS NOT TO EXCEED 9 INCHES IN THICKNESS.
22. FILL MATERIALS SHALL BE FREE OF FROZEN PARTICLES, BRUSH, ROOTS, SOD, OR OTHER FOREIGN OR OBJECTIONABLE MATERIALS THAT WOULD INTERFERE WITH OR PREVENT CONSTRUCTION OF SATISFACTORY FILLS.
23. FROZEN MATERIALS OR SOFT, MUCKY, OR HIGHLY COMPRESSIBLE MATERIALS SHALL NOT BE INCORPORATED INTO FILLS.
24. FILL SHALL NOT BE PLACED ON SATURATED OR FROZEN SURFACES.
25. SEEPS OR SPRINGS ENCOUNTERED DURING CONSTRUCTION SHALL BE HANDLED IN ACCORDANCE WITH THE STANDARD AND SPECIFICATION FOR SUBSURFACE DRAIN OR OTHER APPROVED METHOD.
26. ALL GRADED AREAS SHALL BE PERMANENTLY STABILIZED IMMEDIATELY UPON REACHING FINISHED GRADE. CUT SLOPES IN COMPETENT BEDROCK AND ROCK FILLS NEED NOT BE VEGETATED. SEEDED AREAS WITHIN 50 FEET OF A SURFACE WATER, OR AS OTHERWISE SHOWN ON THE PLAN DRAWINGS, SHALL BE BLANKETED ACCORDING TO THE STANDARDS OF THIS PLAN.
27. IMMEDIATELY AFTER EARTH DISTURBANCE ACTIVITIES CEASE IN ANY AREA OR SUBAREA OF THE PROJECT, THE OPERATOR SHALL STABILIZE ALL DISTURBED AREAS. DURING NON–GERMINATING MONTHS, MULCH OR PROTECTIVE BLANKETING SHALL BE APPLIED AS DESCRIBED IN THE PLAN. AREAS NOT AT FINISHED GRADE, WHICH WILL BE REACTIVATED WITHIN 1 YEAR, MAY BE STABILIZED IN ACCORDANCE WITH THE TEMPORARY STABILIZATION SPECIFICATIONS. THOSE AREAS WHICH WILL NOT BE REACTIVATED WITHIN 1 YEAR SHALL BE STABILIZED IN ACCORDANCE WITH THE PERMANENT STABILIZATION SPECIFICATIONS.
28. PERMANENT STABILIZATION IS DEFINED AS A MINIMUM UNIFORM, PERENNIAL 70% VEGETATIVE COVER OR OTHER PERMANENT NON–VEGETATIVE COVER WITH A DENSITY SUFFICIENT TO RESIST ACCELERATED EROSION. CUT AND FILL SLOPES SHALL BE CAPABLE OF RESISTING FAILURE DUE TO SLUMPING, SLIDING, OR OTHER MOVEMENTS.
29. E&S BMPS SHALL REMAIN FUNCTIONAL AS SUCH UNTIL ALL AREAS TRIBUTARY TO THEM ARE PERMANENTLY STABILIZED OR UNTIL THEY ARE REPLACED BY ANOTHER BMP APPROVED BY THE LOCAL CONSERVATION DISTRICT OR THE DEPARTMENT.
30. UPON COMPLETION OF ALL EARTH DISTURBANCE ACTIVITIES AND PERMANENT STABILIZATION OF ALL DISTURBED AREAS, THE OWNER AND/OR OPERATOR SHALL CONTACT THE LOCAL CONSERVATION DISTRICT FOR AN INSPECTION PRIOR TO REMOVAL/CONVERSION OF THE E&S BMPS.
31. AFTER FINAL SITE STABILIZATION HAS BEEN ACHIEVED, TEMPORARY EROSION AND SEDIMENT BMPS MUST BE REMOVED OR CONVERTED TO PERMANENT POST CONSTRUCTION STORMWATER MANAGEMENT BMPS. AREAS DISTURBED DURING REMOVAL OR CONVERSION OF THE BMPS SHALL BE STABILIZED IMMEDIATELY. IN ORDER TO ENSURE RAPID REVEGETATION OF DISTURBED AREAS, SUCH REMOVAL/CONVERSIONS ARE TO BE DONE ONLY DURING THE GERMINATING SEASON.
32. UPON COMPLETION OF ALL EARTH DISTURBANCE ACTIVITIES AND PERMANENT STABILIZATION OF ALL DISTURBED AREAS, THE OWNER AND/OR OPERATOR SHALL CONTACT THE LOCAL CONSERVATION DISTRICT TO SCHEDULE A FINAL INSPECTION.
33. FAILURE TO CORRECTLY INSTALL E&S BMPS, FAILURE TO PREVENT SEDIMENT–LADEN RUNOFF FROM LEAVING THE CONSTRUCTION SITE, OR FAILURE TO TAKE IMMEDIATE CORRECTIVE ACTION TO RESOLVE FAILURE OF E&S BMPS MAY RESULT IN ADMINISTRATIVE, CIVIL, AND/OR CRIMINAL PENALTIES BEING INSTITUTED BY THE DEPARTMENT AS DEFINED IN SECTION 602 OF THE PENNSYLVANIA CLEAN STREAMS LAW. THE CLEAN STREAMS LAW PROVIDES FOR UP TO $10,000 PER DAY IN CIVIL PENALTIES, UP TO $10,000 IN SUMMARY CRIMINAL PENALTIES, AND UP TO $25,000 IN MISDEMEANOR CRIMINAL PENALTIES FOR EACH VIOLATION.

FILL MATERIAL

IF THE SITE WILL NEED TO HAVE FILL IMPORTED FROM AN OFFSITE LOCATION, THE RESPONSIBILITY FOR PERFORMING ENVIRONMENTAL DUE DILIGENCE AND THE DETERMINATION OF CLEAN FILL WILL RESIDE WITH THE CONTRACTOR. IF THE SITE WILL HAVE EXCESS FILL THAT WILL NEED TO BE EXPORTED TO AN OFFSITE LOCATION, THE RESPONSIBILITY OF CLEAN FILL DETERMINATION AND ENVIRONMENTAL DUE DILIGENCE RESTS ON THE OWNER. THIS INFORMATION SHALL BE COMPLETED PRIOR TO CONDUCTING THE WORK. IF ALL CUT AND FILL MATERIALS WILL BE USED ON THE SITE, A CLEAN FILL DETERMINATION IS NOT REQUIRED BY THE CONTRACTOR UNLESS THERE IS A BELIEF THAT A SPILL OR RELEASE OF A REGULATED SUBSTANCE OCCURRED ON SITE.

ALL OFF–SITE WASTE AND BORROW AREAS MUST HAVE AN E&S PLAN APPROVED BY THE LOCAL CONSERVATION DISTRICT OR DEP FULLY IMPLEMENTED PRIOR TO BEING ACTIVATED.

FILL MATERIAL SHALL NOT BE PLACED WITHIN 50' OF THE TOP OF STREAM BANKS.

OWNER AND/OR CONTRACTOR MUST USE ENVIRONMENTAL DUE DILIGENCE TO ENSURE THAT THE FILL MATERIAL ASSOCIATED WITH THIS PROJECT QUALIFIES AS CLEAN FILL. DEFINITIONS OF CLEAN FILL AND ENVIRONMENTAL DUE DILIGENCE ARE PROVIDED BELOW.

CLEAN FILL IS DEFINED AS: UNCONTAMINATED, NON–WATER SOLUBLE, NON–DECOMPOSABLE, INERT, SOLID MATERIAL. THE TERM INCLUDES SOIL, ROCK, STONE, DREDGED MATERIAL, USED ASPHALT, AND BRICK, BLOCK OR CONCRETE FROM CONSTRUCTION AND DEMOLITION ACTIVITIES THAT IS SEPARATE FROM OTHER WASTE AND IS RECOGNIZABLE AS SUCH. THE TERM DOES NOT INCLUDE MATERIALS PLACED IN OR ON THE WATERS OF THE COMMONWEALTH UNLESS OTHERWISE AUTHORIZED. (THE TERM "USED ASPHALT" DOES NOT INCLUDE MILLED ASPHALT OR ASPHALT THAT HAS BEEN PROCESSED FOR RE–USE.)

ENVIRONMENTAL DUE DILIGENCE: INVESTIGATIVE TECHNIQUES, INCLUDING, BUT NOT LIMITED TO, VISUAL PROPERTY INSPECTIONS, ELECTRONIC DATA BASE SEARCHES, REVIEW OF PROPERTY OWNERSHIP, REVIEW OF PROPERTY USE HISTORY, SANBORN MAPS, ENVIRONMENTAL QUESTIONNAIRES, TRANSACTION SCREENS, ANALYTICAL TESTING, ENVIRONMENTAL ASSESSMENTS OR AUDITS.

DETAILS

No.	Date	Revisions	By

EROSION AND SEDIMENTATION CONTROL PLAN
ITC LAKE ERIE CONNECTOR LLC
PENNSYLVANIA CABLE ROUTE

SCALE: AS SHOWN
DATE: 1/22/2016
APPROVED BY:
DRAWN BY: JEFFREY T. BERNOSKY

SPRINGFIELD TWP., GIRARD TWP., CONNEAUT TWP., ERIE COUNTY, PENNSYLVANIA

Deiss & Halmi Engineering, Inc.
ENVIRONMENTAL AND CIVIL ENGINEERING
105 Meadville Street, Edinboro PA 16412 PH. 814-734-3640 Fax 814-734-3643

DRAWING NO.: 2080215–17

EROSION AND SEDIMENTATION CONTROL PLAN

FOR

ITC LAKE ERIE CONNECTOR LLC
ERIE CONVERTER STATION

CONNEAUT TOWNSHIP, ERIE COUNTY, PENNSYLVANIA

PREPARED BY:

STEVEN R. HALMI, P.E.

DEISS & HALMI ENGINEERING, INC.
EDINBORO, PENNSYLVANIA

JANUARY 22, 2016

TABLE OF CONTENTS **Section**

1.1 INTRODUCTION

1.1.1 Purpose of Erosion and Sedimentation Control Plan

This Erosion and Sedimentation Control Plan (E&SC Plan) is required by Pennsylvania Department of Environmental Protection (PaDEP) regulations at 25 Pa. Code Chapter 102, and related to requirements for an NPDES Permit for Stormwater Discharges Associated with Construction Activities (NPDES Permit). Those regulations include the implementation of certain best management practices (BMPs) for erosion and sedimentation control in relation to earth disturbance activities and implementation of a Post-Construction Stormwater Management Plan (PCSM Plan) (reference is made to the separate PCSM Plan document which accompanies this E&SC Plan as part of the NPDES Permit application). PaDEP, with the assistance of the Erie County Conservation District (ECCD), will review this plan as part of the process for issuance of the NPDES Permit.

1.1.2 Overall Project Description

The proposed Project is an approximately 72.4 mile (117 km) 1,000 megawatt (MW) +/-320 kilovolt (kV) high-voltage direct current (HVDC) bi-directional electric transmission interconnection to transfer electricity between Canada and the United States (refer to Figure 2.3). The Project will consist of one 1,000-MW HVDC transmission line and two HVDC converter stations with ancillary aboveground facilities. One converter station will be located in Canada, the other in the United States (U.S.). The HVDC transmission line consists of two transmission cables, one positively charged and the other negatively charged, along with a fiber optic cable for communications between the converter stations. The HVDC transmission line consists of underground portions in Canada and the U.S. and an underwater portion through Lake Erie, having the following approximate lengths:

- Terrestrial 500 kV AC Cable Route – Haldimand County, Ontario - 0.8 mi (1.3 km)
- Canada, Underground HVDC Cable Route - 0.8 mi (1.3 km)
- Canada, Underwater HVDC Cable Route - 29.1 mi (46.8 km)
- U.S., Underwater HVDC Cable Route - 35.4 mi (58.0 km)
- U.S., Underground HVDC Cable Route - 7.1 mi (11.4 km)
- Terrestrial 500 kV AC Cable Route – Erie County, Pennsylvania - 0.4 mi (0.7 km)

For the purposes of this plan, only the U.S. portion of the Project is subject to Pa. DEP Chapter 102 regulations / NPDES Permit requirements. In the U.S. the cable will make landfall in Springfield Township in Erie County, Pennsylvania and will occur primarily along existing roadways to a new HVDC converter station (Erie Converter Station) to be constructed in Conneaut Township in Erie County, Pennsylvania. A conceptual plan for the Erie Converter Station is included as Figure 2.4. The Erie Converter Station will convert +/- 320 kV direct current (DC) power to 345 kV alternating current (AC) power or vice-versa and connect to a nearby Point of Interconnection (POI) at the existing Penelec Erie West Substation that is part of

the PJM Grid [1]. The route of the 345 kV AC interconnection between the Erie Converter Station property and the Erie West Substation is approximately 1,600 feet in length.

This Erosion and Sedimentation Control Plan applies to the Erie Converter Station site in Conneaut Township, Erie County, Pennsylvania, which is further described in the following sections. A separate Erosion and Sedimentation Control Plan has been prepared for the Pennsylvania cable route between the Lake Erie shoreline and the Erie Converter Station, only a portion of which is in Conneaut Township (the remainder of the cable route is in Girard Township and Springfield Township). Erosion and sedimentation control measures relating to the underwater installation of the transmission line in the bed of Lake Erie are addressed in various other plans submitted with the PaDEP / U.S. Army Corps of Engineers Joint Water Obstruction and Encroachment Permit application, including an inadvertent return contingency plan and blasting plan.

1.1.3 Erie Converter Station Site Description

The proposed Erie Converter Station site location and layout is shown in the E&SC Plan drawings. The selected location and layout of the Erie Converter Station is intended to be close to the existing Penelec Erie West Substation, avoid unnecessary wetland effects, and minimize other environmental and community effects.

An area of approximately 6 acres (2.4 hectares) is required for the Erie Converter Station with its surrounding equipment and access ways. Approximately 2 acres (0.9 hectares) is required for construction of stormwater management facilities. Additional areas will be temporarily disturbed during construction for the laydown and to support construction efforts.

The Erie Converter Station will have a main building, which will be used to house HVDC converter modules and a service building to contain the control and protection equipment, cooling equipment and auxiliary distribution panels. The main building (converter hall) will be approximately 370 feet by 110 feet (110 m by 35 m) with a building footprint of approximately 1 acre (0.4 hectares) and a height of approximately 60 feet (18 m) (Figure 2.4). The primary equipment installed outside of the building is anticipated to include circuit breakers, disconnects, surge arrestors, transformers, cooling equipment, and power line carrier filters. The facility will also have an emergency generator. Security fencing will surround the Erie Converter Station area to prevent unauthorized access and to ensure public safety.

A driveway will be constructed to the Erie Converter Station to provide access to the site from nearby roadways. The driveway will be approximately 20 feet (6.1 m) wide, with 3-foot (0.9 m) shoulders. A culvert will be installed to ensure that stormwater flow across the driveway can be conveyed without adverse impact to upstream or downstream properties.

The Erie Converter Station will interconnect with the existing electrical power systems at the nearby Erie West Substation POI through short underground AC cables.

[1] PJM Grid is the regional transmission organization that coordinates electricity movement in 13 U.S. states and the District of Columbia.

Other pertinent information regarding the Erie Converter Station is as follows:

Property Information:
Erie County Tax Identification Numbers: 04-005-010.0-004.00 and 04-005-010.0-003.00
Municipality: Conneaut Township, Erie County, Pennsylvania
Latitude/Longitude: N 41° 56' 12" / W 80° 22' 36"
Size: 22.84 acres (9.24 hectares) and 10.11 acres (4.09 hectares), respectively

Property Owners:

Andrew Jr. and Alice Hazer	Terry A. Lavery
409 Vesta Drive	8680 Lexington Road
Dauphin, PA 17018	Girard, PA 16417

(Note: ITC Lake Erie Connector LLC has executed option agreements to purchase these properties.)

Applicant:
ITC Lake Erie Connector LLC
27175 Energy Way
Novi, MI 48377

1.1.4 Plan Preparer, Training, and Experience

This plan has been prepared by Deiss & Halmi Engineering, Inc. Contact information for the plan preparer is as follows:

Steven R. Halmi, P.E.
Deiss & Halmi Engineering, Inc.
105 Meadville Street
Edinboro, PA 16412
Phone: (814) 734-3640
Fax: (814) 734-3643
Email: shalmi@deisshalmi.com

Mr. Halmi is a licensed professional engineer in Pennsylvania. He has a B.S. degree in Civil and Environmental Engineering from Penn State University, and a M.S. degree in Civil and Environmental Engineering from Cornell University. Formal training includes college, graduate, and post-graduate courses in soils, hydrology and hydraulics, stormwater management, erosion and sedimentation control, environmental engineering, and other relevant subjects. Mr. Halmi has prepared numerous erosion and sedimentation control plans of similar scope throughout northwestern Pennsylvania. As such, he is trained and experienced in erosion and sedimentation control design methods and techniques applicable to the size and scope of the project.

Other firms participating in the preparation of this Erosion and Sedimentation Control Plan include HDR Engineering, Inc. and David Laird Associates.

1.2 E&SC PLAN REQUIREMENTS PER 25 PA CODE CHAPTER 102

25 Pa. Code §102.4(b)(5) requires the following items to be described within the narrative and drawings of the E&SC Plan.

1.2.1 The existing topographic features of the project site and the immediate surrounding area.

The topographic features of the project site and the surrounding area are shown on the E&SC Plan drawings. A USGS location map is included in Figure 2.1, and an aerial photo is shown in Figure 2.2. The ground generally slopes south to north, and slopes range from about 1 to 8 percent.

Stormwater runoff from the project location generally flows south to north as sheet flow and shallow concentrated flow. On the eastern portion of the property, there is a low area that conveys shallow concentrated flow from south to north, becoming a defined watercourse at the north edge of the property, which initially flows west, then north as an unnamed tributary to Crooked Creek. On the western portion of the property, runoff flows north and west as overland flow, then forms a swale in the wooded area near the northwest corner of the property. The swale forms a watercourse which flows northeast, joining with the aforementioned watercourse which flows north as an unnamed tributary to Crooked Creek.

Offsite runoff enters the property as sheet flow and shallow concentrated flow from the south. Part of that offsite runoff is intercepted in an existing poorly defined ditch along the south property line, which flows west, then north towards the swale in the wooded area. There is also a catch basin near the southeast corner of the property which collects runoff flowing north along the west side of Lexington Road. The outlet of this catch basin appears to be part of an existing agricultural drainage tile system that runs north through the eastern portion of the project property. There are no ditches along Lexington Road along the property frontage.

1.2.2 The types, depth, slope, locations and limitations of the soils.

Soil types have been plotted on the E&SC Plan drawings using shapefiles available on the Pennsylvania Spatial Data Access (PASDA). Soil descriptions are excerpted from the 1960 "Soil Survey for Erie County Pennsylvania" prepared by the United States Department of Agriculture (USDA) Soil Conservation Service. The 1960 soil survey was used for the soil descriptions this report as the data is consistent with the soil mapping available on the PASDA database. Newer soil maps, descriptions, and limitations available from other sources such as the USDA Natural Resources Conservation Service (NRCS) Web Soil Survey are not consistent with the data available on PASDA, limitations identified in the March 2012 Pa. DEP "Erosion and Sediment Pollution Control Manual," nor are they consistent with the soil hydrologic soil group data contained in Exhibit A of NRCS TR-55 which is the most generally accepted modeling method for stormwater management calculations. For these reasons, the PASDA and 1960 "Soil Survey for Erie County Pennsylvania" were used to maintain consistency of data.

Section 3.1 includes soils descriptions and a discussion of soil use limitations for each of the soil types identified on the site. Soils limitations are excerpted from Appendix E of the March 2012 PaDEP "Erosion and Sediment Pollution Control Manual."

Several soil investigation test pits were excavated at various locations on the project site; the location of these test pits is indicated on the E&SC Plan drawings. At each test pit, each soil horizon was identified and described using the methods employed by the PaDEP for soil investigations for on-lot disposal of sewage. The description for each horizon includes the horizon depth, soil color (as determined using a Munsell Soil Color Chart), texture, structure, indications of mottling, masses of loose fragments. The limiting zone (high water table) was also identified for each test pit. Soils investigation reports are presented in Section 3.2.

Infiltration tests were performed adjacent to those soil investigation test pits that had adequately deep limiting zones and soil textures and structures that would support infiltration. The locations and depths of infiltration test sites are shown on the E&SC Plan drawings. A double ring infiltrometer was used to measure the vertical movement of water through the bottom of the test area. A double ring infiltrometer consists of two concentric metal rings. The rings are driven into the ground and filled with water. The outer ring helps to prevent divergent (non-vertical) flow. The drop in water level over time in the inner ring is used to calculate an infiltration rate. Infiltration test results are presented in Section 3.3.

1.2.3 The characteristics of the earth disturbance activity, including the past, present and proposed land uses and the proposed alteration to the project site.

The existing land use consists of an agricultural field, with a wooded area on the western third of the property. There are wetlands in the wooded area. None of the wetlands will be disturbed, and disturbance of the wooded areas will be minimal. The site is surrounded on the north by agricultural fields, woods, and residential properties; on the west by woods; on the east by Lexington Road and agricultural fields; and on the south by woods, brush, and residential properties. There is an existing high voltage overhead power line which crosses the southeastern corner of the property. The historical land use (past 50 years) has been similar to the current land use.

The proposed Erie Converter Station site location and layout is shown in the E&SC Plan drawings. An area of approximately 6 acres (2.4 hectares) is required for the Erie Converter Station with its surrounding equipment and access ways. Approximately 2 acres (0.9 hectares) is required for construction of stormwater management facilities. Additional areas will be temporarily disturbed during construction for the laydown and to support construction efforts. The Erie Converter Station will have a main building, which will be used to house HVDC converter modules and a service building to contain the control and protection equipment, cooling equipment and auxiliary distribution panels. The main building (converter hall) will be approximately 370 feet by 110 feet (110 m by 35 m) with a building footprint of approximately 1 acre (0.4 hectares) and a height of approximately 60 feet (15 m) (Figure 2.4). The primary equipment installed outside of the building is anticipated to include circuit breakers, disconnects, surge arrestors, transformers, cooling equipment, and power line carrier filters. The facility will

also have an emergency generator. Security fencing will surround the Erie Converter Station area to prevent unauthorized access and to ensure public safety. A driveway will be constructed to the Erie Converter Station to provide access to the site from nearby roadways. The driveway will be approximately 20 feet (6.1 m) wide with 3 feet (0.9 m) shoulders. A culvert will be installed to ensure that stormwater flow across the driveway can be conveyed without adverse impact to upstream or downstream properties. The Erie Converter Station will interconnect with the existing electrical power systems at the nearby Erie West Substation POI through underground AC cables.

The selected location and layout of the Erie Converter Station is intended to be close to the existing Penelec Erie West Substation, avoid unnecessary wetland effects, and minimize other environmental and community effects. The site has been selected and located to utilize the non-structural stormwater management BMPs described in the PCSM Plan, including BMPs to protect sensitive/ special value features, protect/ conserve/ enhance riparian areas, and protect/ utilize natural flow pathways in overall stormwater planning and design.

As required for the NPDES Permit, the owner as permittee and/or contractor as co-permittee will prepare and implement a Preparedness, Prevention, and Contingency (PPC) Plan when storing, using or transporting materials including: fuels, chemicals, solvents, pesticides, fertilizers, lime, petrochemicals, wastewater, wash water, core drilling wastewater, cement, sanitary wastes, solid wastes or hazardous materials onto, on or from the project site during earth disturbance activities. The PPC Plan will be prepared in accordance with the PaDEP "Guidelines for the Development and Implementation of Environmental Emergency Response Plans." The PPC Plan will be made available upon request by the PaDEP or ECCD.

1.2.4 The volume and rate of runoff from the project site and its upstream watershed area.

Post-Construction. For the volume control requirement for the project, PaDEP Worksheet 4 (from the NPDES Permit Application) is used, a copy of which is included in Section 4.1. As shown on Worksheet 4, the 2-year, 24-hour rainfall runoff volume increase that must be controlled is 44,986 cubic feet. This increase in runoff volume is mitigated by the storage capacity of the proposed infiltration/detention basin, which is 60,623 cubic feet, and the infiltration volume of the proposed infiltration/detention basin, which has been calculated to be 57,891 cubic feet, as documented in the PSCM Plan.

For the converter station site, peak rates of runoff are calculated separately for the drainage to the west of the site, which does not pass through the proposed infiltration/detention basin, and the drainage to the north of the site, which does pass through the proposed infiltration/detention basin. Maps of these "west" and "north" drainage areas are included in Section 4. These drainage areas include those offsite areas from which runoff flows into the project property. For the proposed development, runoff from the entire fenced area of the converter station will be diverted into the drainage to the north of the site, which passes through the proposed infiltration/detention basin. A summary of the peak rate of runoff for each of these drainage areas is as follows:

Peak rate of runoff to west of site:

Return Interval (Year)	Pre-Developed Peak Discharge (CFS)	Post-Developed Peak Discharge (CFS)
1	5.38	4.02
2	10.65	8.31
10	30.20	24.68
25	45.55	37.77
50	59.45	49.67
100	74.97	63.01

Peak rate of runoff to north of site:

Return Interval (Year)	Pre-Developed Peak Discharge (CFS)	Post-Developed Peak Discharge (CFS)
1	3.61	1.43
2	6.10	2.57
10	14.25	6.42
25	20.27	10.19
50	25.59	16.28
100	31.43	22.95

Additional documentation regarding how the post-construction volume control and peak rate control requirements are met, including an explanation of the data provided in this section, is included in the PCSM Plan.

During Construction. The drainage areas associated with the offsite and onsite runoff to be managed during construction are called “WEST”, “EAST”, and “SITE”, as shown in Section 4.4. These during-construction drainage areas are slightly different from the post-construction drainage areas described in the previous paragraphs (compare the post-construction drainage area map in Section 4.3 to the during-construction drainage area map in Section 4.4). Runoff from offsite upgradient area “WEST” will be diverted to the west of the construction site via diversion channel #D1 and #D2. Runoff from the construction site itself will be conveyed to the sediment basin via conveyance channel #C1. A summary of the peak rate of runoff from each of these areas during construction is as follows, not including the effects of routing through the sediment basin:

Return Interval (Year)	"SITE" Peak Discharge During Construction (CFS)	"EAST" Peak Discharge During Construction (CFS)	"WEST" Peak Discharge During Construction (CFS)
1	19.55	5.70	5.13
2	25.98	8.34	9.79
10	43.65	16.18	26.56
25	55.29	21.62	39.53
50	65.05	26.30	51.22
100	75.41	31.35	64.22

Calculations documenting the above peak rates of runoff during construction are presented in Section 4.4.

1.2.5 The location of all surface waters of this Commonwealth which may receive runoff within or from the project site and their classification under Chapter 93.

Stormwater runoff from the project location generally flows south to north as sheet flow and shallow concentrated flow. On the eastern portion of the property, there is a low area that conveys shallow concentrated flow from south to north, becoming a defined watercourse at the north edge of the property, which initially flows west, then north as an unnamed tributary to Crooked Creek. On the western portion of the property, runoff flows north and west as overland flow, then forms a swale in the wooded area near the northwest corner of the property. The swale forms a watercourse which flows northeast, joining with the aforementioned watercourse which flows north as an unnamed tributary to Crooked Creek.

The entire converter station site is in the Crooked Creek watershed. Crooked Creek has protected uses designated at 25 Pa. Code Chapter 93 as HQ-CWF, MF (High Quality – Cold Water Fishes; Migratory Fishes). Development in a High Quality watershed requires certain special protections per the provisions of 25 Pa. Code Chapter 102, including more stringent criteria to be used to design the BMPs for the site, and the use of BMPs considered to be Antidegradation Best Available Combination of Technologies (ABACT) BMPs. A discussion of the proposed erosion and sedimentation control BMPs is in the following section.

1.2.6 A narrative description of the location and type of perimeter and onsite BMPs used before, during and after the earth disturbance activity.

The following best management practices (BMPs) are proposed for erosion and sedimentation control before, during, and after earth disturbance activities. In the following descriptions, disturbed areas are considered to be stabilized when a uniform 70 percent perennial vegetative cover has been achieved, or the surface has been otherwise covered with a durable, mud free driving surface.

1.2.6.1 Rock construction entrance with wash rack. A rock construction entrance with wash rack will be constructed where construction vehicles access the property to prevent soil loss from traffic leaving the construction site. Wash racks in construction entrances are for washing of tires only. Where it is necessary to wash an entire vehicle prior to leaving the site, this should be done at a site designed to prevent untreated nutrient-enriched wastewater or hazardous wastes from being discharged to surface or ground waters. The location and details for the rock construction entrance with wash rack are shown on the E&SC Plan drawings. The rock construction entrance with wash rack will be installed before significant earth disturbance is to occur at the site, and will remain in place until the site is stabilized such that no significant soil loss onto adjacent roadways is expected.

1.2.6.2 Compost filter sock. Compost filter sock will be placed downgradient of disturbed areas to prevent the transport of sediment offsite. Details of the filter sock as well as placement are shown on the E&SC Plan drawings. Sediment will be removed from the filter sock when accumulations reach one half the height of the sock. Compost filter socks will be installed before significant earth disturbance occurs upgradient of the compost filter sock, and will remain in place until upgradient disturbed areas have been stabilized.

1.2.6.3 Diversion channels. Diversion channel #D1 and #D2 will be constructed to divert runoff from upgradient areas around the construction site. The location and details for the diversion channels are shown on the E&SC Plan drawings. Calculations associated with the design of the diversion channel are presented in Section 1.2.8. The diversion channel will be constructed prior to any bulk earthmoving operations, and will remain in place during construction and after construction as a vegetated swale, which is a post-construction stormwater management BMP.

1.2.6.4 Conveyance channel. Conveyance channel #C1 will be constructed to convey runoff from the construction site to the proposed sediment basin. The location and details for the conveyance channel are shown on the E&SC Plan drawings. Calculations associated with the design of the conveyance channel are presented in Section 1.2.8. The conveyance channel will be constructed prior to any bulk earthmoving operations, and will remain in place until all upgradient disturbed areas have been stabilized. After stabilization, the conveyance channel will be converted to a vegetated swale, which is a post-construction stormwater management BMP.

1.2.6.5 Sediment basin. A sediment basin will be constructed to collect, treat, and discharge onsite runoff water from disturbed areas. The location and details of the sediment basin are shown on the E&SC Plan drawings. Calculations associated with the design of the sediment basin are presented in Section 1.2.8. The sediment basin will be constructed prior to any bulk earthmoving operations, and will remain in place until all upgradient disturbed areas have been stabilized. After the sediment basin has been used, the sediment basin area will be graded and vegetated.

1.2.6.6 Erosion control mulch blanket. Erosion control mulch blankets will be installed on all permanent slopes 3H:1V and steeper. Specifications for erosion control mulch blankets are presented on the E&SC Plan drawings. Erosion control mulch blankets will be installed as soon as practical after final grade has been achieved, and will remain in place as the permanent vegetative cover is established.

1.2.6.7 Riprap aprons. Riprap aprons will be installed at all storm drainage pipe outfalls (except where a level spreader is used). The location and details for riprap aprons are shown on the E&SC Plan drawings. Calculations associated with the design of riprap aprons are presented in Section 1.2.8. Riprap aprons will be installed at the time the pipe outfall is completed, and will remain in place as long as the pipe outfall remains.

1.2.6.8 Vegetative stabilization. Vegetative stabilization consists of final grading, topsoil placement, seeding, and mulching. Permanent vegetative stabilization will be applied to all earth-exposed areas that are not otherwise covered with gravel, pavement, buildings, etc. If weather conditions are favorable, permanent seeding will take place within 7 days of final grade being achieved. Otherwise, temporary seeding and mulching will be implemented until conditions become favorable for the establishment of permanent vegetative cover. Temporary seeding and mulching will be applied to earth-exposed areas where earthwork is delayed or stopped for a period of 4 or more days. Temporary vegetative stabilization will be maintained until earthmoving recommences, or until the temporary vegetative stabilization is replaced by permanent vegetative stabilization. Specifications for vegetative stabilization are included on the E&SC Plan drawings.

1.2.6.9 Weighted sediment filter tube. Weighted sediment filter tubes are proposed downgradient of the end of diversion channel #D1 and the proposed driveway culvert outlet. Weighted sediment filter tubes are tube-shaped devices filled with non-biodegradable filter materials for longevity and reuse. Weighted sediment filter tubes may be placed in areas of concentrated flow in lieu of rock filters if installed according to manufacturer's recommendations and the details shown on the E&SC Plan drawings. When the area tributary to a tube has been stabilized, an undamaged tube may be removed and used at another location. Where the total length is greater than the length of individual tubes, place multiple tubes with overlap of 12 inch minimum (or as specified by manufacturer). Specifications for weighted sediment filter tubes are presented on the E&SC Plan drawings. Weighted sediment filter tubes will be installed prior to upgradient earth disturbance, and will remain in place until permanent vegetative cover is established on upgradient areas.

1.2.7 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.

BMP installation and removal in relation to earth disturbance activities is projected to proceed in accordance with the following relative sequence:

1. Install rock construction entrance with wash rack.
2. Install compost filter sock at the following locations:
    a. Along edge of woods near wetlands at the west end of the site.
    b. Along north property line.
    c. Upgradient of the proposed infiltration/detention basin site.
    d. Downgradient of proposed topsoil stockpile areas.
3. Protect infiltration/detention basin area from compaction and sedimentation during construction.
4. Construct construction office area, construction parking area, and construction laydown areas.
    a. Remove and stockpile topsoil; temporarily seed stockpile.
    b. Regrade, compact, and apply aggregate surfacing as necessary.
    c. Complete site access driveways, culvert, graveled areas to be used for construction office area, graveled construction parking area, and construction laydown areas.
    d. Seed and mulch main access driveway sideslopes.
5. Install weighted sediment filter tubes downgradient of diversion channel #D1 and downgradient of driveway culvert outlet.
6. Construct diversion channel #D1 and #D2 with a temporary lining.
7. Construct sediment basin.
    a. Remove and stockpile topsoil; temporarily seed stockpile.
    b. Excavate sediment basin, place and compact fill for sediment basin berm.
    c. Install sediment basin outlet structure including skimmer device and discharge pipe.
    d. Install sediment basin emergency spillway and lining.
    e. Excavate conveyance channel #C1 and construct adjacent berm.
    f. Install temporary lining within conveyance channel #C1.
    g. Apply temporary seeding to sediment basin inner and outer slopes and to conveyance channel #C1 inner and outer slopes.
8. Construction of converter station.
    a. Strip and stockpile topsoil from converter station site; temporarily seed stockpiles.
    b. Bulk excavation/grading for the converter station site.
    c. Bulk excavation for structure foundations.
    d. Installation of converter station perimeter fence.
    e. Construction of converter station buildings and other structures.
    f. Apply finished surface of aggregate over areas within converter station that have been completed.
9. Construct infiltration/detention basin.
    a. Place and compact fill for basin berms.

b. Apply vegetative stabilization to disturbed areas of infiltration/detention basin; apply erosion control mulch blanket to all permanent slopes of 3:1 or greater.

10. Assure that all areas upgradient of sediment basin have been stabilized.
11. Dewater sediment basin.
12. Fill sediment basin. Grade area of sediment basin.
13. Convert conveyance channel #C1 to a permanent vegetated swale #C1 and #C2 with a discharge to the infiltration/detention basin. Install temporary lining in vegetated swale.
14. Construct infiltration/detention basin outlet structure.
15. Demobilize construction office areas, construction parking areas, and construction laydown areas. Remove aggregate surfacing, decompact, fine grade, and revegetate.
16. Remove rock construction entrance with wash rack.
17. Apply permanent vegetative stabilization to all remaining disturbed areas; apply erosion control mulch blanket to all permanent slopes of 3:1 or greater.
18. After all remaining disturbed areas have been stabilized with permanent vegetation, remove compost filter socks and weighted sediment filter tubes.
19. Maintain stormwater BMPs according to maintenance schedule.

1.2.8 Supporting calculations and measurements.

1.2.8.1 Stormwater Calculations. Calculations for the stormwater runoff rates presented in Section 1.2.4 associated with peak rates of runoff during construction are presented in Section 4.4.

1.2.8.2 Compost filter sock. Standard E&S Worksheet #1 for compost filter sock is included in Section 5.1.

1.2.8.3 Diversion channel. Calculations for flow rates associated with diversion channel #D1 and #D2 are presented in Section 5.2. Standard E&S Worksheet #11 for channel design data for diversion channel #D1 and #D2 is also presented in Section 5.2.

1.2.8.4 Conveyance channel. Calculations for flow rates associated with conveyance channel #C1 are presented in Section 5.2. Standard E&S Worksheet #11 for channel design data for conveyance channel #C1 is also presented in Section 5.2.

1.2.8.5 Sediment basin. Standard E&S Worksheets #12 “sediment basin capacity requirements,” #13 “sediment basin dimensions and elevations,” #14 “sediment basin/ sediment trap storage data”, and #17 “sediment basin discharge capacity” are presented in Section 5.3.

1.2.8.6 Riprap aprons. Figure 9.3, “riprap apron design” is presented in Section 5.4 for both the sediment basin outlet pipe and the driveway culvert pipe.

1.2.9 Plan drawings.

The E&SC Plan drawings show the location, details, and specifications for all BMPs. The E&SC Plan drawings also show existing and proposed contours.

1.2.10 A maintenance program which provides for the operation and maintenance of BMPs and the inspection of BMPs 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 for completion of a written report documenting each inspection and all BMP repair, or replacement and maintenance activities.

A maintenance program for erosion and sedimentation control facilities will be implemented, consisting of inspections by the contractor to occur weekly, as well as after any stormwater event. Each inspection must be documented in writing as to the date of the inspection, the person performing the inspection, and any BMP repairs, replacement or maintenance activities that occur. Records of these inspections will be kept on site by the contractor, and will be made available upon request to inspectors from PaDEP or the Erie County Conservation District. Inspections will cover all aspects of the BMPs, particularly with regard to the following:

1.2.10.1 Rock construction entrance with wash rack. The rock construction size and thickness will be maintained to the specified dimensions by adding additional rock as necessary. A stockpile will be maintained on site for this purpose. The drain space under the wash rack will be kept open at all times. Damage to the wash rack will be repaired prior to further use of the wash rack. At the end of each construction day, all sediment deposited from the site onto adjacent roadways will be removed and returned to the construction site. Washing the roadway or sweeping deposits into roadside ditches, storm sewers, culverts, or other drainage courses is not acceptable.

1.2.10.2 Compost filter sock. Accumulated sediment shall be removed when it reaches half the aboveground height of the sock. Compost filter socks will be reset as necessary, and repaired according to the manufacturer's specifications. Biodegradable filter socks will be replaced after six months; photodegradable socks after one year. Polypropylene socks will be replaced according to the manufacturer's recommendations. Upon removal, the compost filter socks may be cut open and the mulch spread as a soil supplement.

1.2.10.3 Channels. Channels found to be eroded will be restored to their design dimensions. Channels with sediment deposition will be cleaned whenever the total channel depth is reduced by 25 percent at any location. Damaged channel linings will be repaired or replaced immediately.

1.2.10.4 Sediment basin. Provide access for sediment removal and other required maintenance activities. Basin embankments, spillways, and outlets will be inspected for erosion, piping, and settlement. Necessary repairs will be made immediately. Remove trash or other floating debris that could cause malfunction of the skimmer or basin outlet.

Any clogged, damaged, or malfunctioning skimmer will be repaired or replaced within 24 hours of inspection. Ice or sediment buildup around the skimmer will be removed so as to allow the skimmer to respond to fluctuating water elevations. A cleanout stake will be placed near the center of the basin. Sediment will be removed from the basin when it reaches the level marked on the sediment cleanout stake, and the basin will be restored to its original dimensions. Dispose of materials removed from the basin as fill to be used in a non-wetland upland area. Displaced riprap within the overflow spillway will be replaced immediately.

1.2.10.5 Erosion control mulch blanket. Areas covered by erosion control mulch blankets will be inspected weekly and after each runoff event until perennial vegetation is established to a minimum uniform 70 percent coverage throughout the blanketed area. Damaged or displaced blankets will be restored or replaced within 4 calendar days.

1.2.10.6 Riprap aprons. Displaced riprap within riprap aprons will be restored immediately.

1.2.10.8 Vegetative Stabilization. Seeded areas will be maintained in accordance with the specifications until perennial vegetation is established to a minimum uniform 70 percent coverage.

1.2.10.9 Weighted sediment filter tube. Weighted sediment filter tubes will be inspected weekly and after each runoff event. Sediment deposits will be cleaned from the tube when it reaches half the height of the tube. Damaged tubes will be replaced within 24 hours of inspection. A supply of tubes will be maintained on site for this purpose.

1.2.11 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 this title.

Excess excavated material will be used as fill in a non-wetland upland area. All building materials and wastes (excess topsoil, demolition debris, concrete washout, excess building materials) must be removed from the site and recycled or disposed of in accordance with PaDEP and other applicable regulations. No building materials or wastes will be burned, buried, dumped, or discharged at the site. All applicable federal, state, and local laws and regulations must be followed in the use, handling, and disposal of potentially hazardous materials.

For concrete operations, a suitable washout facility must be provided for the cleaning of chutes, mixers, and hoppers of the delivery vehicles unless such a facility will be used at the source of the concrete. Wash water from these vehicles will not be allowed to enter any surface waters. Proper signage will be provided to drivers so that they are aware of the presence of washout facilities. Washout facilities should not be placed within 50 feet of storm drains, open ditches or surface waters. They should be in a convenient location for the trucks, preferably near the place where the concrete is being poured, but far enough from other vehicular traffic to minimize the potential for accidental damage or spills. Wherever possible, they should be located on slopes not

exceeding a 2 percent grade. Self-installed, earthen washouts should be excavated below grade to prevent runoff of the wash water and minimize the potential for breaching. They should be sized to handle solids, wash water, and rainfall. A below-grade washout should be a minimum of 10 feet wide and provide at least 12 inches of freeboard above the liquid and solid waste anticipated between cleanout intervals. The pit should be lined with plastic sheeting of at least 10-mil thickness (with no holes or tears) to prevent leaching of liquids into the ground. Sediment basins and sediment traps may not be used as concrete washout devices, since they discharge directly to surface waters. All concrete washout facilities should be inspected daily. Damaged or leaking washouts should be deactivated and repaired or replaced immediately. Accumulated materials should be removed when they reach 75 percent capacity. Plastic liners should be replaced with each cleaning of the washout facility.

1.2.12 Identification of the naturally occurring 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 the formations.

There are no known naturally occurring geological formations or soil conditions at the site expected to have the potential to cause pollution during earth disturbance activities.

1.2.13 Identification of potential thermal impacts to surface waters of this Commonwealth from the earth disturbance activity including BMPs to avoid, minimize or mitigate potential pollution from thermal impacts.

All surface runoff from developed areas will be conveyed to the infiltration/detention basin. Because the infiltration/detention basin is anticipated to infiltrate the net increase in runoff from the 2-year, 24-hour storm, thermal impacts to downstream surface waters are expected to be negligible. Furthermore, the proposed vegetated swales will provide for cooling of runoff from impervious surfaces.

1.2.14 The E&S Plan shall be planned, designed and implemented to be consistent with the PCSM Plan under §102.8 (relating to PCSM requirements). Unless otherwise approved by the Department, the E&S Plan must be separate from the PCSM Plan and labeled ''E&S'' or ''Erosion and Sediment Control Plan'' and be the final plan for construction.

This E&SC Plan has been planned and designed to be consistent with the separate PCSM Plan for this site.

1.2.15 Identification of existing and proposed riparian forest buffers.

The Project has been located and designed to avoid disturbance within 150 feet of Crooked Creek and tributary streams within the Crooked Creek watershed. One exception occurs at the Erie Converter Station site, where the limit of disturbance is less than 150 feet of Stream SPA-KAS-029, although none of the disturbed area that is within 150 feet of that stream involves earth disturbance within 100 feet of any stream, wetlands, or other surface water. In addition, the disturbed area does not include any existing forested areas. A riparian buffer equivalency demonstration is provided in the PCSM Plan, but no offsetting measures are required under Pennsylvania Act 162 of 2014, 35 P.S. §691.402(c)(2).

1.3 ANTIDEGRADATION ANALYSIS

For watersheds designated as High Quality (HQ), an antidegradation analysis is required to demonstrate how designated and existing water quality uses will be maintained and protected. The analysis is a multi-step process. First, environmentally sound nondischarge BMPs must be evaluated. If the net change in stormwater discharge during or after construction is not fully eliminated by nondischarge BMPs, the applicant must utilize ABACT BMPs to manage the change. ABACT stands for Antidegradation Best Available Combination of Technologies. If it is not possible to use ABACT BMPs to achieve no net change in stormwater discharge and assure that existing or designated surface water uses are protected, the applicant must provide Social or Economic Justification (SEJ) to demonstrate why any associated reduction in water quality is necessary to accommodate important economic or social development in the area in which the waters are located.

Nondischarge BMP Evaluation. The first non-discharge BMP to consider is alternative project siting such that the development does not impact HQ waters. For this project, selection of an alternative project location which completely avoids earth disturbance to the Crooked Creek watershed is not possible because the Erie West POI with the PJM Grid is itself located within the Crooked Creek watershed. It is therefore also not possible to avoid discharges into the Crooked Creek watershed.

Another nondischarge BMP is the use of Low Impact Development (LID). LID is indeed proposed for this project in the form of the following BMPs, all of which are described in the PCSM Plan: Protect Sensitive/Special Value Features, Protect/Conserve/Enhance Riparian Areas, Protect/Utilize Natural Flow Pathways in Overall Stormwater Planning and Design. Protection of riparian buffers and riparian forest buffers must be evaluated as a nondischarge BMP. A discussion of riparian buffer protection including a riparian buffer equivalency demonstration is provided in the PCSM Plan.

Infiltration BMPs are also considered nondischarge BMPs. The PCSM Plan describes the use of a proposed infiltration/detention basin to infiltrate runoff to the extent practical. Another potential nondischarge BMP is water reuse. Water reuse is not proposed, since the project will not require a significant enough amount of water to warrant water reuse as a BMP (the only

anticipated regular water use will be for sanitary facilities, which is expected to be very minimal).

ABACT BMPs. Because the nondischarge BMPs described above are not in themselves sufficient to manage the entire change in stormwater discharge during and after construction, ABACT BMPs are necessary. Post-construction stormwater management ABACT BMPs are described in the PCSM Plan. As detailed in the PCSM Plan, the BMPs being implemented at this project collectively manage the difference in the net change in stormwater volume, rate, and quality for storm events up to and including the 2-year, 24-hour storm when compared to the stormwater rate, volume and quality prior to earth disturbance activities, and as a result protect the existing quality of the receiving waters within the Crooked Creek watershed. For BMPs to be implemented during construction, design features have been included to meet ABACT guidelines per the PaDEP Erosion and Sediment Pollution Program Manual. BMPs including ABACT features include rock construction entrance with wash rack, diversion and conveyance channels, compost filter socks, weighted sediment filter tubes, and sediment basin with skimmer.

1.4 CONCLUSION

The project site has been selected to be as near as possible to the point of interconnection with the existing Erie West Substation. It is in the best interest of the project owner to minimize the duration of construction. For these reasons, the E&SC Plan minimizes the extent and duration of earth disturbance. The E&SC Plan avoids disturbance of wetlands and waterways on the property, and disturbance of wooded areas will be minimal. Soil compaction will be minimized to be within the limits of disturbance. The BMPs described in this E&SC Plan and in the PCSM Plan include other measures that prevent or minimize the generation of increased stormwater runoff.

This Erosion and Sedimentation Control Plan meets the requirements of the PaDEP at 25 Pa. Code Chapter 102, including the enhanced BMPs and ABACT requirements applicable to projects in high quality watersheds.

Section 2
Maps and Figures

2.1 Location Map/USGS Quad Map

ALBION & EAST SPRINGFIELD, PENNSYLVANIA
USGS 7.5 MINUTE QUADRANGLE

Deiss & Halmi Engineering, Inc.
ENVIRONMENTAL AND CIVIL ENGINEERING
105 Meadville Street, Edinboro PA 16412 Ph. 814.734.3640 Fax 814.734.3643

Date: 6/26/2015 Scale: 1" = 2000'

Project:

ITC Lake Erie Connector, LLC

Erie Converter Station

Conneaut Township, Erie County

Pennsylvania

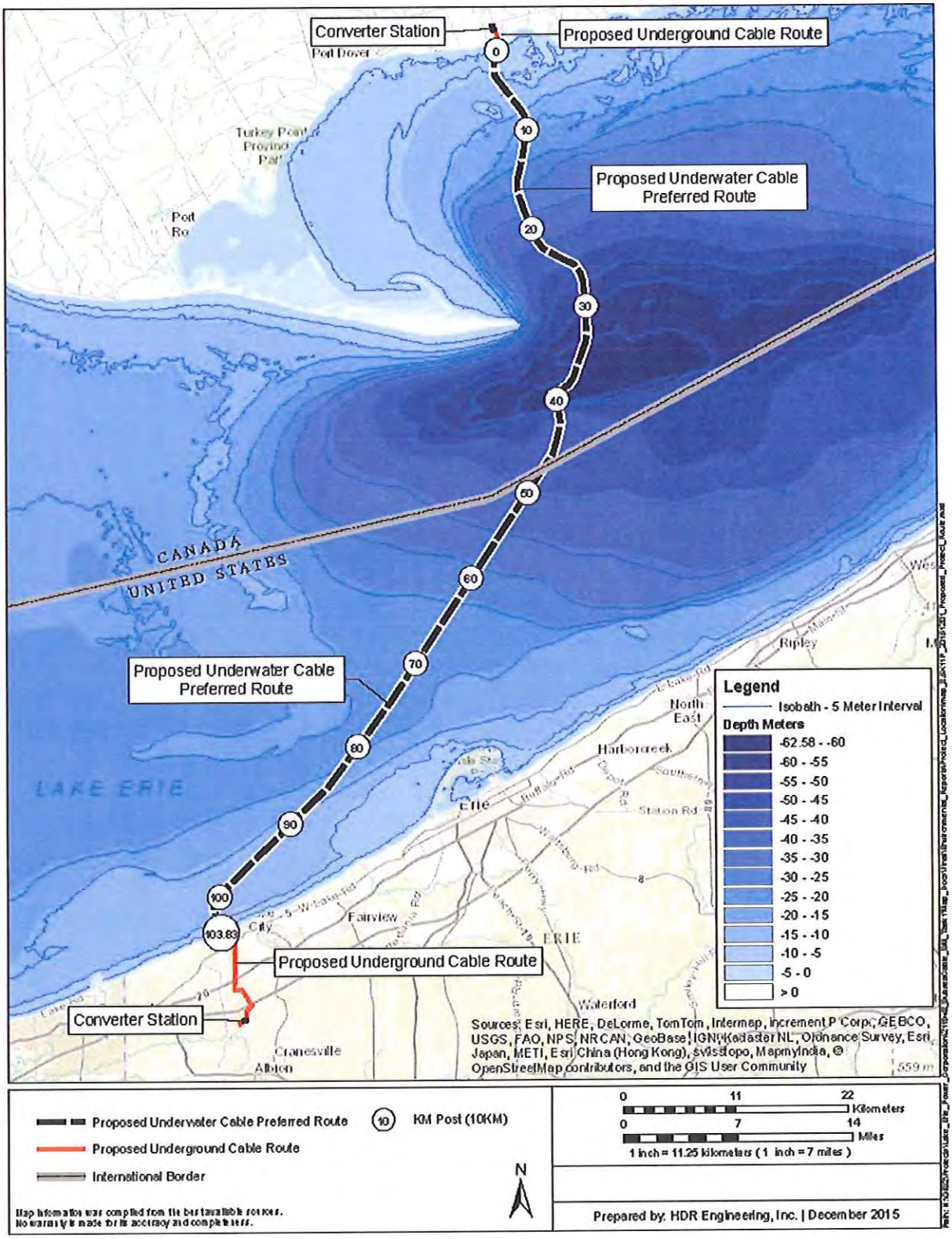
2.2 Aerial Photo

Google earth

feet 1000

meters 400

2.3 Overall Project Map



Proposed Underwater Cable Preferred Route

Proposed Underground Cable Route

International Border

(10) KM Post (10KM)

N

0 11 22 Kilometers

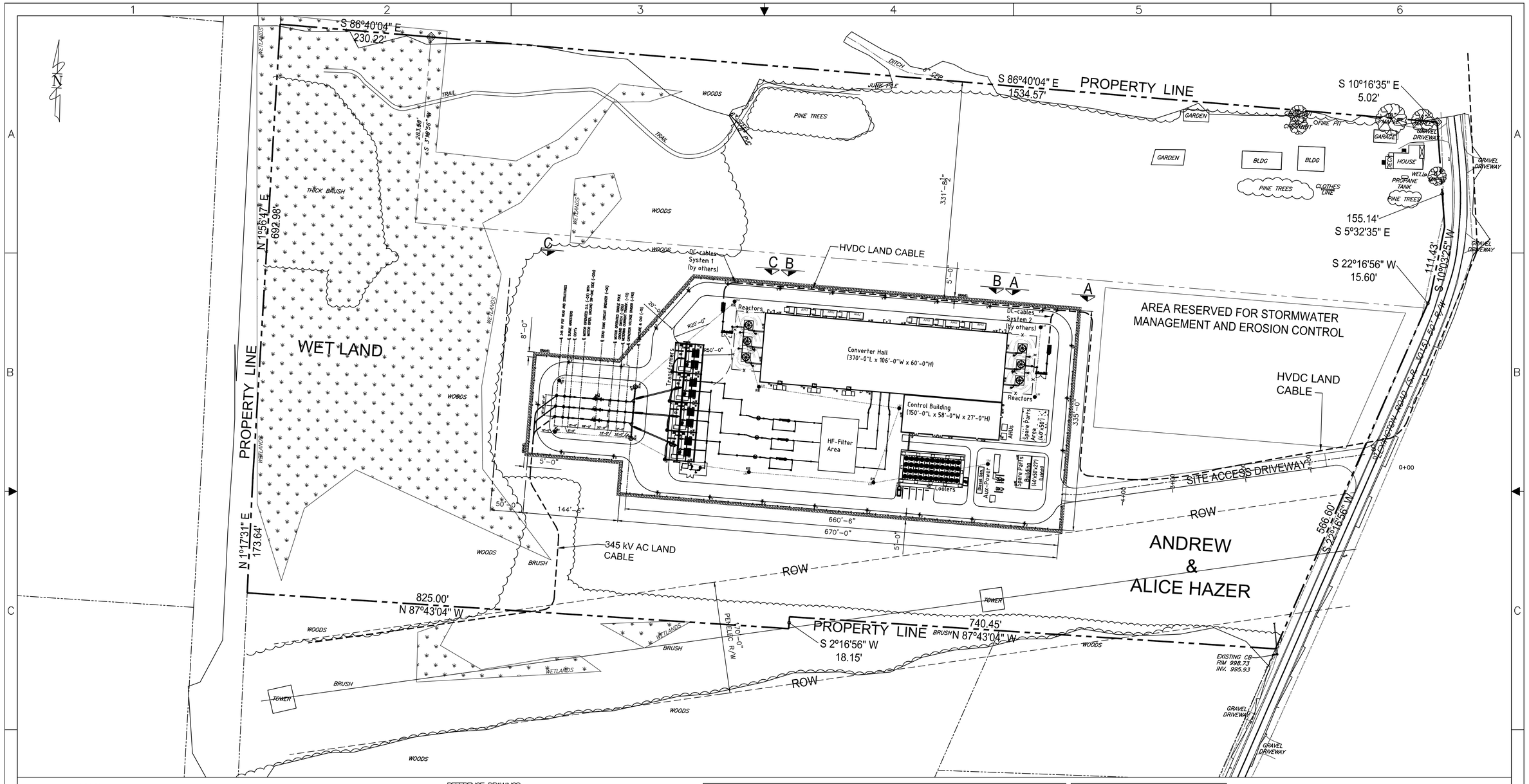
0 7 14 Miles

1 inch = 11.25 kilometers (1 inch = 7 miles)

Map information was compiled from the best available sources. No warranty is made for its accuracy and completeness.

Prepared by: HDR Engineering, Inc. | December 2015

2.4 Erie Converter Station Concept Plan



NOTES:

1. EQUIPMENTS ARE REPRESENTATIVE, ACTUAL DIMENSIONS MAY CHANGE.
2. PROPERTY LINE LOCATION IS APPROXIMATED.
3. EXACT LOCATION OF THE HVDC CONVERTER STATION TO BE CONFIRM.
4. ACCESS ROAD TO THE HVDC CONVERTER STATION T.B.C. AT LATER STAGE.
5. LIGHTING WILL BE IN ACCORDANCE WITH THE IES STANDARD.

REFERENCE DRAWINGS:

LAND DEVELOPMENT PLAN
ITC LAKE ERIE CONNECTOR, LCC
ERIE CONVERTER STATION
CONNEAUT TOWNSHIP, ERIE COUNTY
PENNSYLVANIA
DRAWING No.: 2080615-3, d&h Delss & Halmi Engineering, Inc.

FIXTURE SCHEDULE

TYPE	SYMBOL	MANUFACTURER & CAT. No.	DESCRIPTION	INPUT POWER
R		HOLOPHANE RS2L-100HP-12-S-A21	100W, HPS AREA/ROADWAY POLE MOUNTED LUMINAIRE WITH MOUNT. BCKT.	120V 1PH
V		COOPER LIGHTING VXM-250HPS-480-SL-BK-PRCPR-FF-T	250W, HPS ROADWAY POLE MOUNTED AREA LUMINAIRE WITH MOUNTING BCKT.	480V 2PH
W		HOLOPHANE W4-070HP-12-C-G	70W, HPS WALLPACK IV LUMINAIRE, WALL MOUNTED.	120V 1PH

GRAPHICAL SYMBOL

PRELIMINARY
ONLY FOR QUOTATION

Rev	Date	Description	Eng	Chk	App
K	03/27/15	UPDATED AS PER SIEMENS AG ONE-LINE DIAGRAM, DWG No. EM TS 2 HVDC	M.Zurita	K.Seider	O. Macchione
J	03/05/15	BUILDINGS DIMENSIONS UPDATED	M.Zurita	K.Seider	O. Macchione
H	02/23/15	FIVE Ft OF GRAVEL ALL AROUND THE PERIMETRAL FENCE WAS ADDED	M.Zurita	K.Seider	O. Macchione
G	12/30/14	PROPERTY LINE UPDATED, HVDC FOOTPRINT RELOCATED	M. Zurita	R Munoz	O Macchione
F	11/24/14	PROPERTY LINE UPDATED, DC CABLE ROUTE CHANGED, AC SWITCHYARD UPDATED	M.Zurita	R Munoz	O Macchione
E	10/13/14	AS MARKED	M.Zurita	R Munoz	O Macchione

Rev	Date	Description	Eng	Chk	App
Q	01/25/16	REVISED FENCED AREA AND DRIVEWAY AT THE NORTHWEST CORNER	M. Zurita	R. Munoz	O.Macchione
P	11/13/15	UPDATED AS PER LAND DEVELOPM. PLAN BY h&d, ADDED LUMINARIES & FIXTURE SCH.	M. Zurita	R. Munoz	O.Macchione
N	09/14/15	ADDED BUILDINGS DIMS., UPDATED PROPERTY LINE AND CONVERTER STATION NAME	M. Zurita	R. Munoz	O.Macchione
M	05/06/15	ADDED CCVTs (A-Ph, C-Ph), UPDATED CLIENT NAME IN TITLE BLOCK	M. Zurita	R. Munoz	O.Macchione
L	04/03/15	ADDED CCVT (PHASE B)	J. Pearson	M. Zurita	R. Munoz

P. E. License

PROJ. ORDER: F-P00100 | SCALE 1"=70'-0" | FOR PROPOSAL

SIEMENS
ENERGY INC.
HIGH VOLTAGE SYSTEMS

ITC LAKE ERIE CONNECTOR LLC
Lake Erie HVDC Project
ERIE CONVERTER STATION – PA, USA
GENERAL ARRANGEMENT

DOC. NO. F-P00100-L001-01-Q | SHEET: 01 NEXT: 02 | REV Q

F-P00100-L001-01-Q

Confidential Document

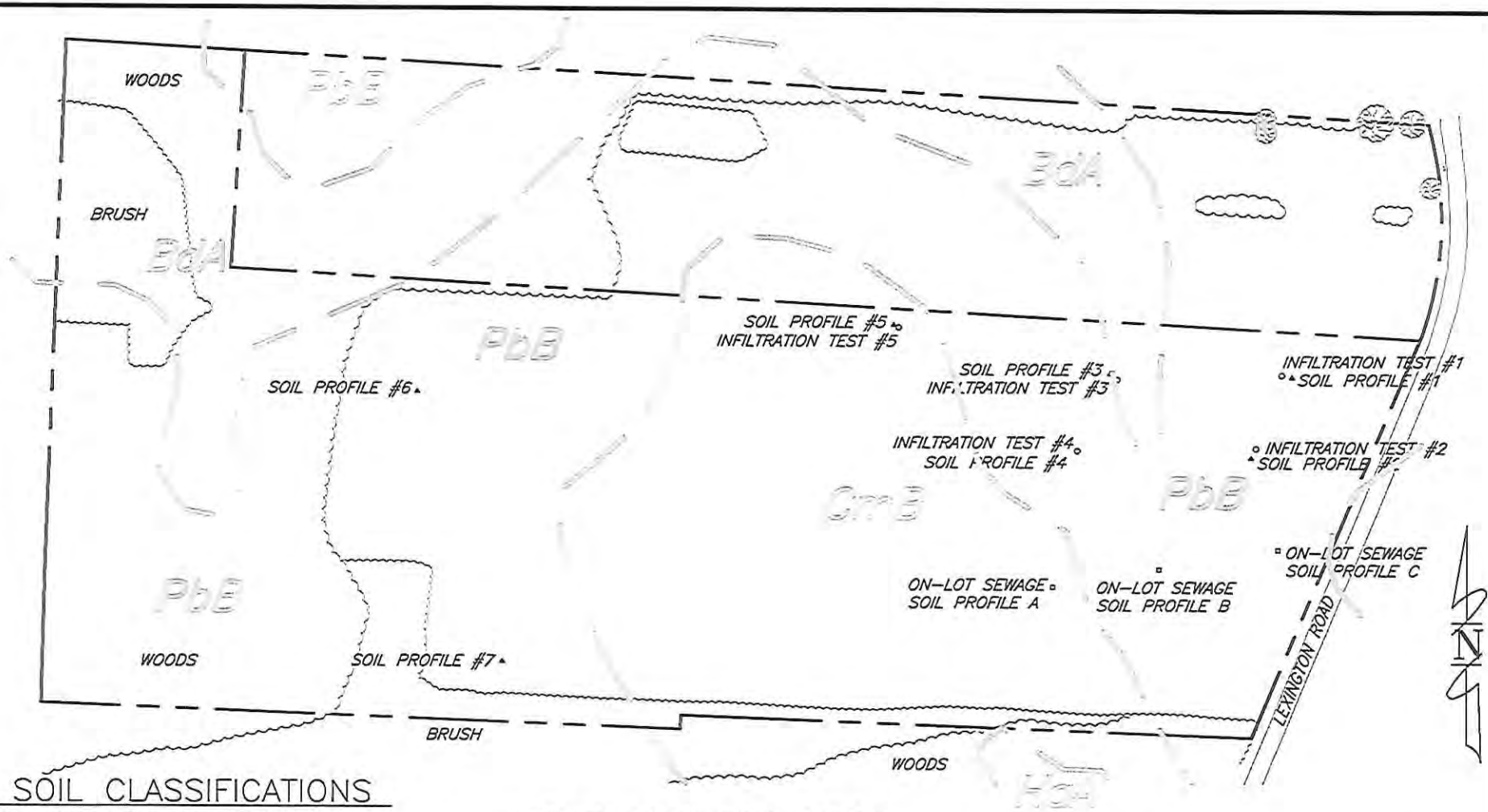
Section 3
Soils Information

3.1 Soils Descriptions and Soils Limitations

Soil types have been plotted on the site plan using shape files available on the Pennsylvania Spatial Data Access (PASDA). PASDA is the official public access geospatial information clearinghouse for the Commonwealth of Pennsylvania and has served for fifteen years as Pennsylvania's node on the National Spatial Data Infrastructure, Geospatial One-Stop, and the National Biological Information Infrastructure. PASDA was developed by the Pennsylvania State University as a service to the citizens, governments, and businesses of the Commonwealth. PASDA is a cooperative project of the Governor's Office of Administration, Office for Information Technology, Geospatial Technologies Office and the Penn State Institutes of Energy and the Environment of the Pennsylvania State University.

Soil descriptions are excerpted from the 1960 "Soil Survey for Erie County Pennsylvania" prepared by the United States Department of Agriculture (USDA) Soil Conservation Service. The 1960 soil survey was used for the soil descriptions this report as the data is consistent with the soil mapping available on the PASDA database. Newer soil maps, descriptions, and limitations available from other sources such as the USDA Natural Resources Conservation Service (NRCS) Web Soil Survey are not consistent with the data available on PASDA, limitations identified in the March 2012 Pa. DEP "Erosion and Sediment Pollution Control Manual," nor are they consistent with the soil hydrologic soil group data contained in Exhibit A of NRCS TR-55 which is the most generally accepted modeling method for stormwater management calculations. For these reasons, the PASDA and 1960 "Soil Survey for Erie County Pennsylvania" were used to maintain consistency of data.

Soil use limitations for each of the soil types identified on the site are excerpted from Appendix E of the March 2012 Pa. DEP "Erosion and Sediment Pollution Control Manual."



SOIL CLASSIFICATIONS

BdA BIRDSALL SILT LOAM, 0%–2% SLOPES.

CmB CONOTTON GRAVELLY SANDY LOAM, MODERATELY WELL DRAINED VARIANT, 3%–8% SLOPES.

HaA HALSEY LOAM, 0%–3% SLOPES.

PbB PLATEA SILT LOAM, 2%–8% SLOPES.

SOILS MAP PER NRCS

SCALE: 0 200 400 feet

ITC LAKE ERIE CONNECTOR, LLC ERIE CONVERTER STATION	DATE: 6/26/2015 SCALE: 1"=200'
	REV.:
CONNEAUT TOWNSHIP, ERIE COUNTY PENNSYLVANIA	DRAWN BY: JEFFREY T. BERNOSKY
d&h Deiss & Halmi Engineering, Inc. ENVIRONMENTAL AND CIVIL ENGINEERING 105 Meadville Street, Edinboro PA 16412 Ph. 814-734-3640 Fax 814-734-3643	APPROVED BY:
	DRAWING No.: SOILS MAP

Soil types identified on the site are as follows:

- BdA – Birdsall Silt Loam, HSG D
- CmB – Conotton Gravelly Sandy Loam, Moderately Well Drained Variant, HSG B
- HaA – Halsey Loam, HSG C
- PbB – Platea Silt Loam, HSG C

The location and boundaries of the mapped soil types in the project area are shown on the drawings. Representative profiles of the soil types present at the site are as follows (adapted from the USDA SCS, Official Series Description):

Birdsall silt loam (BdA): This is a deep, very poorly drained to poorly drained soil derived from lacustrine deposits of glacial origin. The following profile is representative of this soil:

0 to 10 inches	Very dark grayish-brown silt loam; moderate, fine, granular structure; friable when moist; pH 5.4; diffuse, smooth lower boundary
10 to 18 inches	yellowish-brown silt loam with many, fine, distinct mottles of grayish brown; moderate, medium, granular structure; friable when moist; pH 5.4; clear, smooth lower boundary
18 to 26 inches	yellowish-brown silty clay loam with common, coarse, distinct mottles of grayish brown; moderate, medium, subangular blocky structure; hard when dry, firm when moist, and sticky when wet; pH 6.0; gradual, smooth lower boundary
26 to 36 inches	dark grayish-brown silty clay loam with common medium, distinct mottles of yellowish brown; weak, medium, subangular blocky structure; hard when dry, firm when moist, and nonsticky when wet; pH 6.4

Connotton moderately well drained variants (CmA): This is a deep, moderately well-drained, moderately coarse textured to medium textured soil derived from acid shale bedrock and from sandstone and granite of glacial origin sorted and deposited by wave action. The soils have a firm, compact layer that is moderately permeable to air and water. The following profile is representative of this soil:

0 to 7 inches	dark-brown gravelly sandy loam; weak, coarse, granular structure; friable when moist; contains about 25% gravel; pH 5.6; abrupt, smooth lower boundary

7 to 12 inches reddish-brown coarse sandy loam; moderate, coarse, granular structure; friable when moist; pH 6.0; gradual, smooth lower boundary

12 to 20 inches yellowish-red coarse sandy loam; moderate, medium, subangular blocky structure; friable when moist; pH 6.0; clear, wavy lower boundary

20 to 28 inches dark-brown coarse sandy loam; moderate, thick, platy structure; friable when moist; pH 5.8; clear, wavy boundary

28 to 33 inches dark grayish-brown coarse sandy loam with common, fine, distinct mottles of light olive brown and strong brown; strong, coarse, subangular blocky structure; hard when dry, firm when moist; pH 5.6; clear, wavy lower boundary

33 to 72 inches+ dark-brown loamy, sandy gravel; stratified; single grain (structureless); friable when moist; pH 6.0; contains more than 45 percent gravel

Halsey Series (HaA): The Halsey soils are deep and are very poorly drained. They occur in depressions on the gravelly beach ridges along the lake plain and also on gravelly outwash terraces along stream valleys in the upland. The parent material consisted of alternate layers of sand, silt, and gravel mixed with some clay. It was derived from acid shale bedrock and sediments of sandstone and granite of glacial origin. This material was sorted and deposited by water.

0 to 7 inches very dark grayish-brown loam; moderate, fine, granular structure; friable when moist; pH 5.8; gradual, smooth lower boundary

7 to 12 inches dark-brown silt loam with many, medium, distinct mottles of strong brown; moderate, coarse, granular structure; friable when moist; pH 6.0; clear, smooth lower boundary

12 to 15 inches very dark grayish-brown silty clay loam with many, medium, distinct mottles of gray and dark reddish brown; strong, medium, granular structure; friable when moist, slightly sticky when wet; pH 5.8; abrupt, smooth lower boundary

15 to 25 inches grayish-brown silt loam with many, coarse, distinct mottles of dark brown; moderate, medium, subangular blocky structure; friable when moist, slightly sticky when wet; pH 6.2; gradual, smooth lower boundary.

25 to 30 inches yellowish-brown loam with many, coarse, distinct mottles of gray; weak, medium, subangular blocky structure; friable when moist, slightly sticky when wet; pH 6.6; gradual, smooth lower boundary.

30 to 42 inches + variegated brownish-yellow and dark yellowish-brown, stratified loamy sand to sandy loam; single grain (structureless) to weak, medium, subangular blocky structure; friable when moist; pH 7.0

Platea silt loam (PbB): The Platea series consists of deep, somewhat poorly drained soils on the upland. The parent material was silty glacial till containing a few rounded pebbles of granite and sandstone. Moderately well drained variants of the Platea series occupy sites having favorable internal drainage.

0 to 8 inches dark-brown silt loam; weak, fine, granular structure; friable when moist; pH 4.8; clear, wavy lower boundary.

8 to 15 inches brown silt loam with common, medium, distinct mottles of light brownish gray and strong brown; compound structure—weak, medium, platy and weak, medium, subangular blocky; friable when moist, nonplastic when wet; pH 4.8; clear, wavy lower boundary.

15 to 28 inches yellowish-brown silt loam with common, medium, distinct mottles of gray and strong brown; moderate, medium, blocky structure; hard when dry, firm when moist, and slightly plastic when wet; pH 5.6; clear, irregular lower boundary.

28 to 38 inches dark yellowish-brown silt loam with common, coarse, distinct mottles of gray and dark brown; very coarse prisms that break to moderate, medium, blocky or platy structure; thick coating of clay on the structural units; hard when dry, firm when moist, and slightly plastic when wet; pH 5.8; gradual, wavy lower boundary.

38 to 48 inches dark-brown silt loam with medium, distinct, mottles of gray; very coarse prisms that break to moderate, medium, platy structure; thick coating of clay on the structural units; firm when moist, slightly plastic when wet; pH 5.8; gradual, wavy lower boundary.

48 to 60 inches dark yellowish-brown silt loam with a few, medium, distinct mottles of gray; very coarse prisms that break to moderate, medium, platy structure; distinct, thin coating of clay on the structural units; firm when moist, slightly plastic when wet; pH 6.8; gradual, wavy lower boundary.

60 to 80 inches olive-brown silt loam; moderate, thick, platy structure; firm when moist, slightly plastic when wet; pH 7.2.

Soil Name	Cutbanks Cave	Corrosive to Concrete/Steel	Droughty	Easily Erodible	Flooding	Depth to Saturated Zone/ Seasonal High Water Table	Hydric/Hydric Inclusions	Low Strength/ Landslide Prone	Slow Percolation	Piping	Poor Source of Topsoil	Frost Action	Shrink-Swell	Potential Sinkhole	Ponding	Wetness
Birdsall	X	c/s				X	X	X	X	X	X	X	X		X	X
Conotton	X	c/s	X	X		X	X	X	X	X	X	X				
Halsey	X	c/s		X	X	X	X	X	X	X	X	X				X
Platea	X	c/s		X		X	X	X	X	X		X				X

Summary of soil limitations

Proposed measures to address soil limitations:

1. Cutbanks Cave. There will be no exposed cutbanks upon completion of the project. The contractor shall adhere to all OSHA regulations regarding excavation and shoring/bracing or sloping trench walls.

2. Corrosive to Concrete/Steel. Concrete and steel structures shall be designed by the supplier for direct burial.

3. Droughty. This limitation will not have an adverse effect on the project.

4. Easily Erodible. All disturbed surfaces will be stabilized either with asphalt, or with well-established vegetation to prevent erosion. Slopes of 3H:1V and steeper will be stabilized using an erosion control mulch blanket until a uniform 70% vegetative cover has been established.

5. Flooding. The area of the proposed project has been investigated and is not subject to flooding.

6. Depth to Saturated Zone/Seasonal High Water Table. Various test pits have been dug on the property to identify the seasonal high water table. Structural stormwater BMPs will be designed taking the limiting zone into consideration.

7. Hydric/Hydric Inclusions. Wetlands have been delineated within the project area. The area proposed for development on the site has been located to protect the delineated wetlands.

8. Low Strength/Landslide Prone. The proposed grades and construction activities located in these areas are not subject to landslides.

9. Slow Percolation. Infiltration testing has been completed at various locations on the site. Stormwater management features have been designed taking the infiltration rate into account. The site is graded to avoid ponding, except in the stormwater management area.

10. Piping. Berms shall be constructed of acceptable material that is not susceptible to piping.

11. Poor Source of Topsoil. The project is not dependent upon a significant depth of topsoil. What topsoil is available on site will be stockpiled and redistributed on areas that are to be seeded. Any additional topsoil that is required beyond what is available on site will be imported from a supplier.

12. Frost Action. This limitation will not have an adverse effect on the proposed activity.

13. Shrink/Swell. This limitation will not have an adverse effect on the proposed activity.

14. Ponding. The project site has been investigated and sufficient topography exists such that ponding on the site is not a concern. Stormwater management features have been designed taking this limitation into account. The site is graded to avoid ponding, except in the stormwater management area.

15. Wetness. The project site has been investigated and sufficient topography exists such that wetness on the site is not a concern.

3.2 Onsite Soils Test Pit Reports

Several soil investigation test pits were excavated at various locations on the project site as shown on the Drawings. Each soil horizon was identified and described using the methods employed by the Pa. DEP for soil investigations for on-lot disposal of sewage. The description for each horizon includes the horizon depth, soil color (as determined using a Munsell Soil Color Chart), texture, structure, indications of mottling, masses of loose fragments. The limiting zone (high water table) was also identified for each test pit.

Infiltration tests were performed adjacent to those soil investigation test pits that had adequately deep limiting zones and soil textures and structures that would support infiltration. The locations and depths of infiltration test sites are shown on the drawings. A double ring infiltrometer was used to measure the vertical movement of water through the bottom of the test area. A double ring infiltrometer consists of two concentric metal rings. The rings are driven into the ground and filled with water. The outer ring helps to prevent divergent (horizontal) flow. The drop in water level over time in the inner ring is used to calculate an infiltration rate.

Abbreviations

BOUNDARY DISTINCTNESS

Abrupt A	Clear C	Gradual G	Diffused D

COARSE FRAGMENT MODIFIER

Gravelly	GR	Very gravelly	VGR	Extremely gravelly	EGR
Cobbly	CB	Very cobbly	VCB	Extremely cobbly	ECB
Channery	CH	Very channery	VCH	Extremely channery	ECH
Flaggy	FL	Very flaggy	VFL	Extremely flaggy	EFL
Stony	ST	Very stony	VST	Extremely stony	EST
Bouldery	BD	Very boulder	VBD	Extremely boulder	EBD

TEXTURAL CLASS

Sand – S	Coarse sand – COS	Fine sand – FS
Very fine sand – VFS	Loamy sand – LS	Loamy coarse sand – LCOS
Loamy fine sand – LFS	Loamy very fine sand – LVFS	Sandy loam – SL
Coarse sandy loam – COSL	Fine sandy loam – FSL	Very fine sandy loam – VFSL
Loam – L	Silt loam – SIL	Silt – SI
Sandy clay loam – SCL	Clay loam – CL	Silty clay loam – SICL
Sandy clay – SC	Clay – C	Silty clay - SIC

STRUCTURE

Grade:	Structureless	0	Shape:	Granular	GR
	Weak	1		Platy	PL
	Moderate	2		Subangular blocky	SBK
	Strong	3		Angular blocky	ABK
				Prismatic	PR
				Massive	MA
				Single grain	SG

MOIST CONSISTENCE

Loose	LO
Very friable	VFR
Friable	FR
Firm	FI
Very firm	VFI
Extremely firm	EFI

REDOX FEATURES

Abundance:	Few	F	Contrast:	Faint	F
	Common	C		Distinct	D
	Many	M		Prominent	P

GRADE

M	Massive	1	Weak	3	Strong
SG	Single Grain	2	Moderate		

SIZE

vf	very fine	vc	Very course	c	very course
m	medium	f	fine		

BOUNDARY

a	abrupt	c	clear	g	gradual	d	difuse
s	smooth	w	wavy	l	irregular	b	broken

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SITE INVESTIGATION AND PERCOLATION TEST REPORT FOR ON-LOT DISPOSAL OF SEWAGE

Application No. N/A Municipality Conneaut Twp. County Erie
Site Location Lexington Road, 1/2 m. North of RR Subdivision Name
☐ SUITABLE Soil Type LamB Slope ___ % Depth to Limiting Zone 52" Ave. Perc. Rate ___
☐ UNSUITABLE ☐ Mottling ☒ Seeps or Ponded Water ☐ Bedrock ☐ Fractures ☐ Coarse Fragments
☐ Perc. Rate ☐ Slope ☐ Unstabilized Fill ☐ Floodplain ☐ Other

INSTRUCTIONS FOR COMPLETION OF THIS FORM ARE LOCATED ON THE REVERSE

SOILS DESCRIPTION:
Soils Description Complete by: M. Light SEO# 2269 Date: 1/22/15

Inches			Description of Horizon
0	TO	9"	10YR 3/4; SL; SG; m; G-R; fr; 0-15% gravelly; a; s; plowing
9	TO	16"	10YR 3/4; SL; 1; vf; SBK; fr; 0-15% gravelly; a; s
16"	TO	31"	10YR 3/1; SL; SG; c; G-R; lo; 15-35% gravelly; g; i
31"	TO		
31"	TO	52"	10YR 4/3; S; SG; c; G-R; lo; 35-60% gravelly d; i
	TO		
52"	TO	59"	Seeped water to 52" no other Data
	TO		
	TO		
	TO		
	TO		
	TO		
	TO		

Depth to Limiting Zone: 52 Inches

Pit # 1

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SITE INVESTIGATION AND PERCOLATION TEST REPORT FOR ON-LOT DISPOSAL OF SEWAGE

Application No. N/A Municipality Conneaut County Erie
Site Location Lexington Rd 1/2 m. North of R.R. Tracks Subdivision Name _____
☐ SUITABLE Soil Type CmB Slope ____ % Depth to Limiting Zone 48 (10") Ave. Perc. Rate ____
☐ UNSUITABLE ☐ Mottling ☒ Seeps or Ponded Water ☐ Bedrock ☐ Fractures ☐ Coarse Fragments
☐ Perc. Rate ☐ Slope ☐ Unstabilized Fill ☐ Floodplain ☐ Other _____

INSTRUCTIONS FOR COMPLETION OF THIS FORM ARE LOCATED ON THE REVERSE

SOILS DESCRIPTION:
Soils Description Complete by: M. Tighe SEO # Z269 Date: 1/22/15

Inches			Description of Horizon
0	TO	10"	10YR 4/2, SL, SG, M, GR, fr, a, s (Plow line)
10"	TO	14"	10YR 5/4, CL, Z, f, SBK, vfi, c, s
____	TO	____	Few, Fine, faint iron mottles
14"	TO	34"	10YR 5/4, CL, Z, f, SBK, vfi, g, w
____	TO	____	Many, Coarse, Distinct mottles (iron)
34"	TO	48"	10YR 5/4, LCOS, SG, c, GR, lo, 35-60% gravelly
____	TO	____	g, l did not observe mottling
48	TO	52"	Water seeps in to 48"
____	TO	____	
____	TO	____	
____	TO	____	
____	TO	____	
____	TO	____	

Depth to Limiting Zone: 48, (10") Inches

Soil Pit #2

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SITE INVESTIGATION AND PERCOLATION TEST REPORT FOR ON-LOT DISPOSAL OF SEWAGE

Application No. _____ Municipality Conneaut County Erie

Site Location Lexington Rd. 1/2 M. North of R.R. Tracks Subdivision Name _____

☐ SUITABLE Soil Type PbB Slope ____ % Depth to Limiting Zone 11" Ave. Perc. Rate ____

☐ UNSUITABLE ☒ Mottling ☐ Seeps or Ponded Water ☐ Bedrock ☐ Fractures ☐ Coarse Fragments

☐ Perc. Rate ☐ Slope ☐ Unstabilized Fill ☐ Floodplain ☐ Other _____

INSTRUCTIONS FOR COMPLETION OF THIS FORM ARE LOCATED ON THE REVERSE

SOILS DESCRIPTION:

Soils Description Complete by: M. Tight Date: 1/22/15

Inches			Description of Horizon
0	TO	11"	10YR 4/3, SiCL, 1, m, SBK, fr, 0-15% gravelly
____	TO	____	a, s, Plowline at 11"
11"	TO	20"	10YR 5/3, SiCL, 1, m, SBK, fr, 0-15%
20"	TO	____	gravelly, c, s, few Faint iron, gray mottles
20"	TO	62"	10YR 6/2, CL, 2, f, SBK, fr, c, w,
____	TO	____	Red, gray common, medium, Distinct mottles
62"	TO	____	Gley 1 6/N, Cl, M, vf, SBK, efi, c, w,
____	TO	____	Greyng present.
____	TO	____	
____	TO	____	
____	TO	____	
____	TO	____	
____	TO	____	

Depth to Limiting Zone: 11 Inches

Pit #3

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SITE INVESTIGATION AND PERCOLATION TEST REPORT FOR ON-LOT DISPOSAL OF SEWAGE

Application No. _____ Municipality Conneaut County Erie

Site Location Lexington Rd. 1/2 M. North of R.R. Tracks Subdivision Name _____

☐ SUITABLE Soil Type _____ Slope _____% Depth to Limiting Zone 35" Ave. Perc. Rate _____

☐ UNSUITABLE ☒ Mottling ☐ Seeps or Ponded Water ☐ Bedrock ☐ Fractures ☐ Coarse Fragments

☐ Perc. Rate ☐ Slope ☐ Unstabilized Fill ☐ Floodplain ☐ Other _____

INSTRUCTIONS FOR COMPLETION OF THIS FORM ARE LOCATED ON THE REVERSE

SOILS DESCRIPTION:
Soils Description Complete by: M. Tighe Date: 1/22/15

Inches			Description of Horizon
0	TO	12"	10YR 4/2, SiCL, SG, m, G-R, fr, g, s, (Plow line)
12"	TO	24"	10YR 5/6, SiCL, 1, m, G-R, fr, 0-15%
	TO		gravelly, c, w
24	TO	35"	10YR 4/4, LS, SG, m, GR, lo, g, i
35	TO	39"	10YR 5/4, CL, 1, vf, SBK, fi, g, i
	TO		many course distinct red mottles
39"	TO	58"	10YR 5/4, SCL, SG, c, GR, lo, c, w
	TO		Has few fine faint gray mottles in Sand
58"	TO	68"	10YR 5/4, COS, SG, vc, GR, Lo, 35-60% Gravelly
	TO		g, i, very porous
68"	TO	76"	10YR 5/2, CL, 1, vf, SBK, vfi, ss, g, i,
	TO		couldn't see if mottling was present
76"	TO		CL, gleying was present.

Depth to Limiting Zone: 35 Inches

Pit # 4

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SITE INVESTIGATION AND PERCOLATION TEST REPORT FOR ON-LOT DISPOSAL OF SEWAGE

Application No. _____ Municipality Conneaut County Erie

Site Location Lexington Rd. 1/2m. north of R.R. Tracks Subdivision Name _____

☐ SUITABLE Soil Type _____ Slope 14 % Depth to Limiting Zone 14" Ave. Perc. Rate _____

☐ UNSUITABLE ☒ Mottling ☐ Seeps or Ponded Water ☐ Bedrock ☐ Fractures ☐ Coarse Fragments

☐ Perc. Rate ☐ Slope ☐ Unstabilized Fill ☐ Floodplain ☐ Other _____

INSTRUCTIONS FOR COMPLETION OF THIS FORM ARE LOCATED ON THE REVERSE

SOILS DESCRIPTION:
Soils Description Complete by: M. Tighe Date: 1/22/15

Inches			Description of Horizon
0	TO	14"	10YR 3/3, Si, 1, m, SBK, fr, c, s
14"	TO	24"	10YR 5/1, CL, 1, f, SBK, fr, g, l,
___	TO	___	3" line of Stratified Clay (fill) mottles 14" Depth to Limiting Zone: 14 Inches
24"	TO	33"	10YR 5/2, CL, 1, vf, SBK, vfr, c, w,
___	TO	___	Many prominent iron mottles
33"	TO	41"	10YR 5/2, SCL, SG, m, GR, lo, c, w - Fine Sand
41"	TO	50"	10YR 5/3, CL, 1, f, SBK, fr, c, w, iron mottles
50"	TO	62"	10YR 5/3 CL, 2, vf, SBK, fi, vs, c, s
62"	TO	81"	10YR 5/3 CL, 1, f, SBK, vfi, s, c, w
___	TO	___	
___	TO	___	
___	TO	___	
___	TO	___	

pit # 5

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SITE INVESTIGATION AND PERCOLATION TEST REPORT FOR ON-LOT DISPOSAL OF SEWAGE

Application No. _____ Municipality Conneaut County Erie

Site Location Lexington Rd. 1/2 m. North of RR track Subdivision Name _____

☐ SUITABLE Soil Type _____ Slope _____% Depth to Limiting Zone 14" Ave. Perc. Rate _____

☐ UNSUITABLE ☒ Mottling ☐ Seeps or Ponded Water ☐ Bedrock ☐ Fractures ☐ Coarse Fragments

☐ Perc. Rate ☐ Slope ☐ Unstabilized Fill ☐ Floodplain ☐ Other _____

INSTRUCTIONS FOR COMPLETION OF THIS FORM ARE LOCATED ON THE REVERSE

SOILS DESCRIPTION:

Soils Description Complete by: M. Tighe Date: 1/22/15

Inches			Description of Horizon
0	TO	11"	10YR 4/3, SCL, 1, m, SBK, fr, c, s
11"	TO	18"	10YR 4/6, CL, 1, f, SBK, fr, c, w
____	TO	____	Common, Medium, Distinct red mottles
18"	TO	27"	10YR 6/4, SiCL, 2, vf, SBK, fr - some sand
27"	TO	38"	10YR 6/4, SiCL, 2, vf, SBK, fi
38"	TO	46"	10YR 6/4, CL, 2, vf, SBK, fi - some sand
46"	TO	72"	10YR 6/4, CL, 2, vf, SBK, fi - all clay
____	TO	____	
____	TO	____	
____	TO	____	
____	TO	____	
____	TO	____	
____	TO	____	

Depth to Limiting Zone: 14" Inches

Pit # 6

ER-BWQ-290 Appendix A
Revised 5-07

SITE INVESTIGATION AND PERCOLATION TEST REPORT FOR ON-LOT DISPOSAL OF SEWAGE

Application No. _____ Municipality Conneaut County Erie

Site Location Lexington Rd. 1/2 m North of RR tracks Subdivision Name _____

☐ SUITABLE Soil Type Bdf Slope ____% Depth to Limiting Zone 7" Ave. Perc. Rate ____

☐ UNSUITABLE ☒ Mottling ☐ Seeps or Ponded Water ☐ Bedrock ☐ Fractures ☐ Coarse Fragments

☐ Perc. Rate ☐ Slope ☐ Unstabilized Fill ☐ Floodplain ☐ Other _____

INSTRUCTIONS FOR COMPLETION OF THIS FORM ARE LOCATED ON THE REVERSE

SOILS DESCRIPTION:
Soils Description Complete by: M. Tighe Date: 1/22/15

Inches			Description of Horizon
0	TO	7"	10YR 3/3, CL, 1, M, SBK, fr, SS, C, W
____	TO	____	few, faint, red mottles
7"	TO	20"	10YR 4/1, CL, 1, f, SBK, fr, SS, C, W
____	TO	____	Common, coarse, prominent red mottles
____	TO	____	throughout rest of Horizons
20"	TO	28"	10YR 4/1, CL, 2, f, SBK, fr, S, C, W
28"	TO	36"	10YR 4/3, CL, 1, f, SBK, vfr, S, C, W
36"	TO	46"	10YR 4/4, CL, 1, f, SBK, fr, SS, 0-15%
____	TO	____	gravelly, C, W
46"	TO	72"	10YR 4/3, CL, 1, vf, SBK, fr, S, C, W
____	TO	____	
____	TO	____	
____	TO	____	

Depth to Limiting Zone: 7" Inches

Pit #7

3.3 Onsite Soils Infiltration Test Reports

Several soil investigation test pits were excavated at various locations on the project site as shown on the Drawings. Each soil horizon was identified and described using the methods employed by the Pa. DEP for soil investigations for on-lot disposal of sewage. The description for each horizon includes the horizon depth, soil color (as determined using a Munsell Soil Color Chart), texture, structure, indications of mottling, masses of loose fragments. The limiting zone (high water table) was also identified for each test pit.

Infiltration tests were performed adjacent to those soil investigation test pits that had adequately deep limiting zones and soil textures and structures that would support infiltration. The locations and depths of infiltration test sites are shown on the drawings. A double ring infiltrometer was used to measure the vertical movement of water through the bottom of the test area. A double ring infiltrometer consists of two concentric metal rings. The rings are driven into the ground and filled with water. The outer ring helps to prevent divergent (horizontal) flow. The drop in water level over time in the inner ring is used to calculate an infiltration rate.

DOUBLE RING INFILTROMETER TEST

CALCULATIONS AND RESULTS

Prepared by: Andrew Halmi
Deiss & Halmi Engineering, Inc.

Test date: 1/22/2015
Report date: 1/23/2015

Project: Lake Erie Power Converter Station

Location: Test Pit #1 – Northeast portion of stomwater management area

	Depth (inches)	Elevation
Ground Surface:	0	995.85
Test Location:	26	993.68
Limiting Zone:	N/A	

Inner Ring Diameter (in): 6
Outer Ring Diameter (in): 12

Inner Ring

Time (hours)	Elapsed Time (hour:min)	Drop (in)	Infiltration Rate (inches/hour)
9:49 AM	0:00	N/A	Presoak
	0:02	6.000	180.00
	0:04	6.250	187.50
	0:06	6.000	180.00
	0:08	6.500	195.00
	0:10	6.500	195.00
	0:12	6.125	183.75
	0:14	5.875	176.25
	0:16	6.125	183.75

Summary

- Infiltration rate: 183.75 inches per hour

Comments

2 minute time intervals used due to rapid infiltration.
.5 hour presoak used because of rapid infiltration and moist soil

DOUBLE RING INFILTROMETER TEST

CALCULATIONS AND RESULTS

Prepared by: Andrew Halmi
Deiss & Halmi Engineering, Inc.

Test date: 1/22/2015
Report date: 1/23/2015

Project: Lake Erie Power Converter Station

Location: Test Pit #2 - Southeast portion of stomwater management area

	Depth (inches)	Elevation
Ground Surface:	0	995.33
Test Location:	13	994.25
Limiting Zone:	N/A	

Inner Ring Diameter (in): 12
Outer Ring Diameter (in): 24

Inner Ring

Time (hours)	Elapsed Time (hour:min)	Drop (in)	Infiltration Rate (inches/hour)
10:14 AM		N/A	Presoak
11:01 AM		N/A	refill
11:11 AM	0:10	1.375	8.25
11:13 AM	0:59		refill
11:23 AM	1:09	1.938	11.63
11:27 AM	1:13		refill
11:37 AM	1:23	1.500	9.00
11:38 AM	1:24		refill
11:48 AM	1:34	1.500	9.00
11:49 AM	1:35		refill
11:59 AM	1:45	1.250	7.50
12:00 PM	1:46		refill
12:10 PM	1:56	1.625	9.75
12:11 PM	1:57		refill
12:21 PM	2:07	1.438	8.63
12:22 PM	2:08		refill
12:32 PM	2:18	1.500	9.00

Summary

- Infiltration rate: 9.0 inches per hour

Comments

10 minute time intervals used
.5 hour presoak used because of lack of water and moist soils

DOUBLE RING INFILTROMETER TEST

CALCULATIONS AND RESULTS

Prepared by: Andrew Halmi
Deiss & Halmi Engineering, Inc.

Test date: 1/22/2015
Report date: 1/23/2015

Project: Lake Erie Power Converter Station

Location: Test Pit #3 - Northwest portion of stomwater management area

	Depth (inches)	Elevation
Ground Surface:	0	995.00
Test Location:	0	995.00
Limiting Zone:	N/A	

Inner Ring Diameter (in): 6
Outer Ring Diameter (in): 12

Inner Ring

Time (hours)	Elapsed Time (hour:min)	Drop (in)	Infiltration Rate (inches/hour)
10:30 AM	0:00	N/A	Presoak
11:00 AM	0:30		refill
11:30 AM	1:00	3.875	7.75
11:31 AM	1:01		refill
12:01 PM	1:31	4.000	8.00
12:04 PM	1:34		refill
12:35 PM	2:05	3.750	7.26
12:36 PM	2:06		refill
1:06 PM	2:36	3.438	6.88
1:36 PM	3:06	3.438	6.87
2:06 PM	3:36	3.438	6.87
2:36 PM	4:06	3.250	6.50
3:06 PM	4:36	3.313	6.62

Summary

- **Infiltration rate: 6.62 inches per hour**

Comments

30 minute time intervals used
Test stabilized at 0.875 inches/hour

DOUBLE RING INFILTROMETER TEST

CALCULATIONS AND RESULTS

Prepared by: Andrew Halmi
Deiss & Halmi Engineering, Inc.

Test date: 1/22/2015
Report date: 1/23/2015

Project: Lake Erie Power Converter Station

Location: Test Pit #4 - Southwest portion of stomwater management area

	Depth (inches)	Elevation
Ground Surface:	0	998
Test Location:	46	994.17
Limiting Zone:	N/A	

Inner Ring Diameter (in): 6
Outer Ring Diameter (in): 12

Inner Ring

Time (hours)	Elapsed Time (hour:min)	Drop (in)	Infiltration Rate (inches/hour)
11:36 AM	0:00	N/A	Presoak
12:09 PM	0:33		Refill
12:19 PM	0:43	0.813	4.88
12:20 PM	0:44		Refill
12:30 PM	0:54	0.875	5.25
12:30 PM	0:54		Refill
12:40 PM	1:04	0.875	5.25
12:41 PM	1:05		Refill
12:51 PM	1:15	0.813	4.88
12:51 PM	1:15		Refill
1:01 PM	1:25	0.875	5.25
1:01 PM	1:25		Refill
1:11 PM	1:35	0.875	5.25
1:11 PM	1:35		Refill
1:21 PM	1:45	0.875	5.25
1:22 PM	1:46		Refill
1:32 PM	1:56	0.875	5.25

Summary

- Infiltration rate: 5.25 inches per hour

Comments

10 minute time intervals used
.5 hour presoak used because of moist soils

DOUBLE RING INFILTROMETER TEST

CALCULATIONS AND RESULTS

Prepared by: Andrew Halmi
Deiss & Halmi Engineering, Inc.

Test date: 1/22/2015
Report date: 1/23/2015

Project: Lake Erie Power Converter Station

Location: Test Pit #5 - Outside Northeast corner of converter station footprint

	Depth (inches)	Elevation
Ground Surface:	0	1000.5
Test Location:	31	997.9166667
Limiting Zone:	N/A	

Inner Ring Diameter (in): 6
Outer Ring Diameter (in): 12

Inner Ring

Time (hours)	Elapsed Time (hour:min)	Drop (in)	Infiltration Rate (inches/hour)
1:40 PM	0:00	N/A	Presoak
2:12 PM	0:32	0.000	0.00
2:42 PM	1:02	0.000	0.00
3:12 PM	1:32	0.000	0.00
3:42 PM	2:02	0.000	0.00

Summary

- **Infiltration rate: 0.00 inches per hour**

Comments

30 minute time intervals used
Clay soils did not allow for infiltration

Section 4
Stormwater Calculations

4.1 PaDEP NPDES Permit Worksheet No. 4

Worksheet 4. Change in Runoff Volume for 2-YR Storm Event

PROJECT: Lake Erie Connector - Converter Station Site
Drainage Area: Crooked Creek Watershed
2-Year Rainfall: 2.56 in

Total Site Area: 33.61 acres
Protected Site Area: 12.23 acres
Managed Site Area: 21.38 acres

Existing Conditions:

Cover Type/Condition	Soil Type	Area (sf)	Area (ac)	CN	S	Ia (0.2*S)	Q Runoff[1] (in)	Runoff Volume[2] (ft3)
Woods (good condition)	C	5227	0.12	70	4.29	0.86	0.48	211
Meadow (good condition)	B	324086	7.44	58	7.24	1.45	0.15	3996
Meadow (good condition)	C	545371	12.52	71	4.08	0.82	0.52	23695
Meadow (good condition)	D	56628	1.30	78	2.82	0.56	0.83	3903
TOTAL:		931313	21.38					31805

Developed Conditions:

Cover Type/Condition	Soil Type	Area (sf)	Area (ac)	CN	S	Ia (0.2*S)	Q Runoff[1] (in)	Runoff Volume[2] (ft3)
Impervious	N/A	256133	5.88	98	0.20	0.04	2.33	49741
Meadow (good condition)	B	119790	2.75	58	7.24	1.45	0.15	1477
Meadow (good condition)	C	498762	11.45	71	4.08	0.82	0.52	21670
Meadow (good condition)	D	56628	1.30	78	2.82	0.56	0.83	3903
TOTAL:		931313	21.38					76791

2-Year Volume Increase (ft^3): 44986

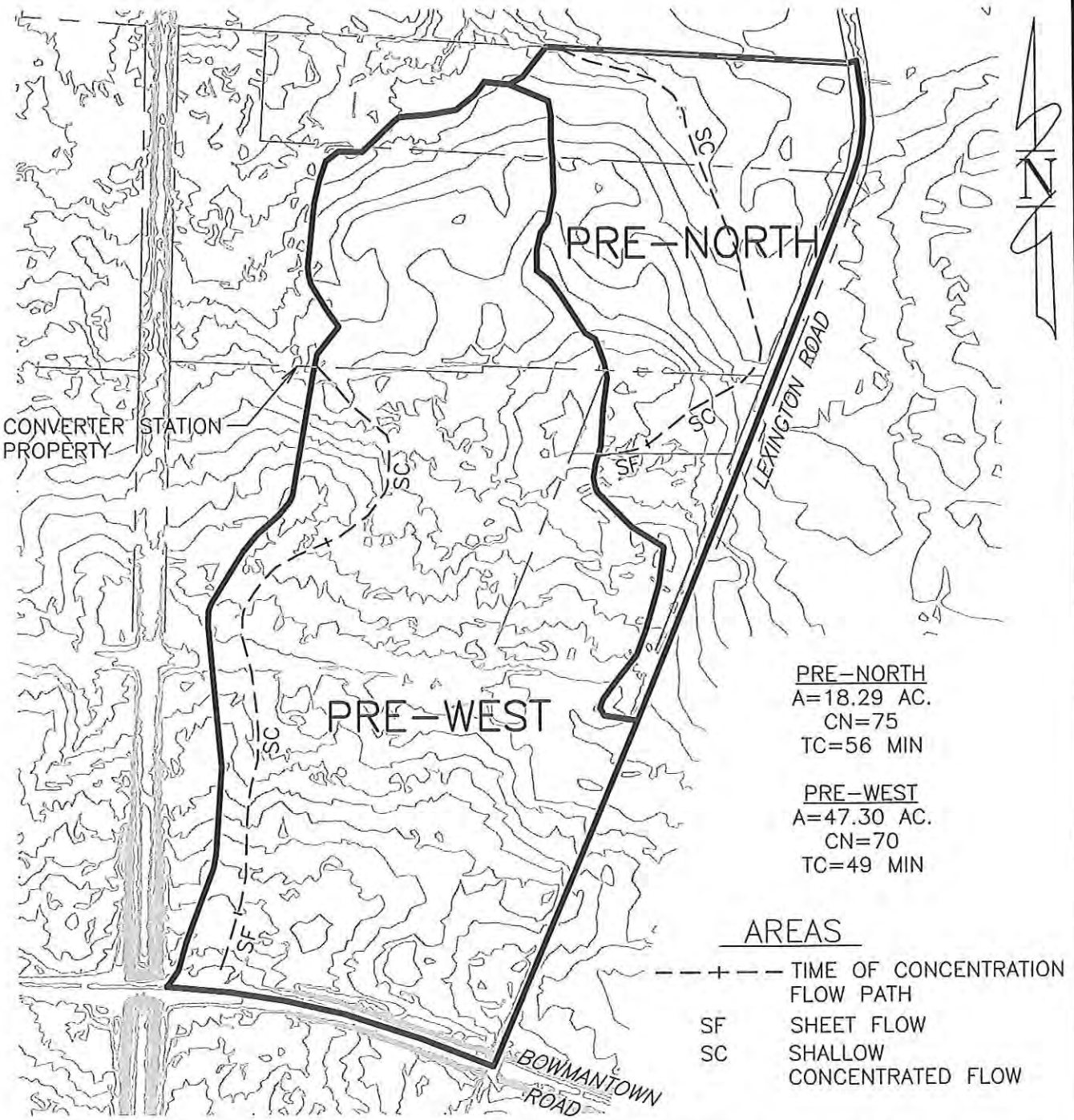
2-Year Volume Increase = Developed Conditions Runoff Volume - Existing Conditions Runoff Volume

1. Runoff (in) = $Q = (P-0.2S)^2 / (P+0.8S)$ where
   P = 2-Year Rainfall (in)
   S = (1000/CN) - 10

2. Runoff Volume (CF) = Q x Area x 1/12
   Q = Runoff (in)
   Area = Land use area (sq. ft.)

Note: Runoff Volume must be calculated for EACH land use type/condition and HSGI. The use of a weighted CN value for volume calculations is not acceptable.

4.2 Stormwater Drainage – Pre-Construction



PRE-DEVELOPMENT DRAINAGE AREA

SCALE:
0 400 800 feet

ITC LAKE ERIE CONNECTOR LLC ERIE CONVERTER STATION CONNEAUT TOWNSHIP, ERIE COUNTY PENNSYLVANIA	DATE: 6/26/2015 SCALE: 1"=400' REV.: DRAWN BY: JEFFREY T. BERNOSKY APPROVED BY: DRAWING No.: PRE-DRAINAGE

Deiss & Halmi Engineering, Inc.
ENVIRONMENTAL AND CIVIL ENGINEERING
105 Meadville Street, Edinboro PA 16412 Ph. 814-734-3640 Fax 814-734-3643

PRE-WEST

PRE-NORTH

Subcat Reach Pond Link

Drainage Diagram for LEC Converter Station PRE
Prepared by Deiss & Halmi Engineering, Inc., Printed 1/22/2016

Summary for Subcatchment 1S: PRE-WEST

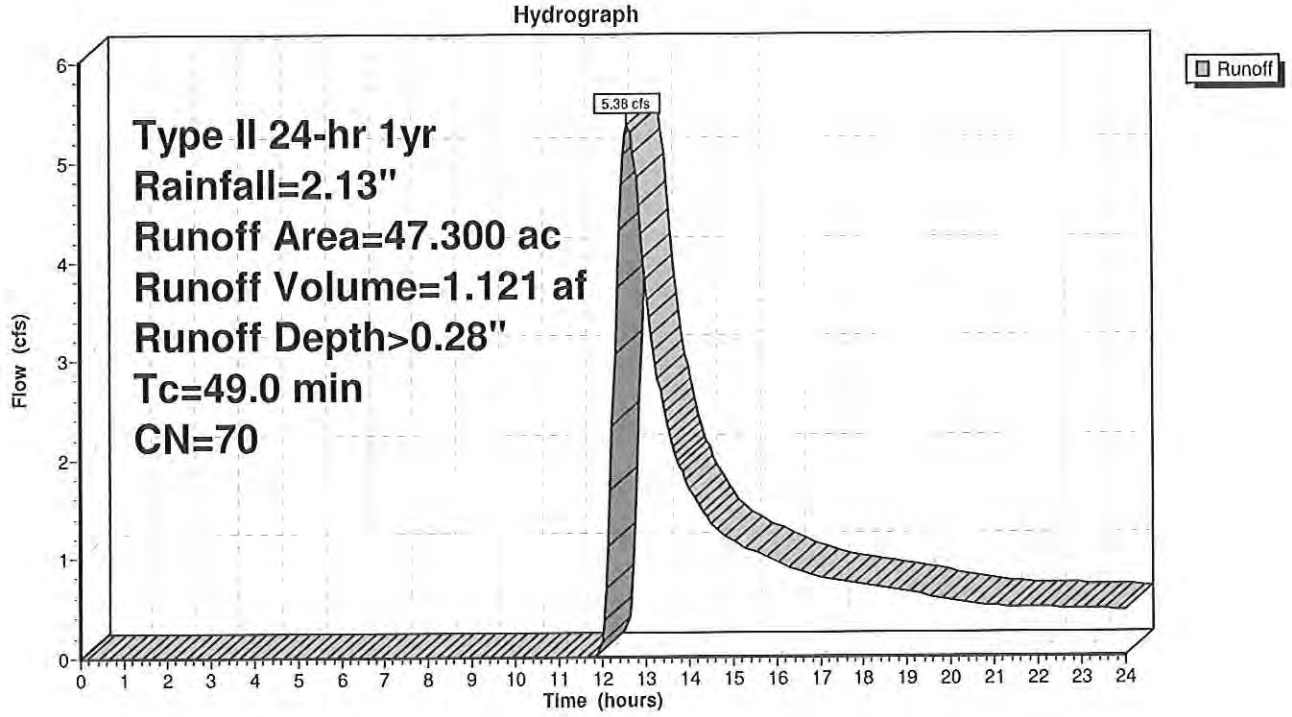
Runoff = 5.38 cfs @ 12.62 hrs, Volume= 1.121 af, Depth> 0.28"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 1yr Rainfall=2.13"

	Area (ac)	CN	Description
*	47.300	70	
	47.300		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
49.0					**Direct Entry,**

Subcatchment 1S: PRE-WEST



Summary for Subcatchment 2S: PRE-NORTH

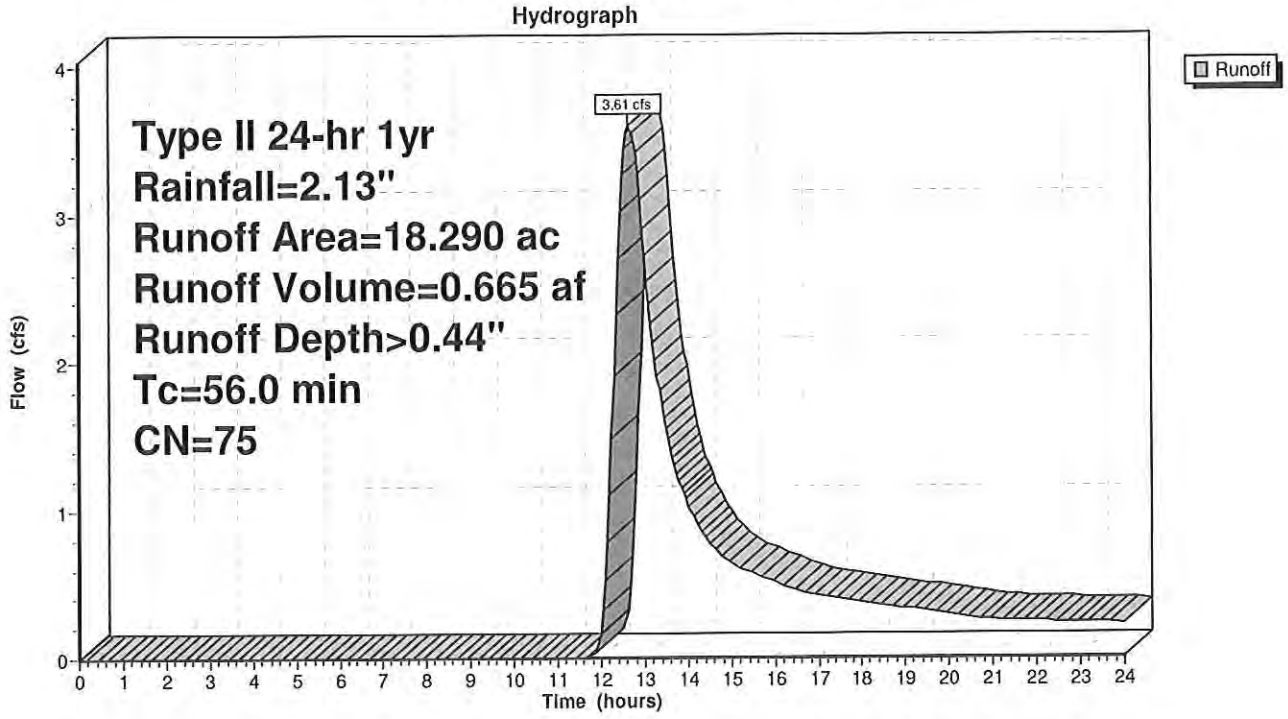
Runoff = 3.61 cfs @ 12.66 hrs, Volume= 0.665 af, Depth> 0.44"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 1yr Rainfall=2.13"

	Area (ac)	CN	Description
*	18.290	75	
	18.290		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
56.0					**Direct Entry,**

Subcatchment 2S: PRE-NORTH



Summary for Subcatchment 1S: PRE-WEST

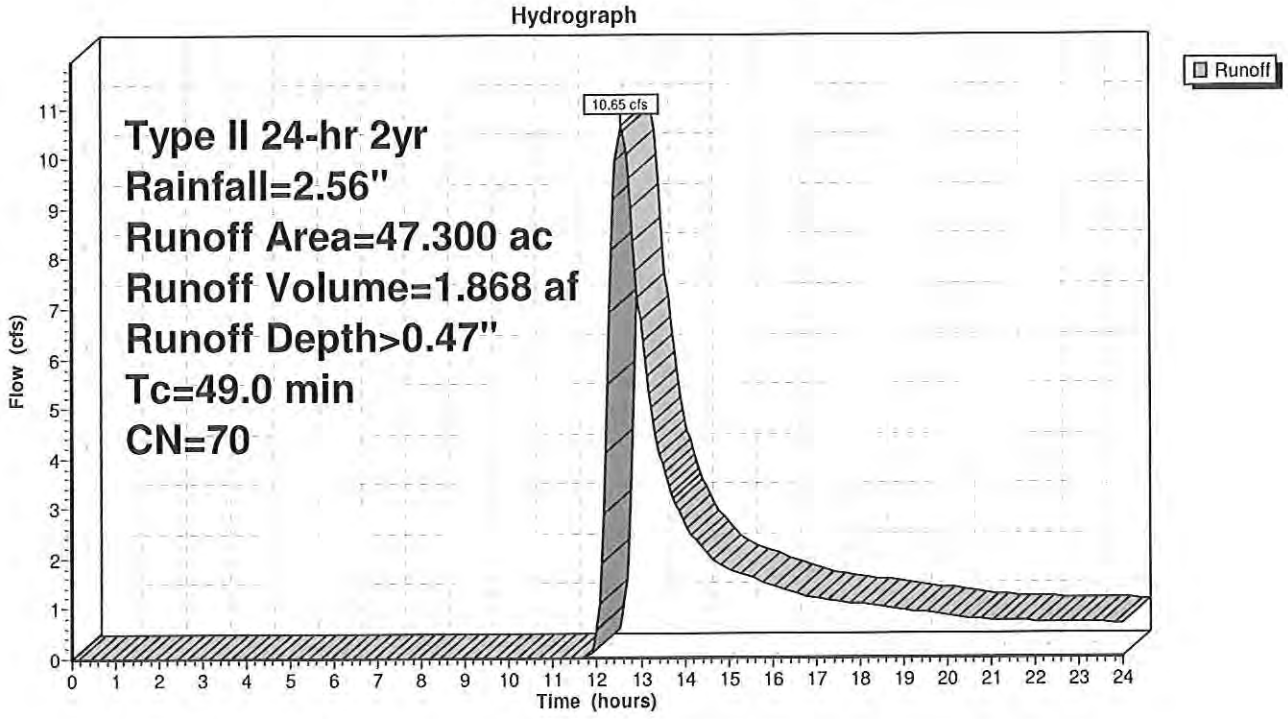
Runoff = 10.65 cfs @ 12.58 hrs, Volume= 1.868 af, Depth> 0.47"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2yr Rainfall=2.56"

	Area (ac)	CN	Description
*	47.300	70	
	47.300		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
49.0					**Direct Entry,**

Subcatchment 1S: PRE-WEST



Summary for Subcatchment 2S: PRE-NORTH

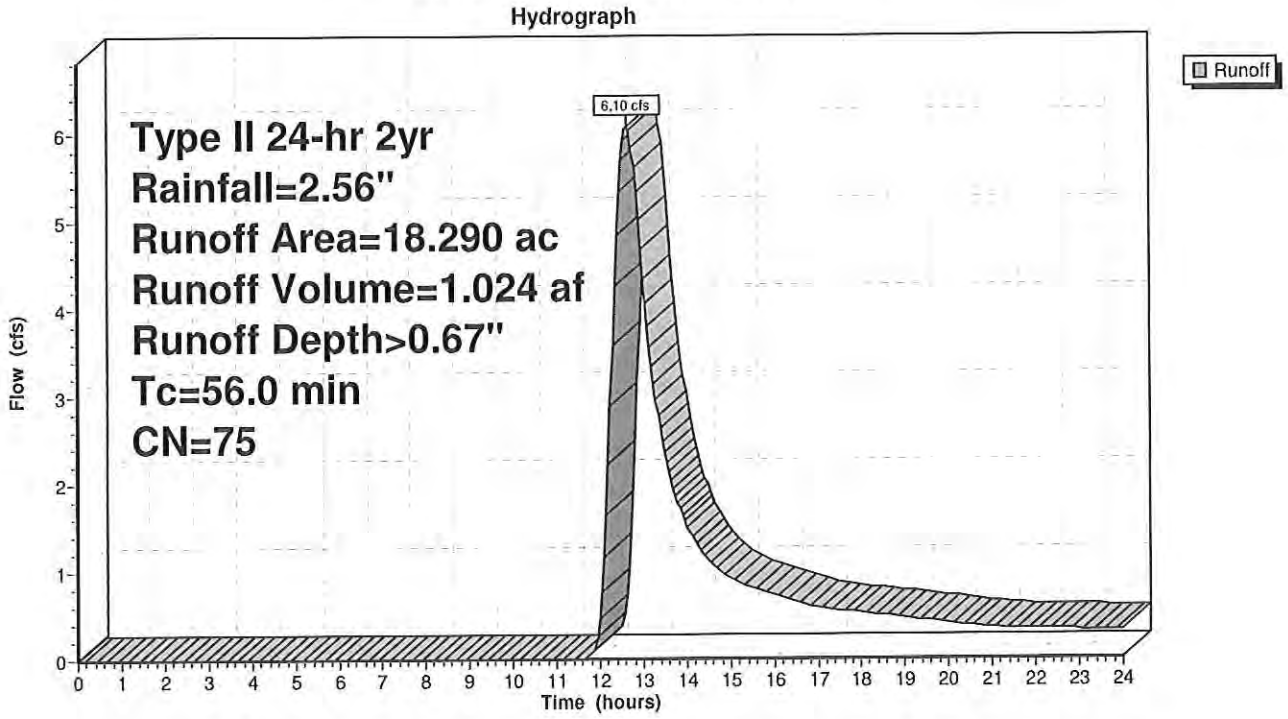
Runoff = 6.10 cfs @ 12.64 hrs, Volume= 1.024 af, Depth> 0.67"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2yr Rainfall=2.56"

	Area (ac)	CN	Description
*	18.290	75	
	18.290		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
56.0					**Direct Entry,**

Subcatchment 2S: PRE-NORTH



Summary for Subcatchment 1S: PRE-WEST

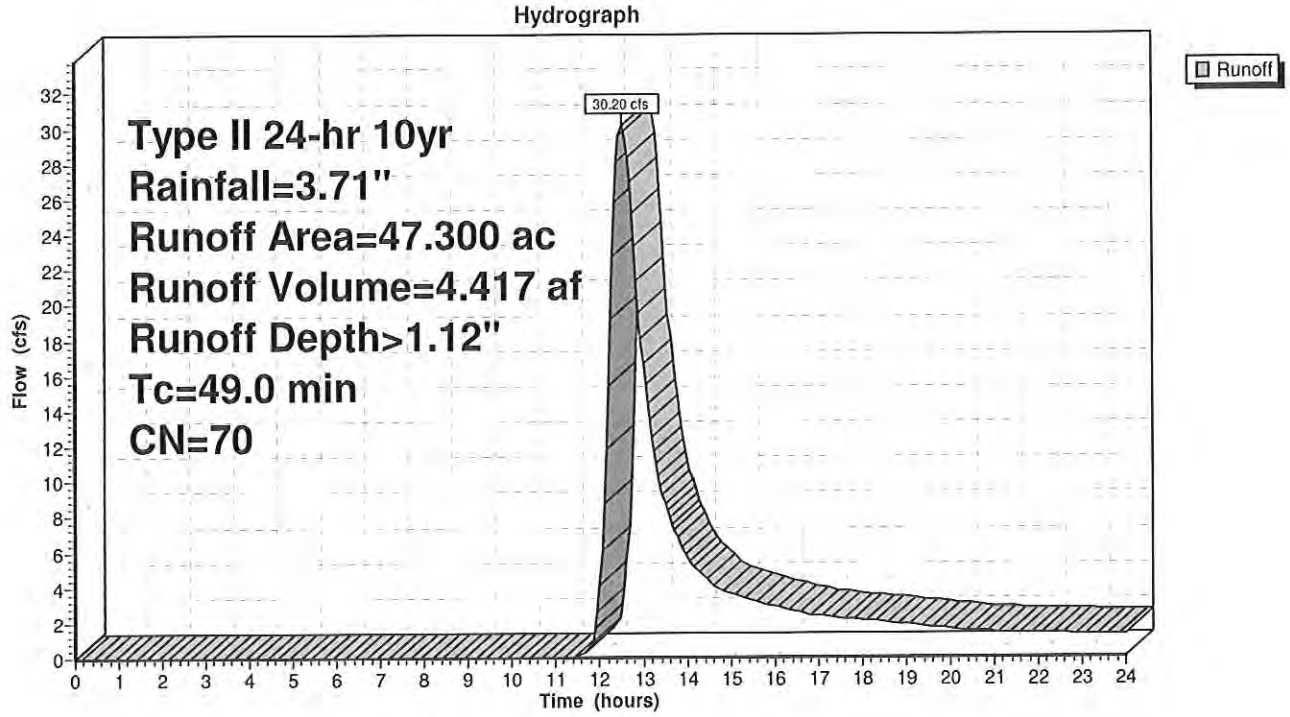
Runoff = 30.20 cfs @ 12.52 hrs, Volume= 4.417 af, Depth> 1.12"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10yr Rainfall=3.71"

	Area (ac)	CN	Description
*	47.300	70	
	47.300		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
49.0					**Direct Entry,**

Subcatchment 1S: PRE-WEST



Summary for Subcatchment 2S: PRE-NORTH

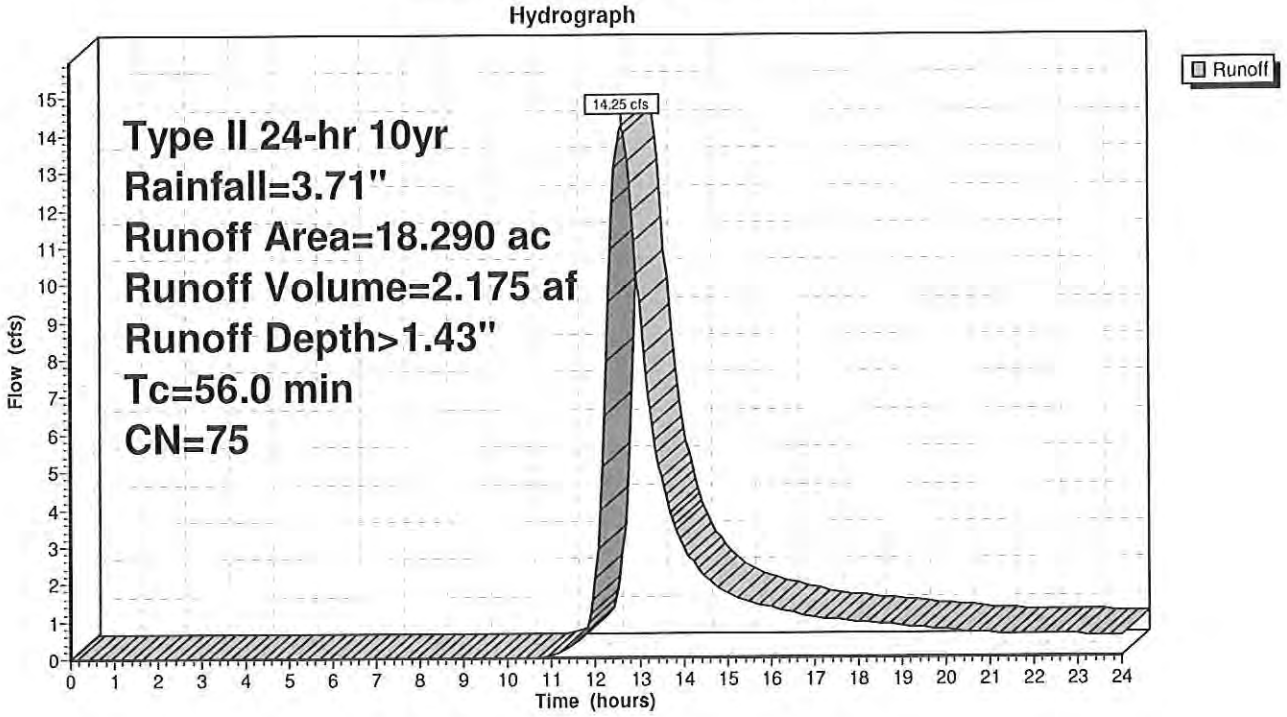
Runoff = 14.25 cfs @ 12.60 hrs, Volume= 2.175 af, Depth> 1.43"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10yr Rainfall=3.71"

	Area (ac)	CN	Description
*	18.290	75	
	18.290		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
56.0					**Direct Entry,**

Subcatchment 2S: PRE-NORTH



Summary for Subcatchment 1S: PRE-WEST

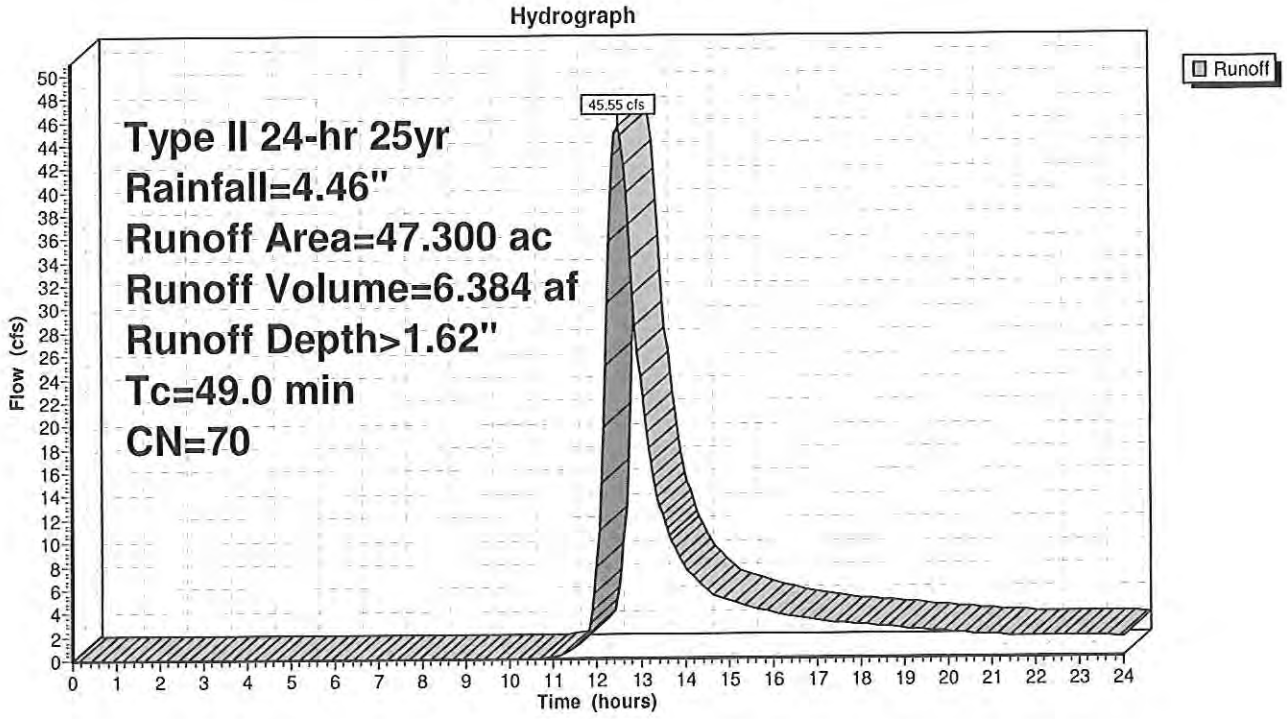
Runoff = 45.55 cfs @ 12.51 hrs, Volume= 6.384 af, Depth> 1.62"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 25yr Rainfall=4.46"

	Area (ac)	CN	Description
*	47.300	70	
	47.300		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
49.0					**Direct Entry,**

Subcatchment 1S: PRE-WEST



Summary for Subcatchment 2S: PRE-NORTH

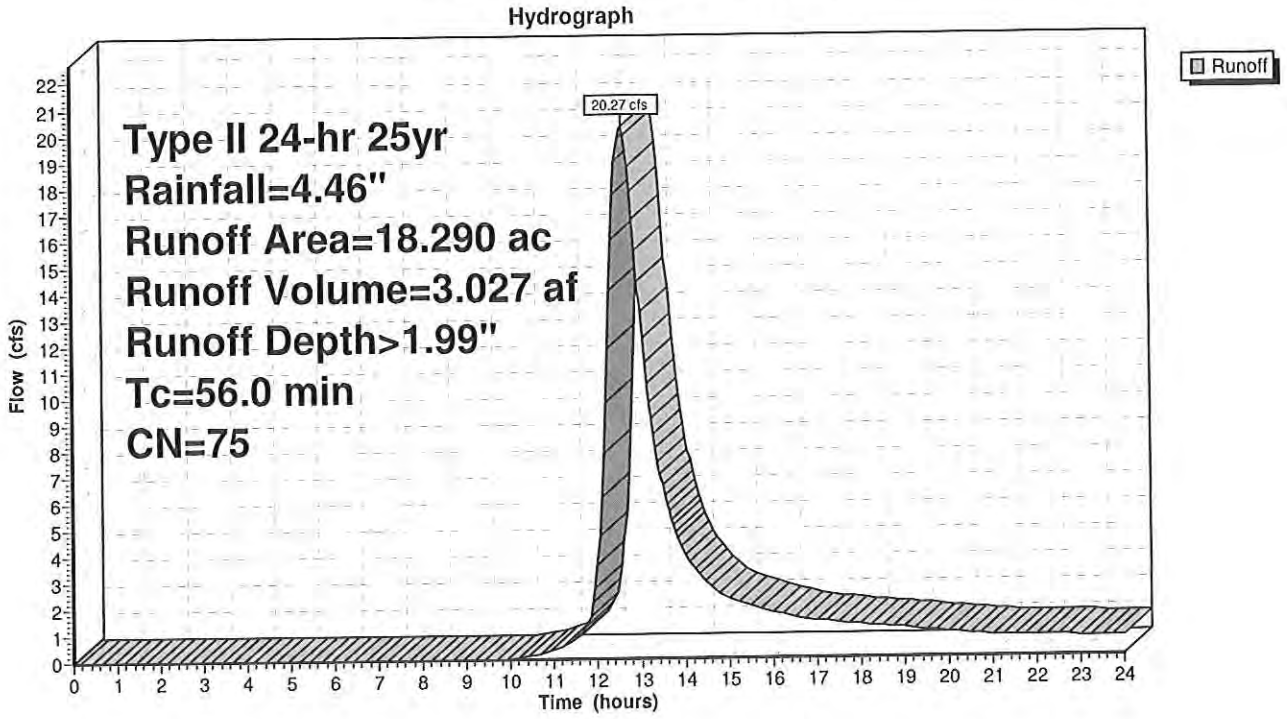
Runoff = 20.27 cfs @ 12.59 hrs, Volume= 3.027 af, Depth> 1.99"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 25yr Rainfall=4.46"

	Area (ac)	CN	Description
*	18.290	75	
	18.290		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
56.0					**Direct Entry,**

Subcatchment 2S: PRE-NORTH



Summary for Subcatchment 1S: PRE-WEST

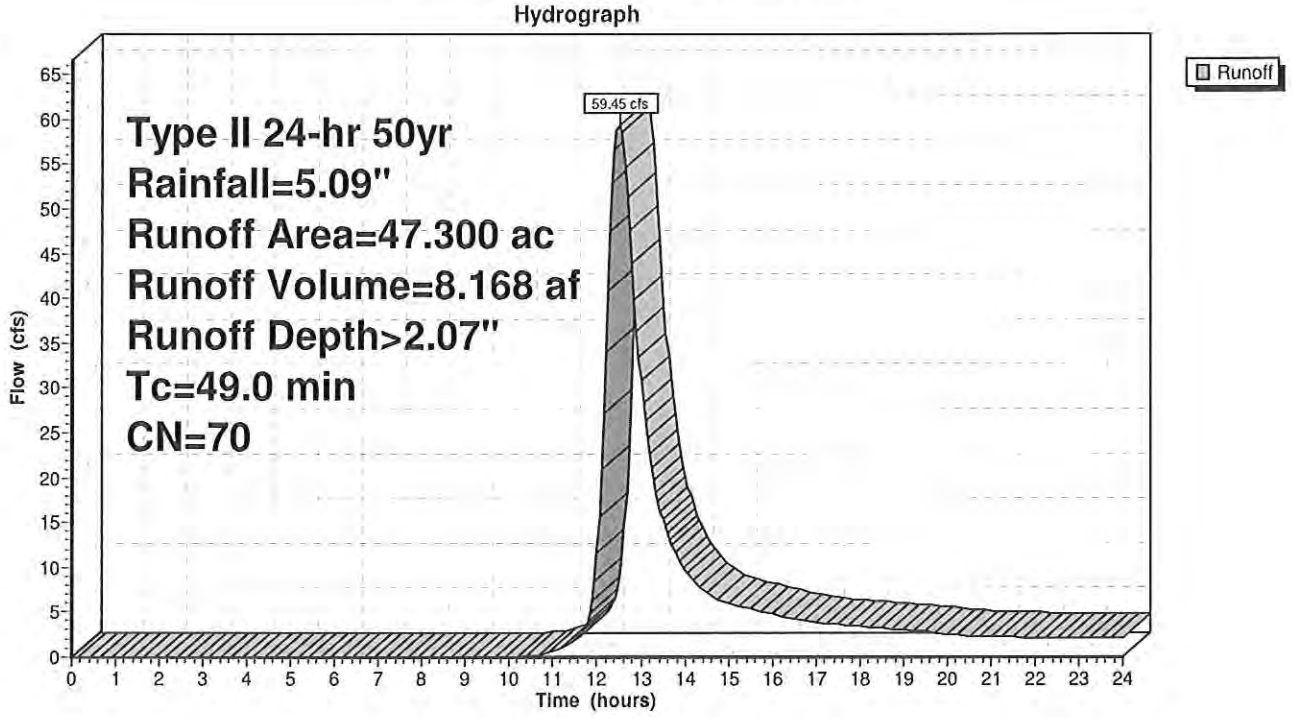
Runoff = 59.45 cfs @ 12.50 hrs, Volume= 8.168 af, Depth> 2.07"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 50yr Rainfall=5.09"

	Area (ac)	CN	Description
*	47.300	70	
	47.300		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
49.0					**Direct Entry,**

Subcatchment 1S: PRE-WEST



Summary for Subcatchment 2S: PRE-NORTH

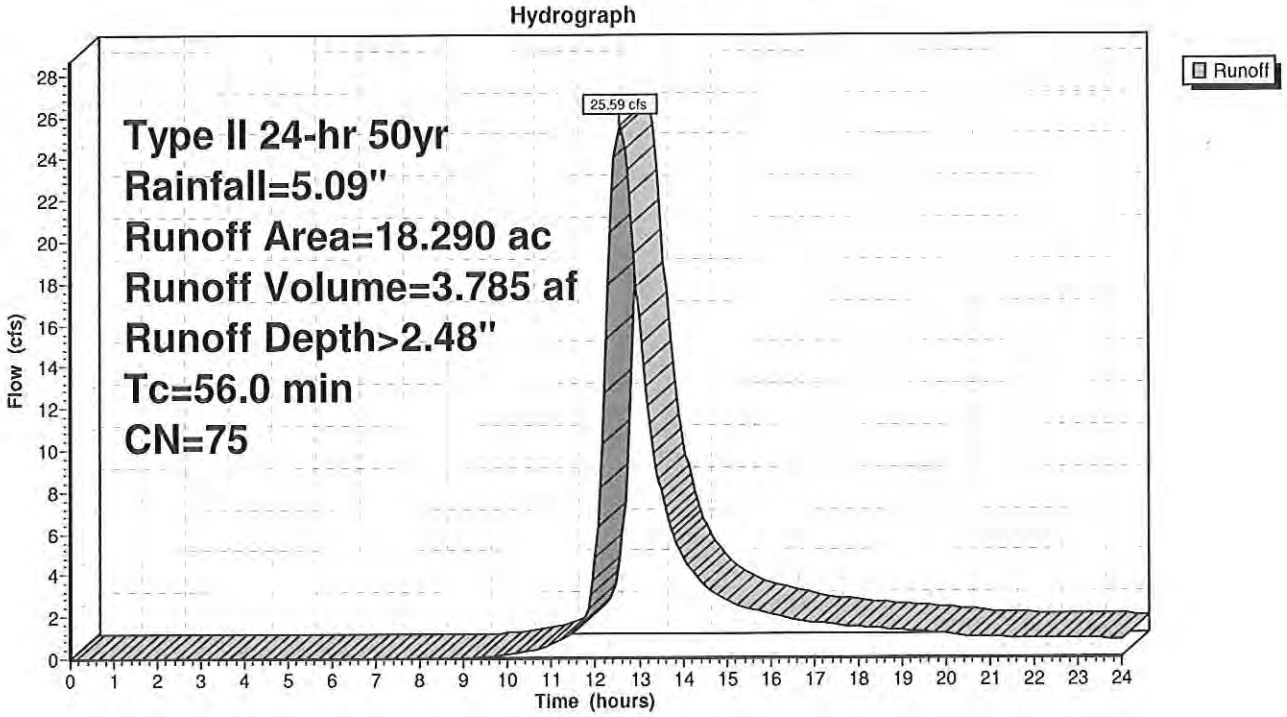
Runoff = 25.59 cfs @ 12.58 hrs, Volume= 3.785 af, Depth> 2.48"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 50yr Rainfall=5.09"

	Area (ac)	CN	Description
*	18.290	75	
	18.290		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
56.0					**Direct Entry,**

Subcatchment 2S: PRE-NORTH



Summary for Subcatchment 1S: PRE-WEST

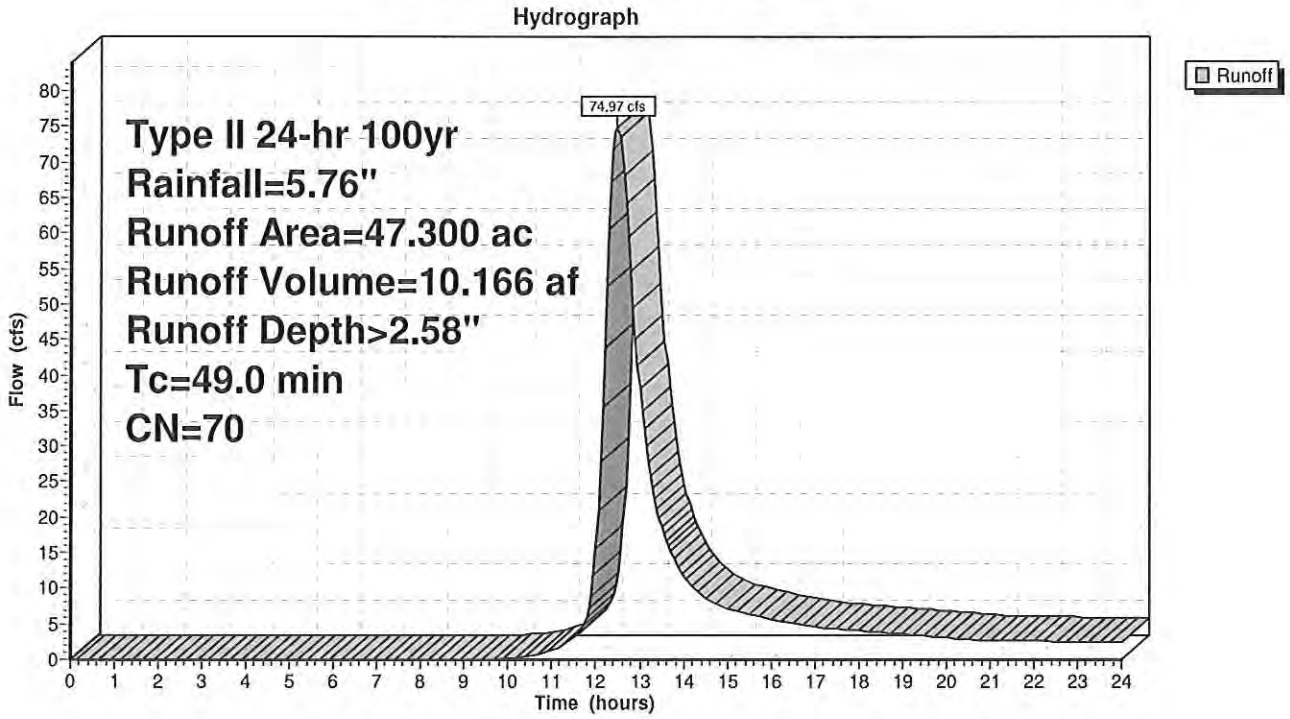
Runoff = 74.97 cfs @ 12.49 hrs, Volume= 10.166 af, Depth> 2.58"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 100yr Rainfall=5.76"

	Area (ac)	CN	Description
*	47.300	70	
	47.300		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
49.0					**Direct Entry,**

Subcatchment 1S: PRE-WEST



Summary for Subcatchment 2S: PRE-NORTH

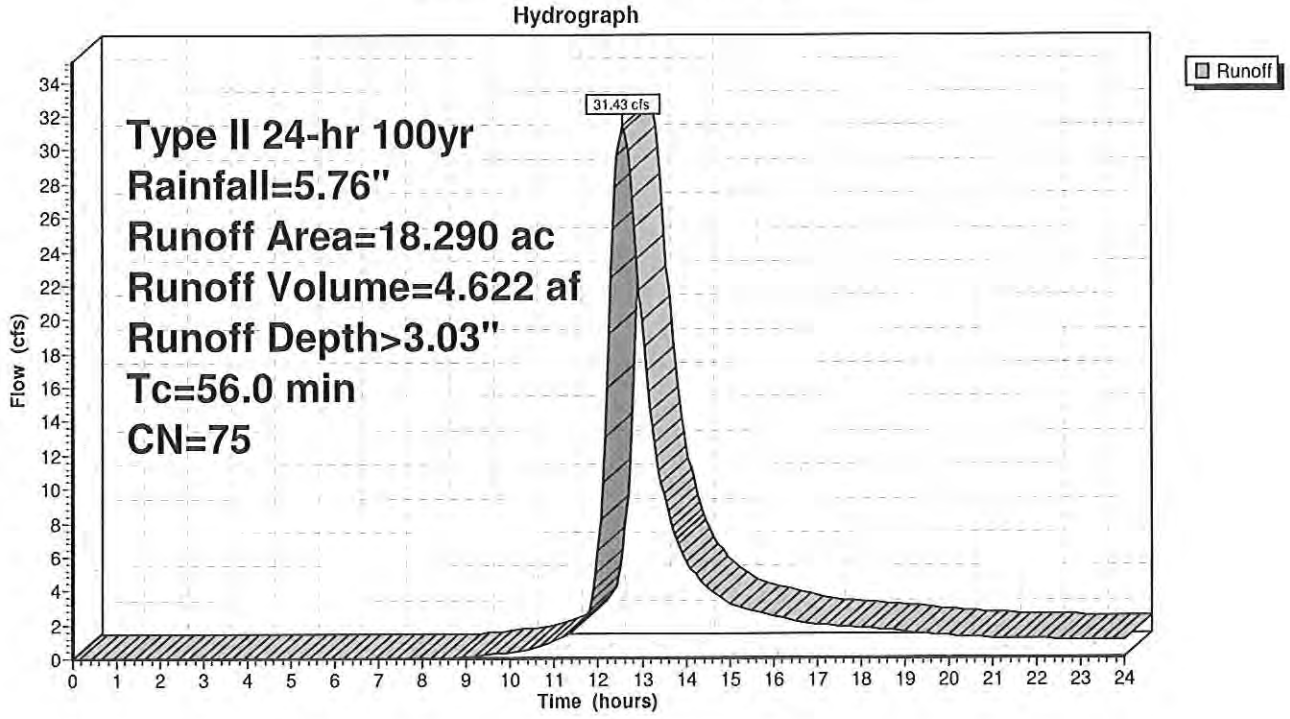
Runoff = 31.43 cfs @ 12.58 hrs, Volume= 4.622 af, Depth> 3.03"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 100yr Rainfall=5.76"

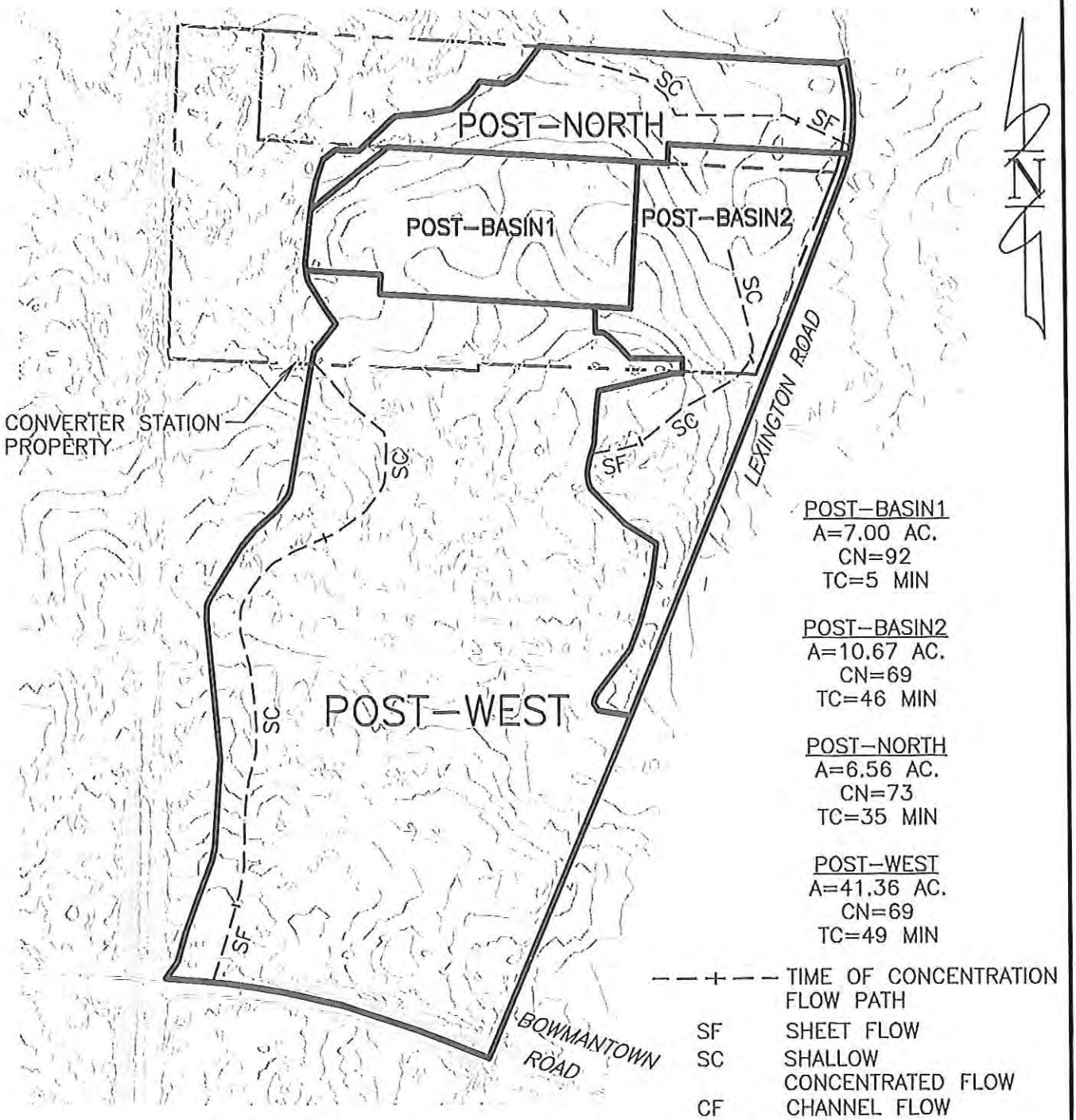
	Area (ac)	CN	Description
*	18.290	75	
	18.290		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
56.0					**Direct Entry,**

Subcatchment 2S: PRE-NORTH



4.3 Stormwater Drainage – Post Construction

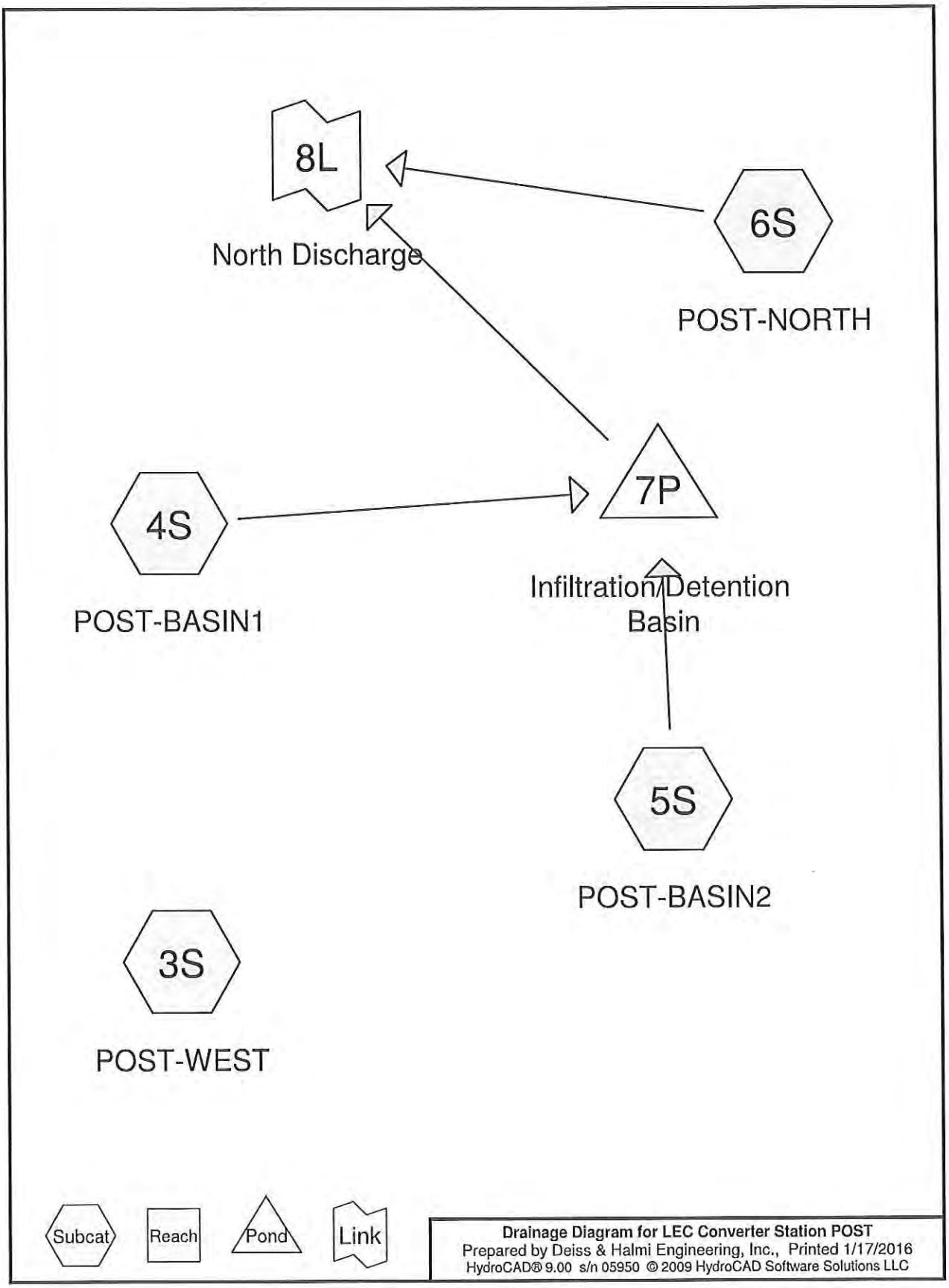


POST DEVELOPMENT DRAINAGE AREA

SCALE:
0 400 800 feet

ITC LAKE ERIE CONNECTOR, LLC ERIE CONVERTER STATION CONNEAUT TOWNSHIP, ERIE COUNTY PENNSYLVANIA	DATE: 6/26/2015 SCALE: 1"=400' REV.: DRAWN BY: JEFFREY T. BERNOSKY APPROVED BY: DRAWING No.: POST-DRAINAGE

Deiss & Halmi Engineering, Inc.
ENVIRONMENTAL AND CIVIL ENGINEERING
105 Meadville Street, Edinboro PA 16412 Ph. 814-734-3640 Fax 814-734-3643



Drainage Diagram for LEC Converter Station POST
Prepared by Deiss & Halmi Engineering, Inc., Printed 1/17/2016

Summary for Subcatchment 3S: POST-WEST

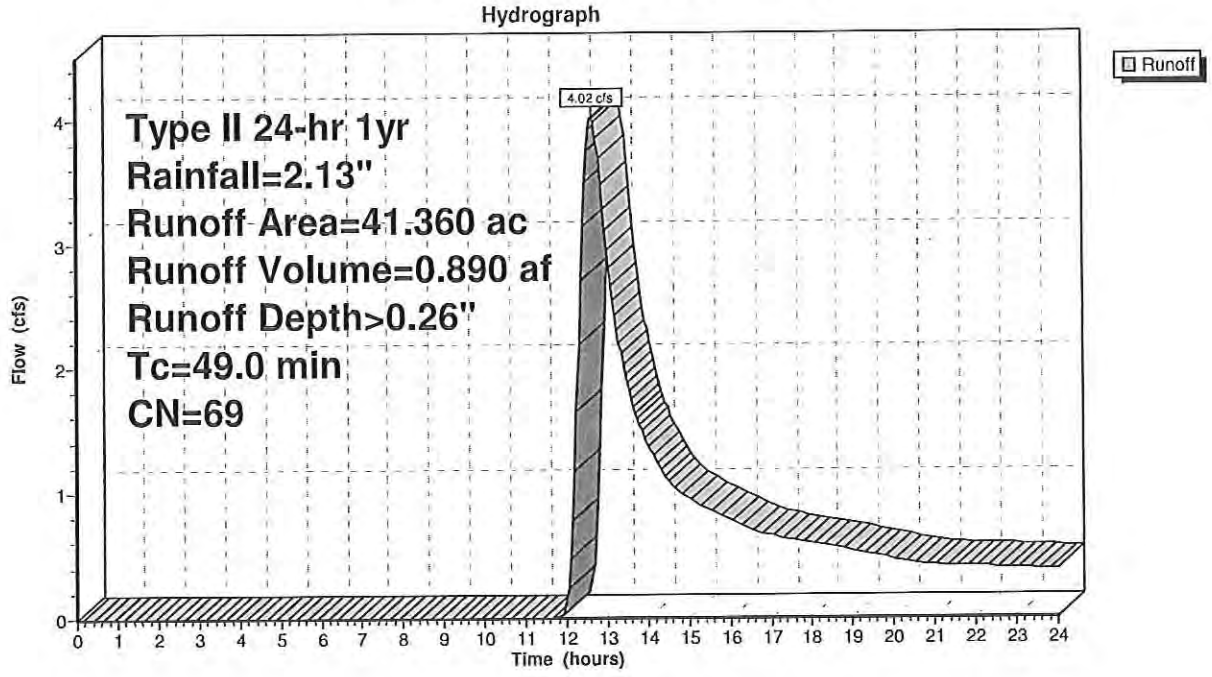
Runoff = 4.02 cfs @ 12.63 hrs, Volume= 0.890 af, Depth> 0.26"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 1yr Rainfall=2.13"

	Area (ac)	CN	Description
*	41.360	69	
	41.360		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
49.0					Direct Entry,

Subcatchment 3S: POST-WEST



Summary for Subcatchment 4S: POST-BASIN1

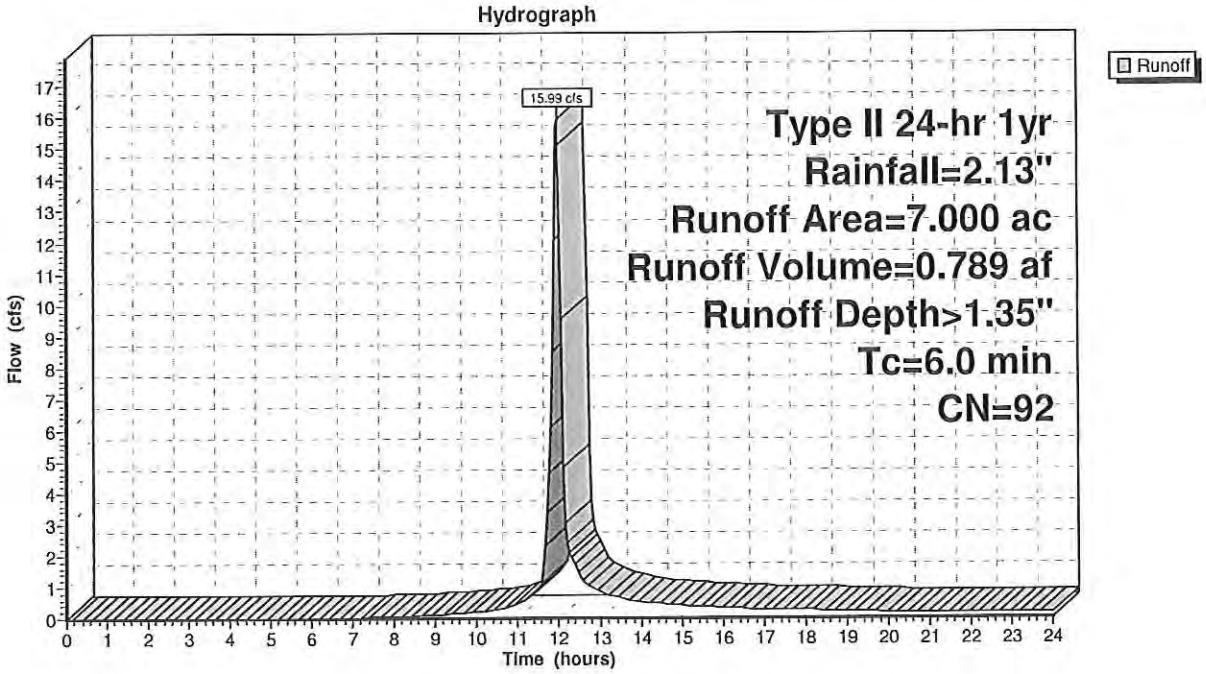
Runoff = 15.99 cfs @ 11.97 hrs, Volume= 0.789 af, Depth> 1.35"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 1yr Rainfall=2.13"

	Area (ac)	CN	Description
*	7.000	92	
	7.000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 4S: POST-BASIN1



Summary for Subcatchment 5S: POST-BASIN2

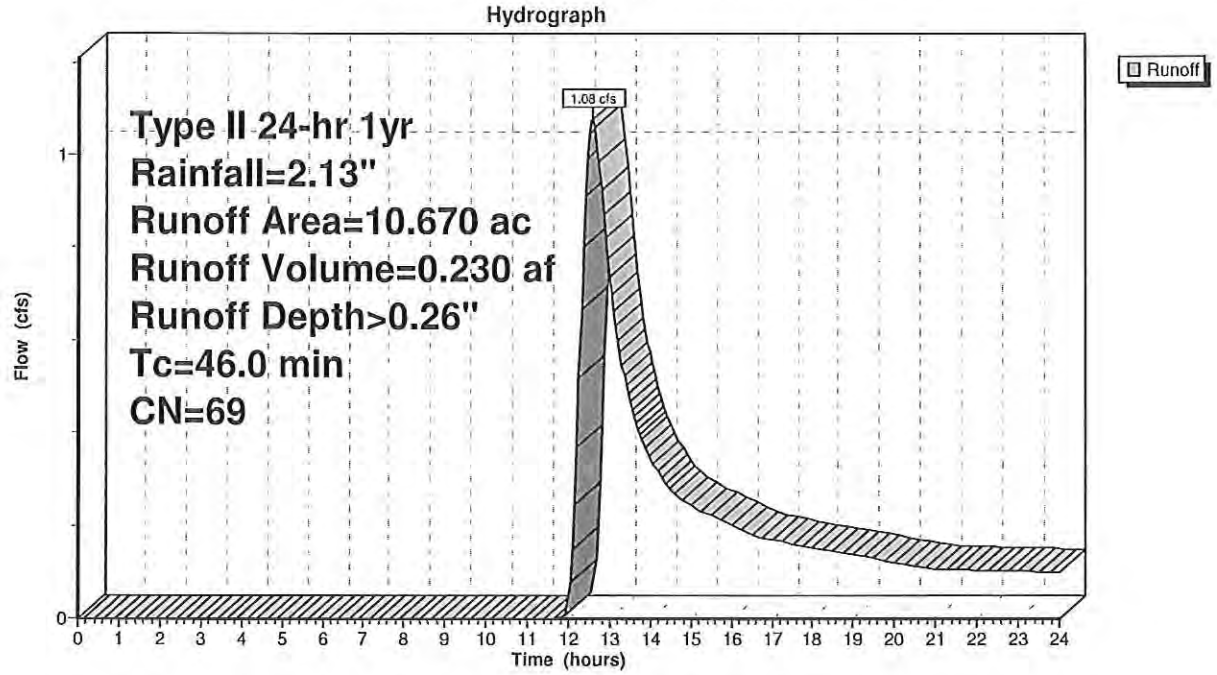
Runoff = 1.08 cfs @ 12.59 hrs, Volume= 0.230 af, Depth> 0.26"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 1yr Rainfall=2.13"

	Area (ac)	CN	Description
*	10.670	69	
	10.670		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
46.0					**Direct Entry,**

Subcatchment 5S: POST-BASIN2



Summary for Subcatchment 6S: POST-NORTH

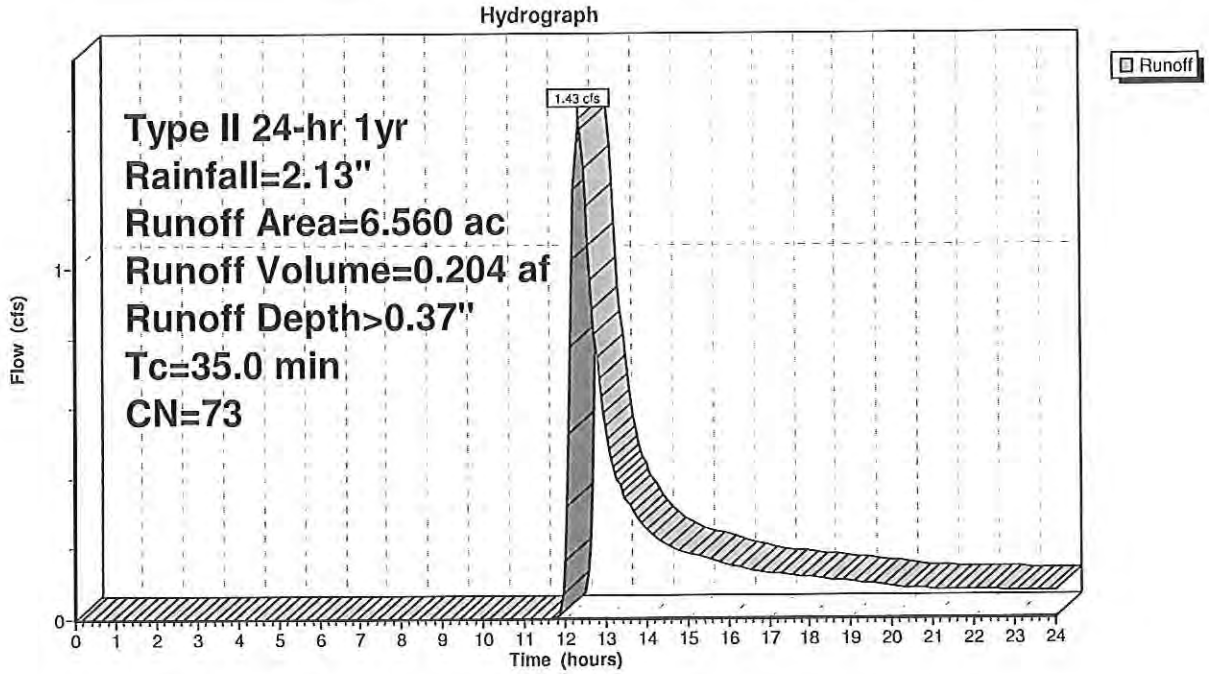
Runoff = 1.43 cfs @ 12.38 hrs, Volume= 0.204 af, Depth> 0.37"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 1yr Rainfall=2.13"

	Area (ac)	CN	Description
*	6.560	73	
	6.560		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
35.0					Direct Entry,

Subcatchment 6S: POST-NORTH



Summary for Pond 7P: Infiltration/Detention Basin

Inflow Area = 17.670 ac, 0.00% Impervious, Inflow Depth > 0.69" for 1yr event
Inflow = 16.01 cfs @ 11.97 hrs, Volume= 1.019 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 839.99' @ 24.00 hrs Surf.Area= 58,449 sf Storage= 44,366 cf

Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	837.30'	218,256 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

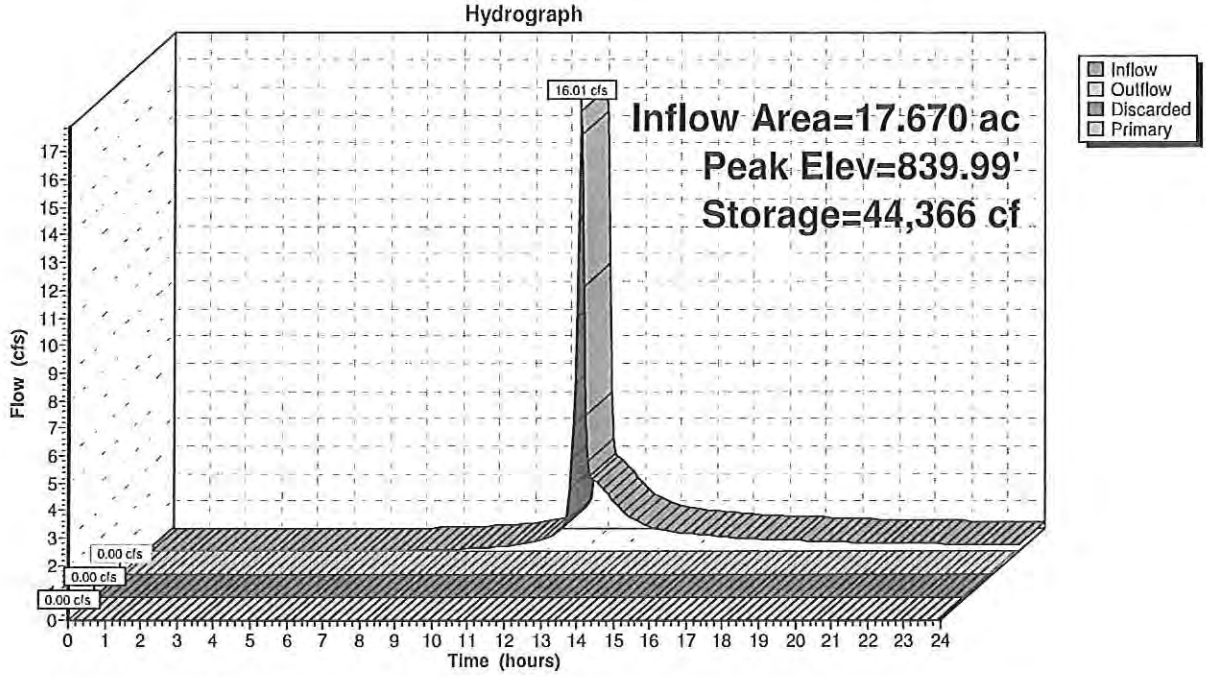
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
837.30	0	0	0
838.00	546	191	191
839.00	15,030	7,788	7,979
840.00	58,870	36,950	44,929
841.00	90,107	74,489	119,418
842.00	107,570	98,839	218,256

Device	Routing	Invert	Outlet Devices
#1	Primary	837.00'	**15.0" Round Culvert** L= 212.0' CPP, square edge headwall, Ke= 0.500 Outlet Invert= 835.75' S= 0.0059 '/' Cc= 0.900 n= 0.010
#2	Device 1	840.25'	**24.0" x 36.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	837.30'	**4.0" Vert. Orifice/Grate X 0.00** C= 0.600
#4	Discarded	837.30'	**2.260 in/hr Exfiltration X 0.00 over Horizontal area above 837.30'** Excluded Horizontal area = 0 sf
#5	Primary	841.25'	**8.0' long x 17.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.00 cfs @ 0.00 hrs HW=837.30' (Free Discharge)
└**4=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=837.30' (Free Discharge)
├**1=Culvert** (Passes 0.00 cfs of 0.42 cfs potential flow)
│ ├**2=Orifice/Grate** (Controls 0.00 cfs)
│ └**3=Orifice/Grate** (Controls 0.00 cfs)
└**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 7P: Infiltration/Detention Basin

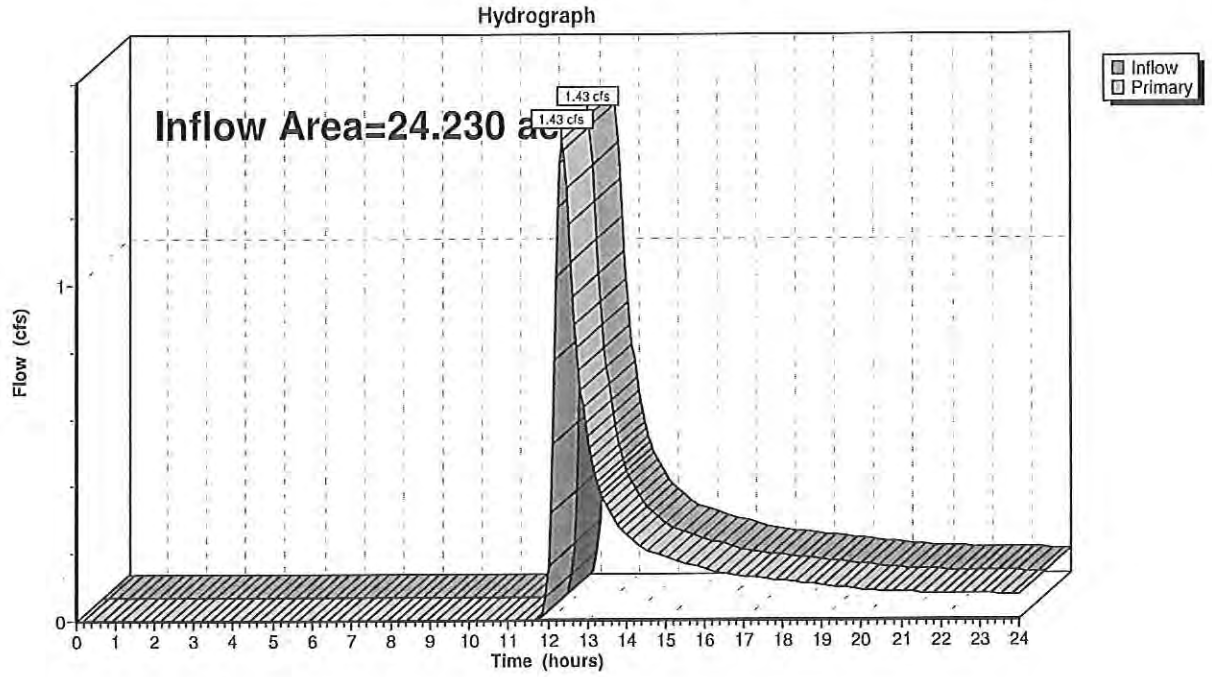


Summary for Link 8L: North Discharge

Inflow Area = 24.230 ac, 0.00% Impervious, Inflow Depth > 0.10" for 1yr event
Inflow = 1.43 cfs @ 12.38 hrs, Volume= 0.204 af
Primary = 1.43 cfs @ 12.38 hrs, Volume= 0.204 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 8L: North Discharge



Summary for Subcatchment 3S: POST-WEST

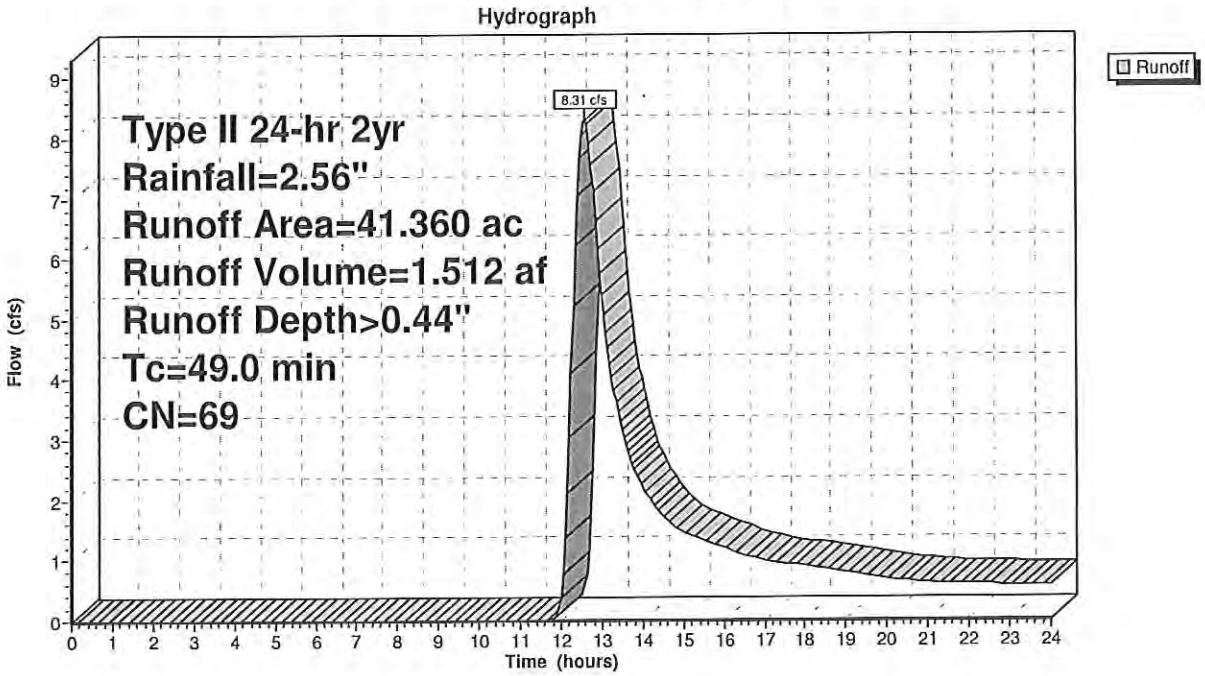
Runoff = 8.31 cfs @ 12.59 hrs, Volume= 1.512 af, Depth> 0.44"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2yr Rainfall=2.56"

	Area (ac)	CN	Description
*	41.360	69	
	41.360		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
49.0					**Direct Entry,**

Subcatchment 3S: POST-WEST



Summary for Subcatchment 4S: POST-BASIN1

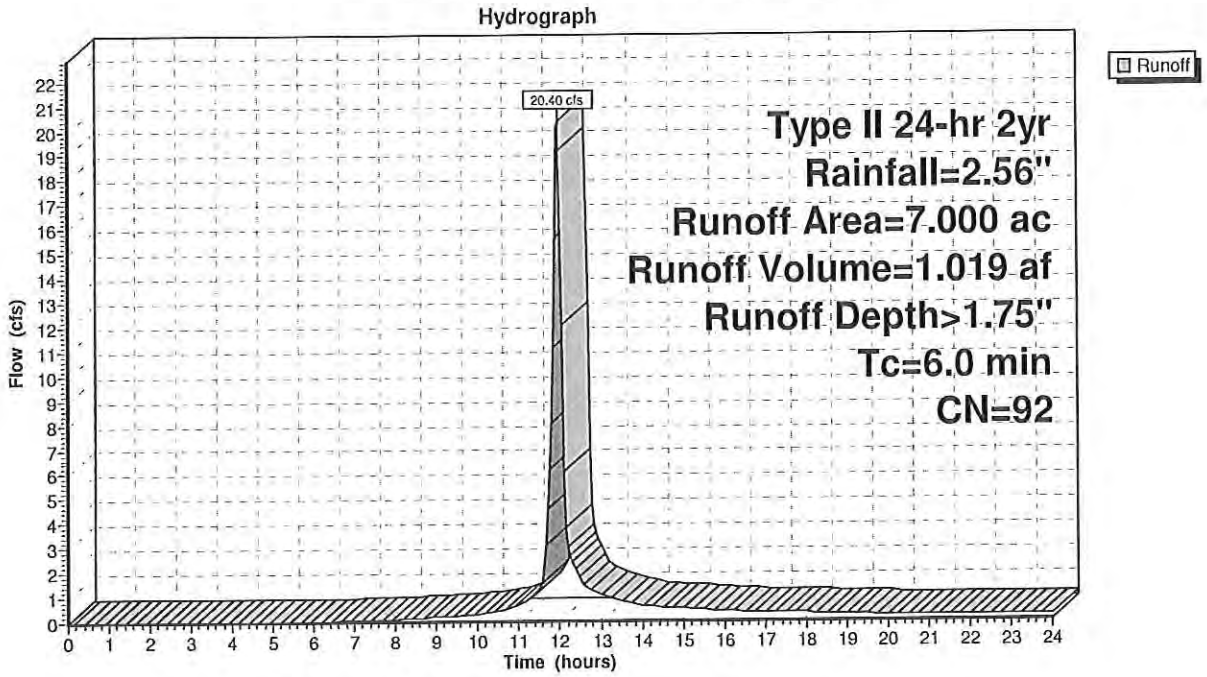
Runoff = 20.40 cfs @ 11.97 hrs, Volume= 1.019 af, Depth> 1.75"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2yr Rainfall=2.56"

	Area (ac)	CN	Description
*	7.000	92	
	7.000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 4S: POST-BASIN1



Summary for Subcatchment 5S: POST-BASIN2

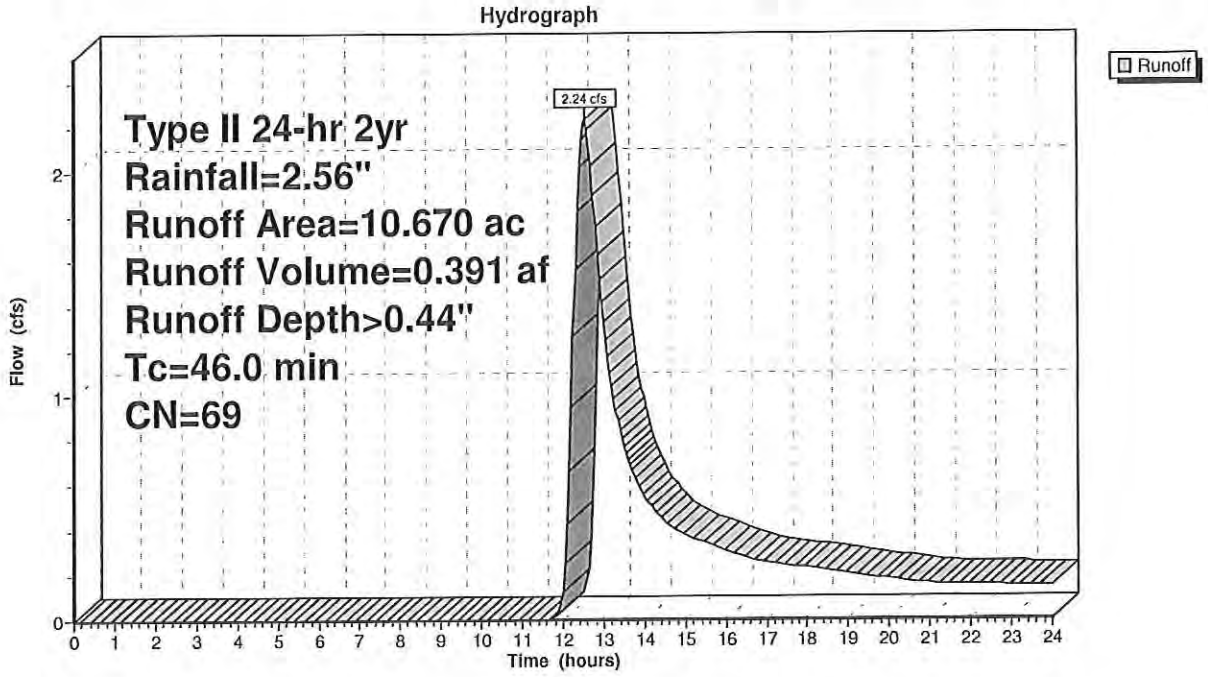
Runoff = 2.24 cfs @ 12.54 hrs, Volume= 0.391 af, Depth> 0.44"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2yr Rainfall=2.56"

	Area (ac)	CN	Description
*	10.670	69	
	10.670		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
46.0					Direct Entry,

Subcatchment 5S: POST-BASIN2



Summary for Subcatchment 6S: POST-NORTH

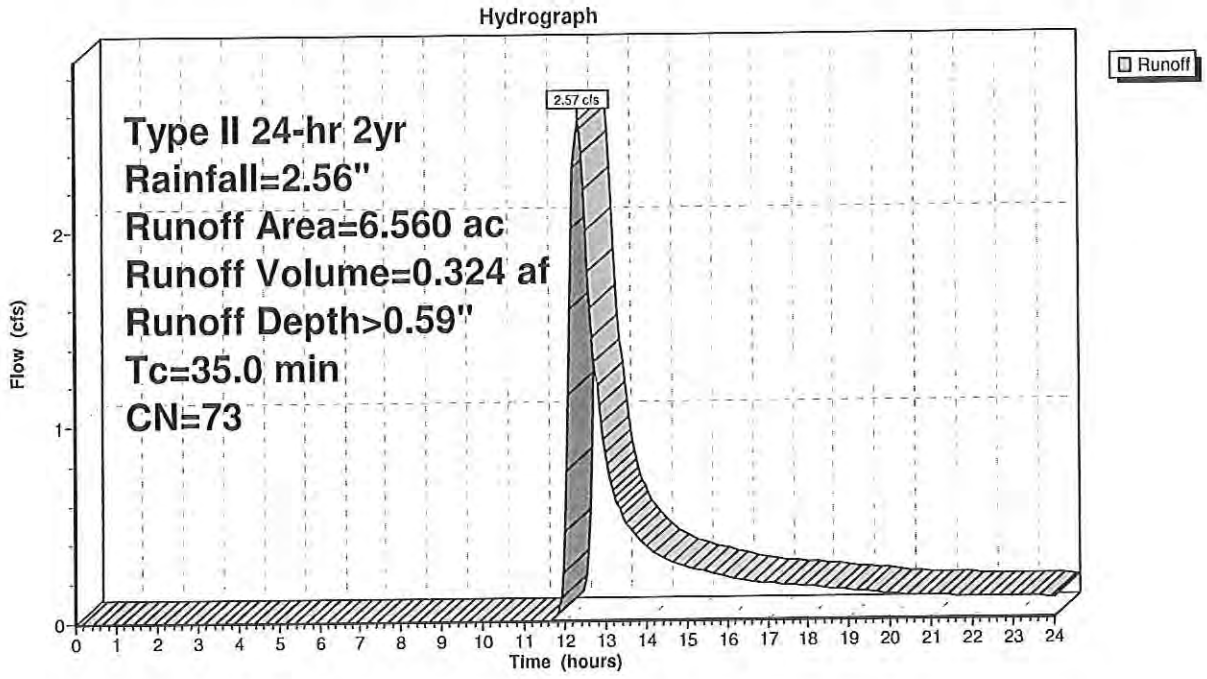
Runoff = 2.57 cfs @ 12.35 hrs, Volume= 0.324 af, Depth> 0.59"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2yr Rainfall=2.56"

	Area (ac)	CN	Description
*	6.560	73	
	6.560		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
35.0					Direct Entry,

Subcatchment 6S: POST-NORTH



Summary for Pond 7P: Infiltration/Detention Basin

Inflow Area = 17.670 ac, 0.00% Impervious, Inflow Depth > 0.96" for 2yr event
Inflow = 20.47 cfs @ 11.97 hrs, Volume= 1.410 af
Outflow = 0.04 cfs @ 24.00 hrs, Volume= 0.001 af, Atten= 100%, Lag= 722.0 min
Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Primary = 0.04 cfs @ 24.00 hrs, Volume= 0.001 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 840.26' @ 24.00 hrs Surf.Area= 67,013 sf Storage= 61,337 cf

Plug-Flow detention time= 1,067.1 min calculated for 0.001 af (0% of inflow)
Center-of-Mass det. time= 592.3 min (1,428.2 - 835.9)

Volume	Invert	Avail.Storage	Storage Description
#1	837.30'	218,256 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

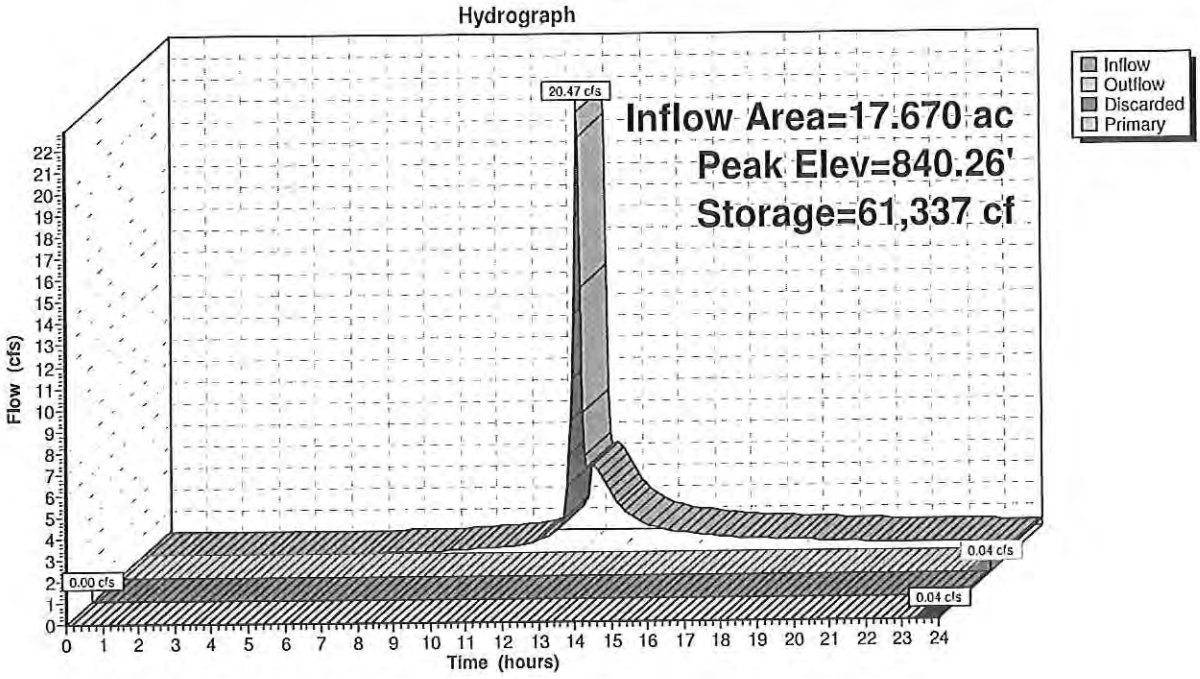
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
837.30	0	0	0
838.00	546	191	191
839.00	15,030	7,788	7,979
840.00	58,870	36,950	44,929
841.00	90,107	74,489	119,418
842.00	107,570	98,839	218,256

Device	Routing	Invert	Outlet Devices
#1	Primary	837.00'	**15.0" Round Culvert** L= 212.0' CPP, square edge headwall, Ke= 0.500 Outlet Invert= 835.75' S= 0.0059 '/' Cc= 0.900 n= 0.010
#2	Device 1	840.25'	**24.0" x 36.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	837.30'	**4.0" Vert. Orifice/Grate X 0.00** C= 0.600
#4	Discarded	837.30'	**2.260 in/hr Exfiltration X 0.00 over Horizontal area above 837.30'** Excluded Horizontal area = 0 sf
#5	Primary	841.25'	**8.0' long x 17.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.00 cfs @ 0.00 hrs HW=837.30' (Free Discharge)
└**4=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=0.04 cfs @ 24.00 hrs HW=840.26' (Free Discharge)
└**1=Culvert** (Passes 0.04 cfs of 8.45 cfs potential flow)
  └**2=Orifice/Grate** (Weir Controls 0.04 cfs @ 0.34 fps)
  └**3=Orifice/Grate** (Controls 0.00 cfs)
└**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 7P: Infiltration/Detention Basin

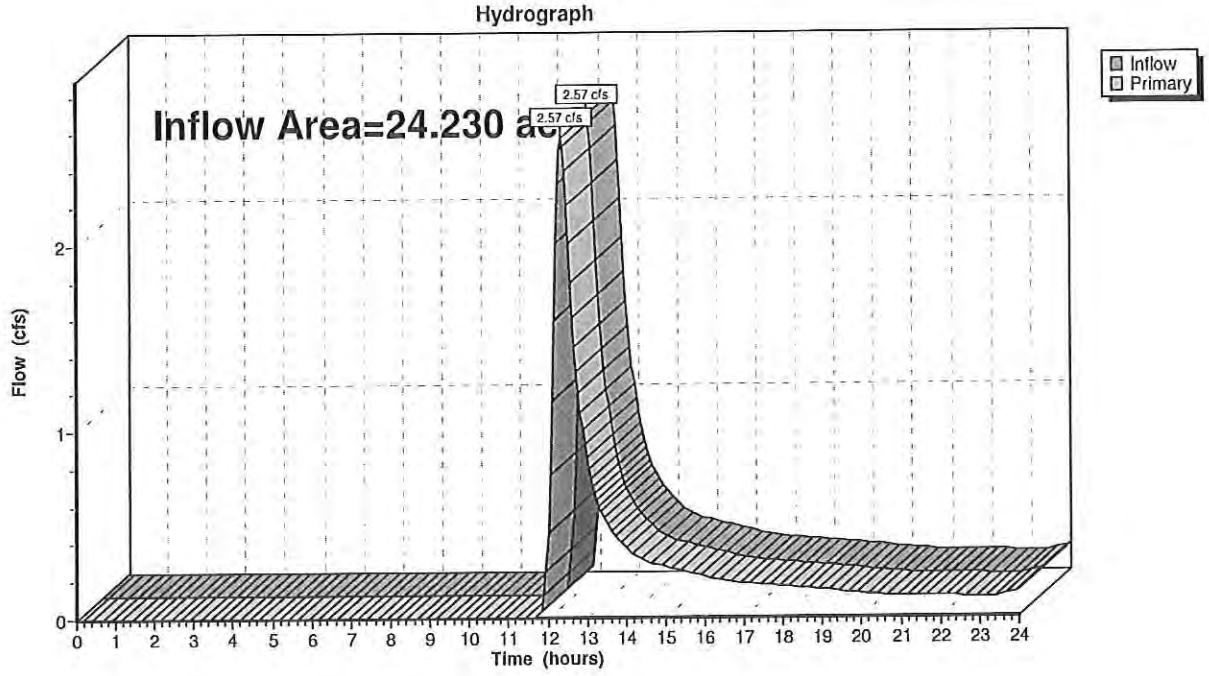


Summary for Link 8L: North Discharge

Inflow Area = 24.230 ac, 0.00% Impervious, Inflow Depth > 0.16" for 2yr event
Inflow = 2.57 cfs @ 12.35 hrs, Volume= 0.325 af
Primary = 2.57 cfs @ 12.35 hrs, Volume= 0.325 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 8L: North Discharge



Summary for Subcatchment 3S: POST-WEST

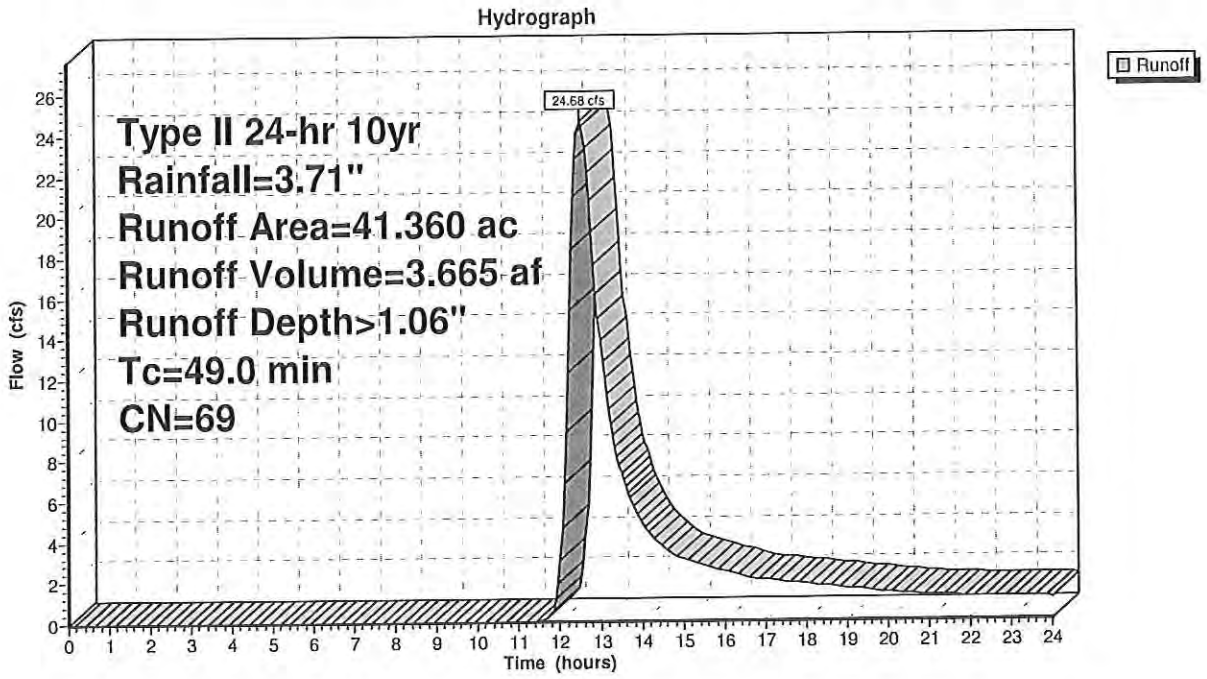
Runoff = 24.68 cfs @ 12.53 hrs, Volume= 3.665 af, Depth> 1.06"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10yr Rainfall=3.71"

	Area (ac)	CN	Description
*	41.360	69	
	41.360		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
49.0					Direct Entry,

Subcatchment 3S: POST-WEST



Summary for Subcatchment 4S: POST-BASIN1

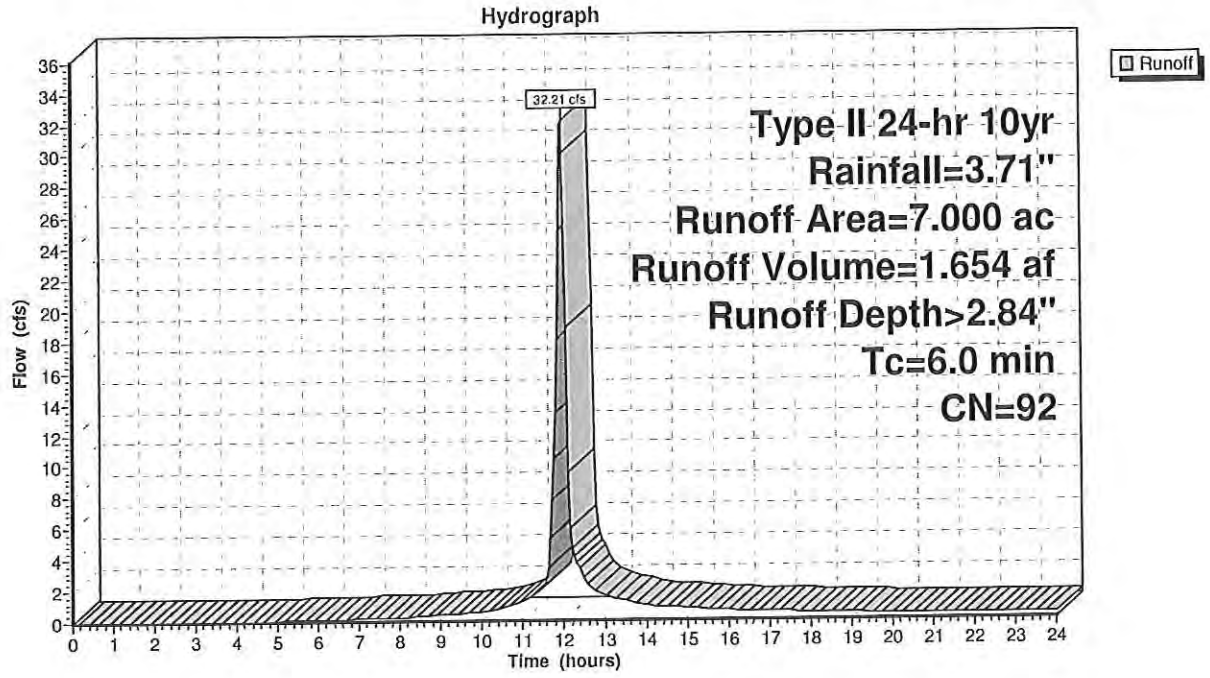
Runoff = 32.21 cfs @ 11.96 hrs, Volume= 1.654 af, Depth> 2.84"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10yr Rainfall=3.71"

	Area (ac)	CN	Description
*	7.000	92	
	7.000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 4S: POST-BASIN1



Summary for Subcatchment 5S: POST-BASIN2

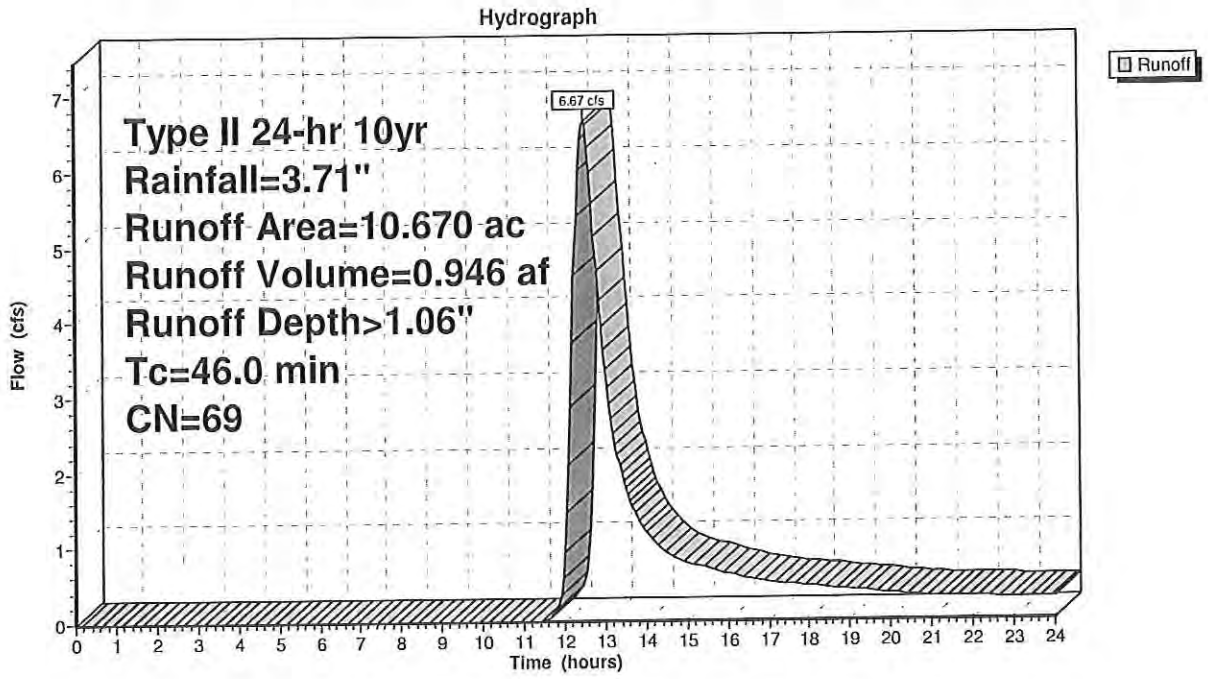
Runoff = 6.67 cfs @ 12.49 hrs, Volume= 0.946 af, Depth> 1.06"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10yr Rainfall=3.71"

	Area (ac)	CN	Description
*	10.670	69	
	10.670		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
46.0					Direct Entry,

Subcatchment 5S: POST-BASIN2



Summary for Subcatchment 6S: POST-NORTH

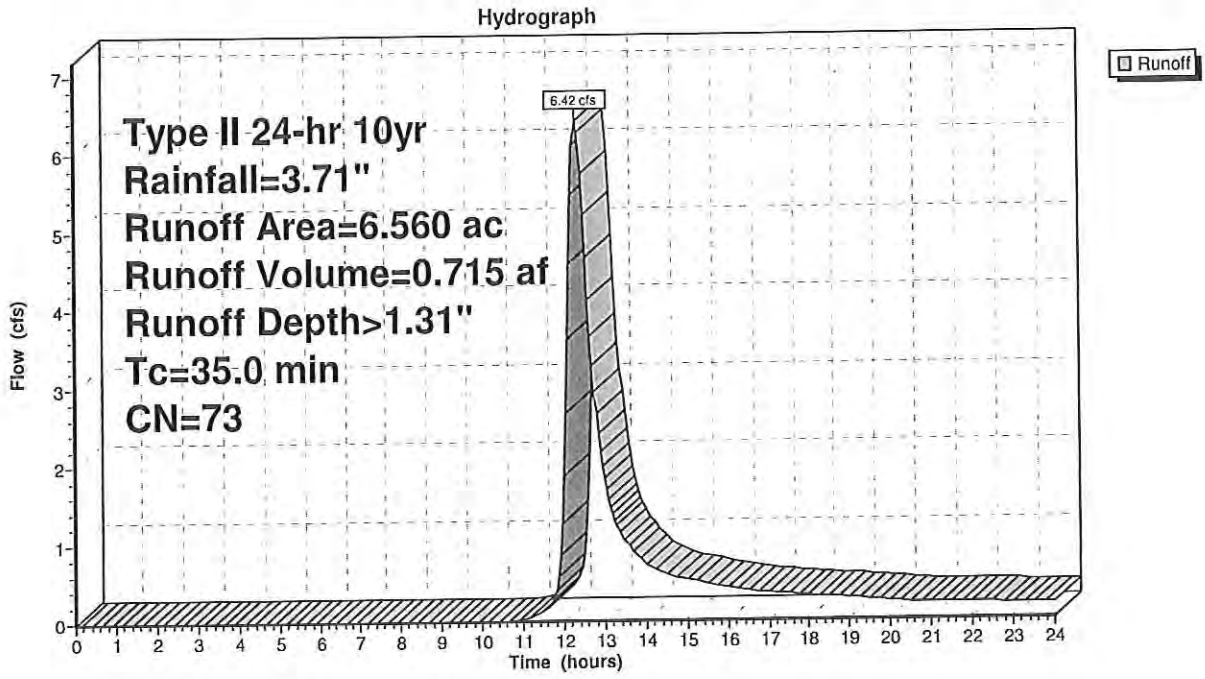
Runoff = 6.42 cfs @ 12.32 hrs, Volume= 0.715 af, Depth> 1.31"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10yr Rainfall=3.71"

	Area (ac)	CN	Description
*	6.560	73	
	6.560		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
35.0					Direct Entry,

Subcatchment 6S: POST-NORTH



Summary for Pond 7P: Infiltration/Detention Basin

Inflow Area =	17.670 ac,	0.00% Impervious,	Inflow Depth >	1.77"	for 10yr event
Inflow =	32.89 cfs @	11.97 hrs, Volume=	2.601 af		
Outflow =	2.24 cfs @	13.93 hrs, Volume=	1.103 af,	Atten= 93%,	Lag= 118.0 min
Discarded =	0.00 cfs @	0.00 hrs, Volume=	0.000 af		
Primary =	2.24 cfs @	13.93 hrs, Volume=	1.103 af		

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 840.42' @ 13.93 hrs Surf.Area= 71,893 sf Storage= 72,188 cf

Plug-Flow detention time= 339.4 min calculated for 1.103 af (42% of inflow)
Center-of-Mass det. time= 202.0 min (1,028.6 - 826.7)

Volume	Invert	Avail.Storage	Storage Description
#1	837.30'	218,256 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

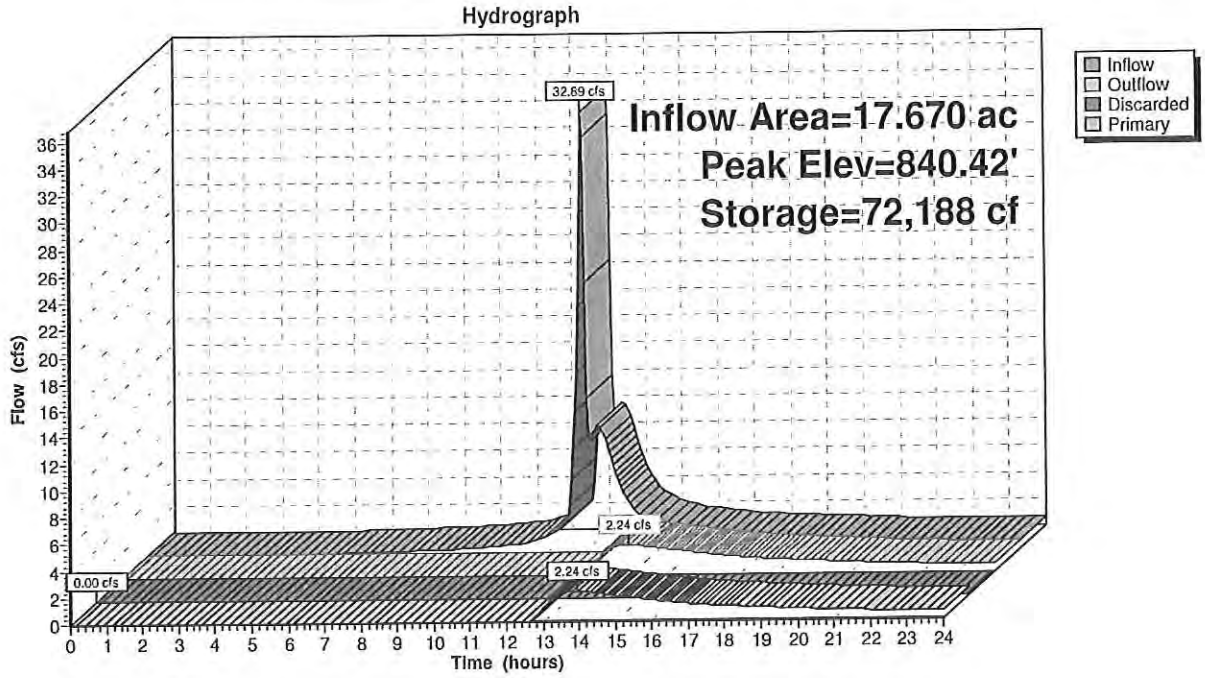
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
837.30	0	0	0
838.00	546	191	191
839.00	15,030	7,788	7,979
840.00	58,870	36,950	44,929
841.00	90,107	74,489	119,418
842.00	107,570	98,839	218,256

Device	Routing	Invert	Outlet Devices
#1	Primary	837.00'	**15.0" Round Culvert** L= 212.0' CPP, square edge headwall, Ke= 0.500 Outlet Invert= 835.75' S= 0.0059 '/' Cc= 0.900 n= 0.010
#2	Device 1	840.25'	**24.0" x 36.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	837.30'	**4.0" Vert. Orifice/Grate X 0.00** C= 0.600
#4	Discarded	837.30'	**2.260 in/hr Exfiltration X 0.00 over Horizontal area above 837.30'** Excluded Horizontal area = 0 sf
#5	Primary	841.25'	**8.0' long x 17.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.00 cfs @ 0.00 hrs HW=837.30' (Free Discharge)
↑**4=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=2.23 cfs @ 13.93 hrs HW=840.42' (Free Discharge)
↑**1=Culvert** (Passes 2.23 cfs of 8.65 cfs potential flow)
↑**2=Orifice/Grate** (Weir Controls 2.23 cfs @ 1.34 fps)
3=Orifice/Grate (Controls 0.00 cfs)
5=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 7P: Infiltration/Detention Basin

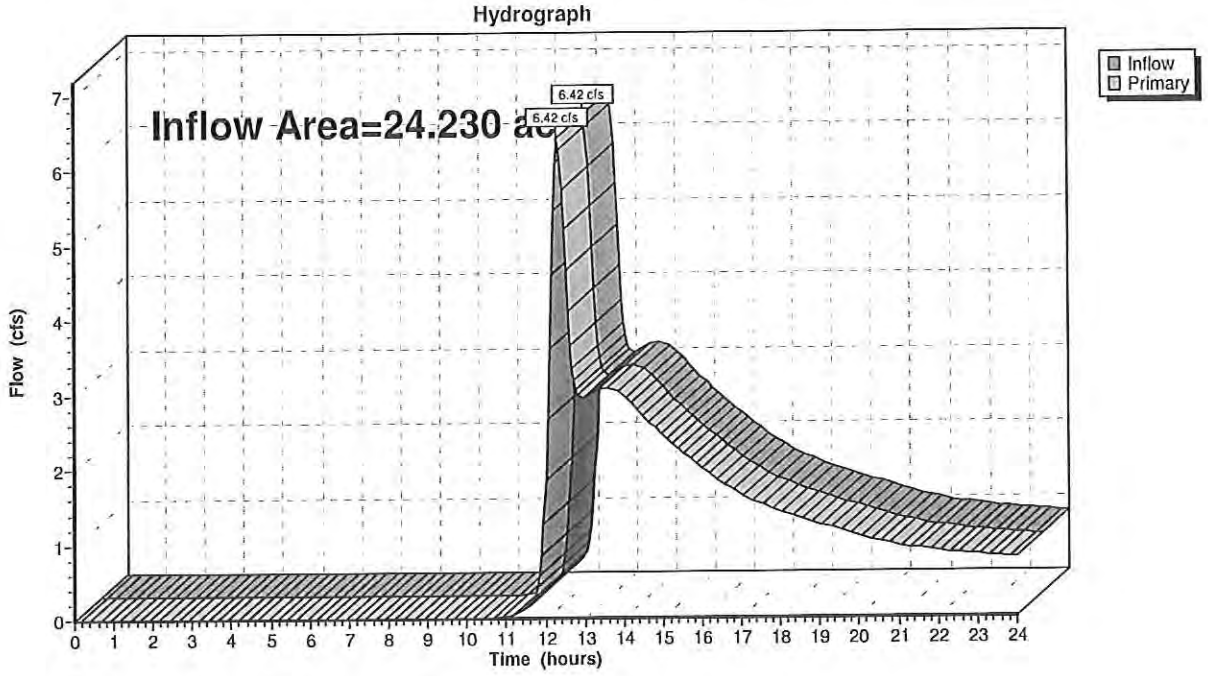


Summary for Link 8L: North Discharge

Inflow Area = 24.230 ac, 0.00% Impervious, Inflow Depth > 0.90" for 10yr event
Inflow = 6.42 cfs @ 12.32 hrs, Volume= 1.818 af
Primary = 6.42 cfs @ 12.32 hrs, Volume= 1.818 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 8L: North Discharge



Summary for Subcatchment 3S: POST-WEST

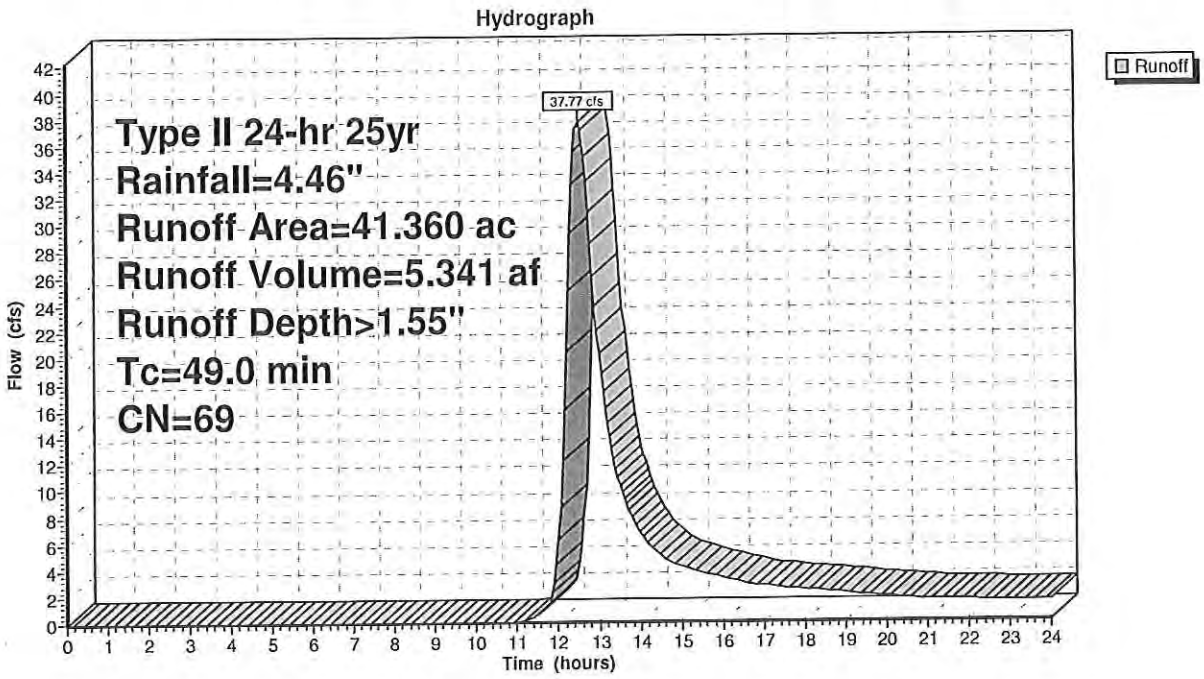
Runoff = 37.77 cfs @ 12.51 hrs, Volume= 5.341 af, Depth> 1.55"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 25yr Rainfall=4.46"

	Area (ac)	CN	Description
*	41.360	69	
	41.360		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
49.0					Direct Entry,

Subcatchment 3S: POST-WEST



Summary for Subcatchment 4S: POST-BASIN1

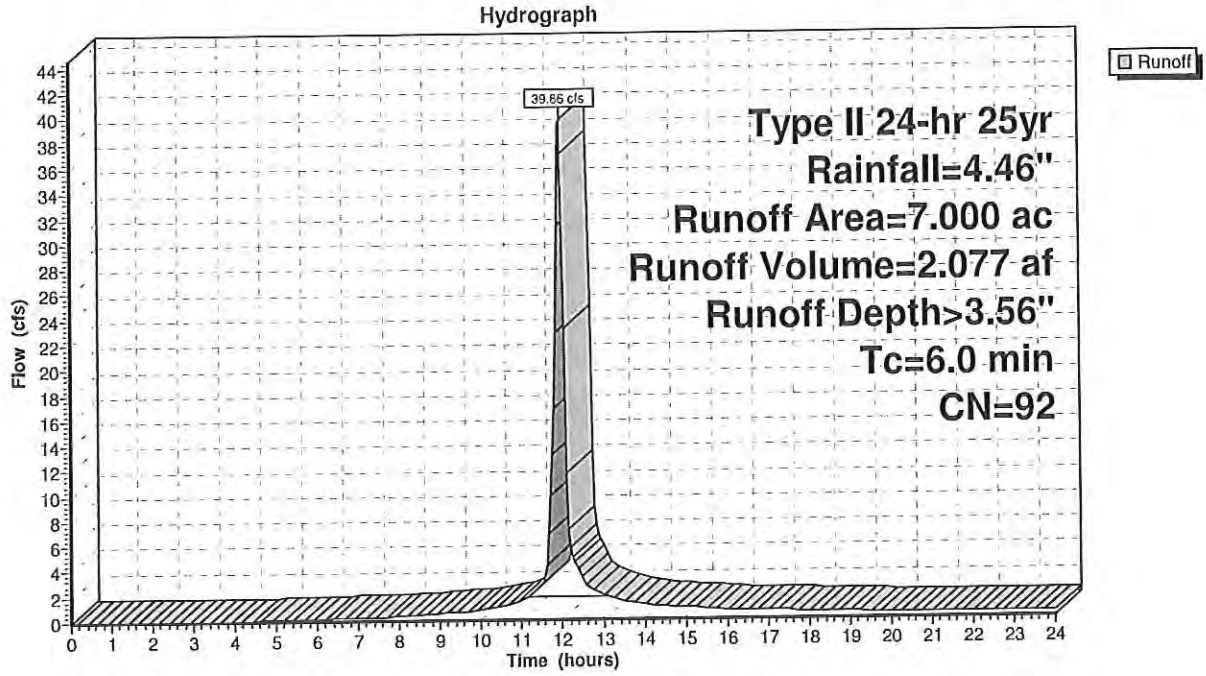
Runoff = 39.86 cfs @ 11.96 hrs, Volume= 2.077 af, Depth> 3.56"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 25yr Rainfall=4.46"

	Area (ac)	CN	Description
*	7.000	92	
	7.000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 4S: POST-BASIN1



Summary for Subcatchment 5S: POST-BASIN2

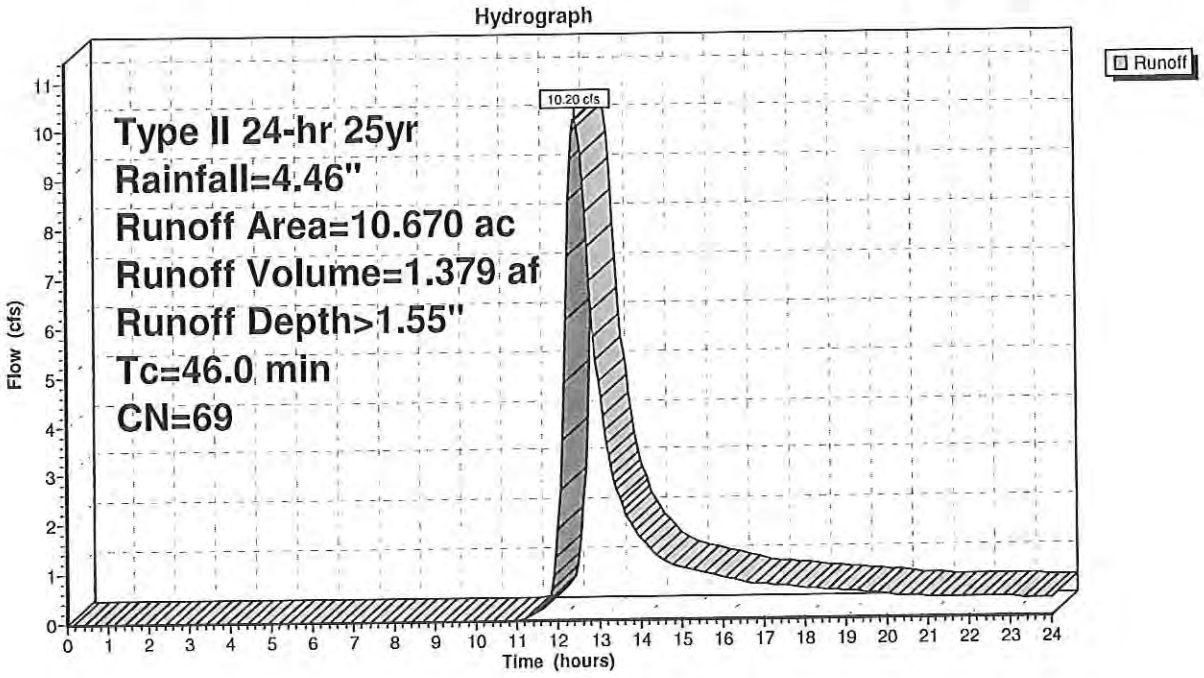
Runoff = 10.20 cfs @ 12.47 hrs, Volume= 1.379 af, Depth> 1.55"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 25yr Rainfall=4.46"

	Area (ac)	CN	Description
*	10.670	69	
	10.670		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
46.0					Direct Entry,

Subcatchment 5S: POST-BASIN2



Summary for Subcatchment 6S: POST-NORTH

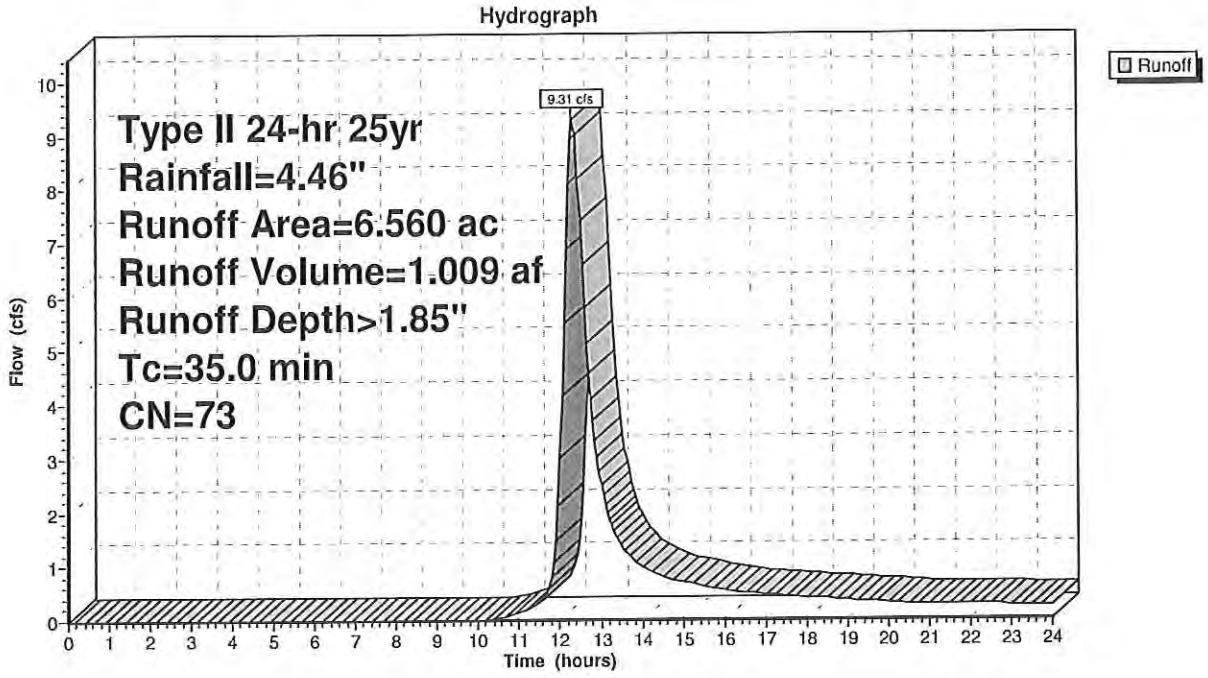
Runoff = 9.31 cfs @ 12.32 hrs, Volume= 1.009 af, Depth> 1.85"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 25yr Rainfall=4.46"

	Area (ac)	CN	Description
*	6.560	73	
	6.560		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
35.0					Direct Entry,

Subcatchment 6S: POST-NORTH



Summary for Pond 7P: Infiltration/Detention Basin

Inflow Area =	17.670 ac,	0.00% Impervious,	Inflow Depth >	2.35"	for 25yr event
Inflow =	41.29 cfs @	11.97 hrs, Volume=	3.456 af		
Outflow =	5.79 cfs @	13.13 hrs, Volume=	1.939 af,	Atten= 86%,	Lag= 69.9 min
Discarded =	0.00 cfs @	0.00 hrs, Volume=	0.000 af		
Primary =	5.79 cfs @	13.13 hrs, Volume=	1.939 af		

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 840.57' @ 13.13 hrs Surf.Area= 76,520 sf Storage= 83,179 cf

Plug-Flow detention time= 264.5 min calculated for 1.935 af (56% of inflow)
Center-of-Mass det. time= 145.2 min (967.3 - 822.1)

Volume	Invert	Avail.Storage	Storage Description
#1	837.30'	218,256 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

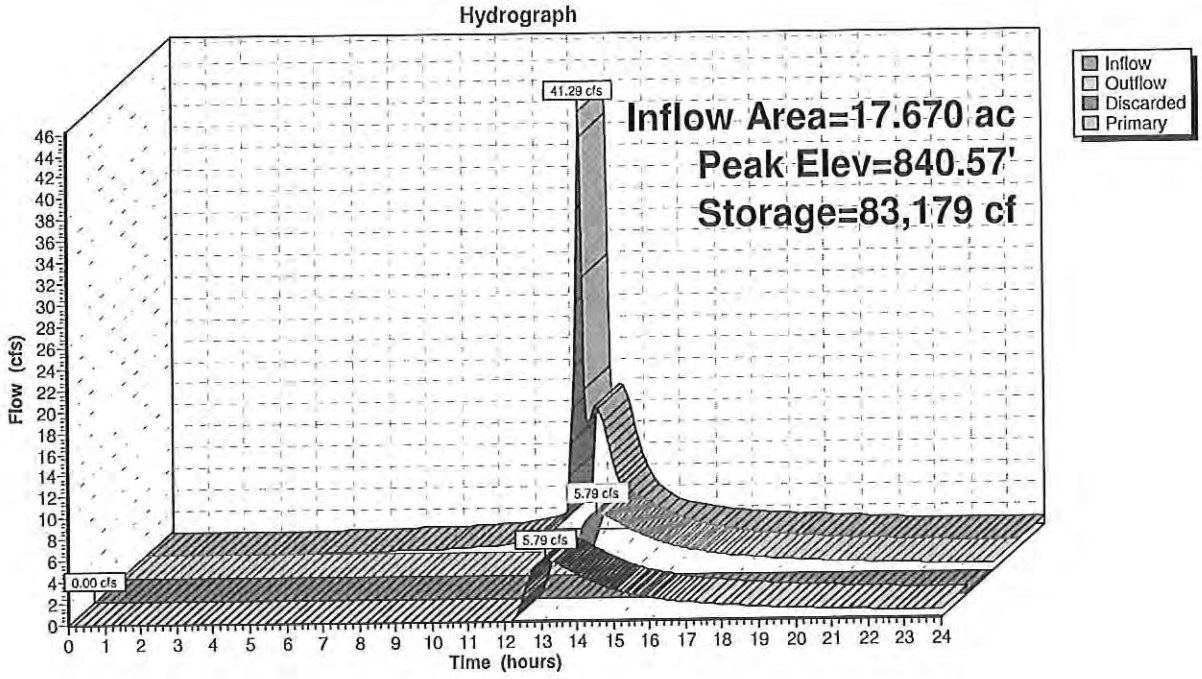
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
837.30	0	0	0
838.00	546	191	191
839.00	15,030	7,788	7,979
840.00	58,870	36,950	44,929
841.00	90,107	74,489	119,418
842.00	107,570	98,839	218,256

Device	Routing	Invert	Outlet Devices
#1	Primary	837.00'	**15.0" Round Culvert** L= 212.0' CPP, square edge headwall, Ke= 0.500 Outlet Invert= 835.75' S= 0.0059 '/' Cc= 0.900 n= 0.010
#2	Device 1	840.25'	**24.0" x 36.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	837.30'	**4.0" Vert. Orifice/Grate X 0.00** C= 0.600
#4	Discarded	837.30'	**2.260 in/hr Exfiltration X 0.00 over Horizontal area above 837.30'** Excluded Horizontal area = 0 sf
#5	Primary	841.25'	**8.0' long x 17.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.00 cfs @ 0.00 hrs HW=837.30' (Free Discharge)
↑**4=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=5.78 cfs @ 13.13 hrs HW=840.56' (Free Discharge)
↑**1=Culvert** (Passes 5.78 cfs of 8.84 cfs potential flow)
↑**2=Orifice/Grate** (Weir Controls 5.78 cfs @ 1.84 fps)
3=Orifice/Grate (Controls 0.00 cfs)
5=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 7P: Infiltration/Detention Basin

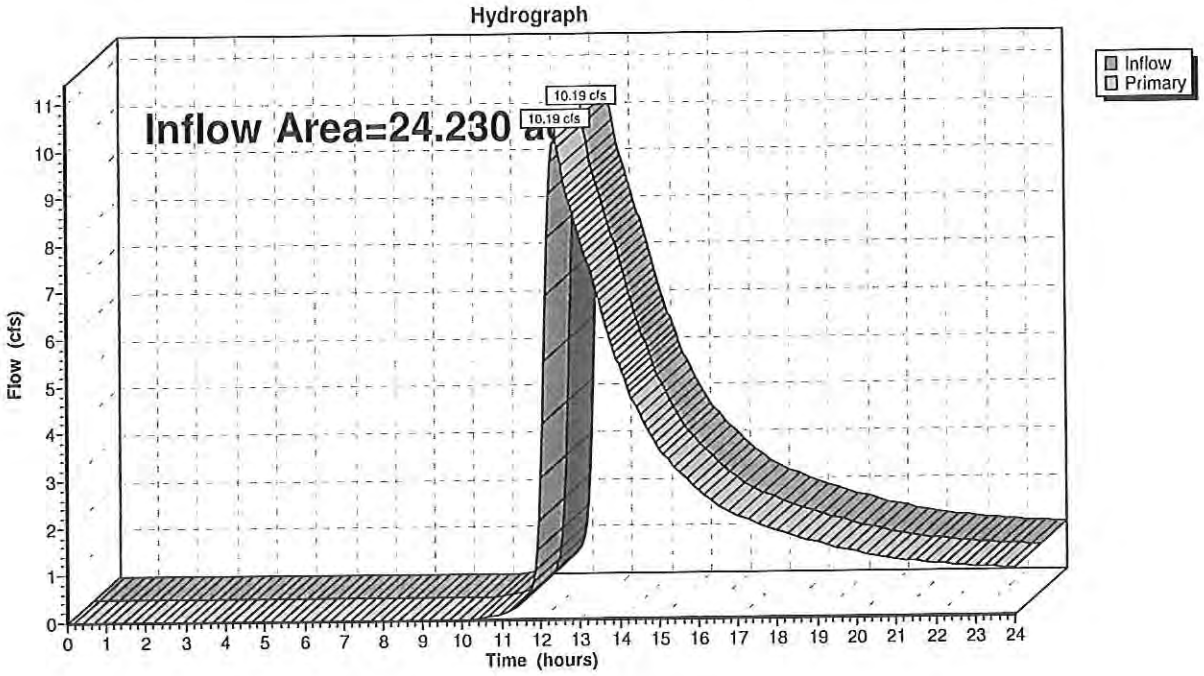


Summary for Link 8L: North Discharge

Inflow Area = 24.230 ac, 0.00% Impervious, Inflow Depth > 1.46" for 25yr event
Inflow = 10.19 cfs @ 12.40 hrs, Volume= 2.949 af
Primary = 10.19 cfs @ 12.40 hrs, Volume= 2.949 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 8L: North Discharge



Summary for Subcatchment 3S: POST-WEST

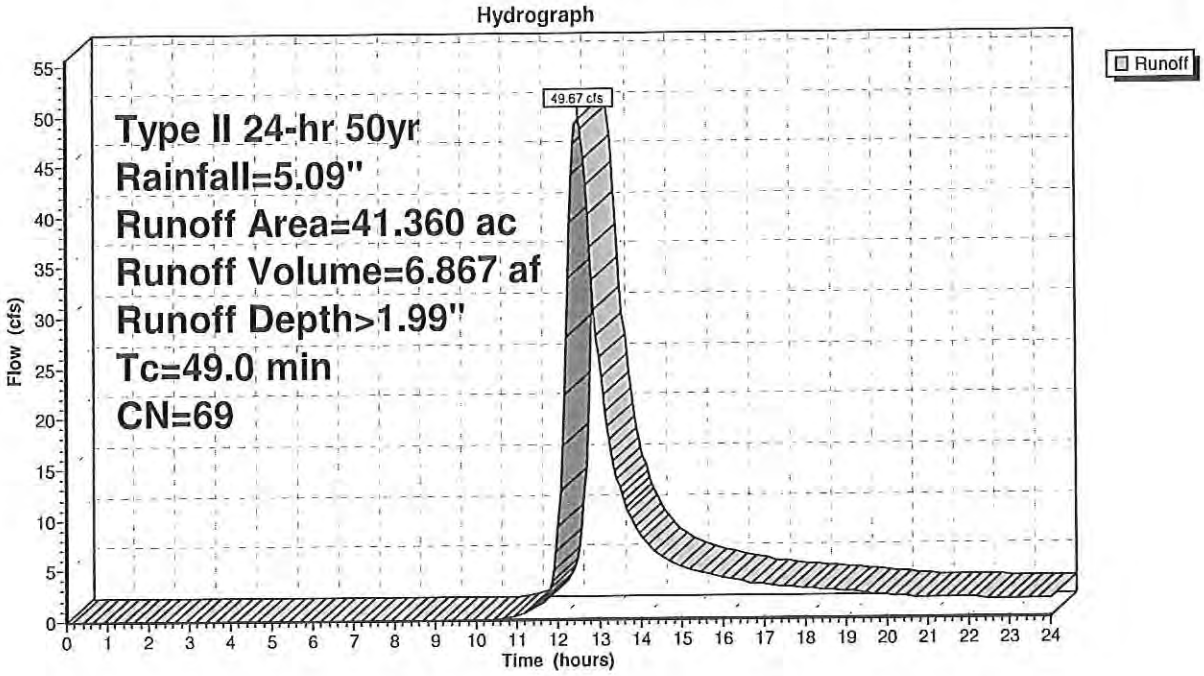
Runoff = 49.67 cfs @ 12.50 hrs, Volume= 6.867 af, Depth> 1.99"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 50yr Rainfall=5.09"

	Area (ac)	CN	Description
*	41.360	69	
	41.360		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
49.0					**Direct Entry,**

Subcatchment 3S: POST-WEST



Summary for Subcatchment 4S: POST-BASIN1

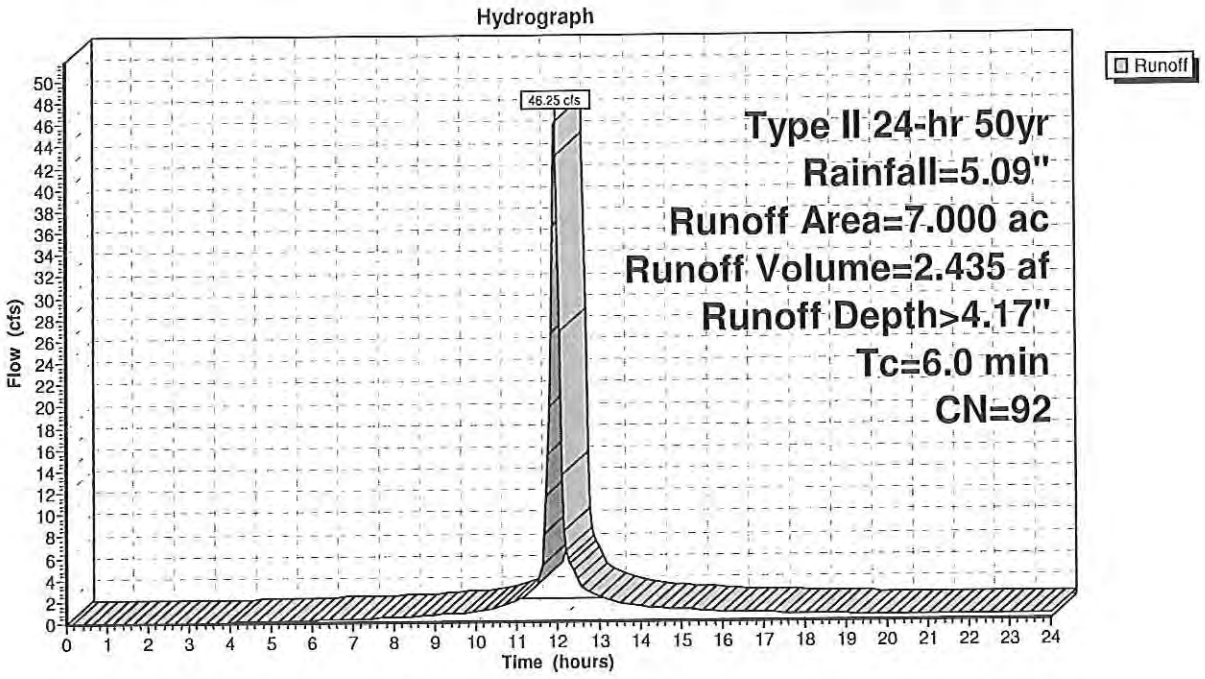
Runoff = 46.25 cfs @ 11.96 hrs, Volume= 2.435 af, Depth> 4.17"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 50yr Rainfall=5.09"

	Area (ac)	CN	Description
*	7.000	92	
	7.000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 4S: POST-BASIN1



Summary for Subcatchment 5S: POST-BASIN2

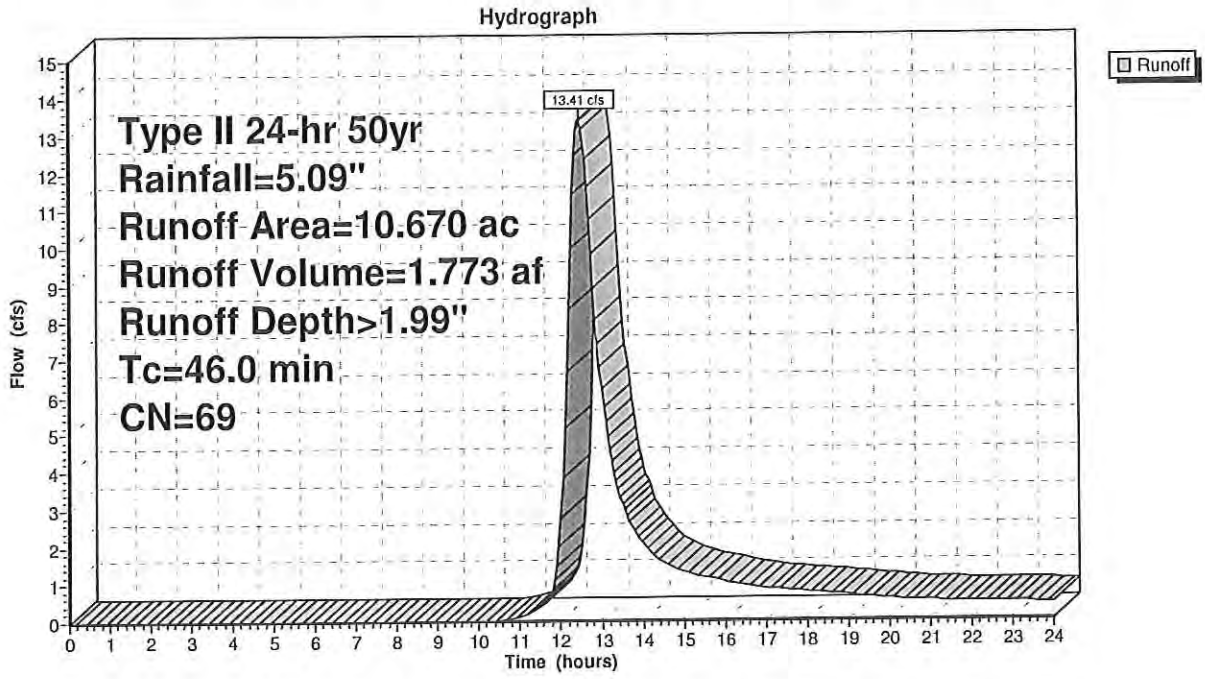
Runoff = 13.41 cfs @ 12.46 hrs, Volume= 1.773 af, Depth> 1.99"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 50yr Rainfall=5.09"

	Area (ac)	CN	Description
*	10.670	69	
	10.670		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
46.0					Direct Entry,

Subcatchment 5S: POST-BASIN2



Summary for Subcatchment 6S: POST-NORTH

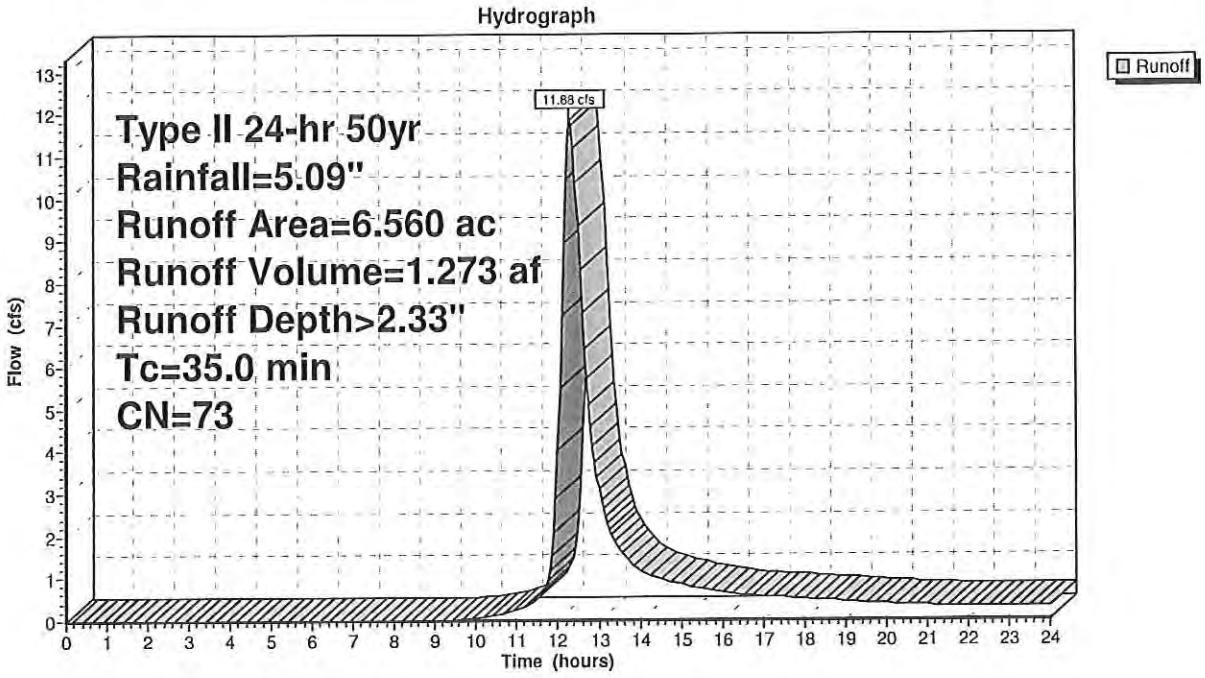
Runoff = 11.88 cfs @ 12.31 hrs, Volume= 1.273 af, Depth> 2.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 50yr Rainfall=5.09"

	Area (ac)	CN	Description
*	6.560	73	
	6.560		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
35.0					**Direct Entry,**

Subcatchment 6S: POST-NORTH



Summary for Pond 7P: Infiltration/Detention Basin

Inflow Area = 17.670 ac, 0.00% Impervious, Inflow Depth > 2.86" for 50yr event
Inflow = 48.42 cfs @ 11.97 hrs, Volume= 4.208 af
Outflow = 8.99 cfs @ 12.96 hrs, Volume= 2.676 af, Atten= 81%, Lag= 59.8 min
Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Primary = 8.99 cfs @ 12.96 hrs, Volume= 2.676 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 840.69' @ 12.96 hrs Surf.Area= 80,407 sf Storage= 92,943 cf

Plug-Flow detention time= 231.6 min calculated for 2.676 af (64% of inflow)
Center-of-Mass det. time= 121.6 min (940.4 - 818.8)

Volume	Invert	Avail.Storage	Storage Description
#1	837.30'	218,256 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

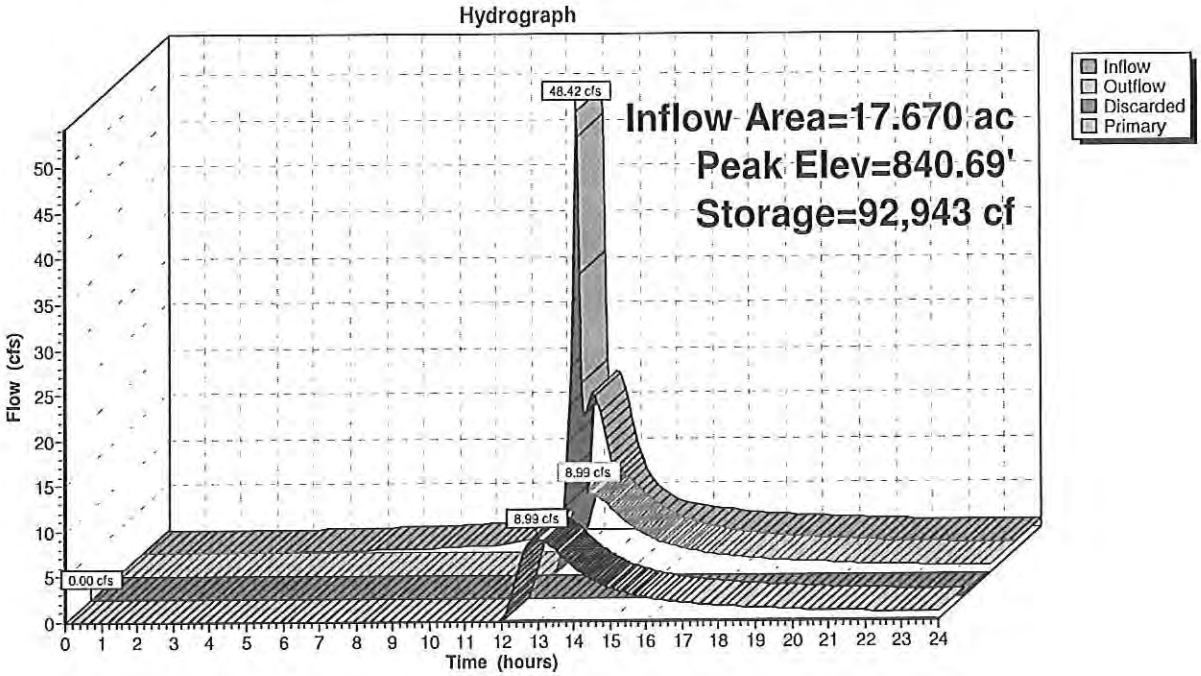
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
837.30	0	0	0
838.00	546	191	191
839.00	15,030	7,788	7,979
840.00	58,870	36,950	44,929
841.00	90,107	74,489	119,418
842.00	107,570	98,839	218,256

Device	Routing	Invert	Outlet Devices
#1	Primary	837.00'	**15.0" Round Culvert** L= 212.0' CPP, square edge headwall, Ke= 0.500 Outlet Invert= 835.75' S= 0.0059 '/' Cc= 0.900 n= 0.010
#2	Device 1	840.25'	**24.0" x 36.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	837.30'	**4.0" Vert. Orifice/Grate X 0.00** C= 0.600
#4	Discarded	837.30'	**2.260 in/hr Exfiltration X 0.00 over Horizontal area above 837.30'** Excluded Horizontal area = 0 sf
#5	Primary	841.25'	**8.0' long x 17.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.00 cfs @ 0.00 hrs HW=837.30' (Free Discharge)
└**4=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=8.99 cfs @ 12.96 hrs HW=840.69' (Free Discharge)
├**1=Culvert** (Barrel Controls 8.99 cfs @ 7.33 fps)
│ ├**2=Orifice/Grate** (Passes 8.99 cfs of 9.52 cfs potential flow)
│ └**3=Orifice/Grate** (Controls 0.00 cfs)
└**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 7P: Infiltration/Detention Basin

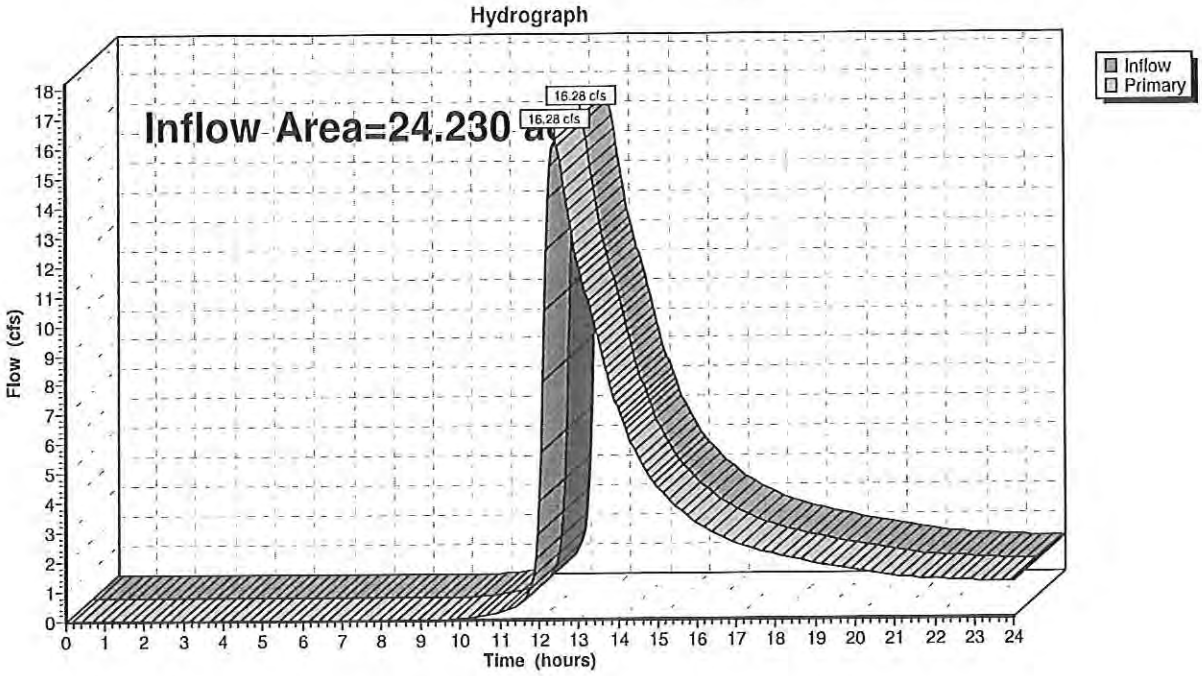


Summary for Link 8L: North Discharge

Inflow Area = 24.230 ac, 0.00% Impervious, Inflow Depth > 1.96" for 50yr event
Inflow = 16.28 cfs @ 12.42 hrs, Volume= 3.948 af
Primary = 16.28 cfs @ 12.42 hrs, Volume= 3.948 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 8L: North Discharge



Summary for Subcatchment 3S: POST-WEST

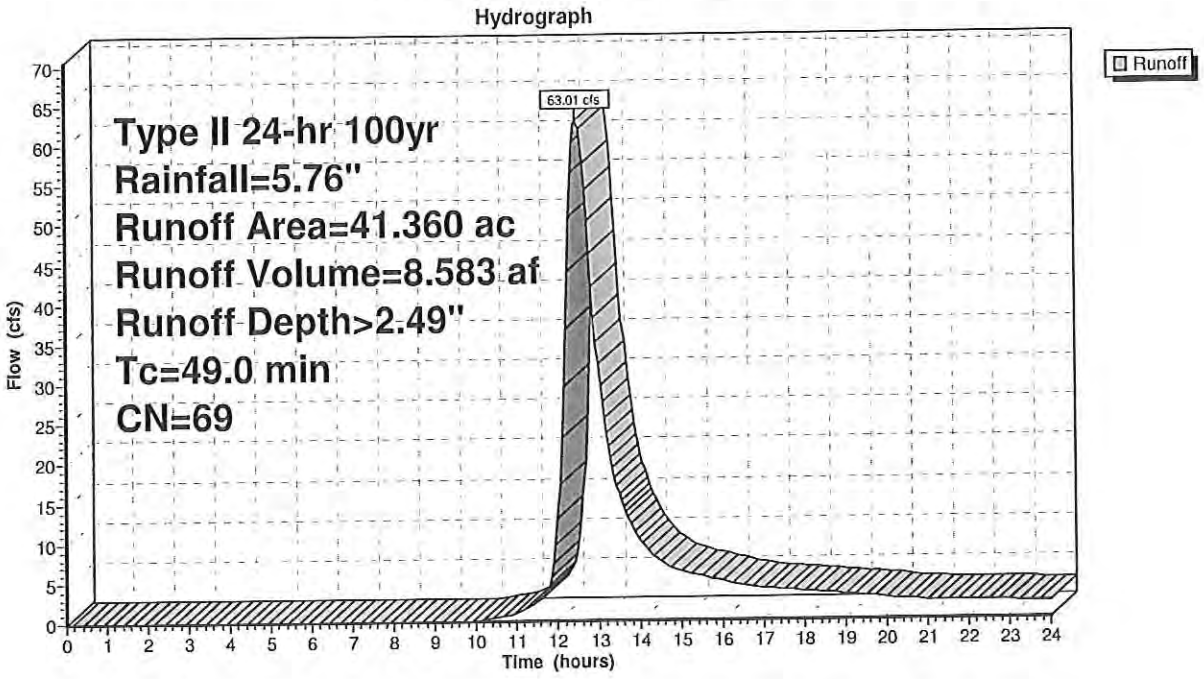
Runoff = 63.01 cfs @ 12.50 hrs, Volume= 8.583 af, Depth> 2.49"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 100yr Rainfall=5.76"

	Area (ac)	CN	Description
*	41.360	69	
	41.360		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
49.0					Direct Entry,

Subcatchment 3S: POST-WEST



Summary for Subcatchment 4S: POST-BASIN1

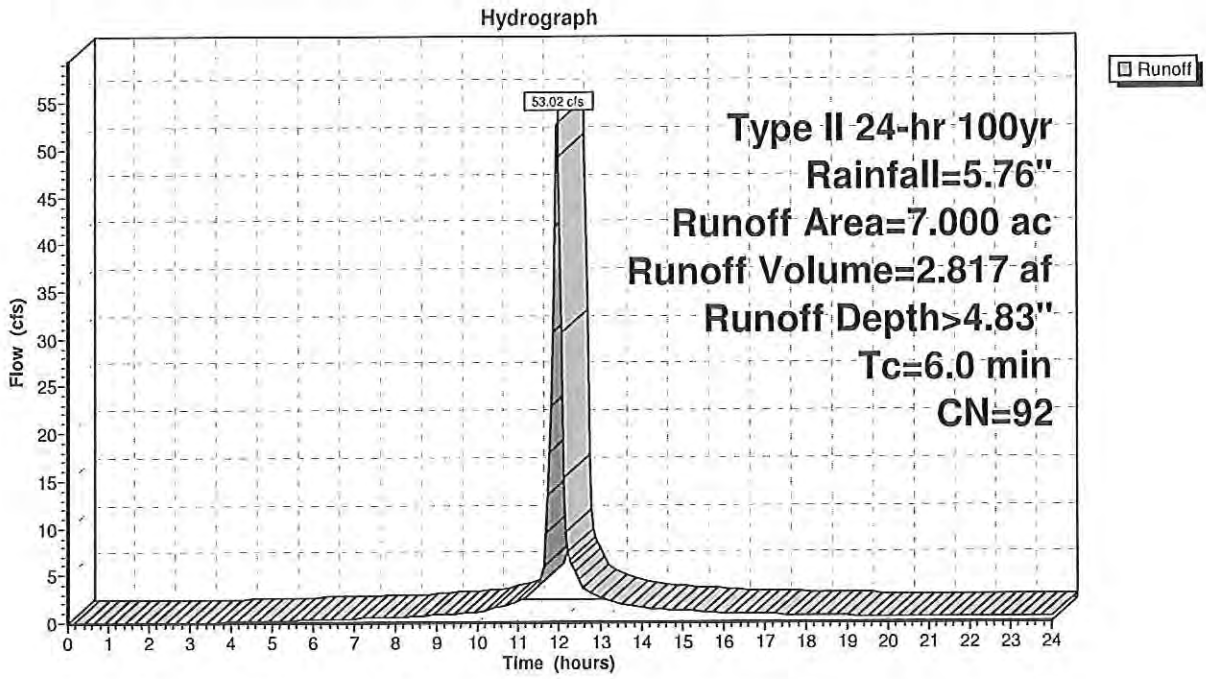
Runoff = 53.02 cfs @ 11.96 hrs, Volume= 2.817 af, Depth> 4.83"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 100yr Rainfall=5.76"

	Area (ac)	CN	Description
*	7.000	92	
	7.000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 4S: POST-BASIN1



Summary for Subcatchment 5S: POST-BASIN2

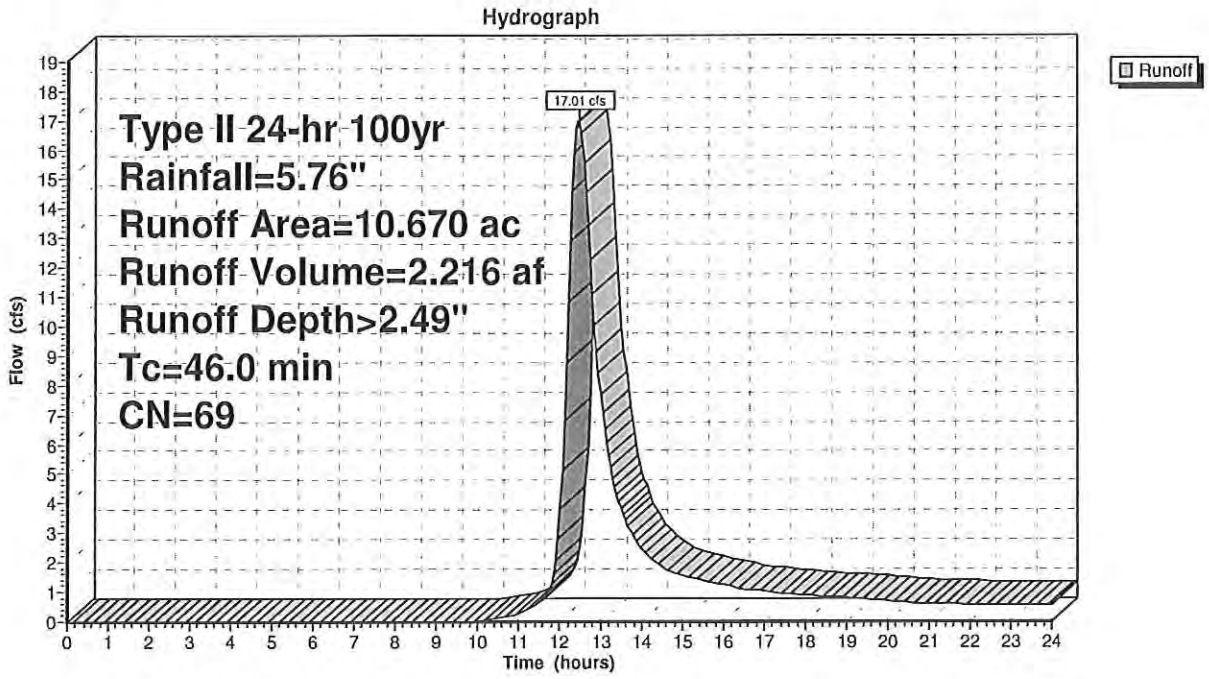
Runoff = 17.01 cfs @ 12.46 hrs, Volume= 2.216 af, Depth> 2.49"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 100yr Rainfall=5.76"

	Area (ac)	CN	Description
*	10.670	69	
	10.670		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
46.0					Direct Entry,

Subcatchment 5S: POST-BASIN2



Summary for Subcatchment 6S: POST-NORTH

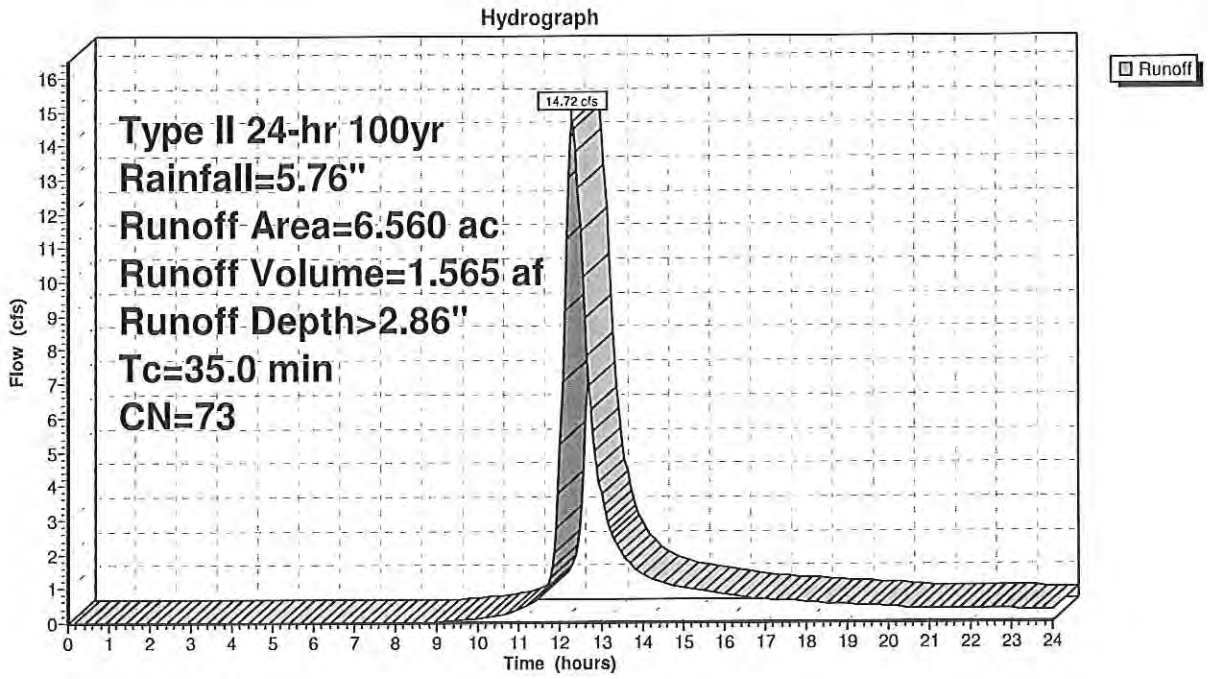
Runoff = 14.72 cfs @ 12.31 hrs, Volume= 1.565 af, Depth> 2.86"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 100yr Rainfall=5.76"

	Area (ac)	CN	Description
*	6.560	73	
	6.560		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
35.0					Direct Entry,

Subcatchment 6S: POST-NORTH



Summary for Pond 7P: Infiltration/Detention Basin

Inflow Area = 17.670 ac, 0.00% Impervious, Inflow Depth > 3.42" for 100yr event
Inflow = 56.05 cfs @ 11.97 hrs, Volume= 5.033 af
Outflow = 9.22 cfs @ 13.08 hrs, Volume= 3.485 af, Atten= 84%, Lag= 66.9 min
Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Primary = 9.22 cfs @ 13.08 hrs, Volume= 3.485 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 840.88' @ 13.08 hrs Surf.Area= 86,414 sf Storage= 108,982 cf

Plug-Flow detention time= 215.9 min calculated for 3.485 af (69% of inflow)
Center-of-Mass det. time= 114.5 min (930.3 - 815.8)

Volume	Invert	Avail.Storage	Storage Description
#1	837.30'	218,256 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

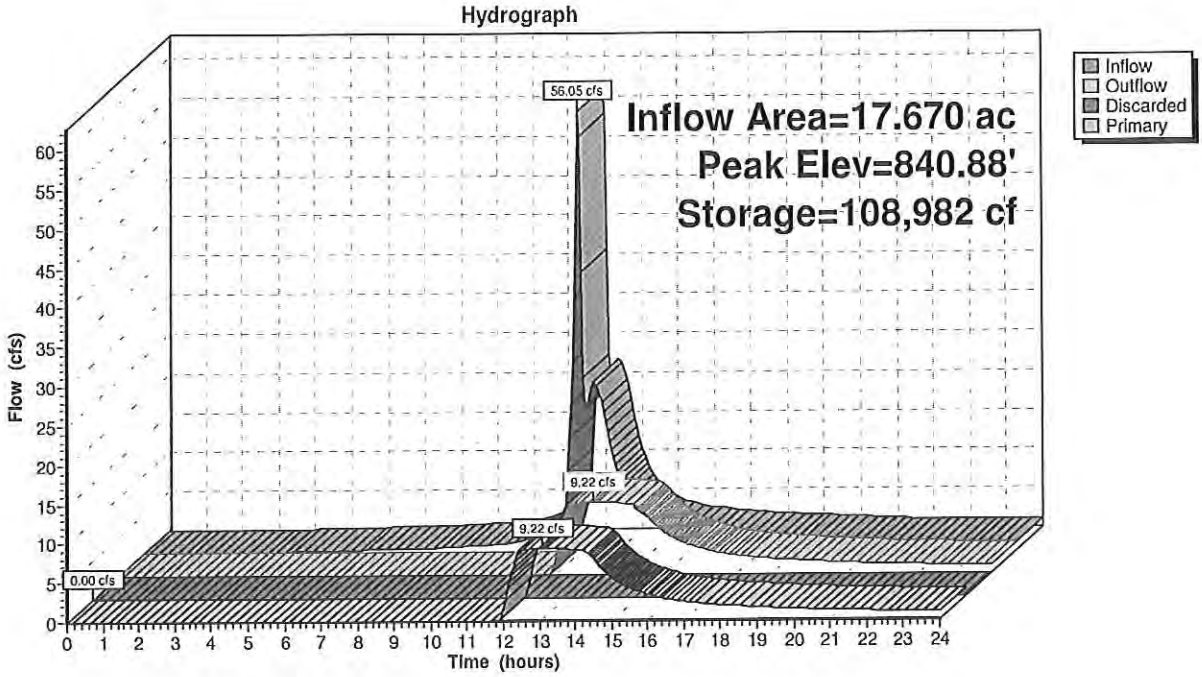
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
837.30	0	0	0
838.00	546	191	191
839.00	15,030	7,788	7,979
840.00	58,870	36,950	44,929
841.00	90,107	74,489	119,418
842.00	107,570	98,839	218,256

Device	Routing	Invert	Outlet Devices
#1	Primary	837.00'	**15.0" Round Culvert** L= 212.0' CPP, square edge headwall, Ke= 0.500 Outlet Invert= 835.75' S= 0.0059 '/' Cc= 0.900 n= 0.010
#2	Device 1	840.25'	**24.0" x 36.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	837.30'	**4.0" Vert. Orifice/Grate X 0.00** C= 0.600
#4	Discarded	837.30'	**2.260 in/hr Exfiltration X 0.00 over Horizontal area above 837.30'** Excluded Horizontal area = 0 sf
#5	Primary	841.25'	**8.0' long x 17.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.00 cfs @ 0.00 hrs HW=837.30' (Free Discharge)
└**4=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=9.22 cfs @ 13.08 hrs HW=840.88' (Free Discharge)
└**1=Culvert** (Barrel Controls 9.22 cfs @ 7.52 fps)
  └**2=Orifice/Grate** (Passes 9.22 cfs of 16.41 cfs potential flow)
    └**3=Orifice/Grate** (Controls 0.00 cfs)
└**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 7P: Infiltration/Detention Basin

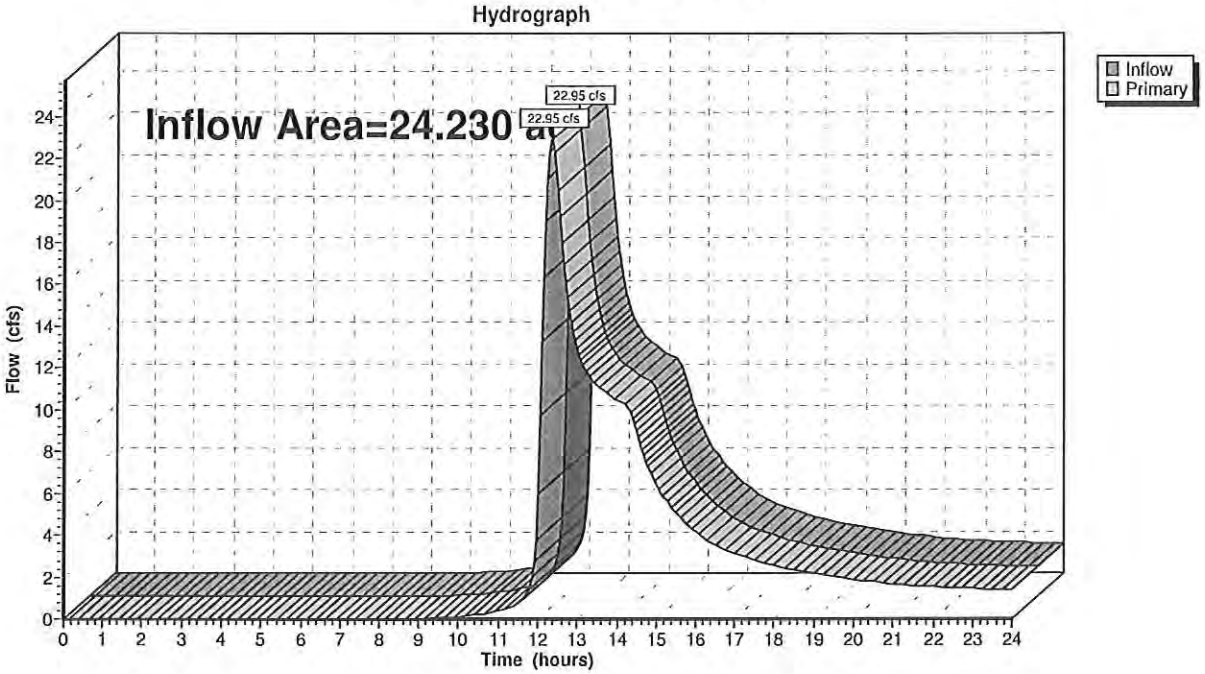


Summary for Link 8L: North Discharge

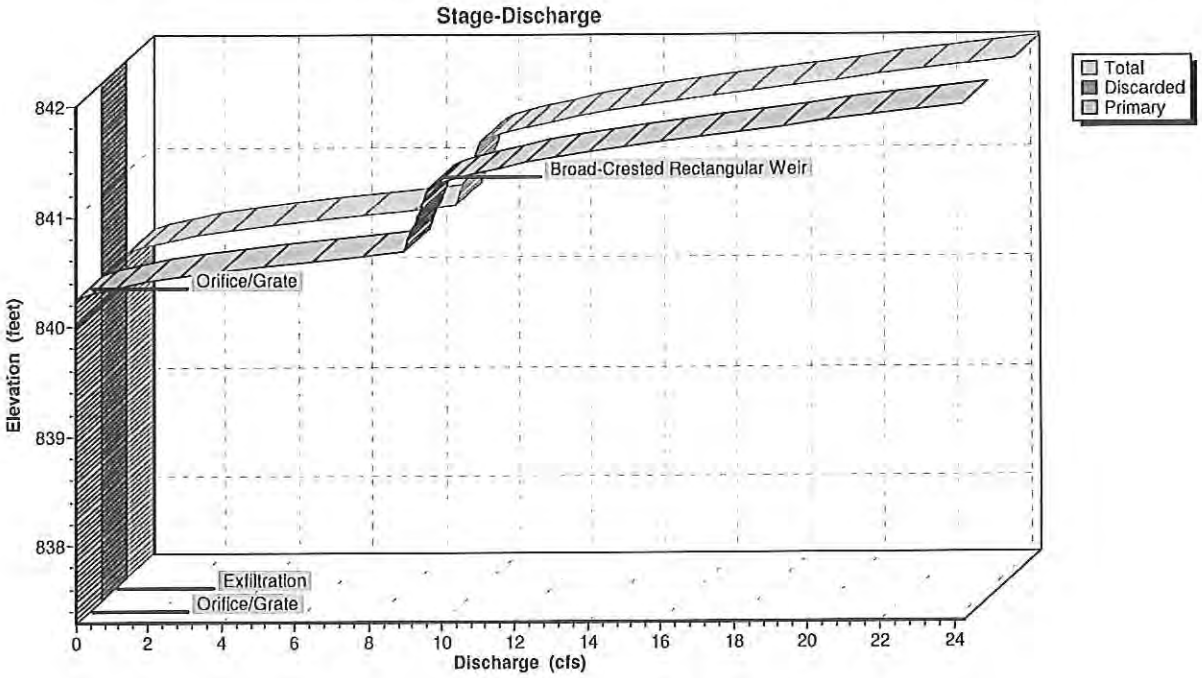
Inflow Area = 24.230 ac, 0.00% Impervious, Inflow Depth > 2.50" for 100yr event
Inflow = 22.95 cfs @ 12.37 hrs, Volume= 5.050 af
Primary = 22.95 cfs @ 12.37 hrs, Volume= 5.050 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

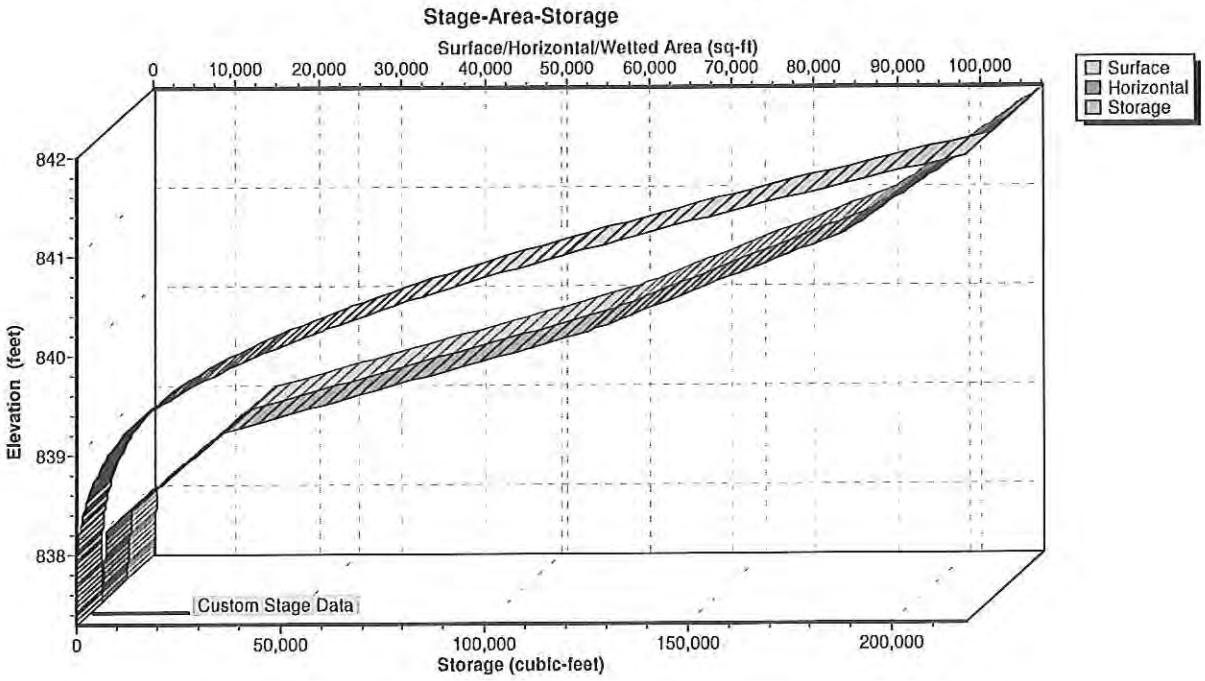
Link 8L: North Discharge



Pond 7P: Infiltration/Detention Basin



Pond 7P: Infiltration/Detention Basin



Stage-Discharge for Pond 7P: Infiltration/Detention Basin

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
837.30	0.00	**0.00**	0.00
837.35	0.00	0.00	0.00
837.40	0.00	0.00	0.00
837.45	0.00	0.00	0.00
837.50	0.00	0.00	0.00
837.55	0.00	0.00	0.00
837.60	0.00	0.00	0.00
837.65	0.00	0.00	0.00
837.70	0.00	0.00	0.00
837.75	0.00	0.00	0.00
837.80	0.00	0.00	0.00
837.85	0.00	0.00	0.00
837.90	0.00	0.00	0.00
837.95	0.00	0.00	0.00
838.00	0.00	0.00	0.00
838.05	0.00	0.00	0.00
838.10	0.00	0.00	0.00
838.15	0.00	0.00	0.00
838.20	0.00	0.00	0.00
838.25	0.00	0.00	0.00
838.30	0.00	0.00	0.00
838.35	0.00	0.00	0.00
838.40	0.00	0.00	0.00
838.45	0.00	0.00	0.00
838.50	0.00	0.00	0.00
838.55	0.00	0.00	0.00
838.60	0.00	0.00	0.00
838.65	0.00	0.00	0.00
838.70	0.00	0.00	0.00
838.75	0.00	0.00	0.00
838.80	0.00	0.00	0.00
838.85	0.00	0.00	0.00
838.90	0.00	0.00	0.00
838.95	0.00	0.00	0.00
839.00	0.00	0.00	0.00
839.05	0.00	0.00	0.00
839.10	0.00	0.00	0.00
839.15	0.00	0.00	0.00
839.20	0.00	0.00	0.00
839.25	0.00	0.00	0.00
839.30	0.00	0.00	0.00
839.35	0.00	0.00	0.00
839.40	0.00	0.00	0.00
839.45	0.00	0.00	0.00
839.50	0.00	0.00	0.00
839.55	0.00	0.00	0.00
839.60	0.00	0.00	0.00
839.65	0.00	0.00	0.00
839.70	0.00	0.00	0.00
839.75	0.00	0.00	0.00
839.80	0.00	0.00	0.00
839.85	0.00	0.00	0.00
839.90	0.00	0.00	0.00
839.95	0.00	0.00	0.00
840.00	0.00	0.00	0.00
840.05	0.00	0.00	0.00
840.10	0.00	0.00	0.00
840.15	0.00	0.00	0.00
840.20	0.00	0.00	0.00
840.25	0.00	0.00	0.00
840.30	0.37	0.00	0.37
840.35	1.03	0.00	1.03
840.40	1.90	0.00	1.90
840.45	2.92	0.00	2.92
840.50	4.09	0.00	4.09
840.55	5.37	0.00	5.37
840.60	6.77	0.00	6.77
840.65	8.27	0.00	8.27
840.70	9.01	0.00	9.01
840.75	9.07	0.00	9.07
840.80	9.13	0.00	9.13
840.85	9.19	0.00	9.19
840.90	9.25	0.00	9.25
840.95	9.30	0.00	9.30
841.00	9.36	0.00	9.36
841.05	9.42	0.00	9.42
841.10	9.48	0.00	9.48
841.15	9.54	0.00	9.54
841.20	9.59	0.00	9.59
841.25	9.65	0.00	9.65
841.30	9.95	0.00	9.95
841.35	10.44	0.00	10.44
841.40	11.07	0.00	11.07
841.45	11.79	0.00	11.79
841.50	12.62	0.00	12.62
841.55	13.52	0.00	13.52
841.60	14.50	0.00	14.50
841.65	15.56	0.00	15.56
841.70	16.67	0.00	16.67
841.75	17.84	0.00	17.84
841.80	19.07	0.00	19.07
841.85	20.35	0.00	20.35
841.90	21.62	0.00	21.62
841.95	22.93	0.00	22.93
842.00	**24.26**	0.00	**24.26**

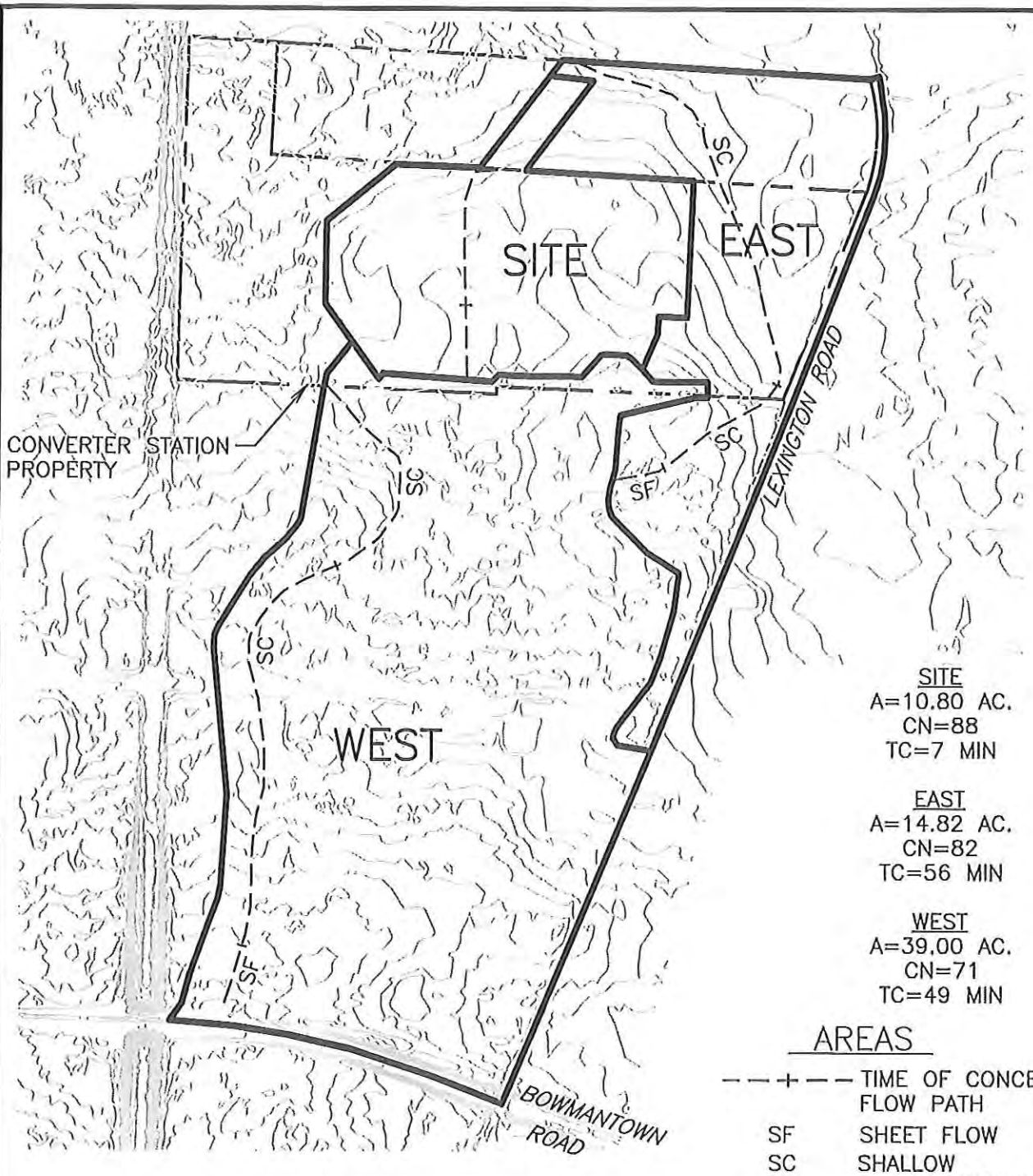
Stage-Area-Storage for Pond 7P: Infiltration/Detention Basin

Elevation (feet)	Surface (sq-ft)	Horizontal (sq-ft)	Storage (cubic-feet)
837.30	0	0	0
837.35	39	39	1
837.40	78	78	4
837.45	117	117	9
837.50	156	156	16
837.55	195	195	24
837.60	234	234	35
837.65	273	273	48
837.70	312	312	62
837.75	351	351	79
837.80	390	390	98
837.85	429	429	118
837.90	468	468	140
837.95	507	507	165
838.00	546	546	191
838.05	1,270	1,270	237
838.10	1,994	1,994	318
838.15	2,719	2,719	436
838.20	3,443	3,443	590
838.25	4,167	4,167	780
838.30	4,891	4,891	1,007
838.35	5,615	5,615	1,269
838.40	6,340	6,340	1,568
838.45	7,064	7,064	1,903
838.50	7,788	7,788	2,275
838.55	8,512	8,512	2,682
838.60	9,236	9,236	3,126
838.65	9,961	9,961	3,606
838.70	10,685	10,685	4,122
838.75	11,409	11,409	4,674
838.80	12,133	12,133	5,263
838.85	12,857	12,857	5,888
838.90	13,582	13,582	6,549
838.95	14,306	14,306	7,246
839.00	15,030	15,030	7,979
839.05	17,222	17,222	8,785
839.10	19,414	19,414	9,701
839.15	21,606	21,606	10,727
839.20	23,798	23,798	11,862
839.25	25,990	25,990	13,107
839.30	28,182	28,182	14,461
839.35	30,374	30,374	15,925
839.40	32,566	32,566	17,498
839.45	34,758	34,758	19,181
839.50	36,950	36,950	20,974
839.55	39,142	39,142	22,876
839.60	41,334	41,334	24,888
839.65	43,526	43,526	27,010
839.70	45,718	45,718	29,241
839.75	47,910	47,910	31,582
839.80	50,102	50,102	34,032

Stage-Area-Storage for Pond 7P: Infiltration/Detention Basin (continued)

Elevation (feet)	Surface (sq-ft)	Horizontal (sq-ft)	Storage (cubic-feet)
839.85	52,294	52,294	36,592
839.90	54,486	54,486	39,261
839.95	56,678	56,678	42,040
840.00	58,870	58,870	44,929
840.05	60,432	60,432	47,912
840.10	61,994	61,994	50,972
840.15	63,556	63,556	54,111
840.20	65,117	65,117	57,328
840.25	66,679	66,679	60,623
840.30	68,241	68,241	63,996
840.35	69,803	69,803	67,447
840.40	71,365	71,365	70,976
840.45	72,927	72,927	74,583
840.50	74,489	74,489	78,269
840.55	76,050	76,050	82,032
840.60	77,612	77,612	85,874
840.65	79,174	79,174	89,793
840.70	80,736	80,736	93,791
840.75	82,298	82,298	97,867
840.80	83,860	83,860	102,021
840.85	85,421	85,421	106,253
840.90	86,983	86,983	110,563
840.95	88,545	88,545	114,951
841.00	90,107	90,107	119,418
841.05	90,980	90,980	123,945
841.10	91,853	91,853	128,516
841.15	92,726	92,726	133,130
841.20	93,600	93,600	137,788
841.25	94,473	94,473	142,490
841.30	95,346	95,346	147,236
841.35	96,219	96,219	152,025
841.40	97,092	97,092	156,857
841.45	97,965	97,965	161,734
841.50	98,839	98,839	166,654
841.55	99,712	99,712	171,618
841.60	100,585	100,585	176,625
841.65	101,458	101,458	181,676
841.70	102,331	102,331	186,771
841.75	103,204	103,204	191,909
841.80	104,077	104,077	197,091
841.85	104,951	104,951	202,317
841.90	105,824	105,824	207,586
841.95	106,697	106,697	212,899
842.00	**107,570**	**107,570**	**218,256**

4.4 Stormwater Drainage – During Construction



SITE
A=10.80 AC.
CN=88
TC=7 MIN

EAST
A=14.82 AC.
CN=82
TC=56 MIN

WEST
A=39.00 AC.
CN=71
TC=49 MIN

AREAS

- – – + – – TIME OF CONCENTRATION FLOW PATH
- SF SHEET FLOW
- SC SHALLOW CONCENTRATED FLOW

DURING CONSTRUCTION DRAINAGE AREA

SCALE:
0 400 800 feet

ITC LAKE ERIE CONNECTOR, LLC
ERIE CONVERTER STATION
CONNEAUT TOWNSHIP, ERIE COUNTY
PENNSYLVANIA

DATE: 6/26/2015 | SCALE: 1"=400'
REV.:
DRAWN BY: JEFFREY T. BERNOSKY
APPROVED BY:
DRAWING No.: DURING DRAINAGE

Deiss & Halmi Engineering, Inc.
ENVIRONMENTAL AND CIVIL ENGINEERING
105 Meadville Street, Edinboro PA 16412 Ph. 814-734-3640 Fax 814-734-3643

CURVE NUMBER (CN) WORKSHEET

Project: Lake Erie Connector - Converter Station Site

By: A. Halmi Date: 6/17/2015

Location: Conneaut Township, Erie County

Comments: During Construction; West

Number	Description	Soil Group	CN	Area (acres)	CN*Area
1					
2	1/2 acre residential lot	C	80	3.36	269
3	1/2 acre residential lot	D	85	0.12	10
4	Meadow	B	58	2.06	120
5	Meadow	C	71	5.86	416
6	Woods (good)	B	58	4.14	240
7	Woods (good)	C	72	22.04	1587
8	Woods (good)	D	79	1.42	112
9					
10					
Watershed or subarea pervious curve number (CN_p)			71	39.00	2754

CURVE NUMBER (CN) WORKSHEET

Project: Lake Erie Connector - Converter Station Site

By: A. Halmi Date: 3/4/2015

Location: Conneaut Township, Erie County

Comments: Site During Construction

Number	Description	Soil Group	CN	Area (acres)	CN*Area
1	Bare Ground	B	86	5.82	500
2	Bare Ground	C	91	4.98	453
Watershed or subarea pervious curve number (CN_p)			88	10.80	953

CURVE NUMBER (CN) WORKSHEET

Project: Lake Erie Connector - Converter Station Site

By: A. Halmi Date: 6/17/2015

Location: Conneaut Township, Erie County

Comments: During Construction; East

Number	Description	Soil Group	CN	Area (acres)	CN*Area
1	Bare Ground	B	86	1.00	86
2	Bare Ground	C	91	5.87	534
3	Bare Ground	D	94	1.32	124
4	Meadow	C	71	0.96	68
5	Meadow	D	78	0.10	8
6	Woods	B	58	1.54	90
7	Woods	C	72	0.84	60
8	1/2 acre residential lot	B	70	1.29	90
9	1/2 acre residential lot	C	80	1.85	148
10	1/2 acre residential lot	D	85	0.05	5
Watershed or subarea pervious curve number (CN_p)			82	14.82	1213

TIME OF CONCENTRATION (Tc) WORKSHEET

Project: Lake Erie Connector - Converter Station Site

By: A. Halmi Date: 6/17/2015

Location: Conneaut Township, Erie County

Comments: During Construction; west

Sheet Flow (Applicable to Tc only)		Segment ID	SF					
1.)	Surface description		Woods					
2.)	Manning's roughness coeff., n		0.4					
3.)	Flow length, L (total L < 300 ft.)	(ft)	140					
4.)	Two-yr. 24-hr. rainfall, P2	(in)	2.56					
5.)	Land slope, s	(ft/ft)	0.0143					Total Tt
6.)	Tt	(hr)	0.5992					0.6
Shallow Concentrated Flow		Segment ID	SC					
7.)	Surface description (paved (p),or unpaved (unp))		unp					
8.)	Flow length L	(ft)	1768					
9.)	Watercourse slope, s	(ft/ft)	0.0187					
10.)	Average velocity, V	(ft/s)	2.20					Total Tt
11.)	Tt = L/(3600 x V)	(hr)	0.2228					0.22
Channel Flow		Segment ID	CH					
12.)	Cross sectional flow area, a	(ft^2)						
13.)	Wetted perimeter, Pw	(ft)						
14.)	Hydraulic radius, r = a/Pw	(ft)						
15.)	Channel slope, s	(ft/ft)						
16.)	Manning's roughness coeff. , n							
17.)	Velocity, V	(ft/s)						
18.)	Flow Length, L	(ft)						Total Tt
19.)	Tt = L/(3600 x V)	(hr)						0.000

Watershed or subarea Tc	(hr)	0.82
	(min)	49

TIME OF CONCENTRATION (Tc) WORKSHEET

Project: Lake Erie Connector - Converter Station Site

By: A. Halmi Date: 6/17/2015

Location: Conneaut Township, Erie County

Comments: During Construction; Site

Sheet Flow (Applicable to Tc only)

			Segment ID	SF				
1.)	Surface description			Bare Parched Soil				
2.)	Manning's roughness coeff., n			0.01				
3.)	Flow length, L (total L < 300 ft.)	(ft)		190				
4.)	Two-yr. 24-hr. rainfall, P2	(in)		2.56				
5.)	Land slope, s	(ft/ft)		0.01				Total Tt
6.)	Tt	(hr)		0.0461				0.05

Shallow Concentrated Flow

			Segment ID	SC				
7.)	Surface description (paved (p),or unpaved (unp))			unp				
8.)	Flow length L	(ft)		397				
9.)	Watercourse slope, s	(ft/ft)		0.01				
10.)	Average velocity, V	(ft/s)		1.61				Total Tt
11.)	Tt = L/(3600 x V)	(hr)		0.0683				0.07

Channel Flow

			Segment ID					
12.)	Cross sectional flow area, a	(ft^2)						
13.)	Wetted perimeter, Pw	(ft)						
14.)	Hydraulic radius, r = a/Pw	(ft)						
15.)	Channel slope, s	(ft/ft)						
16.)	Manning's roughness coeff. , n							
17.)	Velocity, V	(ft/s)						
18.)	Flow Length, L	(ft)						Total Tt
19.)	Tt = L/(3600 x V)	(hr)						0.000

Watershed or subarea Tc (hr) 0.12

(min) 7

TIME OF CONCENTRATION (Tc) WORKSHEET

Project: Lake Erie Connector - Converter Station Site

By: A. Halmi Date: 6/17/2015

Location: Conneaut Township, Erie County

Comments: During Construction; East

Sheet Flow (Applicable to Tc only)

			Segment ID					
1.)	Surface description		SF				
2.)	Manning's roughness coeff., n		Woods				
3.)	Flow length, L (total L < 300 ft.)	(ft)	0.4				
4.)	Two-yr. 24-hr. rainfall, P2	(in)	138				
5.)	Land slope, s	(ft/ft)	2.56				
6.)	Tt	(hr)	0.01				Total Tt
			0.6832				0.68

Shallow Concentrated Flow

			Segment ID				
7.)	Surface description (paved (p),or unpaved (unp))		SC	SC			
8.)	Flow length L	(ft)	unp	unp			
9.)	Watercourse slope, s	(ft/ft)	369	1072			
10.)	Average velocity, V	(ft/s)	0.0253	0.007			
11.)	Tt = L/(3600 x V)	(hr)	2.57	1.35			Total Tt
			0.0399	0.2206			0.26

Channel Flow

			Segment ID				
12.)	Cross sectional flow area, a	(ft^2)					
13.)	Wetted perimeter, Pw	(ft)					
14.)	Hydraulic radius, r = a/Pw	(ft)					
15.)	Channel slope, s	(ft/ft)					
16.)	Manning's roughness coeff. , n						
17.)	Velocity, V	(ft/s)					
18.)	Flow Length, L	(ft)					
19.)	Tt = L/(3600 x V)	(hr)					Total Tt
							0.000

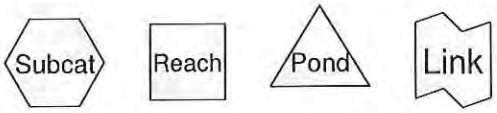
Watershed or subarea Tc (hr) 0.94

(min) 56

DURING-SITE

DURING-EAST

DURING-WEST



Drainage Diagram for LEC Converter Station DURING
Prepared by Deiss & Halmi Engineering, Inc., Printed 1/22/2016

Summary for Subcatchment 3S: DURING-SITE

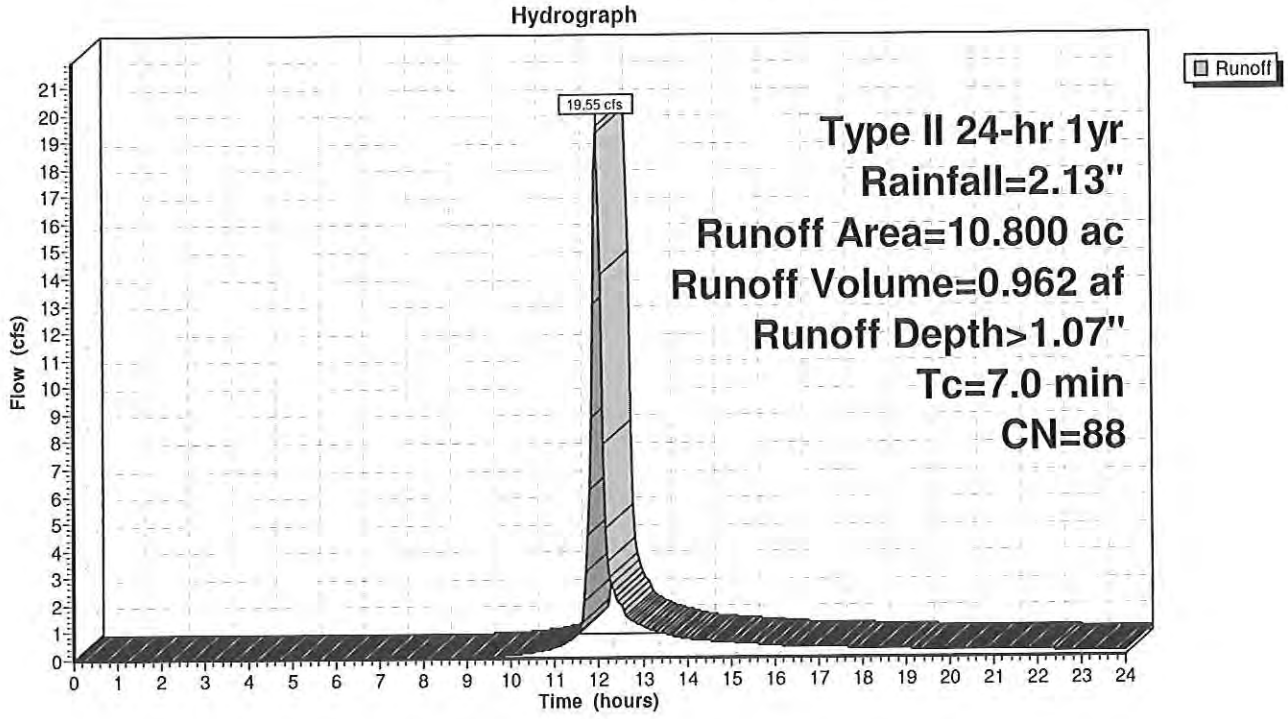
Runoff = 19.55 cfs @ 11.99 hrs, Volume= 0.962 af, Depth> 1.07"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 1yr Rainfall=2.13"

	Area (ac)	CN	Description
*	10.800	88	
	10.800		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry,**

Subcatchment 3S: DURING-SITE



Summary for Subcatchment 4S: DURING-EAST

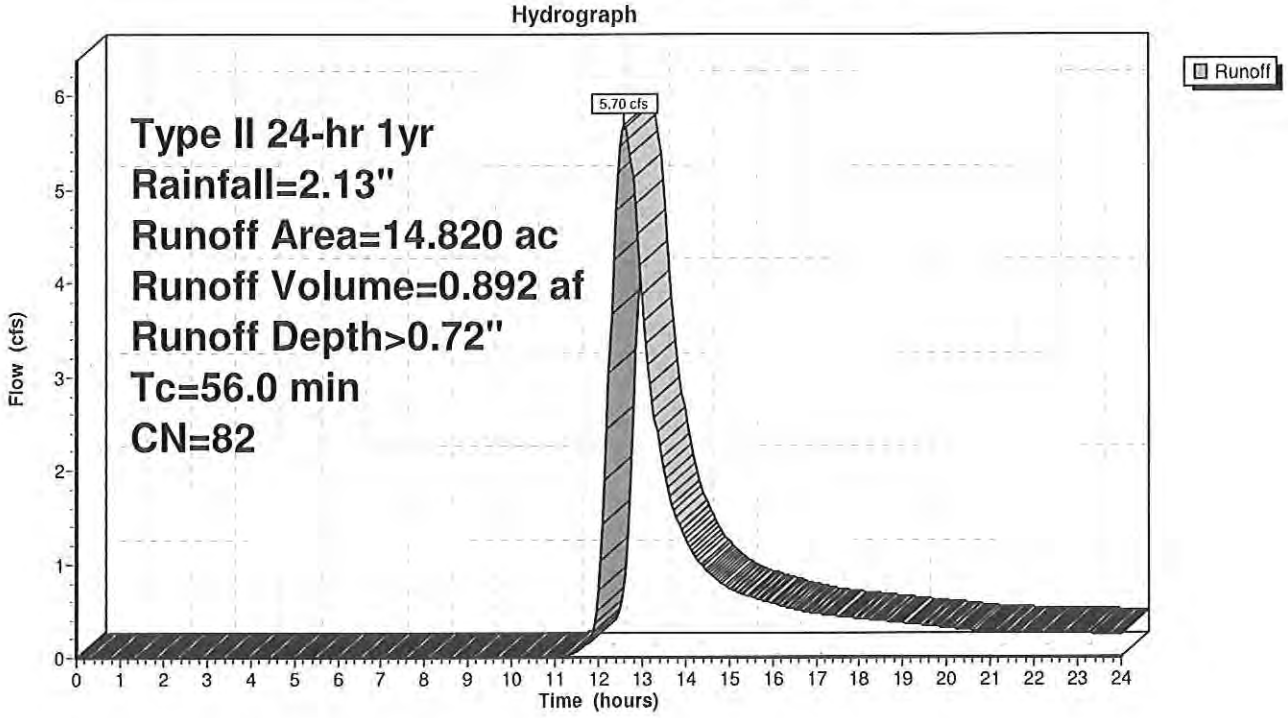
Runoff = 5.70 cfs @ 12.61 hrs, Volume= 0.892 af, Depth> 0.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 1yr Rainfall=2.13"

	Area (ac)	CN	Description
*	14.820	82	
	14.820		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
56.0					**Direct Entry,**

Subcatchment 4S: DURING-EAST



Summary for Subcatchment 5S: DURING-WEST

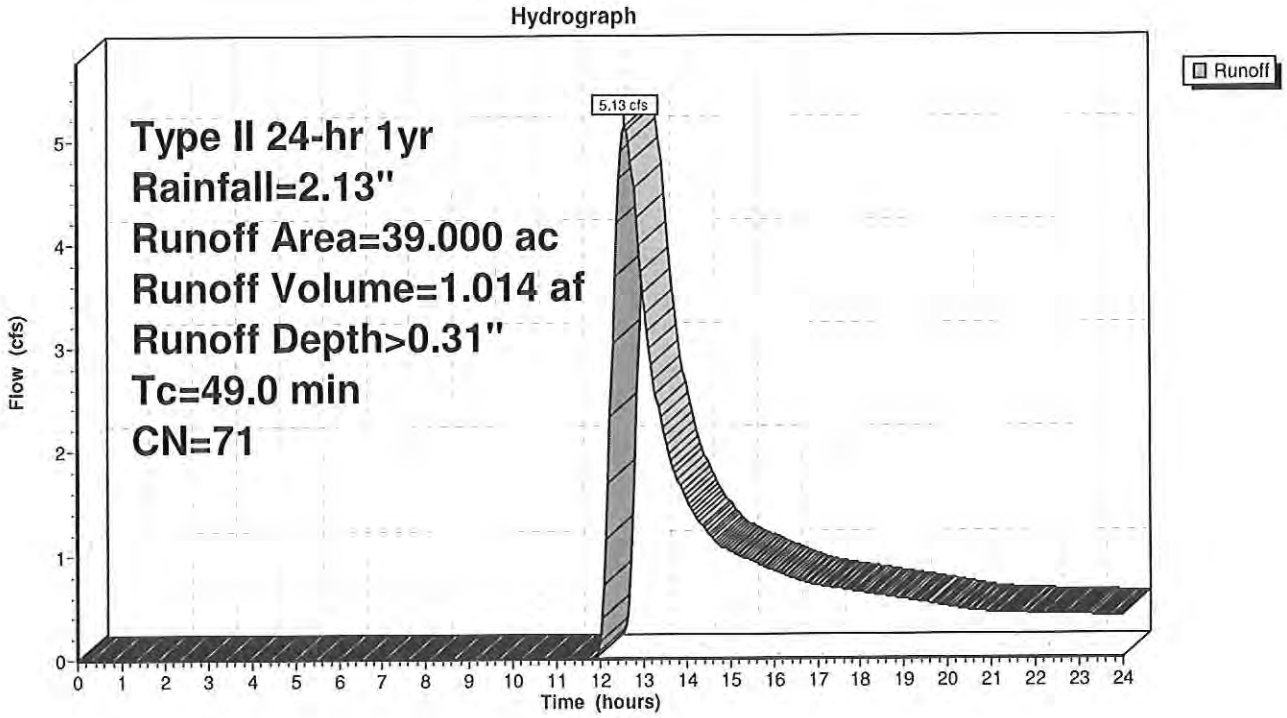
Runoff = 5.13 cfs @ 12.60 hrs, Volume= 1.014 af, Depth> 0.31"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 1yr Rainfall=2.13"

	Area (ac)	CN	Description
*	39.000	71	
	39.000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
49.0					**Direct Entry,**

Subcatchment 5S: DURING-WEST



Summary for Subcatchment 3S: DURING-SITE

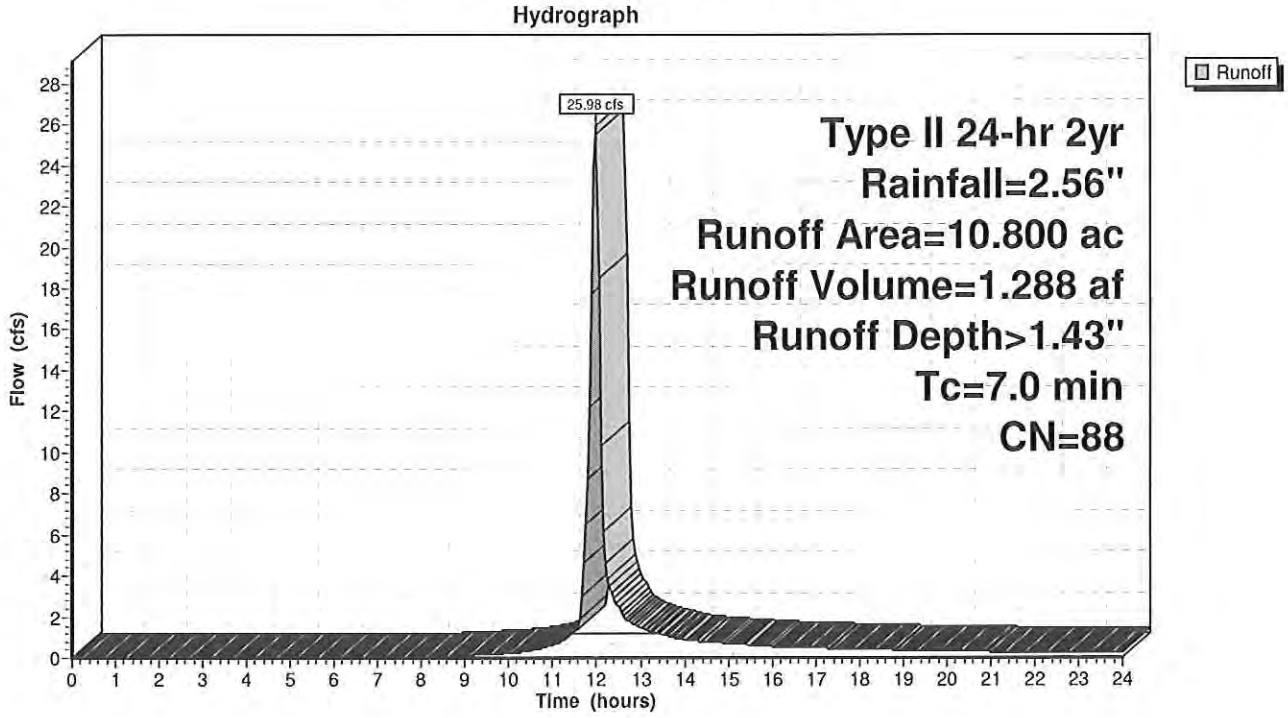
Runoff = 25.98 cfs @ 11.98 hrs, Volume= 1.288 af, Depth> 1.43"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2yr Rainfall=2.56"

	Area (ac)	CN	Description
*	10.800	88	
	10.800		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry,**

Subcatchment 3S: DURING-SITE



Summary for Subcatchment 4S: DURING-EAST

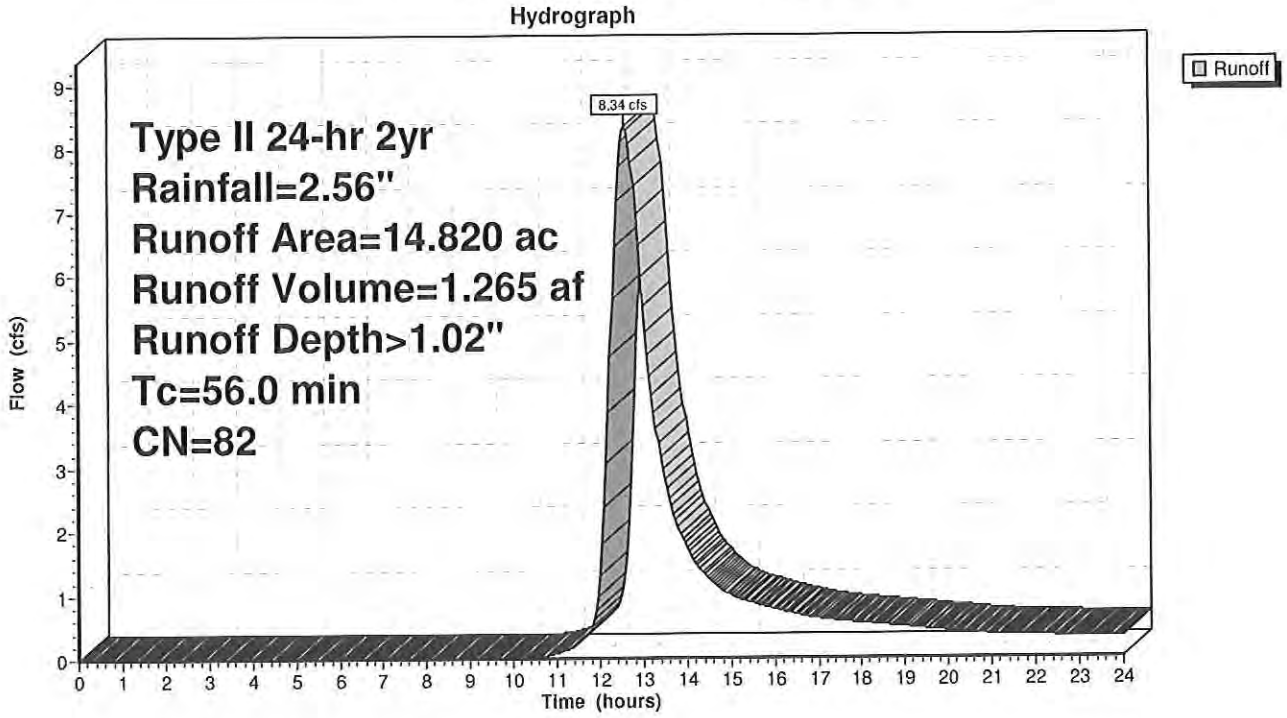
Runoff = 8.34 cfs @ 12.60 hrs, Volume= 1.265 af, Depth> 1.02"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2yr Rainfall=2.56"

	Area (ac)	CN	Description
*	14.820	82	
	14.820		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
56.0					Direct Entry,

Subcatchment 4S: DURING-EAST



Summary for Subcatchment 5S: DURING-WEST

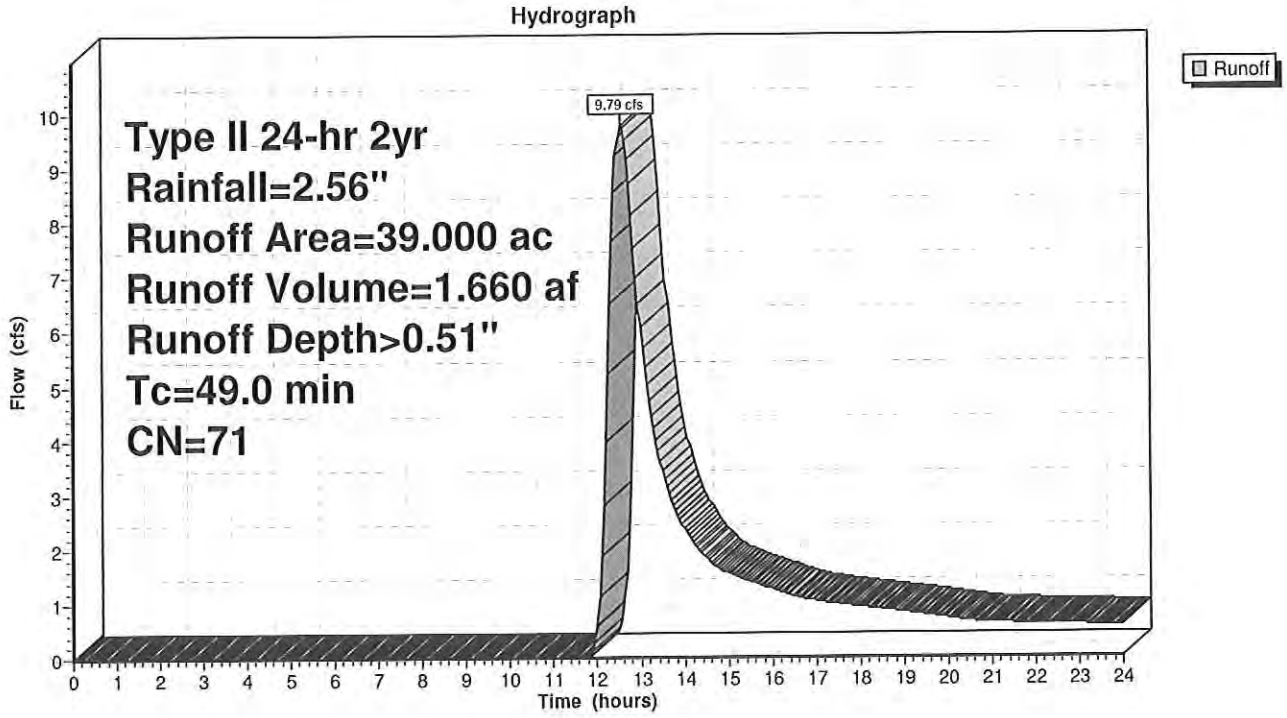
Runoff = 9.79 cfs @ 12.57 hrs, Volume= 1.660 af, Depth> 0.51"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2yr Rainfall=2.56"

	Area (ac)	CN	Description
*	39.000	71	
	39.000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
49.0					**Direct Entry,**

Subcatchment 5S: DURING-WEST



Summary for Subcatchment 3S: DURING-SITE

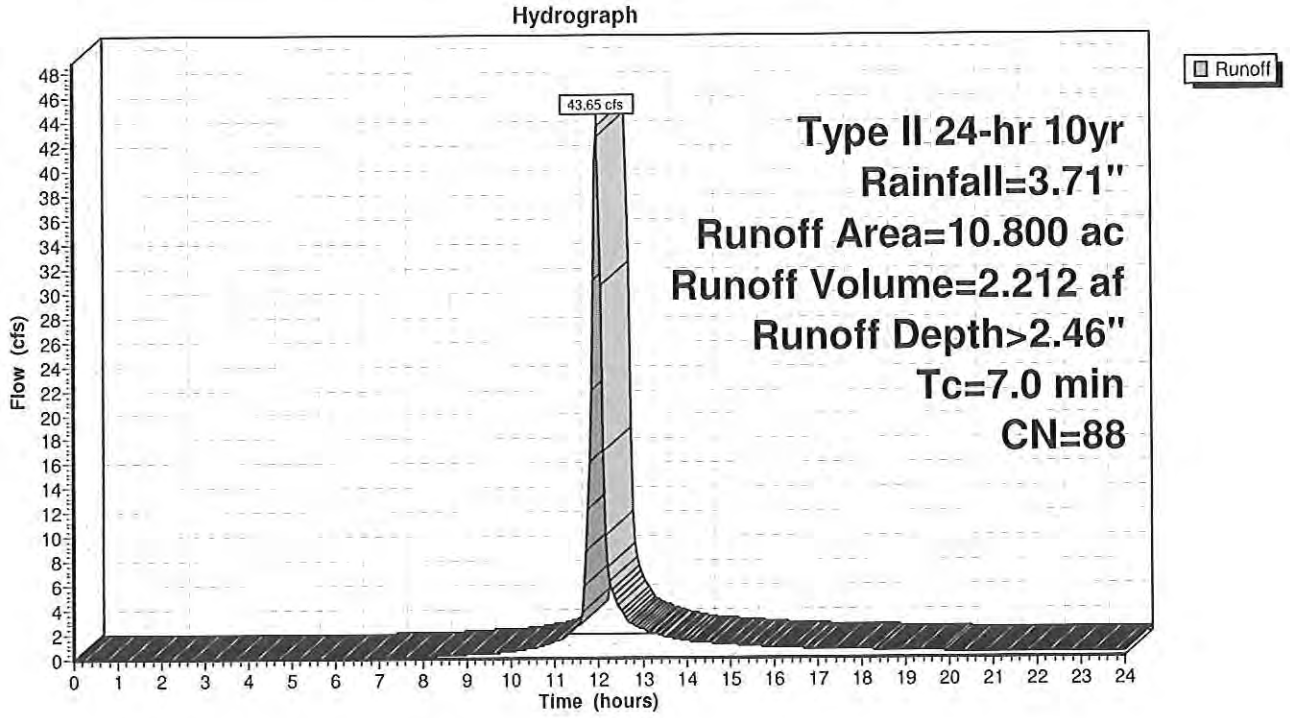
Runoff = 43.65 cfs @ 11.98 hrs, Volume= 2.212 af, Depth> 2.46"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10yr Rainfall=3.71"

	Area (ac)	CN	Description
*	10.800	88	
	10.800		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					Direct Entry,

Subcatchment 3S: DURING-SITE



Summary for Subcatchment 4S: DURING-EAST

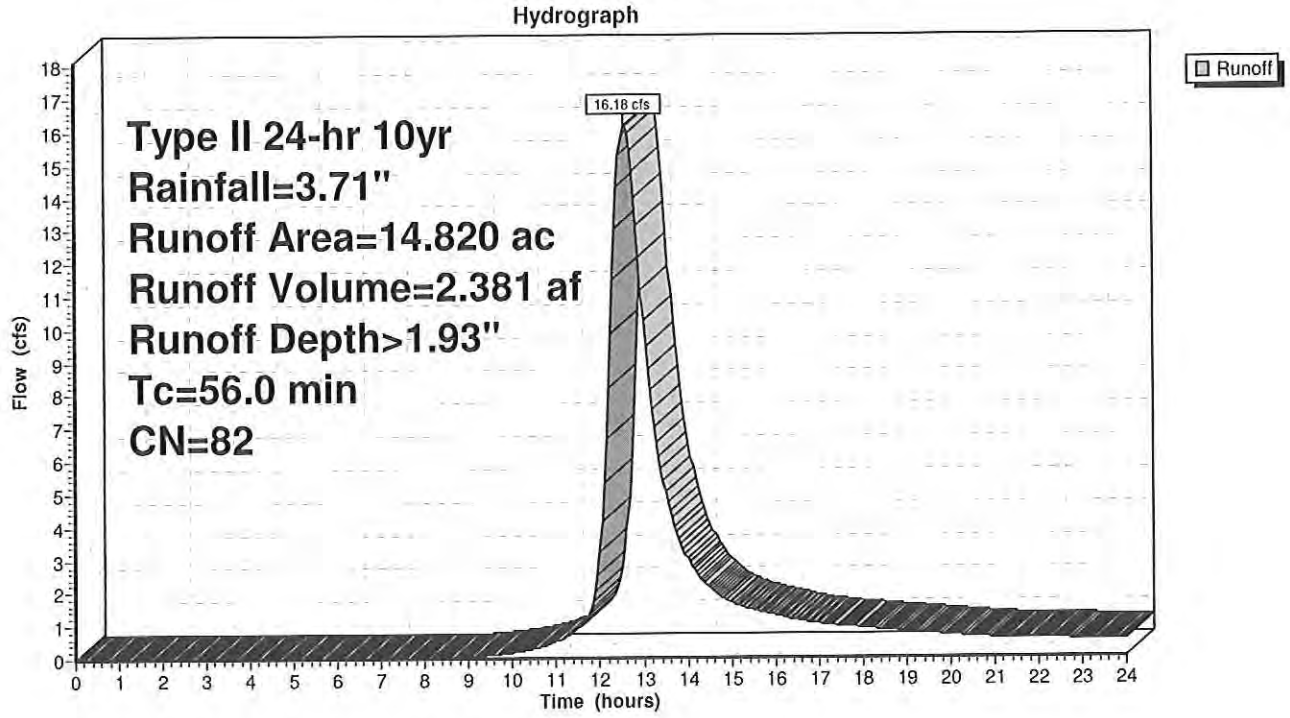
Runoff = 16.18 cfs @ 12.58 hrs, Volume= 2.381 af, Depth> 1.93"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10yr Rainfall=3.71"

	Area (ac)	CN	Description
*	14.820	82	
	14.820		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
56.0					Direct Entry,

Subcatchment 4S: DURING-EAST



Summary for Subcatchment 5S: DURING-WEST

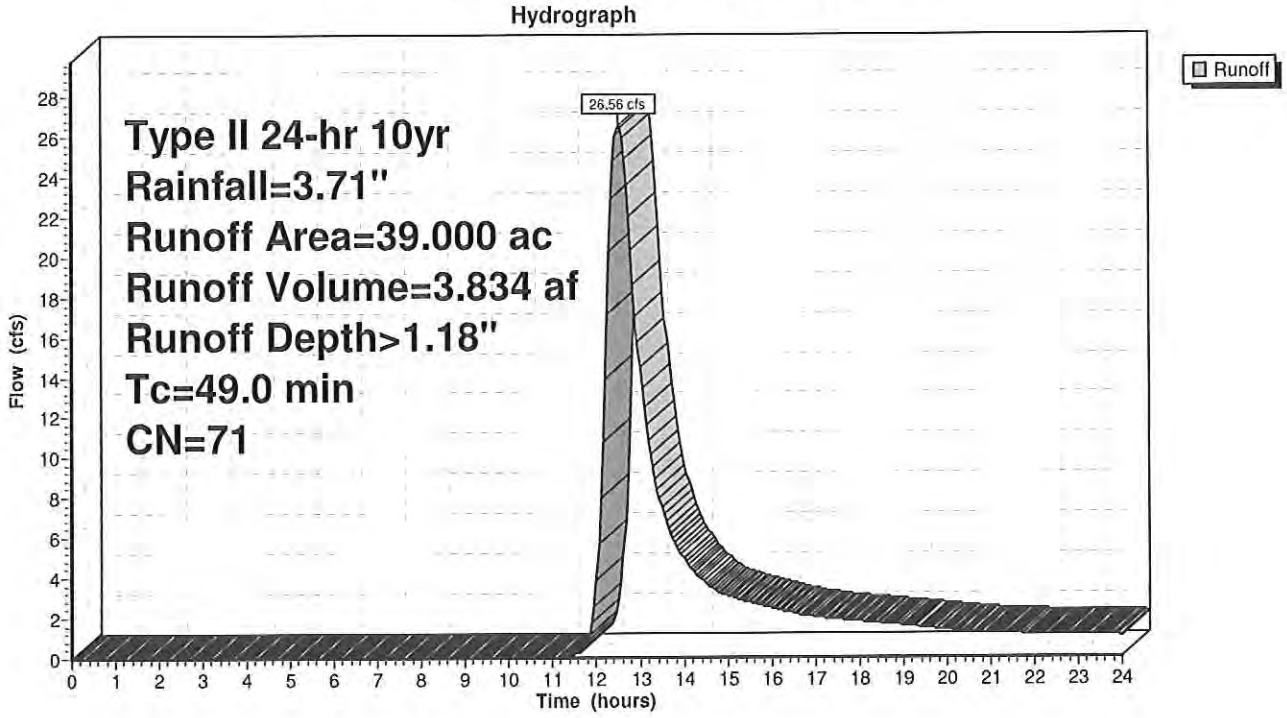
Runoff = 26.56 cfs @ 12.52 hrs, Volume= 3.834 af, Depth> 1.18"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10yr Rainfall=3.71"

	Area (ac)	CN	Description
*	39.000	71	
	39.000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
49.0					**Direct Entry,**

Subcatchment 5S: DURING-WEST



Summary for Subcatchment 3S: DURING-SITE

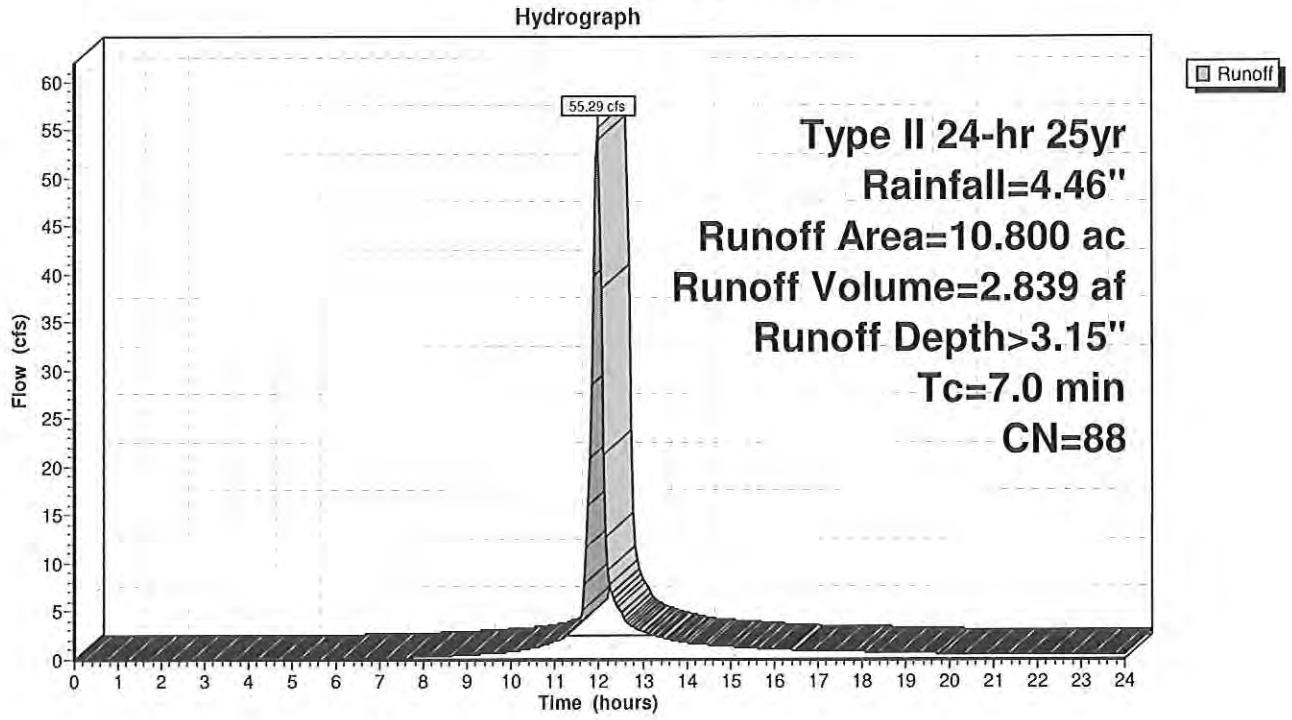
Runoff = 55.29 cfs @ 11.98 hrs, Volume= 2.839 af, Depth> 3.15"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 25yr Rainfall=4.46"

	Area (ac)	CN	Description
*	10.800	88	
	10.800		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry,**

Subcatchment 3S: DURING-SITE



Summary for Subcatchment 4S: DURING-EAST

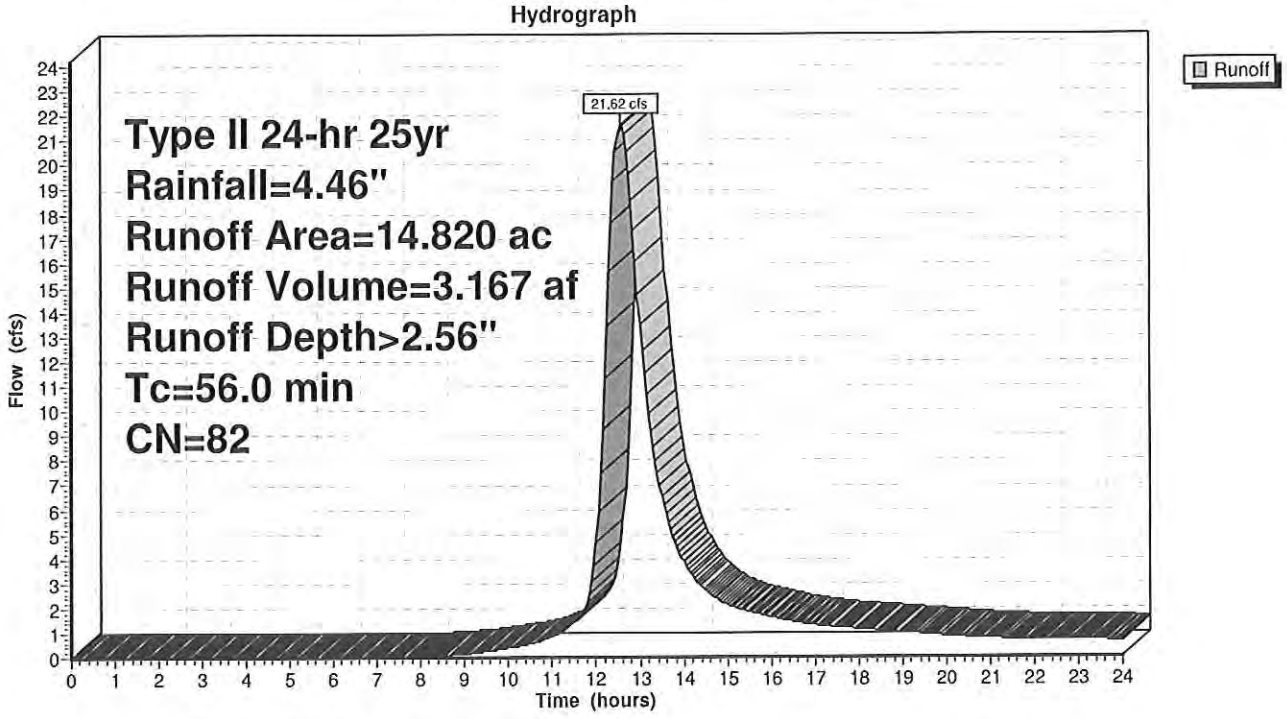
Runoff = 21.62 cfs @ 12.57 hrs, Volume= 3.167 af, Depth> 2.56"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 25yr Rainfall=4.46"

	Area (ac)	CN	Description
*	14.820	82	
	14.820		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
56.0					**Direct Entry,**

Subcatchment 4S: DURING-EAST



Summary for Subcatchment 5S: DURING-WEST

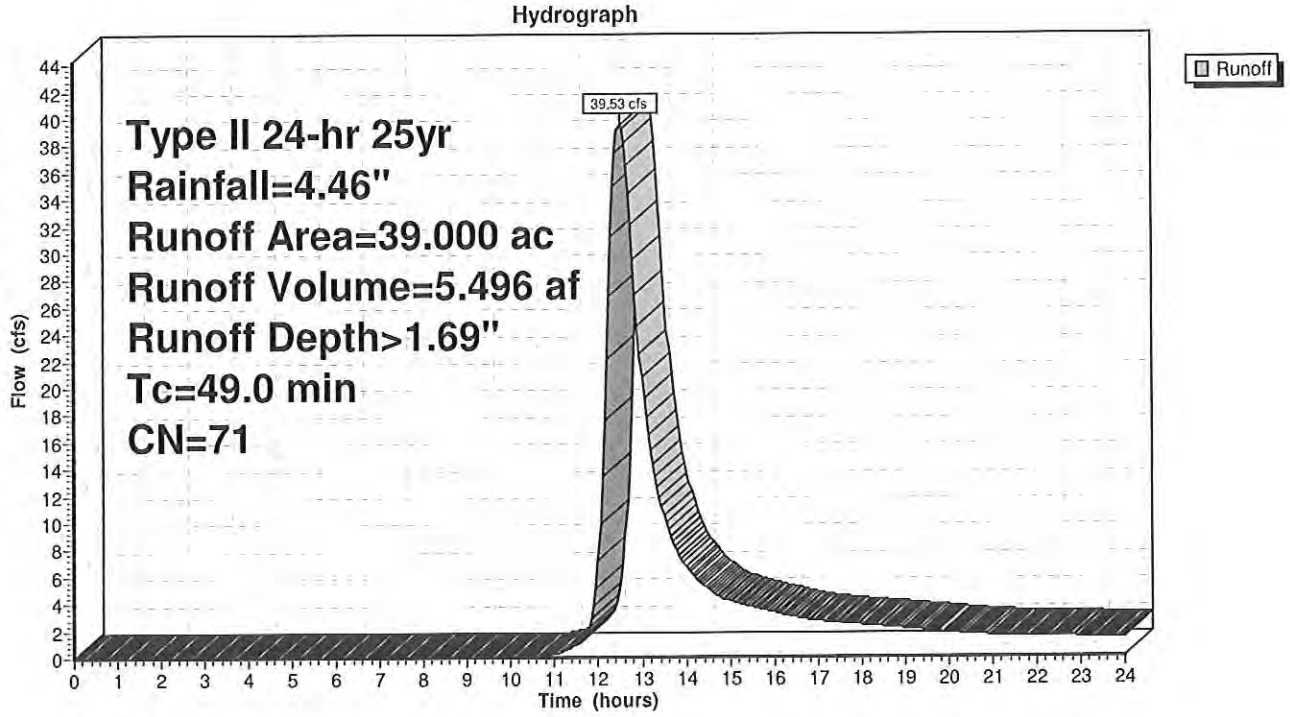
Runoff = 39.53 cfs @ 12.51 hrs, Volume= 5.496 af, Depth> 1.69"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 25yr Rainfall=4.46"

	Area (ac)	CN	Description
*	39.000	71	
	39.000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
49.0					**Direct Entry,**

Subcatchment 5S: DURING-WEST



Summary for Subcatchment 3S: DURING-SITE

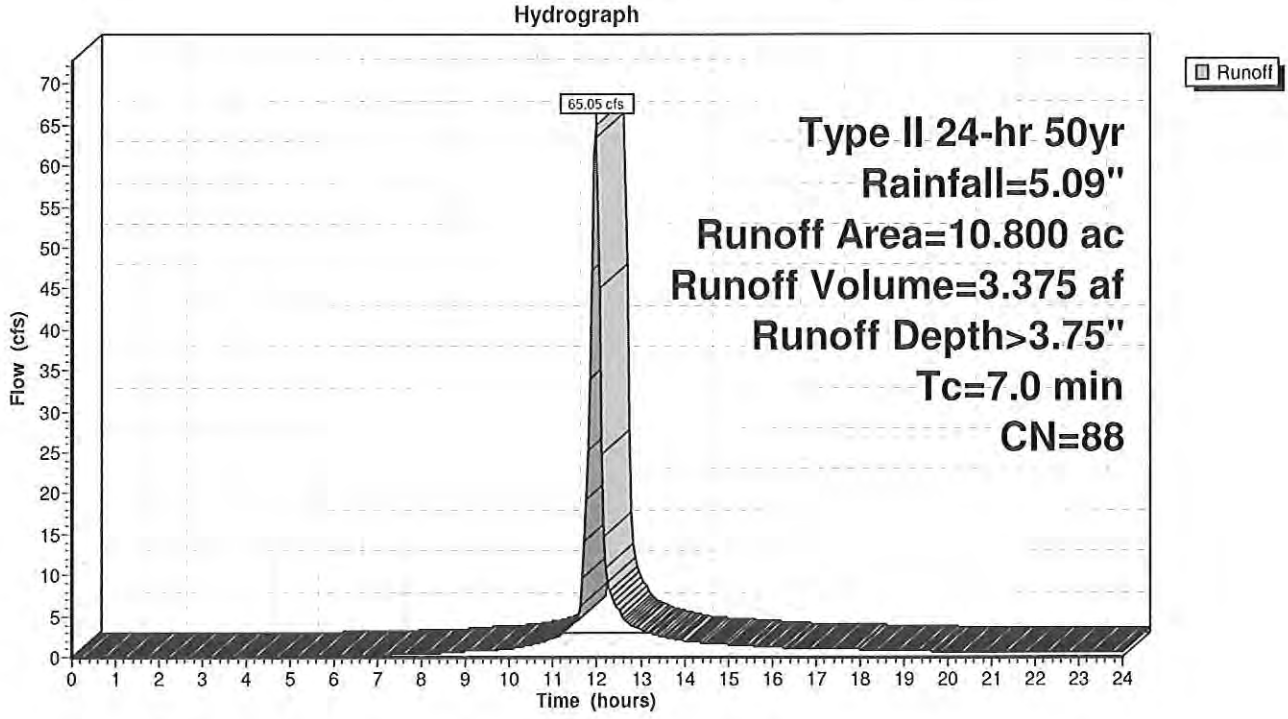
Runoff = 65.05 cfs @ 11.98 hrs, Volume= 3.375 af, Depth> 3.75"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 50yr Rainfall=5.09"

	Area (ac)	CN	Description
*	10.800	88	
	10.800		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry,**

Subcatchment 3S: DURING-SITE



Summary for Subcatchment 4S: DURING-EAST

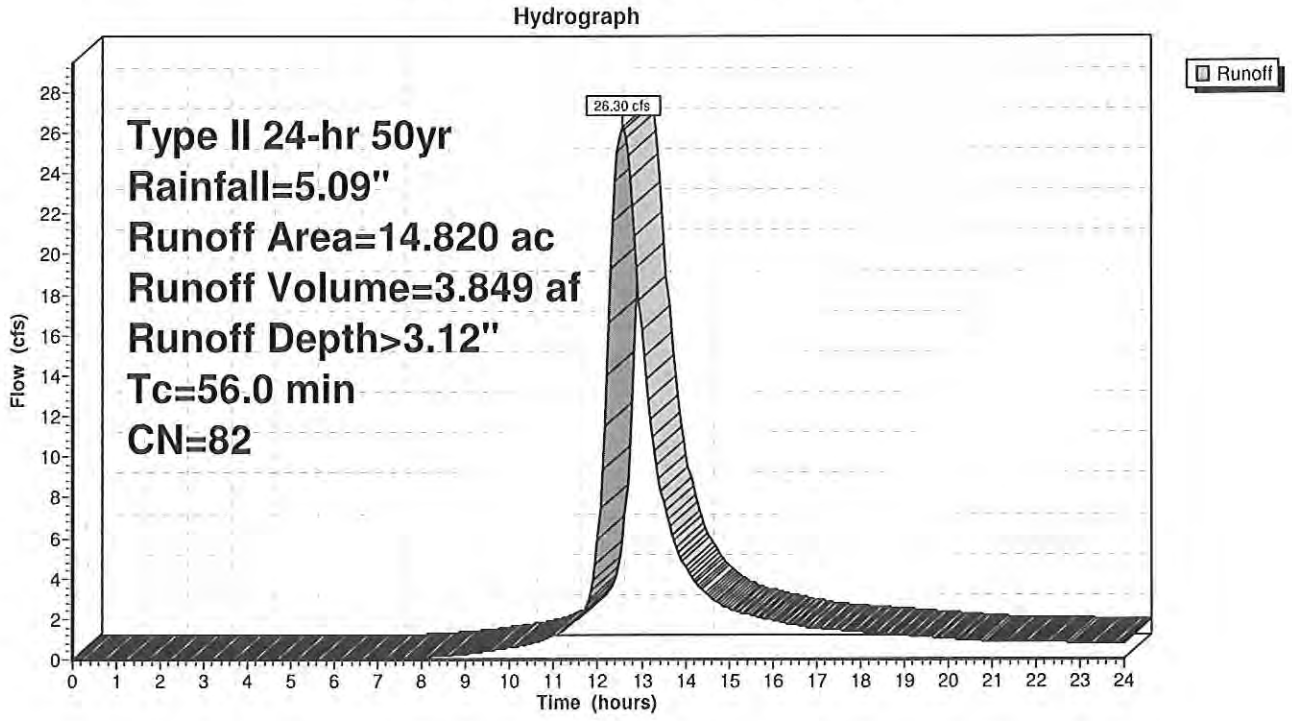
Runoff = 26.30 cfs @ 12.57 hrs, Volume= 3.849 af, Depth> 3.12"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 50yr Rainfall=5.09"

	Area (ac)	CN	Description
*	14.820	82	
	14.820		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
56.0					**Direct Entry,**

Subcatchment 4S: DURING-EAST



Summary for Subcatchment 5S: DURING-WEST

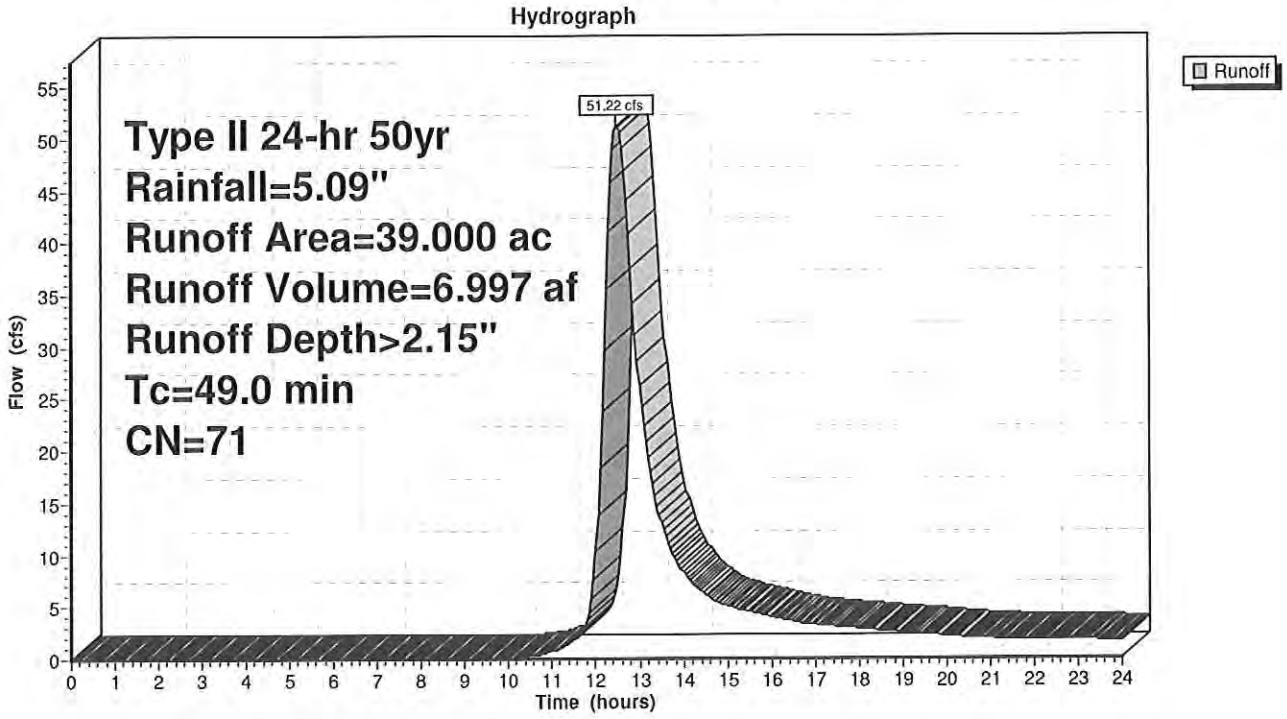
Runoff = 51.22 cfs @ 12.50 hrs, Volume= 6.997 af, Depth> 2.15"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 50yr Rainfall=5.09"

	Area (ac)	CN	Description
*	39.000	71	
	39.000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
49.0					**Direct Entry,**

Subcatchment 5S: DURING-WEST



Summary for Subcatchment 3S: DURING-SITE

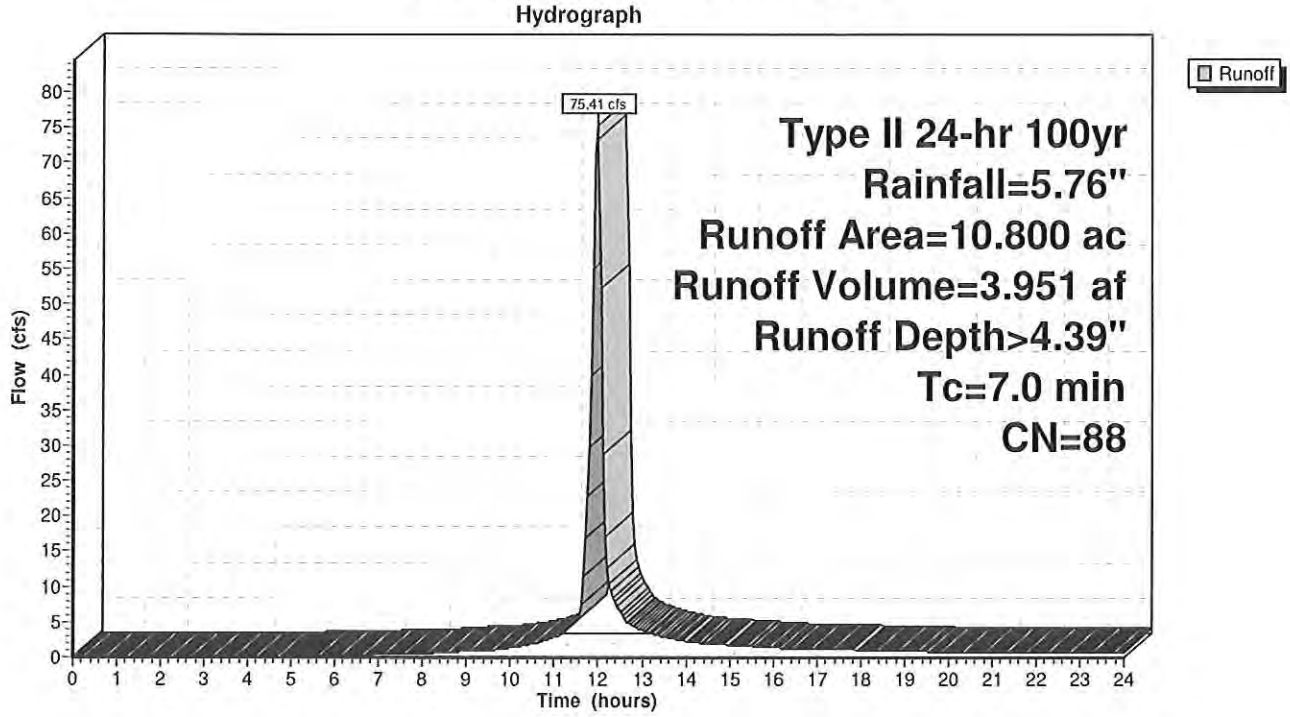
Runoff = 75.41 cfs @ 11.98 hrs, Volume= 3.951 af, Depth> 4.39"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 100yr Rainfall=5.76"

	Area (ac)	CN	Description
*	10.800	88	
	10.800		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry,**

Subcatchment 3S: DURING-SITE



Summary for Subcatchment 4S: DURING-EAST

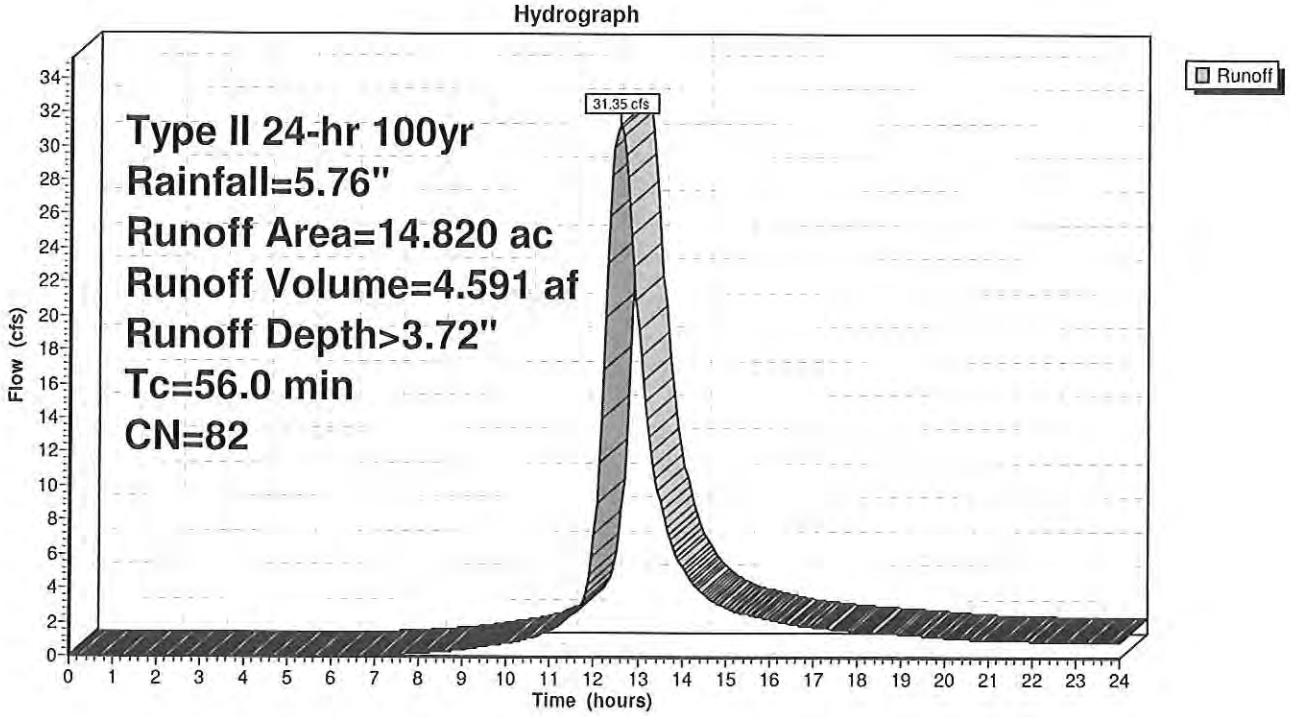
Runoff = 31.35 cfs @ 12.56 hrs, Volume= 4.591 af, Depth> 3.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 100yr Rainfall=5.76"

	Area (ac)	CN	Description
*	14.820	82	
	14.820		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
56.0					**Direct Entry,**

Subcatchment 4S: DURING-EAST



Summary for Subcatchment 5S: DURING-WEST

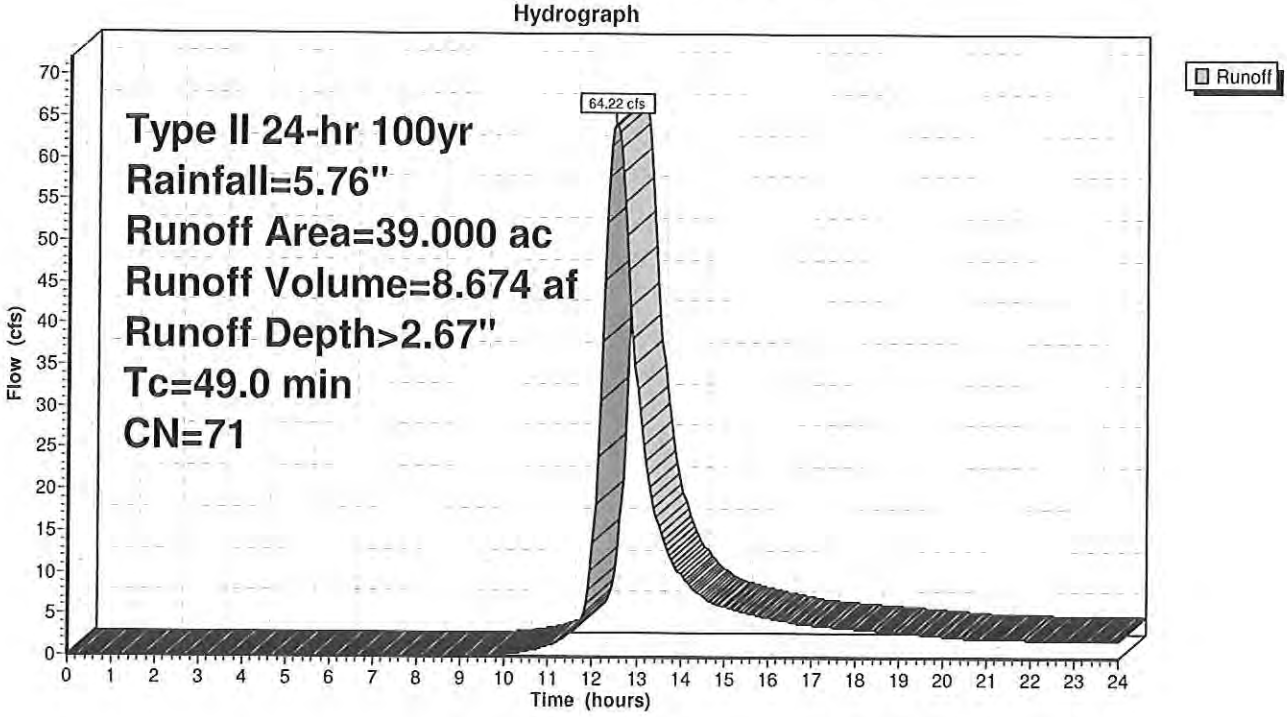
Runoff = 64.22 cfs @ 12.49 hrs, Volume= 8.674 af, Depth> 2.67"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 100yr Rainfall=5.76"

	Area (ac)	CN	Description
*	39.000	71	
	39.000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
49.0					Direct Entry,

Subcatchment 5S: DURING-WEST

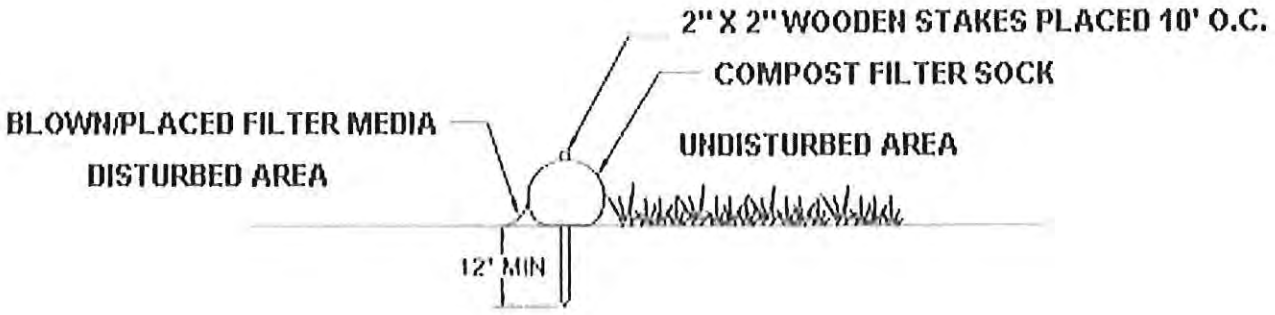


Section 5
E&S Design Worksheets

5.1 Compost Filter Sock Design Worksheets

STANDARD E&S WORKSHEET #1
Compost Filter Socks

PROJECT NAME: ITC LAKE ERIE CONNECTOR, LLC
LOCATION: CONNEAUT TOWNSHIP, ERIE COUNTY
PREPARED BY: ASH DATE: 6/16/2015
CHECKED BY: SRM DATE: 6/26/2015



SOCK NO.	Dia. In.	LOCATION	SLOPE PERCENT	SLOPE LENGTH ABOVE BARRIER (FT)	
				ACTUAL	ALLOWABLE
1	12	SEE PLAN SHEET ES-3	33	25	40
2	12	"	< 2	350	520
3	12	"	33	20	40
4	12	"	25	50	55
5	12	"	< 2	500	520

5.2 Diversion and Conveyance Channel Design Worksheets

STANDARD E&S WORKSHEET # 11
Channel Design Data

PROJECT NAME: ITC LAKE ERIE CONNECTOR, LLC
LOCATION: ERIE CONVERTER STATION, CONNEAUT TWP., ERIE CO.
PREPARED BY: ABH DATE: 6/22/2015
CHECKED BY: SRH DATE: 6/22/2015

CHANNEL OR CHANNEL SECTION		C1				
TEMPORARY OR PERMANENT?	(T OR P)	T				
DESIGN STORM	(2, 5, OR 10 YR)	10				
ACRES	(AC)	5.4		} APPROX 1/2 OF		
MULTIPLIER	(1.6, 2.25, or 2.75)[1]			} N and QR	FOR	
Q_r (REQUIRED CAPACITY)	(CFS)	21.8		} AREA "SITE"		
Q (CALCULATED AT FLOW DEPTH d)	(CFS)					
PROTECTIVE LINING[2]		STRAW/NET				
n (MANNING'S COEFFICIENT)[2]		0.025				
V_a (ALLOWABLE VELOCITY)	(FPS)					
V (CALCULATED AT FLOW DEPTH d)	(FPS)	3.21				
τ_a (MAX ALLOWABLE SHEAR STRESS)	(LB/FT^2)	1.45				
τ_d (CALC'D SHEAR STRESS AT FLOW DEPTH d)	(LB/FT^2)	0.31				
CHANNEL BOTTOM WIDTH	(FT)	4.00				
CHANNEL SIDE SLOPES	(H:V)	3:1				
D (TOTAL DEPTH)	(FT)	2.00				
CHANNEL TOP WIDTH @ D	(FT)	16.00				
d (CALCULATED FLOW DEPTH)	(FT)	0.98				
CHANNEL TOP WIDTH @ FLOW DEPTH d	(FT)	9.88				
BOTTOM WIDTH: FLOW DEPTH RATIO	(12:1 MAX)	4.1				
d_{50} STONE SIZE	(IN)					
A (CROSS-SECTIONAL AREA)	(SQ. FT.)	6.80				
R (HYDRAULIC RADIUS)		0.67				
S (BED SLOPE)[3]	(FT/FT)	0.005				
S_c (CRITICAL SLOPE)	(FT/FT)	0.011				
$.7S_c$	(FT/FT)	0.008				
$1.3S_c$	(FT/FT)	0.014				
STABLE FLOW?	(Y/N)	Y				
FREEBOARD BASED ON UNSTABLE FLOW	(FT)					
FREEBOARD BASED ON STABLE FLOW	(FT)	0.25				
MINIMUM REQUIRED FREEBOARD[4]	(FT)	0.50				
DESIGN METHOD FOR PROTECTIVE LINING[5] PERMISSIBLE VELOCITY (V) OR SHEAR STRESS (S)		S				
FREEBOARD PROVIDED	(FT)	1.02				

1. Use 1.6 for Temporary Channels; 2.25 for Temporary Channels in Special Protection (HQ or EV) Watersheds; 2.75 for Permanent Channels. For Rational Method, enter "N/A" and attach E&S Worksheets 9 and 10. For TR-55 enter "N/A" and attach appropriate Worksheets.
2. Adjust "n" value for changes in channel liner and flow depth. For vegetated channels, provide data for manufactured linings without vegetation and with vegetation in separate columns.
3. Slopes may not be averaged.
4. Minimum Freeboard is 0.5 ft. or ¼ Total Channel Depth, whichever is greater
5. Permissible velocity lining design method is not acceptable for channels with a bed slope of 10% or greater. Shear stress lining design method is required for channels with a bed slope of 10% or greater. Shear stress lining design method may be used for any channel bed slope.

STANDARD E&S WORKSHEET # 11
Channel Design Data

PROJECT NAME: ITC LAKE ERIE CONNECTOR, LLC
LOCATION: ERIE CONVERTER STATION, CONNEAUT TWP., ERIE CO.
PREPARED BY: ABM DATE: 6/22/2015
CHECKED BY: SRM DATE: 6/22/2015

CHANNEL OR CHANNEL SECTION		D1	D1			
TEMPORARY OR PERMANENT?	(T OR P)	T	P			
DESIGN STORM	(2, 5, OR 10 YR)	10	10			
ACRES	(AC)	20.7	20.7	APPROX. 1/2 OF A and QR FOR AREA "WEST"		
MULTIPLIER	(1.6, 2.25, or 2.75)[1]					
Q_r (REQUIRED CAPACITY)	(CFS)	12.4	12.4			
Q (CALCULATED AT FLOW DEPTH d)	(CFS)					
PROTECTIVE LINING[2]		STRAW/NET	VEG. C			
n (MANNING'S COEFFICIENT)[2]		0.025	0.094			
V_a (ALLOWABLE VELOCITY)	(FPS)					
V (CALCULATED AT FLOW DEPTH d)	(FPS)	2.73	1.05			
τ_a (MAX ALLOWABLE SHEAR STRESS)	(LB/FT^2)	1.45	1.0			
τ_d (CALC'D SHEAR STRESS AT FLOW DEPTH d)	(LB/FT^2)	0.23	0.45			
CHANNEL BOTTOM WIDTH	(FT)	4.0	4.0			
CHANNEL SIDE SLOPES	(H:V)	3:1	3:1			
D (TOTAL DEPTH)	(FT)	2.00	2.00			
CHANNEL TOP WIDTH @ D	(FT)	16.00	16.00			
d (CALCULATED FLOW DEPTH)	(FT)	0.73	1.43			
CHANNEL TOP WIDTH @ FLOW DEPTH d	(FT)	8.38	12.56			
BOTTOM WIDTH: FLOW DEPTH RATIO	(12:1 MAX)	5.5	2.9			
d_{50} STONE SIZE	(IN)					
A (CROSS-SECTIONAL AREA)	(SQ. FT.)	4.52	11.81			
R (HYDRAULIC RADIUS)		0.52	0.91			
S (BED SLOPE)[3]	(FT/FT)	0.005	0.005			
S_c (CRITICAL SLOPE)	(FT/FT)	0.012	0.175			
$.7S_c$	(FT/FT)	0.008	0.123			
$1.3S_c$	(FT/FT)	0.016	0.228			
STABLE FLOW?	(Y/N)	Y	Y			
FREEBOARD BASED ON UNSTABLE FLOW	(FT)					
FREEBOARD BASED ON STABLE FLOW	(FT)	0.18	0.34			
MINIMUM REQUIRED FREEBOARD[4]	(FT)	0.50	0.50			
DESIGN METHOD FOR PROTECTIVE LINING [5] PERMISSIBLE VELOCITY (V) OR SHEAR STRESS (S)		S	S			
FREEBOARD PROVIDED	(FT)	1.27	0.57			

1. Use 1.6 for Temporary Channels; 2.25 for Temporary Channels in Special Protection (HQ or EV) Watersheds; 2.75 for Permanent Channels. For Rational Method, enter "N/A" and attach E&S Worksheets 9 and 10. For TR-55 enter "N/A" and attach appropriate Worksheets.
2. Adjust "n" value for changes in channel liner and flow depth. For vegetated channels, provide data for manufactured linings without vegetation and with vegetation in separate columns.
3. Slopes may not be averaged.
4. Minimum Freeboard is 0.5 ft. or ¼ Total Channel Depth, whichever is greater
5. Permissible velocity lining design method is not acceptable for channels with a bed slope of 10% or greater. Shear stress lining design method is required for channels with a bed slope of 10% or greater. Shear stress lining design method may be used for any channel bed slope.

STANDARD E&S WORKSHEET # 11
Channel Design Data

PROJECT NAME: ITC LAKE ERIE CONNECTOR, LLC
LOCATION: ERIE CONNECTER STATION, CONNEAUT TWP., ERIE CO.
PREPARED BY: ABM DATE: 6/22/2015
CHECKED BY: ERM DATE: 6/22/2015

CHANNEL OR CHANNEL SECTION		D2	D2			
TEMPORARY OR PERMANENT?	(T OR P)	T	P			
DESIGN STORM	(2, 5, OR 10 YR)	10	10			
ACRES	(AC)	41.4	41.4			
MULTIPLIER	(1.6, 2.25, or 2.75)[1]			AREA	"WEST"	
Q_r (REQUIRED CAPACITY)	(CFS)	24.7	24.7			
Q (CALCULATED AT FLOW DEPTH d)	(CFS)					
PROTECTIVE LINING[2]		STRAW/NET	VEG. C			
n (MANNING'S COEFFICIENT)[2]		0.025	0.078			
V_a (ALLOWABLE VELOCITY)	(FPS)					
V (CALCULATED AT FLOW DEPTH d)	(FPS)	3.20	1.41			
τ_a (MAX ALLOWABLE SHEAR STRESS)	(LB/FT^2)	1.45	1.0			
τ_d (CALC'D SHEAR STRESS AT FLOW DEPTH d)	(LB/FT^2)	0.28	0.50			
CHANNEL BOTTOM WIDTH	(FT)	6.00	6.00			
CHANNEL SIDE SLOPES	(H:V)	3:1	3:1			
D (TOTAL DEPTH)	(FT)	2.20	2.20			
CHANNEL TOP WIDTH @ D	(FT)	19.20	19.20			
d (CALCULATED FLOW DEPTH)	(FT)	0.89	1.61			
CHANNEL TOP WIDTH @ FLOW DEPTH d	(FT)	11.34	15.70			
BOTTOM WIDTH: FLOW DEPTH RATIO	(12:1 MAX)	6.7	3.7			
d_{50} STONE SIZE	(IN)					
A (CROSS-SECTIONAL AREA)	(SQ. FT.)	7.7	17.5			
R (HYDRAULIC RADIUS)		0.66	1.08			
S (BED SLOPE)[3]	(FT/FT)	0.005	0.005			
S_c (CRITICAL SLOPE)	(FT/FT)	0.011	0.111			
$.7S_c$	(FT/FT)	0.008	0.078			
$1.3S_c$	(FT/FT)	0.014	0.141			
STABLE FLOW?	(Y/N)	Y	Y			
FREEBOARD BASED ON UNSTABLE FLOW	(FT)					
FREEBOARD BASED ON STABLE FLOW	(FT)	0.22	0.40			
MINIMUM REQUIRED FREEBOARD[4]	(FT)	0.50	0.50			
DESIGN METHOD FOR PROTECTIVE LINING[5] PERMISSIBLE VELOCITY (V) OR SHEAR STRESS (S)		S	S			
FREEBOARD PROVIDED (FT)		1.31	0.59			

1. Use 1.6 for Temporary Channels; 2.25 for Temporary Channels in Special Protection (HQ or EV) Watersheds; 2.75 for Permanent Channels. For Rational Method, enter "N/A" and attach E&S Worksheets 9 and 10. For TR-55 enter "N/A" and attach appropriate Worksheets.
2. Adjust "n" value for changes in channel liner and flow depth. For vegetated channels, provide data for manufactured linings without vegetation and with vegetation in separate columns.
3. Slopes may not be averaged.
4. Minimum Freeboard is 0.5 ft. or ¼ Total Channel Depth, whichever is greater
5. Permissible velocity lining design method is not acceptable for channels with a bed slope of 10% or greater. Shear stress lining design method is required for channels with a bed slope of 10% or greater. Shear stress lining design method may be used for any channel bed slope.

5.3 Sediment Basin Design Worksheets

STANDARD E&S WORKSHEET # 12
Sediment Basin Capacity Requirements

PROJECT NAME: ITC LAKE ERIE CONNECTOR LLC
LOCATION: CONNEAUT TOWNSHIP, ERIE COUNTY
PREPARED BY: ARH DATE: 6/16/2015
CHECKED BY: SRH DATE: 1/15/2016

BASIN NUMBER		1	
PERMANENT OR TEMPORARY BASIN?	(P or T)	T	
SPECIAL PROTECTION WATERSHED?	(YES OR NO)	YES	
Karst soils?	(YES OR NO)	NO	
(A) MAXIMUM TOTAL DRAINAGE AREA	(AC)	10.8	
IS DRAINAGE AREA (A) MORE THAN 10% LARGER THAN THE PRECONSTRUCTION CONDITION?	(YES OR NO)	NO	
(A_1) DISTURBED ACRES IN DRAINAGE AREA (AC)		10.8	
(I) INITIAL REQ'D DEWATERING ZONE (5,000 X A)	(CF)	54000	
(T) REDUCTION FOR TOP DEWATERING (-700 X A)	(CF)	N/A	
(P) REDUCTION FOR PERMANENT POOL (-700 X A)	(CF)	N/A	
(L) REDUCTION FOR 4:1 FLOW LENGTH:WIDTH (-350 X A)	(CF)	N/A	
(D) REDUCTION FOR 4 TO 7 DAY DEWATERING (- 350 X A)	(CF)	N/A	
(Sv) REQUIRED DEWATERING ZONE [I - (T+P+L+D)][1]	(CF)	54000	
(Sd) REQUIRED SEDIMENT STORAGE VOLUME (1000 X A_1)	(CF)	10800	
(St) TOTAL REQUIRED STORAGE VOLUME (Sv + Sd)	(CF)	64800	
TOTAL STORAGE VOLUME PROVIDED (@ ELEV 3)[2]	(CF)	69125	
DEWATERING TIME FOR DEWATERING ZONE	(DAYS)	5.7	
REQUIRED DISCHARGE CAPACITY (2 X A)	(CFS)[3]	55.3 *	
PRINCIPAL SPILLWAY TYPE (PERFORATED RISER, SKIMMER, etc.)		SKIMMER	
PEAK FLOW FROM 10 YR/24 HR STORM FOR DRAINAGE AREA (A)		43.7	
PRINCIPAL SPILLWAY CAPACITY (@ ELEV 5)	(CFS)[4]	43.8	
EMERGENCY SPILLWAY CAPACITY (@ ELEV 5)	(CFS)[4]	63.5	
TOTAL BASIN DISCHARGE CAPACITY (@ ELEV 5)	(CFS)	107.3	
EMERGENCY SPILLWAY PROTECTIVE LINING[5]		TRM	
OUTLET TO A SURFACE WATER?	(YES OR NO)[6]	YES	
PEAK FLOW FROM A 100 YR/24 HR STORM FOR DRG. AREA (A)		75.4	

1 The minimum dewatering zone capacity for sediment basins is (3,600 X A). No reduction is permitted in Special Protection (HQ and EV) Watersheds.
2 Total Storage Volume provided at riser crest.
3 Or provide calculations to show peak flow from 25 yr./24 hr. storm for area (A) is routed through the basin.
4 Provide supporting computations.
5 If grass lining is proposed, spillway should be constructed in original ground unless a suitable TRM lining is used. Wherever a TRM is used, riprap should be placed at the bottom of the embankment to prevent scour.
6 If no, and basin is permanent or drainage area is more than 10% larger than pre-construction, provide supporting calculations to show accelerated erosion will not result from the proposed discharge. For discharges increasing volume or rate of flow onto a neighboring property prior to entering a surface water, an easement should be obtained prior to plan submittal.

* 25-YR, 24-HR PEAK FLOW IS 55.3 CFS

FOR 24-HR PEAK FLOW CALCULATIONS, REFER TO SECTION 4.4

Determining the Skimmer Size and the Required Orifice for the *Faircloth Skimmer®* Surface Drain

November 2007

Important note: *The orifice sizing chart in the Pennsylvania Erosion Control Manual and reproduced in the North Carolina Design Manual* ***DOES NOT APPLY*** *to our skimmers. It will give the wrong size orifice and not specify which size skimmer is required. Please use the information below to choose the size skimmer required for the basin volume provided and determine the orifice size required for the drawdown time, typically 4-7 days in Pennsylvania and 3 days in North Carolina.*

The **size** of a Faircloth Skimmer®, for example a 4" skimmer, refers to the maximum diameter of the skimmer inlet. The inlet on each of the 8 sizes offered can be reduced to adjust the flow rate by cutting a hole or ***orifice*** in a plug using an adjustable cutter (both supplied).

Determining the skimmer size needed and the orifice for that skimmer required to drain the sediment basin's volume in the required time involves two steps: **First**, determining the size skimmer required based on the volume to be drained and the number of days to drain it; and **Second**, calculate the orifice size to adjust the flow rate and "customize" the skimmer for the basin's volume. *The second step is not always necessary* if the flow rate for the skimmer with the inlet wide open equals or is close to the flow rate required for the basin volume and the drawdown time.

Both the skimmer size and the required orifice radius for the skimmer should be shown for each basin on the erosion and sediment control plan. Make it clear that the dimension is either the radius or the diameter. It is also helpful to give the basin volume in case there are questions. During the skimmer installation the required orifice can be cut in the plastic plug using the supplied adjustable cutter and installed in the skimmer using the instructions provided.

The plan review and enforcement authority may require the calculations showing that the skimmer used can drain the basin in the required time.

Determining the Skimmer Size

Step 1. Below are approximate **skimmer maximum flow capacities** based on typical draw down requirements, which can vary between States and jurisdictions and watersheds. If one 6" skimmer does not provide enough capacity, multiple skimmers can be used to drain the basin. For drawdown times not shown, multiply the 24-hour figure by the number of days required.

Example: A basin's volume is 29,600 cubic feet and it must be drained in 3 days. A 3" skimmer with the inlet wide open will work perfectly. (Actually, the chart below gives 29,322 cubic feet but this is well within the accuracy of the calculations and the basin's constructed volume.)
Example: A basin's volume is 39,000 cubic feet and it must be drained in 3 days. The 3" skimmer is too small; a 4" skimmer has enough capacity but it is too large, so the inlet will need

to be reduced using step 2 to adjust the flow rate for the basin's volume. (It needs a 3.2" diameter orifice.)

1½" skimmer: with a 1½" head	1,728 cubic feet in **24 hours** 3,456 cubic feet in **2 days** 5,184 cubic feet in **3 days**	6,912 cubic feet in **4 days** 12,096 cubic feet in **7 days**
2" skimmer: with a 2" head	3,283 cubic feet in **24 hours** 6,566 cubic feet in **2 days** 9,849 cubic feet in **3 days**	13,132 cubic feet in **4 days** 22,982 cubic feet in **7 days**
2½" skimmer: with a 2.5" head Revised 11-6-07	6,234 cubic feet in **24 hours** 12,468 cubic feet in **2 days** 18,702 cubic feet in **3 days**	24,936 cubic feet in **4 days** 43,638 cubic feet in **7 days**
3" skimmer: with a 3" head	9,774 cubic feet in **24 hours** 19,547 cubic feet in **2 days** 29,322 cubic feet in **3 days**	39,096 cubic feet in **4 days** 68,415 cubic feet in **7 days**
4" skimmer: with a 4" head Revised 11-6-07	20,109 cubic feet in **24 hours** 40,218 cubic feet in **2 days** 60,327 cubic feet in **3 days**	80,436 cubic feet in **4 days** 140,763 cubic feet in **7 days**
5" skimmer: with a 4" head	32,832 cubic feet in **24 hours** 65,664 cubic feet in **2 days** 98,496 cubic feet in **3 days**	131,328 cubic feet in **4 days** 229,824 cubic feet in **7 days**
6" skimmer: with a 5" head	51,840 cubic feet in **24 hours** 103,680 cubic feet in **2 days** 155,520 cubic feet in **3 days**	207,360 cubic feet in **4 days** 362,880 cubic feet in **7 days**
8" skimmer: with a 6" head **CUSTOM MADE BY ORDER**	97,978 cubic feet in **24 hours** 195,956 cubic feet in **2 days** 293,934 cubic feet in **3 days** **CALL!**	391,912 cubic feet in **4 days** 685,846 cubic feet in **7 days**

Determining the Orifice

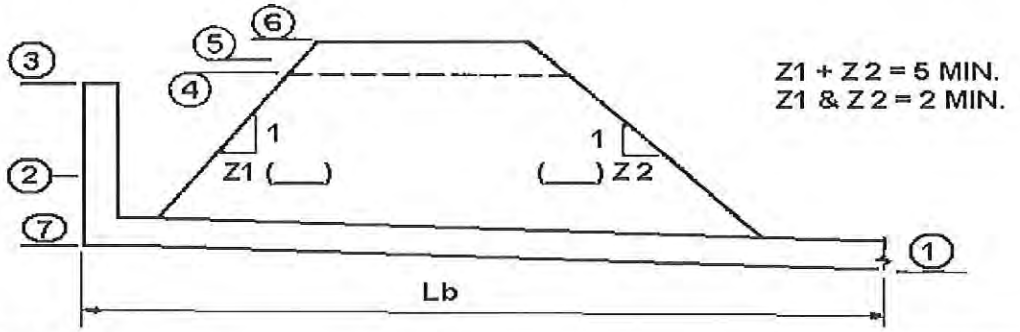
Step 2. To determine the orifice required to reduce the flow rate for the basin's volume and the number of days to drain the basin, simply use the formula volume ÷ **factor** (from the chart below) for the same size skimmer chosen in the first step and the same number of days. This calculation will give the **area** of the required orifice. Then calculate the orifice radius using Area = πr^2 and solving for r, $r = \sqrt{(Area/3.14)}$ .The supplied cutter can be adjusted to this radius to cut the orifice in the plug. The instructions with the plug and cutter has a ruler divided into tenths of inches. Again, this step is not always necessary as explained above.

An alternative method is to use the orifice equation with the head for a particular skimmer shown on the previous page and determine the orifice needed to give the required flow for the volume and draw down time. C = 0.59 is used in this chart.

Example: A 4" skimmer is the smallest skimmer that will drain 39,000 cubic feet in 3 days but a 4" inlet will drain the basin too fast (in 1.9 days) To determine the orifice required use the factor of 4,803 from the chart below for a 4" skimmer and a drawdown time of 3 days. 39,000 cubic

STANDARD E&S WORKSHEET # 13
Sediment Basin Dimensions and Elevations

PROJECT NAME: ITC LAKE ERIE CONNECTOR LLC
LOCATION: CONNEAUT TOWNSHIP, ERIE COUNTY
PREPARED BY: ABM DATE: 6/16/2015
CHECKED BY: SRH DATE: 1/15/2016



BASIN NUMBER		1	
1. DISCHARGE PIPE ELEVATION	(FT)	834.75	
2. ELEVATION AT TOP OF SEDIMENT STORAGE ZONE (@ Sd) (MIN. 1.0' ABOVE ELEVATION 7)	(FT)	836.25	
3. ELEVATION AT TOP OF DEWATERING ZONE (St) (CREST OF PRINCIPAL SPILLWAY)	(FT)	839.25	
4. EMERGENCY SPILLWAY CREST ELEVATION (MIN. 0.5' ABOVE ELEVATION 3)	(FT)	839.75	
5. 2 CFS/ACRE OR 25-YR/24-HR FLOW ELEVATION	(FT)	841.55	
6. TOP OF EMBANKMENT ELEVATION (MIN. 24" ABOVE ELEVATION 5 OR 12" WITH ROUTED 100-YR/24-HR STORM)	(FT)	842.75 *	
7. BASIN BOTTOM ELEVATION	(FT)	835.25	
AVERAGE BOTTOM WIDTH	(FT)	50	
AVERAGE BOTTOM LENGTH	(FT)	260	
(SA_{min}) REQUIRED SURFACE AREA AT ELEVATION 2	(SQ. FT.)	11300 **	
SURFACE AREA PROVIDED AT ELEVATION 2	(SQ. FT.)	14560	
AVERAGE BASIN WIDTH (W) AT ELEVATION 3	(FT)	74	
FLOW LENGTH (L) AT ELEVATION 3	(FT)	306	
FLOW LENGTH:WIDTH RATIO AT ELEVATION 3	(L/W)	4.1	
SILT CURTAIN OR FOREBAY? (IF YES, INDICATE WHICH)		N/A	
EMBANKMENT TOP WIDTH	(FT, 8' MIN.)	8	
EMBANKMENT SOIL TYPE(S)		SM, ML	
KEY TRENCH DEPTH	(FT, 2' MIN.)	2.0	
KEY TRENCH WIDTH	(FT, 4' MIN.)	4.0	
RISER DIAMETER/TYPE	(15" MIN.)	24" x 36" CONC	
BARREL DIAMETER/TYPE	(12" MIN.)	30" CPP	
Lb (BARREL LENGTH)	(FT)	64	
EMERGENCY SPILLWAY WIDTH	(FT)	10	
EMERGENCY SPILLWAY SIDE SLOPES	(H:V)	3:1	
EMERGENCY SPILLWAY DEPTH	(FT)	3.0	

For irregular shaped traps, provide stage storage data

* ROUTED 100-YR/24-HR STORM (75.4 CFS) ELEVATION IS 841.0 FT

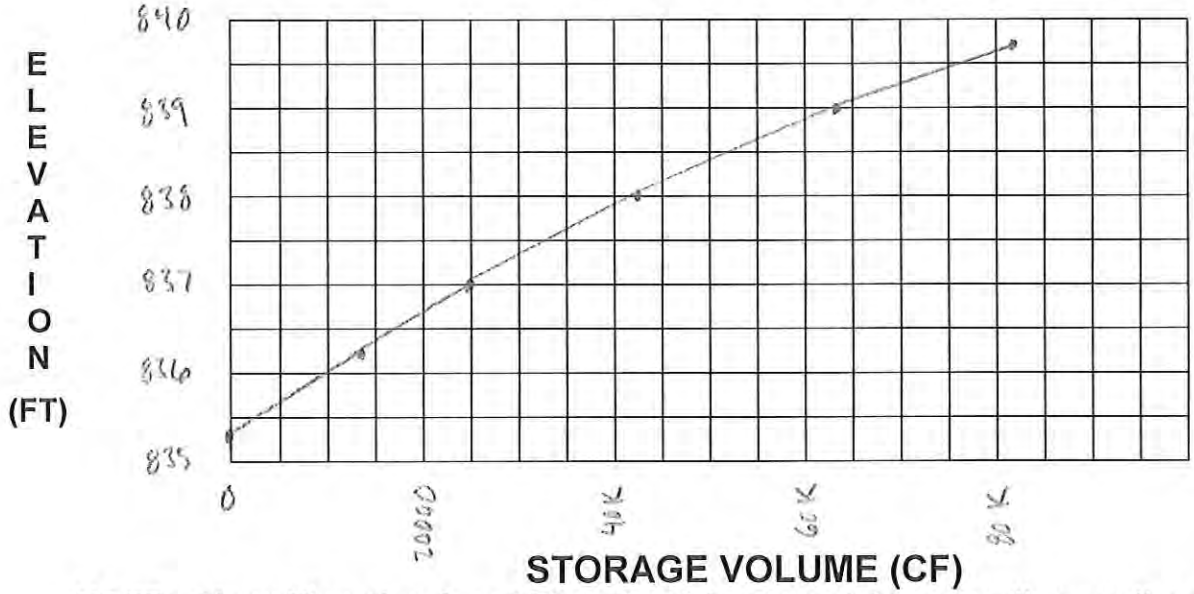
** $SA_{min} = 1.2 (q_{out} / v_s) = 1.2 (0.113 \text{ cfs}) / (7.3 \times 10^{-5} \text{ ft/s}) = 11300 \text{ ft}^2$

STANDARD E&S WORKSHEET # 14
Sediment Basin/Sediment Trap Storage Data

PROJECT NAME: ITC LAKE ERIE CONNECTOR LLC
LOCATION: CONNEAUT TOWNSHIP, ERIE COUNTY
PREPARED BY: ABH DATE: 6/16/2015
CHECKED BY: SRH DATE: 1/15/2016

WATER SURFACE ELEVATION (FEET)	AREA (SQ. FT.)	AVERAGE AREA (SQ. FT.)	DIFFERENCE IN ELEVATION (FEET)	STORAGE VOLUME (CUBIC FEET)	
				INCREMENTAL	TOTAL
835.25	12554				0
		13557	1.00	13557	13557 (Elev. 2)
836.25	14560				
		15340	0.75	11505	25062
837.00	16120				
		17438	1.00	17438	42500
838.00	18757				
		20823	1.00	20823	63323
839.00	22889				
		23206	0.25	5802	69125 (Elev. 3)
839.85	23522				

STAGE STORAGE CURVE



NOTE: Show Elevation 2 and Elevation 3 in above table as well as on the Stage Storage Curve.

STANDARD E&S WORKSHEET # 17
Sediment Basin Discharge Capacity

PROJECT NAME: ITC LAKE ERIE CONNECTOR LLC
LOCATION: CONNEAUT TOWNSHIP, ERIE COUNTY
PREPARED BY: ABH DATE: 6/10/2015
CHECKED BY: SRH DATE: 1/15/2016

PRINCIPAL SPILLWAY DISCHARGE CAPACITY

BASIN NO: 1

WATER SURFACE ELEVATION[4] (FT)	Flow into Top of TEMPORARY RISER			Flow into Top of PERMANENT RISER			BARREL PIPE FLOW		PRINCIPAL SPILLWAY CAPACITY[3] (CFS)
	HEAD (FT)	ORIFICE FLOW[1] Q(CFS)	WEIR FLOW Q(CFS)	HEAD (FT)	ORIFICE FLOW[1] Q(CFS)	WEIR FLOW Q(CFS)	HEAD[2] (FT)	Q (CFS)	
841.55	2.3								43.8

See attached HydroCAD calculation

EMERGENCY SPILLWAY DISCHARGE CAPACITY

WATER SURFACE ELEVATION[4] (FT)	EMERGENCY SPILLWAY BOTTOM WIDTH[5] (FT)	TABLE OR C VALUE USED[6]	EMERGENCY SPILLWAY CAPACITY (CFS)	REQUIRED DISCHARGE CAPACITY (CFS)	TOTAL DISCHARGE CAPACITY PROVIDED (CFS)[7]
841.55	10	See attached	63.5	55.3	107.3

See attached HydroCAD calculation

1. Flow into top of riser only (Flow through perforations not included)
2. Water surface elevation minus elevation at centerline of pipe outlet
3. Least of orifice, weir, or pipe flow (Peak flow from 10 yr/24 hr storm Min.)
4. 24" below top of embankment (12" if 100-year storm routed through basin)
5. 8 Ft. minimum
6. Use Tables 7.5 through 7.8 or equation for broad-crested weir [$Q = CLH^{1.5}$, where $C \leq 2.8$ (MAX)]; for Riprap larger than R-3 or flows less than 1.5' deep adjust C downward]
7. Principal Spillway Capacity + Emergency Spillway Capacity

Summary for Pond 6P: Sediment Basin

Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 0.00' @ 0.00 hrs Surf.Area= 0 sf Storage= 0 cf

Plug-Flow detention time= (not calculated)
Center-of-Mass det. time= (not calculated)

Volume	Invert	Avail.Storage	Storage Description
#1	835.25'	156,733 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
835.25	12,554	0	0
836.25	14,560	13,557	13,557
837.00	16,120	11,505	25,062
838.00	18,757	17,439	42,501
839.00	22,889	20,823	63,324
839.25	23,522	5,801	69,125
840.00	28,496	19,507	88,632
842.00	39,605	68,101	156,733

Device	Routing	Invert	Outlet Devices
#1	Primary	835.25'	**30.0" Round Culvert** L= 64.0' CPP, square edge headwall, Ke= 0.500 Outlet Invert= 834.75' S= 0.0078 '/' Cc= 0.900 n= 0.010
#2	Device 1	839.25'	**24.0" x 36.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Secondary	839.75'	**10.0' long x 23.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.00' (Free Discharge)
↑—**1=Culvert** (Controls 0.00 cfs)
↑—**2=Orifice/Grate** (Controls 0.00 cfs)

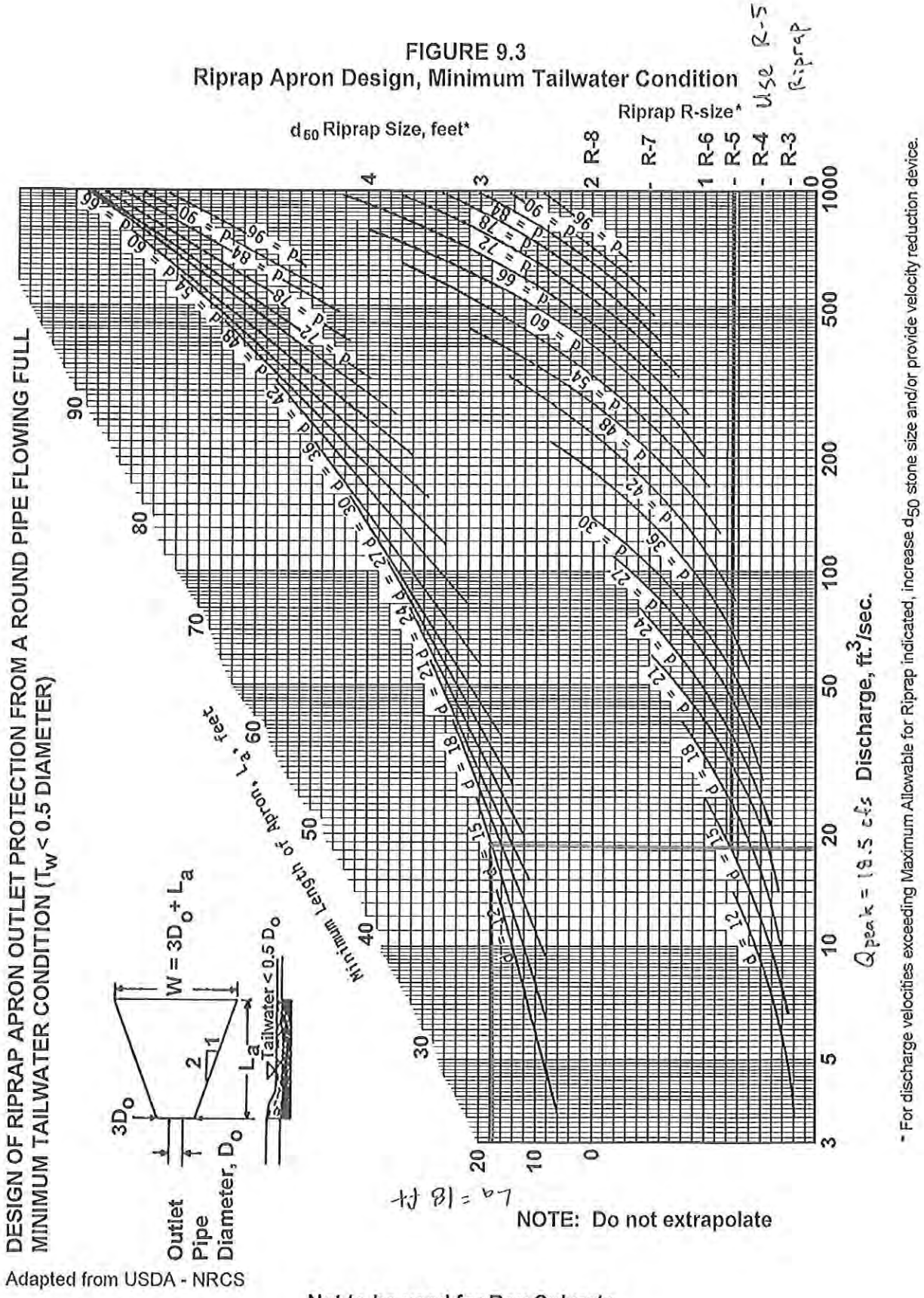
Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.00' (Free Discharge)
↑—**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Stage-Discharge for Pond 6P: Sediment Basin

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
835.25	0.00	0.00	0.00
835.35	0.00	0.00	0.00
835.45	0.00	0.00	0.00
835.55	0.00	0.00	0.00
835.65	0.00	0.00	0.00
835.75	0.00	0.00	0.00
835.85	0.00	0.00	0.00
835.95	0.00	0.00	0.00
836.05	0.00	0.00	0.00
836.15	0.00	0.00	0.00
836.25	0.00	0.00	0.00
836.35	0.00	0.00	0.00
836.45	0.00	0.00	0.00
836.55	0.00	0.00	0.00
836.65	0.00	0.00	0.00
836.75	0.00	0.00	0.00
836.85	0.00	0.00	0.00
836.95	0.00	0.00	0.00
837.05	0.00	0.00	0.00
837.15	0.00	0.00	0.00
837.25	0.00	0.00	0.00
837.35	0.00	0.00	0.00
837.45	0.00	0.00	0.00
837.55	0.00	0.00	0.00
837.65	0.00	0.00	0.00
837.75	0.00	0.00	0.00
837.85	0.00	0.00	0.00
837.95	0.00	0.00	0.00
838.05	0.00	0.00	0.00
838.15	0.00	0.00	0.00
838.25	0.00	0.00	0.00
838.35	0.00	0.00	0.00
838.45	0.00	0.00	0.00
838.55	0.00	0.00	0.00
838.65	0.00	0.00	0.00
838.75	0.00	0.00	0.00
838.85	0.00	0.00	0.00
838.95	0.00	0.00	0.00
839.05	0.00	0.00	0.00
839.15	0.00	0.00	0.00
839.25	0.00	0.00	0.00
839.35	1.03	1.03	0.00
839.45	2.92	2.92	0.00
839.55	5.37	5.37	0.00
839.65	8.27	8.27	0.00
839.75	11.56	11.56	0.00
839.85	16.05	15.20	0.85
839.95	21.55	19.15	2.40
840.05	27.82	23.40	4.42
840.15	34.24	27.41	6.83
840.25	38.44	28.89	9.55
840.35	42.85	30.30	12.55
840.45	47.28	31.65	15.64
840.55	51.83	32.94	18.89
840.65	56.68	34.18	22.50
840.75	61.68	35.38	26.30
840.85	66.94	36.54	30.40
840.95	72.37	37.67	34.70
841.05	77.89	38.76	39.13
841.15	83.55	39.82	43.73
841.25	89.26	40.86	48.41
841.35	95.09	41.87	53.23
841.45	101.15	42.85	58.29
841.55	107.33	43.81	63.51
841.65	113.63	44.76	68.88
841.75	120.07	45.68	74.39
841.85	126.62	46.58	80.04
841.95	**133.29**	**47.47**	**85.82**

5.4 Riprap Outlet Protection Design Worksheets

FIGURE 9.3
Riprap Apron Design, Minimum Tailwater Condition



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

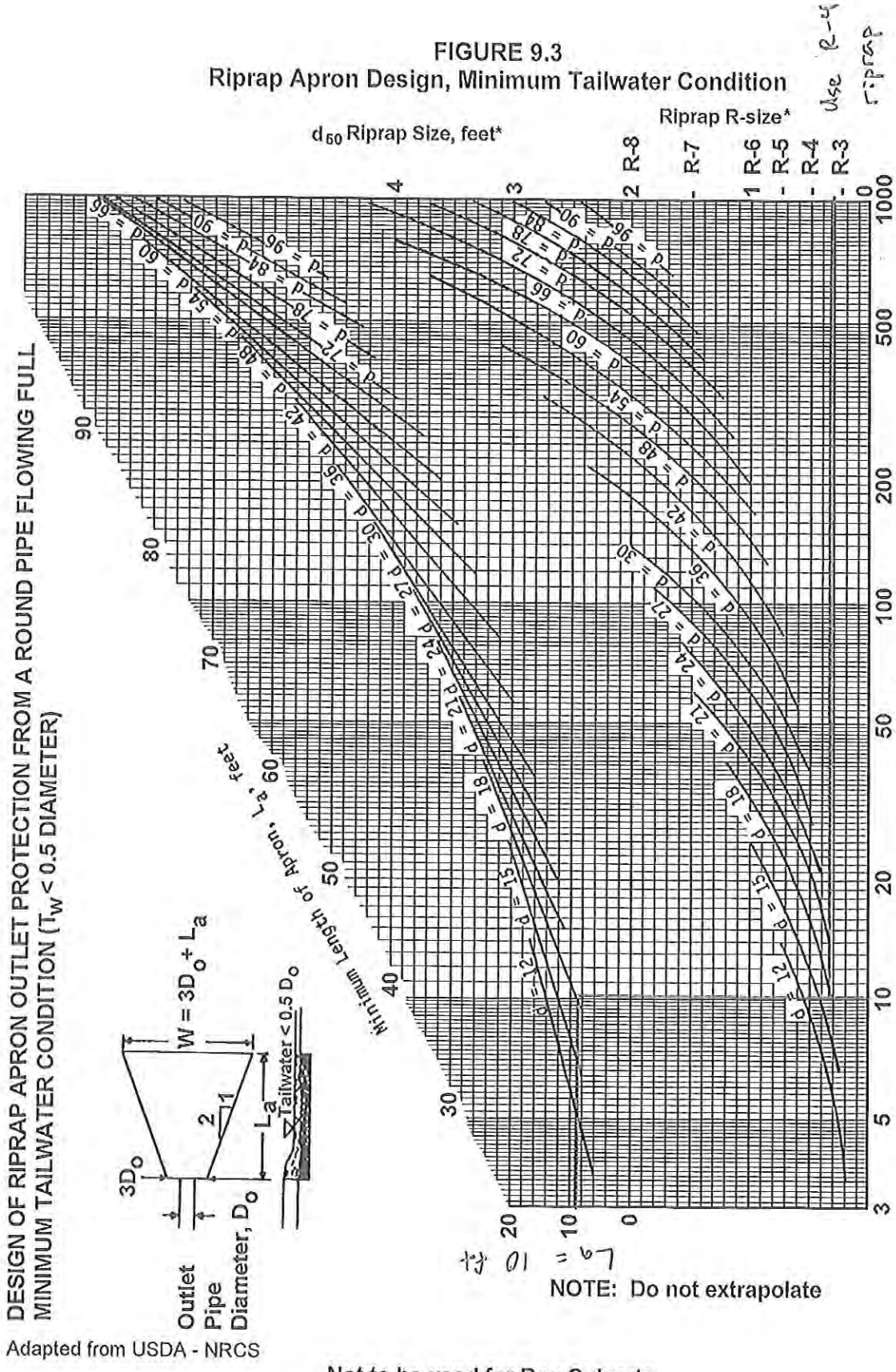
Use R-5 Riprap

SEDIMENT BASIN OUTLET PIPE

L_a = 18 ft

Not to be used for Box Culverts

FIGURE 9.3
Riprap Apron Design, Minimum Tailwater Condition

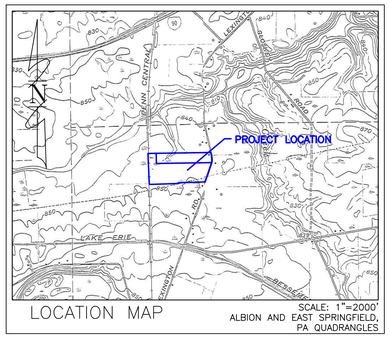


* For discharge velocities exceeding Maximum Allowable for Riprap indicated, increase d_{50} stone size and/or provide velocity reduction device.

Not to be used for Box Culverts

DRIVEWAY CULVERT PIPE

ITC LAKE ERIE CONNECTOR LLC
ERIE CONVERTER STATION
EROSION AND SEDIMENTATION CONTROL PLAN
CONNEAUT TOWNSHIP
ERIE COUNTY, PENNSYLVANIA



LOCATION MAP

SCALE: 1"=2000'
ALBION AND EAST SPRINGFIELD, PA QUADRANGLES

SHEET INDEX

PROPERTY INFORMATION

TAX I.D. # 04-005-010.0-004.00

OWNER OF RECORD:
ANDREW, JR. AND ALICE HAZER
409 VESTA DRIVE
DAUPHIN, PA 17018

DEED BOOK 0723, PAGE 0075

ACREAGE: 22.84 ACRES

TAX I.D. # 04-005-010.0-003.00

OWNER OF RECORD:
TERRY A. LAVERY
8680 LEXINGTON ROAD
GIRARD, PA 16417

DEED BOOK 2014, PAGE 3507

ACREAGE: 10.11 ACRES

LEGEND

- PROPERTY BOUNDARY
- RIGHT-OF-WAY LINE
- NPDES PERMIT BOUNDARY
- LIMIT OF DISTURBANCE
- SOIL BOUNDARIES
- OHE — OVERHEAD ELECTRIC DISTRIBUTION
- CFS — PROPOSED COMPOST FILTER SOCK
- EDGE OF WOODS
- EDGE OF BRUSH
- 1005 — EXISTING CONTOURS
- 1005 — PROPOSED CONTOURS
- WETLANDS
- △ SOIL PROFILE LOCATION
- ○ INFILTRATION TEST LOCATION
- □ ON-LOT SEWAGE SOIL PROFILE LOCATION

NOTES:

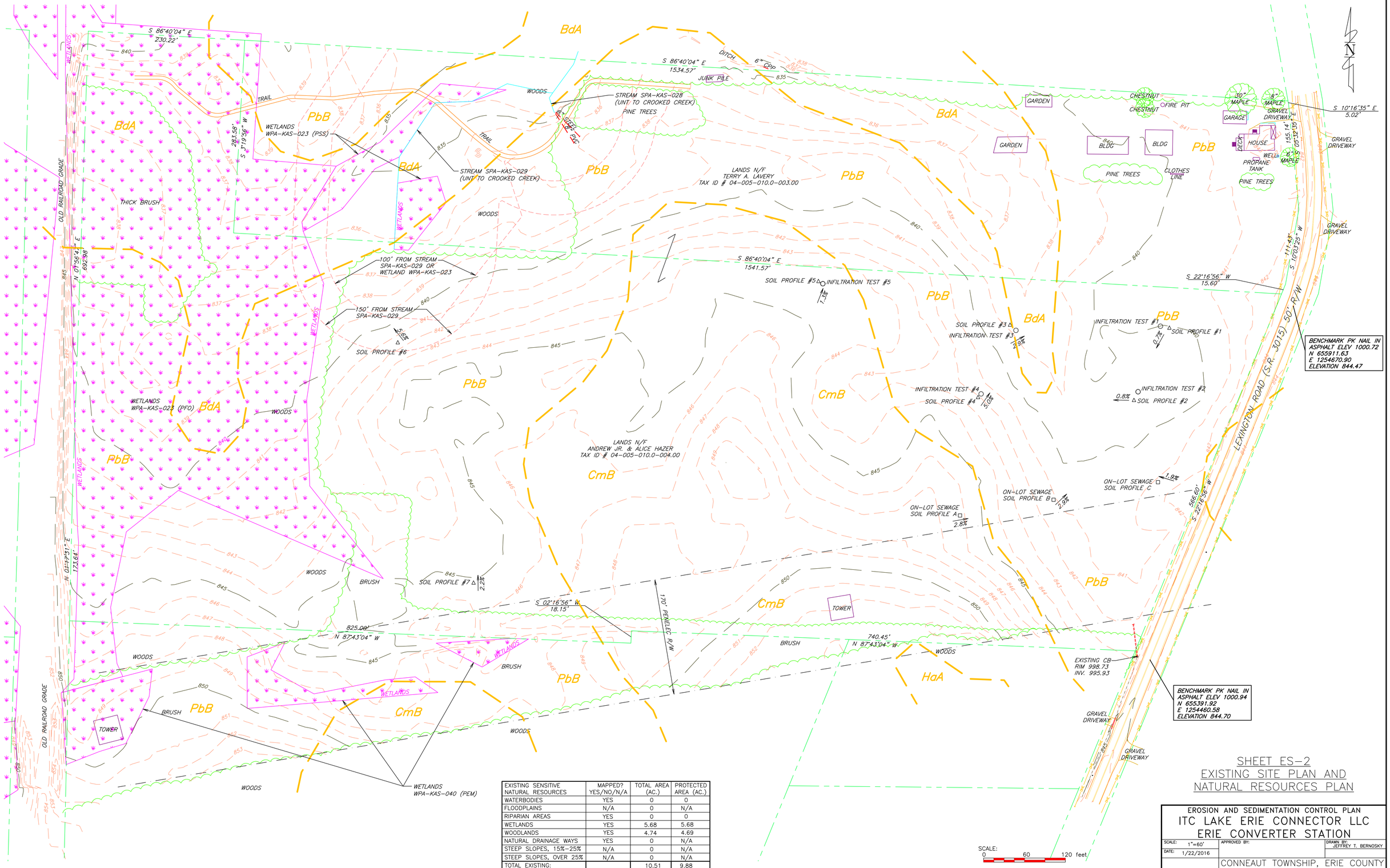
1. TOPOGRAPHY PER FIELD SURVEYS BY DEISS & HALMI ENGINEERING, INC. CONDUCTED 11/3/2014 TO 11/11/2014 AND ON 6/4/2015.
2. PROPERTY LINES PLOTTED PER "ALTA/ACSM LAND TITLE SURVEY OF THE HAZER PROPERTY" PREPARED BY DAVID LAIRD ASSOCIATES 12/8/2014 AND "ALTA/ACSM LAND TITLE SURVEY OF THE LAVERY PROPERTY" PREPARED BY DAVID LAIRD ASSOCIATES 10/7/2015.
3. ELEVATION DATUM IS NAVD 88.
4. WETLANDS PLOTTED PER DELINEATION BY HDR ENGINEERING PERFORMED AUGUST 2014 THROUGH DECEMBER 2015.
5. PER FEMA FLOOD INSURANCE RATE MAP NUMBERS 42049C0325D, 42049C0309D, 42049C0336D (ALL HAVING AN EFFECTIVE DATE OF 2/19/2014), THE PROPERTY IS IN ZONE X (AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN).
6. THE CONTRACTOR SHALL CONTACT PENNSYLVANIA ONE CALL SYSTEM, INC. A MINIMUM OF 3 WORKING DAYS PRIOR TO BEGINNING WORK, TELEPHONE NUMBER 1-800-242-1776. THE SERIAL NUMBER FOR THIS PROJECT IS 20152941661.

SOIL CLASSIFICATIONS

SYMBOL	DESCRIPTION	HYDROLOGIC SOIL GROUP
BdA	BIRDSALL SILT LOAM, 0%-2% SLOPES.	D
CmB	CONOTTON GRAVELLY SANDY LOAM, MODERATELY WELL DRAINED VARIANT, 3%-8% SLOPES.	B
HaA	HALSEY LOAM, 0%-3% SLOPES.	C
PbB	PLATEA SILT LOAM, 2%-8% SLOPES.	C

PREPARED BY:
DEISS & HALMI ENGINEERING, INC.
EDINBORO, PENNSYLVANIA

JANUARY 22, 2016



EXISTING SENSITIVE NATURAL RESOURCES	MAPPED? YES/NO/N/A	TOTAL AREA (AC.)	PROTECTED AREA (AC.)
WATERBODIES	YES	0	0
FLOODPLAINS	N/A	0	N/A
RIPARIAN AREAS	YES	0	0
WETLANDS	YES	5.68	5.68
WOODLANDS	YES	4.74	4.69
NATURAL DRAINAGE WAYS	YES	0	N/A
STEEP SLOPES, 15%-25%	N/A	0	N/A
STEEP SLOPES, OVER 25%	N/A	0	N/A
TOTAL EXISTING:		10.51	9.88

SHEET ES-2
EXISTING SITE PLAN AND NATURAL RESOURCES PLAN

No.	Date	Revisions	By

EROSION AND SEDIMENTATION CONTROL PLAN
ITC LAKE ERIE CONNECTOR LLC
ERIE CONVERTER STATION

SCALE: 1"=60'
DATE: 1/22/2016
APPROVED BY:
DRAWN BY: JEFFREY T. BERNOSKY

CONNEAUT TOWNSHIP, ERIE COUNTY PENNSYLVANIA

Deiss & Halmi Engineering, Inc.
ENVIRONMENTAL AND CIVIL ENGINEERING
105 Meadville Street, Edinboro PA 16412 PH. 814-734-3640 Fax 814-734-3643

DRAWING NO.: 2080215-2

LIMIT OF DISTURBANCE

REFER TO SEPARATE EROSION AND SEDIMENT CONTROL PLAN FOR PENNSYLVANIA CABLE ROUTE

NPDES PERMIT BOUNDARY

RIPRAP OUTLET PROTECTION (SEE DETAIL)

OUTLET STRUCTURE (SEE DETAIL)

12" COMPOST FILTER SOCK #2 (SEE DETAIL)

SEDIMENT BASIN
BOTTOM LEVEL AT ELEV. 835.25
BERM ELEV. 842.75

CONSTRUCTION STAGING/STORAGE AREA (SEE NOTE 1)

EMERGENCY SPILLWAY, 10 FT. WIDE, CREST ELEV. 839.75
EXTENT OF TURF REINFORCED MAT AS SHOWN

TEMPORARY ACCESS DRIVEWAY

CONSTRUCTION STAGING/STORAGE AREA (SEE NOTE 1)

ROCK CONSTRUCTION ENTRANCE WITH WASH RACK (SEE DETAIL)

18" CORRUGATED HDPE CULVERT, 40' LONG
UPSTREAM INV. 838.91
DOWNSTREAM INV. 838.71

CONVEYANCE CHANNEL #C1

12" COMPOST FILTER SOCK #3 (SEE DETAIL)

12" COMPOST FILTER SOCK #4 (SEE DETAIL)

100' FROM STREAM SPA-KAS-029 OR WETLAND WPA-KAS-023

150' FROM STREAM SPA-KAS-029

12" COMPOST FILTER SOCK #1 (SEE DETAIL)

CONVERTER HALL BUILDING
(APPROXIMATE LOCATION-NOT ALL STRUCTURES IN CONVERTER STATION FOOTPRINT ARE SHOWN)

CONSTRUCTION OFFICE TRAILER AREA (SEE NOTE 1)

AREA RESERVED FOR INFILTRATION/DETENTION BASIN
NOTE: BOTTOM (BELOW ELEV. 842.0) TO BE LEFT UNDISTURBED.

20" WEIGHTED SEDIMENT FILTER TUBE (SEE DETAIL)

INV. 839.85

CONVERTER STATION FOOTPRINT
(FENCED AREA)

RIPRAP OUTLET PROTECTION (SEE DETAIL)

24" CORRUGATED HDPE CULVERT

SITE ACCESS DRIVEWAY

ROCK CONSTRUCTION ENTRANCE WITH WASH RACK (SEE DETAIL)

12" COMPOST FILTER SOCK (SEE DETAIL)

12" COMPOST FILTER SOCK #5 (SEE DETAIL)

20" WEIGHTED SEDIMENT FILTER TUBE (SEE DETAIL)

ON-LOT SEWAGE SOIL PROFILE A

ON-LOT SEWAGE SOIL PROFILE B

ON-LOT SEWAGE SOIL PROFILE C

INV. 840.05

AREA RESERVED FOR ON-LOT SEWAGE DISPOSAL ABSORPTION AREA. AREA SHALL BE PROMINENTLY MARKED TO PREVENT DISTURBANCE.

CONSTRUCTION OFFICE TRAILER AND PARKING AREA (SEE NOTE 1)

TOPSOIL STORAGE AREA

DIVERSION CHANNEL #D2

DIVERSION CHANNEL #D1

NPDES PERMIT BOUNDARY

REFER TO SEPARATE EROSION AND SEDIMENTATION CONTROL PLAN FOR PENNSYLVANIA CABLE ROUTE

EXISTING CB
RIM 998.73
INV. 995.93

BENCHMARK PK NAIL IN ASPHALT ELEV 1000.72
N 655911.63
E 1254670.90
ELEVATION 844.47

BENCHMARK PK NAIL IN ASPHALT ELEV 1000.94
N 655391.92
E 1254460.58
ELEVATION 844.70

OLD RAILROAD GRADE

LEXINGTON ROAD (S.R. 3015) 50' R/W

SHEET ES-3
GRADING PLAN AND PROPOSED BMPS

NOTE:
1. CONSTRUCTION OFFICE AND PARKING AREA AND CONSTRUCTION STAGING/STORAGE AREA TO BE TEMPORARILY GRADED AS NECESSARY TO MEET NEEDS OF CONTRACTOR. FINAL GRADES TO BE SIMILAR TO EXISTING IN THESE AREAS EXCEPT AS SHOWN ON POST CONSTRUCTION STORMWATER MANAGEMENT PLAN.

SCALE: 0 60 120 feet

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ERIE CONVERTER STATION

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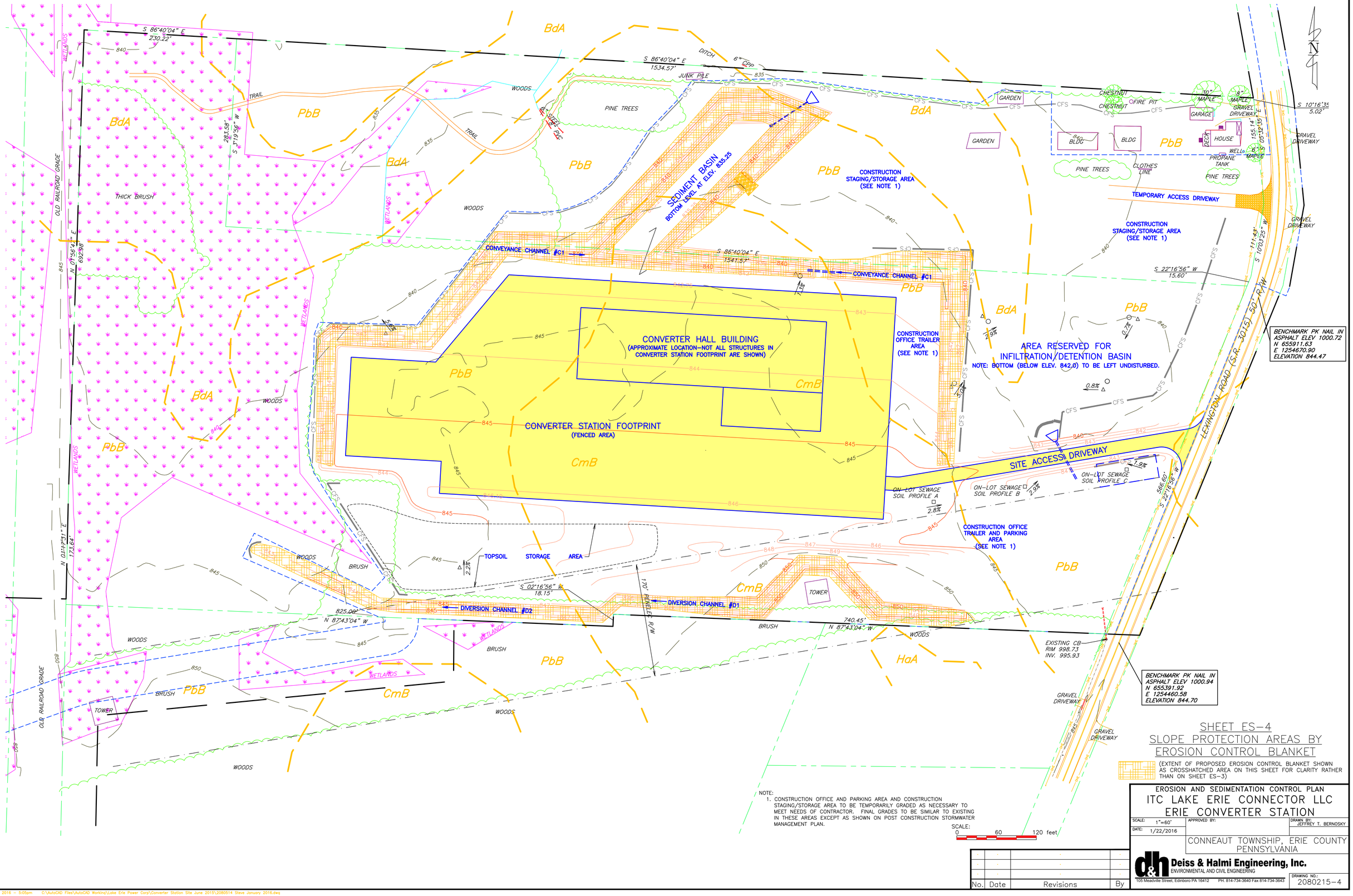
DRAWING NO.: 2080215-3



SHEET ES–4

SLOPE PROTECTION AREAS BY EROSION CONTROL BLANKET

(EXTENT OF PROPOSED EROSION CONTROL BLANKET SHOWN AS CROSSHATCHED AREA ON THIS SHEET FOR CLARITY RATHER THAN ON SHEET ES–3)

NOTE:
1. CONSTRUCTION OFFICE AND PARKING AREA AND CONSTRUCTION STAGING/STORAGE AREA TO BE TEMPORARILY GRADED AS NECESSARY TO MEET NEEDS OF CONTRACTOR. FINAL GRADES TO BE SIMILAR TO EXISTING IN THESE AREAS EXCEPT AS SHOWN ON POST CONSTRUCTION STORMWATER MANAGEMENT PLAN.

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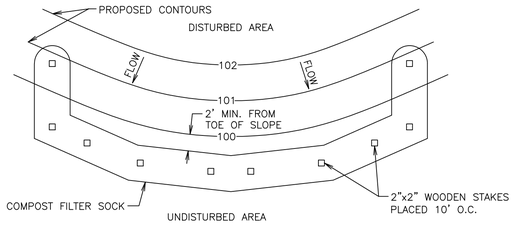
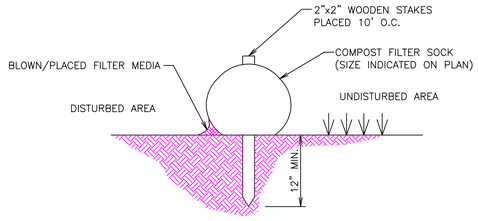
DRAWING NO.: 2080215–4



PLAN VIEW



SECTION VIEW

NOTES:

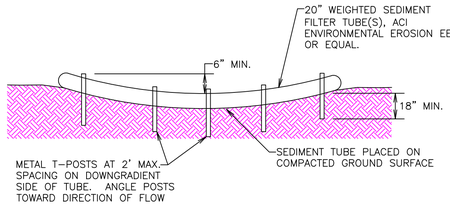
1. COMPOST SHALL MEET THE FOLLOWING STANDARDS:

ORGANIC MATTER CONTENT	25%–100% (DRY WEIGHT BASIS)
ORGANIC PORTION	FIBROUS AND ELONGATED
pH	5.5–8.5
MOISTURE CONTENT	30%–60%
PARTICLE SIZE	30%–50% PASS THROUGH 3/8" SIEVE
SOLUBLE SALT CONCENTRATION	5.0 dS MAXIMUM

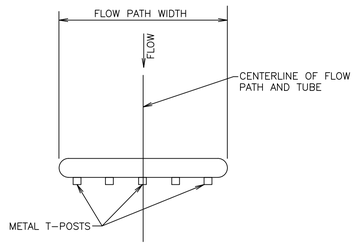
2. COMPOST FILTER SOCK SHALL BE PLACED AT EXISTING LEVEL GRADE. BOTH ENDS OF THE SOCK SHALL BE EXTENDED AT LEAST 8 FEET UP SLOPE AT 45 DEGREES TO THE MAIN SOCK ALIGNMENT.
3. TRAFFIC SHALL NOT BE PERMITTED TO CROSS FILTER SOCKS.
4. ACCUMULATED SEDIMENT SHALL BE REMOVED WHEN IT REACHES ½ THE ABOVE GROUND HEIGHT OF THE SOCK AND DISPOSED IN THE MANNER DESCRIBED ELSEWHERE THE PLAN.
5. SOCKS SHALL BE INSPECTED WEEKLY AND AFTER EACH RUNOFF EVENT. DAMAGED SOCK SHALL BE REPAIRED ACCORDING TO MANUFACTURER'S SPECIFICATIONS OR REPLACED WITHIN 24 HOURS OF INSPECTION.
6. BIODEGRADABLE FILTER SOCK SHALL BE REPLACED AFTER 6 MONTHS; PHOTODEGRADABLE SOCKS AFTER 1 YEAR. POLYPROPYLENE SOCKS SHALL BE REPLACED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS.
7. UPON STABILIZATION OF THE AREA TRIBUTARY TO THE SOCK, STAKES SHALL BE REMOVED. THE SOCK MAY BE LEFT IN PLACE AND VEGETATED OR REMOVED. IN THE LATTER CASE, THE MESH SHALL BE CUT OPEN AND THE MULCH SPREAD AS A SOIL SUPPLEMENT.

COMPOST FILTER SOCK

N.T.S.



FRONT VIEW



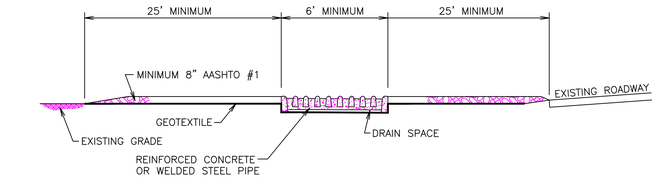
PLAN VIEW

NOTES:

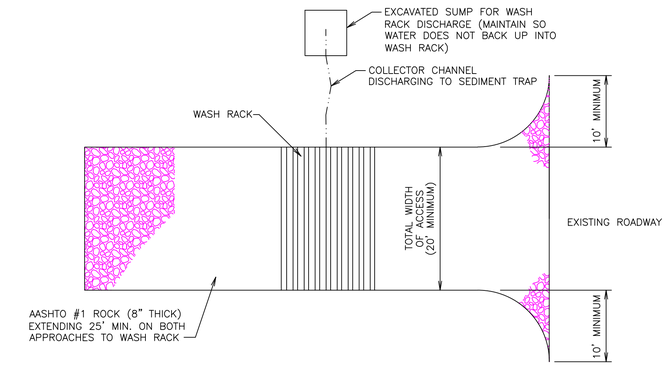
1. WHERE THE FLOW PATH IS WIDER THAN THE LENGTH OF ONE TUBE, PLACE MULTIPLE TUBES WITH A MINIMUM 12" OVERLAP BETWEEN TUBES.
2. METAL T–POSTS SHALL BE INSTALLED AT THE CENTER AND AT EACH END OF THE TUBE. ADDITIONAL T–POSTS SHALL BE INSTALLED AS NEEDED TO MEET THE MAXIMUM 2–FOOT SPACING.
3. SEDIMENT TUBES SHALL BE INSPECTED WEEKLY AND AFTER EACH RUNOFF EVENT.
4. ACCUMULATED SEDIMENT SHALL BE REMOVED WHEN IT REACHES HALF THE HEIGHT OF THE TUBE AND DISPOSED AS DIRECTED ELSEWHERE IN THE E&S PLAN.
5. DAMAGED TUBES SHALL BE REPAIRED OR REPLACED WITHIN 24 HOURS OF INSPECTION. A SUPPLY OF TUBES SHALL BE KEPT ON SITE FOR THIS PURPOSE.

WEIGHTED SEDIMENT FILTER TUBE

N.T.S.



PROFILE



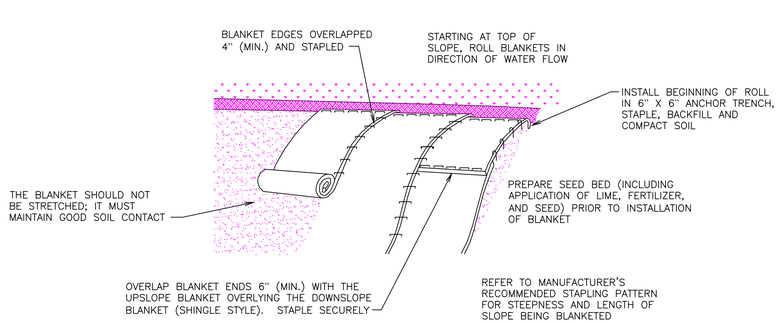
PLAN VIEW

NOTES:

1. TOPSOIL SHOULD BE REMOVED PRIOR TO INSTALLATION OF ROCK CONSTRUCTION ENTRANCE.
2. EXTEND ROCK OVER FULL WIDTH OF ENTRANCE.
3. RUNOFF SHALL BE DIVERTED FROM ROADWAY TO A SUITABLE SEDIMENT REMOVAL BMP PRIOR TO ENTERING ROCK CONSTRUCTION ENTRANCE.
4. MOUNTABLE BERM SHOULD BE INSTALLED WHEREVER OPTIONAL CULVERT PIPE IS USED. PIPE TO BE SIZED APPROPRIATELY FOR SIZE OF DITCH BEING CROSSED.
5. WASH RACK SHALL BE 20 FEET (MIN.) WIDE OR TOTAL WIDTH OF ACCESS.
6. WASH RACK SHALL BE DESIGNED AND CONSTRUCTED TO ACCOMMODATE ANTICIPATED CONSTRUCTION VEHICULAR TRAFFIC.
7. A WATER SUPPLY SHALL BE MADE AVAILABLE TO WASH THE WHEELS OF ALL VEHICLES EXITING THE SITE.
8. MAINTENANCE: ROCK CONSTRUCTION ENTRANCE THICKNESS SHALL BE CONSTANTLY MAINTAINED TO THE SPECIFIED DIMENSIONS BY ADDING ROCK. A STOCKPILE OF ROCK MATERIAL SHALL BE MAINTAINED ON SITE FOR THIS PURPOSE. DRAIN SPACE UNDER WASH RACK SHALL BE KEPT OPEN AT ALL TIMES. DAMAGE TO THE WASH RACK SHALL BE REPAIRED PRIOR TO FURTHER USE OF THE RACK. ALL SEDIMENT DEPOSITED ON ROADWAYS SHALL BE REMOVED AND RETURNED TO THE CONSTRUCTION SITE IMMEDIATELY. WASHING THE ROADWAY OR SWEEPING THE DEPOSITS INTO ROADWAY DITCHES, SEWER, CULVERTS, OR OTHER DRAINAGEWAYS IS NOT ACCEPTABLE.

ROCK CONSTRUCTION ENTRANCE WITH WASH RACK

N.T.S.

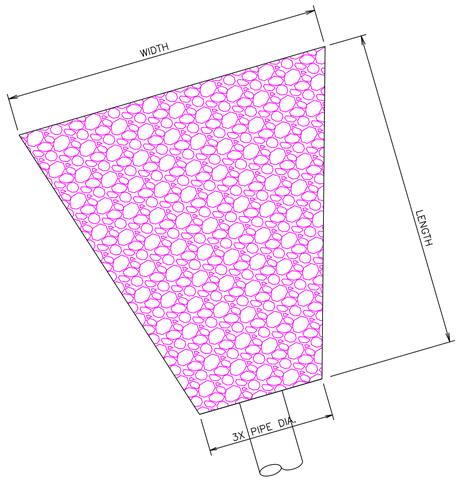


NOTES:

1. APPLY TO ALL NEWLY CONSTRUCTED SLOPES 3:1 OR STEEPER. (REFER TO SHEET ES–4)
2. SEED AND SOIL AMENDMENTS SHALL BE APPLIED ACCORDING TO THE RATES IN THE PLAN DRAWINGS PRIOR TO INSTALLING THE BLANKET.
3. PROVIDE ANCHOR TRENCH AT TOE OF SLOPE IN SIMILAR FASHION AS AT TOP OF SLOPE.
4. SLOPE SURFACE SHALL BE FREE OF ROCKS, CLODS, STICKS, AND GRASS.
5. BLANKET SHALL HAVE GOOD CONTINUOUS CONTACT WITH UNDERLYING SOIL THROUGHOUT ENTIRE LENGTH. LAY BLANKET LOOSELY AND STAKE OR STAPLE TO MAINTAIN DIRECT CONTACT WITH SOIL. DO NOT STRETCH BLANKET.
6. STAPLING OF THE BLANKET SHALL BE DONE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
7. BLANKETED AREAS SHALL BE INSPECTED WEEKLY AND AFTER EACH RUNOFF EVENT UNTIL PERENNIAL VEGETATION IS ESTABLISHED TO A MINIMUM UNIFORM 70% COVERAGE THROUGHOUT THE BLANKETED AREA. DAMAGED OR DISPLACED BLANKETS SHALL BE RESTORED OR REPLACED WITHIN 5 CALENDAR DAYS.

EROSION CONTROL BLANKET INSTALLATION

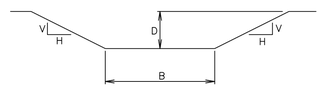
NOT TO SCALE



LOCATION	WIDTH	LENGTH	RIPRAP SIZE	PLACEMENT THICKNESS
SEDIMENT BASIN OUTLET	22'	18'	R–5	27"
DRIVEWAY CULVERT OUTLET	16'	10'	R–4	18"

RIPRAP OUTLET PROTECTION

N.T.S.



CHANNEL NO.	SLOPE	H:V	B (FT)	D (FT)	LINING TYPE
C1	0.005	3:1	4.0	2.0	VEG., RET. CLASS C
C2	0.005	3:1	4.0	2.0	VEG., RET. CLASS C
D1	0.005	3:1	4.0	2.0	VEG., RET. CLASS C
D2	0.005	3:1	4.0	2.0	VEG., RET. CLASS C

NOTE: ALL VEGETATED SWALES TO HAVE TEMPORARY LINING OF STRAW WITH NET, PROPEX LANDLOK S2, OR EQUAL, UNTIL PERMANENT VEGETATED LINING IS ESTABLISHED.

CHANNEL DETAIL

N.T.S.

SHEET ES–5
DETAILS

No.	Date	Revisions	By

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ITC LAKE ERIE CONNECTOR LLC
ERIE CONVERTER STATION

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DRAWING NO.: 2080215–5

SEEDING SPECIFICATIONS

	TEMPORARY	GENERAL SITE (INCLUDING INFILTRATION BASINS) PENNDOT FORMULA B		
SPECIES:	ANNUAL RYEGRASS	PERENNIAL RYEGRASS	CREEPING RED OR CHEWINGS FESCUE	KENTUCKY BLUEGRASS
% PURITY	95	97	97	97
% GERMINATION	90	90	85	80
APPL. RATE (LB/ACRE)	48	41	61	102

SOW SEEDS UNIFORMLY ON THE PREPARED AREAS BY HYDRAULIC PLACEMENT, BROADCASTING, DRILLING, OR HAND SEEDING METHODS. INSPECT SEEDING EQUIPMENT AND ADJUST THE EQUIPMENT, IF REQUIRED, TO ENSURE THE SPECIFIED APPLICATION RATES. PERIODICALLY PERFORM A CHECK ON THE RATE AND UNIFORMITY OF APPLICATION, AS DIRECTED. SEEDING MAY BE APPLIED MARCH 15 TO OCTOBER 15 FOR TEMPORARY; MARCH 15 – JUNE 1, AUGUST 1 – OCTOBER 15 FOR PERMANENT.

1. COMMERCIAL FERTILIZER SHALL BE 10–20–20 APPLIED AT 678 LB/ACRE AND BLENDED INTO THE TOPSOIL
2. LIMING RATE SHALL BE 1.9 TON/ACRE
3. A SLOW RELEASE NITROGEN FERTILIZER SHALL BE APPLIED TO THE SURFACE AND SHALL BE 38–0–0 UREAFORM FERTILIZER APPLIED AT 242 LB/ACRE OR 32–0–0 TO 38–0–0 SULFER COATED UREA FERTILIZER APPLIED AT 286 LB/ACRE TO 242 LB/ACRE OR 31–0–0 IBDU FERTILIZER APPLIED AT 295 LB/ACRE

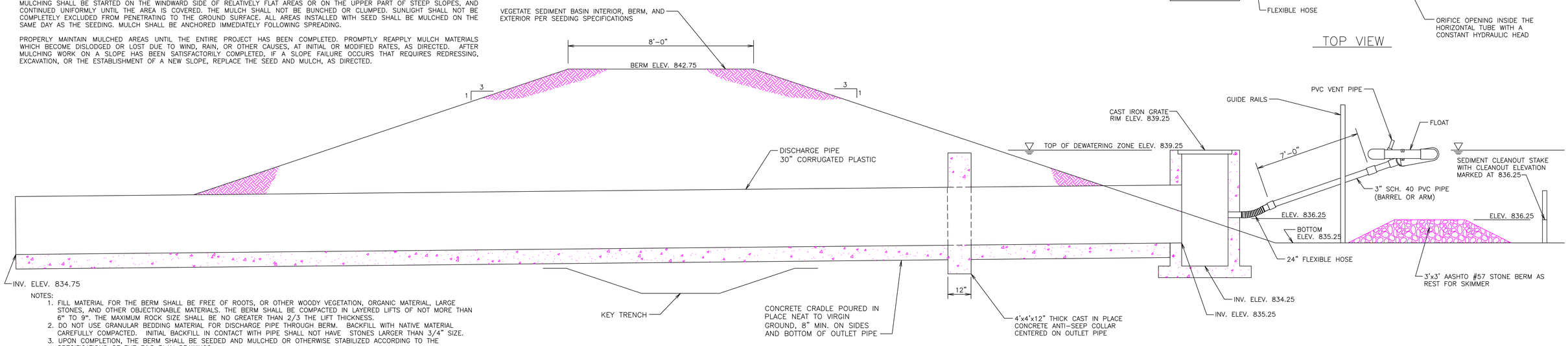
MULCH SHALL BE FREE FROM NOXIOUS WEEDS, MOLD, AND OTHER DELETERIOUS MATERIALS.

1. STRAW – EITHER WHEAT OR OAT STRAW, REASONABLY FREE OF VIABLE SEED, WELL CURED TO LESS THAN 20% MOISTURE CONTENT, BY WEIGHT AND OF PROPER CONSISTENCY FOR PLACING WITH COMMERCIAL MULCH BLOWING EQUIPMENT.

2. HAY – TIMOTHY HAY, MIXED CLOVER AND TIMOTHY HAY, OR OTHER ACCEPTABLE NATIVE OR FORAGE GRASSES, WELL–CURED TO LESS THAN 20% MOISTURE CONTENT, BY WEIGHT AND OF PROPER CONSISTENCY FOR PLACING WITH COMMERCIAL MULCH BLOWING EQUIPMENT.

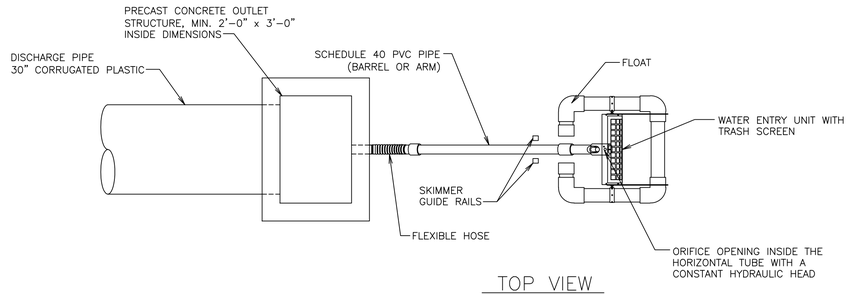
APPLICATION: HAY OR STRAW MULCH SHALL BE SPREAD UNIFORMLY AT THE RATE OF 3.0 TONS PER ACRE TO PRODUCE A LAYER 1.0 TO 1.5 INCHES DEEP. MULCH SHALL BE SPREAD BY HAND, BLOWER–TYPE MULCH SPREADER, OR OTHER APPROVED METHOD. MULCHING SHALL BE STARTED ON THE WINDWARD SIDE OF RELATIVELY FLAT AREAS OR ON THE UPPER PART OF STEEP SLOPES, AND CONTINUED UNIFORMLY UNTIL THE AREA IS COVERED. THE MULCH SHALL NOT BE BUNCHED OR CLUMPED. SUNLIGHT SHALL NOT BE COMPLETELY EXCLUDED FROM PENETRATING TO THE GROUND SURFACE. ALL AREAS INSTALLED WITH SEED SHALL BE MULCHED ON THE SAME DAY AS THE SEEDING. MULCH SHALL BE ANCHORED IMMEDIATELY FOLLOWING SPREADING.

PROPERLY MAINTAIN MULCHED AREAS UNTIL THE ENTIRE PROJECT HAS BEEN COMPLETED. PROMPTLY REAPPLY MULCH MATERIALS WHICH BECOME DISLODGED OR LOST DUE TO WIND, RAIN, OR OTHER CAUSES, AT INITIAL OR MODIFIED RATES, AS DIRECTED. AFTER MULCHING WORK ON A SLOPE HAS BEEN SATISFACTORILY COMPLETED, IF A SLOPE FAILURE OCCURS THAT REQUIRES REDRESSING, EXCAVATION, OR THE ESTABLISHMENT OF A NEW SLOPE, REPLACE THE SEED AND MULCH, AS DIRECTED.

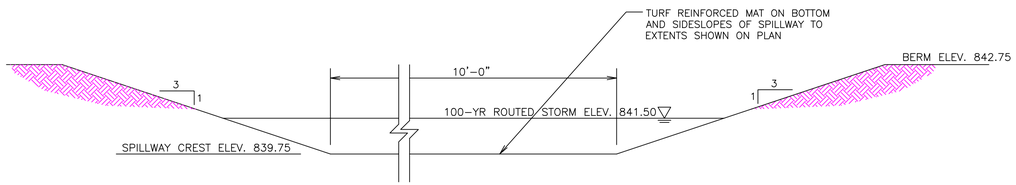


NOTES:
1. FILL MATERIAL FOR THE BERM SHALL BE FREE OF ROOTS, OR OTHER WOODY VEGETATION, ORGANIC MATERIAL, LARGE STONES, AND OTHER OBJECTIONABLE MATERIALS. THE BERM SHALL BE COMPACTED IN LAYERED LIFTS OF NOT MORE THAN 6" TO 9". THE MAXIMUM ROCK SIZE SHALL BE NO GREATER THAN 2/3 THE LIFT THICKNESS.
2. DO NOT USE GRANULAR BEDDING MATERIAL FOR DISCHARGE PIPE THROUGH BERM. BACKFILL WITH NATIVE MATERIAL CAREFULLY COMPACTED. INITIAL BACKFILL IN CONTACT WITH PIPE SHALL NOT HAVE STONES LARGER THAN 3/4" SIZE.
3. UPON COMPLETION, THE BERM SHALL BE SEEDED AND MULCHED OR OTHERWISE STABILIZED ACCORDING TO THE SPECIFICATIONS OF THE E&S PLAN DRAWINGS.
4. PROVIDE ACCESS FOR SEDIMENT REMOVAL AND OTHER REQUIRED MAINTENANCE ACTIVITIES.
5. A CLEAN OUT STAKE SHALL BE PLACED NEAR THE CENTER OF EACH TRAP. ACCUMULATED SEDIMENT SHALL BE REMOVED WHEN IT HAS REACHED THE CLEAN OUT ELEVATION ON THE STAKE AND THE TRAP RESTORED TO ITS ORIGINAL DIMENSIONS. DISPOSE OF MATERIALS REMOVED FROM THE TRAP IN THE MANNER DESCRIBED IN THE E&S PLAN.

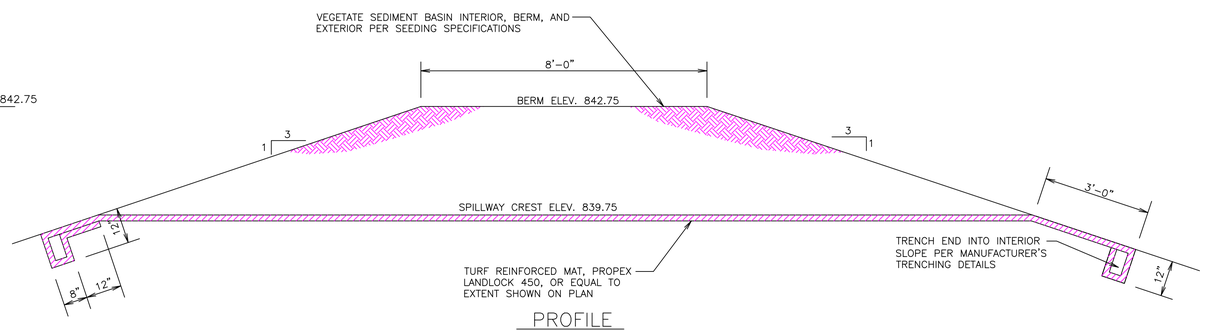
SEDIMENT BASIN OUTLET STRUCTURE WITH FAIRCLOTH SKIMMER DETAIL
N.T.S.



TOP VIEW



CROSS SECTION



PROFILE

SEDIMENT BASIN EMERGENCY SPILLWAY DETAIL
N.T.S.

SHEET ES–6 DETAILS

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DRAWING NO.: 2080215–6

SOIL LIMITATIONS

SOIL NAME	CUTBANKS CAVE	CORROSIVE TO CONCRETE/STEEL	DROUGHTY	EASILY ERODIBLE	FLOODING	DEPTH TO SATURATED ZONE/ SEASONAL HIGH WATER TABLE	HYDRIC/HYDRIC INCLUSIONS	LOW STRENGTH/ LANDSLIDE PRONE	SLOW PERCOLATION	PIPING	POOR SOURCE OF TOPSOIL	FROST ACTION	SHRINK-SWELL	POTENTIAL SINKHOLE	PONDING	WETNESS
BIRDSALL	X	c/s				X	X	X	X	X	X	X	X		X	X
CONOTTON	X	c/s	X	X		X	X	X	X	X	X	X				
HALSEY	X	c/s		X	X	X	X	X	X	X	X	X				X
PLATEA	X	c/s		X		X	X	X	X	X		X				X

PROPOSED MEASURES TO ADDRESS SOIL LIMITATIONS

1. CUTBANKS CAVE. THERE WILL BE NO EXPOSED CUTBANKS UPON COMPLETION OF THE PROJECT. THE CONTRACTOR SHALL ADHERE TO ALL OSHA REGULATIONS REGARDING EXCAVATION AND SHORING/BRACING OR SLOPING TRENCH WALLS.
2. CORROSIVE TO CONCRETE/STEEL. CONCRETE AND STEEL STRUCTURES SHALL BE DESIGNED BY THE SUPPLIER FOR DIRECT BURIAL.
3. DROUGHTY. THIS LIMITATION WILL NOT HAVE AN ADVERSE EFFECT ON THE PROJECT.
4. EASILY ERODIBLE. ALL DISTURBED SURFACES WILL BE STABILIZED EITHER WITH ASPHALT, OR WITH WELL ESTABLISHED VEGETATION TO PREVENT EROSION. SLOPES OF 3H:1V AND STEEPER WILL BE STABILIZED USING AN EROSION CONTROL MULCH BLANKET UNTIL A UNIFORM 70% VEGETATIVE COVER HAS BEEN ESTABLISHED.
5. FLOODING. THE AREA OF THE PROPOSED PROJECT HAS BEEN INVESTIGATED AND IS NOT SUBJECT TO FLOODING.
6. DEPTH TO SATURATED ZONE/SEASONAL HIGH WATER TABLE. VARIOUS TEST PITS HAVE BEEN DUG ON THE PROPERTY TO IDENTIFY THE SEASONAL HIGH WATER TABLE. STRUCTURAL STORMWATER BMPS WILL BE DESIGNED TAKING THE LIMITING ZONE INTO CONSIDERATION.
7. HYDRIC/HYDRIC INCLUSIONS. WETLANDS HAVE BEEN DELINEATED WITHIN THE PROJECT AREA. THE THE AREA PROPOSED FOR DEVELOPMENT ON THE SITE HAS BEEN LOCATED TO PROTECT THE DELINEATED WETLANDS.
8. LOW STRENGTH/LANDSLIDE PRONE. THE PROPOSED GRADES AND CONSTRUCTION ACTIVITIES LOCATED IN THESE AREAS ARE NOT SUBJECT TO LANDSLIDES.
9. SLOW PERCOLATION. INFILTRATION TESTING HAS BEEN COMPLETED AT VARIOUS LOCATIONS ON THE SITE. STORMWATER MANAGEMENT FEATURES HAVE BEEN DESIGNED TAKING THE INFILTRATION RATE INTO ACCOUNT. THE SITE IS GRADED TO AVOID PONDING, EXCEPT IN THE STORMWATER MANAGEMENT AREA.
10. PIPING. BERMS SHALL BE CONSTRUCTED OF ACCEPTABLE MATERIAL THAT IS NOT SUSCEPTIBLE TO PIPING.
11. POOR SOURCE OF TOPSOIL. THE PROJECT IS NOT DEPENDENT UPON A SIGNIFICANT DEPTH OF TOPSOIL. WHAT TOPSOIL IS AVAILABLE ON SITE WILL BE STOCKPILED AND REDISTRIBUTED ON AREAS THAT ARE TO BE SEEDED. ANY ADDITIONAL TOPSOIL THAT IS REQUIRED BEYOND WHAT IS AVAILABLE ON SITE WILL BE IMPORTED FROM A SUPPLIER.
12. FROST ACTION. THIS LIMITATION WILL NOT HAVE AN ADVERSE EFFECT ON THE PROPOSED ACTIVITY.
13. SHRINK/SWELL. THIS LIMITATION WILL NOT HAVE AN ADVERSE EFFECT ON THE PROPOSED ACTIVITY.
14. PONDING. THE PROJECT SITE HAS BEEN INVESTIGATED AND SUFFICIENT TOPOGRAPHY EXISTS SUCH THAT PONDING ON THE SITE IS NOT A CONCERN. STORMWATER MANAGEMENT FEATURES HAVE BEEN DESIGNED TAKING THIS LIMITATION INTO ACCOUNT. THE SITE IS GRADED TO AVOID PONDING, EXCEPT IN THE STORMWATER MANAGEMENT AREA.
15. WETNESS. THE PROJECT SITE HAS BEEN INVESTIGATED AND SUFFICIENT TOPOGRAPHY EXISTS SUCH THAT WETNESS ON THE SITE IS NOT A CONCERN.

BMPS TO BE USED:

THE FOLLOWING BEST MANAGEMENT PRACTICES (BMPS) ARE PROPOSED FOR EROSION AND SEDIMENTATION CONTROL BEFORE, DURING, AND AFTER EARTH DISTURBANCE ACTIVITIES. IN THE FOLLOWING DESCRIPTIONS, DISTURBED AREAS ARE CONSIDERED TO BE STABILIZED WHEN A UNIFORM 70 PERCENT PERENNIAL VEGETATIVE COVER HAS BEEN ACHIEVED, OR THE SURFACE HAS BEEN OTHERWISE COVERED WITH A DURABLE, MUD FREE DRIVING SURFACE.

ROCK CONSTRUCTION ENTRANCE WITH WASH RACK. A ROCK CONSTRUCTION ENTRANCE WITH WASH RACK WILL BE CONSTRUCTED WHERE CONSTRUCTION VEHICLES ACCESS THE PROPERTY TO PREVENT SOIL LOSS FROM TRAFFIC LEAVING THE CONSTRUCTION SITE. WASH RACKS IN CONSTRUCTION ENTRANCES ARE FOR WASHING OF TIRES ONLY – WHERE IT IS NECESSARY TO WASH AN ENTIRE VEHICLE PRIOR TO LEAVING THE SITE, THIS SHOULD BE DONE AT A SITE DESIGNED TO PREVENT UNTREATED NUTRIENT–ENRICHED WASTEWATER OR HAZARDOUS WASTES FROM BEING DISCHARGED TO SURFACE OR GROUND WATERS. THE LOCATION AND DETAILS FOR THE ROCK CONSTRUCTION ENTRANCE WITH WASH RACK ARE SHOWN ON THE E&SC PLAN DRAWINGS. THE ROCK CONSTRUCTION ENTRANCE WITH WASH RACK WILL BE INSTALLED BEFORE SIGNIFICANT EARTH DISTURBANCE IS TO OCCUR AT THE SITE, AND WILL REMAIN IN PLACE UNTIL THE SITE IS STABILIZED SUCH THAT NO SIGNIFICANT SOIL LOSS ONTO ADJACENT ROADWAYS IS EXPECTED.

COMPOST FILTER SOCK. COMPOST FILTER SOCK WILL BE PLACED DOWNGRADIENT OF DISTURBED AREAS TO PREVENT THE TRANSPORT OF SEDIMENT OFFSITE. DETAILS OF THE FILTER SOCK AS WELL AS PLACEMENT ARE SHOWN ON THE E&SC PLAN DRAWINGS. SEDIMENT WILL BE REMOVED FROM THE FILTER SOCK WHEN ACCUMULATIONS REACH ONE HALF THE HEIGHT OF THE SOCK. COMPOST FILTER SOCKS WILL BE INSTALLED BEFORE SIGNIFICANT EARTH DISTURBANCE OCCURS UPGRADIENT OF THE COMPOST FILTER SOCK, AND WILL REMAIN IN PLACE UNTIL UPGRADIENT DISTURBED AREAS HAVE BEEN STABILIZED.

DIVERSION CHANNELS. DIVERSION CHANNEL "D" WILL BE CONSTRUCTED TO DIVERT RUNOFF FROM UPGRADIENT AREAS AROUND THE CONSTRUCTION SITE. THE LOCATION AND DETAILS FOR THE DIVERSION CHANNELS ARE SHOWN ON THE E&SC PLAN DRAWINGS. CALCULATIONS ASSOCIATED WITH THE DESIGN OF THE DIVERSION CHANNELS ARE PRESENTED IN SECTION 1.2.8. THE DIVERSION CHANNELS WILL BE CONSTRUCTED PRIOR TO ANY BULK EARTHMOVING OPERATIONS, AND WILL REMAIN IN PLACE DURING CONSTRUCTION AND AFTER CONSTRUCTION AS A POST–CONSTRUCTION STORMWATER MANAGEMENT BMP.

CONVEYANCE CHANNEL. CONVEYANCE CHANNEL "C" WILL BE CONSTRUCTED TO CONVEY RUNOFF FROM THE CONSTRUCTION SITE TO THE PROPOSED SEDIMENT BASIN. THE LOCATION AND DETAILS FOR THE CONVEYANCE CHANNEL ARE SHOWN ON THE E&SC PLAN DRAWINGS. CALCULATIONS ASSOCIATED WITH THE DESIGN OF THE CONVEYANCE CHANNEL ARE PRESENTED IN SECTION 1.2.8. THE CONVEYANCE CHANNEL WILL BE CONSTRUCTED PRIOR TO ANY BULK EARTHMOVING OPERATIONS, AND WILL REMAIN IN PLACE UNTIL ALL UPGRADIENT DISTURBED AREAS HAVE BEEN STABILIZED. AFTER STABILIZATION, THE CONVEYANCE CHANNEL WILL BE CONVERTED TO A VEGETATED SWALE AS A POST–CONSTRUCTION STORMWATER MANAGEMENT BMP.

SEDIMENT BASIN. A SEDIMENT BASIN WILL BE CONSTRUCTED TO COLLECT, TREAT, AND DISCHAGE ONSITE RUNOFF WATER FROM DISTURBED AREAS. THE LOCATION AND DETAILS OF THE SEDIMENT BASIN ARE SHOWN ON THE E&SC PLAN DRAWINGS. CALCULATIONS ASSOCIATED WITH THE DESIGN OF THE SEDIMENT BASIN ARE PRESENTED IN SECTION 1.2.8. THE SEDIMENT BASIN WILL BE CONSTRUCTED PRIOR TO ANY BULK EARTHMOVING OPERATIONS, AND WILL REMAIN IN PLACE UNTIL ALL UPGRADIENT DISTURBED AREAS HAVE BEEN STABILIZED. AFTER THE SEDIMENT BASIN HAS BEEN USED, THE SEDIMENT BASIN AREA WILL BE GRADED AND VEGETATED.

EROSION CONTROL MULCH BLANKET. EROSION CONTROL MULCH BLANKETS SHALL BE INSTALLED ON ALL PERMANENT SLOPES 3H:1V AND STEEPER. SPECIFICATIONS FOR EROSION CONTROL MULCH BLANKETS ARE PRESENTED ON THE E&SC PLAN DRAWINGS. EROSION CONTROL MULCH BLANKETS SHALL BE INSTALLED AS SOON AS PRACTICAL AFTER FINAL GRADE HAS BEEN ACHIEVED, AND SHALL REMAIN IN PLACE AS THE PERMANENT VEGETATIVE COVER IS ESTABLISHED.

RIPRAP APRONS. RIPRAP APRONS WILL BE INSTALLED AT ALL STORM DRAINAGE PIPE OUTFALLS (EXCEPT WHERE A LEVEL SPREADER IS USED). THE LOCATION AND DETAILS FOR RIPRAP APRONS ARE SHOWN ON THE E&SC PLAN DRAWINGS. CALCULATIONS ASSOCIATED WITH THE DESIGN OF RIPRAP APRONS ARE PRESENTED IN SECTION 1.2.8. RIPRAP APRONS WILL BE INSTALLED AT THE TIME THE PIPE OUTFALL IS COMPLETED, AND WILL REMAIN IN PLACE AS LONG AS THE PIPE OUTFALL REMAINS.

VEGETATIVE STABILIZATION. VEGETATIVE STABILIZATION CONSISTS OF FINAL GRADING, TOPSOIL PLACEMENT, SEEDING, AND MULCHING. PERMANENT VEGETATIVE STABILIZATION WILL BE APPLIED TO ALL EARTH–EXPOSED AREAS THAT ARE NOT OTHERWISE COVERED WITH GRAVEL, PAVEMENT, BUILDINGS, ETC. IF WEATHER CONDITIONS ARE FAVORABLE, PERMANENT SEEDING SHALL TAKE PLACE WITHIN 7 DAYS OF FINAL GRADE BEING ACHIEVED. OTHERWISE, TEMPORARY SEEDING AND MULCHING SHALL BE IMPLEMENTED UNTIL CONDITIONS BECOME FAVORABLE FOR THE ESTABLISHMENT OF PERMANENT VEGETATIVE COVER. TEMPORARY SEEDING AND MULCHING SHALL BE APPLIED TO EARTH–EXPOSED AREAS WHERE EARTHWORK IS DELAYED OR STOPPED FOR A PERIOD OF 4 OR MORE DAYS. TEMPORARY VEGETATIVE STABILIZATION SHALL BE MAINTAINED UNTIL EARTHMOVING RECOMMENCES, OR UNTIL THE TEMPORARY VEGETATIVE STABILIZATION IS REPLACED BY PERMANENT VEGETATIVE STABILIZATION. SPECIFICATIONS FOR VEGETATIVE STABILIZATION ARE INCLUDED ON THE E&SC PLAN DRAWINGS.

WEIGHTED SEDIMENT FILTER TUBE. WEIGHTED SEDIMENT FILTER TUBES ARE PROPOSED DOWNGRADIENT OF THE END OF DIVERSION CHANNEL D AND THE PROPOSED DRIVEWAY CULVERT OUTLET. WEIGHTED SEDIMENT FILTER TUBES ARE TUBE–SHAPED DEVICES FILLED WITH NON–BIODEGRADABLE FILTER MATERIALS FOR LONGEVITY AND REUSE. WEIGHTED SEDIMENT FILTER TUBES MAY BE PLACED IN AREAS OF CONCENTRATED FLOW IN LIEU OF ROCK FILTERS IF INSTALLED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS AND THE DETAILS SHOWN ON THE E&SC PLAN DRAWINGS. WHEN THE AREA TRIBUTARY TO A TUBE HAS BEEN STABILIZED, AN UNDAMAGED TUBE MAY BE REMOVED AND USED AT ANOTHER LOCATION. WHERE THE TOTAL LENGTH IS GREATER THAN THE LENGTH OF INDIVIDUAL TUBES, PLACE MULTIPLE TUBES WITH OVERLAP OF 12 INCH MINIMUM (OR AS SPECIFIED BY MANUFACTURER). SPECIFICATIONS FOR WEIGHTED SEDIMENT FILTER TUBES ARE PRESENTED ON THE E&SC PLAN DRAWINGS. WEIGHTED SEDIMENT FILTER TUBES SHALL BE INSTALLED PRIOR TO UPGRADIENT EARTH DISTURBANCE, AND SHALL REMAIN IN PLACE UNTIL PERMANENT VEGETATIVE COVER IS ESTABLISHED ON UPGRADIENT AREAS.

INVASIVE SPECIES CONTROL

PER THE RECOMMENDATIONS OF PA. DCNR, THE FOLLOWING STEPS SHOULD BE TAKEN TO HELP PREVENT THE SPREAD OF INVASIVE SPECIES:
1. THE AREA OF DISTURBANCE SHOULD BE MINIMIZED TO THE FULLEST EXTENT THAT WOULD ALLOW FOR CONSTRUCTION. THIS WILL HELP TO LESSEN THE AREA OF SOIL AND VEGETATION DISTURBANCE ASSOCIATED WITH THIS PROJECT.
2. IF POSSIBLE, CLEAN ALL CONSTRUCTION EQUIPMENT AND VEHICLES THOROUGHLY (ESPECIALLY THE UNDERCARRIAGE AND WHEELS) BEFORE THEY ARE BROUGHT ON SITE. THIS WILL REMOVE INVASIVE PLANT SEEDS FROM THE EQUIPMENT AND UNDERCARRIAGES OF THE VEHICLES THAT MAY HAVE BEEN PICKED UP AT OTHER SITES.
3. AVOID USING SEED MIXES THAT INCLUDE INVASIVE PLANT SPECIES (E.G. CROWN VETCH) TO RE–VEGETATE THE AREA. USE WEED–FREE STRAW OR HAY MIXES WHEN POSSIBLE.

STAGING OF CONSTRUCTION ACTIVITIES

BMP INSTALLATION AND REMOVAL IN RELATION TO EARTH DISTURBANCE ACTIVITIES IS PROJECTED TO PROCEED IN ACCORDANCE WITH THE FOLLOWING RELATIVE SEQUENCE:

1. INSTALL ROCK CONSTRUCTION ENTRANCE WITH WASH RACK.
2. INSTALL COMPOST FILTER SOCK AT THE FOLLOWING LOCATIONS:
   a. ALONG EDGE OF WOODS NEAR WETLANDS AT THE WEST END OF THE SITE.
   b. ALONG NORTH PROPERTY LINE.
   c. UPGRADIENT OF THE PROPOSED INFILTRATION/DETENTION BASIN SITE.
   d. DOWNGRADIENT OF PROPOSED TOPSOIL STOCKPILE AREAS.
3. PROTECT INFILTRATION/DETENTION BASIN AREA FROM COMPACTION AND SEDIMENTATION DURING CONSTRUCTION.
4. CONSTRUCT CONSTRUCTION OFFICE AREA, CONSTRUCTION PARKING AREA, AND CONSTRUCTION LAYDOWN AREAS.
   a. REMOVE AND STOCKPILE TOPSOIL; TEMPORARILY SEED STOCKPILE.
   b. REGRADE, COMPACT, AND APPLY AGGREGATE SURFACING AS NECESSARY.
   c. COMPLETE SITE ACCESS DRIVEWAYS, CULVERT, GRAVELED AREAS TO BE USED FOR CONSTRUCTION OFFICE AREA, GRAVELED CONSTRUCTION PARKING AREA, AND CONSTRUCTION LAYDOWN AREAS.
   d. SEED AND MULCH MAIN ACCESS DRIVEWAY SIDESLOPES.
5. INSTALL WEIGHTED SEDIMENT FILTER TUBES DOWNGRADIENT OF DIVERSION CHANNEL #D1 AND DOWNGRADIENT OF DRIVEWAY CULVERT OUTLET.
6. CONSTRUCT DIVERSION CHANNEL #D1 AND #D2 WITH A TEMPORARY LINING.
7. CONSTRUCT SEDIMENT BASIN.
   a. REMOVE AND STOCKPILE TOPSOIL; TEMPORARILY SEED STOCKPILE.
   b. EXCAVATE SEDIMENT BASIN, PLACE AND COMPACT FILL FOR SEDIMENT BASIN BERM.
   c. INSTALL SEDIMENT BASIN OUTLET STRUCTURE INCLUDING SKIMMER DEVICE AND DISCHARGE PIPE.
   d. INSTALL SEDIMENT BASIN EMERGENCY SPILLWAY AND LINING.
   e. EXCAVATE CONVEYANCE CHANNEL #C1 AND CONSTRUCT ADJACENT BERM.
   f. INSTALL TEMPORARY LINING WITHIN CONVEYANCE CHANNEL #C1.
   g. APPLY TEMPORARY SEEDING TO SEDIMENT BASIN INNER AND OUTER SLOPES AND TO CONVEYANCE CHANNEL #C1 INNER AND OUTER SLOPES.
8. CONSTRUCTION OF CONVERTER STATION.
   a. STRIP AND STOCKPILE TOPSOIL FROM CONVERTER STATION SITE; TEMPORARILY SEED STOCKPILES.
   b. BULK EXCAVATION/GRADING FOR THE CONVERTER STATION SITE.
   c. BULK EXCAVATION FOR STRUCTURE FOUNDATIONS.
   d. INSTALLATION OF CONVERTER STATION PERIMETER FENCE.
   e. CONSTRUCTION OF CONVERTER STATION BUILDINGS AND OTHER STRUCTURES.
   f. APPLY FINISHED SURFACE OF AGGREGATE OVER AREAS WITHIN CONVERTER STATION THAT HAVE BEEN COMPLETED.
9. CONSTRUCT INFILTRATION/DETENTION BASIN.
   a. PLACE AND COMPACT FILL FOR BASIN BERMS.
   b. APPLY VEGETATIVE STABILIZATION TO DISTURBED AREAS OF INFILTRATION/DETENTION BASIN; APPLY EROSION CONTROL MULCH BLANKET TO ALL PERMANENT SLOPES OF 3:1 OR GREATER.
10. ASSURE THAT ALL AREAS UPGRADIENT OF SEDIMENT BASIN HAVE BEEN STABILIZED.
11. DEWATER SEDIMENT BASIN.
12. FILL SEDIMENT BASIN. GRADE AREA OF SEDIMENT BASIN. EXCESS FILL MAY BE USED TO CONSTRUCT BERM FOR INFILTRATION/DETENTION BASIN.
13. CONVERT CONVEYANCE CHANNEL #C1 TO A PERMANENT VEGETATED SWALE #C1 AND #C2 WITH A DISCHARGE TO THE INFILTRATION/DETENTION BASIN. INSTALL TEMPORARY LINING IN VEGETATED SWALE.
14. CONSTRUCT INFILTRATION/DETENTION BASIN OUTLET STRUCTURE.
15. DEMOBILIZE CONSTRUCTION OFFICE AREAS, CONSTRUCTION PARKING AREAS, AND CONSTRUCTION LAYDOWN AREAS. REMOVE AGGREGATE SURFACING, DECOMPACT, FINE GRADE, AND REVEGETATE.
16. REMOVE ROCK CONSTRUCTION ENTRANCE WITH WASH RACK.
17. APPLY PERMANENT VEGETATIVE STABILIZATION TO ALL REMAINING DISTURBED AREAS; APPLY EROSION CONTROL MULCH BLANKET TO ALL PERMANENT SLOPES OF 3:1 OR GREATER.
18. AFTER ALL REMAINING DISTURBED AREAS HAVE BEEN STABILIZED WITH PERMANENT VEGETATION, REMOVE COMPOST FILTER SOCKS AND WEIGHTED SEDIMENT FILTER TUBES.
19. MAINTAIN STORMWATER BMPS ACCORDING TO MAINTENANCE SCHEDULE.

MAINTENANCE PROVISIONS

A MAINTENANCE PROGRAM FOR EROSION AND SEDIMENTATION CONTROL FACILITIES WILL BE ESTABLISHED, CONSISTING OF INSPECTIONS BY THE CONTRACTOR TO OCCUR WEEKLY, AS WELL AS AFTER ANY STORMWATER EVENT. EACH INSPECTION MUST BE DOCUMENTED IN WRITING AS TO THE DATE OF THE INSPECTION, THE PERSON PERFORMING THE INSPECTION, AND ANY BMP REPAIRS, REPLACEMENT OR MAINTENANCE ACTIVITIES THAT OCCUR. RECORDS OF THESE INSPECTIONS WILL BE KEPT ON SITE BY THE CONTRACTOR, AND WILL BE MADE AVAILABLE UPON REQUEST TO INSPECTORS FROM PADEP OR THE ERIE COUNTY CONSERVATION DISTRICT. INSPECTIONS WILL COVER ALL ASPECTS OF THE BMPS, PARTICULARLY WITH REGARD TO THE FOLLOWING:

ROCK CONSTRUCTION ENTRANCE WITH WASH RACK. THE ROCK CONSTRUCTION SIZE AND THICKNESS WILL BE MAINTAINED TO THE SPECIFIED DIMENSIONS BY ADDING ADDITIONAL ROCK AS NECESSARY. A STOCKPILE SHALL BE MAINTAINED ON SITE FOR THIS PURPOSE. THE DRAIN SPACE UNDER THE WASH RACK SHALL BE KEPT OPEN AT ALL TIMES. DAMAGE TO THE WASH RACK SHALL BE REPAIRED PRIOR TO FURTHER USE OF THE WASH RACK. AT THE END OF EACH CONSTRUCTION DAY, ALL SEDIMENT DEPOSITED FROM THE SITE ONTO ADJACENT ROADWAYS SHALL BE REMOVED AND RETURNED TO THE CONSTRUCTION SITE. WASHING THE ROADWAY OR SWEEPING DEPOSITS INTO ROADSIDE DITCHES, STORM SEWERS, CULVERTS, OR OTHER DRAINAGE COURSES IS NOT ACCEPTABLE.

COMPOST FILTER SOCK. COMPOST FILTER SOCKS WILL BE RESET AS NECESSARY, AND REPAIRED ACCORDING TO THE MANUFACTURER'S SPECIFICATIONS. BIODEGRADABLE FILTER SOCKS SHALL BE REPLACED AFTER SIX MONTHS; PHOTODEGRADABLE SOCKS AFTER ONE YEAR. POLYPROPYLENE SOCKS SHALL BE REPLACED ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS. UPON REMOVAL, THE COMPOST FILTER SOCKS MAY BE CUT OPEN AND THE MULCH SPREAD AS A SOIL SUPPLEMENT.

CHANNELS. CHANNELS FOUND TO BE ERODED SHALL BE RESTORED TO THEIR DESIGN DIMENSIONS. CHANNELS WITH SEDIMENT DEPOSITION SHALL BE CLEANED WHENEVER THE TOTAL CHANNEL DEPTH IS REDUCED BY 25 PERCENT AT ANY LOCATION. DAMAGED CHANNEL LININGS SHALL BE REPAIRED OR REPLACED IMMEDIATELY.

SEDIMENT BASIN. PROVIDE ACCESS FOR SEDIMENT REMOVAL AND OTHER REQUIRED MAINTENANCE ACTIVITIES. BASIN EMBANKMENTS, SPILLWAYS, AND OUTLETS SHALL BE INSPECTED FOR EROSION, PIPING, AND SETTLEMENT. NECESSARY REPAIRS SHALL BE IMMEDIATELY. REMOVE TRASH OR OTHER FLOATING DEBRIS THAT COULD CAUSE MALFUNCTION OF THE SKIMMER OR BASIN OUTLET. ANY CLOGGED, DAMAGED, OR MALFUNCTIONING SKIMMER SHALL BE REPAIRED OR REPLACED WITHIN 24 HOURS OF INSPECTION. ICE OR SEDIMENT BUILDUP AROUND THE SKIMMER SHALL BE REMOVED SO AS TO ALLOW THE SKIMMER TO RESPOND TO FLUCTUATING WATER ELEVATIONS. A CLEANOUT STAKE SHALL BE PLACED NEAR THE CENTER OF THE BASIN. SEDIMENT SHALL BE REMOVED FROM THE BASIN WHEN IT REACHES THE LEVEL MARKED ON THE SEDIMENT CLEANOUT STAKE, AND THE BASIN SHALL BE RESTORED TO ITS ORIGINAL DIMENSIONS. DISPOSE OF MATERIALS REMOVED FROM THE BASIN AS FILL TO BE USED IN A NON–WETLAND UPLAND AREA. DISPLACED RIPRAP WITHIN THE OVERFLOW SPILLWAY SHALL BE REPLACED IMMEDIATELY.

EROSION CONTROL MULCH BLANKET. AREAS COVERED BY EROSION CONTROL MULCH BLANKETS SHALL BE INSPECTED WEEKLY AND AFTER EACH RUNOFF EVENT UNTIL PERENNIAL VEGETATION IS ESTABLISHED TO A MINIMUM UNIFORM 70 PERCENT COVERAGE THROUGHOUT THE BLANKETED AREA. DAMAGED OR DISPLACED BLANKETS SHALL BE RESTORED OR REPLACED WITHIN 4 CALENDAR DAYS.

RIPRAP APRONS. DISPLACED RIPRAP WITHIN RIPRAP APRONS SHALL BE RESTORED IMMEDIATELY.

VEGETATIVE STABILIZATION. SEEDED AREAS SHALL BE MAINTAINED IN ACCORDANCE WITH THE SPECIFICATIONS UNTIL PERENNIAL VEGETATION IS ESTABLISHED TO A MINIMUM UNIFORM 70 PERCENT COVERAGE.

WEIGHTED SEDIMENT FILTER TUBE. WEIGHTED SEDIMENT FILTER TUBES SHALL BE INSPECTED WEEKLY AND AFTER EACH RUNOFF EVENT. SEDIMENT DEPOSITS SHALL BE CLEANED FROM THE TUBE WHEN IT REACHES HALF THE HEIGHT OF THE TUBE. DAMAGED TUBES SHALL BE REPLACED WITHIN 24 HOURS OF INSPECTION. A SUPPLY OF TUBES SHALL BE MAINTAINED ON SITE FOR THIS PURPOSE.

RECYCLING MATERIAL AND WASTE/BORROW AREAS

EXCESS EXCAVATED MATERIAL SHALL BE USED AS FILL IN A NON–WETLAND UPLAND AREA. ALL BUILDING MATERIALS AND WASTES (EXCESS TOPSOIL, DEMOLITION DEBRIS, CONCRETE WASHOUT, EXCESS BUILDING MATERIALS) MUST BE REMOVED FROM THE SITE AND RECYCLED OR DISPOSED OF IN ACCORDANCE WITH PADEP AND OTHER APPLICABLE REGULATIONS. NO BUILDING MATERIALS OR WASTES SHALL BE BURNED, BURIED, DUMPED, OR DISCHARGED AT THE SITE. ALL APPLICABLE FEDERAL, STATE, AND LOCAL LAWS AND REGULATIONS MUST BE FOLLOWED IN THE USE, HANDLING, AND DISPOSAL OF POTENTIALLY HAZARDOUS MATERIALS.

FOR CONCRETE OPERATIONS, A SUITABLE WASHOUT FACILITY MUST BE PROVIDED FOR THE CLEANING OF CHUTES, MIXERS, AND HOPPERS OF THE DELIVERY VEHICLES UNLESS SUCH A FACILITY WILL BE USED AT THE SOURCE OF THE CONCRETE. UNDER NO CIRCUMSTANCES MAY WASH WATER FROM THESE VEHICLES BE ALLOWED TO ENTER ANY SURFACE WATERS. PROPER SIGNAGE SHALL BE PROVIDED TO DRIVERS SO THAT THEY ARE AWARE OF THE PRESENCE OF WASHOUT FACILITIES. WASHOUT FACILITIES SHOULD NOT BE PLACED WITHIN 50 FEET OF STORM DRAINS, OPEN DITCHES OR SURFACE WATERS. THEY SHOULD BE IN A CONVENIENT LOCATION FOR THE TRUCKS, PREFERABLY NEAR THE PLACE WHERE THE CONCRETE IS BEING POURED, BUT FAR ENOUGH FROM OTHER VEHICULAR TRAFFIC TO MINIMIZE THE POTENTIAL FOR ACCIDENTAL DAMAGE OR SPILLS. WHEREVER POSSIBLE, THEY SHOULD BE LOCATED ON SLOPES NOT EXCEEDING A 2 PERCENT GRADE. SELF–INSTALLED, EARTHEN WASHOUTS SHOULD BE EXCAVATED BELOW GRADE TO PREVENT RUNOFF OF THE WASH WATER AND MINIMIZE THE POTENTIAL FOR BREACHING. THEY SHOULD BE SIZED TO HANDLE SOLIDS, WASH WATER, AND RAINFALL. A BELOW–GRADE WASHOUT SHOULD BE A MINIMUM OF 10 FEET WIDE AND PROVIDE AT LEAST 12 INCHES OF FREEBOARD ABOVE THE LIQUID AND SOLID WASTE ANTICIPATED BETWEEN CLEANOUT INTERVALS. THE PIT SHOULD BE LINED WITH PLASTIC SHEETING OF AT LEAST 10–MIL THICKNESS (WITH NO HOLES OR TEARS) TO PREVENT LEACHING OF LIQUIDS INTO THE GROUND. SEDIMENT BASINS AND SEDIMENT TRAPS MAY NOT BE USED AS CONCRETE WASHOUT DEVICES, SINCE THEY DISCHARGE DIRECTLY TO SURFACE WATERS. ALL CONCRETE WASHOUT FACILITIES SHOULD BE INSPECTED DAILY. DAMAGED OR LEAKING WASHOUTS SHOULD BE DEACTIVATED AND REPAIRED OR REPLACED IMMEDIATELY. ACCUMULATED MATERIALS SHOULD BE REMOVED WHEN THEY REACH 75 PERCENT CAPACITY. PLASTIC LINERS SHOULD BE REPLACED WITH EACH CLEANING OF THE WASHOUT FACILITY.

FILL MATERIAL

IF THE SITE WILL NEED TO HAVE FILL IMPORTED FROM AN OFFSITE LOCATION, THE RESPONSIBILITY FOR PERFORMING ENVIRONMENTAL DUE DILIGENCE AND THE DETERMINATION OF CLEAN FILL WILL RESIDE WITH THE CONTRACTOR. IF THE SITE WILL HAVE EXCESS FILL THAT WILL NEED TO BE EXPORTED TO AN OFFSITE LOCATION, THE RESPONSIBILITY OF CLEAN FILL DETERMINATION AND ENVIRONMENTAL DUE DILIGENCE RESTS ON THE OWNER. THIS INFORMATION SHALL BE COMPLETED PRIOR TO CONDUCTING THE WORK. IF ALL CUT AND FILL MATERIALS WILL BE USED ON THE SITE, A CLEAN FILL DETERMINATION IS NOT REQUIRED BY THE CONTRACTOR UNLESS THERE IS A BELIEF THAT A SPILL OR RELEASE OF A REGULATED SUBSTANCE OCCURRED ON SITE.

ALL OFF–SITE WASTE AND BORROW AREAS MUST HAVE AN E&S PLAN APPROVED BY THE LOCAL CONSERVATION DISTRICT OR DEP FULLY IMPLEMENTED PRIOR TO BEING ACTIVATED.

FILL MATERIAL SHALL NOT BE PLACED WITHIN 50' OF THE TOP OF STREAM BANKS.

OWNER AND/OR CONTRACTOR MUST USE ENVIRONMENTAL DUE DILIGENCE TO ENSURE THAT THE FILL MATERIAL ASSOCIATED WITH THIS PROJECT QUALIFIES AS CLEAN FILL. DEFINITIONS OF CLEAN FILL AND ENVIRONMENTAL DUE DILIGENCE ARE PROVIDED BELOW.

CLEAN FILL IS DEFINED AS: UNCONTAMINATED, NON–WATER SOLUBLE, NON–DECOMPOSABLE, INERT, SOLID MATERIAL. THE TERM INCLUDES SOIL, ROCK, STONE, DREDGED MATERIAL, USED ASPHALT, AND BRICK, BLOCK OR CONCRETE FROM CONSTRUCTION AND DEMOLITION ACTIVITIES THAT IS SEPARATE FROM OTHER WASTE AND IS RECOGNIZABLE AS SUCH. THE TERM DOES NOT INCLUDE MATERIALS PLACED IN OR ON THE WATERS OF THE COMMONWEALTH UNLESS OTHERWISE AUTHORIZED. (THE TERM "USED ASPHALT" DOES NOT INCLUDE MILLED ASPHALT OR ASPHALT THAT HAS BEEN PROCESSED FOR RE–USE.)

ENVIRONMENTAL DUE DILIGENCE: INVESTIGATIVE TECHNIQUES, INCLUDING, BUT NOT LIMITED TO, VISUAL PROPERTY INSPECTIONS, ELECTRONIC DATA BASE SEARCHES, REVIEW OF PROPERTY OWNERSHIP, REVIEW OF PROPERTY USE HISTORY, SANBORN MAPS, ENVIRONMENTAL QUESTIONNAIRES, TRANSACTION SCREENS, ANALYTICAL TESTING, ENVIRONMENTAL ASSESSMENTS OR AUDITS.

GENERAL NOTES:

1. A COPY OF THE APPROVED DRAWINGS (STAMPED SIGNED AND DATED BY THE REVIEWING AGENCY) MUST BE AVAILABLE AT THE PROJECT SITE AT ALL TIMES.
2. AT LEAST 7 DAYS PRIOR TO STARTING ANY EARTH DISTURBANCE ACTIVITIES (INCLUDING CLEARING AND GRUBBING), THE OWNER AND/OR OPERATOR SHALL INVITE ALL CONTRACTORS, THE LANDOWNER, APPROPRIATE MUNICIPAL OFFICIALS, THE E&S PLAN PREPARER, THE POST CONSTRUCTION STORMWATER MANAGEMENT PLAN PREPARER, AND A REPRESENTATIVE FROM THE LOCAL 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. THE SERIAL NUMBER FOR THIS PROJECT IS 20143041081, 20143041164, 20143041188, 20143041189, 20143041215, 20143041216, 20143041228, 20143041229, 20143041269, 20143041270, 20143041290, 20143041294, 20143041304, 20143041305, 20143041317, 20143041331, 20143041332, 20143041359, AND 20143041374.
4. ALL EARTH DISTURBANCE ACTIVITIES SHALL PROCEED IN ACCORDANCE WITH THE SEQUENCE PROVIDED ON THE PLAN DRAWINGS. DEVIATION FROM THAT SEQUENCE MUST BE APPROVED IN WRITING FROM THE LOCAL CONSERVATION DISTRICT OR BY DEP PRIOR TO IMPLEMENTATION.
5. CLEARING, GRUBBING, AND TOPSOIL STRIPPING SHALL BE LIMITED TO THOSE AREAS DESCRIBED IN EACH STAGE OF THE CONSTRUCTION SEQUENCE. GENERAL SITE CLEARING, GRUBBING AND TOPSOIL STRIPPING MAY NOT COMMENCE IN ANY STAGE OR PHASE OF THE PROJECT UNTIL THE E&S BMPS SPECIFIED BY THE CONSTRUCTION SEQUENCE FOR THAT STAGE OR PHASE HAVE BEEN INSTALLED AND ARE FUNCTIONING AS DESCRIBED IN THIS DOCUMENT.
6. AT NO TIME SHALL CONSTRUCTION VEHICLES BE ALLOWED TO ENTER AREAS OUTSIDE THE LIMIT OF DISTURBANCE BOUNDARIES SHOWN ON THE PLAN MAPS. THESE AREAS MUST BE CLEARLY MARKED AND FENCED OFF BEFORE CLEARING AND GRUBBING OPERATIONS BEGIN.
7. STOCKPILE HEIGHTS MUST NOT EXCEED 35 FEET. STOCKPILE SLOPES MUST BE 2H:1V OR FLATTER.
8. IMMEDIATELY UPON DISCOVERING UNFORESEEN CIRCUMSTANCES POSING THE POTENTIAL FOR ACCELERATED EROSION AND/OR SEDIMENT POLLUTION, THE OPERATOR SHALL IMPLEMENT APPROPRIATE BMPS TO MINIMIZE THE POTENTIAL FOR EROSION AND SEDIMENT POLLUTION AND NOTIFY THE LOCAL CONSERVATION DISTRICT AND/OR THE REGIONAL OFFICE OF DEP.
9. ALL BUILDING MATERIALS AND WASTES MUST BE REMOVED FROM THE SITE AND RECYCLED OR DISPOSED OF IN ACCORDANCE WITH THE DEPARTMENT'S SOLID WASTE MANAGEMENT REGULATIONS AT 25 PA. CODE CHAPTER 260, §§260.1 ET SEQ., 271.1, AND 287.1 ET. SEQ. NO BUILDING MATERIALS OR WASTES OR UNUSED BUILDING MATERIALS SHALL BE BURNED, BURIED, DUMPED, OR DISCHARGED AT THE SITE.
10. ALL OFF–SITE WASTE AND BORROW AREAS MUST HAVE AN E&S PLAN APPROVED BY THE LOCAL CONSERVATION DISTRICT OR DEP FULLY IMPLEMENTED PRIOR TO BEING ACTIVATED.
11. THE CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT ANY MATERIAL BROUGHT ON SITE IS CLEAN FILL. FORM FP–001 MUST BE RETAINED BY THE PROPERTY OWNER FOR ANY FILL MATERIAL AFFECTED BY A SPILL OR RELEASE OF A REGULATED SUBSTANCE BUT QUALIFYING AS CLEAN FILL DUE TO ANALYTICAL TESTING.
12. ALL PUMPING OF WATER FROM ANY WORK AREA SHALL BE DONE ACCORDING TO THE PROCEDURE DESCRIBED IN THIS PLAN, OVER UNDISTURBED VEGETATED AREAS.
13. UNTIL THE SITE IS STABILIZED, ALL E&S BMPS MUST BE MAINTAINED PROPERLY. MAINTENANCE MUST INCLUDE INSPECTIONS OF ALL E&S BMPS AFTER EACH RUNOFF EVENT AND ON A WEEKLY BASIS. ALL PREVENTATIVE AND REMEDIAL MAINTENANCE WORK, INCLUDING CLEAN OUT, REPAIR, REPLACEMENT, REGRADING, RESEEDING, REMULCHING AND RENETTING MUST BE PERFORMED IMMEDIATELY. IF E&S BMPS FAIL TO PERFORM AS EXPECTED, REPLACEMENT BMPS, OR MODIFICATIONS OF THOSE INSTALLED WILL BE REQUIRED.
14. A LOG SHOWING DATES THAT E&S BMPS WERE INSPECTED AS WELL AS ANY DEFICIENCIES FOUND AND THE DATE THEY WERE CORRECTED SHALL BE MAINTAINED ON THE SITE AND BE MADE AVAILABLE TO REGULATORY AGENCY OFFICIALS AT THE TIME OF INSPECTION.
15. SEDIMENT TRACKED ONTO ANY PUBLIC ROADWAY OR SIDEWALK SHALL BE RETURNED TO THE CONSTRUCTION SITE BY THE END OF EACH WORK DAY AND DISPOSED IN THE MANNER DESCRIBED IN THIS PLAN. IN NO CASE SHALL THE SEDIMENT BE WASHED, SHOVELED, OR SWEPT INTO ANY ROADSIDE DITCH, STORM SEWER, OR SURFACE WATER.
16. ALL SEDIMENT REMOVED FROM BMPS SHALL BE DISPOSED OF IN THE MANNER DESCRIBED ON THE PLAN DRAWINGS.
17. AREAS WHICH ARE TO BE TOPSOILED SHALL BE SCARIFIED TO A MINIMUM DEPTH OF 4 INCHES PRIOR TO PLACEMENT OF TOPSOIL. AREAS TO BE VEGETATED SHALL HAVE A MINIMUM 4 INCHES OF TOPSOIL IN PLACE PRIOR TO SEEDING AND MULCHING. FILL OUTSLOPES SHALL HAVE A MINIMUM OF 2 INCHES OF TOPSOIL.
18. ALL FILLS SHALL BE COMPACTED AS REQUIRED TO REDUCE EROSION, SLIPPAGE, SETTLEMENT, SUBSIDENCE OR OTHER RELATED PROBLEMS. FILL INTENDED TO SUPPORT BUILDINGS, STRUCTURES AND CONDUITS, ETC. SHALL BE COMPACTED IN ACCORDANCE WITH LOCAL REQUIREMENTS OR CODES.
19. ALL FILLS SHALL BE PLACED IN COMPACTED LAYERS NOT TO EXCEED 9 INCHES IN THICKNESS.
20. FILL MATERIALS SHALL BE FREE OF FROZEN PARTICLES, BRUSH, ROOTS, SOD, OR OTHER FOREIGN OR OBJECTIONABLE MATERIALS THAT WOULD INTERFERE WITH OR PREVENT CONSTRUCTION OF SATISFACTORY FILLS.
21. FROZEN MATERIALS OR SOFT, MUCKY, OR HIGHLY COMPRESSIBLE MATERIALS SHALL NOT BE INCORPORATED INTO FILLS.
22. FILL SHALL NOT BE PLACED ON SATURATED OR FROZEN SURFACES.
23. SEEPS OR SPRINGS ENCOUNTERED DURING CONSTRUCTION SHALL BE HANDLED IN ACCORDANCE WITH THE STANDARD AND SPECIFICATION FOR SUBSURFACE DRAIN OR OTHER APPROVED METHOD.
24. ALL GRADED AREAS SHALL BE PERMANENTLY STABILIZED IMMEDIATELY UPON REACHING FINISHED GRADE. CUT SLOPES IN COMPETENT BEDROCK AND ROCK FILLS NEED NOT BE VEGETATED.
25. IMMEDIATELY AFTER EARTH DISTURBANCE ACTIVITIES CEASE IN ANY AREA OR SUBAREA OF THE PROJECT, THE OPERATOR SHALL STABILIZE ALL DISTURBED AREAS. DURING NON–GERMINATING MONTHS, MULCH OR PROTECTIVE BLANKETING SHALL BE APPLIED AS DESCRIBED IN THE PLAN. AREAS NOT AT FINISHED GRADE, WHICH WILL BE REACTIVATED WITHIN 1 YEAR, MAY BE STABILIZED IN ACCORDANCE WITH THE TEMPORARY STABILIZATION SPECIFICATIONS. THOSE AREAS WHICH WILL NOT BE REACTIVATED WITHIN 1 YEAR SHALL BE STABILIZED IN ACCORDANCE WITH THE PERMANENT STABILIZATION SPECIFICATIONS.
26. PERMANENT STABILIZATION IS DEFINED AS A MINIMUM UNIFORM, PERENNIAL 70% VEGETATIVE COVER OR OTHER PERMANENT NON–VEGETATIVE COVER WITH A DENSITY SUFFICIENT TO RESIST ACCELERATED EROSION. CUT AND FILL SLOPES SHALL BE CAPABLE OF RESISTING FAILURE DUE TO SLUMPING, SLIDING, OR OTHER MOVEMENTS.
27. E&S BMPS MUST REMAIN FUNCTIONAL AS SUCH UNTIL ALL AREAS TRIBUTARY TO THEM ARE PERMANENTLY STABILIZED OR UNTIL THEY ARE REPLACED BY ANOTHER BMP APPROVED BY THE LOCAL CONSERVATION DISTRICT OR DEP.
28. UPON COMPLETION OF ALL EARTH DISTURBANCE ACTIVITIES AND PERMANENT STABILIZATION OF ALL DISTURBED AREAS, THE OWNER AND/OR OPERATOR SHALL CONTACT THE LOCAL CONSERVATION DISTRICT FOR AN INSPECTION PRIOR TO REMOVAL/CONVERSION OF THE E&S BMPS.
29. AFTER FINAL SITE STABILIZATION HAS BEEN ACHIEVED, TEMPORARY E&S BMPS MUST BE REMOVED OR CONVERTED TO PERMANENT POST CONSTRUCTION STORMWATER MANAGEMENT BMPS. AREAS DISTURBED DURING REMOVAL OR CONVERSION OF THE BMPS MUST BE STABILIZED IMMEDIATELY. IN ORDER TO ENSURE RAPID REVEGETATION OF DISTURBED AREAS, SUCH REMOVAL/CONVERSIONS SHOULD BE DONE ONLY DURING THE GERMINATING SEASON.
30. UPON COMPLETION OF ALL EARTH DISTURBANCE ACTIVITIES AND PERMANENT STABILIZATION OF ALL DISTURBED AREAS, THE OWNER AND/OR OPERATOR SHALL CONTACT THE LOCAL CONSERVATION DISTRICT TO SCHEDULE A FINAL INSPECTION.
31. FAILURE TO CORRECTLY INSTALL E&S BMPS, FAILURE TO PREVENT SEDIMENT–LADEN RUNOFF FROM LEAVING THE CONSTRUCTION SITE, OR FAILURE TO TAKE IMMEDIATE CORRECTIVE ACTION TO RESOLVE FAILURE OF E&S BMPS MAY RESULT IN ADMINISTRATIVE, CIVIL, AND/OR CRIMINAL PENALTIES BEING INSTITUTED BY THE PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL PROTECTION AS DEFINED IN SECTION 602 OF THE PENNSYLVANIA CLEAN STREAMS LAW. THE CLEAN STREAMS LAW PROVIDES FOR UP TO $10,000 PER DAY IN CIVIL PENALTIES, UP TO $10,000 IN SUMMARY CRIMINAL PENALTIES, AND UP TO $25,000 IN MISDEMEANOR CRIMINAL PENALTIES FOR EACH VIOLATION.

SHEET ES–7
DETAILS

No.	Date	Revisions	By
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EROSION AND SEDIMENTATION CONTROL PLAN
ITC LAKE ERIE CONNECTOR LLC
ERIE CONVERTER STATION

SCALE: AS SHOWN	APPROVED BY:	DRAWN BY: JEFFREY T. BERNOSKY
DATE: 1/22/2016		
	CONNEAUT TOWNSHIP, ERIE COUNTY PENNSYLVANIA	

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