



Legal Department

American Electric Power
1 Riverside Plaza
Columbus, OH 43215-2373
AEP.com

February 9, 2021

Ms. Tanowa Troupe, Secretary
Ohio Power Siting Board
180 East Broad Street
Columbus, Ohio 43215-3793

Tanner S. Wolfram
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Senior Counsel –
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**RE: Notice of Supplemental Information
Case No. 19-1383-EL-BNR
North Proctorville Station Expansion Project**

Dear Ms. Troupe:

AEP Ohio Transmission Company, Inc. submits this notice and attachment to inform you that the Ohio Environmental Protection Agency National Pollutant Discharge Elimination System-Construction Site Stormwater General Permit has been approved for the above-referenced Project.

If you have questions regarding this information, please do not hesitate to contact me.

Respectfully submitted,

/s/ Tanner S. Wolfram

Christen M. Blend (0086881), Counsel of Record
Tanner S. Wolfram (0097789)
Counsel for AEP Ohio Transmission Company, Inc.



Mike DeWine, Governor
Jon Husted, Lt. Governor
Laurie A. Stevenson, Director

Nov 06, 2019

AEP Ohio Transmission Company, Inc.
Aimee Toole
8600 Smiths Mill Road
New Albany, OH 43054

Re: Approval Under Ohio EPA National Pollutant Discharge Elimination System (NPDES) - Construction Site Stormwater General Permit - OHC000005

Dear Applicant,

Your NPDES Notice of Intent (NOI) application is approved for the following facility/site. Please use your Ohio EPA Facility Permit Number in all future correspondence.

Facility Name:	North Proctorville Station
Facility Location:	3401 SR 775
City:	Proctorville
County:	Lawrence
Township:	Symmes
Ohio EPA Facility Permit Number:	0GC03492*AG
Permit Effective Date:	Nov 06, 2019

Please read and review the permit carefully. The permit contains requirements and prohibitions with which you must comply. Coverage under this permit will remain in effect until a renewal of the permit is issued by the Ohio EPA.

If more than one operator (defined in the permit) will be engaged at the site, each operator shall seek coverage under the general permit. Additional operator(s) shall submit a Co-Permittee NOI to be covered under this permit. There is no fee associated with the Co-Permittee NOI form.

Please be aware that this letter only authorizes discharges in accordance with the above referenced NPDES CGP. The placement to fill into regulated waters of the state may require a 401 Water Quality Certification and/or Isolated Wetlands Permit from Ohio EPA. Also, a Permit-To-Install (PTI) is required for the construction of sanitary or industrial wastewater collection, conveyance, storage, treatment, or disposal facility; unless a specific exemption by rule exists. Failure to obtain the required permits in advance is a violation of Ohio Revised Code 6111 and potentially subjects you to enforcement and civil penalties.

To view your electronic submissions and permits please Logon in to the Ohio EPA's eBusiness Center at <http://ebiz.epa.ohio.gov>.

If you need assistance or have questions please call (614) 644-2001 and ask for Construction Site Stormwater General Permit support or visit our website at <http://www.epa.ohio.gov>.

Sincerely,

Laurie A. Stevenson
Director

Project Environmental Considerations

Project Name: North Proctorville Station Fence Project

WERS Permit Specialist: Amy Toohey

SMG WERS: Eric Ward

Regional Environmental Coordinator/LERS SMG: Vaughn Kaufman

NOTE: Review of this form is not a substitute for reviewing, understanding, and maintaining full compliance with all applicable regulations, permits, plans and the Transmission Contractors Environmental Requirements Document (CERD). This form is intended only to highlight a few key requirements and is not an exhaustive list of all compliance obligations.

Project Environmental Permits:

- ☒ General Stormwater Construction Permit
- ☐ US Army Corps of Engineers Permit
- ☐ State/401 Permit
- ☐ Floodplain Permit
- ☐ Other: **{Insert other required permit(s)}**

Project Environmental Considerations:

- ☒ Threatened/Endangered Species-rbc
- ☐ Cultural

Stormwater Compliance:

General:

- ☒ Must comply with all aspects of the Stormwater Pollution Prevention Plan (SWPPP) until final stabilization is achieved, accepted by WERS, and Notice of Termination is filed/approved by agency. Read the SWPPP and plan for full compliance during each phase of the project.
- ☒ All forms included in SWPPP must be completed as required:
 - See swppp
- ☒ SWPPP is a living document and must be kept up-to-date. Adjustments and improvements to adequately control erosion & sediment are expected & required and must be documented on the SWPPP map. SWPPP maps must also include location of **{insert items for your state such as portalets, solid waste containers, and vehicle fueling areas}**.
- ☐ Documented SWPPP Training for SWPPP contractors & construction crews is required **{enter frequency for state}**. Identify responsible party.
- ☐ Access roads can be the largest contributor of sediment to stormwater. Careful planning and consideration must be given to management of run-on and run-off from access roads.
- ☐ Adequate stabilized construction entrances must be installed and maintained/enhanced as necessary to avoid soil tracking onto public roads. Roads must be kept clear of track-out (make a plan to immediately address road cleaning should it become necessary).
- ☐ Public notice signs must be posted ahead of construction **{insert specific requirements for state/county}**.
- ☐ Concrete washouts must be used. Do not fill past 50% capacity **{insert any state-specific requirements}**. Any spilled concrete must be cleaned up immediately.

Installation of Controls:

- ☒ Downslope controls must be in-place ahead of upslope soil disturbance. If site conditions warrant significant changes/adjustments to the controls identified in the SWPPP, engage WERS. Update SWPPP accordingly.
- ☒ Controls must be properly installed in accordance with specifications in the SWPPP (e.g. silt fence trenched in, straw wattles must not substituted for compost sock/silt fence unless approved by WERS, **{insert other common mistakes with installation in your area}**).
- ☒ All inclined access roads must be accompanied by adequate water conveyance such as drainage ditches and water bars/culverts to divert water away from the roadbed. All ditches must permit positive drainage.
- ☐ Grade sediment basin as one of the first phases of earthwork so it can function as a control throughout the project.

Inspections & Maintenance:

- ☒ SWPPP inspections must be completed by no state qualifications.
- ☒ SWPPP inspections must be complete every 7 calendar days and after every storm event of 0.5 inch/24 hours. There are no exceptions to this frequency {make note of any exceptions in your state}. Identify responsible party and backup for each phase of project.
- ☒ All required information must be documented on inspection reports and reports must reflect site conditions.
- ☒ Copies of reports must be provided to Eric Ward-ericward@safetymanagementgroup.com and TCR within after completion of weekly and rain event.
- ☒ Maintenance/corrective actions for inspection items must be completed within 3 days of the inspection date. Identify plan & responsible party to complete maintenance/corrective actions in required timeframe for each phase of project.
- ☒ Inspection reports must be signed as required in the SWPPP Robert Riber, TCR.

Temporary & Final Stabilization:

- ☒ Areas of soil disturbance (including stockpiles) where the soil will not be actively graded/disturbed for 7 days, must receive temporary stabilization (such as mulch & seed) within 7 days.
- ☐ Clean out/seed sediment basin upon project completion and prior to demobilization
- ☒ Final stabilization must be completed with 7 days of achieving final grade in an area.
- ☒ It is unacceptable and a violation to allow disturbed areas to remain unstabilized until final restoration phases of the project. Note, it may be necessary to reseed/straw disturbed areas following demobilization. Identify plan and responsible party for temporary & final stabilization.

Wetland/Stream Compliance:

- ☒ All wetlands/stream areas that are not permitted for impact, must be field marked with orange barrier construction fencing and signs. Wetlands/streams must also be protected with sediment controls (such as silt sock) in accordance with the SWPPP/permit.
- ☒ Wetland/streams must not be used as areas to store materials or for placement waste containers. Materials, waste containers, and vehicle parking areas should not be in or adjacent to wetlands/streams.
- ☒ Pertinent wetland/stream permits must be located on project-site.

NOTE: WERS must be notified ahead of any changes in Limits of Disturbances, unplanned tree clearing, adjustments in access plans, and of any agency inspections. All agency inspection reports or violation/enforcement must be communicated to WERS immediately.

COMMENTS:

Details were given regarding the wetlands to be avoided; cow management to avoid impacts

Sign Off:

Facilitator: Amy J Tooke

Contractor/subcontractor firms present:
New River; Liberty;SSOE engineers-security fence

Date: _____

****Please place this completed document in the PSSEP**



Division of Surface Water - Notice of Intent (NOI) For Coverage Under Ohio Environmental Protection Agency General NPDES Permit

(Read accompanying instructions carefully before completing this form.)

Submission of this NOI constitutes notice that the party identified in Section I of this form intends to be authorized to discharge into state surface waters under Ohio EPA's NPDES general permit program. Becoming a permittee obligates a discharger to comply with the terms and conditions of the permit. Complete all required information as indicated by the instructions. Do not use correction fluid on this form. Forms transmitted by fax will not be accepted. A check for the proper amount must accompany this form and be made payable to "Treasurer, State of Ohio." (See the fee table in Attachment C of the NOI instructions for the appropriate processing fee.)

I. Applicant Information/Mailing Address

Company (Applicant) Name: AEP Ohio Transmission Company, Inc.

Mailing (Applicant) Address: 8600 Smiths Mill Road

City: New Albany

State : OH

Zip Code: 43054

Country: USA

Contact Person: Aimee Toole

Phone: (614) 933-2060

Fax:

Contact E-mail Address: artoole@aep.com

II. Facility/Site Location Information

Facility/Site Name: North Proctorville Station

Facility Address: 3401 SR 775

City: Proctorville

State: OH

Zip Code: 45669

County: Lawrence

Township: Union

Facility Contact Person: robert Reiber

Phone: (740) 331-2342

Fax:

Facility Contact E-mail Address: rtreiber@aep.com

Latitude: 38.477654

Longitude: -82.395018

Facility/Map Attachment location map.pdf

Receiving Stream or MS4: Unnamed Tribs of Four Mile Creek, unnamed trib of Indian Guyan Creek

III. General Permit Information

General Permit Number: OHC000005

Initial Coverage: Y **Renewal Coverage:** N

Type of Activity: Construction Site Stormwater General Permit

SIC Code(s):

Existing NPDES Facility Permit Number:

ODNR Coal Mining Application Number:

If Household Sewage Treatment System, is system for:

New Home Construction:

Replacement of failed existing system:

Outfall

Design Flow (MGD):

Associated Permit Effluent Table:

Receiving Water :

Latitude

Longitude

Are These Permits Required?

PTI: NO

Individual 401 Water Quality Certification: NO

Individual NPDES: NO

Isolated Wetland: NO

U.S. Army Corp Nationwide Permit: NO

Proposed Project Start Date(if applicable): November 15, 2019

Estimated Completion Date(if applicable): April 29, 2020

Total Land Disturbance (Acres): 9

MS4 Drainage Area (Sq. Miles):

SWP3 Attachment(s): <None>

IV. Payment Information

Check #:

Check Amount:

Date of Check:

For Ohio EPA Use Only

Check ID(OFA):

ORG #:

Rev ID:

DOC #:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Applicant Name: Aimee Toole

Title: Transmission Project Environmental Support Manager

Signature: Electronically submitted by p000106	Date: Electronically submitted on 10/25/2019
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NORTH PROCTORVILLE STATION

PROCTORVILLE, OHIO

3401 S.R. 775 PROCTORVILLE, OH 45669

LAT/LONG: 38.477654, -82.395018

STORM WATER POLLUTION PREVENTION PLAN (SWP3)



Prepared for:

AEP Ohio Transmission Company, Inc.
700 Morrison Road
Gahanna, OH 43230

Prepared by:

EARTH ENVIRONMENTAL AND CIVIL, INC.
235 CLAIBORNE AVENUE
ROCKY MOUNT, VA 24151

Site Contact: ROBERT REIBER
Phone: (740) 331-2342
E-mail: RTREIBER@AEP.COM

REVISION 0, AUGUST 19, 2019
REVISION 1, OCTOBER 17, 2019

Project Start Date: NOVEMBER 2019
Project End Date: OCTOBER 2020

NORTH PROCTORVILLE STATION

CERTIFICATION

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Name: Annee Tade

Title: Mgr - Trans Project Bw. Support

Signature: [Signature]

Date: 10-25-2019

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APPENDIX 2 – Project Location Map, Soil Erosion and Sediment Control Plan, USDA Soils Map, Watershed (HUC-12) Map, and ODNR Rainwater and Land Development Manual Details

APPENDIX 3 – SWP3 Inspection Form and SWP3 Amendments, Grading, and Stabilization Log

APPENDIX 4 – Duty to Inform Contractors and Subcontractors Signature Form

APPENDIX 5 – Storm Water Calculations Report

APPENDIX 6 – Long-term Maintenance Plan

I. Site Description

A. Description of Construction Activity

Ohio Power Company, Inc. (AEP) is proposing to conduct construction activities for the North Proctorville Station Project located approximately 4 miles north of Proctorville, in Lawrence County, Ohio. The Project consists of adding an approximate 0.20-acre gravel pad to the existing 91.68-acre site. Construction activities will include minor grading, gravel placement, and the installation of a new fence. The existing station fence will be replaced and access to the project is provided by the existing drive off S.R. 775.

B. Disturbed Area

Total Area of the Site – 91.68 acres

Total Disturbed Area – 8.31 acres

Table 1: Disturbed Area

County	Township/Village/City	Disturbance Acreage
Lawrence	Union Township	8.31

C. Impervious Area

The station will result in 0.20 acre of additional impervious surface. As a result of the change in impervious area, post-construction best management practices (BMPs) are not warranted. See Section II.D.5 of this SWP3 for post-construction storm water management requirements and calculations.

Table 2: Impervious Area

	Impervious Acreage	% Imperviousness
Existing	24.06	30%
New	0.20	0.25%
Total	24.26	30.25%

D. Storm Water Calculations

Pre- and post-development runoff coefficients have been calculated based on the pre- and post-estimates for impervious surfaces within the existing facility. The proposed construction does not include the addition of impermeable materials such as concrete, asphalt, or other hard surfaces. A measure of the impervious areas and percent imperviousness created by the construction activity can be found in the water quality calculations included in Appendix 5. The resulting increase in overall impermeability due to the expansion is less than 3%, producing a negligible increase in runoff volume, as indicated in the water quality calculations in Appendix 5. Therefore, this does not warrant the need for post-construction best management practices (BMPs).

Drainage Area A:

Pre-development curve number – 77

Post-development curve number – 77

E. Existing Soil Data

The United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Web Soil Survey was used to determine soil types within the Project area. A copy of the web-based soil map is included in Appendix 2. Soils in the Project area are shown in Table 3.

Table 3: Soil Types

Map Unit Symbol	Map Unit Description	Drainage Class	Hydric Soil?
Cub1AO	Cuba silt loam, 0 to 3 percent slopes, occasionally flooded	Well drained	No
KaB	Kanawha silt loam, 2 to 6 percent slopes	Well drained	No
UgE	Upshur-Gilpin complex, 25 to 35 percent slopes	Well drained	No
UgF	Upshur-Gilpin complex, 40 to 70 percent slopes	Well drained	No

F. Prior Land Uses

The Project is located in a non-urban area of Proctorville, Ohio in the fence line of the existing station. Prior land use is excess station acreage and grass/gravel that was previously graded.

G. On-site Streams and Receiving Streams and Surface Waters

1. On-Site Waterbodies

Table 4: Delineated Streams

Stream ID	Stream Name	Flow Regime	Ohio EPA 401 Permitting Eligibility	Stream Stability
SOH-JJP-001	Fourmile Creek	PERENNIAL	ELIGIBLE	N/A
SOH-JJP-002	Indian Guyan Creek	PERENNIAL	ELIGIBLE	N/A
SOH-JJP-003	UNT	EMPHEMERAL	ELIGIBLE	N/A
SOH-JJP-004	UNT	INTERMITTENT	ELIGIBLE	N/A
SOH-JJP-005	UNT	EMPHEMERAL	ELIGIBLE	N/A
SOH-JJP-006	UNT	PERENNIAL	ELIGIBLE	N/A
SOH-JJP-007	UNT	EMPHEMERAL	ELIGIBLE	N/A
SOH-JJP-008	UNT	EMPHEMERAL	ELIGIBLE	N/A

SOH-JJP-009	UNT	EMPHEMERAL	ELIGIBLE	N/A
SOH-JJP-010	UNT	EMPHEMERAL	ELIGIBLE	N/A
SOH-CDK-001	UNT	INTERMITTENT	ELIGIBLE	N/A

Table 5: Delineated Wetlands and Ponds

Wetland ID	Cowardin Classification	ORAM Category
WOH-JJP-001	PEM	1
WOH-JJP-002	PEM	1
WOH-JJP-003	PEM	1
WOH-JJP-003	PSS	1
WOH-JJP-004	PEM	1
WOH-JJP-005	PEM	1
WOH-JJP-006	PEM	1
WOH-JJP-007	PEM	1
WOH-JJP-008	PEM	1
WOH-JJP-009	PFO	1
WOH-CDK-001	PEM	1
WOH-CDK-002	PEM	1
WOH-CDK-003	PEM	1
WOH-CDK-004	PEM	1
WOH-CDK-005	PSS	1
WOH-CDK-006	PEM	1

2. Receiving Waters

The Project is located in the Fourmile Creek, Wolf Creek – Indian Guyan Creek Watershed (HUC-12: 050901010708) which ultimately drains to the Ohio River. The site is not located within an MS-4.

H. Implementation Schedule

A construction log will be kept at the Project site to record major dates of grading and stabilization. The general order of construction is provided in Table 6 below and will begin in November 2019 and is estimated to end in October 2020.

Table 6: Implementation Schedule

Task	Date
Identify environmental avoidance areas in the field [i.e. wetlands, 50' stream buffers, other environmental commitments]	November 2019
Mobilize construction equipment	November 2019

Forestry clearing/grubbing to begin	November 2019
Install E&S Controls	November 2019
Grading	November 2019
Install temporary seed and mulch, as needed, during Project activities	November 2019
Drill foundations and install fence	December 2020
Remove E&S controls	March 2020
Construction demobilization	April 2020
Inspection with AEP and SWPPP contractor	TBD

I. Subdivided Development Drawing

Not applicable.

J. Dedicated Asphalt and Concrete Plant Discharges

Not applicable.

K. Log of Grading and Stabilization Activities

A log for documenting grading and stabilization activities and amendments to the SWP3 is included in Appendix 3.

L. Site Map

A vicinity of the Project area is included in Appendix 2, along with the Erosion and Sediment Control Plan and details. The Erosion and Sediment Control Plan shows the Project boundaries and contours, the limits of construction, and the locations of the erosion and sediment control features.

M. Permit Requirements

The permit requirements can be reviewed in the Ohio EPA General Permit No. OHC000005 which has been included as Appendix 1.

II. **Storm Water Pollution Prevention Plan**

The SWP3 was developed to meet the objectives in Part II. Non-numeric Effluent Limitations and Part III. Storm Water Pollution Prevention Plan (SWP3) of Ohio EPA General Permit No. OHC000005.

A. SWP3 Availability

This Plan, a copy of the Notice of Intent (NOI), and the Ohio EPA authorization shall be made available on-site immediately upon request of the director or an authorized representative and MS4 operators or authorized representative during working hours. Per Ohio EPA, an electronic copy is an acceptable format for on-site availability and review.

B. Amendments

The SWP3 is a living document that will be updated as needed. The SWP3 shall be amended whenever there is a change in design, construction, operation or maintenance, or if the SWP3 proves to be ineffective in controlling pollutants in storm water discharges associated with construction activity. A log for documenting amendments is included in Appendix 3.

AEP Environmental Services shall be notified prior to any significant modifications to the SWP3, such as changes to the access roads, disturbance acreage, culvert installations, etc., to ensure the Project remains in compliance with Ohio EPA General Permit No. OHC000005.

C. Duty to Inform Contractors

All contractors and subcontractors who will be involved in implementation of the SWP3 shall review and understand the conditions and responsibilities of the SWP3 and document their acknowledgement by signing the form included in Appendix 4.

D. Controls

Timing: Temporary erosion and sediment control measures shall be installed prior to earth-disturbing activity. Temporary control measures will not be removed until final site stabilization, in the form of permanent gravel cover or perennial vegetative cover with a density of at least 70%, is achieved.

The locations of the control methods are shown on the Erosion and Sediment Control Plans in Appendix 2. Maintenance and inspections requirements for these controls can be found in Section II.D.6 of this SWP3. The control measures for this Project include the following:

1. Preservation Methods

Existing natural conditions shall be preserved as much as feasible. Such practices may include: preserving existing vegetation, vegetative buffer strips, and existing soil profile and topsoil; minimizing soil compaction; minimizing disturbance of steep slopes; phasing of construction operations to minimize the amount of disturbed land at any one time; and protective clearing or grubbing practices. For all construction activity adjacent to surface waters of the state, a 50-foot undisturbed natural buffer will be maintained as measured from the ordinary high water mark (OHWM).

2. Erosion, Sediment, and Runoff Controls

a. *Stabilization and Seeding*

Disturbed areas will be stabilized as specified in tables 7 and 8 below per the Erosion and Sediment Control Plan and BMP detail sheets in Appendix 2. Mulch shall be applied to all exposed soil that has been seeded in an effort to facilitate seed germination and development.

Table 7: Permanent Stabilization

Area Requiring Permanent Stabilization	Time Frame to Apply Erosion Controls
Any areas that will lie dormant for one year or more.	Within seven calendar days of the most recent disturbance.
Any areas within 50 feet of a surface water of the state and at final grade.	Within two calendar days of reaching final grade.
Other areas at final grade.	Within seven calendar days of reaching final grade within that area.

Table 8: Temporary Stabilization

Area Requiring Temporary Stabilization	Time Frame to Apply Erosion Controls
Any disturbed areas within 50 feet of a surface water of the state and not at final grade.	Within two calendar days of the most recent disturbance if the area will remain idle for more than 14 calendar days.
Any disturbed areas that will be dormant for more than 14 calendar days but less than one year, and not within 50 feet of a surface water of the state.	Within seven calendar days of the most recent disturbance within the area. For residential subdivisions, disturbed areas must be stabilized at least seven days prior to transfer of permit coverage for the individual lot(s).
Disturbed areas that will be idle over winter.	Prior to the onset of winter weather.

b. *Sediment Barriers and Diversions*

Filter sock and Silt Fence will be installed to encompass the entire site at all appropriate locations to filter sediment from site runoff. Orange barrier fencing will be used as needed and to protect wetland areas and 50-foot natural stream buffers. After Project completion, the posts, fencing, and ties shall be removed from the Project site and transported to an appropriate off-site disposal facility.

c. *Temporary Construction Entrances*

Construction entrances consisting of a stabilized pad of aggregate will be installed where construction vehicles leave active construction areas and enter public roadways to reduce the amount of sediment tracked offsite. Temporary construction entrance locations and details are provided in Appendix 2.

3. Surface Water Protection

No direct discharge to surface waters is proposed for this Project. Surface waters will be protected through the erosion and sediment controls outlined in the sections above.

4. Other Controls

a. *Non-sediment Pollutant Controls*

Waste disposal containers shall be provided for proper collection of all waste material including sanitary garbage, petroleum products and any materials to be used onsite (excluding inert waste/materials such as construction debris that would not be expected to contribute pollution to storm water). Containers shall be covered and not leaking. No construction waste materials shall be buried on-site. All waste materials shall be disposed of in the manner specified by local or state regulations or by the manufacturer. No solid or liquid wastes will be discharged in storm water runoff.

b. *Off-site Traffic and Dust Control*

Any paved roads adjacent to the site entrance shall be swept to remove any excess mud, dirt, or rock tracked from the site, as necessary. Dump trucks hauling materials to or from the site shall be covered with a tarpaulin. Dust control shall be observed both on and off the site for the duration of the Project. Dust and sedimentation will be minimized by limiting earth-moving activities, site traffic, and soil and vegetation disturbances throughout the site. Chemical stabilizers and adhesives will not be used unless written permission is received from AEP Environmental Representative. Dust control details can be found in Appendix 2.

c. *Concrete Washouts*

Concrete washouts will be located in upland areas outside of wetlands or flood zones. Under no circumstances will concrete trucks wash out into a drainage channel, storm sewer or surface water.

d. *Wash Water*

Water from vehicle washing, wheel washing, and other wash waters will be treated appropriately prior to discharge to minimize pollutants. Spills and leaks will be prevented and responded to as necessary.

e. *Compliance with Other Requirements*

This SWP3 is consistent with state and/or local waste disposal, sanitary sewer or septic system regulations including provisions prohibiting waste disposal by open burning. Spill response, disposal of suspect contaminated soils and clean-up activities are initiated by calling the AEP Regional Environmental Coordinator (REC).

f. *Trench and Groundwater Control and Dewatering*

Not applicable.

g. *Contaminated Sediment*

Contaminated soils are not expected to be encountered on this Project. However, if they should exist within the limits of construction, they will be disposed of properly per direction of the AEP Regional Environmental Coordinator (REC).

5. Post-Construction Storm Water Management Requirements

No post construction stormwater BMP's are being utilized for this project.]

6. Maintenance and Inspections Requirements

*All temporary and permanent control practices shall be maintained and repaired as needed to ensure continued performance of their intended function. All erosion and sediment control measures shall be inspected:

- Once every seven calendar days; and,
- After any storm event greater than one-half inch of rain per 24-hour period by the end of the next calendar day, excluding weekends and holidays unless work is scheduled.

An inspection report shall be made after each inspection. The SWP3 Inspection Form is included in Appendix 3.

*The Contractor shall select at least two qualified individuals responsible for inspections, maintenance, and repair activities, and filling out the SWP3 Inspection Form and SWP3 Amendments, Grading, and Stabilization Log in Appendix 3. Personnel selected for these responsibilities shall be knowledgeable and experienced in all inspection and maintenance practices necessary for keeping the erosion and sediment controls in good working order.

*If an inspection reveals that a control is in need of repair or maintenance, with the exception of a sediment settling pond, it shall be repaired or maintained within three calendar days of the inspection. Sediment ponds will be repaired or maintained within 10 calendar days of the inspection. If an inspection reveals that a control fails to perform its intended function and that another, more appropriate control is required, the SWP3 shall be amended and the new control shall be installed within 10 calendar days of the inspection. If an inspection reveals a control has been installed inappropriately or incorrectly, the control will be replaced or modified for site conditions.

*When controls are modified, the erosion control drawings associated with the SWP3 will be updated to reflect the modifications, and the changes will be reflected using the SWP3 Amendments, Grading, and Stabilization Log in Appendix 3.

- Silt fence and/or Filter sock shall be inspected for depth of sediment, tears, and to ensure the anchor posts are firmly in the ground. Silt fence and/or filter sock shall also be inspected to ensure they are maintained in the appropriate positions per the plans in

Appendix 2. Built up sediment shall be removed from the silt fence when it has reached one-half the height of the fence. Built up sediment shall be removed from the filter sock when it has reached one-third the height of the sock.

- Orange barrier fence shall be inspected to ensure the fence is erect and functioning as intended per the plans in Appendix 2.
- Temporary and permanent seeding shall be inspected for bare spots, washouts, and healthy growth. If seed does not germinate in an area on which it was placed, the area will either be re-seeded or an alternate erosion control method will be employed.
- Locations where vehicles and equipment enter or exit the site shall be inspected for evidence of off-site tracking of sediment. Sediment being tracked onto off-site roadways shall be cleaned up promptly.
- Excess concrete should be removed when the washout system reaches 50 percent of the design capacity. Use of the system should be discontinued until appropriate measures can be initiated to clean out the structure. Prefabricated systems should also utilize this criterion unless the manufacturer has alternative specifications.

*The permittee shall maintain the SWP3 Inspection Forms for three years following the submittal of a notice of termination (NOT) form. The Inspection Forms shall be signed in accordance with Part V.G of Ohio EPA General Permit OHC000005.

III. Approved State or Local Plans

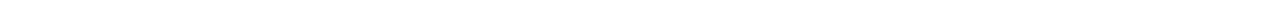
The erosion and sediment control plans were prepared in accordance with Ohio EPA Permit No. OHC000005.

IV. Exceptions

There are no exceptions to the erosion and sediment control practices contained in the Ohio EPA General Permit No. OHC000005.

APPENDIX 1

Ohio EPA General Permit No. OHC000005



Issuance Date: April 23, 2018
Effective Date: April 23, 2018
Expiration Date: April 22, 2023

Ohio EPA APR 23/18
Entered Directors Journal

OHIO ENVIRONMENTAL PROTECTION AGENCY

**GENERAL PERMIT AUTHORIZATION FOR STORM WATER DISCHARGES ASSOCIATED
WITH CONSTRUCTION ACTIVITY UNDER THE NATIONAL POLLUTANT
DISCHARGE ELIMINATION SYSTEM**

In compliance with the provisions of the federal Water Pollution Control Act, as amended (33 U.S.C. Section 1251 et. seq. hereafter referred to as "the Act") and the Ohio Water Pollution Control Act [Ohio Revised Code ("ORC") Chapter 6111], dischargers of storm water from sites where construction activity is being conducted, as defined in Part I.B of this permit, are authorized by the Ohio Environmental Protection Agency, hereafter referred to as "Ohio EPA," to discharge from the outfalls at the sites and to the receiving surface waters of the state identified in their Notice of Intent ("NOI") application form on file with Ohio EPA in accordance with the conditions specified in Parts I through VII of this permit.

It has been determined that a lowering of water quality of various waters of the state associated with granting coverage under this permit is necessary to accommodate important social and economic development in the state of Ohio. In accordance with OAC 3745-1-05, this decision was reached only after examining a series of technical alternatives, reviewing social and economic issues related to the degradation, and considering all public and intergovernmental comments received concerning the proposal.

This permit is conditioned upon payment of applicable fees, submittal of a complete NOI application form, development (and submittal, if applicable) of a complete Storm Water Pollution Prevention Plan (SWP3) and written approval of coverage from the director of Ohio EPA in accordance with Ohio Administrative Code ("OAC") Rule 3745-38-02.



Craig W. Butler
Director

Total Pages: 60

I certify this to be a true and accurate copy of the
official documents as filed in the records of the Ohio
Environmental Protection Agency.

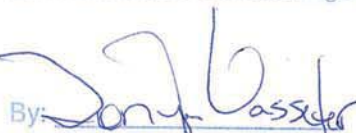
By:  Date: 4-23-18

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PART I. COVERAGE UNDER THIS PERMIT

A. Permit Area.

This permit covers the entire State of Ohio. Appendices A and B of this permit contain additional watershed specific requirements for construction activities located partially or fully within the Big Darby Creek Watershed and portions of the Olentangy River Watershed. Projects within portions of the Olentangy River watershed shall seek coverage under this permit following the expiration of OHCO00002 (May 31, 2019).

B. Eligibility.

1. Construction activities covered. Except for storm water discharges identified under Part I.B.2, this permit may cover all new and existing discharges composed entirely of storm water discharges associated with construction activity that enter surface waters of the state or a storm drain leading to surface waters of the state.

For the purposes of this permit, construction activities include any clearing, grading, excavating, grubbing and/or filling activities that disturb one or more acres. Discharges from trench dewatering are also covered by this permit as long as the dewatering activity is carried out in accordance with the practices outlined in Part III.G.2.g.iv of this permit.

Construction activities disturbing one or more acres of total land or will disturb less than one acre of land but are part of a larger common plan of development or sale that will ultimately disturb one or more acres of land are eligible for coverage under this permit. The threshold acreage includes the entire area disturbed in the larger common plan of development or sale.

This permit also authorizes storm water discharges from support activities (e.g., concrete or asphalt batch plants, equipment staging yards, material storage areas, excavated material disposal areas, borrow areas) provided:

- a. The support activity is directly related to a construction site that is required to have NPDES permit coverage for discharges of storm water associated with construction activity;
 - b. The support activity is not a commercial operation serving multiple unrelated construction projects and does not operate beyond the completion of the construction activity at the site it supports;
 - c. Appropriate controls and measures are identified in a storm water pollution prevention plan (SWP3) covering the discharges from the support activity; and
 - d. The support activity is on or contiguous with the property defined in the NOI (offsite borrow pits and soil disposal areas, which serve only one project, do not have to be contiguous with the construction site).
2. Limitations on coverage. The following storm water discharges associated with construction activity are not covered by this permit:

- a. Storm water discharges that originate from the site after construction activities have ceased, including any temporary support activity, and the site has achieved final stabilization. Industrial post-construction storm water discharges may need to be covered by an NPDES permit;
 - b. Storm water discharges associated with construction activity that the director has shown to be or may reasonably expect to be contributing to a violation of a water quality standard; and
 - c. Storm water discharges authorized by an individual NPDES permit or another NPDES general permit.
3. Waivers. After March 10, 2003, sites whose larger common plan of development or sale have at least one, but less than five acres of land disturbance, which would otherwise require permit coverage for storm water discharges associated with construction activities, may request that the director waive their permit requirement. Entities wishing to request such a waiver must certify in writing that the construction activity meets one of the two waiver conditions:
- a. Rainfall Erosivity Waiver. For a construction site to qualify for the rainfall erosivity waiver, the cumulative rainfall erosivity over the project duration must be five or less and the site must be stabilized with a least a 70 percent vegetative cover or other permanent, non-erosive cover. The rainfall erosivity must be calculated according to the method in U.S. EPA Fact Sheet 3.1 Construction Rainfall Erosivity Waiver dated January 2001 and be found at: http://epa.ohio.gov/portals/35/permits/USEPAfact3-1_s.pdf. If it is determined that a construction activity will take place during a time period where the rainfall erosivity factor is less than five, a written waiver certification must be submitted to Ohio EPA at least 21 days before construction activity is scheduled to begin. If the construction activity will extend beyond the dates specified in the waiver certification, the operator must either: (a) recalculate the waiver using the original start date with the new ending date (if the R factor is still less than five, a new waiver certification must be submitted) or (b) submit an NOI application form and fee for coverage under this general permit at least seven days prior to the end of the waiver period; or
 - b. TMDL (Total Maximum Daily Load) Waiver. Storm water controls are not needed based on a TMDL approved or established by U.S. EPA that addresses the pollutant(s) of concern or, for non-impaired waters that do not require TMDLs, and equivalent analysis that determines allocations for small construction sites for the pollutant(s) of concern or that determines that such allocations are not needed to protect water quality based on consideration of existing in-stream concentrations, expected growth in pollutant contributions from all sources, and a margin of safety. The pollutant(s) of concern include sediment or a parameter that addresses sediment (such as total suspended solids, turbidity or siltation) and any other pollutant that has been identified as a cause of impairment of any water body that will receive a discharge from the construction activity. The operator must certify to the director of Ohio EPA that the construction activity will take place, and storm water discharges will occur, within the drainage area addressed by the TMDL or equivalent analysis. A written waiver certification must be submitted to Ohio EPA at least 21 days before the construction activity is scheduled to begin.

4. Prohibition on non-storm water discharges. All discharges covered by this permit must be composed entirely of storm water with the exception of the following: discharges from firefighting activities; fire hydrant flushings; potable water sources including waterline flushings; irrigation drainage; lawn watering; routine external building washdown which does not use detergents; pavement washwaters where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed) and where detergents are not used; air conditioning condensate; springs; uncontaminated ground water from trench or well point dewatering and foundation or footing drains where flows are not contaminated with process materials such as solvents. Dewatering activities must be done in compliance with Part II.C and Part III.G.2.g.iv of this permit. Discharges of material other than storm water or the authorized non-storm water discharges listed above must comply with an individual NPDES permit or an alternative NPDES general permit issued for the discharge.

Except for flows from firefighting activities, sources of non-storm water listed above that are combined with storm water discharges associated with construction activity must be identified in the SWP3. The SWP3 must identify and ensure the implementation of appropriate pollution prevention measures for the non-storm water component(s) of the discharge.

5. Spills and unintended releases (Releases in excess of Reportable Quantities). This permit does not relieve the permittee of the reporting requirements of Title 40 of the Code of Federal Regulations ("CFR") Part 117 and 40 CFR Part 302. In the event of a spill or other unintended release, the discharge of hazardous substances in the storm water discharge(s) from a construction site must be minimized in accordance with the applicable storm water pollution prevention plan for the construction activity and in no case, during any 24-hour period, may the discharge(s) contain a hazardous substance equal to or in excess of reportable quantities.

40 CFR Part 117 sets forth a determination of the reportable quantity for each substance designated as hazardous in 40 CFR Part 116. The regulation applies to quantities of designated substances equal to or greater than the reportable quantities, when discharged to surface waters of the state. 40 CFR Part 302 designates under section 102(a) of the Comprehensive Environmental Response, Compensation and Liability Act of 1980, those substances in the statutes referred to in section 101(14), identifies reportable quantities for these substances and sets forth the notification requirements for releases of these substances. This regulation also sets forth reportable quantities for hazardous substances designated under section 311(b)(2)(A) of the Clean Water Act (CWA).

C. Requiring an individual NPDES permit or an alternative NPDES general permit.

1. The director may require an alternative permit. The director may require any operator eligible for this permit to apply for and obtain either an individual NPDES permit or coverage under an alternative NPDES general permit in accordance with OAC Rule 3745-38-02. Any interested person may petition the director to take action under this paragraph.

The director will send written notification that an alternative NPDES permit is required. This notice shall include a brief statement of the reasons for this decision, an application form and a statement setting a deadline for the operator to file the application. If an operator fails to submit an application in a timely manner as required by the director under this paragraph, then coverage, if in effect, under this permit is automatically terminated at the end of the day specified for application submittal.

2. Operators may request an individual NPDES permit. Any owner or operator eligible for this permit may request to be excluded from the coverage of this permit by applying for an individual permit. The owner or operator shall submit an individual application with reasons supporting the request to the director in accordance with the requirements of 40 CFR 122.26. If the reasons adequately support the request, the director shall grant it by issuing an individual NPDES permit.
3. When an individual NPDES permit is issued to an owner or operator otherwise subject to this permit or the owner or operator is approved for coverage under an alternative NPDES general permit, the applicability of this permit to the individual NPDES permittee is automatically terminated on the effective date of the individual permit or the date of approval for coverage under the alternative general permit, whichever the case may be.

D. Permit requirements when portions of a site are sold

If an operator obtains a permit for a development, and then the operator (permittee) sells off lots or parcels within that development, permit coverage must be continued on those lots until a Notice of Termination (NOT) in accordance with Part IV.B is submitted. For developments which require the use of centralized sediment and erosion controls (i.e., controls that address storm water runoff from one or more lots) for which the current permittee intends to terminate responsibilities under this permit for a lot after sale of the lot to a new owner and such termination will either prevent or impair the implementation of the controls and therefore jeopardize compliance with the terms and conditions of this permit, the permittee will be required to maintain responsibility for the implementation of those controls. For developments where this is not the case, it is the permittee's responsibility to temporarily stabilize all lots sold to individual lot owners unless an exception is approved in accordance with Part III.G.4. In cases where permit responsibilities for individual lot(s) will be terminated after sale of the lot, the permittee shall inform the individual lot owner of the obligations under this permit and ensure that the Individual Lot NOI application is submitted to Ohio EPA.

E. Authorization

1. Obtaining authorization to discharge. Operators that discharge storm water associated with construction activity must submit an NOI application form and Storm Water Pollution Prevention Plan (SWP3) if located within the Big Darby Creek watershed or portions of the Olentangy watershed in accordance with the requirements of Part I.F of this permit to obtain authorization to discharge under this general permit. As required under OAC Rule 3745-38-06(E), the director, in response to the NOI submission, will notify the applicant in writing that he/she has or has not been granted general permit coverage to discharge storm water associated with construction activity under the terms and conditions of this permit or that the applicant must apply for an individual NPDES permit or coverage under an alternate general NPDES permit as described in Part I.C.1.

2. No release from other requirements. No condition of this permit shall release the permittee from any responsibility or requirements under other environmental statutes or regulations. Other permit requirements commonly associated with construction activities include, but are not limited to, section 401 water quality certifications, isolated wetland permits, permits to install sanitary sewers or other devices that discharge or convey polluted water, permits to install drinking water lines, single lot sanitary system permits and disturbance of land which was used to operate a solid or hazardous waste facility (i.e., coverage under this NPDES general permit does not satisfy the requirements of OAC Rule 3745-27-13 or ORC Section 3734.02(H)). The issuance of this permit is subject to resolution of an antidegradation review. This permit does not relieve the permittee of other responsibilities associated with construction activities such as contacting the Ohio Department of Natural Resources, Division of Water, to ensure proper well installation and abandonment of wells.

F. Notice of Intent Requirements

1. Deadlines for notification.
 - a. Initial coverage: Operators who intend to obtain initial coverage for a storm water discharge associated with construction activity under this general permit must submit a complete and accurate NOI application form, a completed Storm Water Pollution Prevention Plan (SWP3) for projects within the Big Darby Creek and portions of the Olentangy river watersheds and appropriate fee at least 21 days (or 45 days in the Big Darby Creek watershed and portions of the Olentangy watershed) prior to the commencement of construction activity. If more than one operator, as defined in Part VII of this general permit, will be engaged at a site, each operator shall seek coverage under this general permit prior to engaging in construction activities. Coverage under this permit is not effective until an approval letter granting coverage from the director of Ohio EPA is received by the applicant. Where one operator has already submitted an NOI prior to other operator(s) being identified, the additional operator shall request modification of coverage to become a co-permittee. In such instances, the co-permittees shall be covered under the same facility permit number. No additional permit fee is required.
 - b. Individual lot transfer of coverage: Operators must each submit an individual lot notice of intent (Individual Lot NOI) application form (no fee required) to Ohio EPA at least seven days prior to the date that they intend to accept responsibility for permit requirements for their portion of the original permitted development from the previous permittee. Transfer of permit coverage is not granted until an approval letter from the director of Ohio EPA is received by the applicant.
2. Failure to notify. Operators who fail to notify the director of their intent to be covered and who discharge pollutants to surface waters of the state without an NPDES permit are in violation of ORC Chapter 6111. In such instances, Ohio EPA may bring an enforcement action for any discharges of storm water associated with construction activity.
3. How to submit an NOI. Operators seeking coverage under this permit must submit a complete and accurate Notice of Intent (NOI) application using Ohio EPA's electronic application form which is available through the Ohio EPA eBusiness Center at: <https://ebiz.epa.ohio.gov/>. Submission through the Ohio EPA eBusiness Center will

require establishing an Ohio EPA eBusiness Center account and obtaining a unique Personal Identification Number (PIN) for final submission of the NOI. Existing eBusiness Center account holders can access the NOI form through their existing account and submit using their existing PIN. Please see the following link for guidance:

<http://epa.ohio.gov/dsw/ebs.aspx#170669803-streams-guidance>. Alternatively, if you are unable to access the NOI form through the agency eBusiness Center due to a demonstrated hardship, the NOI may be submitted on a paper NOI form provided by Ohio EPA. NOI information shall be typed on the form. Please contact Ohio EPA, Division of Surface Water at (614) 644-2001 if you wish to receive a paper NOI form.

4. Additional notification. NOIs and SWP3s are considered public documents and shall be made available to the public in accordance with Part III.C.2. The permittee shall make NOIs and SWP3s available upon request of the director of Ohio EPA, local agencies approving sediment and erosion control plans, grading plans or storm water management plans, local governmental officials, or operators of municipal separate storm sewer systems (MS4s) receiving drainage from the permitted site. Each operator that discharges to an NPDES permitted MS4 shall provide a copy of its Ohio EPA NOI submission to the MS4 in accordance with the MS4's requirements, if applicable.
5. Re-notification. Existing permittees having coverage under the previous generations of this general permit shall have continuing coverage under OHC000005 with the submittal of a timely renewal application. Within 180 days from the effective date of this permit, existing permittees shall submit the completed renewal application expressing their intent for continued coverage. In accordance with Ohio Administrative Code (OAC) 3745-38-02(E)(2)(a)(i), a renewal application fee will only apply to existing permittees having general permit coverage for 5 or more years as of the effective date of this general permit. Permit coverage will be terminated if Ohio EPA does not receive the renewal application within this 180-day period.

Part II. NON-NUMERIC EFFLUENT LIMITATIONS

You shall comply with the following non-numeric effluent limitations for discharges from your site and/or from construction support activities. Part III of this permit contains the specific design criteria to meet the objectives of the following non-numeric effluent limitations. You shall develop and implement the SWP3 in accordance with Part III of this permit to satisfy these non-numeric effluent limitations.

- A. **Erosion and Sediment Controls.** You shall design, install and maintain effective erosion controls and sediment controls to minimize the discharge of pollutants. At a minimum, such controls shall be designed, installed and maintained to:
 1. Control storm water volume and velocity within the site to minimize soil and stream erosion;
 2. Control storm water discharges, including both peak flowrates and total storm water volume, to minimize erosion at outlets and to minimize downstream channel and streambank erosion;
 3. Minimize the amount of soil exposed during construction activity;

4. Minimize the disturbance of steep slopes;
 5. Minimize sediment discharges from the site. The design, installation and maintenance of erosion and sediment controls shall address factors such as the amount, frequency, intensity and duration of precipitation, the nature of resulting storm water runoff, and soil characteristics, including the range of soil particle sizes expected to be present on the site;
 6. If feasible, provide and maintain a 50-foot undisturbed natural buffer around surface waters of the state, direct storm water to vegetated areas to increase sediment removal and maximize storm water infiltration. If it is infeasible to provide and maintain an undisturbed 50-foot natural buffer, you shall comply with the stabilization requirements found in Part II.B for areas within 50 feet of a surface water; and
 7. Minimize soil compaction and, unless infeasible, preserve topsoil.
- B. Soil Stabilization.** Stabilization of disturbed areas shall, at a minimum, be initiated in accordance with the time frames specified in the following tables.

Table 1: Permanent Stabilization

Area requiring permanent stabilization	Time frame to apply erosion controls
Any areas that will lie dormant for one year or more	Within seven days of the most recent disturbance
Any areas within 50 feet of a surface water of the state and at final grade	Within two days of reaching final grade
Other areas at final grade	Within seven days of reaching final grade within that area

Table 2: Temporary Stabilization

Area requiring temporary stabilization	Time frame to apply erosion controls
Any disturbed areas within 50 feet of a surface water of the state and not at final grade	Within two days of the most recent disturbance if the area will remain idle for more than 14 days
Any disturbed areas that will be dormant for more than 14 days but less than one year, and not within 50 feet of a surface water of the state	Within seven days of the most recent disturbance within the area For residential subdivisions, disturbed areas must be stabilized at least seven days prior to transfer of permit coverage for the individual lot(s).
Disturbed areas that will be idle over winter	Prior to the onset of winter weather

Where vegetative stabilization techniques may cause structural instability or are otherwise unobtainable, alternative stabilization techniques must be employed. Permanent and temporary stabilization are defined in Part VII.

- C. Dewatering.** Discharges from dewatering activities, including discharges from dewatering of trenches and excavations, are prohibited unless managed by appropriate controls.
- D. Pollution Prevention Measures.** Design, install, implement and maintain effective pollution prevention measures to minimize the discharge of pollutants. At a minimum, such measures must be designed, installed, implemented and maintained to:
1. Minimize the discharge of pollutants from equipment and vehicle washing, wheel washwater, and other washwaters. Washwaters shall be treated in a sediment basin or alternative control that provides equivalent or better treatment prior to discharge;
 2. Minimize the exposure of construction materials, products, and wastes; landscape materials, fertilizers, pesticides, and herbicides; detergents, sanitary waste and other materials present on the site to precipitation and to storm water; and
 3. Minimize the discharge of pollutants from spills and leaks and implement chemical spill and leak prevention and response procedures.
- E. Prohibited Discharges.** The following discharges are prohibited:
1. Wastewater from washout of concrete, unless managed by an appropriate control;
 2. Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds and other construction materials;
 3. Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance; and
 4. Soaps or solvents used in vehicle and equipment washing or all other waste water streams which could be subject to an individual NPDES permit (Part III.G.2.g).
- F. Surface Outlets.** When discharging from sediment basins utilize outlet structures that withdraw water from the surface, unless infeasible. (Note: Ohio EPA believes that the circumstances in which it is infeasible to design outlet structures in this manner are rare. Exceptions may include time periods with extended cold weather during winter months. If you have determined that it is infeasible to meet this requirement, you shall provide documentation in your SWP3 to support your determination.)
- G. Post-Construction Storm Water Management Controls.** So that receiving stream's physical, chemical and biological characteristics are protected, and stream functions are maintained, post-construction storm water practices shall provide long-term management of runoff quality and quantity.

PART III. STORM WATER POLLUTION PREVENTION PLAN (SWP3)

A. Storm Water Pollution Prevention Plans.

A SWP3 shall be developed for each site covered by this permit. For a multi-phase construction project, a separate NOI shall be submitted when a separate SWP3 will be prepared for

subsequent phases. SWP3s shall be prepared in accordance with sound engineering and/or conservation practices by a professional experienced in the design and implementation of standard erosion and sediment controls and storm water management practices addressing all phases of construction. The SWP3 shall clearly identify all activities which are required to be authorized under Section 401 and subject to an antidegradation review. The SWP3 shall identify potential sources of pollution which may reasonably be expected to affect the quality of storm water discharges associated with construction activities. The SWP3 shall be a comprehensive, stand-alone document, which is not complete unless it contains the information required by Part III.G of this permit. In addition, the SWP3 shall describe and ensure the implementation of best management practices (BMPs) that reduce the pollutants and impact of storm water discharges during construction and pollutants associated with the post-construction land use to ensure compliance with ORC Section 6111.04, OAC Chapter 3745-1 and the terms and conditions of this permit.

B. Timing.

An acceptable SWP3 shall be completed and submitted to the applicable regulated MS4 entity (for projects constructed entirely within a regulated MS4 area) prior to the timely submittal of an NOI. Projects within the Big Darby Creek and portions of the Olentangy watersheds must submit a SWP3 with the NOI. The SWP3 shall be updated in accordance with Part III.D. Submission of a SWP3 does not constitute review and approval on the part of Ohio EPA. Upon request and good cause shown, the director may waive the requirement to have a SWP3 completed at the time of NOI submission. If a waiver has been granted, the SWP3 must be completed prior to the initiation of construction activities. The SWP3 must be implemented upon initiation of construction activities.

In order to continue coverage from the previous generations of this permit, the permittee shall review and update the SWP3 to ensure that this permit's requirements are addressed within 180 days after the effective date of this permit. If it is infeasible for you to comply with a specific requirement in this permit because (1) the provision was not part of the permit you were previously covered under, and (2) because you are prevented from compliance due to the nature or location of earth disturbances that commenced prior to the effective date of this permit, you shall include documentation within your SWP3 of the reasons why it is infeasible for you to meet the specific requirement.

Examples of OHC000005 permit conditions that would be infeasible for permittees renewing coverage to comply with include:

- OHC000005 post-construction requirements, for projects that obtained NPDES construction storm water coverage and started construction activities prior to the effective date of this permit;
- OHC000005 post-construction requirements, for multi-phase development projects with an existing regional post-construction BMP issued under previous NPDES post-construction requirements. This only applies to construction sites authorized under Ohio EPA's Construction Storm Water Permits issued after April 20, 2003;
- OHC000005 post-construction requirements, for renewing or initial coverage and you have a SWP3 approved locally and you will start construction within 180 days of the effective date of this permit;

- Sediment settling pond design requirements, if the general permit coverage was obtained prior to April 21, 2013 and the sediment settling pond has been installed; or
- Case-by-case situations approved by the Director.

C. SWP3 Signature and Review.

1. Plan Signature and Retention On-Site. The SWP3 shall include the certification in Part V.H, be signed in accordance with Part V.G., and be retained on site during working hours.
2. Plan Availability
 - a. On-site: The plan shall be made available immediately upon request of the director or his authorized representative and MS4 operators or their authorized representative during working hours. A copy of the NOI and letter granting permit coverage under this general permit also shall be made available at the site.
 - b. By written request: The permittee must provide the most recent copy of the SWP3 within 7 days upon written request by any of the following:
 - i. The director or the director's authorized representative;
 - ii. A local agency approving sediment and erosion plans, grading plans or storm water management plans; or
 - iii. In the case of a storm water discharge associated with construction activity which discharges through a municipal separate storm sewer system with an NPDES permit, to the operator of the system.
 - c. To the public: All NOIs, general permit approval for coverage letters, and SWP3s are considered reports that shall be available to the public in accordance with the Ohio Public Records law. The permittee shall make documents available to the public upon request or provide a copy at public expense, at cost, in a timely manner. However, the permittee may claim to Ohio EPA any portion of an SWP3 as confidential in accordance with Ohio law.
3. Plan Revision. The director or authorized representative may notify the permittee at any time that the SWP3 does not meet one or more of the minimum requirements of this part. Within 10 days after such notification from the director or authorized representative (or as otherwise provided in the notification), the permittee shall make the required changes to the SWP3 and shall submit to Ohio EPA the revised SWP3 or a written certification that the requested changes have been made.

D. Amendments.

The permittee shall amend the SWP3 whenever there is a change in design, construction, operation or maintenance, which has a significant effect on the potential for the discharge of pollutants to surface waters of the state or if the SWP3 proves to be ineffective in achieving the

general objectives of controlling pollutants in storm water discharges associated with construction activity. Amendments to the SWP3 may be reviewed by Ohio EPA in the same manner as Part III.C.

E. Duty to inform contractors and subcontractors.

The permittee shall inform all contractors and subcontractors not otherwise defined as “operators” in Part VII of this general permit who will be involved in the implementation of the SWP3 of the terms and conditions of this general permit. The permittee shall maintain a written document containing the signatures of all contractors and subcontractors involved in the implementation of the SWP3 as proof acknowledging that they reviewed and understand the conditions and responsibilities of the SWP3. The written document shall be created, and signatures shall be obtained prior to commencement of earth disturbing activity on the construction site.

F. Total Maximum Daily Load (TMDL) allocations.

If a TMDL is approved for any waterbody into which the permittee’s site discharges and requires specific BMPs for construction sites, the director may require the permittee to revise his/her SWP3. Specific conditions have been provided in Appendix A (for the Big Darby Creek Watershed) and Appendix B (for portions of the Olentangy river watershed).

G. SWP3 Requirements.

Operations that discharge storm water from construction activities are subject to the following requirements and the SWP3 shall include the following items:

1. Site description. Each SWP3 shall provide:
 - a. A description of the nature and type of the construction activity (e.g., low density residential, shopping mall, highway, etc.);
 - b. Total area of the site and the area of the site that is expected to be disturbed (i.e., grubbing, clearing, excavation, filling or grading, including off-site borrow areas);
 - c. A measure of the impervious area and percent imperviousness created by the construction activity (existing, new and total impervious area after construction);
 - d. Storm water calculations, including the volumetric runoff coefficients for both the pre-construction and post- construction site conditions, and resulting water quality volume; design details for post-construction storm water facilities and pretreatment practices such as contributing drainage areas, capacities, elevations, outlet details and drain times shall be included in the SWP3; and if applicable, explanation of the use of existing post-construction facilities. Ohio EPA recommends the use of data sheets (see Ohio’s Rainwater and Land Development manual and Ohio EPA resources for examples);
 - e. Existing data describing the soil and, if available, the quality of any discharge from the site;

- f. A description of prior land uses at the site;
- g. A description of the condition of any on-site streams (e.g. prior channelization, bed instability or headcuts, channels on public maintenance, or natural channels);
- h. An implementation schedule which describes the sequence of major construction operations (i.e., designation of vegetative preservation areas, grubbing, excavating, grading, utilities, infrastructure installation and others) and the implementation of erosion, sediment and storm water management practices or facilities to be employed during each operation of the sequence;
- i. The name and/or location of the immediate receiving stream or surface water(s) and the first subsequent named receiving water(s) and the areal extent and description of wetlands or other special aquatic sites at or near the site which will be disturbed, or which will receive discharges from disturbed areas of the project. For discharges to an MS4, the point of discharge to the MS4 and the location where the MS4 ultimately discharges to a stream or surface water of the state shall be indicated;
- j. For subdivided developments, a detail drawing of individual parcels with their erosion, sediment or storm water control practices and/or a typical individual lot showing standard individual lot erosion and sediment control practices.

A typical individual lot drawing does not remove the responsibility to designate specific erosion and sediment control practices in the SWP3 for critical areas such as steep slopes, stream banks, drainage ways and riparian zones;

- k. Location and description of any storm water discharges associated with dedicated asphalt and dedicated concrete plants covered by this permit and the best management practices to address pollutants in these storm water discharges;
- l. A cover page or title identifying the name and location of the site, the name and contact information of all construction site operators, the name and contact information for the person responsible for authorizing and amending the SWP3, preparation date, and the estimated dates that construction will start and be complete;
- m. A log documenting grading and stabilization activities as well as amendments to the SWP3, which occur after construction activities commence; and
- n. Site map showing:
 - i. Limits of earth-disturbing activity of the site including associated off-site borrow or spoil areas that are not addressed by a separate NOI and associated SWP3;
 - ii. Soils types for all areas of the site, including locations of unstable or highly erodible and/or known contaminated soils;

- iii. Existing and proposed contours. A delineation of drainage watersheds expected during and after major grading activities as well as the size of each drainage watershed, in acres;
- iv. The location of any delineated boundary for required riparian setbacks;
- v. Conservation easements or areas designated as open space, preserved vegetation or otherwise protected from earth disturbing activities. A description of any associated temporary or permanent fencing or signage;
- vi. Surface water locations including springs, wetlands, streams, lakes, water wells, etc., on or within 200 feet of the site, including the boundaries of wetlands or stream channels and first subsequent named receiving water(s) the permittee intends to fill or relocate for which the permittee is seeking approval from the Army Corps of Engineers and/or Ohio EPA;
- vii. Existing and planned locations of buildings, roads, parking facilities and utilities;
- viii. The location of all erosion and sediment control practices, including the location of areas likely to require temporary stabilization during site development;
- ix. Sediment traps and basins noting their sediment storage and dewatering (detention) volume and contributing drainage area. Ohio EPA recommends the use of data sheets (see Ohio EPA's Rainwater and Land Development manual and website for examples) to provide data for all sediment traps and basins noting important inputs to design and resulting parameters such as their contributing drainage area, disturbed area, detention volume, sediment storage volume, practice surface area, dewatering time, outlet type and dimensions;
- x. The location of permanent storm water management practices (new and existing) including pretreatment practices to be used to control pollutants in storm water after construction operations have been completed along with the location of existing and planned drainage features including catch basins, culverts, ditches, swales, surface inlets and outlet structures;
- xi. Areas designated for the storage or disposal of solid, sanitary and toxic wastes, including dumpster areas, areas designated for cement truck washout, and vehicle fueling;
- xii. The location of designated construction entrances where the vehicles will access the construction site; and
- xiii. The location of any areas of proposed floodplain fill, floodplain excavation, stream restoration or known temporary or permanent stream crossings.

2. Controls. In accordance with Part II.A, the SWP3 shall contain a description of the controls appropriate for each construction operation covered by this permit and the operator(s) shall implement such controls. The SWP3 shall clearly describe for each major construction activity identified in Part III.G.1.h: (a) appropriate control measures and the general timing (or sequence) during the construction process that the measures will be implemented; and (b) which contractor is responsible for implementation (e.g., contractor A will clear land and install perimeter controls and contractor B will maintain perimeter controls until final stabilization). The SWP3 shall identify the subcontractors engaged in activities that could impact storm water runoff. The SWP3 shall contain signatures from all of the identified subcontractors indicating that they have been informed and understand their roles and responsibilities in complying with the SWP3. Ohio EPA recommends that the primary site operator review the SWP3 with the primary contractor prior to commencement of construction activities and keep a SWP3 training log to demonstrate that this review has occurred.

Ohio EPA recommends that the erosion, sediment, and storm water management practices used to satisfy the conditions of this permit should meet the standards and specifications in the most current edition of Ohio's Rainwater and Land Development (see definitions) manual or other standards acceptable to Ohio EPA. The controls shall include the following minimum components:

- a. Preservation Methods. The SWP3 shall make use of practices which preserve the existing natural condition as much as feasible. Such practices may include: preserving existing vegetation, vegetative buffer strips, and existing soil profile and topsoil; phasing of construction operations to minimize the amount of disturbed land at any one time; and designation of tree preservation areas or other protective clearing or grubbing practices. For all construction activities immediately adjacent to surface waters of the state, the permittee shall comply with the buffer non-numeric effluent limitation in Part II.A.6, as measured from the ordinary high water mark of the surface water.
- b. Erosion Control Practices. The SWP3 shall make use of erosion controls that provide cover over disturbed soils unless an exception is approved in accordance with Part III.G.4. A description of control practices designed to re-establish vegetation or suitable cover on disturbed areas after grading shall be included in the SWP3. The SWP3 shall provide specifications for stabilization of all disturbed areas of the site and provide guidance as to which method of stabilization will be employed for any time of the year. Such practices may include: temporary seeding, permanent seeding, mulching, matting, sod stabilization, vegetative buffer strips, phasing of construction operations, use of construction entrances and the use of alternative ground cover.
- i. **Stabilization.** Disturbed areas shall be stabilized in accordance with Table 1 (Permanent Stabilization) and Table 2 (Temporary Stabilization) in Part II.B of this permit.
- ii. **Permanent stabilization of conveyance channels.** Operators shall undertake special measures to stabilize channels and outfalls and prevent erosive flows. Measures may include seeding, dormant seeding (as defined in the most current edition of the Rainwater and Land

Development manual), mulching, erosion control matting, sodding, riprap, natural channel design with bioengineering techniques or rock check dams.

- c. Runoff Control Practices. The SWP3 shall incorporate measures which control the flow of runoff from disturbed areas so as to prevent erosion from occurring. Such practices may include rock check dams, pipe slope drains, diversions to direct flow away from exposed soils and protective grading practices. These practices shall divert runoff away from disturbed areas and steep slopes where practicable. Velocity dissipation devices shall be placed at discharge locations and along the length of any outfall channel to provide non-erosive flow velocity from the structure to a water course so that the natural physical and biological characteristics and functions are maintained and protected.
- d. Sediment Control Practices. The plan shall include a description of structural practices that shall store runoff allowing sediments to settle and/or divert flows away from exposed soils or otherwise limit runoff from exposed areas. Structural practices shall be used to control erosion and trap sediment from a site remaining disturbed for more than 14 days. Such practices may include, among others: sediment settling ponds, sediment barriers, earth diversion dikes or channels which direct runoff to a sediment settling pond and storm drain inlet protection. All sediment control practices must be capable of ponding runoff in order to be considered functional. Earth diversion dikes or channels alone are not considered a sediment control practice unless those are used in conjunction with a sediment settling pond.

The SWP3 shall contain detail drawings for all structural practices.

- i. **Timing.** Sediment control structures shall be functional throughout the course of earth disturbing activity. Sediment basins and perimeter sediment barriers shall be implemented prior to grading and within seven days from the start of grubbing. They shall continue to function until the upslope development area is stabilized with permanent cover. As construction progresses and the topography is altered, appropriate controls shall be constructed, or existing controls altered to address the changing drainage patterns.
- ii. **Sediment settling ponds.** A sediment settling pond is required for any one of the following conditions:
- Concentrated or collected storm water runoff (e.g., storm sewer or ditch);
 - Runoff from drainage areas, which exceed the design capacity of silt fence or other sediment barriers; or
 - Runoff from drainage areas that exceed the design capacity of inlet protection.

The permittee may request approval from Ohio EPA to use alternative controls if the permittee can demonstrate the alternative controls are equivalent in effectiveness to a sediment settling pond.

In accordance with Part II.F, if feasible, sediment settling ponds shall be dewatered at the pond surface using a skimmer or equivalent device. The sediment settling pond volume consists of both a dewatering zone and a sediment storage zone. The volume of the dewatering zone shall be a minimum of 1800 cubic feet (ft³) per acre of drainage (67 yd³/acre) with a minimum 48-hour drain time. The volume of the sediment storage zone shall be calculated by one of the following methods:

Method 1: The volume of the sediment storage zone shall be 1000 ft³ per disturbed acre within the watershed of the basin. OR

Method 2: The volume of the sediment storage zone shall be the volume necessary to store the sediment as calculated with RUSLE or a similar generally accepted erosion prediction model.

Accumulated sediment shall be removed from the sediment storage zone once it exceeds 50 percent of the minimum required sediment storage design capacity and prior to the conversion to the post-construction practice unless suitable storage is demonstrated based upon over-design. When determining the total contributing drainage area, off-site areas and areas which remain undisturbed by construction activity shall be included unless runoff from these areas is diverted away from the sediment settling pond and is not co-mingled with sediment-laden runoff. The depth of the dewatering zone shall be less than or equal to five feet. The configuration between inlets and the outlet of the basin shall provide at least two units of length for each one unit of width ($\geq 2:1$ length:width ratio); however, a length to width ratio of 4:1 is recommended. When designing sediment settling ponds, the permittee shall consider public safety, especially as it relates to children, as a design factor for the sediment basin and alternative sediment controls shall be used where site limitations would preclude a safe design. Combining multiple sediment and erosion control measures in order to maximize pollutant removal is encouraged.

- iii. **Sediment Barriers and Diversions.** Sheet flow runoff from denuded areas shall be intercepted by sediment barriers or diversions to protect adjacent properties and water resources from sediment transported via sheet flow. Where intended to provide sediment control, silt fence shall be placed on a level contour downslope of the disturbed area. For most applications, standard silt fence may be substituted with a 12-inch diameter sediment barrier. The relationship between the maximum drainage area to sediment barrier for a particular slope range is shown in the following table:

Table 3 Sediment Barrier Maximum Drainage Area Based on Slope

Maximum drainage area (in acres) to 100 linear feet of sediment barrier	Range of slope for a particular drainage area (in percent)
0.5	< 2%
0.25	$\geq 2\%$ but < 20%
0.125	$\geq 20\%$ but < 50%

Placing sediment barriers in a parallel series does not extend the size of the drainage area. Storm water diversion practices shall be used to keep runoff away from disturbed areas and steep slopes where practicable. Diversion practices, which include swales, dikes or berms, may receive storm water runoff from areas up to 10 acres.

- iv. **Inlet Protection.** Other erosion and sediment control practices shall minimize sediment laden water entering active storm drain systems. All inlets receiving runoff from drainage areas of one or more acres will require a sediment settling pond.
- v. **Surface Waters of the State Protection.** If construction activities disturb areas adjacent to surface waters of the state, structural practices shall be designed and implemented on site to protect all adjacent surface waters of the state from the impacts of sediment runoff. No structural sediment controls (e.g., the installation of silt fence or a sediment settling pond) shall be used in a surface water of the state. For all construction activities immediately adjacent to surface waters of the state, the permittee shall comply with the buffer non-numeric effluent limitation in Part II.A.6, as measured from the ordinary high water mark of the surface water. Where impacts within this buffer area are unavoidable, due to the nature of the construction (e.g., stream crossings for roads or utilities), the project shall be designed such that the number of stream crossings and the width of the disturbance within the buffer area are minimized.
- vi. **Modifying Controls.** If periodic inspections or other information indicates a control has been used inappropriately or incorrectly, the permittee shall replace or modify the control for site conditions.
- e. Post-Construction Storm Water Management Requirements. So that receiving stream's physical, chemical and biological characteristics are protected, and stream functions are maintained, post-construction storm water practices shall provide long-term management of runoff quality and quantity. To meet the post-construction requirements of this permit, the SWP3 shall contain a description of the post-construction BMPs that will be installed during construction for the site and the rationale for their selection. The rationale shall address the anticipated impacts on the channel and floodplain morphology, hydrology, and water quality. Post-construction BMPs cannot be installed within a surface water of the state (e.g., wetland or stream) unless it is authorized by a CWA 401 water quality certification, CWA 404 permit, or Ohio EPA non-jurisdictional wetland/stream program approval. Note: local jurisdictions may have more stringent post-construction requirements.

Detail drawings and maintenance plans shall be provided for all post-construction BMPs in the SWP3. Maintenance plans shall be provided by the permittee to the post-construction operator of the site (including homeowner associations) upon completion of construction activities (prior to termination of permit coverage). Maintenance plans shall ensure that pollutants collected within structural post-construction practices are disposed of in accordance with local, state, and federal regulations. To ensure that storm water management systems function as

designed and constructed, the post-construction operation and maintenance plan shall be a stand-alone document which contains: (1) a designated entity for storm water inspection and maintenance responsibilities; (2) the routine and non-routine maintenance tasks to be undertaken; (3) a schedule for inspection and maintenance; (4) any necessary legally binding maintenance easements and agreements; (5) construction drawings or excerpts showing the plan view, profile and details of the outlet(s); (6) a map showing all access and maintenance easements; and (7) for table 4a/4b practices, provide relevant elevations and associated volumes that dictate when removal of accumulated sediments must occur. Permittees are responsible for assuring all post-construction practices meet plan specifications and intended post-construction conditions have been met (e.g., sediment removed from, and sediment storage restored to, permanent pools, sediment control outlets removed and replaced with permanent post-construction discharge structures, and all slopes and drainageways permanently stabilized), but are not responsible under this permit for operation and maintenance of post-construction practices once coverage under this permit is terminated.

Post-construction storm water BMPs that discharge pollutants from point sources once construction is completed may in themselves need authorization under a separate NPDES permit (one example is storm water discharges from regulated industrial sites).

Construction activities that do not include the installation of any impervious surface (e.g., park lands), abandoned mine land reclamation activities regulated by the Ohio Department of Natural Resources, stream and wetland restoration activities, and wetland mitigation activities are not required to comply with the conditions of Part III.G.2.e of this permit. Linear construction projects (e.g., pipeline or utility line installation) which do not result in the installation of additional impervious surface are not required to comply with the conditions of Part III.G.2.e of this permit. However, linear construction projects shall be designed to minimize the number of stream crossings and the width of disturbance, and to achieve final stabilization of the disturbed area as defined in Part VII.M.1.

For all construction activities that will disturb two or more acres of land or will disturb less than two acres that are part of a larger common plan of development or sale which will disturb two or more acres of land, the post construction BMP(s) chosen shall be able to manage storm water runoff for protection of stream channels, stream stability, and water quality. The BMP(s) chosen must be compatible with site and soil conditions. Structural post-construction storm water treatment practices shall be incorporated into the permanent drainage system for the site. The BMP(s) chosen must be sized to treat the water quality volume (WQ_v) and ensure compliance with Ohio's Water Quality Standards in OAC Chapter 3745-1. The WQ_v shall be equivalent to the volume of runoff from a 0.90-inch rainfall and shall be determined using the following equations:

$$WQ_v = R_v * P * A / 12 \quad (\text{Equation 1})$$

where:

WQ_v = water quality volume in acre-feet
R_v = the volumetric runoff coefficient calculated using equation 2
P = 0.90 inch precipitation depth
A = area draining into the BMP in acres

$$R_v = 0.05 + 0.9i \quad (\text{Equation 2})$$

where i = fraction of post-construction impervious surface

An additional volume equal to 20 percent of the WQ_v shall be incorporated into the BMP for sediment storage. Ohio EPA recommends BMPs be designed according to the methodology described in the most current edition of the Rainwater and Land Development manual or in another design manual acceptable for use by Ohio EPA.

The BMPs listed in Tables 4a and 4b below are considered standard BMPs approved for general use. However, communities with a regulated MS4 may limit the use of some of these BMPs. BMPs shall be designed such that the drain time is long enough to provide treatment but short enough to provide storage for successive rainfall events and avoid the creation of nuisance conditions. The outlet structure for the post-construction BMP shall not discharge more than the first half of the WQ_v in less than one-third of the drain time. The WQ_v is the volume of storm water runoff that must be detained by a post-construction practice as specified by the most recent edition of the Rainwater and Land Development manual.

Post-construction practices shall be sized to treat 100% of the WQ_v associated with their contributing drainage area. If there is an existing post-construction BMP that treats runoff from the disturbed area and the BMP meets the post-construction requirements of this permit, no additional post-construction BMP will be required. A regional storm water BMP may be used to meet the post-construction requirement if: (1) the BMP meets the design requirements for treating the WQ_v; and (2) a legal agreement is established through which the regional BMP owner or operator agrees to provide this service in the long term. Design information for such facilities such as contributing drainage areas, capacities, elevations, outlet details and drain times shall be included in the SWP3.

Table 4a Extended Detention Post-Construction Practices with Minimum Drain Times

Extended Detention Practices	Minimum Drain Time of WQv
Wet Extended Detention Basin ^{1,2}	24 hours
Constructed Extended Detention Wetland ^{1,2}	24 hours
Dry Extended Detention Basin ^{1,3}	48 hours
Permeable Pavement – Extended Detention ¹	24 hours
Underground Storage – Extended Detention ^{1,4}	24 hours
Sand & Other Media Filtration - Extended Detention ^{1, 5}	24 hours

Notes:

1. The outlet structure shall not discharge more than the first half of the WQv in less than one-third of the drain time.
2. Provide a permanent pool with a minimum volume equal to the WQv and an extended detention volume above the permanent pool equal to 1.0 x WQv.
3. Dry basins must include a forebay and a micropool each sized at a minimum of 0.1 x WQv and a protected outlet, or include acceptable pretreatment and a protected outlet.
4. Underground storage must have pretreatment for removal of suspended sediments included in the design and documented in the SWP3. This pretreatment shall concentrate sediment in a location where it can be readily removed. For non-infiltrating, underground extended detention systems, pretreatment shall be 50% effective at capturing total suspended solids according to the testing protocol established in the Alternative Post-Construction BMP Testing Protocol.
5. The WQv ponding area shall completely empty between 24 and 72 hours.

Table 4b Infiltration Post-Construction Practices with Maximum Drain Times

Infiltration Practices	Maximum Drain Time of WQv
Bioretention Area/Cell ^{1,2}	24 hours
Infiltration Basin ²	24 hours
Infiltration Trench ³	48 hours
Permeable Pavement – Infiltration ³	48 hours
Underground Storage – Infiltration ^{3,4}	48 hours

Notes:

1. Bioretention soil media shall have a permeability of approximately 1 – 4 in/hr. Meeting the soil media specifications in the Rainwater and Land Development manual is considered compliant with this requirement. Bioretention cells must have underdrains unless in-situ conditions allow for the WQv (surface ponding) plus the bioretention soil (to a depth of 24 inches) to drain completely within 48 hours.
2. Infiltrating practices with the WQv stored aboveground (bioretention, infiltration basin) shall fully drain the WQv within 24 hours to minimize nuisance effects of standing water and to promote vigorous communities of appropriate vegetation.
3. Subsurface practices designed to fully infiltrate the WQv (infiltration trench, permeable pavement with infiltration, underground storage with infiltration) shall empty within 48 hours to recover storage for subsequent storm events.
4. Underground storage systems with infiltration must have adequate pretreatment of suspended sediments included in the design and documented in the SWP3 in order to minimize clogging of the infiltrating surface. Pretreatment shall concentrate sediment in a location where it can be readily removed. Examples include media filters situated upstream of the storage or other suitable alternative approved by Ohio EPA. For infiltrating underground systems, pretreatment shall be 80% effective at capturing total suspended solids according to the testing protocol established in the Alternative Post-Construction BMP Testing Protocol.

Small Construction Activities. For all construction activities authorized under this permit which result in a disturbance less than 2 acres, a post-construction practice shall be used to treat storm water runoff for pollutants and to reduce adverse impacts on receiving waters. The applicant must provide a justification in the SWP3 why the use of table 4a and 4b practices are not feasible. The justification must address limiting factors which would prohibit the project going forward should table 4a and 4b practices be required. Please note that additional practices selected will require approval from the regulated MS4. The use of green infrastructure BMPs such as runoff reducing practices is also encouraged.

Transportation Projects. The construction of new roads and roadway improvement projects by public entities (i.e., the state, counties, townships, cities, or villages) may implement post-construction BMPs in compliance with the current version (as of the effective date of this permit) of the Ohio Department of Transportation's "Location and Design Manual, Volume Two Drainage Design" that has been accepted by Ohio EPA as an alternative to the conditions of this permit.

Offsite Mitigation of Post-Construction. Ohio EPA may authorize the offsite mitigation of the post-construction requirements of Part III.G.2.e of this permit on a case by case basis provided the permittee clearly demonstrates the BMPs listed in Tables 4a and 4b are not feasible and the following criteria are met: (1) a maintenance agreement or policy is established to ensure operations and treatment long-term; (2) the offsite location discharges to the same HUC-12 watershed unit; and (3) the mitigation ratio of the WQv is 1.5 to 1 or the WQv at the point of retrofit, whichever is greater. Requests for offsite mitigation must be received prior to receipt of the NOI application.

Previously Developed Areas - Ohio EPA encourages the redevelopment of previously graded, paved or built upon sites through a reduction of the WQv treatment requirement. For a previously developed area, one or a combination of the following two conditions shall be met:

- A 20 percent net reduction of the site's volumetric runoff coefficient through impervious area reduction with soil restoration or replacing impervious roof area with green roof area (for these purposes green roofs shall be considered pervious surface) or
- Treatment of 20 percent of the WQv for the previously developed area using a practice meeting Table 4a/4b criteria.

Where there is a combination of redeveloped areas and new development, a weighted approach shall be used with the following equation:

$$WQv = P * A * [(Rv_1 * 0.2) + (Rv_2 - Rv_1)] / 12 \quad (\text{Equation 3})$$

where

P = 0.90 inches

A = area draining into the BMP in acres

Rv₁ = volumetric runoff coefficient for existing conditions (current site impervious area)

Rv₂ = volumetric runoff coefficient for proposed conditions (post-construction site impervious area)

Post-construction practices shall be located to treat impervious areas most likely to generate the highest pollutant load, such as parking lots or roadways, rather than areas predicted to be cleaner such as rooftops.

Runoff Reduction Practices. The size of structural post-construction practices used to capture and treat the WQv can be reduced by incorporating runoff

reducing practices into the design of the site's drainage system. The approach to calculate and document runoff reduction is detailed in the Rainwater and Land Development Manual. BMP-specific runoff reduction volumes are set by specifications in the Rainwater and Land Development Manual for the following practices:

- Impervious surface disconnection
- Rainwater harvesting
- Bioretention
- Infiltration basin
- Infiltration trench
- Permeable pavement with infiltration
- Underground storage with infiltration
- Grass swale
- Sheet flow to filter strip
- Sheet flow to conservation area

A runoff reduction approach may be used to meet the groundwater recharge requirements in the Big Darby Creek Watershed. The runoff reduction practices used for groundwater recharge may be used to reduce the WQv requirement, see appendix A for details on groundwater recharge requirements.

In order to promote the implementation of green infrastructure, the Director may consider the use of runoff reducing practices to demonstrate compliance with Part III.G.2.e of this permit for areas of the site not draining into a common drainage system of the site, e.g., sheet flow from perimeter areas such as the rear yards of residential lots, low density development scenarios, or where the permittee can demonstrate that the intent of pollutant removal and stream protection, as required in Part III.G.2.e of this permit is being addressed through non-structural post-construction BMPs based upon review and approval by Ohio EPA.

Use of Alternative Post-Construction BMPs. This permit does not preclude the use of innovative or experimental post-construction storm water management technologies. Alternative post-construction BMPs shall previously have been tested to confirm storm water treatment efficacy equivalent to those BMPs listed in Tables 4a and 4b using the protocol described in this section. BMP testing may include laboratory testing, field testing, or both.

Permittees shall request approval from Ohio EPA to use alternative post-construction BMPs on a case-by-case basis. To use an alternative post-construction BMP, the permittee must demonstrate that use of a BMP listed in Tables 4a and 4b is not feasible and the proposed alternative post-construction BMP meets the minimum treatment criteria as described in this section. The permittee shall submit an application to Ohio EPA for any proposed alternative post-construction BMP. Where the development project is located within a regulated municipal separate storm sewer system (MS4) community, the use of an alternative practice requires pre-approval by the MS4 before submittal of the

Ohio EPA permit application. Ohio EPA requires that approvals for alternative post-construction BMPs are finalized before permittees submit an NOI for permit coverage.

In addition to meeting sediment removal criteria, the discharge rate from the proposed alternative practice shall be reduced to prevent stream bed erosion and protect the physical and biological stream integrity unless there will be negligible hydrological impact to the receiving surface water of the state. Discharge rate is considered to have a negligible impact if the permittee can demonstrate that one of the following three conditions exist:

- i. The entire WQv is recharged to groundwater;
- ii. The larger common plan of development or sale will create less than one acre of impervious surface;
- iii. The storm water drainage system of the development discharges directly into a large river with drainage area equal to 100 square miles or larger upstream of the development site or to a lake where the development area is less than 5 percent of the watershed area, unless a TMDL has identified water quality problems into the receiving surface waters of the state.

If the conditions above that minimize the potential for hydrological impact to the receiving surface water of the state do not exist, then the alternative post-construction BMP must prevent stream erosion by reducing the flow rate from the WQ_v. In such cases, discharge of the WQ_v must be controlled. A second storm water BMP that provides extended detention of the WQv may be needed to meet the post-construction criteria.

Alternative Post-Construction BMP Testing Protocol. For laboratory testing, the alternative BMP shall be tested using sediment with a specific gravity of 2.65, a particle size distribution closely matching the distribution shown in Table 5, and total suspended sediment (TSS) concentrations within 10% of 200 mg/L (180 mg/L – 220 mg/L TSS). For an alternative BMP to be acceptable, the test results must demonstrate that the minimum treatment rate is 80% TSS removal at the design flow rate for the tested BMP.

Table 5 Particle Size Distribution for Testing Alternative Post-Construction BMPs

Particle Size (microns)	Percent Finer (%)
1,000	100
500	95
250	90
150	75
100	60
75	50
50	45
20	35
8	20
5	10
2	5

- For field testing, the alternative BMP shall be tested using storm water runoff

from the field, not altered by adding aggregate or subjecting to unusually high sediment loads such as those from unstabilized construction disturbance. The storm water runoff used for field testing shall be representative of runoff from the proposed installation site for the alternative BMP after all construction activities have ceased and the ground has been stabilized. The influent and effluent TSS concentrations of storm water runoff must be collected in the field. For an alternative BMP to be acceptable, the test results must demonstrate the minimum treatment rate is 80% TSS removal for influent concentrations equal to or greater than 100 mg/L TSS. If the influent concentration to the proposed alternative BMP is less than 100 mg/L TSS in the field, then the BMP must achieve an average effluent concentration less than or equal to 20 mg/L TSS.

- Testing of alternative post-construction BMPs shall be performed or overseen by a qualified independent, third-party testing organization;
- Testing shall demonstrate the maximum flow rate at which the alternative post-construction BMP can achieve the necessary treatment efficacy, including consideration for the potential of sediment resuspension;
- Testing shall demonstrate the maximum volume of sediment and floatables that can be collected in the alternative post-construction BMP before pollutants must be removed to maintain 80% treatment efficacy;
- Testing shall indicate the recommended maintenance frequency and maintenance protocol to ensure ongoing performance of the alternative post-construction BMP.

The alternative post-construction BMP testing protocol described in this section is similar to testing requirements specified by the New Jersey Department of Environmental Protection (NJDEP) for storm water Manufactured Treatment Devices (MTD) and therefore testing results certified by NJDEP shall be accepted by Ohio EPA. For examples of BMPs that have been tested using New Jersey Department of Environmental Protection's procedures, see the website: www.njstormwater.org.

Another nationally recognized storm water product testing procedure is the Technology Assessment Protocol – Ecology (TAPE) administered by the State of Washington, Department of Ecology. The TAPE testing procedure describes testing to achieve 80% TSS removal using a sediment mix with a particle size distribution with approximately 75% of the mass of the aggregate with particle diameters less than 45 microns. Overall, this particle size distribution is finer than the distribution in Table 5. Therefore, if TAPE testing results are available for a proposed alternative post-construction BMP, those results shall be accepted by Ohio EPA. The State of Washington, Department of Ecology website is <https://ecology.wa.gov/>.

Alternative BMPs that utilize treatment processes such as filtering or centrifugal separation, rather than a detention and settling volume, must be designed to ensure treatment of 90 percent of the average annual runoff

volume. For the design of these BMPs, the water quality flow rate (WQF) considered equivalent to the Water Quality Volume (WQv) shall be determined utilizing the Rational Method (Equation 4) with an intensity (i) appropriate for the water quality precipitation event. This intensity shall be calculated using the table given in Appendix C.

$$WQF = C * i * A \quad \text{(Equation 4)}$$

Where

WQF = water quality flow rate in cubic feet per second (cfs)
C = rational method runoff coefficient
i = intensity (in/hr)
A = area draining to the BMP (acres)

Alternative post-construction BMPs may include, but are not limited to: vegetated swales, vegetated filter strips, hydrodynamic separators, high-flow media filters, cartridge filters, membrane filters, subsurface flow wetlands, multi-chamber treatment trains, road shoulder media filter drains, wetland channels, rain barrels, green roofs, and rain gardens. The Director may also consider non-structural post-construction approaches.

- f. Surface Water Protection. If the project site contains any streams, rivers, lakes, wetlands or other surface waters, certain construction activities at the site may be regulated under the CWA and/or state isolated wetland permit requirements. Sections 404 and 401 of the Act regulate the discharge of dredged or fill material into surface waters and the impacts of such activities on water quality, respectively. Construction activities in surface waters which may be subject to CWA regulation and/or state isolated wetland permit requirements include, but are not limited to: sewer line crossings, grading, backfilling or culverting streams, filling wetlands, road and utility line construction, bridge installation and installation of flow control structures. If the project contains streams, rivers, lakes or wetlands or possible wetlands, the permittee shall contact the appropriate U.S. Army Corps of Engineers District Office. (CAUTION: Any area of seasonally wet hydric soil is a potential wetland - please consult the Soil Survey and list of hydric soils for your County, available at your county's Soil and Water Conservation District. If you have any questions about Section 401 water quality certification, please contact the Ohio Environmental Protection Agency, Section 401 Coordinator.)

U.S. Army Corps of Engineers (Section 404 regulation):

- Huntington, WV District (304) 399-5210 (Muskingum River, Hocking River, Scioto River, Little Miami River, and Great Miami River Basins)
- Buffalo, NY District (716) 879-4330 (Lake Erie Basin)
- Pittsburgh, PA District (412) 395-7155 (Mahoning River Basin)
- Louisville, KY District (502) 315-6686 (Ohio River)

Ohio EPA 401/404 and non-jurisdictional stream/wetland coordinator can be contacted at (614) 644-2001 (all of Ohio)

Concentrated storm water runoff from BMPs to natural wetlands shall be converted to diffuse flow before the runoff enters the wetlands. The flow should be released such that no erosion occurs downslope. Level spreaders may need to be placed in series, particularly on steep sloped sites, to ensure non-erosive velocities. Other structural BMPs may be used between storm water features and natural wetlands, in order to protect the natural hydrology, hydroperiod, and wetland flora. If the applicant proposes to discharge to natural wetlands, a hydrologic analysis shall be performed. The applicant shall attempt to match the pre-development hydroperiods and hydrodynamics that support the wetland. The applicant shall assess whether their construction activity will adversely impact the hydrologic flora and fauna of the wetland. Practices such as vegetative buffers, infiltration basins, conservation of forest cover, and the preservation of intermittent streams, depressions, and drainage corridors may be used to maintain wetland hydrology.

g. Other controls.

- i. **Non-Sediment Pollutant Controls.** In accordance with Part II.E, no solid (other than sediment) or liquid waste, including building materials, shall be discharged in storm water runoff. The permittee must implement all necessary BMPs to prevent the discharge of non-sediment pollutants to the drainage system of the site or surface waters of the state or an MS4. Under no circumstance shall wastewater from the washout of concrete trucks, stucco, paint, form release oils, curing compounds, and other construction materials be discharged directly into a drainage channel, storm sewer or surface waters of the state. Also, no pollutants from vehicle fuel, oils, or other vehicle fluids can be discharged to surface waters of the state. No exposure of storm water to waste materials is recommended. The SWP3 must include methods to minimize the exposure of building materials, building products, construction wastes, trash, landscape materials, fertilizers, pesticides, herbicides, detergents, and sanitary waste to precipitation, storm water runoff, and snow melt. In accordance with Part II.D.3, the SWP3 shall include measures to prevent and respond to chemical spills and leaks. You may also reference the existence of other plans (i.e., Spill Prevention Control and Countermeasure (SPCC) plans, spill control programs, Safety Response Plans, etc.) provided that such plan addresses conditions of this permit condition and a copy of such plan is maintained on site.
- ii. **Off-site traffic.** Off-site vehicle tracking of sediments and dust generation shall be minimized. In accordance with Part II.D.1, the SWP3 shall include methods to minimize the discharge of pollutants from equipment and vehicle washing, wheel washwater, and other washwaters. No detergents may be used to wash vehicles. Washwaters shall be treated in a sediment basin or alternative control that provides equivalent treatment prior to discharge.
- iii. **Compliance with other requirements.** The SWP3 shall be consistent with applicable State and/or local waste disposal, sanitary sewer or septic system regulations, including provisions prohibiting waste disposal by

open burning and shall provide for the proper disposal of contaminated soils to the extent these are located within the permitted area.

- iv. **Trench and ground water control.** In accordance with Part II.C, there shall be no turbid discharges to surface waters of the state resulting from dewatering activities. If trench or ground water contains sediment, it shall pass through a sediment settling pond or other equally effective sediment control device, prior to being discharged from the construction site. Alternatively, sediment may be removed by settling in place or by dewatering into a sump pit, filter bag or comparable practice. Ground water which does not contain sediment or other pollutants is not required to be treated prior to discharge. However, care must be taken when discharging ground water to ensure that it does not become pollutant-laden by traversing over disturbed soils or other pollutant sources.
- v. **Contaminated Sediment.** Where construction activities are to occur on sites with contamination from previous activities, operators shall be aware that concentrations of materials that meet other criteria (is not considered a Hazardous Waste, meeting VAP standards, etc.) may still result in storm water discharges in excess of Ohio Water Quality Standards. Such discharges are not authorized by this permit. Appropriate BMPs include, but are not limited to:
- The use of berms, trenches, and pits to collect contaminated runoff and prevent discharges;
 - Pumping runoff into a sanitary sewer (with prior approval of the sanitary sewer operator) or into a container for transport to an appropriate treatment/disposal facility; and
 - Covering areas of contamination with tarps or other methods that prevent storm water from coming into contact with the material.

Operators should consult with Ohio EPA Division of Surface Water prior to seeking permit coverage.

- h. Maintenance. All temporary and permanent control practices shall be maintained and repaired as needed to ensure continued performance of their intended function. All sediment control practices must be maintained in a functional condition until all up-slope areas they control are permanently stabilized. The SWP3 shall be designed to minimize maintenance requirements. The applicant shall provide a description of maintenance procedures needed to ensure the continued performance of control practices.
- i. Inspections. The permittee shall assign "qualified inspection personnel" to conduct inspections to ensure that the control practices are functional and to evaluate whether the SWP3 is adequate and properly implemented in accordance with the schedule proposed in Part III.G.1.h of this permit or whether additional control measures are required. At a minimum, procedures in a SWP3 shall provide that all controls on the site are inspected:

- after any storm event greater than one-half inch of rain per 24-hour period by the end of the next calendar day, excluding weekends and holidays unless work is scheduled; and
- once every seven calendar days.

The inspection frequency may be reduced to at least once every month for dormant sites if:

- the entire site is temporarily stabilized or
- runoff is unlikely due to weather conditions for extended periods of time (e.g., site is covered with snow, ice, or the ground is frozen).

The beginning and ending dates of any reduced inspection frequency shall be documented in the SWP3.

Once a definable area has achieved final stabilization, the area may be marked on the SWP3 and no further inspection requirements shall apply to that portion of the site.

Following each inspection, a checklist must be completed and signed by the qualified inspection personnel representative. At a minimum, the inspection report shall include:

- i. the inspection date;
- ii. names, titles, and qualifications of personnel making the inspection;
- iii. weather information for the period since the last inspection (or since commencement of construction activity if the first inspection) including a best estimate of the beginning of each storm event, duration of each storm event, approximate amount of rainfall for each storm event (in inches), and whether any discharges occurred;
- iv. weather information and a description of any discharges occurring at the time of the inspection;
- v. location(s) of discharges of sediment or other pollutants from the site;
- vi. location(s) of BMPs that need to be maintained;
- vii. location(s) of BMPs that failed to operate as designed or proved inadequate for a particular location;
- viii. location(s) where additional BMPs are needed that did not exist at the time of inspection; and
- ix. corrective action required including any changes to the SWP3 necessary and implementation dates.

Disturbed areas and areas used for storage of materials that are exposed to precipitation shall be inspected for evidence of or the potential for pollutants entering the drainage system. Erosion and sediment control measures identified in the SWP3 shall be observed to ensure that those are operating correctly. Discharge locations shall be inspected to ascertain whether erosion and sediment control measures are effective in preventing significant impacts to the receiving waters. Locations where vehicles enter or exit the site shall be inspected for evidence of off-site vehicle tracking.

The permittee shall maintain for three years following the submittal of a notice of termination form, a record summarizing the results of the inspection, names(s) and qualifications of personnel making the inspection, the date(s) of the inspection, major observations relating to the implementation of the SWP3 and a certification as to whether the facility is in compliance with the SWP3 and the permit and identify any incidents of non-compliance. The record and certification shall be signed in accordance with Part V.G. of this permit.

- i. **When practices require repair or maintenance.** If the inspection reveals that a control practice is in need of repair or maintenance, with the exception of a sediment settling pond, it shall be repaired or maintained within 3 days of the inspection. Sediment settling ponds shall be repaired or maintained within 10 days of the inspection.
 - ii. **When practices fail to provide their intended function.** If the inspection reveals that a control practice fails to perform its intended function and that another, more appropriate control practice is required, the SWP3 shall be amended and the new control practice shall be installed within 10 days of the inspection.
 - iii. **When practices depicted on the SWP3 are not installed.** If the inspection reveals that a control practice has not been implemented in accordance with the schedule contained in Part III.G.1.h of this permit, the control practice shall be implemented within 10 days from the date of the inspection. If the inspection reveals that the planned control practice is not needed, the record shall contain a statement of explanation as to why the control practice is not needed.
3. Approved State or local plans. All dischargers regulated under this general permit must comply, except those exempted under state law, with the lawful requirements of municipalities, counties and other local agencies regarding discharges of storm water from construction activities. All erosion and sediment control plans and storm water management plans approved by local officials shall be retained with the SWP3 prepared in accordance with this permit. Applicable requirements for erosion and sediment control and storm water management approved by local officials are, upon submittal of a NOI form, incorporated by reference and enforceable under this permit even if they are not specifically included in an SWP3 required under this permit. When the project is located within the jurisdiction of a regulated municipal separate storm sewer system (MS4), the permittee shall certify that the SWP3 complies with the requirements of the storm water management program of the MS4 operator.
4. Exceptions. If specific site conditions prohibit the implementation of any of the erosion and sediment control practices contained in this permit or site-specific conditions are such that implementation of any erosion and sediment control practices contained in this permit will result in no environmental benefit, then the permittee shall provide justification for rejecting each practice based on site conditions. Exceptions from implementing the erosion and sediment control standards contained in this permit will be approved or denied on a case-by-case basis.

The permittee may request approval from Ohio EPA to use alternative methods to satisfy conditions in this permit if the permittee can demonstrate that the alternative methods are sufficient to protect the overall integrity of receiving streams and the watershed. Alternative methods will be approved or denied on a case-by-case basis.

PART IV. NOTICE OF TERMINATION REQUIREMENTS

A. Failure to notify.

The terms and conditions of this permit shall remain in effect until a signed Notice of Termination (NOT) form is submitted. Failure to submit an NOT constitutes a violation of this permit and may affect the ability of the permittee to obtain general permit coverage in the future.

B. When to submit an NOT.

1. Permittees wishing to terminate coverage under this permit shall submit an NOT form in accordance with Part V.G. of this permit. Compliance with this permit is required until an NOT form is submitted. The permittee's authorization to discharge under this permit terminates at midnight of the day the NOT form is submitted. Prior to submitting the NOT form, the permittee shall conduct a site inspection in accordance with Part III.G.2.i of this permit and have a maintenance plan in place to ensure all post-construction BMPs will be maintained in perpetuity.
2. All permittees shall submit an NOT form within 45 days of completing all permit requirements. Enforcement actions may be taken if a permittee submits an NOT form without meeting one or more of the following conditions:
 - a. Final stabilization (see definition in Part VII) has been achieved on all portions of the site for which the permittee is responsible (including, if applicable, returning agricultural land to its pre-construction agricultural use);
 - b. Another operator(s) has assumed control over all areas of the site that have not been finally stabilized;
 - c. A maintenance plan is in place to ensure all post construction BMPs are adequately maintained in the long-term;
 - d. For non-residential developments, all elements of the storm water pollution prevention plan have been completed, the disturbed soil at the identified facility have been stabilized and temporary erosion and sediment control measures have been removed at the appropriate time, or all storm water discharges associated with construction activity from the identified facility that are authorized by the above referenced NPDES general permit have otherwise been eliminated. (i) For residential developments only, temporary stabilization has been completed and the lot, which includes a home, has been transferred to the homeowner; (ii) final stabilization has been completed and the lot, which does not include a home, has been transferred to the property owner; (iii) no stabilization has been implemented on a lot, which includes a home, and the lot has been transferred to the homeowner; or

- e. An exception has been granted under Part III.G.4.

C. How to submit an NOT.

To terminate permit coverage, the permittee shall submit a complete and accurate Notice of Termination (NOT) form using Ohio EPA's electronic application form which is available through the Ohio EPA eBusiness Center at: <https://ebiz.epa.ohio.gov/>. Submission through the Ohio EPA eBusiness Center will require establishing an Ohio EPA eBusiness Center account and obtaining a unique Personal Identification Number (PIN) for final submission of the NOT. Existing eBusiness Center account holders can access the NOT form through their existing account and submit using their existing PIN. Please see the following link for guidance: <http://epa.ohio.gov/dsw/ebs.aspx#170669803-streams-guidance>. Alternatively, if you are unable to access the NOT form through the agency eBusiness Center due to a demonstrated hardship, the NOT may be submitted on paper NOT forms provided by Ohio EPA. NOT information shall be typed on the form. Please contact Ohio EPA, Division of Surface Water at (614) 644-2001 if you wish to receive a paper NOT form.

PART V. STANDARD PERMIT CONDITIONS.

A. Duty to comply.

The permittee shall comply with all conditions of this permit. Any permit noncompliance constitutes a violation of ORC Chapter 6111 and is grounds for enforcement action.

Ohio law imposes penalties and fines for persons who knowingly make false statements or knowingly swear or affirm the truth of a false statement previously made.

B. Continuation of an expired general permit.

An expired general permit continues in force and effect until a new general permit is issued.

C. Need to halt or reduce activity not a defense.

It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

D. Duty to mitigate.

The permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

E. Duty to provide information.

The permittee shall furnish to the director, within 10 days of written request, any information which the director may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit or to determine compliance with this permit. The permittee

shall also furnish to the director upon request copies of records required to be kept by this permit.

F. Other information.

When the permittee becomes aware that he or she failed to submit any relevant facts or submitted incorrect information in the NOI, SWP3, NOT or in any other report to the director, he or she shall promptly submit such facts or information.

G. Signatory requirements.

All NOIs, NOTs, SWP3s, reports, certifications or information either submitted to the director or that this permit requires to be maintained by the permittee, shall be signed.

1. These items shall be signed as follows:
 - a. For a corporation: By a responsible corporate officer. For the purpose of this section, a responsible corporate officer means:
 - i. A president, secretary, treasurer or vice-president of the corporation in charge of a principal business function or any other person who performs similar policy or decision-making functions for the corporation; or
 - ii. The manager of one or more manufacturing, production or operating facilities, provided, the manager is authorized to make management decisions that govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations and initiating and directing other comprehensive measures to assure long-term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures;
 - b. For a partnership or sole proprietorship: By a general partner or the proprietor, respectively; or
 - c. For a municipality, State, Federal or other public agency: By either a principal executive officer or ranking elected official. For purposes of this section, a principal executive officer of a Federal agency includes (1) the chief executive officer of the agency or (2) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrators of U.S. EPA).
2. All reports required by the permits and other information requested by the director shall be signed by a person described in Part V.G.1 of this permit or by a duly authorized representative of that person. A person is a duly authorized representative only if:

- a. The authorization is made in writing by a person described in Part V.G.1 of this permit and submitted to the director;
 - b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of manager, operator of a well or well field, superintendent, position of equivalent responsibility or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position); and
 - c. The written authorization is submitted to the director.
3. Changes to authorization. If an authorization under Part V.G.2 of this permit is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of Part V.G.2 of this permit must be submitted to the director prior to or together with any reports, information or applications to be signed by an authorized representative.

H. Certification.

Any person signing documents under this section shall make the following certification:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

I. Oil and hazardous substance liability.

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities or penalties to which the permittee is or may be subject under section 311 of the CWA or 40 CFR Part 112. 40 CFR Part 112 establishes procedures, methods and equipment and other requirements for equipment to prevent the discharge of oil from non-transportation-related onshore and offshore facilities into or upon the navigable surface waters of the state or adjoining shorelines.

J. Property rights.

The issuance of this permit does not convey any property rights of any sort, nor any exclusive privileges, nor does it authorize any injury to private property nor any invasion of personal rights, nor any infringement of Federal, State or local laws or regulations.

K. Severability.

The provisions of this permit are severable and if any provision of this permit or the application of any provision of this permit to any circumstance is held invalid, the application of such provision to other circumstances and the remainder of this permit shall not be affected thereby.

L. Transfers.

Ohio NPDES general permit coverage is transferable. Ohio EPA must be notified in writing sixty days prior to any proposed transfer of coverage under an Ohio NPDES general permit. The transferee must inform Ohio EPA it will assume the responsibilities of the original permittee transferor.

M. Environmental laws.

No condition of this permit shall release the permittee from any responsibility or requirements under other environmental statutes or regulations.

N. Proper operation and maintenance.

The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit and with the requirements of SWP3s. Proper operation and maintenance requires the operation of backup or auxiliary facilities or similar systems, installed by a permittee only when necessary to achieve compliance with the conditions of the permit.

O. Inspection and entry.

The permittee shall allow the director or an authorized representative of Ohio EPA, upon the presentation of credentials and other documents as may be required by law, to:

1. Enter upon the permittee's premises where a regulated facility or activity is located or conducted or where records must be kept under the conditions of this permit;
2. Have access to and copy at reasonable times, any records that must be kept under the conditions of this permit;
3. Inspect at reasonable times any facilities or equipment (including monitoring and control equipment); and
4. Sample or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the Clean Water Act, any substances or parameters at any location.

P. Duty to Reapply.

If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee must apply for and obtain a new permit.

Q. Permit Actions.

This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any permit condition.

R. Bypass.

The provisions of 40 CFR Section 122.41(m), relating to "Bypass," are specifically incorporated herein by reference in their entirety. For definition of "Bypass," see Part VII.C.

S. Upset.

The provisions of 40 CFR Section 122.41(n), relating to "Upset," are specifically incorporated herein by reference in their entirety. For definition of "Upset," see Part VII.GG.

T. Monitoring and Records.

The provisions of 40 CFR Section 122.41(j), relating to "Monitoring and Records," are specifically incorporated herein by reference in their entirety.

U. Reporting Requirements.

The provisions of 40 CFR Section 122.41(l), relating to "Reporting Requirements," are specifically incorporated herein by reference in their entirety.

PART VI. REOPENER CLAUSE

If there is evidence indicating potential or realized impacts on water quality due to any storm water discharge associated with construction activity covered by this permit, the permittee of such discharge may be required to obtain coverage under an individual permit or an alternative general permit in accordance with Part I.C of this permit or the permit may be modified to include different limitations and/or requirements.

Permit modification or revocation will be conducted according to ORC Chapter 6111.

PART VII. DEFINITIONS

- A. "Act" means Clean Water Act (formerly referred to as the Federal Water Pollution Control Act or Federal Water Pollution Control Act Amendments of 1972) Pub. L. 92-500, as amended Pub. L. 95-217, Pub. L. 95-576, Pub. L. 96-483, Pub. L. 97-117 and Pub. L. 100-4, 33 U.S.C. 1251 et. seq.
- B. "Bankfull channel" means a channel flowing at channel capacity and conveying the bankfull discharge. Delineated by the highest water level that has been maintained for a sufficient period of time to leave evidence on the landscape, such as the point where the natural vegetation changes from predominantly aquatic to predominantly terrestrial or

the point at which the clearly scoured substrate of the stream ends and terrestrial vegetation begins.

- C. "Bankfull discharge" means the streamflow that fills the main channel and just begins to spill onto the floodplain; it is the discharge most effective at moving sediment and forming the channel.
- D. "Best management practices (BMPs)" means schedules of activities, prohibitions of practices, maintenance procedures and other management practices (both structural and non-structural) to prevent or reduce the pollution of surface waters of the state. BMP's also include treatment requirements, operating procedures and practices to control plant and/or construction site runoff, spillage or leaks, sludge or waste disposal or drainage from raw material storage.
- E. "Bypass" means the intentional diversion of waste streams from any portion of a treatment facility.
- F. "Channelized stream" means the definition set forth in Section 6111.01 (M) of the ORC.
- G. "Commencement of construction" means the initial disturbance of soils associated with clearing, grubbing, grading, placement of fill, or excavating activities or other construction activities.
- H. "Concentrated storm water runoff" means any storm water runoff which flows through a drainage pipe, ditch, diversion or other discrete conveyance channel.
- I. "Director" means the director of the Ohio Environmental Protection Agency.
- J. "Discharge" means the addition of any pollutant to the surface waters of the state from a point source.
- K. "Disturbance" means any clearing, grading, excavating, filling, or other alteration of land surface where natural or man-made cover is destroyed in a manner that exposes the underlying soils.
- L. "Drainage watershed" means for purposes of this permit the total contributing drainage area to a BMP, i.e., the "watershed" directed to the practice. This would also include any off-site drainage.
- M. "Final stabilization" means that either:
 - 1. All soil disturbing activities at the site are complete and a uniform perennial vegetative cover (e.g., evenly distributed, without large bare areas) with a density of at least 70 percent cover for the area has been established on all unpaved areas and areas not covered by permanent structures or equivalent stabilization measures (such as the use of mulches, rip-rap, gabions or geotextiles) have been employed. In addition, all temporary erosion and sediment control practices are removed and disposed of and all trapped sediment is permanently stabilized to prevent further erosion; or

2. For individual lots in residential construction by either:
 - a. The homebuilder completing final stabilization as specified above or
 - b. The homebuilder establishing temporary stabilization including perimeter controls for an individual lot prior to occupation of the home by the homeowner and informing the homeowner of the need for and benefits of, final stabilization. (Homeowners typically have an incentive to put in the landscaping functionally equivalent to final stabilization as quick as possible to keep mud out of their homes and off sidewalks and driveways.); or
 3. For construction projects on land used for agricultural purposes (e.g., pipelines across crop or range land), final stabilization may be accomplished by returning the disturbed land to its pre-construction agricultural use. Areas disturbed that were previously used for agricultural activities, such as buffer strips immediately adjacent to surface waters of the state and which are not being returned to their pre-construction agricultural use, must meet the final stabilization criteria in (1) or (2) above.
- N. "General contractor" – for the purposes of this permit, the primary individual or company solely accountable to perform a contract. The general contractor typically supervises activities, coordinates the use of subcontractors, and is authorized to direct workers at a site to carry out activities required by the permit.
- O. "Individual lot NOI" means a Notice of Intent for an individual lot to be covered by this permit (see Part I of this permit).
- P. "Larger common plan of development or sale"- means a contiguous area where multiple separate and distinct construction activities may be taking place at different times on different schedules under one plan.
- Q. "MS4" means municipal separate storm sewer system which means a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels or storm drains) that are:
1. Owned or operated by the federal government, state, municipality, township, county, district(s) or other public body (created by or pursuant to state or federal law) including special district under state law such as a sewer district, flood control district or drainage districts or similar entity or a designated and approved management agency under section 208 of the act that discharges into surface waters of the state; and
 2. Designed or used for collecting or conveying solely storm water,
 3. Which is not a combined sewer and
 4. Which is not a part of a publicly owned treatment works.
- R. "National Pollutant Discharge Elimination System (NPDES)" means the national program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits and enforcing pretreatment requirements, under sections 307, 402, 318 and 405 of the CWA. The term includes an "approved program."

- S. “Natural channel design” means an engineering technique that uses knowledge of the natural process of a stream to create a stable stream that will maintain its form and function over time.
- T. “NOI” means notice of intent to be covered by this permit.
- U. “NOT” means notice of termination.
- V. “Operator” means any party associated with a construction project that meets either of the following two criteria:
1. The party has day-to-day operational control of all activities at a project which are necessary to ensure compliance with a SWP3 for the site and all permit conditions including the ability to authorize modifications to the SWP3, construction plans and site specification to ensure compliance with the General Permit, or
 2. Property owner meets the definition of operator should the party which has day to day operational control require additional authorization from the owner for modifications to the SWP3, construction plans, and/or site specification to ensure compliance with the permit or refuses to accept all responsibilities as listed above (Part VII.V.1).

Subcontractors generally are not considered operators for the purposes of this permit. As set forth in Part I.F.1, there can be more than one operator at a site and under these circumstances, the operators shall be co-permittees.

- W. “Ordinary high water mark” means that line on the shore established by the fluctuations of water and indicated by physical characteristics such as clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.
- X. “Owner or operator” means the owner or operator of any “facility or activity” subject to regulation under the NPDES program.
- Y. “Permanent stabilization” means the establishment of permanent vegetation, decorative landscape mulching, matting, sod, rip rap and landscaping techniques to provide permanent erosion control on areas where construction operations are complete or where no further disturbance is expected for at least one year.
- Z. “Percent imperviousness” means the impervious area created divided by the total area of the project site.
- AA. “Point source” means any discernible, confined and discrete conveyance, including but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, landfill leachate collection system, vessel or the floating craft from which pollutants are or may be discharged. This term does not include return flows from irrigated agriculture or agricultural storm water runoff.

- BB. “Qualified inspection personnel” means a person knowledgeable in the principles and practice of erosion and sediment controls, who possesses the skills to assess all conditions at the construction site that could impact storm water quality and to assess the effectiveness of any sediment and erosion control measures selected to control the quality of storm water discharges from the construction activity.
- CC. “Rainwater and Land Development” is a manual describing construction and post-construction best management practices and associated specifications. A copy of the manual may be obtained by contacting the Ohio Department of Natural Resources, Division of Soil & Water Conservation.
- DD. “Riparian area” means the transition area between flowing water and terrestrial (land) ecosystems composed of trees, shrubs and surrounding vegetation which serve to stabilize erodible soil, improve both surface and ground water quality, increase stream shading and enhance wildlife habitat.
- EE. “Runoff coefficient” means the fraction of total rainfall that will appear at the conveyance as runoff.
- FF. “Sediment settling pond” means a sediment trap, sediment basin or permanent basin that has been temporarily modified for sediment control, as described in the latest edition of the Rainwater and Land Development manual.
- GG. “State isolated wetland permit requirements” means the requirements set forth in Sections 6111.02 through 6111.029 of the ORC.
- HH. “Storm water” means storm water runoff, snow melt and surface runoff and drainage.
- II. “Steep slopes” means slopes that are 15 percent or greater in grade. Where a local government or industry technical manual has defined what is to be considered a “steep slope,” this permit’s definition automatically adopts that definition.
- JJ. “Stream edge” means the ordinary high water mark.
- KK. “Subcontractor” – for the purposes of this permit, an individual or company that takes a portion of a contract from the general contractor or from another subcontractor.
- LL. “Surface waters of the state” or “water bodies” means all streams, lakes, reservoirs, ponds, marshes, wetlands or other waterways which are situated wholly or partially within the boundaries of the state, except those private waters which do not combine or effect a junction with natural surface or underground waters. Waters defined as sewerage systems, treatment works or disposal systems in Section 6111.01 of the ORC are not included.
- MM. “SWP3” means storm water pollution prevention plan.
- NN. “Upset” means an exceptional incident in which there is unintentional and temporary noncompliance with technology based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment

facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

- OO. “Temporary stabilization” means the establishment of temporary vegetation, mulching, geotextiles, sod, preservation of existing vegetation and other techniques capable of quickly establishing cover over disturbed areas to provide erosion control between construction operations.
- PP. “Water Quality Volume (WQ_v)” means the volume of storm water runoff which must be captured and treated prior to discharge from the developed site after construction is complete.

Appendix A Big Darby Creek Watershed

CONTENTS OF THIS APPENDIX

- A.1 Permit Area
- A.2 TMDL Conditions
- A.3 Sediment Settling Ponds and Sampling
- A.4 Riparian Setback Requirements
- A.5 Riparian Setback Mitigation
- A.6 Groundwater Recharge Requirements
- A.7 Groundwater Recharge mitigation

Attachment A-A: Big Darby Creek Watershed Map

Attachment A-B: Stream Assessment and Restoration

A.1 Permit Area.

This appendix to Permit OHC00005 applies to the entire Big Darby Creek Watershed located within the State of Ohio. Please see Attachment A for permit area boundaries.

A.2 TMDL Conditions.

This general permit requires control measures/BMPs for construction sites that reflect recommendations set forth in the U.S. EPA approved Big Darby Creek TMDL.

A.3 Sediment Settling Ponds and Sampling

Sediment settling ponds additional conditions. The sediment settling pond shall be sized to provide a minimum sediment storage volume of 134 cubic yards of effective sediment storage per acre of drainage and maintain a target discharge performance standard of 45 mg/l Total Suspended Solids (TSS) up to a 0.75-inch rainfall event within a 24-hour period. Unless infeasible, sediment settling ponds must be dewatered at the pond surface using a skimmer or equivalent device. The depth of the sediment settling pond must be less than or equal to five feet. Sediment must be removed from the sediment settling pond when the design capacity has been reduced by 40 percent (This is typically reached when sediment occupies one-half of the basin depth).

Silt Fence and Diversions. For sites five or more acres in size, the use of sediment barriers as a primary sediment control is prohibited. Centralized sediment basins shall be used for sites 5 or more acres in size. Diversions shall direct all storm water runoff from the disturbed areas to the impoundment intended for sediment control. The sediment basins and associated diversions shall be implemented prior to the major earth disturbing activity.

The permittee shall sample in accordance with sampling procedures outlined in 40 CFR 136. Sampling shall occur as follows:

- i. Occur at the outfall of each sediment settling pond associated with the site. Each associated outfall shall be identified by a three-digit number (001, 002, etc.);
- ii. The applicable rainfall event for sampling to occur shall be a rainfall event of 0.25-inch to a 0.75-inch rainfall event to occur within a 24-hour period. Grab sampling shall be initiated at a site within 14 days, or the first applicable rainfall event thereafter, once upslope disturbance of each sampling location is initiated and shall continue on a quarterly basis. Quarterly periods shall be represented as January - March, April - June, July - September and October - December. Sampling results shall be retained on site and available for inspection.

If any sample is greater than the performance standard of 45 mg/l TSS, the permittee shall modify the SWP3 and install/implement new control practice(s) within 10 days to ensure the TSS performance standard is maintained. Within 3 days of improvement(s), or the first applicable rainfall event thereafter, the permittee shall resample to ensure SWP3 modifications maintain the TSS performance standard target.

For each sample taken, the permittee shall record the following information:

- the outfall and date of sampling;
- the person(s) who performed the sampling;
- the date the analyses were performed on those samples;
- the person(s) who performed the analyses;
- the analytical techniques or methods used; and
- the results of all analyses.

Both quarterly and sampling results following a discharge target exceedance shall be retained on site and available for inspection.

A.4 Riparian Setback Requirements.

The SWP3 shall clearly delineate the boundary of required stream setback distances. No construction activity shall occur, without appropriate mitigation, within the delineated setback boundary except activities associated with restoration or recovery of natural floodplain and channel form characteristics as described in Attachment B, storm water conveyances from permanent treatment practices and approvable utility crossings. Such conveyances must be designed to minimize the width of disturbance. If intrusion within the delineated setback boundary is necessary to accomplish the purposes of a project, then mitigation shall be required in accordance with Appendix A.5 of this permit. Streams requiring protection under this section are defined as perennial, intermittent or ephemeral streams with a defined bed, bank or channel. National Resources Conservation Service (NRCS) soil survey maps should be used as one reference and the presence of a stream requiring protection should also be confirmed in the field. Any required setback distances shall be clearly displayed in the field prior to any construction related activity.

Riparian setbacks distance shall be delineated based upon one of the following two methods:

- i. The setback distance shall be sized as the greater of the following:

1. The regulatory 100-year floodplain based on FEMA mapping;
2. A minimum of 100 feet from the top of the streambank on each side; or
3. A distance calculated using the following equation:

$$W = 133DA^{0.43} \quad \text{(Equation 1, Appendix A)}$$

where:

DA = drainage area (mi²)

W = total width of riparian setback (ft)

W shall be centered over the meander pattern of the stream such that a line representing the setback width would evenly intersect equal elevation lines on either side of the stream.

If the DA remains relatively constant throughout the stretch of interest, then the DA of the downstream edge of the stretch should be used. Where there is a significant increase in the DA from the upstream edge to the downstream edge of the area of interest, the setback width shall increase accordingly.

- ii. **Stream Restoration with 100 feet (each side) Riparian Setback.** Each stream segment within the proposed site boundaries can be assessed in accordance with Attachment B, Part 1. In the event the stream segment is classified as a "Previously Modified Low Gradient Headwater Stream", the permittee has the option to restore the stream segment in accordance with Attachment B and include a 100-foot water quality setback distance from the top of the streambank on each side. In the event the stream segment exceeds the minimum criteria in Attachment B to be classified as a "Previously Modified Low Gradient Headwater Stream," this Appendix A, Attachment B may be considered on a case-by-case basis.

No structural sediment controls (e.g., the installation of sediment barriers or a sediment settling pond) or structural post-construction controls shall be used in a surface water of the State or the delineated setback corridor.

Previously developed projects (as defined in Part III.G.2.e.) located within the delineated setback boundary are exempt from Riparian Setback Mitigation (A.5) provided the proposed project does not further intrude into the delineated setback boundary.

Linear transportation projects which are caused solely by correcting safety related issues, mandates of modern design requirements and/or resulting from other mitigation activities are exempt from Riparian Setback Mitigation (Appendix A, A.5) if less than one acre of total new right-of-way is associated with the project.

A.5 Riparian Setback Mitigation.

The mitigation required for intrusion into the riparian setback shall be determined by the horizontal distance the intrusion is from the stream. Up to three zones will be used in determining the required mitigation. Zone 1 extends from 0 to 25 feet from the stream edge. Zone 2 extends from 25 to 100 feet from the stream edge, and Zone 3 extends from 100 feet to the outer edge of the setback corridor. Intrusion into these zones will require the following mitigation within the same Watershed Assessment Unit (12-digit HUC scale):

- i. Four times the total area disturbed in the stream and within Zone 1 of the site being developed shall be mitigated within Zone 1 of the mitigation location.
- ii. Three times the area disturbed within Zone 2 of the site being developed shall be mitigated within Zones 1 and/or 2 of the mitigation location.
- iii. Two times the area disturbed within Zone 3 of the site being developed shall be mitigated within any zone of the mitigation location.

In lieu of mitigation ratios found within in this section, linear transportation projects which result in total new right-of-way greater than one acre and less than two acres, which are caused solely by correcting safety related issues, mandates of modern design requirements and/or resulting from other mitigation activities, shall provide Riparian Setback Mitigation at a ratio of 1.5 to 1.

All mitigation shall, at a minimum, include conserved or restored setback zone and should be designed to maximize the ecological function of the mitigation. Including mitigation at the stream edge along with associated setback areas is one way to maximize ecological function. Mitigation shall be protected in perpetuity by binding conservation easements or environmental covenants which must be recorded within 6 months of receiving permit authorization. Granting of binding conservation easements or environmental covenants protected in perpetuity for land outside of disturbed area but within a required riparian setback counts towards required mitigation.

Mitigation may also be satisfied by approved pooled mitigation areas and in-lieu fee sponsored mitigation areas. Mitigation resulting from State or Federal environmental regulations may be adjusted in recognition of these requirements.

A.6 Groundwater Recharge Requirements.

The SWP3 shall ensure that the overall site post-development groundwater recharge equals or exceeds the pre-development groundwater recharge. The SWP3 shall describe the conservation development strategies, BMPs and other practices deemed necessary by the permittee to maintain or improve pre-development rates of groundwater recharge. Pre-development and post-development groundwater recharge shall be calculated using the following equation:

i. $Vre_x = A_x * Dre_x / 12$ (Equation 2, Appendix A)

where:

X = represents a land use and hydrologic soil group pair

Vre_x = volume of total annual recharge from land use-soil group X
(in acre-ft)

Dre_x = depth of total annual recharge associated with land use-soil group X from Tables 1 or 2 (in inches)

A_x = area of land use-soil group X (in acres)

Table A-1 values should be used for land where the underlying geology indicates a potential for downward migration of groundwater. Table A-1 values represent the combined total groundwater recharge potential including groundwater contribution to stream baseflow and to the underlying bedrock aquifer. The potential for downward migration can be determined from a comparison of the potentiometric maps for the glacial and bedrock aquifers. Use Table A-2 when this potential is unlikely to exist. Detailed potentiometric maps for the Franklin county portion of the Darby watershed, and coarse potentiometric maps for the Darby watershed outside of Franklin County and hydrologic soil group data are available at:

http://www.epa.state.oh.us/dsw/permits/GP_ConstructionSiteStormWater_Darby.aspx.

Table A-1 (Appendix A) Annual Average Expected Total Groundwater Recharge³

Land Use	Density (DU ¹ /acre)	% Impervious	Recharge (inches) by Hydrologic Soil Group ²			
			A	B	C	D
Woods / Forest	-	-	17.0	16.6	15.6	14.6
Brush	-	-	17.0	16.6	15.6	14.6
Meadow	-	-	17.0	16.5	15.4	14.4
Managed Wood	-	-	16.9	16.0	14.7	13.4
Pasture	-	-	16.5	15.9	14.4	13.0
Row Crop	-	-	15.8	14.2	11.9	8.1
Urban Grasses	-	-	15.7	15.7	14.2	12.7
Low Density Residential	0.5	12%	15.7	15.7	14.2	12.7
Low Density Residential	1	20%	14.8	14.8	13.7	12.2
Medium Density Residential	2	25%	11.5	11.5	11.5	11.5
Medium Density Residential	3	30%	11.2	11.2	11.2	11.2
Medium Density Residential	4	38%	9.6	9.6	9.6	9.6
High Density Residential	≥5	65%	7.3	7.3	7.3	7.3
Commercial & Road Right-of-Way ⁴	-	90%	4.3	4.3	4.3	4.3

¹ DU = Dwelling Units

² Hydrologic soil group designations of A/D, B/D, and C/D should be considered as D soils for this application.

³ These values apply when recharge of the aquifer is expected; recharge to the bedrock aquifer can be expected when the potentiometric head of the glacial aquifer is greater than the bedrock aquifer.

⁴ The 4.3 infiltration value may only be used for an area as a whole (includes impervious and pervious areas) which includes a minimum of 10 percent pervious area. If all land uses (pervious and impervious) are tabulated separately, then impervious areas have 0 inches of recharge.

Table A-2 (Appendix A) Annual Average Expected Baseflow Recharge³

Land Use	Density (DU ¹ /acre)	% Impervious	Recharge (inches) by Hydrologic Soil Group ²			
			A	B	C	D
Woods / Forest	-	-	11.8	11.4	10.7	9.9
Brush	-	-	11.7	11.4	10.7	9.9
Meadow	-	-	11.8	11.3	10.6	9.8
Managed Wood	-	-	11.7	11.0	10.0	9.1
Pasture	-	-	11.3	11.0	9.9	8.9
Row Crop	-	-	11.1	10.1	9.0	6.2
Urban Grasses	-	-	11.2	11.2	10.3	9.3
Low Density Residential	0.5	12%	11.2	11.2	10.3	9.3
Low Density Residential	1	20%	9.5	9.5	9.0	8.6
Medium Density Residential	2	25%	7.8	7.8	7.8	7.8
Medium Density Residential	3	30%	7.6	7.6	7.6	7.6
Medium Density Residential	4	38%	6.5	6.5	6.5	6.5
High Density Residential	≥5	65%	5.0	5.0	5.0	5.0
Commercial & Road Right-of-Way ⁴	-	90%	2.9	2.9	2.9	2.9

¹ DU = Dwelling Units

² Hydrologic soil group designations of A/D, B/D, and C/D should be considered as D soils for this application.

³ These values apply when no recharge of the aquifer is expected.

⁴ The 2.9 infiltration value may only be used for an area as a whole (includes impervious and pervious areas) which includes a minimum of 10 percent pervious area. If all land uses (pervious and impervious) are tabulated separately, then impervious areas have 0 inches of recharge.

Table A-3 (Appendix A) Land Use Definitions

Land Use	Definition
Woods / Forest	Areas dominated by trees. Woods are protected from grazing and litter and brush adequately cover the soil.
Brush	Brush, weeds, grass mixture where brush is the major element and more than 75% of the ground is covered.
Meadow	Continuous grass, protected from grazing, generally mowed for hay.
Managed Wood	Orchards, tree farms, and other areas planted or maintained for the production of fruits, nuts, berries, or ornamentals.
Pasture	Pasture, grassland, or range where at least 50% of the ground is covered and the area is not heavily grazed.
Row Crop	Areas used to produce crops, such as corn, soybeans, vegetables, tobacco, and cotton.
Urban Grasses	Vegetation (primarily grasses) planted in developed settings for recreation, erosion control, or aesthetic purposes. Examples include parks, lawns, golf courses, airport grasses, and industrial site grasses.
Residential	Areas with a mixture of constructed materials and vegetation; the average % imperviousness and number of dwelling units per acre to determine the appropriate density is specified.
Commercial	Includes infrastructure (e.g. roads, railroads, etc.) and all highly developed areas not classified as High Intensity Residential.

- ii. The pre-development ground water recharge volume shall be calculated by determining the area of each land use-soil type pairing on the site of interest. The recharge associated with each such pairing multiplied by the area will give the pre-development volume of total groundwater

recharge. The same shall be done for the post-development land use-soil type pairings.

Any activity that is expected to produce storm water runoff with elevated concentrations of carcinogens, hydrocarbons, metals, or toxics is prohibited from infiltrating untreated storm water from the area affected by the activity. The groundwater recharge mitigation requirement for areas affected by such activities must be met by methods which do not present a risk of groundwater contamination. The following land uses and activities are typically deemed storm water hotspots:

Vehicle salvage yards and recycling facilities

- vehicle service and maintenance facilities (i.e. truck stops, gas stations)
- fleet storage areas (i.e. bus, truck)
- industrial sites subject to industrial storm water permitting requirements
- bulk terminals
- marinas
- facilities that generate or store hazardous materials
- other land uses and activities as designated by individual review

The following land uses and activities are not normally considered hotspots:

- residential streets and rural highways
- residential development
- institutional development
- commercial and office developments
- non-industrial rooftops
- pervious areas, except golf courses and nurseries

The applicant may use structural BMPs within drinking water source protection areas for community public water systems only to the extent that the structural BMP(s) does not cause contaminants in the recharge waters to impact the ground water quality at levels that would cause an exceedance of the drinking water Maximum Contaminant Levels (OAC Section 3745-81 and 3745-82). To obtain a map of drinking water source protection areas for community public water systems contact Ohio EPA's Division of Drinking and Ground Waters at (614) 644-2752.

Linear transportation projects which are caused solely by correcting safety related issues, mandates of modern design requirements and/or resulting from other mitigation activities are exempt from Groundwater Recharge Mitigation (Appendix B, A.7) if less than one acre of total new right-of-way is associated with the project.

Protection of open space (infiltration areas) shall be by binding conservation easements that identify a third-party management agency, such as a homeowners' association/condominium association, political jurisdiction or third-party land trust.

A.7 Groundwater Recharge Mitigation.

If the post-development recharge volume is less than the pre-development recharge volume, then mitigation will be required. Two options are available for most applications:

- i. The preferred method is to convert additional land to land use with higher recharge potential. The difference in groundwater recharge between the existing and converted land use recharge is the amount which can be used as recharge credit. Off-site Groundwater Recharge Mitigation shall occur within the same Watershed Assessment Unit (12-digit HUC scale) as the permitted site and preferably up-gradient and within a 2-mile radius.

Mitigation shall be protected in perpetuity by binding conservation easements or environmental covenants which must be recorded within 6 months of receiving permit authorization. Granting of binding conservation easements or environmental covenants protected in perpetuity for land outside of the disturbed area, but within a required riparian setback counts towards required mitigation.

Mitigation may also be satisfied by approved pooled mitigation areas and in-lieu fee sponsored mitigation areas.

- ii. On-site structural and non-structural practices may also be used to achieve groundwater mitigation requirements by retaining and infiltrating on-site a minimum volume of storm water runoff based on the area and hydrologic soil groups of disturbed soils. If these infiltrating practices are incorporated upstream of the water quality volume treatment practice, the volume of groundwater being infiltrated may be subtracted from the water quality volume for the purpose of meeting post-construction requirements. The on-site retention requirement is determined by the following formula:

$$V_{\text{retention}} = A_{\text{HSG-A}} * 0.90 \text{ in} + A_{\text{HSG-B}} * 0.75 \text{ in} + A_{\text{HSG-C}} * 0.50 \text{ in} + A_{\text{HSG-D}} * 0.25 \text{ in}$$

(Equation 3, Appendix A)

Where,

$V_{\text{retention}}$ = volume of runoff retained onsite using an approved infiltration practice

$A_{\text{HSG-x}}$ = area of each hydrologic soil group within the disturbed area

Table A-4: Hydrologic Soil Groups and On-site Retention Depth per Acre

Hydrologic Soil Group	HSG A	HSG B	HSG C	HSG D
Retention Depth (inches)	0.90	0.75	0.50	0.25

Retention volume ($V_{\text{retention}}$) provided by selected practices shall be determined using the runoff reduction method criteria as outlined in Part III.G.2.e, Ohio EPA's Runoff Reduction spreadsheet and supporting documentation in the Rainwater and Land Development manual. Hydrologic soil group (HSG) areas are to be determined by using the current version of SURGO or Web Soil Survey soils information.

Appendix A Attachment A: Big Darby Creek Watershed



A more detailed map can be viewed at:

http://www.epa.state.oh.us/dsw/permits/GP_ConstructionSiteStormWater_Darby.aspx

Appendix A Attachment B

Part 1 Stream Assessment

This assessment will determine if a stream is considered a previously channelized, low-gradient headwater stream (a drainage ditch) which would be applicable for stream restoration in lieu of protecting a setback as per Appendix A. A.4.i and ii.

In the event the assessment of the stream, meets all the criteria listed below, restoration (provided 401/404 permits are authorized) as depicted in Part 2 of this attachment, may be a means of reducing the setback distance required by A.4.i. (Appendix A).

Previously Channelized Low-Gradient Headwater Streams (drainage ditches) shall for the purposes of this permit be defined as having all of the following characteristics:

- Less than 10 square miles of drainage area
- Low gradient and low stream power such that despite their straightened and entrenched condition incision (down-cutting) is not evident
- Entrenched, entrenchment ratio < 2.2
- Straight, sinuosity of the bankfull channel < 1.02

Part 2 Restoration

Restoration shall be accomplished by any natural channel design approach that will lead to a self-maintaining reach able to provide both local habitat and watershed services (e.g. self-purification and valley floodwater storage).

- a. Construction of a floodplain, channel and habitat via natural channel design;
- b. Floodplain excavation necessary to promote interaction between stream and floodplain;
- c. Include a water quality setback of 100 feet from top of the streambank on each side.

The primary target regardless of design approach shall be the frequently flooded width, which shall be maximized, at 10 times the channel's self-forming width. Five times the self-forming channel width may still be acceptable particularly on portions of the site if greater widths are achieved elsewhere.

Appendix B Olentangy River Watershed

CONTENTS OF THIS APPENDIX

- B.1 Permit Area
- B.2 TMDL Conditions
- B.3 Riparian Setback Requirements
- B.4 Riparian Setback Mitigation

Attachment B-A: Area of Applicability for the Olentangy Watershed (Map)

Attachment B-B: Stream Assessment and Restoration

B.1 Permit Area.

This appendix to Permit OHC00005 applies to specific portions of the Olentangy River Watershed located within the State of Ohio. The permit area includes the following 12-digit Hydrologic Unit Codes (HUC-12) within the Olentangy River Watershed:

12-Digit Hydrologic Unit Codes

12-Digit Hydrologic Unit Codes (HUC)	Narrative Description of Sub-Watershed
05060001 09 01	Shaw Creek
05060001 09 02	Headwaters Whetstone Creek
05060001 09 03	Claypool Run-Whetstone Creek
05060001 10 07	Delaware Run-Olentangy River
05060001 11 01	Deep Run-Olentangy River
05060001 11 02 (Only portion as depicted in Attachment A)	Rush Run-Olentangy River

Please see Attachment A (Appendix B) for permit area boundaries. An electronic version of Attachment A can be viewed at

http://epa.ohio.gov/dsw/permits/GP_ConstructionSiteStormWater_Olentangy.aspx

B.2 TMDL Conditions.

This general permit requires control measures/BMPs for construction sites that reflect recommendations set forth in the U.S. EPA approved Olentangy TMDL.

B.3 Riparian Setback Requirements.

The permittee shall comply with the riparian setback requirements of this permit or alternative riparian setback requirements established by a regulated MS4 and approved by Ohio EPA. The SWP3 shall clearly delineate the boundary of required stream setback distances. The stream setback shall consist of a streamside buffer and an outer buffer. No construction activity shall occur, without appropriate mitigation, within the streamside buffer except activities associated with storm water conveyances from permanent treatment practices, approvable utility crossings and restoration or recovery of floodplain and channel form characteristics as described in Attachment B. Storm water conveyances must be designed to minimize the width of disturbance.

Construction activities requiring mitigation for intrusions within the outer buffer for the Olentangy River mainstem and perennial streams are described in Appendix B.4.

If intrusion within the delineated setback boundary is necessary to accomplish the purposes of a project, then mitigation shall be required in accordance with Appendix B.3. of this permit. Streams requiring protection under this section have a defined bed and bank or channel and are defined as follows:

- The Olentangy River mainstem;
- Perennial streams have continuous flow on either the surface of the stream bed or under the surface of the stream bed;
- Intermittent streams flow for extended periods of time seasonally of a typical climate year; and
- Ephemeral streams are normally dry and only flow during and after precipitation runoff (episodic flow).

National Resources Conservation Service (NRCS) soil survey maps should be used as one reference and the presence of a stream requiring protection should also be confirmed in the field. Any required setback distances shall be clearly displayed in the field prior to any construction related activity.

Riparian setbacks shall be delineated based upon one of the following two methods:

- i. The required setback distances shall vary with stream type as follows:
 - a. The setback distances associated with the mainstem of the Olentangy River shall consist of:
 - (1) A streamside buffer width of 100 feet as measured horizontally from the ordinary high water mark per side; and
 - (2) An outer buffer width sized to the regulatory 100-year floodplain based on FEMA mapping. No impervious surfaces shall be constructed without appropriate mitigation and moderate to substantial fill activities with no impervious surface may require appropriate mitigation pending an individual approval by Ohio EPA.
 - b. The setback distance associated with perennial streams, other than the Olentangy mainstem, shall consist of:
 - (1) A streamside buffer width of 80 feet per side measured horizontally from the ordinary high water mark; and
 - (2) An outer buffer width sized to the regulatory 100-year floodplain based on FEMA mapping. In the event the regulatory 100-year floodplain is not established, the outer buffer width shall be calculated using the following equation and measured horizontally from the ordinary high water mark. No impervious surfaces, structure, fill, or activity that would impair the floodplain or stream stabilizing ability of the outer buffer shall occur without appropriate mitigation:

$$W = 143DA^{0.41} \quad (\text{Equation 1 Appendix B})$$

where:

DA = drainage area (mi²)

W = total width of riparian setback (ft)

W shall be centered over the meander pattern of the stream such that a line representing the setback width would evenly intersect equal elevation lines on either side of the stream.

If the DA remains relatively constant throughout the stretch of interest, then the DA of the downstream edge of the stretch should be used. Where there is a significant increase in the DA from the upstream edge to the downstream edge of the area of interest, the setback width shall increase accordingly.

c. The setback distance associated with intermittent streams and ephemeral streams shall be a streamside buffer width of 30 feet per side measured horizontally from the centerline of the stream. No outer buffer is required for intermittent and ephemeral streams.

- ii. Stream Restoration with 100 feet (each side) Riparian Setback. Each stream segment within the proposed site boundaries can be assessed in accordance with Attachment B. In the event the stream segment is classified as a "Previously Modified Low Gradient Headwater Stream", the permittee has the option to restore the stream segment in accordance with Attachment B and include a 100 feet water quality setback distance from the top of the streambank on each side. In the event the stream segment exceeds the minimum criteria in Attachment B to be classified as a "Previously Modified Low Gradient Headwater Stream", this may be considered on a case-by-case basis.

No structural sediment controls (e.g., the installation of sediment barriers or a sediment settling pond) or structural post-construction controls shall be used in a stream or the streamside buffer. Activities and controls that would not impair the floodplain or stream stabilizing ability of the outer buffer can be considered.

Redevelopment projects (i.e., developments on previously developed property) located within the delineated setback boundary is exempt from Riparian Setback Mitigation (B.3) provided the proposed project does not further intrude the delineated setback boundary.

B.4 Riparian Setback Mitigation.

The mitigation required for intrusion into the riparian setback of the **Olentangy River mainstem or perennial streams** shall be determined by the horizontal distance the intrusion is from the stream. Up to three zones will be used in determining the required mitigation. Zone 1 extends from 0 to 30 feet from the stream edge. Zone 2 extends

from 30 feet to the outer edge of the streamside buffer. Zone 3 extends from the outer edge of the streamside buffer to the outer edge of the outer buffer. Intrusion into these zones will require the following mitigation within the same Watershed Assessment Unit (12-digit HUC scale). Alternative mitigation, within the permit area, may be considered on a case-by-case basis:

1. Four (4) times the total area disturbed in the stream within Zone 1 of the site being developed shall be mitigated; or, two (2) times the total area disturbed in the stream within Zone 1 shall be mitigated within the watershed of the immediate receiving stream, and the entire required setback of the site shall be protected by binding conservation easements or environmental covenants.
2. Three (3) times the area disturbed within Zone 2 of the site being developed shall be mitigated within Zones 1 and/or 2 of the mitigation location; or, one and one-half (1.5) times the total area disturbed within Zone 2 shall be mitigated within the watershed of the immediate receiving stream, and the entire required setback of the site shall be protected in perpetuity by binding conservation easements or environmental covenants.
3. Two (2) times the area to be mitigated within Zone 3 of the site being developed shall be mitigated within any Zone of the mitigation location; or, one (1) times the total area to be mitigated within any zone shall be mitigated within the watershed of the immediate receiving stream, and the entire required setback of the site shall be protected in perpetuity by binding conservation easements or environmental covenants.

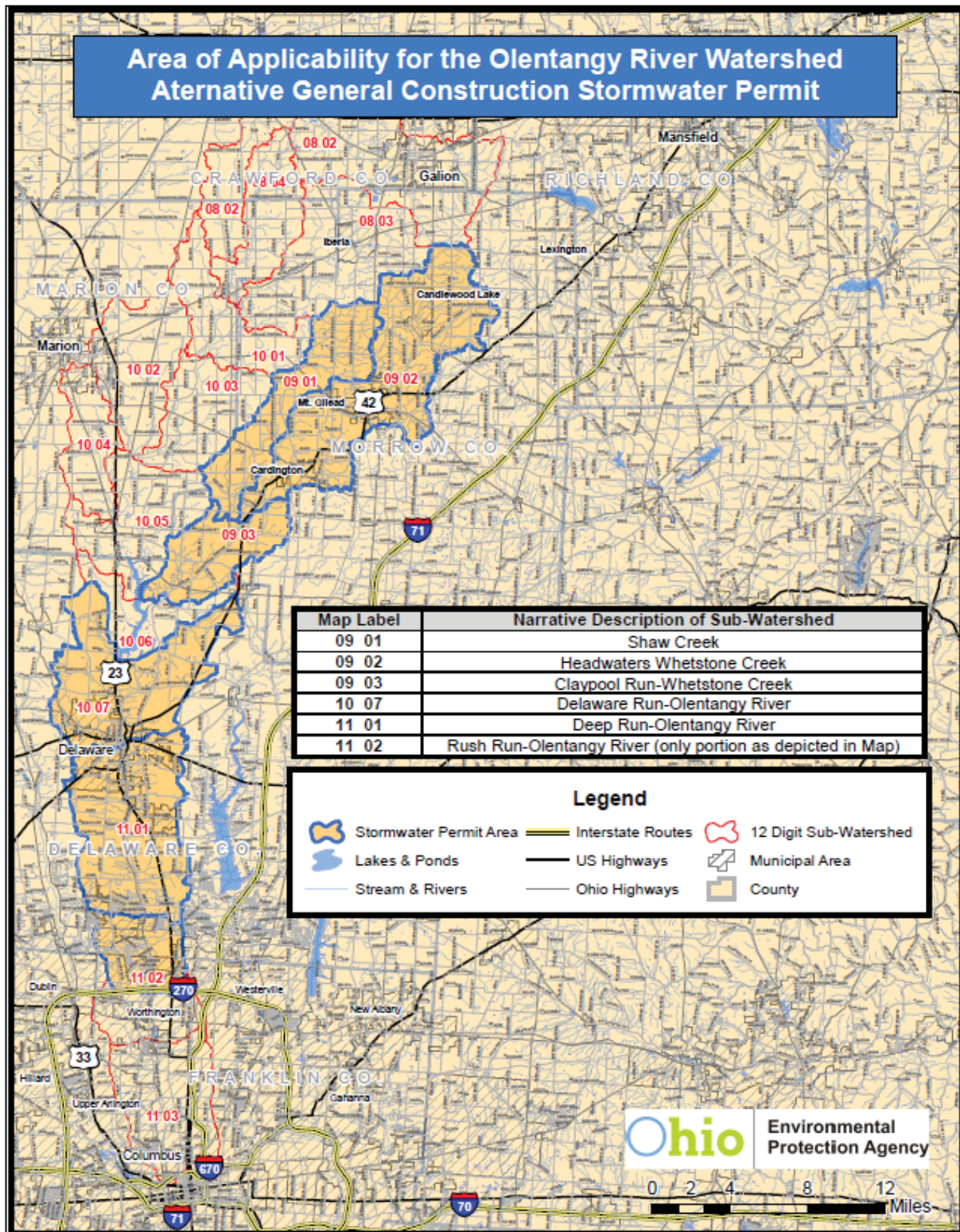
The mitigation required for intrusion into the riparian setback of an **intermittent stream** shall be four (4) times the total area disturbed within the riparian setback of the site being developed shall be mitigated; or two (2) times the total area disturbed within the riparian setback shall be mitigated within the watershed of the immediate receiving stream, and the entire required setback of the site shall be protected in perpetuity by binding conservation easements or environmental covenants.

The mitigation required for intrusion into the streamside buffer of an **ephemeral stream** shall be two (2) times the total area disturbed within the riparian setback of the site being developed shall be mitigated; or one (1) times the total area disturbed within the riparian setback shall be mitigated within the watershed of the immediate receiving stream, and the entire required setback of the site shall be protected in perpetuity by binding conservation easements or environmental covenants.

All mitigation shall, at a minimum, include conserved or restored setback zone, and should be designed to maximize the ecological function of the mitigation. Including mitigation at the stream edge along with associated setback areas is one way to maximize ecological function. Mitigation shall be protected in perpetuity by binding conservation easements or environmental covenants which must be recorded within 6 months of permit authorization. Granting of binding conservation easements or environmental covenants protected for land outside of disturbed area, but within a required riparian setback counts towards required mitigation.

Mitigation may also be satisfied by approved pooled mitigation areas and in-lieu fee sponsored mitigation areas. Mitigation resulting from State or Federal environmental regulations may be adjusted in recognition of these requirements.

Appendix B Attachment A Applicable Portions of the Olentangy Watershed



A more detailed map can be viewed at:
http://epa.ohio.gov/dsw/permits/GP_ConstructionSiteStormWater_Olentangy.aspx

Appendix B Attachment B

Part 1 Stream Assessment

This assessment will determine if a stream is considered a previously channelized, low-gradient headwater stream (a drainage ditch) which would be applicable for stream restoration in lieu of protecting an outer 'no build' setback as per Appendix B B.2i. and ii.

In the event the assessment of the stream meets all the criteria listed below, restoration as depicted in Part 2 of this attachment or natural channel design could be performed, provided 401/404 permits are authorized, and may be a means of reducing the setback distance required by B.2.i. (Appendix B).

Previously Modified, Low-Gradient Headwater Streams shall, for the purposes of this permit, be defined as having all of the following characteristics:

- Less than 10 square miles of drainage area;
- Low gradient and low stream power such that incision (down-cutting) is not evident;
- Entrenched such that the ratio of the frequently flooded width to the bankfull width is less than 2.2; and
- Straight with little or no sinuosity present such that the ratio of the bankfull channel length to the straight-line distance between two points is less than 1.02.

Part 2 Restoration

Restoration shall be accomplished by any natural channel design approach that will lead to a self-maintaining reach able to provide both local habitat and watershed services (e.g. self-purification and valley floodwater storage).

- a. Construction of a floodplain, channel and habitat via natural channel design;
- b. Floodplain excavation necessary to promote interaction between stream and floodplain;
- c. Include a water quality setback of 100 feet from top of the streambank on each side.

The primary target shall be a frequently flooded width of 10 times the channel's self-forming width. Five times the self-forming channel width may be acceptable if sufficient elements of natural channel design are included in the restoration project.

Appendix C Rainfall Intensity for Calculation of Water Quality Flow (WQF)

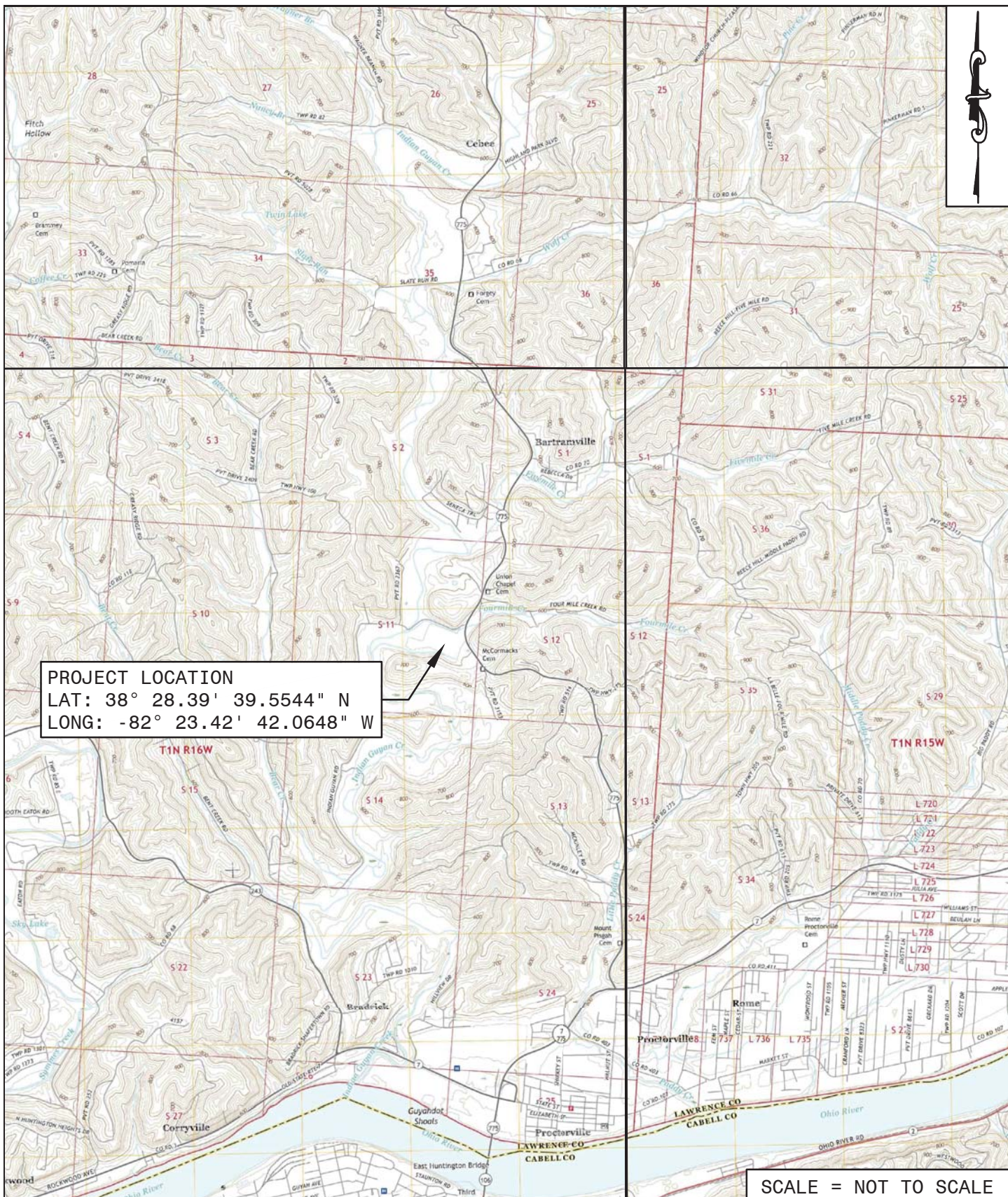
DURATION t_c (minutes)	WATER QUALITY INTENSITY [i_{wq}] (inches/hour)	DURATION t_c (minutes)	WATER QUALITY INTENSITY [i_{wq}] (inches/hour)
5	2.37	33	0.95
6	2.26	34	0.93
7	2.15	35	0.92
8	2.04	36	0.90
9	1.94	37	0.88
10	1.85	38	0.86
11	1.76	39	0.85
12	1.68	40	0.83
13	1.62	41	0.82
14	1.56	42	0.80
15	1.51	43	0.78
16	1.46	44	0.77
17	1.41	45	0.76
18	1.37	46	0.75
19	1.33	47	0.74
20	1.29	48	0.73
21	1.26	49	0.72
22	1.22	50	0.71
23	1.19	51	0.69
24	1.16	52	0.68
25	1.13	53	0.67
26	1.10	54	0.66
27	1.07	55	0.66
28	1.05	56	0.65
29	1.03	57	0.64
30	1.01	58	0.64
31	0.99	59	0.63
32	0.97	60	0.62


Note: For $t_c < 5$ minutes, use $i = 2.37$ in/hr; for $t_c > 60$ minutes, use $i = 0.62$ in/hr. For all other t_c , use the appropriate value from this table.

APPENDIX 2

Project Location Map, Erosion and Sediment Control Plan, USDA Soils
Map, Watershed (HUC-12) Map, and ODNR Rainwater and Land
Development Manual Details

Project Location Map



Ohio Power Company		North Proctorville Station		765 kV	
APP'D BY : BJB	DR. BY : AKS	CH. BY : BKS	DATE : 8/19/2019	Site Location Map	
		1 RIVERSIDE PLAZA COLUMBUS, OH 43215	Work Order #: 42841330-02	DWG. No.	REV

Erosion and Sediment Control Plan

02-E-1720

OWNER / APPLICANT:

AMERICAN ELECTRIC POWER
ATTENTION: PROJECT MANAGER
1 EXTENSION PLAZA
COLUMBUS, OHIO 43215

PROJECT MANAGER: ROBERT S. HOWARD
PHONE: (614) 205-5241
EMAIL: RHOWARD@AEP.COM
CIVIL ENGINEER: ANDREA J. KING, PE
PHONE: (614) 203-2048
EMAIL: AKING@AEP.COM

STATION ENGINEER: TANNER CARROLL
PHONE: (614) 203-2353
EMAIL: TCARROLL@AEP.COM
TCE: ROBERT REBER
PHONE: (740) 201-2342
EMAIL: RREBER@AEP.COM

CIVIL/SITE DESIGN CONSULTANT:

EARTH ENVIRONMENTAL AND CIVIL, INC.
10000 WOODBURN ROAD
ROCKY MOUNT, VA 24151

JIM R. LOWELL, P.E.
PHONE: (434) 455-3885
EMAIL: JLOWELL@EARTHENV.COM

STATION ADDRESS:
3401 S.R. 775
PROCTORVILLE, OH 45669

TAX MAP: 23-031-1500-000
EFFECTIVE DATE: APRIL 2, 2015
LAT: 38° 28' 35" 40" N LONG: 82° 23' 42" 42.0648" W

FLOOD INFORMATION:
AS PER FLOOD INSURANCE RATE MAP #99087G0382
EFFECTIVE DATE: APRIL 2, 2015. AREAS OF STATION ARE WITHIN 0.2% ANNUAL
CHANCE FLOOD HAZARD ZONE "1".

PROJECT LIMITS OF DISTURBANCE: 4.31 ACRES

WMOB HYDROLOGIC UNIT CODE (HUC 12) - 0609010708 - WOLF CREEK - INDIAN GRAYN CREEK

LEGEND:

EXISTING

PROPERTY LINE
STRUCTURE
INTERMEDIATE CONTOUR - EXISTING
NET AND
STREAM
FLOODPLAIN
EDGE OF PAVE
EDGE OF GRAVEL

PROPOSED

STRUCTURE (STATION EQUIPMENT NOT GRAPHICALLY SHOWN)
INTERMEDIATE CONTOUR - PROPOSED
GRADE SPOT SHOT

EDGE OF GRAVEL
GRAVEL HATCH - SUBSTATION
FENCE SECTION
STORM DRAIN INLET
STORM DRAIN PIPE
UNDERDRAIN
STORMWATER OUTFALL STRUCTURE
GRAVEL CHANNEL/SWALE
SHOTGATE HATCH
OVERHEAD ELECTRIC (NOT GRAPHICALLY SHOWN)
ELECTRIC TOWER STRUCTURE
SILT FENCE
DRAINAGE AREA
DRAINAGE TO PATH
LIMITS OF DISTURBANCE
PLAN SHEET MATCHLINE

NOTE:
THE LEGEND & SHEET INDEX IS TO BE USED THROUGHOUT THE
CONSTRUCTION PLANS. IT HAS NOT BEEN PLACED ON REMAINING
PLAN SHEETS FOR THE PURPOSE OF CLARITY AND READABILITY.

NOTIFY UTILITY COMPANIES BEFORE YOU DIG

THE LOCATIONS OF UNDERGROUND UTILITIES AS SHOWN HEREON
UNDERGROUND UTILITY RECORDS AND FIELD SURVEY DATA MAY VARY FROM LOCATIONS
BE ENCOUNTERED. NO EXCAVATIONS WERE MADE DURING THE
UTILITIES LOCATIONS.
ACTUAL LOCATIONS SHOULD BE VERIFIED BY THE CONTRACTOR. THE CONTRACTOR SHALL NOT BE RESPONSIBLE FOR ANY
DAMAGE TO UTILITIES OR PERSONS OR PROPERTY. THE CONTRACTOR SHALL NOTIFY UTILITY AT R11 TWO
(1) WORKING DAYS PRIOR TO THE START OF CONSTRUCTION.



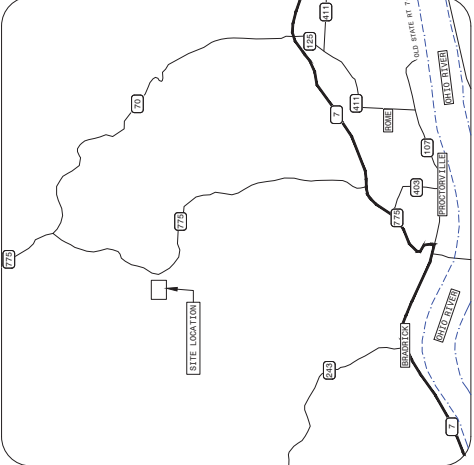
AMERICAN ELECTRIC POWER
FOR OHIO POWER COMPANY

NORTH PROCTORVILLE 765KV STATION

PROCTORVILLE, OHIO
LAWRENCE COUNTY

SITE/CIVIL GRADING PACKAGE

(STATION COORDINATES: 38.477654°, -82.395018°)



SHEET #	DRAWING INDEX	REV'D	REV 1
E-1720	COVER SHEET	8/25/2019	11/6/2019
E-1720	GENERAL NOTES (SEE MAP STANDARDS)	8/25/2019	11/6/2019
E-1722	EROSION AND SEDIMENT CONTROL PLAN (SOILS MAP & DESCRIPTIONS)	8/25/2019	11/6/2019
E-1723	STATION LAYOUT PLAN (EXISTING CONDITIONS AND REMOVALS)	8/25/2019	11/6/2019
E-1724	STATION LAYOUT PLAN (PROPOSED)	8/25/2019	11/6/2019
E-1725	STATION LAYOUT PLAN (EXISTING AND PROPOSED)	8/25/2019	11/6/2019
E-1726	GRADING PLAN (PHASE I - EROSION AND SEDIMENT CONTROL PLAN)	8/25/2019	11/6/2019
E-1727	GRADING PLAN (PHASE II - EROSION AND SEDIMENT CONTROL PLAN)	8/25/2019	11/6/2019
E-1728	EROSION AND SEDIMENT CONTROL PLAN (SEE DRAINAGE AREAS)	8/25/2019	11/6/2019
E-1729	EROSION AND SEDIMENT CONTROL DETAILS	8/25/2019	11/6/2019

DESCRIPTION	UNIT	QUANTITY
CLEARING AND GRUBBING - REMOVAL AND DISPOSAL OF EXISTING VEGETATION WITHIN CONSTRUCTION LIMITS AND DISPOSAL OFF-SITE IN AN AEP APPROVED FACILITY.	ACRE	0.93
DEMOLITION AND DISPOSAL - EXISTING CONCRETE GRADE BEAM FOUNDATION, TOSCOIL RESERVED MATERIAL, MATERIAL SUITABLE FOR STRUCTURAL FILL, MATERIAL NOT SUITABLE FOR TOPSOIL, RESPAVED OR STRUCTURAL FILL.	CY	49
EARTHWORK - CUT SOIL	CY	1
EARTHWORK - FILL (TONS AGGREGATE FOR CONSTRUCTION)	TON	100
STONE 4557 LIMESTONE "F" - STATION PAD, PLACE 2" #30 STONE ON SURGRADE REGRADE STATION PAD TO SUBGRADE AFTER BELOW AND ABOVE GRADE CONTRACTOR HAS FINISHED WORK AND PLACE 2" CLEAN, WASHED #50 STONE.	TON	5,888
CHAIN LINK FENCE W/ APERTURES PER AEP STANDARDS.	BACH	3
REMOVAL OF SUBSTITUTION FENCE	LF	4,518
ACCESS ROAD	TON	124
4" STONE #50 OR EQUIVALENT	TON	99
MIRAFI 100X GEOTEXTILE FABRIC OR EQUIVALENT BASED ON SQUARE FOOTAGE OF ACCESS ROAD	SY	447
CONSTRUCTION AREA OF NECESSITY:	BACH	1
CONCRETE WASHOUT	LF	12,870
SAFETY & ENVIRONMENTAL FENCE - INSTALL/MAINTAIN/REMOVE	BACH	1
VEHICLE MAINTENANCE FENCE	BACH	1
EROSION AND SEDIMENT CONTROL MEASURES:	LF	1,032
SUPER SILT FENCE - INSTALL/MAINTAIN/REMOVE	BACH	3
CONSTRUCTION ENTRANCE	ACRE	0.03
STAKING AND MILEAGING (HUNDREDS)	ACRE	0.03
FLUOROPOLYMER MARKING	LF	3,669

NOTE:
ALL STREAMS AND WETLANDS SHALL BE
PROTECTED WITH ORANGE BARRIER FENCE AND
SHALL BE AVOIDED UNLESS OTHERWISE NOTED.

NOTE:
NO REGRADED CLEARINGS IN WETLANDS OR
STREAMS - HAND CLEARING ONLY
NO REGRADED CLEARINGS WITHIN 50' OF STREAMS
WETLANDS AND WETLANDS TO BE FLAGGED FOR
FORESTRY TO AVOID IMPACTS

NOTE:
REFER TO SHEET E-1729 FOR ADDITIONAL
EROSION AND SEDIMENT CONTROL DETAILS

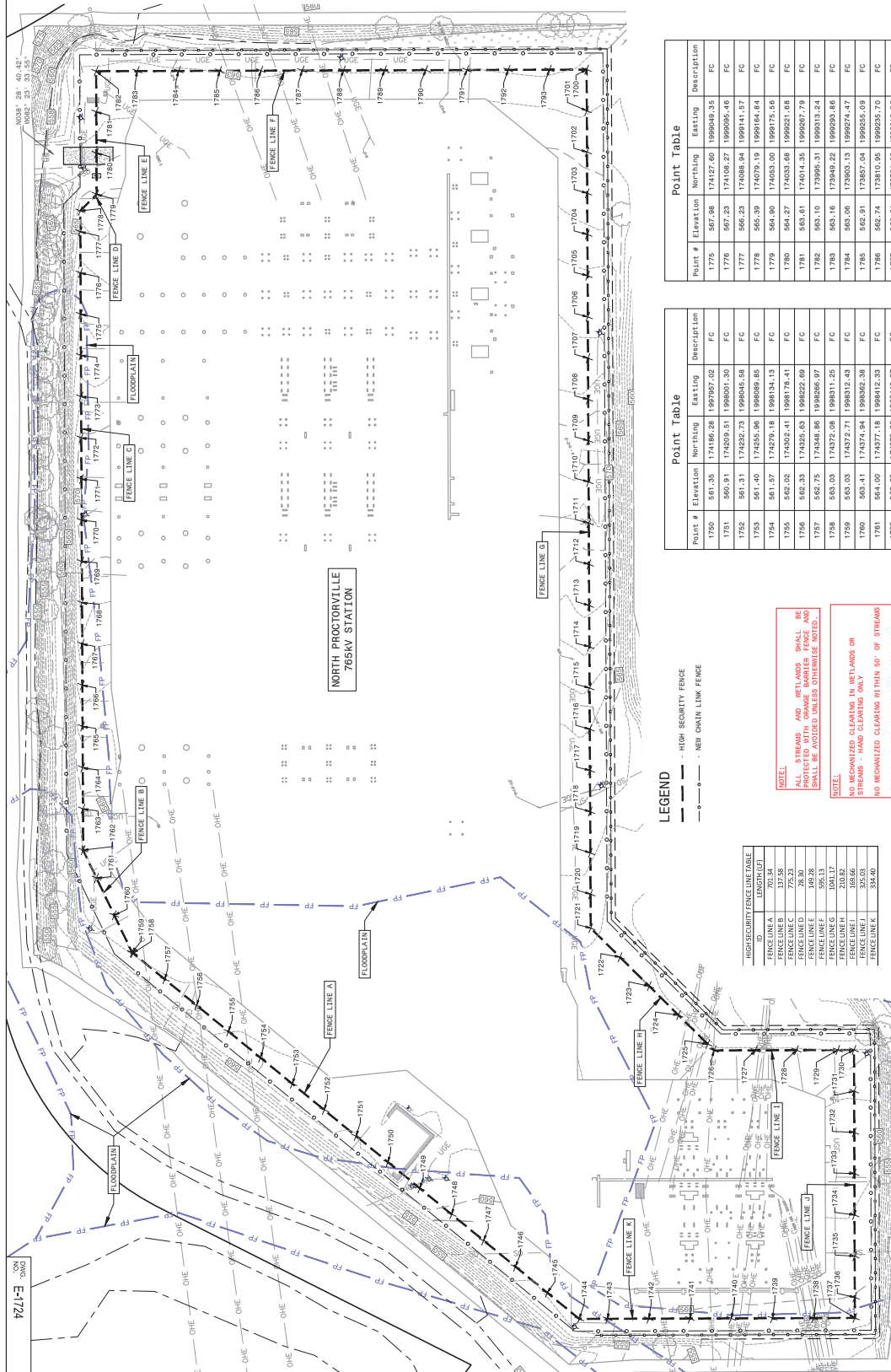


OLD DWS: 11/6/2019
NEW DWS: 11/6/2019
PROJECT: NORTH PROCTORVILLE STATION
SHEET: COVER SHEET
SCALE: NONE
DRAWN BY: JNL
CHECKED BY: JNL
DATE: 11/6/2019
NO. 1

PROCTORVILLE
NORTH PROCTORVILLE STATION
COVER SHEET
SCALE: NONE
DRAWN BY: JNL
CHECKED BY: JNL
DATE: 11/6/2019
NO. 1

NO.	DATE	APPROVED	REVISION DESCRIPTION
1	11/6/2019	JNL	ISSUED





Point Table					Description
Point #	Elevation	Northing	Eastng		
1700	563.19	734466.70	1909082.48		FC
1701	563.48	734466.02	1909086.36		FC
1702	563.41	734466.02	1909090.34		FC
1703	565.46	734503.95	1909199.40		FC
1704	565.46	735203.95	1909348.11		FC
1705	566.21	735203.95	1909388.11		FC
1706	567.15	735242.98	1909481.99		FC
1707	566.48	735622.98	1909601.87		FC
1708	566.38	735811.91	1909739.75		FC
1709	570.65	736011.23	1909873.43		FC
1710	570.65	736309.48	1909862.14		FC
1711	571.00	736509.47	1909875.28		FC
1712	569.19	736878.49	1909855.16		FC
1713	569.54	736907.00	1909843.04		FC
1714	568.13	737371.12	1909436.92		FC
1715	566.97	737206.14	1909430.90		FC
1716	565.98	737255.75	1909344.49		FC
1717	565.32	737591.38	1909262.45		FC
1718	564.65	738131.70	1909206.33		FC
1719	564.43	738333.01	1909160.21		FC
1720	561.18	738498.95	1909152.16		FC
1721	562.53	738300.01	1909075.49		FC
1722	562.19	73811.06	1909059.62		FC
1723	562.20	737592.12	1909793.34		FC

Point Table			Point #	North	East	Description
1726	562.04	1737375.17	1976927.07	FC		
1727	561.98	1737222.97	1976927.06	FC		
1728	561.99	1735676.87	1976938.35	FC		
1729	562.00	1735800.76	1976939.50	FC		
1730	562.00	1736212.63	1976921.31	FC		
1731	562.00	1736362.40	1976915.55	FC		
1732	561.99	1736581.40	1976919.21	FC		
1733	561.23	1735070.79	1976973.12	FC		
1734	560.85	1735890.21	1976976.63	FC		
1735	560.43	1737599.58	1976950.84	FC		
1736	559.80	1737238.99	1976954.76	FC		
1737	559.31	1737335.61	1976961.77	FC		
1738	558.42	1737894.75	1976978.14	FC		
1739	559.49	1738000.34	1976960.52	FC		
1740	559.55	1738676.93	1976915.30	FC		
1741	559.64	1739263.03	1976939.27	FC		
1742	559.37	1739899.12	1976968.84	FC		
1743	559.39	1740512.52	1976978.02	FC		
1744	559.21	1740546.93	1976969.135	FC		
1745	559.05	1740761.18	1976975.63	FC		
1746	558.15	1740933.88	1977795.90	FC		
1747	559.25	1741161.61	1977628.44	FC		
1748	559.69	1741339.33	1977698.46	FC		
1749	559.61	1741653.06	1979291.24	FC		

Point Table				Description	
Point #	Elevation	Northing	Easting		
1776	507.98	74127.60	190900.35	FC	
1776	507.23	74108.27	190906.46	FC	
1777	505.25	74208.34	190911.27	FC	
1778	505.39	74203.91	190914.44	FC	
1779	504.90	74203.08	190917.65	FC	
1780	504.90	74203.08	190922.148	FC	
1781	503.61	74201.34	190928.79	FC	
1782	503.61	73295.31	190933.24	FC	
1783	503.16	73299.22	190929.86	FC	
1784	503.16	73293.21	190927.47	FC	
1785	502.91	73287.04	190925.09	FC	
1786	502.91	73281.05	190923.25	FC	
1787	502.91	73274.86	190921.62	FC	
1788	502.80	73271.78	190918.63	FC	
1789	502.88	73267.92	190917.45	FC	
1790	502.88	73260.40	190918.18	FC	
1791	502.87	73258.60	190918.48	FC	
1792	502.85	73254.42	190919.39	FC	
1793	502.79	73248.33	190919.01	FC	

Point Table					Description	
Point #	Elevation	Northing	Eastng			
1750	561.35	174285.28	190979.02	FC		
1751	560.81	174289.51	190800.30	FC		
1752	561.31	174282.73	190800.58	FC		
1753	561.40	174255.61	190800.85	FC		
1754	561.57	174297.18	190817.34	FC		
1755	562.02	174292.41	190817.43	FC		
1756	562.33	174285.03	190822.40	FC		
1757	562.75	174248.48	190826.97	FC		
1758	562.75	174372.08	190831.25	FC		
1759	563.03	174372.71	190832.48	FC		
1760	563.41	174374.94	190836.28	FC		
1761	564.00	174377.18	190842.23	FC		
1762	563.93	174377.48	190849.87	FC		
1763	564.26	174359.54	190845.95	FC		
1764	565.15	174320.08	190852.10	FC		
1765	566.44	174340.88	190868.21	FC		
1766	567.58	174301.35	190883.43	FC		
1767	568.73	174282.22	190880.55	FC		
1768	569.51	174292.00	190872.05	FC		
1769	570.00	174243.37	190872.05	FC		
1770	570.51	174262.44	190881.78	FC		
1771	570.01	174250.41	190884.49	FC		
1772	570.41	174185.58	190891.01	FC		
1773	569.04	174166.26	190895.97	FC		
1774	568.12	174146.93	190903.25	FC		

- HIGH SECURITY FENCE
 - NEW GAIN LINK FENCE

NOTE: ALL STREAMS AND WETLANDS SHALL BE PROTECTED WITH CHARGE BARRIER FENCE AND SHALL BE AVOIDED UNLESS OTHERWISE NOTED.

NOTE: NO MECHANIZED CLEARING IN WETLANDS OR STREAMS - HAND CLEARING ONLY

NOTE: NO MECHANIZED CLEARING WITHIN 50' OF STREAMS - STREAMS AND WETLANDS TO BE FLAGGED FOR FORESTRY TO AVOID IMPACTS

NOTE: REFER TO SHEET E-1720 FOR AVOIDANCE, PROTECTION, AND EROSION AND SEDIMENT CONTROL DETAILS

LANDSCAPE

LANDS (ROLLS MAP AND DESCRIPTIONS) CONDITIONS AND DEMOLITION

FENCE SPOT ELEVATIONS AND DIMENSIONS

RAIN AND SEDIMENT CONTROL PLAN


RAIN (PRE DRAINAGE AREA) PLAN

RAIN (POST DRAINAGE AREAS)

HIGH SECURITY FENCE LINE TABLE	
ID	LENGTH (LF)
FENCE LINE A	701.34
FENCE LINE B	137.58
FENCE LINE C	775.23
FENCE LINE D	28.30
FENCE LINE E	149.78
FENCE LINE F	595.13
FENCE LINE G	1041.17
FENCE LINE H	210.82
FENCE LINE I	169.66
FENCE LINE J	325.03
FENCE LINE K	334.40

IF THIS DRAWING IS A REDUCTION
GRAPHIC SCALE MUST BE USED

SCALE: 1" = 60'



0 30 60'

REFERENCE DRAWINGS:

E-720	COVER SHEETS (WITH MINIMUM STANDARDS)
E-721	EROSION AND SEDIMENT CONTROL PLAN (SOILS MAP AND DESCRIPTIONS)
E-722	STATION LAYOUT PLAN (EXISTING CONDITIONS AND DEMOLITION)
E-723	STATION LAYOUT PLAN (INDEX)
E-724	STATION LAYOUT PLAN (FENCE, SPOT ELEVATIONS AND DIMENSIONS)
E-725	EROSION AND SEDIMENT CONTROL PLAN (PHASE I - EROSION AND SEDIMENT CONTROL PLAN)
E-726	EROSION AND SEDIMENT CONTROL PLAN (PHASE II - EROSION AND SEDIMENT CONTROL PLAN)
E-727	GRADING PLAN (PHASE I - EROSION AND SEDIMENT CONTROL PLAN)
E-728	EROSION AND SEDIMENT CONTROL PLAN (POST DRAINAGE AREAS)
E-729	EROSION AND SEDIMENT CONTROL PLAN (PRE DRAINAGE AREAS)

NOTIFY UTILITY COMPANIES BEFORE YOU DIG



OLD DWG :	STD DWG :
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THIS DRAWING IS THE PROPERTY OF AMERICAN ELECTRIC POWER AND IS LOANED UPON CONDITION OF BEING REPRODUCED IN WHOLE OR IN PART, OR USED FOR FURNISHING INFORMATION TO ANY PERSONS OR ORGANIZATION, WITHOUT THE WRITTEN CONSENT OF AMERICAN ELECTRIC POWER. IT IS TO BE RETURNED TO THE COMPANY IMMEDIATELY UPON REQUEST. IT IS NOT TO BE REPRODUCED, COPIED, REPRODUCED, OR FOR ANY PURPOSE BE LOANED TO ANY OTHER PERSON OR ORGANIZATION WITHOUT THE WRITTEN CONSENT OF AMERICAN ELECTRIC POWER.

OHO POWER COMPANY

NORTH PROCTORVILLE STATION

765 KV
STATION LAYOUT PLAN

SCALE: 1"=60'	 AMERICAN ELECTRIC INCORPORATED
DR: AKS WO#: 4 2841 330-02	ENG: BKS APPD: EJB DWG. E-1724 NO.

NO	DATE	REVISION DESCRIPTION	APPR	CHK	ENG	ISSUE#
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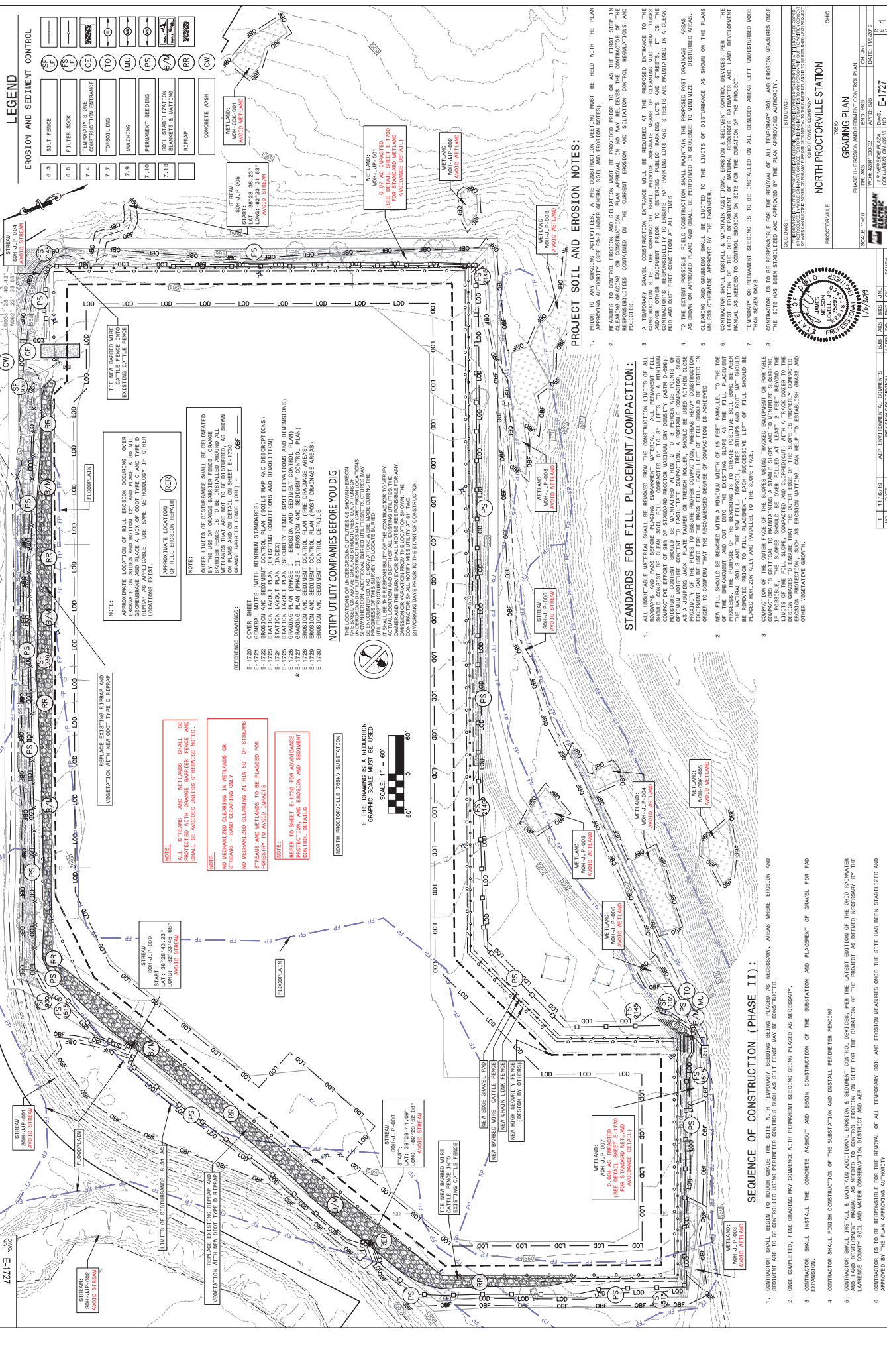
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EROSION AND SEDIMENT CONTROL	
6.3	SILT FENCE
6.6	FILTER SOCK
7.4	TEMPORARY EROSION CONTROL ENTRANCE
7.7	TOPSOILING
7.8	MULCHING
7.10	PERMANENT SEEDING
7.13	SOIL STABILIZATION BLANKETS & MATTING
7.15	RIPRAP
7.16	CONCRETE WASH

NOTE:
APPROXIMATE LOCATION OF RILL EROSION OCCURRING, OVER ELEVATION ON SIDES AND BOTTOM 12" AND PLACE A 30 M.I.L. BARBED FENCE IS TO BE INSTALLED AROUND ALL RILL LOCATIONS EXISTING. USE SAME METHODOLOGY IF OTHER LOCATIONS EXIST.

NOTE:
OUTER LIMITS OF DISTURBANCE SHALL BE DELINEATED BY BARBED FENCE TO BE INSTALLED AROUND ALL DISTURBED AREAS. FENCE SHALL BE INSTALLED ON PAND AND ON DETAIL ON SHEET E-1720.

NOTE:
APPROXIMATE LOCATION OF RILL EROSION REPAIR

NOTE:
REPLACE EXISTING RIPRAP AND VEGETATION WITH NEW 0001 TYPE D RIPRAP

NOTE:
ALL STREAMS AND WETLANDS SHALL BE PROTECTED WITH ORANGE BARBED FENCE AND SHALL BE AVOIDED UNLESS OTHERWISE NOTED.

NOTE:
NO RECONSTRUCTED CLEARINGS IN WETLANDS OR STREAMS AND CLEARINGS SHALL BE AVOIDED UNLESS OTHERWISE NOTED.

NOTE:
NO RECONSTRUCTED CLEARINGS WITHIN 50' OF STREAMS OR WETLANDS TO BE PLACED FOR ORIGINALLY AVOIDED IMPACTS.

NOTE:
REFER TO SHEET E-1720 FOR AVOIDANCE, PROTECTION, AND EROSION AND SEDIMENT CONTROL DETAILS.

NOTE:
IF THIS DRAWING IS A REDUCTION GRAPHIC SCALE MUST BE USED

NOTE:
SCALE 1" = 60'

NOTE:
NORTH PROCTORVILLE TRUNK SUBSTATION

NOTE:
LIMITS OF DISTURBANCE 9-31 AC

NOTE:
REPLACE EXISTING RIPRAP AND VEGETATION WITH NEW 0001 TYPE D RIPRAP

NOTE:
LIMITS OF DISTURBANCE 9-31 AC

LEGEND

PROJECT SOIL AND EROSION NOTES:

STANDARD FOR FILL PLACEMENT/COMPACTION:

SEQUENCE OF CONSTRUCTION (PHASE III):

NOTIFY UTILITY COMPANIES BEFORE YOU DIG

NOTES

GENERAL NOTES

STATION LAYOUT PLAN

GRADING PLAN

EROSION AND SEDIMENT CONTROL PLAN

EROSION AND SEDIMENT CONTROL PLAN

EROSION AND SEDIMENT CONTROL PLAN

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PRE DRAINAGE AREA				
LAND COVER	AREA (SF)	AREA (AC)	SOIL TYPE	CURVE #
OPEN SPACE	811958.40	18.64	B	55
OPEN SPACE	498326.40	11.44	C	70
OPEN SPACE	1094662.80	25.13	D	77
IMPERVIOUS	1048053.60	24.07	N/A	98
TOTAL	3453301.20	79.27	COMPOSITE	77

NOTE:

WETLANDS
ALL STREAMS AND WETLANDS SHALL BE PROTECTED WITH ORANGE BARRIER FENCE AND SHALL BE AVOIDED UNLESS OTHERWISE NOTED.

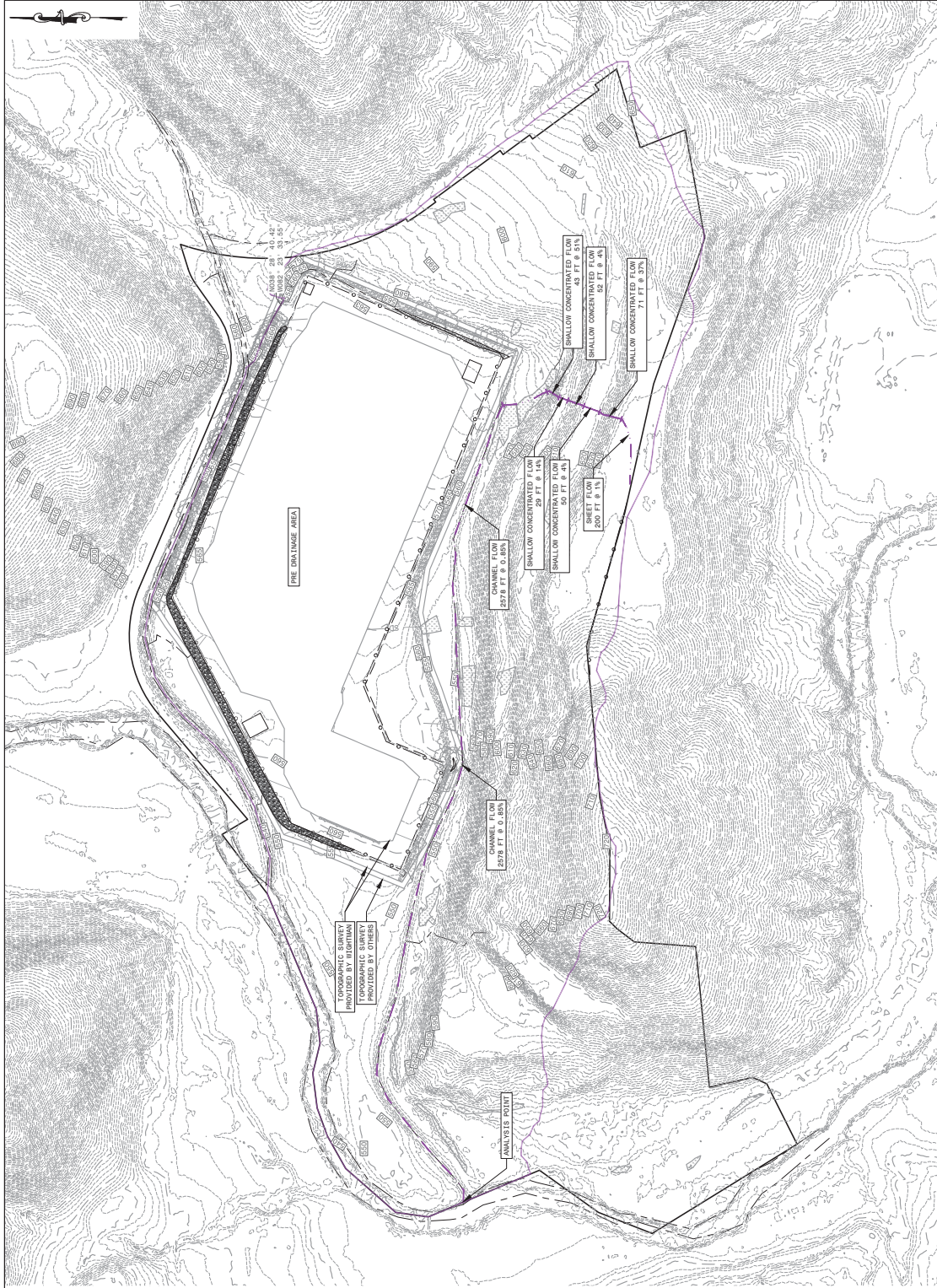
NOTE:

NO MECHANIZED CLEARING IN WETLANDS OR
STREAMS - HAND CLEARING ONLY

NO MECHANIZED CLEARING WITHIN 50' OF STREAMS
AND WETLANDS TO BE FLAGGED FOR
FORESTRY TO AVOID IMPACTS

NOTE

REFER TO SHEET E-1730 FOR AVOIDANCE,
PROTECTION, AND EROSION AND SEDIMENT
CONTROL DETAILS



IF THIS DRAWING IS A REDUCTION
GRAPHIC SCALE MUST BE USED

SCALE: 1" = 150'



REFERENCE DRAWING:

NO.	COVER SHEET	DESCRIPTIONS
E-1720	GENERAL NOTES (WITH MINIMUM STANDARDS)	
E-1721	EROSION AND SEDIMENT CONTROL PLAN (SLOPES, MAP AND DESCRIPTIONS)	
E-1722	EROSION AND SEDIMENT CONTROL PLAN (SLOPES, MAP AND DESCRIPTIONS)	
E-1723	EROSION AND SEDIMENT CONTROL PLAN (SLOPES, MAP AND DESCRIPTIONS)	
E-1724	STATION LAAYOUT PLAN (INDEX)	
E-1725	STATION LAAYOUT PLAN (SECURITY FENCE POST ELEVATIONS AND DIMENSIONS)	
E-1726	GRADING PLAN (PHASE I - EROSION AND SEDIMENT CONTROL PLAN)	
E-1727	GRADING PLAN (PHASE II - EROSION AND SEDIMENT CONTROL PLAN)	
E-1728	EROSION AND SEDIMENT CONTROL PLAN (POST BRANCHING AREAS)	
E-1729	EROSION AND SEDIMENT CONTROL PLAN (POST BRANCHING AREAS)	
E-1730	EROSION AND SEDIMENT CONTROL DETAILS	

NOTIFY UTILITY COMPANIES BEFORE YOU DIG

THE LOCATIONS OF UNDERGROUND UTILITIES AS SHOWN HEREON ARE BASED ON ABOVE-GROUND STRUCTURES. LOCATIONS OF UNDERGROUND UTILITIES TRUST RECORDS MAY VARY FROM LOCATIONS SHOWN HEREON. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY UNDISCOVERED UTILITIES. NO EXCAVATIONS WERE MADE DURING THE PROGRESS OF THIS SURVEY TO LOCATE BURIED UTILITIES/STRUCTURES.

IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY ACTUAL LOCATION AND DEPTH OF ALL EXISTING UTILITIES. THE OWNER AND THE SURVEYOR SHALL NOT BE RESPONSIBLE FOR ANY DAMAGE TO EXISTING UTILITIES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO EXISTING UTILITIES. THE CONTRACTOR SHALL NOTIFY MISS UTILITIES AT 811 TWO (2) WORKING DAYS BEFORE THE START OF CONSTRUCTION.

[illegible]

POST DRAINAGE AREA				
LAND COVER	AREA (SF)	AREA (AC)	SOIL TYPE	CURVE #
OPEN SPACE	79080.40	18.34	B	55
OPEN SPACE	498426.40	11.44	C	70
OPEN SPACE	1094227.20	25.12	D	77
IMPERVIOUS	301555.20	24.37	N/A	98
TOTAL	1661089.00	79.27	COMPOSITE	77

NOTE: ALL STREAMS AND WETLANDS SHALL BE PROTECTED WITH ORANGE BARRIER FENCE AND SHALL BE AVOIDED UNLESS OTHERWISE NOTED.

NOTE:

- NO MECHANIZED CLEARING IN WETLANDS OR STREAMS - HAND CLEARING ONLY
- NO MECHANIZED CLEARING WITHIN 50' OF STREAMS
- STREAMS AND WETLANDS TO BE FLAGGED FOR FORESTRY TO AVOID IMPACTS.

NOTE:
REFER TO SHEET E-1730 FOR AVOIDANCE,
PROTECTION, AND EROSION AND SEDIMENT
CONTROL DETAILS

NOTIFY UTILITY COMPANIES BEFORE YOU DIG

THE LOCATIONS OF UNDERGROUND UTILITIES AS SHOWN HEREON ARE NOT GUARANTEED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE LOCATION AND DEPTH OF ALL EXISTING UTILITIES. THE OWNER AND THE SURVEYOR SHALL NOT BE RESPONSIBLE FOR ANY OMISSION OR VARIATION FROM THE LOCATION SHOWN. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND FOR THE START-UP OF CONTRIBUTION TO WORKING DRAINAGE PRIOR TO THE START OF CONSTRUCTION.

REFERENCE DRAWINGS:

- | | |
|--------|--|
| E-1720 | COVER SHEET |
| E-1721 | GENERAL NOTES (WITH MINIMUM STANDARDS) |
| E-1722 | EROSION AND SEDIMENT CONTROL PLAN (SOILS MAP AND DESCRIPTIONS) |
| E-1723 | EROSION AND SEDIMENT CONTROL PLAN (VEGETATION CONDITIONS AND REDEMPTION) |
| E-1724 | STATION LAYOUT PLAN (INDEX) |
| E-1725 | STATION LAYOUT PLAN (SECURITY SHEET ELEVATIONS AND DIMENSIONS) |
| E-1726 | GRADING PLAN (PHASE I - EROSION AND SEDIMENT CONTROL PLAN) |
| E-1727 | GRADING PLAN (PHASE II - EROSION AND SEDIMENT CONTROL PLAN) |
| E-1728 | EROSION AND SEDIMENT CONTROL PLAN (PRE DRAINAGE AREAS) |
| E-1729 | EROSION AND SEDIMENT CONTROL PLAN (POST DRAINAGE AREAS) |
| E-1730 | EROSION AND SEDIMENT CONTROL PLAN DETAILS |



IF THIS DRAWING IS A REDUCTION
GRAPHIC SCALE MUST BE USED

SCALE: 1" = 150'

		OLD DWG: _____	STD DWG: _____	<p>THE LOCATIONS OF ALL MEASUREMENTS AND THE LOCATIONS OF ALL CONSTRUCTION SHALL BE PLAINLY INDICATED ON THIS DRAWING. THE INFORMATION ON THIS DRAWING IS TO BE USED FOR THE PURPOSES OF THE PROJECT ONLY AND IS NOT TO BE USED FOR ANY OTHER PURPOSES WITHOUT THE WRITTEN PERMISSION OF THE ENGINEER. THE ENGINEER SHALL BE RESPONSIBLE FOR THE ACCURACY OF THE INFORMATION ON THIS DRAWING.</p>	
<p>PROCTORVILLE</p> <p>NORTH PROCTORVILLE STATION</p> <p>OHIO</p>		<p>76507</p> <p>EROSION AND SEDIMENT CONTROL PLAN</p>			
<p>SCALE: 1" = 150'</p> <p>DATE: 11/16/18</p> <p>PROJECT: 11/16/18</p> <p>PROJECT: 11/16/18</p> <p>PROJECT: 11/16/18</p>		<p>DR. MARKS</p> <p>DR. MARKS</p> <p>DR. MARKS</p> <p>DR. MARKS</p> <p>DR. MARKS</p>			
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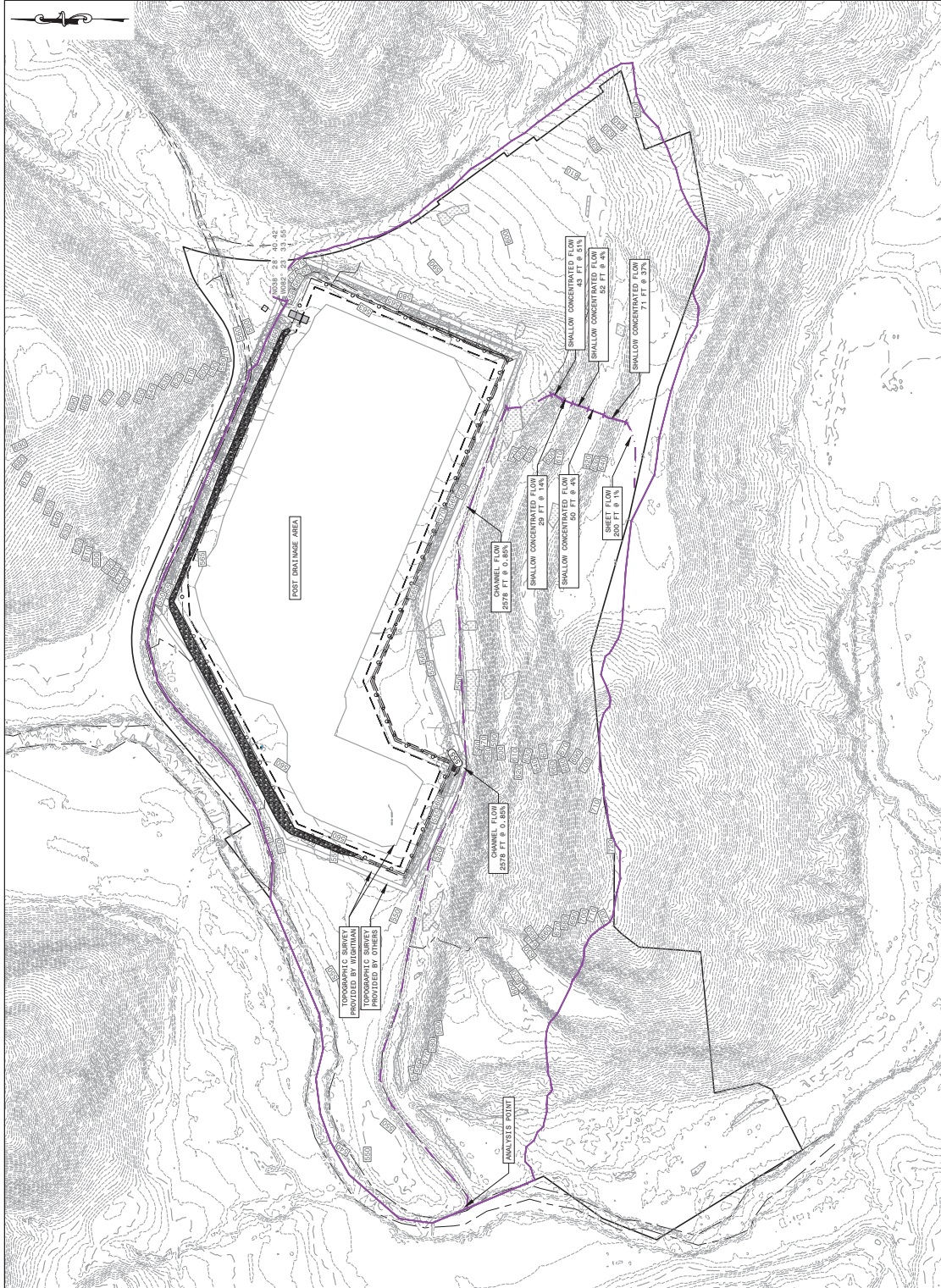


Table 7.10. Maintenance for Permanent Seedlings Fertilization and Mowing

[illegible]

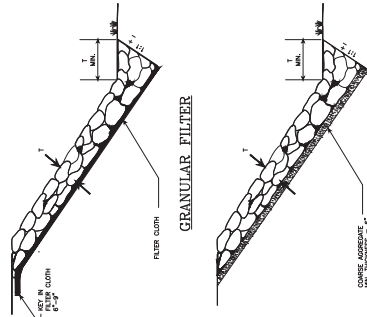
Note: Following will not be considered in preferred to Fertilizer rates shown above.

Table 7.10.2 Normant's Seeding

[illegible]

Note: Offer approved and queries may be submitted.

TOE REQUIREMENTS FOR
BANK STABILIZATION
FILTER CLOTH UNDERLINER (PREFERRED)



SOURCE: Adapted from VDOT Drainage Manual

NOTIFY UTILITY COMPANIES BEFORE YOU DIG

THE LOCATIONS OF UNDERGROUND UTILITIES AS SHOWN HEREON ARE BASED ON ABOVE-GROUND STRUCTURES, LOCATIONS AND LOCATIONS SHOWN HEREON. ADDITIONAL BURIED UTILITIES MAY BE ENCOUNTERED. NO EXCAVATIONS WERE MADE DURING THE PROGRESS OF THIS SURVEY TO LOCATE BURIED UTILITIES/STRUCTURES.

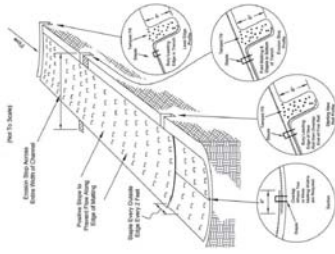
IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY EACH LOCATION AND DEPTH OF ALL EXISTING UTILITIES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING PERMISSION FOR ANY CROSSING OR VARIATION FROM THE LOCATION SHOWN. THE CONTRACTOR SHALL NOTIFY MISS UTILITY AT 811 TWO (2) WORKING DAYS BEFORE THE START OF CONSTRUCTION.



REFERENCE DRAWINGS:

- | | |
|--------|---|
| E-1721 | GENERAL NOTES (WITH MINIMUM STANDARDS) |
| E-1722 | EROSION AND SEDIMENT CONTROL PLAN (SOILS MAP AND DESCRIPTIONS) |
| E-1723 | STATION LAYOUT PLAN (EXISTING CONDITIONS AND REMEDIATION) |
| E-1724 | STATION LAYOUT PLAN (SECURITY FENCE SPOT ELEVATIONS AND DIMENSIONS) |
| E-1725 | GRADING PLAN (PHASE I - EROSION AND SEDIMENT CONTROL PLAN) |
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| E-1727 | EROSION AND SEDIMENT CONTROL PLAN (PRE DRAINAGE AREAS) |
| E-1728 | EROSION AND SEDIMENT CONTROL DETAILS |
| E-1729 | EROSION AND SEDIMENT CONTROL DETAILS (POST DRAINAGE AREAS) |
| E-1730 | EROSION AND SEDIMENT CONTROL DETAILS |

Turf Reinforcement Matting

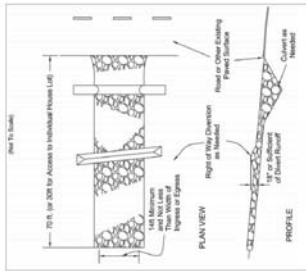


© 2000 Blackwell Science Ltd *Journal of Internal Medicine* 247: 103–110

TABLE 3.30-A

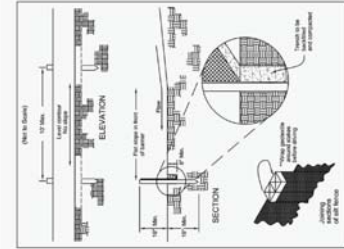
DEPTH (INCHES)	PER 1,000 SQUARE FEET	PER ACRE
1	3.1	134
2	6.2	268
3	9.2	402
4	12.4	537
5	15.5	672
6	18.6	806

Construction Entrance
for
Superficialis



CHAPTER 7: Fuel Substitution 10

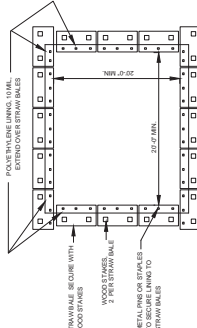
Specifications for Silt Fence



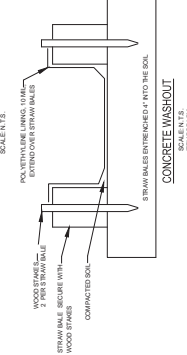
CHAPTER 6 Sediment Corrosion

GENERAL NOTES:

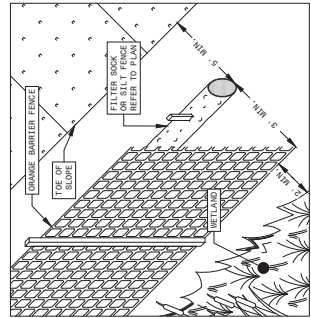
1. CONCRETE WASHOUT SYSTEM SHALL CONTAIN WASHOUT WATER WHICH CHUTES AND PIPES INTO FOLLOWING CONCRETE DELIVERY TO THE CONSTRUCTION SITE.
2. SCRAP AS MUCH MATERIAL FROM CHUTES AS POSSIBLE BEFORE WASTING THEM. USE NON-WATER CLEANING METHODS TO MINIMIZE THE CHANGE FOR WASTE TO FLOW OFF SITE.
3. DONOT BACK FLUSH EQUIPMENT AT THE PROJECT SITE. IT SHOULD BE RESTRICTED TO PLANT.
4. DO NOT USE ADDITIVES WITH WASH WATER. DONOT USE AID OR SOLVENTS.
5. FURNISH A SIGNAGE FOR THE CONCRETE WASHOUT AREA.



PLAN



RETE WA
SCALE N.T.S.

[illegible]

STANDARD WETLAND AVOIDANCE DETAIL

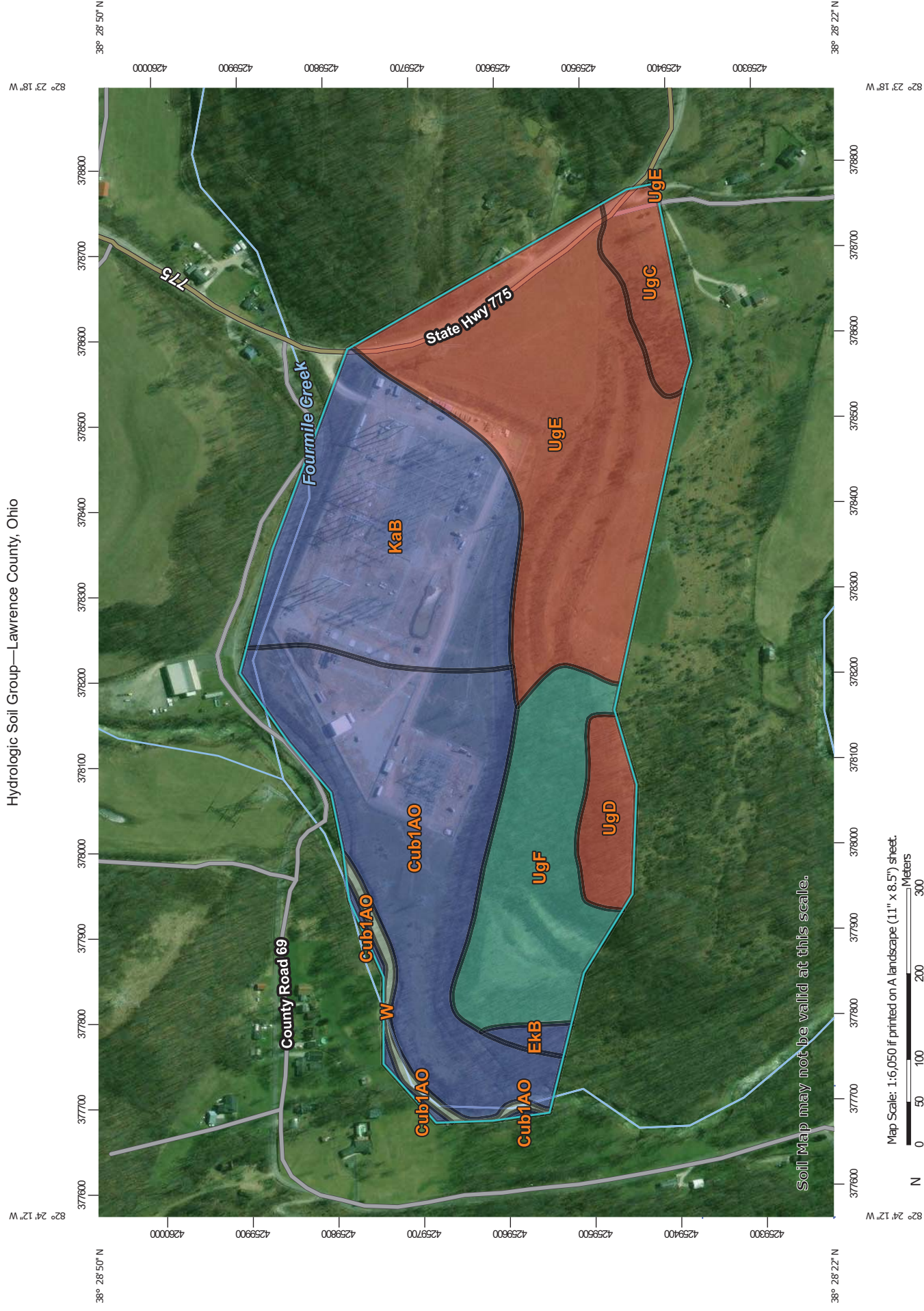
NOTE:
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NOTE:

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- NO MECHANIZED CLEARING WITHIN 50' OF STREAMS
- STREAMS AND WETLANDS TO BE FLAGGED FOR FORESTRY TO AVOID IMPACTS

USDA Soils Map

Hydrologic Soil Group—Lawrence County, Ohio



MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

Soil Rating Lines

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Points

A

A/D

B

B/D

C

C/D

D

Not rated or not available

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL: [Web Soil Survey](#)

Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Lawrence County, Ohio

Survey Area Data: Version 16, Sep 17, 2018

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 5, 2012—Mar 7, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

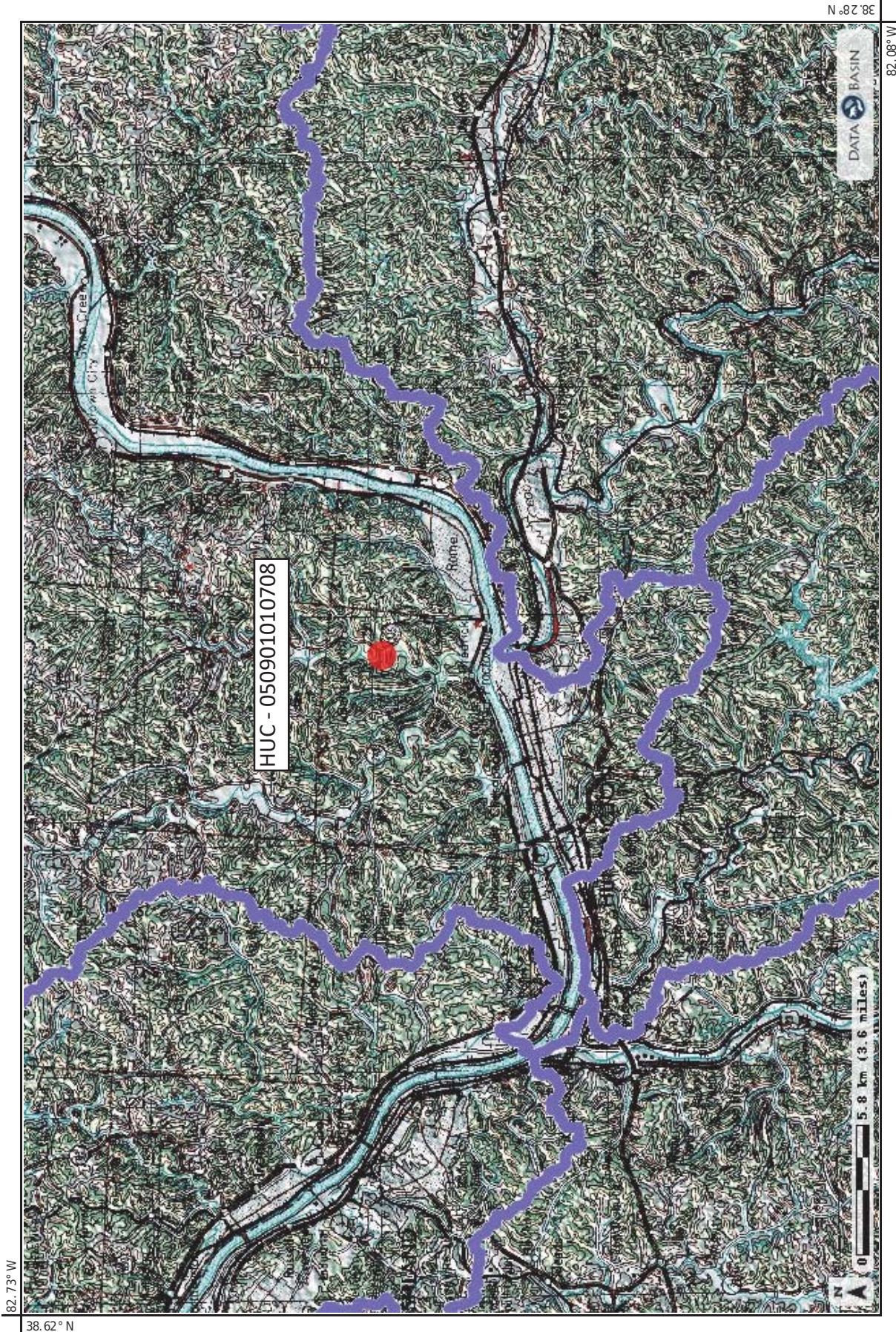
Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
Cub1AO	Cuba silt loam, 0 to 3 percent slopes, occasionally flooded	B	18.4	35.7%
KaB	Kanawha silt loam, 2 to 6 percent slopes	B	22.9	44.3%
UgE	Upshur-Gilpin complex, 25 to 35 percent slopes	D	7.7	15.0%
UgF	Upshur-Gilpin complex, 40 to 70 percent slopes	C	1.9	3.7%
W	Water		0.7	1.3%
Totals for Area of Interest			51.6	100.0%

Watershed (HUC-12) Map

Legend

- Ohio Watersheds
- USA Topographic Map
- New Station Site



38.28° N

82.08° W



82.73° W

38.62° N

ODNR Rainwater and Land Development Manual Details

6.3 SILT FENCE

6.6 FILTER SOCK

7.4 CONSTRUCTION ENTRANCE

7.7 TOPSOILING

7.9 MULCHING

7.10 PERMANENT SEEDING

7.13 TURF REINFORCEMENT MATTING

6.3 Silt Fence



Description

Silt fence is a sediment-trapping practice utilizing a geotextile fence, topography and sometimes vegetation to cause sediment deposition. Silt fence reduces runoff's ability to transport sediment by ponding runoff and dissipating small rills of concentrated flow into uniform sheet flow. Silt fence is used to prevent sediment-laden sheet runoff from entering into downstream creeks and sewer systems.

Conditions Where Practice applies

Silt fence is used where runoff occurs as sheet flow or where flow through small rills can be converted to sheet flow. Major factors in its use are slope, slope length, and the amount of drainage area from which the fence will capture runoff. Silt fence cannot effectively treat flows in gullies, ditches or channels. For concentrated flow conditions see specifications for temporary diversions, sediment traps and sediment basins.

Planning Considerations

Alternatives: Silt Fence vs. Temporary Diversions and Settling Ponds. While silt fence requires less space and disturbs less area than other control measures there are significant disadvantages to its use. Silt fence is not as effective controlling sediment as routing runoff through a system of diversions and settling ponds. Settling ponds and earth diversions are more durable, easier to construct correctly and significantly more effective at removing sediments from runoff. Additionally earth diversions and settling ponds are less apt to fail during construction and typically require less repair and maintenance.

Proper installation is critical. Experience from ODNR and other field testing has shown that nearly 75 percent of silt fence does not function properly due to poor installation. Proper installation consists of it being installed: (1) on the contour; (2) with sufficient geotextile material buried; (3) with the fence pulled taut and supported on the downstream side by strong posts; (4) and with the fence backfilled and compacted.

Two general methods are used to install silt fence: (1) utilizing traditional method of digging the trench, installation of the fence materials, then backfilling and compaction; or (2) a method using an implement to static slice or narrow plow while installing the geotextile in the slot opening, followed by compaction and installation of posts. The latter methods generally installs silt fence more effectively and efficiently.

Silt fence is most applicable for relatively small areas with flat topography. Silt fence should be used below areas where erosion will occur in the form of sheet and rill erosion. For moderately steep areas, the area draining to the silt fence should be no larger that one quarter acre per 100 feet of fence length, the slope length no longer than 100 feet, and the maximum drainage gradient no steeper than 50 percent (2:1). This practice should be sited so that the entire fence ponds runoff and facilitates settling of suspended solids.

Design Criteria

Proper installation of silt fence requires utilizing the site topography. This is critical because the sediment removal process relies on ponding runoff behind the fence. As a ponding occurs behind the fence, coarser materials are allowed to settle out. Leaving a long, flat slope behind the silt fence maximizes areas for ponding (sediment deposition), and for water to disperse and flow over a much larger surface area of the silt fence. For silt fence to work effectively, runoff must be allowed to maintain sheet flow, to pond and to be released slowly. However, if silt fence is used without regard to a site's topography, it will typically concentrate runoff, increasing the likelihood of blocking and overtopping of the fence, thus reducing or eliminating its effectiveness.

Level Contour – For silt fence to promote deposition, it must be placed on the level contour of the land, so that flows are dissipated into uniform sheet flow that has less energy for transporting sediment. Silt fence should never concentrate runoff, which will result if it is placed up and down slopes rather than on the level contour.

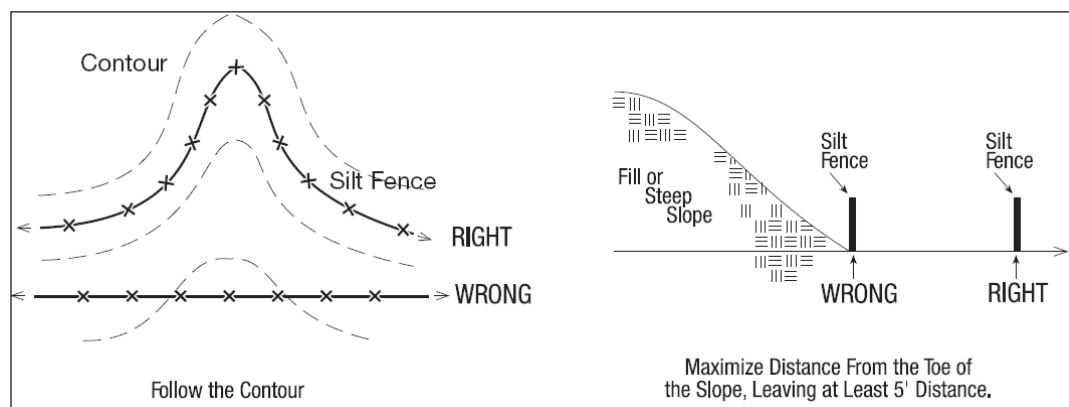


Figure 6.3.1 Silt fence layout

Flat Slopes – Slope has the greatest influence on runoff’s ability to transport sediment, therefore silt fence should be placed several feet away from the toe of a slope if at all possible, to encourage deposition. Silt fence generally should be placed on the flattest area available to increase the shallow ponding of runoff and maximize space available for deposited sediment.

Flow Around Ends – To prevent water ponded by the silt fence from flowing around the ends, each end must be constructed upslope so that the ends are at a higher elevation.

Vegetation – Dense vegetation also has the effect of dissipating flow energies and causing sediment deposition. Sediment-trapping efficiency will be enhanced where a dense stand of vegetation occurs for several feet both behind and in front of a silt fence.

Table 6.3.1 Maximum area contributing area using slope length

Maximum Slope Length Above Silt Fence		
Slope		Slope Length (ft.)
0% - 2%	Flatter than 50:1	250
2% - 10%	50:1 - 10:1	125
10% - 20%	10:1 - 5:1	100
20% - 33%	5:1 - 3:1	75
33% - 50%	3:1 - 2:1	50
> 50%	> 2:1	25

Note: For larger drainage areas, see standards for temporary diversions, sediment traps and sediment basins.

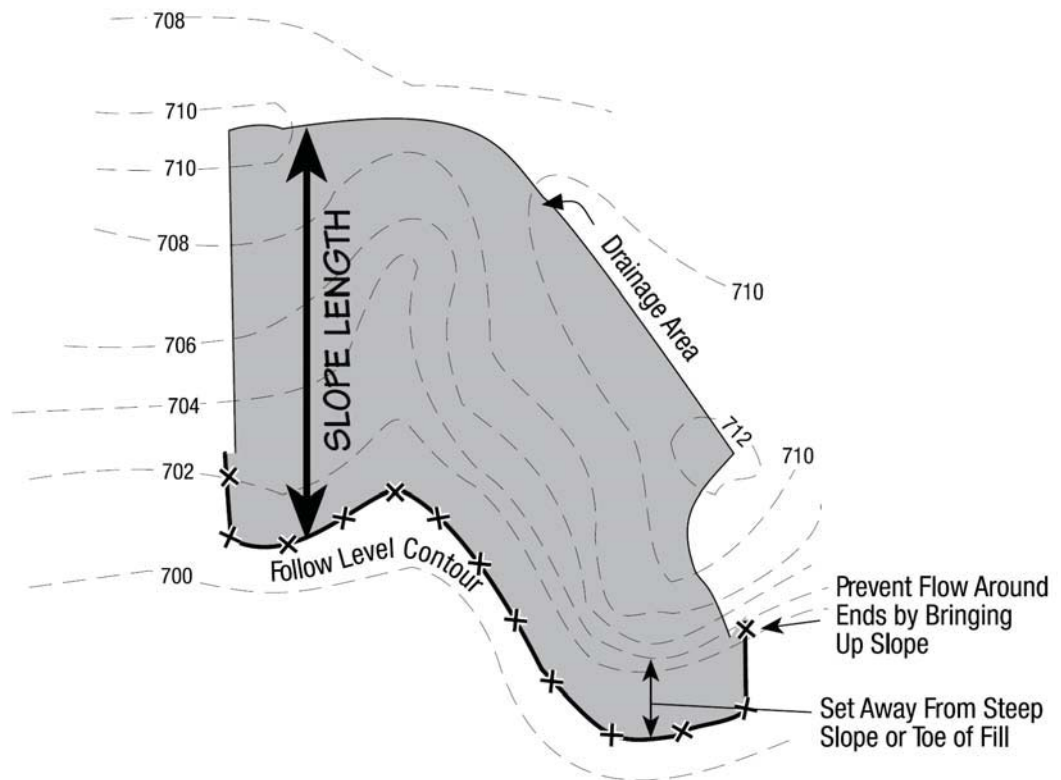


Figure 6.3.2 Silt fence and allowable drainage area

Dispersing Flow – Proper applications of silt fence allow all the intercepted runoff to pass as diffused flow through the geotextile. Runoff should never overtop silt fence, flow around the ends, or in any other way flow as concentrated flow from the practice. If any of these failures occurs, an alternative silt fence layout, or other practices are needed.

In cases where additional support of the fabric is needed, either wire or geogrid fencing may be used as a backing on the fabric. In these instances, the reinforcing material should be attached/erected first, then the fabric installed.

Materials

Fence posts shall be a minimum length of 32 inches long, composed of nominal dimensioned 2-by-2-inch hardwood of sound quality. They shall be free of knots, splits and other visible imperfections which would weaken the posts. Steel posts may be utilized in place of wood provide the geotextile can be adequately secured to the post.

Silt fence geotextile must meet the minimum criteria shown in the table below.

Table 6.3.2

Minimum criteria for Silt Fence Fabric (ODOT, 2002)		
Minimum Tensile Strength	120 lbs. (535 N)	ASTM D 4632
Maximum Elongation at 60 lbs	50%	ASTM D 4632
Minimum Puncture Strength	50 lbs (220 N)	ASTM D 4833
Minimum Tear Strength	40 lbs (180 N)	ASTM D 4533
Apparent Opening Size	≤ 0.84 mm	ASTM D 4751
Minimum Permittivity	1X10 ⁻² sec. ⁻¹	ASTM D 4491
UV Exposure Strength Retention	70%	ASTM G 4355

Maintenance

Silt Fence requires regular inspection and maintenance to insure its effectiveness. Silt fences must be inspected after each rainfall and at least daily during prolonged rainfall. Silt fence found damaged or improperly installed shall be replaced or repaired immediately.

Sediment deposits shall be routinely removed when they reach approximately one-half the height of the silt fence.

Common Problems/Concerns

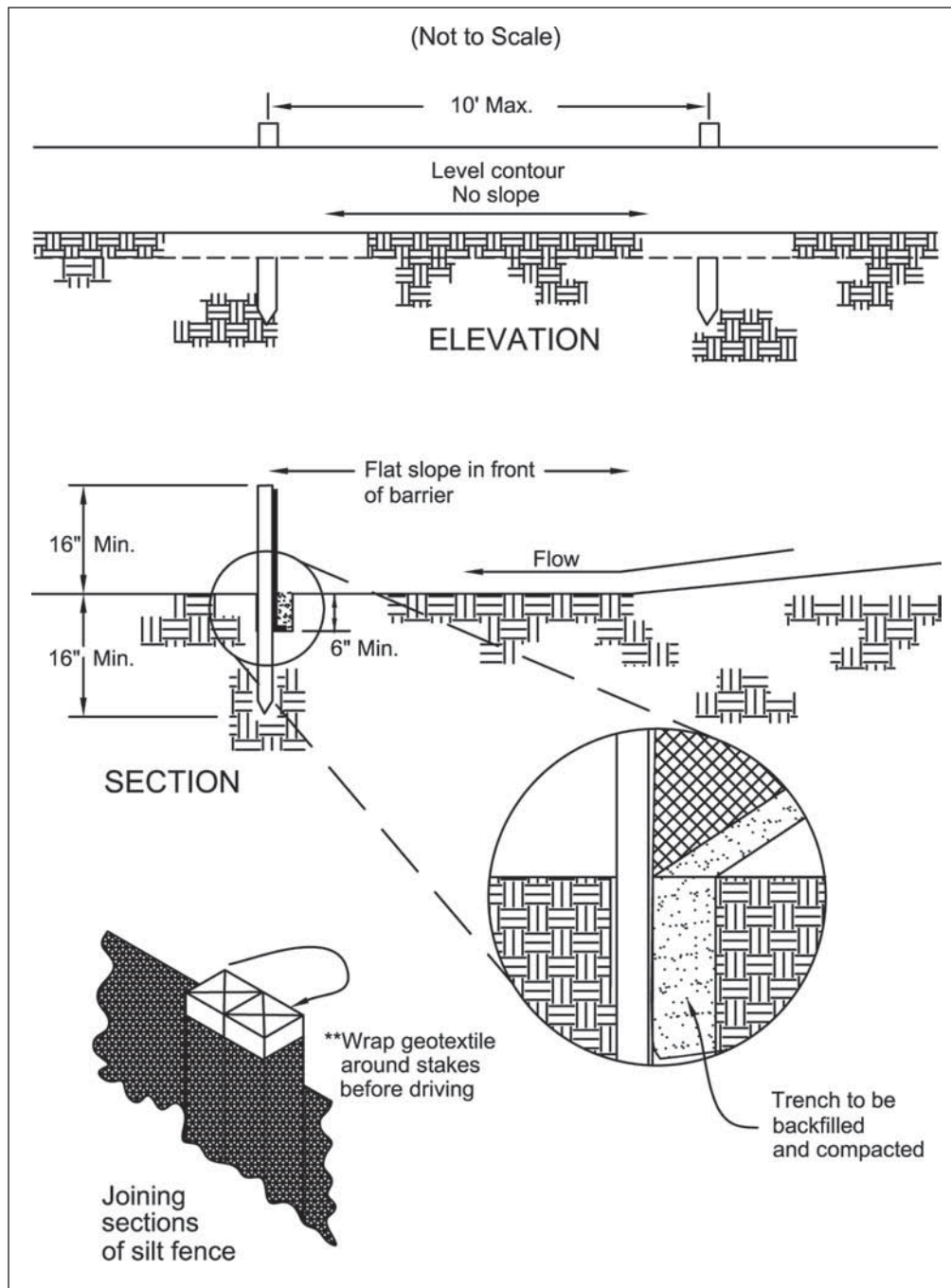
The predominant problems with silt fence regard inadequate installation or location that allows runoff to concentrate, overtop the fence, flow under the fabric or around the fence ends. If this occurs one of the following shall be performed, as appropriate:

- The location and layout of the silt fence shall be changed to conform to the level contour
- The silt fence shall be reinstalled with proper burial, backfill and compaction and support
- Accumulated sediment shall be removed
- Alternative practices shall be installed.

References

Construction and Material Specifications, January 1, 2002. State of Ohio Department of Transportation, P.O. Box 899, Columbus, Ohio 43216-0899, <http://www.dot.state.oh.us/construction/OCA/Specs/2002CMS/Specbook2002/Specbook2002.htm>

Specifications
for
Silt Fence



Specifications for **Silt Fence**

1. Silt fence shall be constructed before upslope land disturbance begins.
2. All silt fence shall be placed as close to the contour as possible so that water will not concentrate at low points in the fence and so that small swales or depressions that may carry small concentrated flows to the silt fence are dissipated along its length.
3. Ends of the silt fences shall be brought upslope slightly so that water ponded by the silt fence will be prevented from flowing around the ends.
4. Silt fence shall be placed on the flattest area available.
5. Where possible, vegetation shall be preserved for 5 feet (or as much as possible) upslope from the silt fence. If vegetation is removed, it shall be reestablished within 7 days from the installation of the silt fence.
6. The height of the silt fence shall be a minimum of 16 inches above the original ground surface.
7. The silt fence shall be placed in an excavated or sliced trench cut a minimum of 6 inches deep. The trench shall be made with a trencher, cable laying machine, slicing machine, or other suitable device that will ensure an adequately uniform trench depth.
8. The silt fence shall be placed with the stakes on the downslope side of the geotextile. A minimum of 8 inches of geotextile must be below the ground surface. Excess material shall lay on the bottom of the 6-inch deep trench. The trench shall be backfilled and compacted on both sides of the fabric.
9. Seams between sections of silt fence shall be spliced together only at a support post with a minimum 6-in. overlap prior to driving into the ground, (see details).
10. Maintenance—Silt fence shall allow runoff to pass only as diffuse flow through the geotextile. If runoff overtops the silt fence, flows under the fabric or around the fence ends, or in any other way allows a concentrated flow discharge, one of the following shall be performed, as appropriate: 1) the layout of the silt fence shall be changed, 2) accumulated sediment shall be removed, or 3) other practices shall be installed.

Sediment deposits shall be routinely removed when the deposit reaches approximately one-half of the height of the silt fence.

Silt fences shall be inspected after each rainfall and at least daily during a prolonged rainfall. The location of existing silt fence shall be reviewed daily to ensure its proper location and effectiveness. If damaged, the silt fence shall be repaired immediately.

Criteria for silt fence materials

1. Fence post – The length shall be a minimum of 32 inches. Wood posts will be 2-by-2-in. nominal dimensioned hardwood of sound quality. They shall be free of knots, splits and other visible imperfections, that will weaken the posts. The maximum spacing between posts shall be 10 ft. Posts shall be driven a minimum 16 inches into the ground, where possible. If not possible, the posts shall be adequately secured to prevent overturning of the fence due to sediment/water loading.
2. Silt fence fabric – See chart below.

Table 6.3.2 Minimum criteria for Silt Fence Fabric (ODOT, 2002)

FABRIC PROPERTIES	VALUES	TEST METHOD
Minimum Tensile Strength	120 lbs. (535 N)	ASTM D 4632
Maximum Elongation at 60 lbs	50%	ASTM D 4632
Minimum Puncture Strength	50 lbs (220 N)	ASTM D 4833
Minimum Tear Strength	40 lbs (180 N)	ASTM D 4533
Apparent Opening Size	≤ 0.84 mm	ASTM D 4751
Minimum Permittivity	1X10 ⁻² sec.-1	ASTM D 4491
UV Exposure Strength Retention	70%	ASTM G 4355

6.6 Filter Sock



Description

Filter socks are sediment-trapping devices using compost inserted into a flexible, permeable tube with a pneumatic blower device or equivalent. Filter socks trap sediment by filtering water passing through the berm and allowing water to pond, creating a settling of solids.

Conditions where practice applies

Filter socks are appropriate for limited drainage areas, requiring sediment control where runoff is in the form of sheet flow or in areas that silt fence is normally considered acceptable. The use of filter socks is applicable to slopes up to 2:1 (H:V), around inlets, and in other disturbed areas of construction sites requiring sediment control. Filter socks also may be useful in areas, where migration of aquatic life such as turtles, salamanders and other aquatic life would be impeded by the use of silt fence.

Planning Considerations

Filter socks are sediment barriers, capturing sediment by ponding and filtering water through the device during rain events. They may be a preferred alternative where equipment may drive near or over sediment barriers, as they are not as prone to complete failure as silt fence if this occurs during construction. Driving over filter socks is not recommended; but if it should occur, the filter sock should be inspected immediately, repaired and moved back into place as soon as possible.

Design Criteria

Typically, filter socks can handle the same water flow or slightly more than silt fence. For most applications, standard silt fence is replaced with 12" diameter filter socks. However, proper installation is especially important for them to work effectively.

Materials – Compost/mulch used for filter socks shall be weed free and derived from a well-decomposed source of organic matter. The compost shall be produced using an aerobic composting process meeting CFR 503 regulations, including time and temperature data indicating effective weed seed, pathogen and insect larvae kill. The compost shall be free of any refuse, contaminants or other materials toxic to plant growth. Non-composted products are not acceptable.

Materials should meet the following requirements: pH between 5.0-8.0; 100% passing a 2" sieve and a minimum of 70% greater than the 3/8" sieve; moisture content is less than 60%; material shall be relatively free (<1% by dry weight) of inert or foreign man made materials.

Level Contour – Place filter socks on the level contour of the land so that flows are dissipated into uniform sheet flow. Flow coming to filter socks must not be concentrated and the filter sock should lie perpendicular to flows.

Flat Slopes – When possible, place filter socks at a 5' or greater distance away from the toe of the slopes in order for the water coming from the slopes to maximize space available for sediment deposit (see the illustration). When this is not possible due to construction limitations, additional filter socks may be required upslope of the initial filter sock (see the chart below for appropriate slope lengths and spacing).

Flow Around Ends – In order to prevent water flowing around the ends of filter socks, the ends of the filter socks must be constructed pointing upslope so the ends are at a higher elevation.

Vegetation – For permanent areas, seeding filter socks is recommended to establish vegetation directly in the sock and immediately in front and back of the sock at a distance of 5 feet. Vegetating on and around the filter socks will assist in slowing down water for filtration creating a more effective longer-term sediment control.

Drainage Area: Generally filter socks are limited to ¼ to ½ acre drainage area per 100 foot of the sediment barrier. Specific guidance is given in the chart below.

Table 6.6.1 Maximum Slope Length Above Filter Sock and Recommended Diameter

Slope	Ratio (H:V)	8"	12"	18"	24"
0% - 2%	10% - 20%	125	250	300	350
10% - 20%	50:1 - 10:1	100	125	200	250
2% - 10%	10:1 - 5:1	75	100	150	200
20% - 33%	5:1 - 2:1		50	75	100
>50%	>2:1		25	50	75

Note: For larger drainage areas, see standards for temporary diversions, sediment traps and sediment basins.

Dispersing flow – Sheet flow and runoff should not exceed berm height or capacity in most storm events. If overflow of the berm is a possibility, a larger filter sock should be installed or an alternative sediment control should be used.

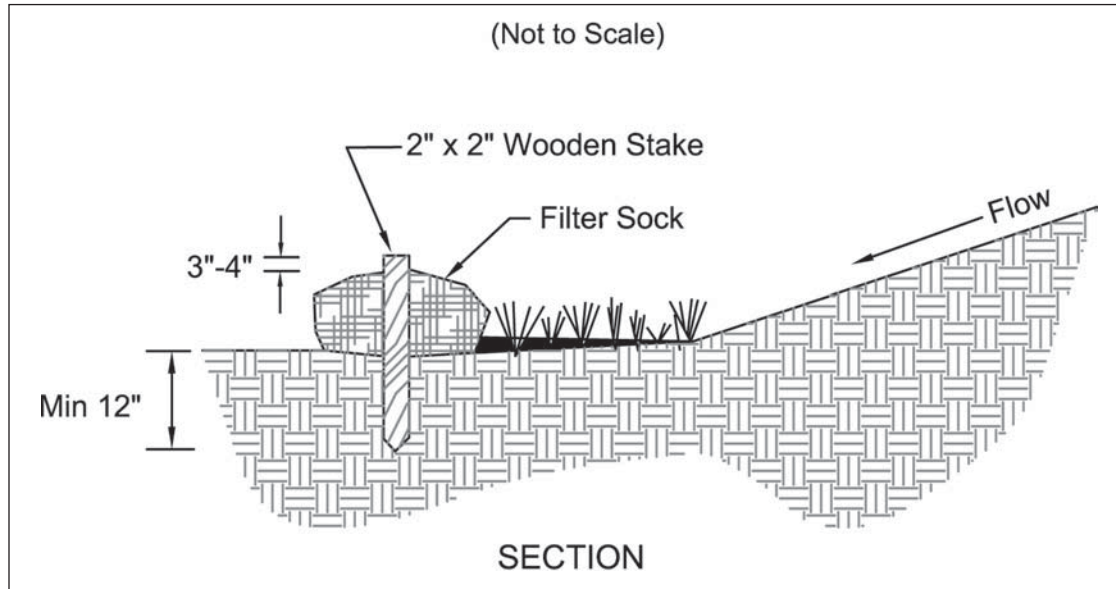
Maintenance – Filter socks should be regularly inspected to make sure they hold their shape, are ponding, and allowing adequate flow through. If ponding becomes excessive, filter socks should be replaced. Used filter socks may be cut and the compost dispersed and seeded to prevent captured sediment from being resuspended.

Removal – When construction is completed on site, the filter socks may be cut and dispersed with a loader, rake, bulldozer or other device to be incorporated into the soil or left on top of the soil for final seeding. The mesh netting material will be disposed of in normal trash container or removed by the contractor.

References

Standard Specification for Compost for Erosion/Sediment Control (Filter Berms) AASHTO Designation: MP-9 <http://www.iaasla.org/NEWS/FILES/AASHTO-Filterberm6.doc>

Specifications
for
Filter Sock



1. Materials – Compost used for filter socks shall be weed, pathogen and insect free and free of any refuse, contaminants or other materials toxic to plant growth. They shall be derived from a well-decomposed source of organic matter and consist of a particles ranging from 3/8" to 2".
2. Filter Socks shall be 3 or 5 mil continuous, tubular, HDPE 3/8" knitted mesh netting material, filled with compost passing the above specifications for compost products.

INSTALLATION:

3. Filter socks will be placed on a level line across slopes, generally parallel to the base of the slope or other affected area. On slopes approaching 2:1, additional socks shall be provided at the top and as needed mid-slope.
4. Filter socks intended to be left as a permanent filter or part of the natural landscape, shall be seeded at the time of installation for establishment of permanent vegetation.

5. Filter Socks are not to be used in concentrated flow situations or in runoff channels.

MAINTENANCE:

6. Routinely inspect filter socks after each significant rain, maintaining filter socks in a functional condition at all times.
7. Remove sediments collected at the base of the filter socks when they reach 1/3 of the exposed height of the practice.
8. Where the filter sock deteriorates or fails, it will be repaired or replaced with a more effective alternative.
9. Removal – Filter socks will be dispersed on site when no longer required in such as way as to facilitate and not obstruct seedings.

7.4 Construction Entrance



Description

A construction entrance is a stabilized pad of stone underlain with a geotextile and is used to reduce the amount of mud tracked off-site with construction traffic. Located at points of ingress/egress, the practice is used to reduce the amount of mud tracked off-site with construction traffic.

Conditions Where Practice Applies

A construction entrance is applicable where:

- Construction traffic leaves active construction areas and enters public roadways or areas unchecked by effective sediment controls;
- Areas where frequent vehicle and equipment access is expected and likely to contribute sediment to runoff, such as at the entrance to individual building lots.

Planning Considerations

Construction entrances address areas that contribute significant amounts of mud to runoff by providing a stable area for traffic. Although they allow some mud to be removed from construction vehicle tires before they enter a public roads, they should not be the only practice relied upon to manage off-site tracking. Since most mud is flung from tires as they reach higher speeds, restricting traffic to stabilized construction roads, entrances and away from muddy areas is necessary.

If a construction entrance is not sufficient to remove the majority of mud from wheels or there is an especially sensitive traffic situation on adjacent roads, wheel wash areas may be necessary. This requires an extended width pad to avoid conflicts with traffic, a supply of wash water and sufficient drainage to assure runoff is captured in a sediment pond or trap.

Proper installation of a construction entrance requires a geotextile and proper drainage to insure construction site runoff does not leave the site. The use of geotextile under the stone helps to prevent potholes from developing and will save the amount of stone needed during the life of the practice. Proper drainage may include culverts to direct water under the roadway or water bars to direct muddy water off the roadway toward sediment traps or ponds.

Design Criteria

The area of the entrance must be cleared of all vegetation, roots, and other objectionable material. Geotextile will then be placed the full width and length of the entrance.

Stone shall be placed to a depth of at least 6 inches. Roads subject to heavy duty loads should be increased to a minimum of 10 inches. Surface water shall be conveyed under the entrance, through culverts, or diverted via a water bars or mountable berms (minimum 5:1 slopes) so as to convey sediment laden runoff to sediment control practices or to allow clean water to pass by the entrance.

The stabilized construction entrance shall meet the specifications that follow.

Maintenance

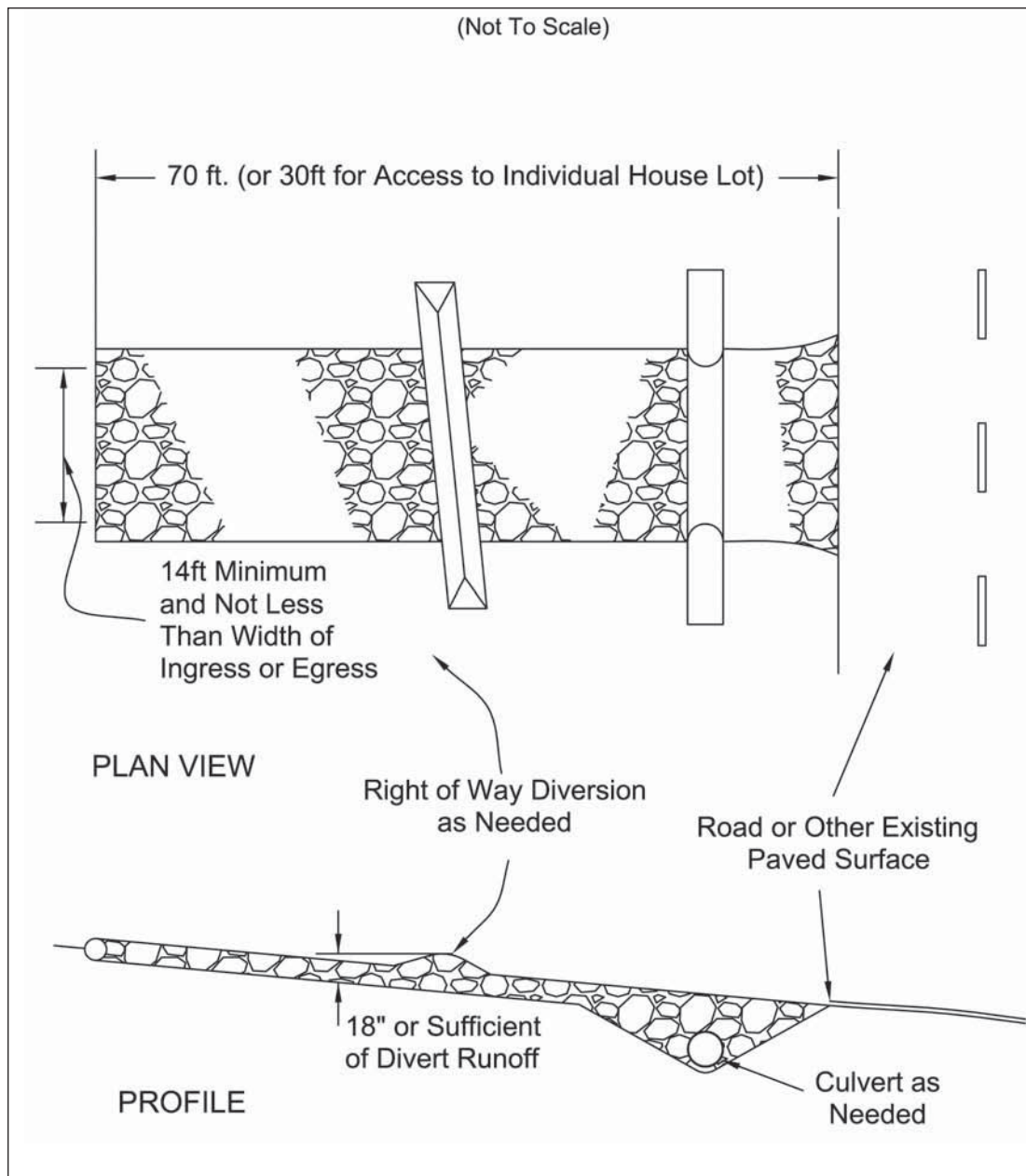
The entrance shall be maintained in a condition that will prevent tracking or flow of mud onto public rights-of-way. This may require periodic top dressing with additional stone or the washing and reworking of existing stone as conditions demand and repair and/or cleanout of any structures used to trap sediment. All materials spilled, dropped, washed, or tracked from vehicles onto roadways or into storm drains must be removed immediately. The use of water trucks to remove materials dropped, washed, or tracked onto roadways will not be permitted under any circumstances.

Common Problems / Concerns

Mud is allowed to accumulate and is tracked on to public right-of-ways. The entrance and associated construction roads may need dressing with additional stone.

Soft depression areas develop in entrance area. Stone may not have been underlain with geotextile or insufficient stone base has been provided.

Specifications
for
Construction Entrance



Specifications for **Construction Entrance**

1. **Stone Size**—ODOT # 2 (1.5-2.5 inch) stone shall be used, or recycled concrete equivalent.
2. **Length**—The Construction entrance shall be as long as required to stabilize high traffic areas but not less than 70 ft. (exception: apply 30 ft. minimum to single residence lots).
3. **Thickness** -The stone layer shall be at least 6 inches thick for light duty entrances or at least 10 inches for heavy duty use.
4. **Width** -The entrance shall be at least 14 feet wide, but not less than the full width at points where ingress or egress occurs.
5. **Geotextile** -A geotextile shall be laid over the entire area prior to placing stone. It shall be composed of strong rot-proof polymeric fibers and meet the following specifications:
6. **Timing**—The construction entrance shall be installed as soon as is practicable before major grading activities.
7. **Culvert** -A pipe or culvert shall be constructed under the entrance if needed to prevent surface water from flowing across the entrance or to prevent runoff from being directed out onto paved surfaces.
8. **Water Bar** -A water bar shall be constructed as part of the construction entrance if needed to prevent surface runoff from flowing the length of the construction entrance and out onto paved surfaces.
9. **Maintenance** -Top dressing of additional stone shall be applied as conditions demand. Mud spilled, dropped, washed or tracked onto public roads, or any surface where runoff is not checked by sediment controls, shall be removed immediately. Removal shall be accomplished by scraping or sweeping.
10. Construction entrances shall not be relied upon to remove mud from vehicles and prevent off-site tracking. Vehicles that enter and leave the construction-site shall be restricted from muddy areas.
11. **Removal**—the entrance shall remain in place until the disturbed area is stabilized or replaced with a permanent roadway or entrance.

Figure 7.4.1

Geotextile Specification for Construction Entrance	
Minimum Tensile Strength	200 lbs.
Minimum Puncture Strength	80 psi.
Minimum Tear Strength	50 lbs.
Minimum Burst Strength	320 psi.
Minimum Elongation	20%
Equivalent Opening Size	EOS < 0.6 mm.
Permittivity	1×10 ⁻³ cm/sec.

7.7 Topsoiling



Description

Topsoiling occurs during grading operations as the upper most organic layer of soil is stripped and stockpiled from areas being graded and subsequently replaced on the newly graded areas. Topsoil provides a more suitable growing medium than subsoil or on areas with poor moisture, low nutrient levels, undesirable pH, or in the presence of other materials that would inhibit establishment of vegetation. Replacing topsoil helps plant growth by improving the water holding capacity and nutrient content and consistency of the soils.

Conditions Where Practice Applies

This practice applies anywhere a good stand of vegetation is desired, whether turf, ornamental plants, and/ or vegetative cover especially in areas where high-quality turf is desirable to withstand intense use or meet aesthetic requirements, although it may not be appropriate for areas with slopes greater than 2:1.

This practice is especially applicable to areas where:

- existing soil structure, pH, or nutrient balance cannot be easily improved with soil amendments to be a suitable growth medium.
- existing soils are too shallow to provide adequate rooting depth or;
- the existing soil contains substances toxic to the desired vegetation.

Planning Considerations

Topsoil is the upper layer of natural soil (A horizon), which is typically darker and more fertile than the subsoil due to increased amounts of organic material. This layer is typically very evident as a person excavates through soil horizons. Project sites will have varying degrees of topsoil resources prior to construction, with some historically eroded sites having limited topsoil resources. These sites may have less justification for moving, stockpiling and re-spreading the top horizon of soil. If in question, assistance by a trained soils professional should be sought to determine the extent of topsoil resources on the project site.

Although replacing topsoil is critical to establishing good vegetation and limiting runoff from development sites, it comes with additional costs. Stripping, stockpiling and reapplying topsoil or importing topsoil will require greater work in grading operations and therefore will increase costs. Topsoiling will also add time to grading operations and may increase the exposure time of denuded areas. Additionally, depending on the original vegetative cover, topsoil often contains weed seeds that may compete with desirable species.

In site planning, the option of topsoiling should be compared with that of preparing a seedbed in subsoil. The clay content of subsoil does provide high moisture availability and deters leaching of nutrients. When adjusted for optimal pH and nutrient availability, subsoil may provide an adequate growth medium that is generally free of weeds. Topsoiling may not be required to establish less demanding, lower maintenance plants, although runoff will be increased due to the lack of topsoil from the site.

If topsoiling is planned, locations for topsoil stockpiles must be determined where drainage and site work will not be encumbered. Construction scheduling must be adjusted to allow sufficient time for moving, stockpiling and spreading topsoil between grading and re-vegetation operations.

Design Criteria

These are provided in the specifications that follow.

Maintenance

Topsoil stockpiles should be stabilized with temporary vegetation and provided sufficient sediment controls. Sediment Controls will need regular inspection and appropriate repairs as needed.

Common Problems / Concerns

- Care must be taken not to apply topsoil to subsoil if the two soils have contrasting textures. Clayey topsoil over sandy subsoil is a particularly poor combination, as water may creep along the junction between the soil layers, leading to sloughing of the topsoil. Sandy topsoil over clay subsoil is equally likely to fail.
- If topsoil and subsoil are not properly bonded, water will not infiltrate the soil profile evenly and it will be difficult to establish vegetation. Topsoiling of steep slopes is highly discouraged, unless good bonding of soils can be achieved.
- Topsoil should not be applied in excessively wet/moist conditions.

Specifications
for
Topsoiling

Salvaging and Stockpiling

1. Determine the depth and suitability of topsoil at the site. (For help, contact your local SWCD office to obtain a county soil survey report).
2. Prior to stripping topsoil, install appropriate downslope erosion and sedimentation controls such as sediment traps and basins.
3. Remove the soil material no deeper than what the county soil survey describes as “surface soil” (ie. A or Ap horizon).
4. Construct stockpiles in accessible locations that do not interfere with natural drainage. Install appropriate sediment controls to trap sediment such as silt fence immediately adjacent to the stockpile or sediment traps or basins downstream of the stockpile. Stockpile side slopes shall not exceed a ratio of 2:1.
5. If topsoil is stored for more than 21 days, it should be temporary seeded, or covered with a tarp.

Spreading the Topsoil

1. Prior to applying topsoil, the topsoil should be pulverized.
2. To ensure bonding, grade the subsoil and roughen the top 3-4 in. by disking.
3. Do not apply when site is wet, muddy, or frozen, because it makes spreading difficult, causes compaction problems, and inhibits bonding with subsoil.
4. Apply topsoil evenly to a depth of at least 4 inches and compact slightly to improve contact with subsoil.
5. After spreading, grade and stabilize with seeding or appropriate vegetation.

7.9 Mulching



Description

A protective layer of mulch, usually of straw, applied to bare soil is used to abate erosion by shielding it from raindrop impact. Mulch also helps establish vegetation by conserving moisture and creating favorable conditions for seeds to germinate.

Conditions Where Practice Applies

Mulch should be used liberally throughout construction to limit the areas that are bare and susceptible to erosion. Mulch can be used in conjunction with seeding to establish vegetation or by itself to provide erosion control when the season does not allow grass to grow. Mulch and other vegetative practices must be applied on all disturbed portions of construction-sites that will not be re-disturbed for more than 21 days.

Design Criteria

See specifications for Mulching.

Maintenance

Additional mulching is necessary to cover exposed soil conditions when observed during routine maintenance inspections.

Common Problems / Concerns

The application of synthetic binders must be conducted in such a manner as to not be introduced into watercourses.

Weather considerations must be addressed to ensure the application of synthetic binders are not washed away and introduced into watercourses.

The use of a mulch cover is not recommended for areas, which will exhibit higher velocities than 3.5 feet/second. An erosion control matting is recommended for areas which will exhibit higher velocities.

Areas which have been mulched should be inspected and maintained if necessary every 7 days or within 24 hours of a rain event greater than or equal to 0.5 inches to ensure adequate protection.

Specifications
for
Mulching

1. Mulch and other appropriate vegetative practices shall be applied to disturbed areas within 7 days of grading if the area is to remain dormant (undisturbed) for more than 21 days or on areas and portions of the site which can be brought to final grade.
2. Mulch shall consist of one of the following:
 - Straw - Straw shall be unrotted small grain straw applied at the rate of 2 tons/ac. or 90 lb./1,000 sq. ft. (two to three bales). The straw mulch shall be spread uniformly by hand or mechanically so the soil surface is covered. For uniform distribution of hand-spread mulch, divide area into approximately 1,000 sq.ft. sections and place two 45-lb. bales of straw in each section.
 - Hydroseeders - Wood cellulose fiber should be used at 2,000 lb./ac. or 46 lb./1,000 sq. ft.
 - Other - Acceptable mulches include mulch mattings and rolled erosion control products applied according to manufacturer's recommendations or wood mulch/chips applied at 10-20 tons/ac.
3. Mulch Anchoring - Mulch shall be anchored immediately to minimize loss by wind or runoff. The following are acceptable methods for anchoring mulch.
 - Mechanical - Use a disk, crimper, or similar type tool set straight to punch or anchor the mulch material into the soil. Straw mechanically anchored shall not be finely chopped but be left generally longer than 6 inches.
 - Mulch Nettings - Use according to the manufacturer's recommendations, following all placement and anchoring requirements. Use in areas of water concentration and steep slopes to hold mulch in place.
 - Synthetic Binders - For straw mulch, synthetic binders such as Acrylic DLR (Agri-Tac), DCA-70, Petroset, Terra Tack or equal may be used at rates recommended by the manufacturer. All applications of Sythetic Binders must be conducted in such a manner where there is no contact with waters of the state.
 - Wood Cellulose Fiber - Wood cellulose fiber may be used for anchoring straw. The fiber binder shall be applied at a net dry weight of 750 lb./acre. The wood cellulose fiber shall be mixed with water and the mixture shall contain a maximum of 50 lb./100 gal. of wood cellulose fiber.

7.10 Permanent Seeding



Description

Perennial vegetation is established on areas that will not be re-disturbed for periods longer than 12 months. Permanent seeding includes site preparation, seedbed preparation, planting seed, mulching, irrigation and maintenance.

Permanent vegetation is used to stabilize soil, reduce erosion, prevent sediment pollution, reduce runoff by promoting infiltration, and provide stormwater quality benefits offered by dense grass cover.

Conditions Where Practice Applies

Permanent seeding should be applied to:

- Any disturbed areas or portions of construction sites at final grade. Permanent seeding should not be delayed on any one portion of the site at final grade while construction on another portion of the site is being completed. Permanent seeding shall be completed in phases, if necessary.
- Areas subject to grading activities but will remain dormant for a year or more.

Planning Considerations

Vegetation controls erosion by reducing the velocity and the volume of overland flow and protects bare soil surface from raindrop impact. A healthy, dense turf promotes infiltration and reduces the amount of runoff. The establishment of quality vegetation requires selection of the right plant materials for the site, adequate soil amendments, careful seedbed preparation, and maintenance.

Soil Compaction—Storm water quality and the amount of runoff both vary significantly with soil compaction. Non-compacted soils improve stormwater infiltration by promoting:

- dense vegetative growth;
- high soil infiltration & lower runoff rates;
- pollutant filtration, deposition & absorption; and
- beneficial biologic activity in the soil.

Construction activity creates highly compacted soils that restrict water infiltration and root growth. The best time for improving soil condition is during the establishment of permanent vegetation. It is highly recommended that subsoilers, plows, or other implements are specified as part of final seedbed preparation. Use discretion in slip-prone areas.

Minimum Soil Conditions—Vegetation cannot be expected to stabilize soil that is unstable due to its texture, structure, water movement or excessively steep slope. The following minimum soil conditions are needed for the establishment and maintenance of a long-lived vegetative cover. If these conditions cannot be met, see the standards and specifications for Topsoiling.

- Soils must include enough fine-grained material to hold at least a moderate amount of available moisture.
- The soil must be free from material that is toxic or otherwise harmful to plant growth.

Design Criteria

See specifications for permanent seeding below.

Maintenance

1. Expect emergence within 4 to 28 days after seeding, with legumes typically following grasses. Check permanent seedlings within 4 to 6 weeks after planting. Look for:
 - Vigorous seedlings;
 - Uniform ground surface coverage with at least 30% growth density;
 - Uniformity with legumes and grasses well intermixed;
 - Green, not yellow, leaves. Perennials should remain green throughout the summer, at least at the plant bases.
2. Permanent seeding shall not be considered established for at least 1 full year from the time of planting. Inspect the seeding for soil erosion or plant loss during this first year. Repair bare and sparse areas. Fill gullies. Re-fertilize, re-seed, and re-mulch if required. Consider no-till planting. A minimum of 70% growth density, based on a visual inspection, must exist for an adequate permanent vegetative planting.
 - If stand is inadequate or plant cover is patchy, identify the cause of failure and take corrective action: choice of plant materials, lime and fertilizer quantities, poor seedbed preparation, or weather. If vegetation fails to grow, have the soil tested to determine whether pH is in the correct range or nutrient deficiency is a problem.
 - Depending on stand conditions, repair with complete seedbed preparation, then over-seed or re-seed.
 - If it is the wrong time of year to plant desired species, over-seed with small grain cover crop to thicken the stand until timing is right to plant perennials or use temporary seeding. See Temporary Seeding standard.

3. Satisfactory establishment may require re-fertilizing the stand in the second growing season.
 - Do not fertilize cool season grasses in late May through July (i.e. Kentucky Bluegrass, Orchardgrass, Perennial Ryegrass, Smooth Brome, Fescues, Timothy, Reed Canarygrass and Garrison Grass)
 - Grass that looks yellow may be nitrogen deficient. In lieu of a soil test, an application of 50 lbs. of N-P-K per acre in early spring will help cool season grasses compete against weeds or grow more successfully.
 - Do not use nitrogen fertilizer if the stand contains more than 20 percent legumes.
4. Long-term maintenance fertilization rates shall be established by following soil test recommendations or by using the rates shown in Table 2.

Table 7.10.1 Maintenance for Permanent Seedings Fertilization and Mowing

Mixture	Formula	Lbs./ Acre	Lbs./1,000 sq.ft.	Time	Mowing
Creeping Red Fescue Ryegrass Kentucky Bluegrass	10-10-10	500	12	Fall, yearly or as needed	Not closer than 3"
Tall Fescue	10-10-10	500	12		Not closer than 4"
Turf-type Fescue	10-10-10	500	12		
Crown Vetch Fescue	0-20-20	400	10	Spring, yearly following establishment and every 4-7 years thereafter	Do not mow
Flat Pea Fescue	0-20-20	400	10		Do not mow

Note: Following soil test recommendations is preferred to fertilizer rates shown above.

5. Consider mowing after plants reach a height of 6 to 8 inches. Mow grasses tall, at least 3 inches in height and minimize compaction during the mowing process. Vegetation on structural practices such as embankments and grass-lined channels need to be mowed only to prevent woody plants from invading the stand.

Common Problems / Concerns

- Insufficient topsoil or inadequately tilled, limed, and/or fertilized seedbed - results in poor establishment of vegetation.
- Unsuitable species or seeding mixture - results in competition with the perennials.
- Nurse crop rate too high in the mixture - results in competition with the perennials.
- Seeding done at the wrong time of year - results in poor establishment of vegetation, also plant hardiness is significantly decreased.
- Mulch rate inadequate - results in poor germination and failure.

Specifications for **Permanent Seeding**

Site Preparation

1. Subsoiler, plow, or other implement shall be used to reduce soil compaction and allow maximum infiltration. (Maximizing infiltration will help control both runoff rate and water quality.) Subsoiling should be done when the soil moisture is low enough to allow the soil to crack or fracture. Subsoiling shall not be done on slip-prone areas where soil preparation should be limited to what is necessary for establishing vegetation.
2. The site shall be graded as needed to permit the use of conventional equipment for seedbed preparation and seeding.
3. Topsoil shall be applied where needed to establish vegetation.

Seedbed Preparation

1. Lime—Agricultural ground limestone shall be applied to acid soil as recommended by a soil test. In lieu of a soil test, lime shall be applied at the rate of 100 pounds per 1,000-sq. ft. or 2 tons per acre.
2. Fertilizer—Fertilizer shall be applied as recommended by a soil test. In place of a soil test, fertilizer shall be applied at a rate of 25 pounds per 1,000-sq. ft. or 1000 pounds per acre of a 10-10-10 or 12-12-12 analyses.
3. The lime and fertilizer shall be worked into the soil with a disk harrow, spring-tooth harrow, or other suitable field implement to a depth of 3 inches. On sloping land, the soil shall be worked on the contour.

Seeding Dates and Soil Conditions

Seeding should be done March 1 to May 31 or August 1 to September 30. If seeding occurs outside of the above-specified dates, additional mulch and irrigation may be required to ensure a minimum of 80% germination. Tillage for seedbed preparation should be done when the soil is dry enough to crumble and not form ribbons when compressed by hand. For winter seeding, see the following section on dormant seeding.

Dormant Seedings

1. Seedings should not be made from October 1 through November 20. During this period, the seeds are likely to germinate but probably will not be able to survive the winter.
2. The following methods may be used for “Dormant Seeding”:

- From October 1 through November 20, prepare the seedbed, add the required amounts of lime and fertilizer, then mulch and anchor. After November 20, and before March 15, broadcast the selected seed mixture. Increase the seeding rates by 50% for this type of seeding.
- From November 20 through March 15, when soil conditions permit, prepare the seedbed, lime and fertilize, apply the selected seed mixture, mulch and anchor. Increase the seeding rates by 50% for this type of seeding.
- Apply seed uniformly with a cyclone seeder, drill, cultipacker seeder, or hydro-seeder (slurry may include seed and fertilizer) on a firm, moist seedbed.
- Where feasible, except when a cultipacker type seeder is used, the seedbed should be firmed following seeding operations with a cultipacker, roller, or light drag. On sloping land, seeding operations should be on the contour where feasible.

Mulching

1. Mulch material shall be applied immediately after seeding. Dormant seeding shall be mulched. 100% of the ground surface shall be covered with an approved material.
2. Materials
 - Straw—If straw is used it shall be unrotted small-grain straw applied at the rate of 2 tons per acre or 90 pounds (two to three bales) per 1,000-sq. ft. The mulch shall be spread uniformly by hand or mechanically applied so the soil surface is covered. For uniform distribution of hand-spread mulch, divide area into approximately 1,000-sq.-ft. sections and spread two 45-lb. bales of straw in each section.
 - Hydroseeders—If wood cellulose fiber is used, it shall be applied at 2,000 lb./ac. or 46 lb./1,000 sq. ft.
 - Other—Other acceptable mulches include rolled erosion control mattings or blankets applied according to manufacturer's recommendations or wood chips applied at 6 tons per acre.

3. Straw and Mulch Anchoring Methods

Straw mulch shall be anchored immediately to minimize loss by wind or water.

- **Mechanical**—A disk, crimper, or similar type tool shall be set straight to punch or anchor the mulch material into the soil. Straw mechanically anchored shall not be finely chopped but, generally, be left longer than 6 inches.
- **Mulch Netting**—Netting shall be used according to the manufacturer's recommendations. Netting may be necessary to hold mulch in place in areas of concentrated runoff and on critical slopes.
- **Asphalt Emulsion**—Asphalt shall be applied as recommended by the manufacture or at the rate of 160 gallons per acre.

- **Synthetic Binders**—Synthetic binders such as Acrylic DLR (Agri-Tac), DCA-70, Petroset, Terra Tack or equivalent may be used at rates specified by the manufacturer.
- **Wood Cellulose Fiber**—Wood cellulose fiber shall be applied at a net dry weight of 750 pounds per acre. The wood cellulose fiber shall be mixed with water with the mixture containing a maximum of 50 pounds cellulose per 100 gallons of water.

Irrigation

Permanent seeding shall include irrigation to establish vegetation during dry weather or on adverse site conditions, which require adequate moisture for seed germination and plant growth.

Irrigation rates shall be monitored to prevent erosion and damage to seeded areas from excessive runoff.

Table 7.10.2 Permanent Seeding

Slope Stability & Natural Corridors Seed Mix

Temporary Matrix		
oz/ac	Grasses	
512	<i>Avena sativa</i>	Seed Oats
160	<i>Lolium multiflorum</i>	Annual Ryegrass
Permanent Matrix		
oz/acre	Grasses	
16	<i>Andropogon gerardii</i>	Big Bluestem
16	<i>Bouteloua curtipendula</i>	Side-Oats Grama
48	<i>Elymus canadensis</i>	Canada Wild Rye
48	<i>Elymus virginicus</i>	Virginia Wild Rye
32	<i>Schizachyrium scoparium</i>	Little Bluestem
16	<i>Sorghastrum nutans</i>	Indian Grass
oz/acre	Forbs	
1	<i>Monarda fistulosa</i>	Bergamot
2	<i>Coreopsis lanceolata</i>	Lanceleaf coreopsis
4	<i>Rudbeckia hirta</i>	Black-eyed Susan
2	<i>Solidago nemoralis</i>	Grey Goldenrod
2	<i>Solidago speciosa</i>	Showy Goldenrod

Lawn Mix – Sun to partial shade

lbs/acre	Grasses	
20	<i>Lolium multiflorum</i>	Annual Ryegrass
100	<i>Poa pratensis</i>	Kentucky Bluegrass
100	<i>Lolium perenne</i>	Perennial Ryegrass

Lawn Mix –Shade

lbs/acre	Grasses	
20	<i>Lolium multiflorum</i>	Annual Ryegrass
100	<i>Poa pratensis</i>	Kentucky Bluegrass
100	<i>Festuca rubra</i>	Creeping Red Fescue

PERMANENT SEED MIXES

Swale and Retention Area Seed Mix

Temporary Matrix		
oz/ac	Grasses	
512	<i>Avena sativa</i>	Seed Oats
160	<i>Lolium multiflorum</i>	Annual Ryegrass
Permanent Matrix		
oz/acre	Grasses	
8	<i>Carex frankii</i>	Frank's Sedge
2	<i>Eleocharis obtusa</i>	BluntSpike Rush
8	<i>Carex vulpinoidea</i>	Fox Sedge
32	<i>Panicum virgatum</i>	Switchgrass
2	<i>Scirpus acutus</i>	Hard Stem Rush
oz/acre	Forbs	
2	<i>Asclepias incarnata</i>	Swamp milkweed
2	<i>Aster novae-angliae</i>	New England Aster
2	<i>Eupatorium perfoliatum</i>	Boneset
1	<i>Helenium autumnale</i>	Autumn Sneezeweed
2	<i>Monarda fistulosa</i>	Bergamot
2	<i>Ratibida pinnata</i>	Yellow Coneflower
2	<i>Rudbeckia subtomentosa</i>	Sweet Black-Eyed Susan

Farm Lane Area Seed Mix

Temporary Matrix		
oz/ac	Grasses	
512	<i>Avena sativa</i>	Seed Oats
160	<i>Lolium multiflorum</i>	Annual Ryegrass
Permanent Matrix		
oz/acre	Grasses	
64	<i>Trifolium pratense</i>	Red Clover
32	<i>Trifolium repens</i>	White Clover

7.13 Turf Reinforcement Matting (Permanent Rolled Erosion Control Products)



Description

Turf reinforcement matting (TRM) is a permanent, non-degradable rolled erosion control product used to reinforce natural soil and vegetated growth with synthetic materials to prevent erosion and maintain the durability of vegetated areas. Turf reinforcement is generally an interwoven material applied to areas where natural vegetation alone is not sufficient to withstand expected flow conditions or to provide sufficient long-term erosion protection.

Condition where practice applies

Turf reinforcement matting (TRM) is applicable on:

- Critical areas or slopes (up to 1:1) where erosion potential is high
- Water conveyances subject to higher shear stresses and velocities (> 3.5 fps) than normally advisable for vegetated channels
- Area subject to limited scour
- slopes areas where vegetation has been disturbed and soil replaced

Turf reinforcement matting is not appropriate for areas which will be constantly inundated with water and therefore unable to establish adequate vegetation.

Planning Considerations

Turf reinforcement matting provides 3-dimensional matrix for root growth that increases the vegetation's ability to resist the shear forces of moving water. TRMs are commonly

used in channels designed to carry stormwater runoff. Site designers should follow manufacturer's recommendations on maximum permissible shear stresses and flow velocities. These recommendations change according to the development of the vegetation. They should be considered for at least these three stages during design: 1) no vegetation (soil and TRM); vegetation at 50% cover; and fully established vegetation.

During establishment velocities should not exceed 10 feet per second. Depending upon the manufacturer's recommendations, velocities may be increased up to 18 fps and 8 pounds of shear stress, or greater, once completely vegetated. Specific guidance regarding product limitations for turf reinforcement mats designed for permanent application must be sought from the manufacturers. While velocity may be useful for slope applications, calculating permissible shear stress is necessary and more appropriate for channel applications.

With many manufacturers' products available, it is impossible to cover all the advantages, disadvantages and specifications of each. Therefore, as with many erosion control products, there is no substitute for a thorough understanding of the manufacturer's instructions and recommendations and site visits by the designer to verify appropriateness.

Design Criteria

Turf reinforcement matting generally has an allowable velocity range during vegetation establishment of less than or equal to 0 – 10 feet per second, although this will vary according to each manufacturer's product.

Materials – shall consist of a 100% non-degradable synthetic material with a three-dimensional geomatrix of nylon, polyethylene, or randomly oriented monofilaments, forming a mat. The product should contain an ultra violet (UV) stabilizer to ensure longevity. Selection of appropriate matting materials along with proper installation and vegetation establishment are critical factors in the success of this practice.

Soil shall be prepared Make the soil surface is stable, firm, and free of rocks and other obstructions. Install the turf reinforcement matting according to the manufacturer's published installation guidelines or the following specifications contains in this practice whichever is more restrictive.

Turf reinforcement matting applications require the TRM material first, applying seed the TRM is required. If soil in-filling is required, install TRM, apply seed, and lightly brush or rake 0.3 to 0.7 in. (8 to 18 mm) of topsoil into the voids in the TRM to fill the product thickness.

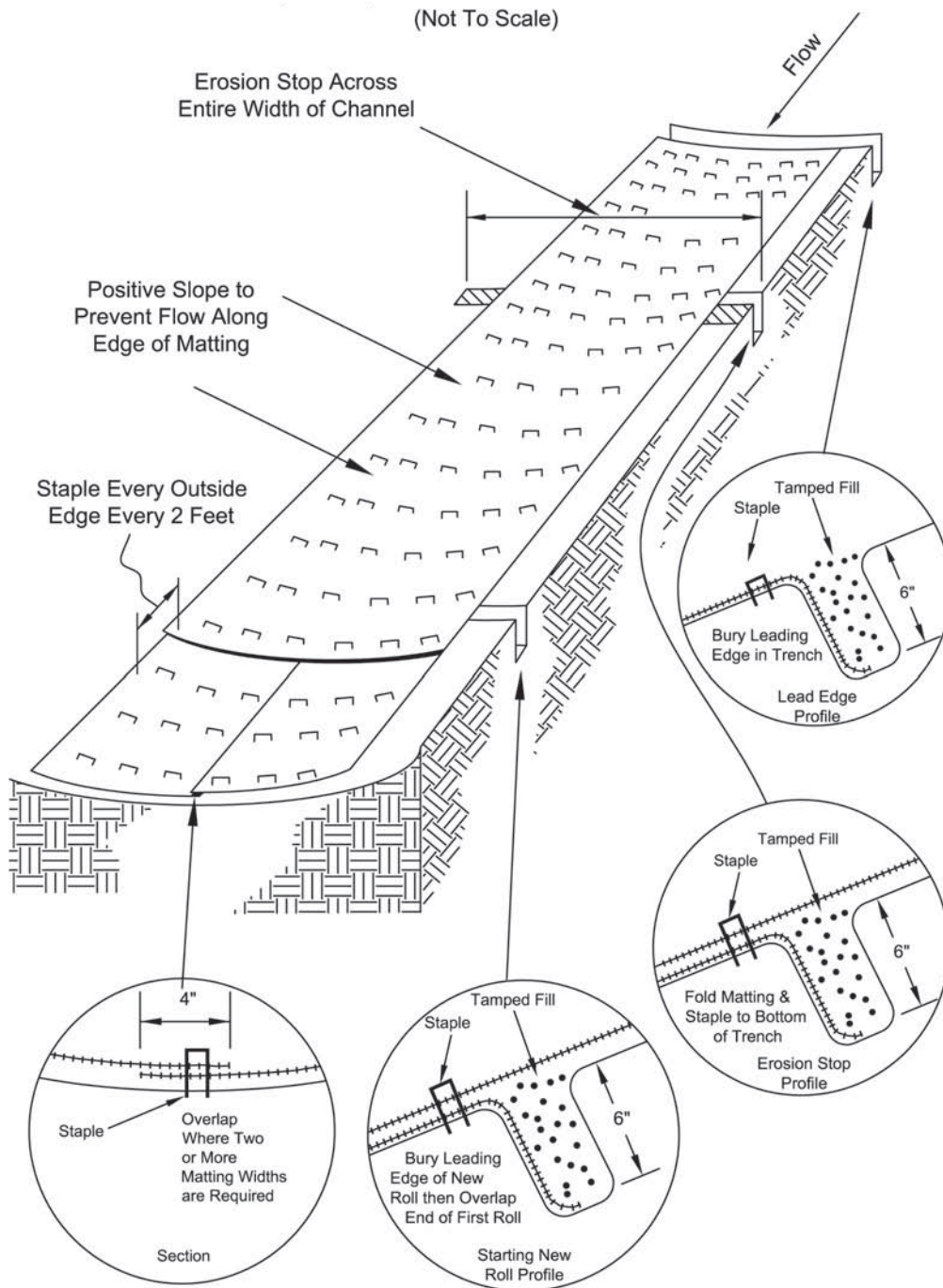
Maintenance

All TRMs should be inspected regularly after installation, especially after storms to check for erosion or undermining of the product. Make needed repairs immediately, addressing rills or gullies that have developed prior to replacing the TRM. In the case erosion repairs, assure that subsequent runoff across the area is dispersed or adequately spread.

Common Problems / Concerns

- Manufacturer's installation recommendations not followed. Results in failure of the TRM.
- Poor contact between soil and the TRM. Results in erosion below the TRM and lower seed germination rates, causing failure.
- Proper stapling guidelines not followed. Results in movement or displacement of TRM.
- Erosion check slots are not used. Results in erosion under the TRM, causing failure.
- Unstable slopes that result in TRM or slope failure. Determine cause of slope failure, correct, and reinstall TRM
- In channels, the width of TRM used is not sufficient, this causes water to flow along the sides of TRM causing erosion. Install TRM up side slopes of ditch line as well as the bottom.

Specifications
for
Turf Reinforcement Matting



Specifications
for
Turf Reinforcement Matting

1. Channel/Slope Soil Preparation Grade and compact area of installation, preparing seedbed by loosening 2"-3" of topsoil above final grade. Incorporate amendments such as lime and fertilizer into soil. Remove all rocks, clods, vegetation or other debris so that installed TRM will have direct contact with the soil surface.
2. Channel/Slope Seeding Apply seed to soil surface prior to installation. All check slots, anchor trenches, and other disturbed areas must be reseeded. Refer to the Permanent Seeding specification for seeding recommendations.

Slope Installation

3. Excavate top and bottom trenches (12"x6"). Intermittent erosion check slots (6"x6") may be required based on slope length. Excavate top anchor trench 2' x 3' over crest of the slope.
4. If intermittent erosion check slots are required install TRM in 6"x6" slot at a maximum of 30' centers or the mid point of the slope. TRM should be stapled into trench on 12" centers.
5. Install TRM in top anchor trench, anchor on 12" spacings, backfill and compact soil.
6. Unroll TRM down slope with adjacent rolls overlapped a minimum of 3". Anchor the seam every 18". Lay the TRM loose to maintain direct soil contact, do not pull taught.
7. Overlap roll ends a minimum of 12" with upslope TRM on top for a shingle effect. Begin all new rolls in an erosion check slot if required, double anchor across roll every 12".
8. Install TRM in bottom anchor trench (12"x6"), anchor every 12". Place all other staples throughout slope at 1 to 2.5 per square yard dependant on slope. Refer to manufacturer's anchor guide.

Channel Installation

9. Excavate initial anchor trench (12"x6") across the lower end of the project area.
10. Excavate intermittent check slots (6"x6") across the channel at 30' intervals along the channel.
11. Excavate longitudinal channel anchor slots (4"x4") along both sides of the channel to bury the edges. Whenever possible extend the TRM 2'-3' above the crest of channel side slopes.
12. Install TRM in initial anchor trench (downstream) anchor every 12", backfill and compact soil.
13. Roll out TRM beginning in the center of the channel toward the intermittent check slot. Do not pull taught. Unroll adjacent rolls upstream with a 3" minimum overlap (anchor every 18") and up each channel side slope.
14. At top of channel side slopes install TRM in the longitudinal anchor slots, anchor every 18".
15. Install TRM in intermittent check slots. Lay into trench and secure with anchors every 12", backfill with soil and compact.
16. Overlap roll ends a minimum of 12" with upstream TRM on top for a shingling effect. Begin all new rolls in an intermittent check slot, double anchored every 12".
17. Install upstream end in a terminal anchor trench (12"x6"); anchor every 12", backfill and compact.
18. Complete anchoring throughout channel at 2.5 per square yard using suitable ground anchoring devices (U shaped wire staples, metal geotextile pins, plastic stakes, and triangular wooden stakes). Anchors should be of sufficient length to resist pullout. Longer anchors may be required in loose sandy or gravelly soils.

APPENDIX 3

SWP3 Inspection Forms and SWP3 Amendments, Grading, and
Stabilization Log

AEP OHIO TRANSMISSION COMPANY, INC.
NORTH PROCTORVILLE STATION PROJECT
STORM WATER POLLUTION PREVENTION PLAN (SWP3) INSPECTION FORM

Date: _____ Inspector's Name/Title: _____

Inspector's Company: _____

Inspector Qualified in accordance with Part VII.BB of Permit: ☐ Yes ☐ No (Document Qualifications in Appendix 3 of SWP3)

Inspection Type: ☐ Weekly (once every seven calendar days)

☐ Storm Event (0.5 inch or greater) Date: _____ Amount: _____ Duration: _____

Rain Event(s) Since Last Inspection:

Date: _____ Amount: _____ Duration: _____	Date: _____ Amount: _____ Duration: _____
Date: _____ Amount: _____ Duration: _____	Date: _____ Amount: _____ Duration: _____

Did any discharges occur during these events? ☐ No ☐ Yes, Location: _____

Current Weather: ☐ Clear ☐ Cloudy ☐ Fog ☐ Rain ☐ Snow ☐ Sleet ☐ High Winds ☐ Other: _____ Temp: _____

Current Discharges: ☐ No ☐ Yes, Location: _____

Evidence of Sediment/Pollutants Leaving the Site? ☐ No ☐ Yes, Location: _____

Has Seeding Taken Place? ☐ No ☐ Yes, Location/Seed tag photo included: _____

Erosion and Sediment Control Features / BMPs Inspected:

☐ **Silt Fence / Filter Sock (Mark which one applies)**

Location(s) (Structure # (STR#)): _____

Properly anchored/installed: ☐ Yes ☐ No Repairs Needed: ☐ Yes ☐ No

Sediment Removal Required (Sediment one-half height for fence & one-third height for sock): ☐ Yes ☐ No

Action Required/Taken/Location(s): _____

☐ **Orange Barrier Fence**

Location(s) (Wetland / Access Road / STR#): _____

Properly anchored/installed: ☐ Yes ☐ No Repairs Needed: ☐ Yes ☐ No

Action Required/Taken/Location(s): _____

☐ **Construction Entrance**

Location(s) (Reference intersection of road and nearest STR#): _____

Entrance Stabilized: ☐ Yes ☐ No Evidence of mud tracked on roadway: ☐ Yes ☐ No

Action Required/Taken/Location(s): _____

☐ **Material Storage Areas (Including waste containers, fuel areas)**

Material Storage Areas located on site and shown on the SWP3: ☐ Yes ☐ No

Materials properly contained and labeled: ☐ Yes ☐ No Evidence of spills or releases: ☐ Yes ☐ No

Action Required/Taken/Location(s): _____

☐ **Concrete Washouts**

Location(s) (Access Road / STR#): _____

Properly installed and located at least 50 feet from wetlands/streams/ditches/storm drains: ☐ Yes ☐ No

Replacement needed (concrete reaches 50 percent of the system): ☐ Yes ☐ No

Action Required/Taken/Location(s): _____

Comments / Additional Control Measures Recommended: _____

If BMP modifications are made, you must update the SWP3 drawings and document changes on the SWP3 amendment log.

Inspector's Signature: _____

Date: _____

AEP OHIO TRANSMISSION COMPANY, INC.
NORTH PROCTORVILLE STATION PROJECT

STORM WATER POLLUTION PREVENTION PLAN
AMENDMENTS, GRADING, AND STABILIZATION LOG

Date: _____ Inspector's Name/Title: _____

Location and Description of Grading and Stabilization Activities

Amendments to SWP3:

Date: _____ Inspector's Name/Title: _____

Location and Description of Grading and Stabilization Activities

Amendments to SWP3:

Date: _____ Inspector's Name/Title: _____

Location and Description of Grading and Stabilization Activities

Amendments to SWP3:

AEP OHIO TRANSMISSION COMPANY, INC. NORTH PROCTORVILLE STATION PROJECT

SUMMARY SWP3 INSPECTION RECORDS – FOR TCRs

I have completed a review of the SWP3 inspections completed on the project for the period of _____ to _____.

The following major observations were made relating to the implementation of the SWP3 and review of the inspection log.

Inspector Qualifications:

- ☐ The inspections were performed by "qualified inspection personnel" knowledgeable in the principles of erosion and sediment control and skilled in assessing the effectiveness of control measures.
- ☐ The inspections were NOT performed by "qualified inspection personnel" knowledgeable in the principles of erosion and sediment control and skilled in assessing the effectiveness of control measures.
- ☐ Corrective Measures were taken on _____ to provide "qualified inspection personnel" at the site.

Permit Compliance Observations:

- ☐ The project was in compliance with the SWP3 and permit during the review period.
- ☐ The project was NOT in compliance with the SWP3 and permit during the review period as noted below:

☐ Non-compliance issues included:

☐ Corrective Measures were taken on _____ to correct the above non-compliance issues.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name: _____

Title: _____

Signature: _____

Date: _____

APPENDIX 4

Duty to Inform Contractors and Subcontractors Signature Form

AEP OHIO TRANSMISSION COMPANY, INC. NORTH PROCTORVILLE STATION PROJECT

DUTY TO INFORM CONTRACTORS AND SUBCONTRACTORS SIGNATURE FORM

By signing below, I acknowledge that I have been informed of the terms and conditions of the Ohio Environmental Protection Agency's General NPDES Permit for Storm Water Associated with Construction Activity, and have reviewed and understand the conditions and responsibilities of the Storm Water Pollution Prevention Plan for the AEP Ohio Transmission Company, Inc. NORTH PROCTORVILLE STATION Project. I understand that Inspectors shall meet the qualifications outlined in Part VII.BB. of Ohio EPA Permit No.: OHC000005.

[illegible]

APPENDIX 5

Storm Water Calculations Report

**North Proctorville 765kV Substation
Tax Map: 23-031-1500.00
Proctorville, OH**

**American Electric Power Company
1 Riverside Plaza
Columbus, OH 43215**

DRAINAGE NARRATIVE AND COMPUTATION SYNOPSIS

PREPARED BY:
EARTH ENVIRONMENTAL AND CIVIL, INC.
235 CLAIBORNE AVE.
ROCKY MOUNT, VA 24151
PH: 540-483-5975
www.earthenv.com

PROJECT NO. 19-030
DATE: August 15, 2019
REVISION 1: October 17, 2019



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3.0	Post Developed Condition	2
4.0	Water Quality	3
5.0	Stormwater Quantity.....	3
6.0	Conclusion:.....	4

APPENDICES

APPENDIX A:

NOAA Precipitation Data
Pre-Hydrographs
Post-Hydrographs

1.0 Introduction

The purpose of this project involves the addition of high security fencing to the existing 765kV substation. High security fencing will replace the already existing station fence. In addition, a perimeter of chain link fencing will be added outside of the high security fencing. This will require minor grading in order to expand the gravel pad in certain sections of the station perimeter. Approximately 0.31 acre of gravel will be added to the existing substation. This project has a Limits of Disturbance (LOD) of 8.31 acres. The station access road is located on state road 775, approximately 4 miles north of Proctorville, Ohio. The site is identified as Tax Map 23-031-1500.000.

This synopsis has been created to provide a quick and simple detail of the Stormwater Management strategies contained herein. All hydrographs and sizing calculations mentioned in this synopsis were utilized to provide values shown within the plan set Sheets E-1720 to E1730. Drainage Area Computations have been completed using the NOAA's Atlas 14 Rainfall Data for Proctorville, Ohio. Throughout this document, all Drainage Areas are calculated for the 1, 2, 5, 10, 25, and 100-year storm events. The SCS Method for calculating runoff has been utilized for the sizing of the stormwater features which have been utilized to reduce post development flow rates to at or below pre development flow rates.

2.0 Pre-Developed Condition

Current conditions indicate the project location resides on property containing an existing 765kV substation. The parcel's land cover is comprised of grass, gravel, and forested land cover. This parcel is bound by Indian Guyan Road to the north, State Road 775 to the east, T-Line right-of-way and open space to the south, and T-Line right-of-way and Indian Guyan Creek to the west. Soil mapping identifies three (3) hydrologic soil ratings on-site, which include B, C, and D soils.

It should be noted this area of Ohio is part of the NWBD Hydrologic Unit Code (HUC 050901010708) Wolf Creek – Indian Guyan Creek watershed. This sub watershed is a part of the Raccoon River basin. There was not a TMDL report for this subregion of Ohio.

The site has one (1) Pre-Drainage Area, which was delineated to a nearby focal point northwest of the property corner. This drainage area is comprised of open space and gravel cover. Hydrographs/Routing and the TR55 Breakdowns are included in Appendix A of this document.

Below is a small schematic of the pre-drainage area, flow chart, and the SCS Method flow rate for Pre-Drainage Area 1.



Post Drainage Area	Area (AC)	Composite CN	1 Year Storm (cfs)	2 Year Storm (cfs)	10 Year Storm (cfs)	25 Year Storm (cfs)	100 Year Storm (cfs)	Point of Analysis
Area 1	79.27	77	20.83	32.61	64.24	86.39	124.27	1

4.0 Water Quality

This project will consist of the installation of a new, higher security, substation fence primarily within the existing footprint of the current substation fence. No permanent stormwater management BMP's or stormwater quality measures are proposed for this project given the limited site work, minimal additional impervious area (0.31 acre for the entirety of the project), and as this project does not discharge through a Municipal Separate Storm Sewer System (MS4). Based on pre and post development drainage calculations the increase in impervious area does not increase the curve number, therefore no increase in runoff or impact to downstream properties is expected.

5.0 Stormwater Quantity

Per Ohio's Division of Surface Water, this project must comply with the requirements of Stream Channel and Flood Plain Erosion, using the Critical Storm Method. Detailed below are the requirements obtained from the Ohio Environmental Protection Agency website.

Stream Channel and Flood Plain Erosion

To control pollution of public waters by soil sediment from accelerated stream channel erosion and to control flood plain erosion caused by accelerated storm water runoff from development areas, the increased peak rates and volumes of runoff shall be controlled such that:

1. The peak rate of runoff from the critical storm and all more frequent storms occurring on the development area does not exceed the peak rate of runoff from a one-year frequency storm (of 24 hours duration) occurring on the same area under pre-development conditions.
2. Storms of less frequent occurrence than the critical storm, up to the one-hundred year storm, have peak runoff rates no greater than the peak runoff rates from equivalent size storms under pre-development conditions.

Analysis Point 1

Analysis Point 1 consists of Post Drainage Area 1. Calculations of runoff before and after development indicates that there will be no increase in peak runoff from Post Drainage Area 1 as a result of project development.

The Critical Storm method was met as design and development match the peak rate of runoff for the one, two, ten, twenty-five, fifty, and one-hundred year storms.

Analysis Point 1					
Drainage Areas	1 Year Storm (cfs)	2 Year Storm (cfs)	10 Year Storm (cfs)	25 Year Storm (cfs)	100 Year Storm (cfs)
Pre Drainage Area 1	20.83	32.61	64.24	86.39	124.27
Post Drainage Area 1	20.83	32.61	64.24	86.39	124.27
Net Change in Runoff	0.000	0.000	0.000	0.000	0.000

Per the Critical Storm method, as design and development match the peak rate of runoff for the one, two, ten, twenty-five, fifty, and one-hundred year storms, no increase in runoff or impact to downstream properties is expected.

6.0 Conclusion:

As indicated in the narrative and charts above, this approach/design is in compliance with the Ohio Division of Surface Water Regulations for Stormwater Quantity, given that the developed site will maintain pre discharge rates, and no impact to downstream properties is anticipated.

APPENDIX A

NOAA RAINFALL DATA PRE HYDROGRAPHS POST HYDROGRAPHS



NOAA RAINFALL DATA



NOAA Atlas 14, Volume 2, Version 3
Location name: Proctorville, Ohio, USA*
Latitude: 38.4776°, Longitude: -82.395°
Elevation: 568.01 ft**
 * source: ESRI Maps
 ** source: USGS



POINT PRECIPITATION FREQUENCY ESTIMATES

G.M. Bonnin, D. Martin, B. Lin, T. Parzybok, M. Yekta, and D. Riley

NOAA, National Weather Service, Silver Spring, Maryland

[PF tabular](#) | [PF graphical](#) | [Maps & aerals](#)

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches) ¹										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.354 (0.323-0.386)	0.421 (0.386-0.461)	0.504 (0.461-0.551)	0.566 (0.518-0.619)	0.645 (0.586-0.704)	0.704 (0.639-0.768)	0.760 (0.686-0.827)	0.816 (0.734-0.886)	0.888 (0.794-0.962)	0.938 (0.835-1.02)
10-min	0.550 (0.502-0.600)	0.657 (0.603-0.720)	0.783 (0.717-0.857)	0.874 (0.799-0.956)	0.986 (0.897-1.08)	1.07 (0.968-1.16)	1.15 (1.03-1.25)	1.22 (1.10-1.32)	1.31 (1.17-1.42)	1.37 (1.22-1.48)
15-min	0.674 (0.616-0.736)	0.804 (0.737-0.881)	0.961 (0.880-1.05)	1.08 (0.984-1.18)	1.22 (1.11-1.33)	1.32 (1.20-1.44)	1.42 (1.28-1.55)	1.52 (1.36-1.65)	1.63 (1.46-1.77)	1.71 (1.52-1.85)
30-min	0.892 (0.815-0.974)	1.08 (0.986-1.18)	1.32 (1.21-1.44)	1.49 (1.37-1.63)	1.72 (1.56-1.88)	1.89 (1.71-2.06)	2.05 (1.85-2.23)	2.21 (1.99-2.40)	2.41 (2.16-2.62)	2.56 (2.28-2.77)
60-min	1.09 (0.995-1.19)	1.32 (1.21-1.45)	1.65 (1.51-1.81)	1.90 (1.74-2.08)	2.23 (2.03-2.44)	2.49 (2.26-2.71)	2.75 (2.48-2.99)	3.00 (2.70-3.26)	3.34 (2.99-3.62)	3.60 (3.20-3.89)
2-hr	1.26 (1.15-1.37)	1.52 (1.39-1.66)	1.90 (1.74-2.07)	2.19 (2.00-2.38)	2.59 (2.35-2.81)	2.90 (2.62-3.14)	3.22 (2.90-3.48)	3.54 (3.17-3.82)	3.98 (3.54-4.29)	4.32 (3.81-4.65)
3-hr	1.32 (1.21-1.45)	1.60 (1.46-1.75)	1.99 (1.82-2.19)	2.30 (2.10-2.52)	2.72 (2.47-2.97)	3.06 (2.76-3.33)	3.40 (3.06-3.70)	3.75 (3.36-4.08)	4.23 (3.76-4.59)	4.62 (4.07-5.00)
6-hr	1.56 (1.44-1.71)	1.88 (1.74-2.05)	2.32 (2.14-2.53)	2.67 (2.45-2.90)	3.17 (2.90-3.44)	3.57 (3.25-3.86)	3.98 (3.60-4.30)	4.41 (3.97-4.75)	5.01 (4.46-5.37)	5.49 (4.85-5.87)
12-hr	1.83 (1.71-1.98)	2.19 (2.04-2.36)	2.67 (2.48-2.88)	3.07 (2.85-3.30)	3.63 (3.36-3.90)	4.10 (3.76-4.38)	4.58 (4.18-4.89)	5.08 (4.61-5.41)	5.79 (5.19-6.14)	6.36 (5.65-6.74)
24-hr	2.22 (2.08-2.37)	2.65 (2.48-2.82)	3.20 (3.00-3.41)	3.65 (3.42-3.89)	4.29 (4.00-4.55)	4.80 (4.46-5.09)	5.33 (4.94-5.65)	5.88 (5.43-6.23)	6.65 (6.11-7.02)	7.25 (6.64-7.66)
2-day	2.65 (2.49-2.82)	3.14 (2.95-3.35)	3.76 (3.53-4.01)	4.26 (3.99-4.54)	4.95 (4.62-5.27)	5.49 (5.12-5.84)	6.05 (5.63-6.43)	6.62 (6.14-7.04)	7.40 (6.83-7.86)	8.00 (7.36-8.50)
3-day	2.85 (2.67-3.05)	3.38 (3.16-3.62)	4.03 (3.76-4.31)	4.54 (4.24-4.86)	5.25 (4.88-5.60)	5.80 (5.39-6.18)	6.36 (5.90-6.77)	6.92 (6.40-7.37)	7.68 (7.08-8.18)	8.27 (7.59-8.79)
4-day	3.05 (2.85-3.28)	3.62 (3.37-3.88)	4.29 (4.00-4.61)	4.83 (4.49-5.18)	5.55 (5.15-5.93)	6.10 (5.66-6.52)	6.66 (6.16-7.11)	7.23 (6.67-7.70)	7.97 (7.33-8.49)	8.54 (7.83-9.09)
7-day	3.65 (3.43-3.88)	4.30 (4.05-4.58)	5.04 (4.75-5.36)	5.61 (5.28-5.97)	6.36 (5.98-6.75)	6.93 (6.50-7.35)	7.48 (7.00-7.93)	8.02 (7.50-8.50)	8.71 (8.13-9.24)	9.22 (8.59-9.78)
10-day	4.19 (3.96-4.45)	4.94 (4.66-5.24)	5.73 (5.40-6.07)	6.33 (5.96-6.71)	7.10 (6.68-7.52)	7.68 (7.22-8.14)	8.24 (7.73-8.73)	8.77 (8.22-9.30)	9.45 (8.82-10.0)	9.94 (9.26-10.5)
20-day	5.81 (5.52-6.11)	6.81 (6.47-7.16)	7.78 (7.39-8.19)	8.51 (8.09-8.95)	9.43 (8.95-9.92)	10.1 (9.58-10.6)	10.7 (10.2-11.3)	11.3 (10.7-11.9)	12.0 (11.4-12.7)	12.5 (11.8-13.2)
30-day	7.28 (6.96-7.62)	8.50 (8.13-8.90)	9.62 (9.18-10.1)	10.4 (9.96-10.9)	11.5 (10.9-12.0)	12.2 (11.6-12.7)	12.9 (12.3-13.5)	13.5 (12.8-14.1)	14.2 (13.5-14.9)	14.7 (14.0-15.4)
45-day	9.27 (8.87-9.68)	10.8 (10.3-11.3)	12.1 (11.5-12.6)	13.0 (12.4-13.6)	14.2 (13.5-14.8)	15.0 (14.3-15.6)	15.7 (15.0-16.4)	16.4 (15.6-17.1)	17.1 (16.3-17.9)	17.7 (16.8-18.4)
60-day	11.1 (10.7-11.6)	12.9 (12.4-13.5)	14.3 (13.7-15.0)	15.4 (14.7-16.0)	16.6 (15.9-17.3)	17.5 (16.8-18.2)	18.3 (17.5-19.0)	19.0 (18.1-19.8)	19.8 (18.9-20.6)	20.3 (19.4-21.2)

¹ Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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PF graphical



NOAA Atlas 14, Volume 2, Version 3
Location name: Proctorville, Ohio, USA*
Latitude: 38.4776°, Longitude: -82.395°
Elevation: 568.01 ft**
 * source: ESRI Maps
 ** source: USGS



POINT PRECIPITATION FREQUENCY ESTIMATES

G.M. Bonnin, D. Martin, B. Lin, T. Parzybok, M. Yekta, and D. Riley

NOAA, National Weather Service, Silver Spring, Maryland

[PF tabular](#) | [PF graphical](#) | [Maps & aeriels](#)

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches/hour) ¹										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	4.25 (3.88-4.63)	5.05 (4.63-5.53)	6.05 (5.53-6.61)	6.79 (6.22-7.43)	7.74 (7.03-8.45)	8.45 (7.67-9.22)	9.12 (8.23-9.92)	9.79 (8.81-10.6)	10.7 (9.53-11.5)	11.3 (10.0-12.2)
10-min	3.30 (3.01-3.60)	3.94 (3.62-4.32)	4.70 (4.30-5.14)	5.24 (4.79-5.74)	5.92 (5.38-6.46)	6.41 (5.81-6.98)	6.87 (6.20-7.48)	7.31 (6.58-7.93)	7.83 (7.00-8.49)	8.20 (7.30-8.88)
15-min	2.70 (2.46-2.94)	3.22 (2.95-3.52)	3.84 (3.52-4.21)	4.30 (3.94-4.70)	4.87 (4.43-5.32)	5.29 (4.79-5.76)	5.69 (5.14-6.19)	6.06 (5.45-6.58)	6.51 (5.83-7.06)	6.83 (6.08-7.40)
30-min	1.78 (1.63-1.95)	2.15 (1.97-2.36)	2.63 (2.41-2.88)	2.99 (2.73-3.27)	3.44 (3.13-3.75)	3.78 (3.43-4.12)	4.11 (3.71-4.47)	4.42 (3.98-4.80)	4.83 (4.32-5.23)	5.12 (4.56-5.55)
60-min	1.09 (0.995-1.19)	1.32 (1.21-1.45)	1.65 (1.51-1.81)	1.90 (1.74-2.08)	2.23 (2.03-2.44)	2.49 (2.26-2.71)	2.75 (2.48-2.99)	3.00 (2.70-3.26)	3.34 (2.99-3.62)	3.60 (3.20-3.89)
2-hr	0.628 (0.574-0.684)	0.762 (0.696-0.832)	0.950 (0.869-1.04)	1.10 (0.999-1.19)	1.30 (1.17-1.41)	1.45 (1.31-1.57)	1.61 (1.45-1.74)	1.77 (1.58-1.91)	1.99 (1.77-2.14)	2.16 (1.91-2.32)
3-hr	0.440 (0.403-0.483)	0.531 (0.487-0.584)	0.663 (0.606-0.728)	0.765 (0.698-0.837)	0.905 (0.822-0.988)	1.02 (0.920-1.11)	1.13 (1.02-1.23)	1.25 (1.12-1.36)	1.41 (1.25-1.53)	1.54 (1.36-1.67)
6-hr	0.261 (0.241-0.285)	0.313 (0.290-0.343)	0.387 (0.357-0.422)	0.446 (0.410-0.485)	0.529 (0.484-0.574)	0.596 (0.542-0.645)	0.665 (0.602-0.718)	0.737 (0.662-0.793)	0.836 (0.745-0.897)	0.916 (0.810-0.980)
12-hr	0.152 (0.142-0.164)	0.181 (0.169-0.196)	0.222 (0.206-0.239)	0.255 (0.237-0.274)	0.302 (0.279-0.324)	0.340 (0.312-0.364)	0.380 (0.347-0.406)	0.422 (0.383-0.449)	0.480 (0.431-0.510)	0.528 (0.469-0.559)
24-hr	0.093 (0.087-0.099)	0.110 (0.103-0.118)	0.133 (0.125-0.142)	0.152 (0.142-0.162)	0.179 (0.167-0.190)	0.200 (0.186-0.212)	0.222 (0.206-0.235)	0.245 (0.226-0.259)	0.277 (0.255-0.293)	0.302 (0.276-0.319)
2-day	0.055 (0.052-0.059)	0.065 (0.061-0.070)	0.078 (0.073-0.084)	0.089 (0.083-0.095)	0.103 (0.096-0.110)	0.114 (0.107-0.122)	0.126 (0.117-0.134)	0.138 (0.128-0.147)	0.154 (0.142-0.164)	0.167 (0.153-0.177)
3-day	0.040 (0.037-0.042)	0.047 (0.044-0.050)	0.056 (0.052-0.060)	0.063 (0.059-0.067)	0.073 (0.068-0.078)	0.081 (0.075-0.086)	0.088 (0.082-0.094)	0.096 (0.089-0.102)	0.107 (0.098-0.114)	0.115 (0.105-0.122)
4-day	0.032 (0.030-0.034)	0.038 (0.035-0.040)	0.045 (0.042-0.048)	0.050 (0.047-0.054)	0.058 (0.054-0.062)	0.064 (0.059-0.068)	0.069 (0.064-0.074)	0.075 (0.069-0.080)	0.083 (0.076-0.088)	0.089 (0.082-0.095)
7-day	0.022 (0.020-0.023)	0.026 (0.024-0.027)	0.030 (0.028-0.032)	0.033 (0.031-0.036)	0.038 (0.036-0.040)	0.041 (0.039-0.044)	0.045 (0.042-0.047)	0.048 (0.045-0.051)	0.052 (0.048-0.055)	0.055 (0.051-0.058)
10-day	0.017 (0.016-0.019)	0.021 (0.019-0.022)	0.024 (0.022-0.025)	0.026 (0.025-0.028)	0.030 (0.028-0.031)	0.032 (0.030-0.034)	0.034 (0.032-0.036)	0.037 (0.034-0.039)	0.039 (0.037-0.042)	0.041 (0.039-0.044)
20-day	0.012 (0.011-0.013)	0.014 (0.013-0.015)	0.016 (0.015-0.017)	0.018 (0.017-0.019)	0.020 (0.019-0.021)	0.021 (0.020-0.022)	0.022 (0.021-0.024)	0.024 (0.022-0.025)	0.025 (0.024-0.026)	0.026 (0.025-0.027)
30-day	0.010 (0.010-0.011)	0.012 (0.011-0.012)	0.013 (0.013-0.014)	0.014 (0.014-0.015)	0.016 (0.015-0.017)	0.017 (0.016-0.018)	0.018 (0.017-0.019)	0.019 (0.018-0.020)	0.020 (0.019-0.021)	0.020 (0.019-0.021)
45-day	0.009 (0.008-0.009)	0.010 (0.010-0.010)	0.011 (0.011-0.012)	0.012 (0.012-0.013)	0.013 (0.013-0.014)	0.014 (0.013-0.014)	0.015 (0.014-0.015)	0.015 (0.014-0.016)	0.016 (0.015-0.017)	0.016 (0.016-0.017)
60-day	0.008 (0.007-0.008)	0.009 (0.009-0.009)	0.010 (0.010-0.010)	0.011 (0.010-0.011)	0.012 (0.011-0.012)	0.012 (0.012-0.013)	0.013 (0.012-0.013)	0.013 (0.013-0.014)	0.014 (0.013-0.014)	0.014 (0.013-0.015)

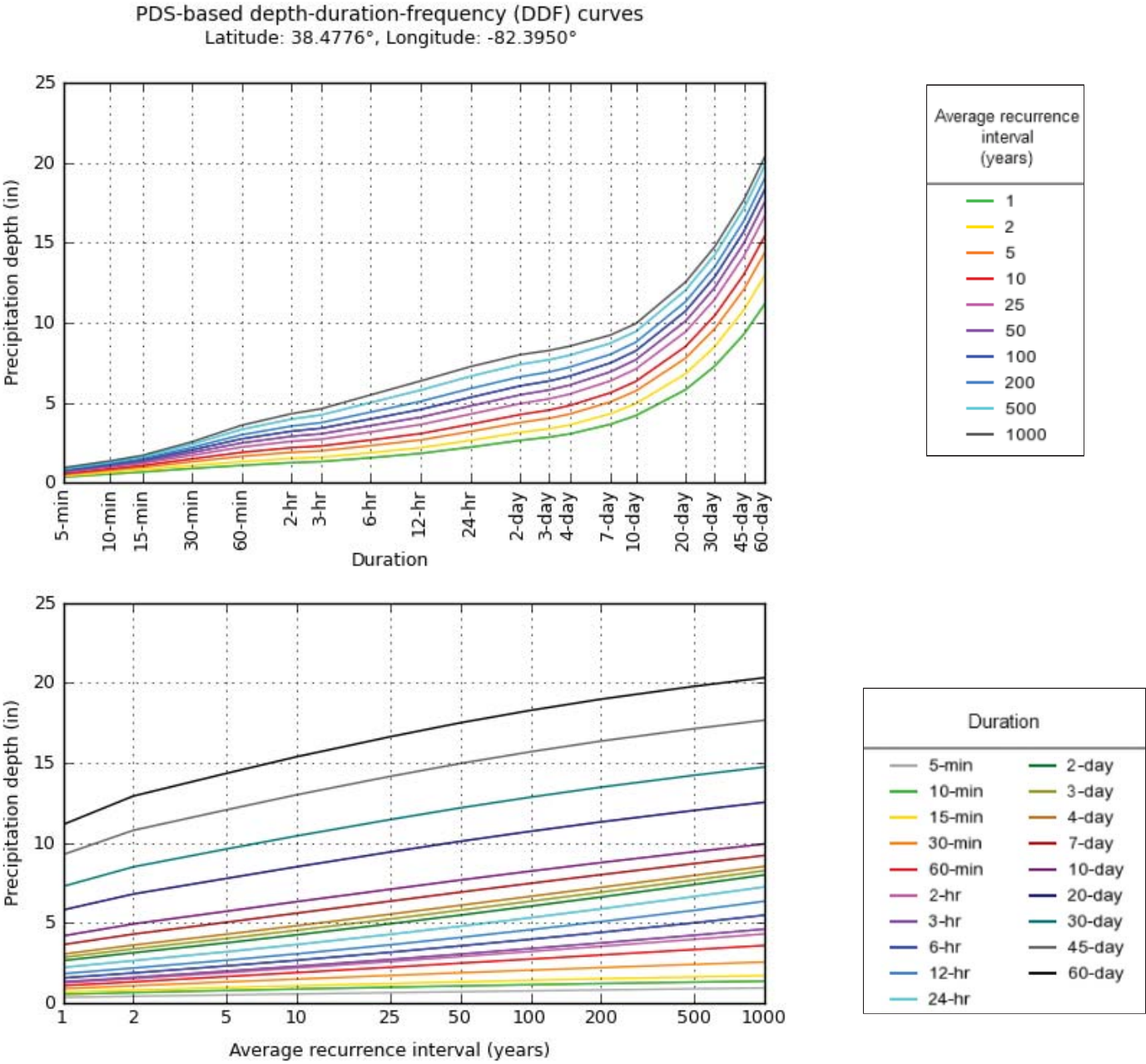
¹ Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

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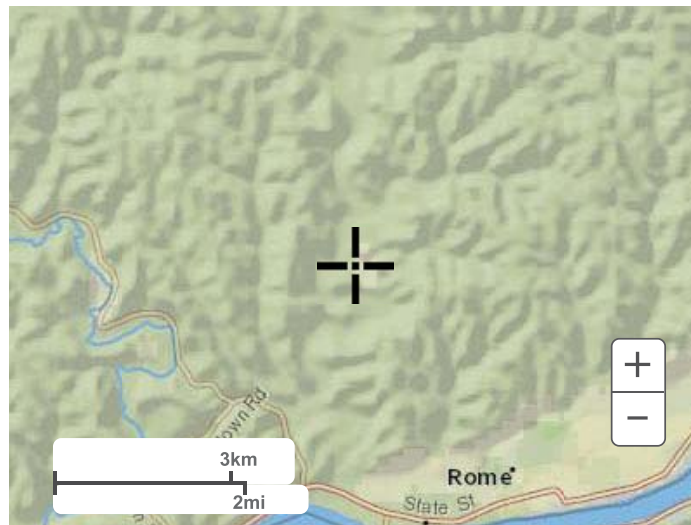
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PF graphical

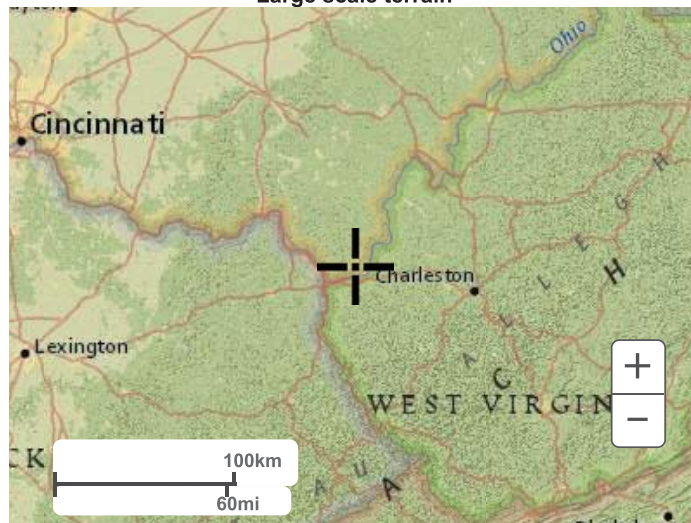


Maps & aerials

Small scale terrain



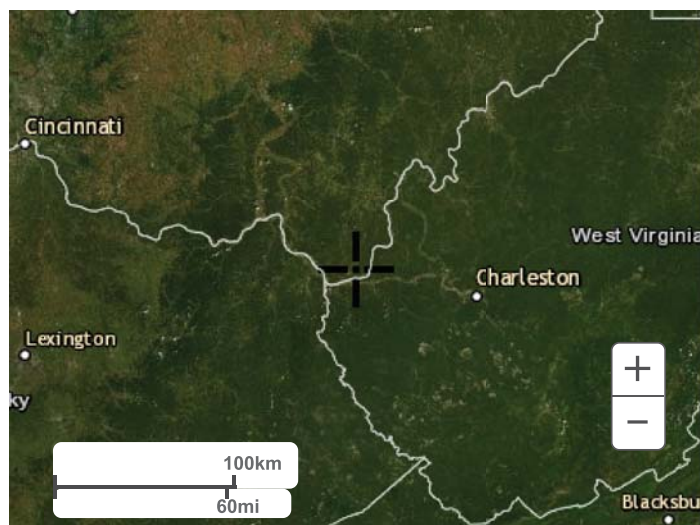
Large scale terrain



Large scale map



Large scale aerial

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Questions?: HDSC.Questions@noaa.gov

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PRE HYDROGRAPHS

TR55 Tc Worksheet

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Hyd. No. 1

PRE DA

<u>Description</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>Totals</u>			
Sheet Flow							
Manning's n-value	= 0.400	0.011	0.011				
Flow length (ft)	= 200.0	0.0	0.0				
Two-year 24-hr precip. (in)	= 2.65	0.00	0.00				
Land slope (%)	= 1.00	0.00	0.00				
Travel Time (min)	= 54.21	+	0.00	+	0.00	=	54.21
Shallow Concentrated Flow							
Flow length (ft)	= 50.00	170.00	165.00				
Watercourse slope (%)	= 4.00	6.67	37.00				
Surface description	= Unpaved	Unpaved	Unpaved				
Average velocity (ft/s)	=3.23	4.17	9.81				
Travel Time (min)	= 0.26	+	0.68	+	0.28	=	1.22
Channel Flow							
X sectional flow area (sqft)	= 10.00	0.00	0.00				
Wetted perimeter (ft)	= 5.00	0.00	0.00				
Channel slope (%)	= 0.85	0.00	0.00				
Manning's n-value	= 0.035	0.015	0.015				
Velocity (ft/s)	=6.24	0.00	0.00				
Flow length (ft)	({})2578.0	0.0	0.0				
Travel Time (min)	= 6.88	+	0.00	+	0.00	=	6.88
Total Travel Time, Tc				62.30 min			

Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

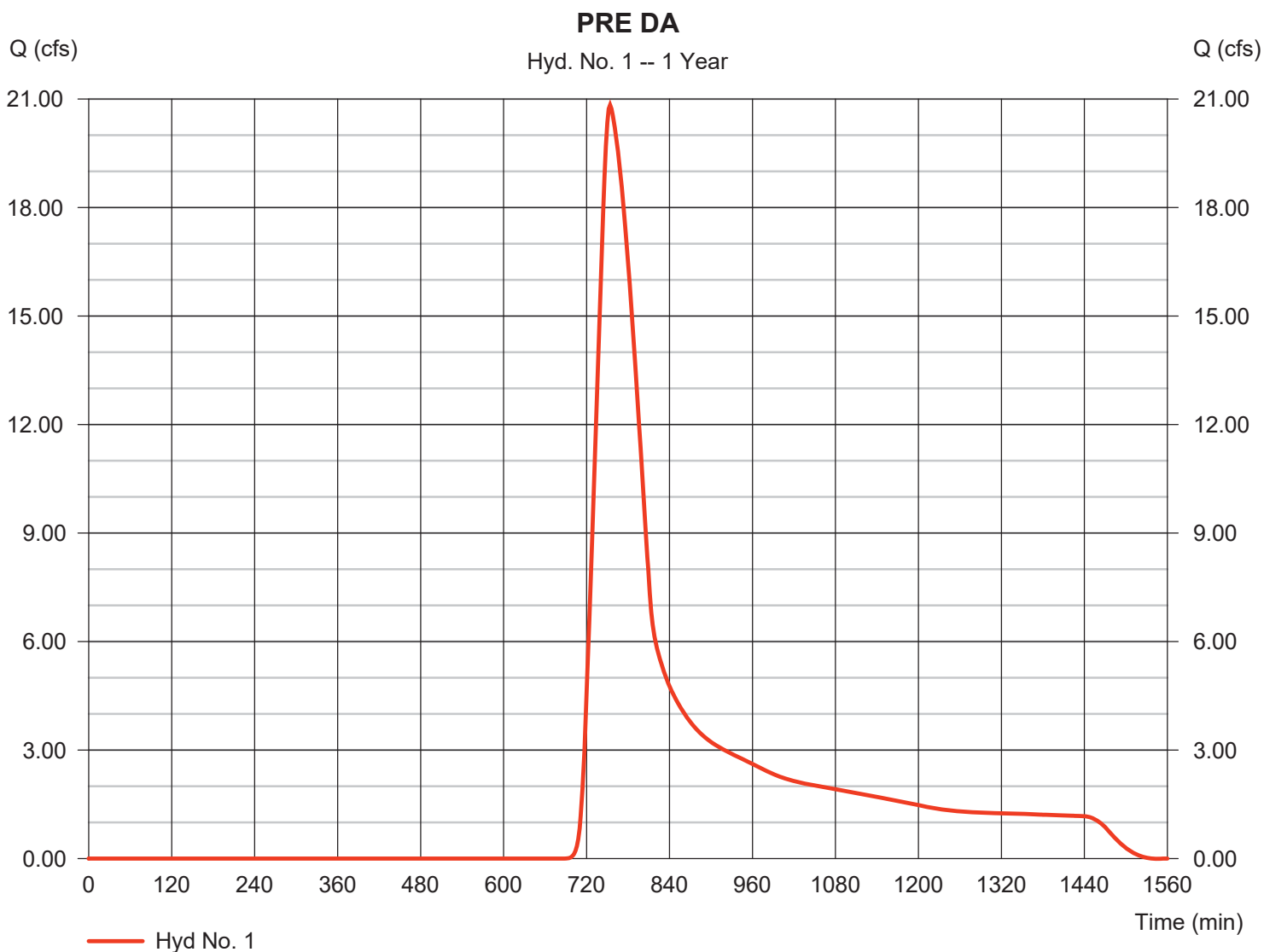
Thursday, 08 / 15 / 2019

Hyd. No. 1

PRE DA

Hydrograph type	= SCS Runoff	Peak discharge	= 20.83 cfs
Storm frequency	= 1 yrs	Time to peak	= 754 min
Time interval	= 2 min	Hyd. volume	= 165,432 cuft
Drainage area	= 79.270 ac	Curve number	= 77*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 62.30 min
Total precip.	= 2.22 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(18.640 \times 55) + (11.440 \times 70) + (25.130 \times 77) + (24.060 \times 98)] / 79.270$



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

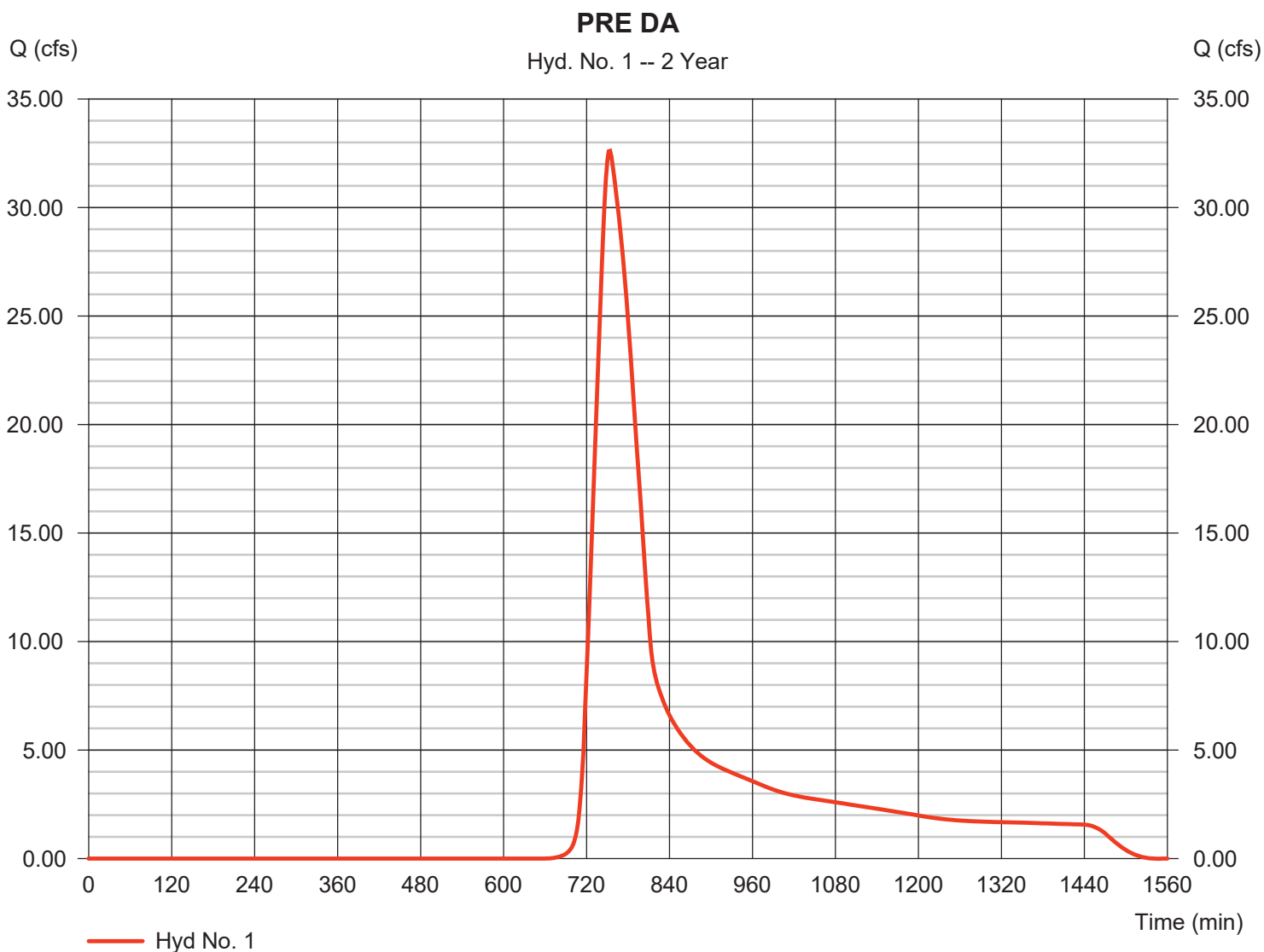
Thursday, 08 / 15 / 2019

Hyd. No. 1

PRE DA

Hydrograph type	= SCS Runoff	Peak discharge	= 32.61 cfs
Storm frequency	= 2 yrs	Time to peak	= 754 min
Time interval	= 2 min	Hyd. volume	= 242,144 cuft
Drainage area	= 79.270 ac	Curve number	= 77*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 62.30 min
Total precip.	= 2.65 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(18.640 \times 55) + (11.440 \times 70) + (25.130 \times 77) + (24.060 \times 98)] / 79.270$



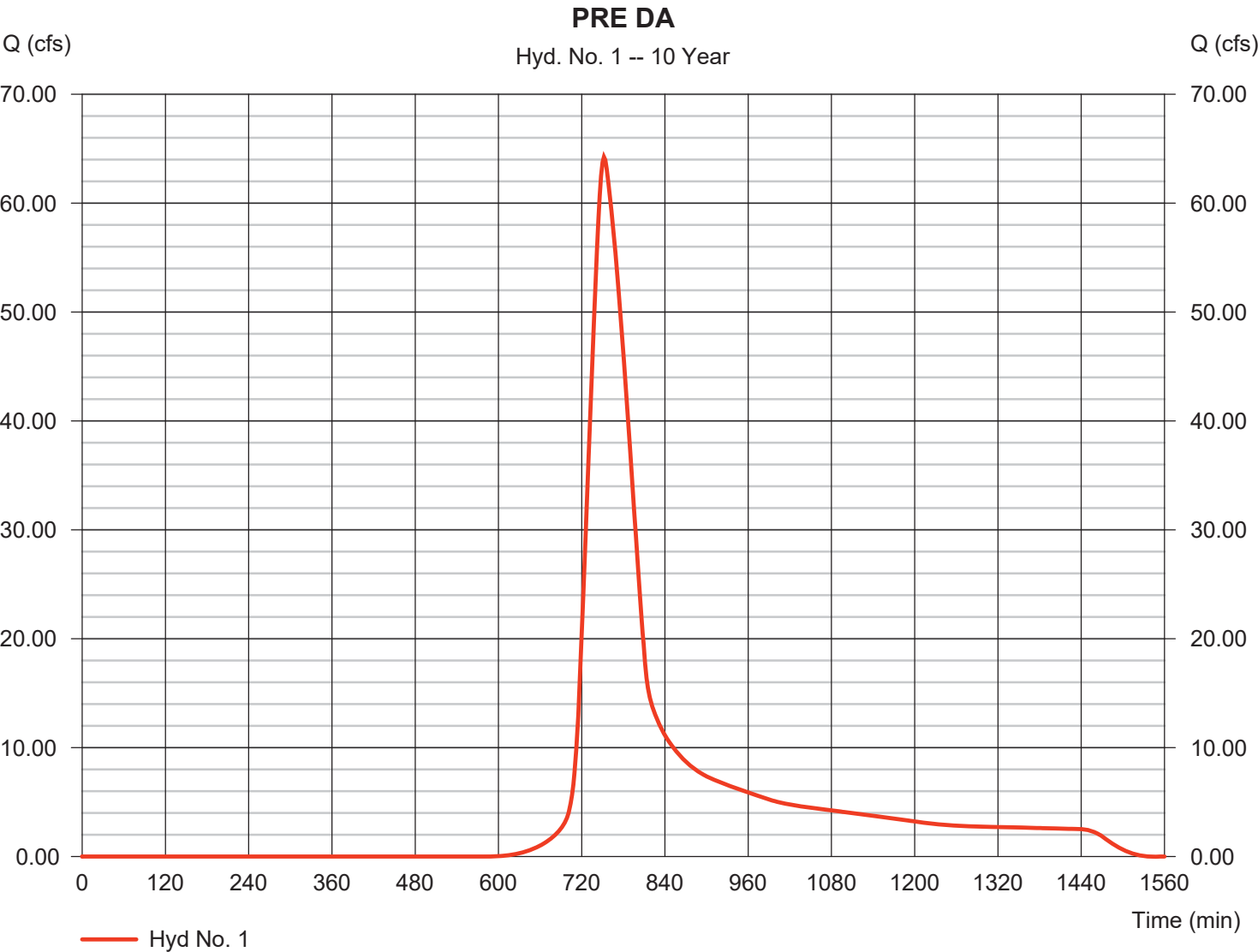
Hydrograph Report

Hyd. No. 1

PRE DA

Hydrograph type	=	SCS Runoff	Peak discharge	=	64.24 cfs
Storm frequency	=	10 yrs	Time to peak	=	752 min
Time interval	=	2 min	Hyd. volume	=	446,883 cuft
Drainage area	=	79.270 ac	Curve number	=	77*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	62.30 min
Total precip.	=	3.65 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(18.640 x 55) + (11.440 x 70) + (25.130 x 77) + (24.060 x 98)] / 79.270



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

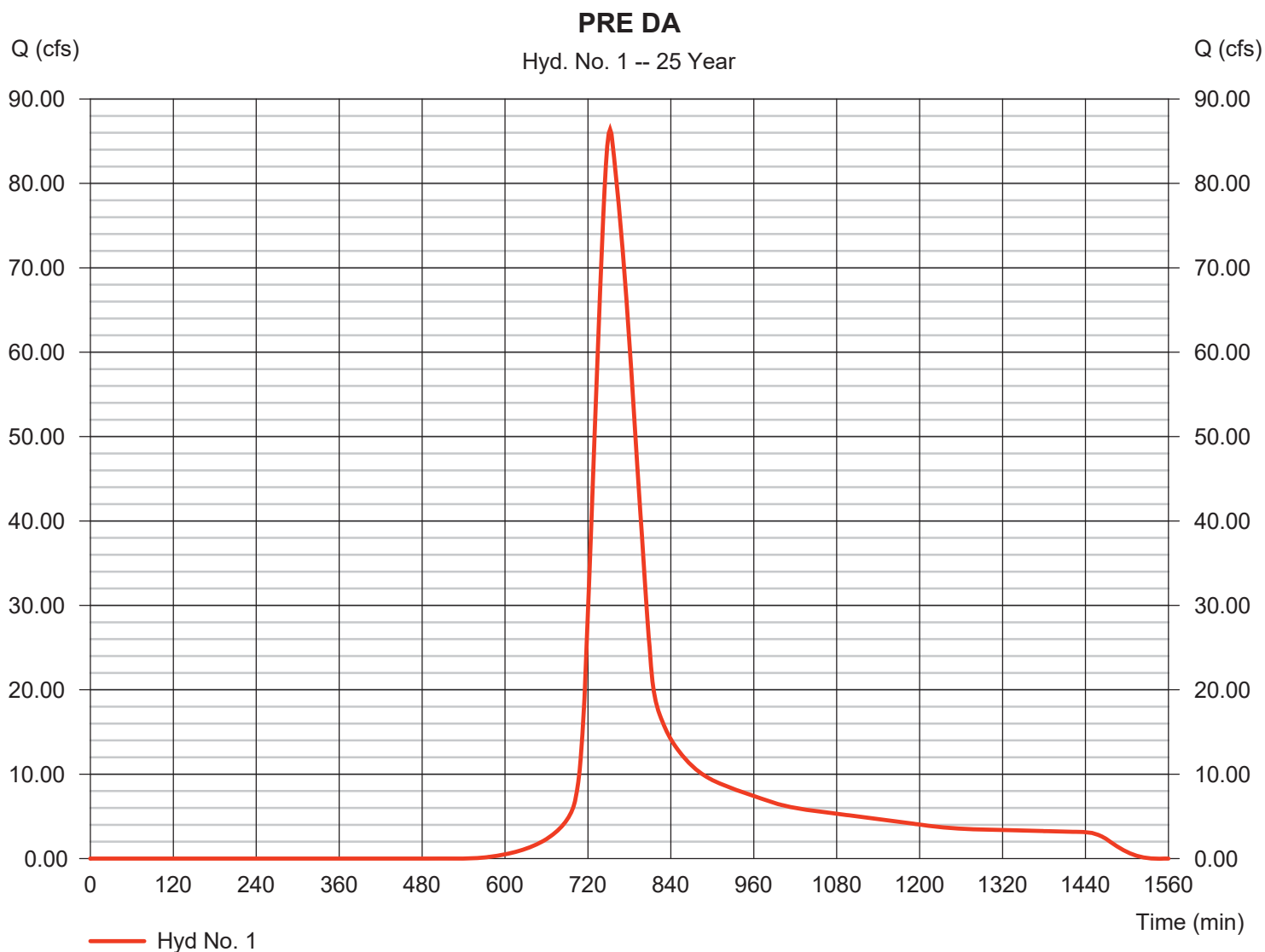
Thursday, 08 / 15 / 2019

Hyd. No. 1

PRE DA

Hydrograph type	= SCS Runoff	Peak discharge	= 86.39 cfs
Storm frequency	= 25 yrs	Time to peak	= 752 min
Time interval	= 2 min	Hyd. volume	= 591,256 cuft
Drainage area	= 79.270 ac	Curve number	= 77*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 62.30 min
Total precip.	= 4.29 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(18.640 \times 55) + (11.440 \times 70) + (25.130 \times 77) + (24.060 \times 98)] / 79.270$



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

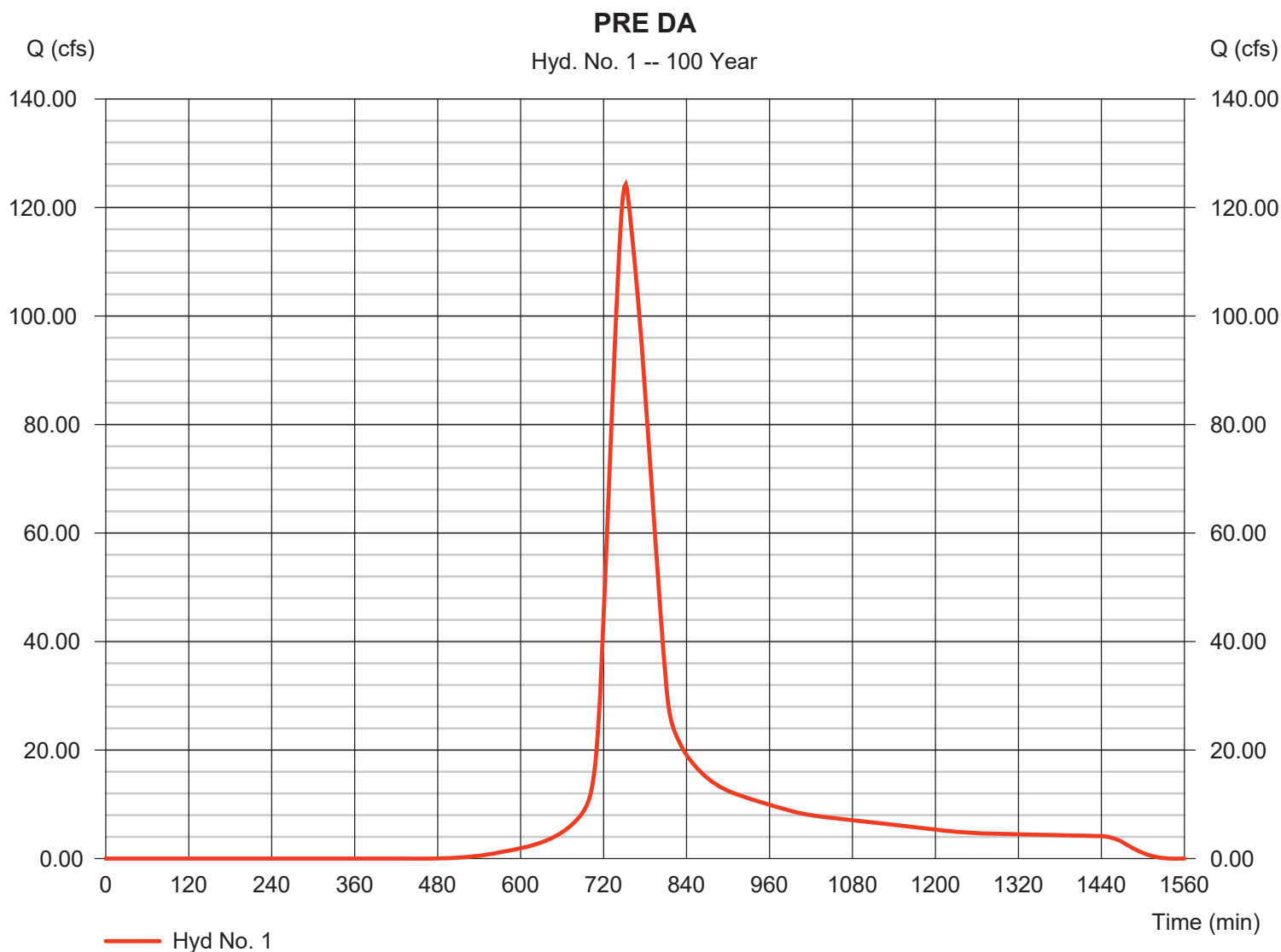
Thursday, 08 / 15 / 2019

Hyd. No. 1

PRE DA

Hydrograph type	= SCS Runoff	Peak discharge	= 124.27 cfs
Storm frequency	= 100 yrs	Time to peak	= 752 min
Time interval	= 2 min	Hyd. volume	= 840,364 cuft
Drainage area	= 79.270 ac	Curve number	= 77*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 62.30 min
Total precip.	= 5.33 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(18.640 \times 55) + (11.440 \times 70) + (25.130 \times 77) + (24.060 \times 98)] / 79.270$



POST HYDROGRAPHS

TR55 Tc Worksheet

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Hyd. No. 3

POST DA

<u>Description</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>Totals</u>			
Sheet Flow							
Manning's n-value	= 0.400	0.011	0.011				
Flow length (ft)	= 200.0	0.0	0.0				
Two-year 24-hr precip. (in)	= 2.65	0.00	0.00				
Land slope (%)	= 1.00	0.00	0.00				
Travel Time (min)	= 54.21	+	0.00	+	0.00	=	54.21
Shallow Concentrated Flow							
Flow length (ft)	= 50.00	170.00	165.00				
Watercourse slope (%)	= 4.00	6.67	37.00				
Surface description	= Unpaved	Unpaved	Unpaved				
Average velocity (ft/s)	=3.23	4.17	9.81				
Travel Time (min)	= 0.26	+	0.68	+	0.28	=	1.22
Channel Flow							
X sectional flow area (sqft)	= 10.00	0.00	0.00				
Wetted perimeter (ft)	= 5.00	0.00	0.00				
Channel slope (%)	= 0.85	0.00	0.00				
Manning's n-value	= 0.035	0.015	0.015				
Velocity (ft/s)	=6.24	0.00	0.00				
Flow length (ft)	(\{0\})2578.0	0.0	0.0				
Travel Time (min)	= 6.88	+	0.00	+	0.00	=	6.88
Total Travel Time, Tc				62.30 min			

Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Thursday, 08 / 15 / 2019

Hyd. No. 3

POST DA

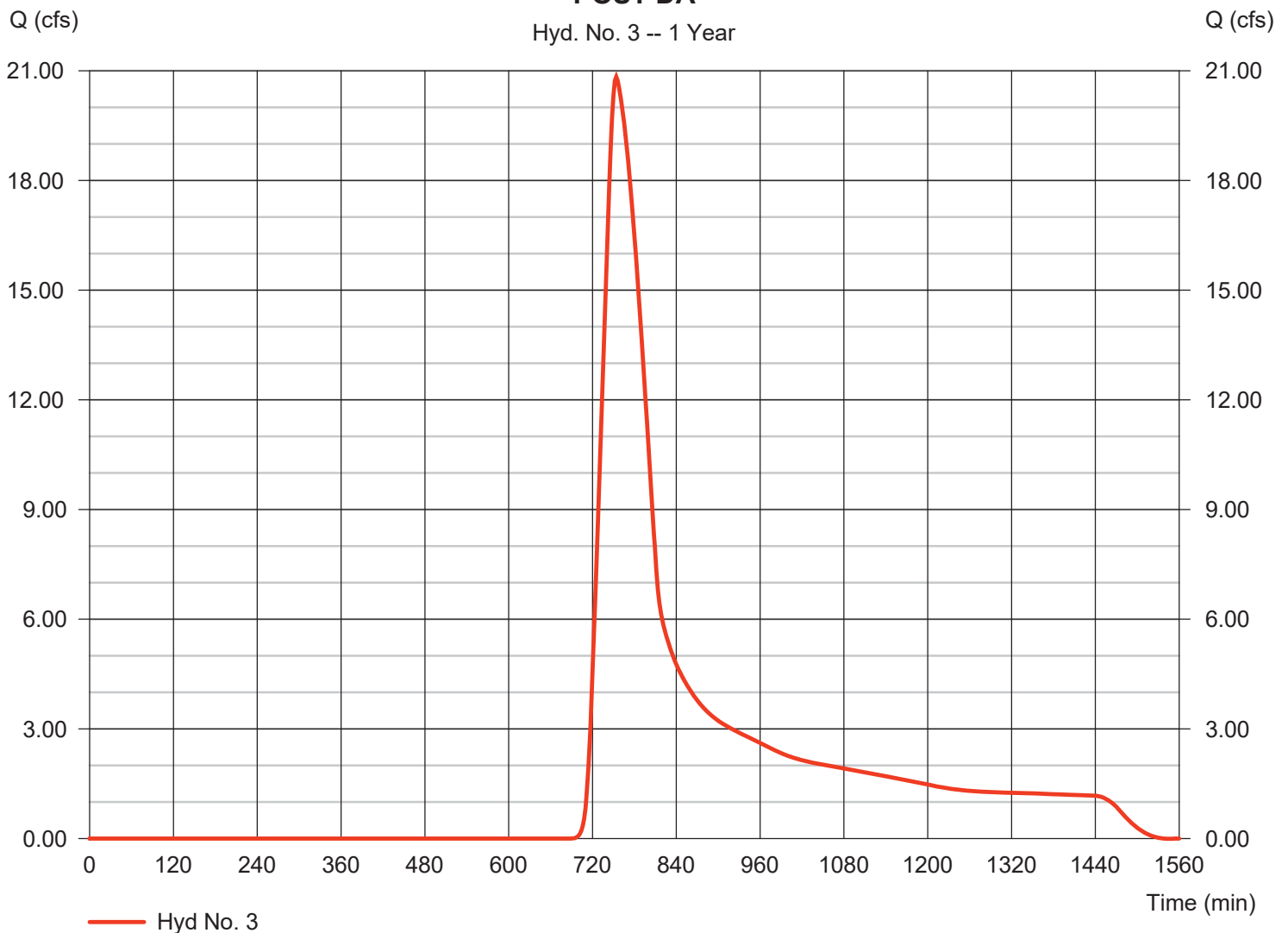
Hydrograph type = SCS Runoff
 Storm frequency = 1 yrs
 Time interval = 2 min
 Drainage area = 79.270 ac
 Basin Slope = 0.0 %
 Tc method = TR55
 Total precip. = 2.22 in
 Storm duration = 24 hrs

Peak discharge = 20.83 cfs
 Time to peak = 754 min
 Hyd. volume = 165,432 cuft
 Curve number = 77*
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 62.30 min
 Distribution = Type II
 Shape factor = 484

* Composite (Area/CN) = $[(18.340 \times 55) + (11.440 \times 70) + (25.120 \times 77) + (24.370 \times 98)] / 79.270$

POST DA

Hyd. No. 3 -- 1 Year



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Thursday, 08 / 15 / 2019

Hyd. No. 3

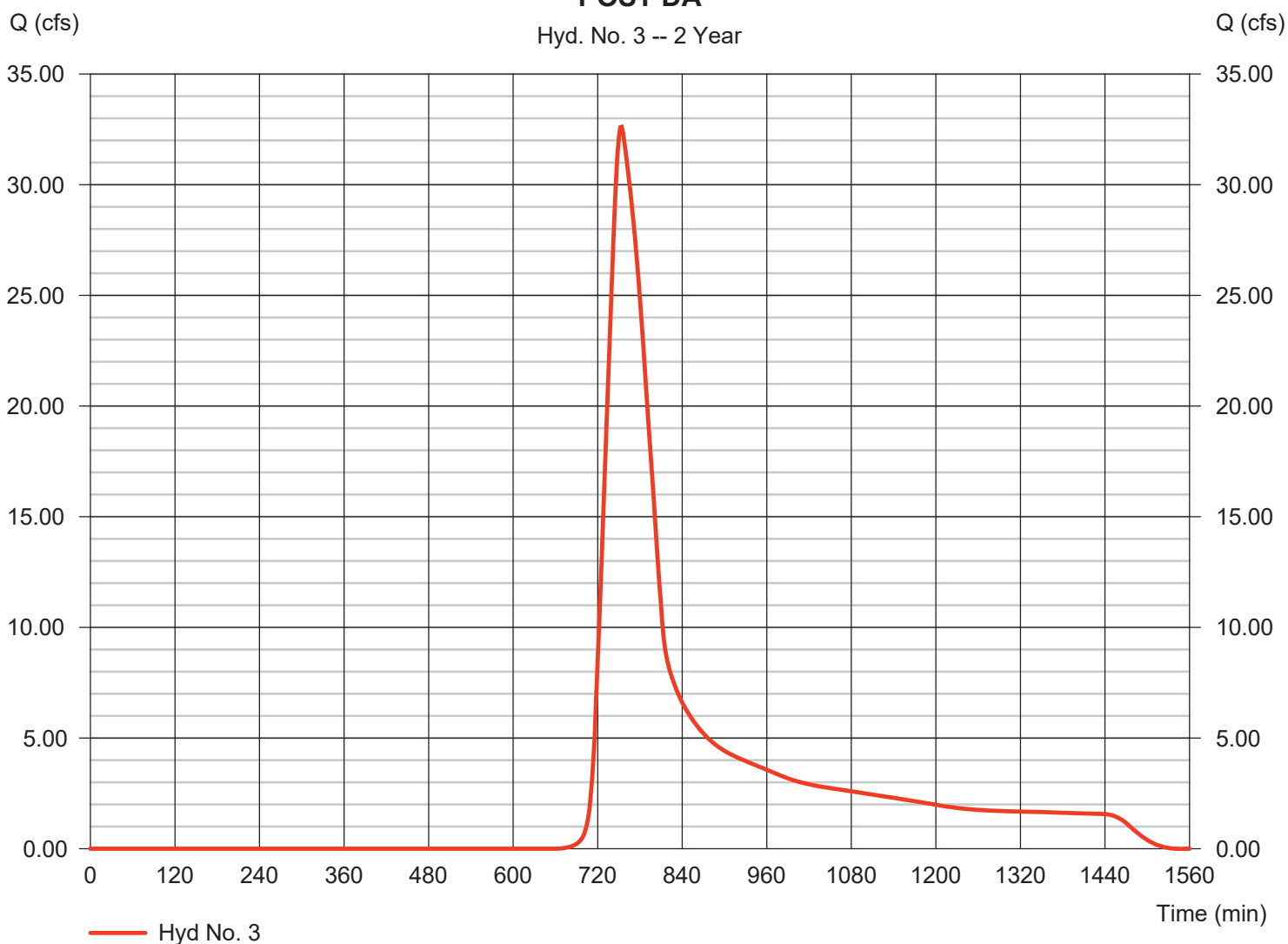
POST DA

Hydrograph type	= SCS Runoff	Peak discharge	= 32.61 cfs
Storm frequency	= 2 yrs	Time to peak	= 754 min
Time interval	= 2 min	Hyd. volume	= 242,144 cuft
Drainage area	= 79.270 ac	Curve number	= 77*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 62.30 min
Total precip.	= 2.65 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(18.340 \times 55) + (11.440 \times 70) + (25.120 \times 77) + (24.370 \times 98)] / 79.270$

POST DA

Hyd. No. 3 -- 2 Year



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Thursday, 08 / 15 / 2019

Hyd. No. 3

POST DA

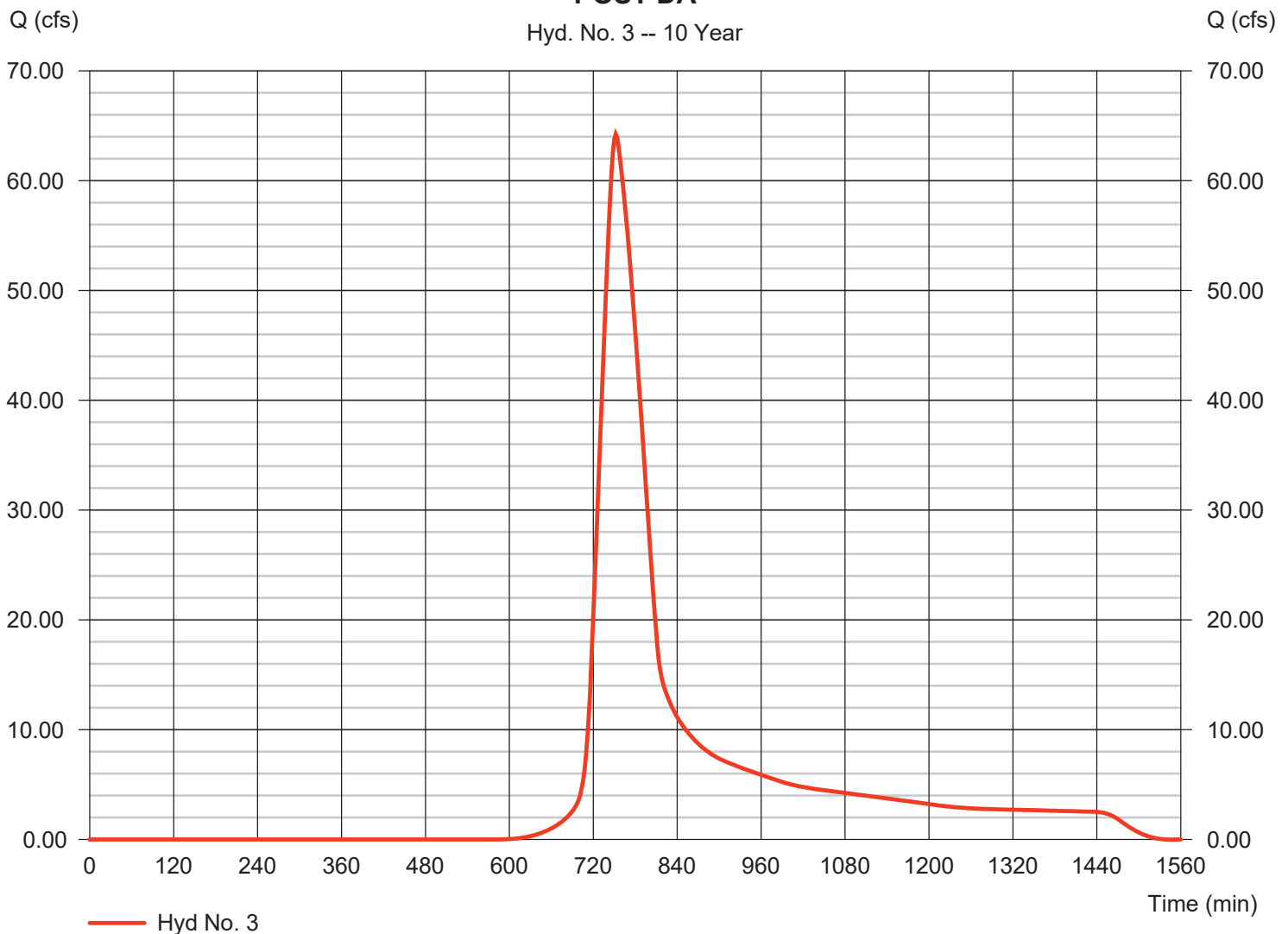
Hydrograph type = SCS Runoff
 Storm frequency = 10 yrs
 Time interval = 2 min
 Drainage area = 79.270 ac
 Basin Slope = 0.0 %
 Tc method = TR55
 Total precip. = 3.65 in
 Storm duration = 24 hrs

Peak discharge = 64.24 cfs
 Time to peak = 752 min
 Hyd. volume = 446,883 cuft
 Curve number = 77*
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 62.30 min
 Distribution = Type II
 Shape factor = 484

* Composite (Area/CN) = $[(18.340 \times 55) + (11.440 \times 70) + (25.120 \times 77) + (24.370 \times 98)] / 79.270$

POST DA

Hyd. No. 3 -- 10 Year



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

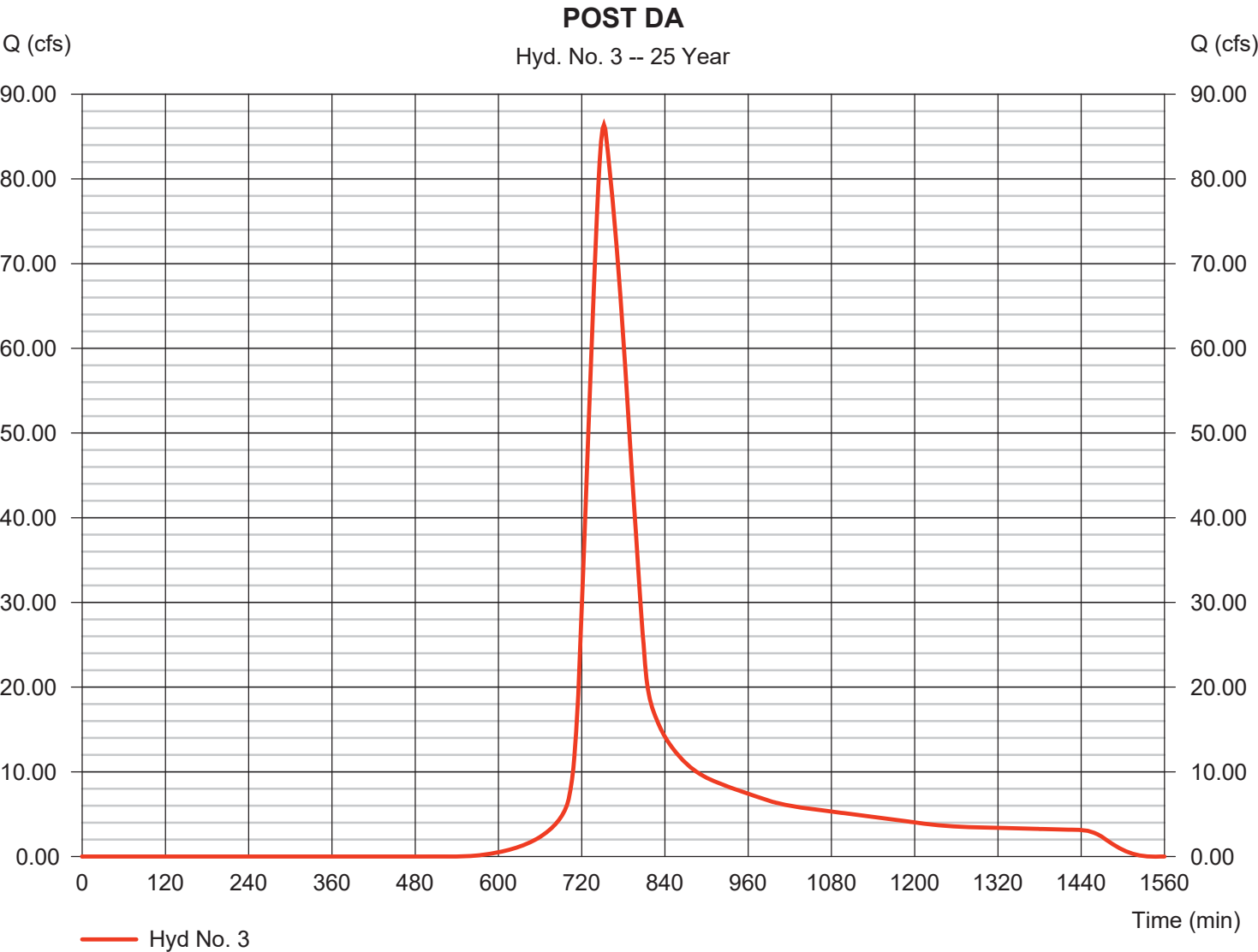
Thursday, 08 / 15 / 2019

Hyd. No. 3

POST DA

Hydrograph type	=	SCS Runoff	Peak discharge	=	86.39 cfs
Storm frequency	=	25 yrs	Time to peak	=	752 min
Time interval	=	2 min	Hyd. volume	=	591,256 cuft
Drainage area	=	79.270 ac	Curve number	=	77*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	62.30 min
Total precip.	=	4.29 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(18.340 x 55) + (11.440 x 70) + (25.120 x 77) + (24.370 x 98)] / 79.270



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

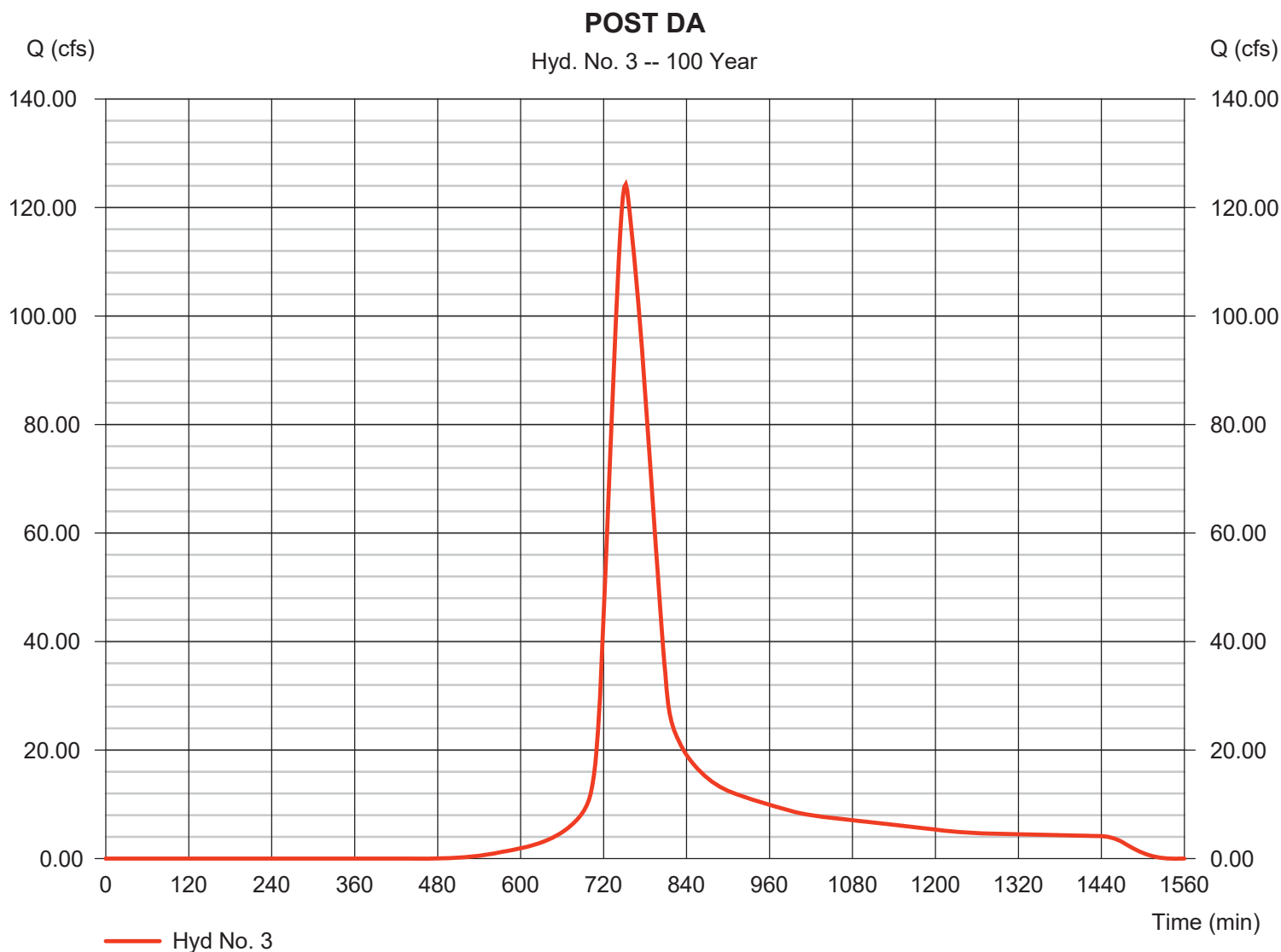
Thursday, 08 / 15 / 2019

Hyd. No. 3

POST DA

Hydrograph type	= SCS Runoff	Peak discharge	= 124.27 cfs
Storm frequency	= 100 yrs	Time to peak	= 752 min
Time interval	= 2 min	Hyd. volume	= 840,364 cuft
Drainage area	= 79.270 ac	Curve number	= 77*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 62.30 min
Total precip.	= 5.33 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(18.340 \times 55) + (11.440 \times 70) + (25.120 \times 77) + (24.370 \times 98)] / 79.270$



APPENDIX 6

Long-term Maintenance Plan

NOTE: No permanent BMP's will remain on the property following construction.

This foregoing document was electronically filed with the Public Utilities

Commission of Ohio Docketing Information System on

2/9/2021 5:38:34 PM

in

Case No(s). 19-1383-EL-BNR

Summary: Notice Notice of supplemental information and associated exhibits for the North Proctorville Station Expansion Project electronically filed by Tanner Wolfram on behalf of AEP Ohio Transmission Company, Inc.