DTE ELECTRIC COMPANY

Vertical Extension Landfill Run-On and Run-off Control System Plan

Monroe Power Plant

Project No. 151630

Revision 3

October 15, 2026

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List of Abbreviations

Abbreviation	Term/Phrase/Name
Burns & McDonnell	Burns & McDonnell Michigan, Inc.
CCR	Coal Combustion Residuals
CFR	Code of Federal Regulations
CHDPE	corrugated high-density polyethylene
CMP	corrugated metal pipe
DTE	DTE Electric Company
EGLE	Michigan Department of Environment, Great Lakes, and Energy
EPA	Environmental Protection Agency
FAB	Fly Ash Basin
FGD	flue gas desulfurization
Monroe	Monroe Power Plant
RCRA	Resource Conservation and Recovery Act
U.S.C.	United States Code
VEL	Vertical Extension Landfill

Index and Certification

DTE Electric Company
Vertical Extension Landfill Run-On and Run-off Control System Plan
Project No. 151630

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Certification

I hereby certify, as a Professional Engineer in the state of Michigan, that the information in this document was assembled under my direct personal charge and that this periodic run-on and run-off control system plan meets the applicable requirements of 40 CFR 257.81. This report is not intended or represented to be suitable for reuse by the DTE Electric Company or others without specific verification or adaptation by the Engineer.



10/15/2026

Allyson Myers

Allyson Myers, P.E. (Michigan License No. 6201312005)

Date: October 15, 2026

1.0 Background

On April 17, 2015, the Environmental Protection Agency (EPA) issued the federal Coal Combustion Residual Rule (CCR Rule) to regulate the disposal of CCR materials generated at coal-fired units. The rule was promulgated as part of the Resource Conservation and Recovery Act [RCRA, 42 United States Code (U.S.C.) §6901 et seq.], under Subtitle D.

DTE Electric Company (DTE) is subject to the CCR Rule and as such must develop a run-on and run-off control system plan for the CCR landfill, known as the Vertical Extension Landfill (VEL) at the Monroe Power Plant (Monroe) per 40 Code of Federal Regulations (CFR) §257.81. This report serves as the second periodic update to the run-on and run-off control system plan which was last prepared by AECOM in October 2021. This run-on and run-off control system plan is in addition to, not in place of, any other applicable site permits, environmental standards, or work safety practices.

1.1 Facility Information

Name of Facility:	Monroe Power Plant
Name of CCR Unit:	Vertical Extension Landfill (VEL)
Name of Operator:	DTE Power Company
Facility Mailing Address:	3500 East Front Street Monroe, MI 48161
Location:	The VEL is located approximately 1.5 miles southwest of the plant and is accessed via Water's Edge Drive east of I-75.
Facility Description:	The Monroe Power Plant has four coal-fired units. The VEL was permitted to receive bottom ash, fly ash, flue gas desulfurization (FGD) scrubber wastewater sludge (solidified with fly ash or bottom ash), and inert material. CCR material was transported to the VEL from the plant by truck. The VEL was constructed over the northwest portion of the Fly Ash Basin (FAB) which is a regulated surface impoundment. Both the VEL and FAB are undergoing closure.

1.2 Regulatory Requirements

Per 40 CFR §257.81, the run-on and run-off control system plan must contain documentation (including supporting engineering calculations) that the control system has been designed and constructed to meet the applicable requirements of 40 CFR 257.81. The owner or operator of a CCR unit must prepare a written plan that includes the information specified in 40 CFR 257.81 (a) and (b), as follows:

(a) The owner or operator of an existing or new CCR landfill or any lateral expansion of a CCR landfill must design, construct, operate and maintain:

(1) A run-on control system to prevent flow onto the active portion of the CCR unit during the peak discharge from a 24-hour, 25-year storm; and

(2) A run-off control system from the active portion of the CCR unit to collect and control at least the water volume resulting from a 24-hour, 25-year storm.

(b) Run-off from the active portion of the CCR unit must be handled in accordance with the surface water requirements under §257.3-3.

These items are addressed in Sections 2.0 and 3.0 of this document. Per 40 CFR §257.81(c)(5), DTE must obtain certification from a qualified professional engineer that the run-on and run-off control system plan, and subsequent updates to the plan, meet the requirements of 40 CFR §257.81. This sealed document serves as that certification.

2.0 Landfill Run-on and Run-off Controls

The VEL is a 79-acre CCR landfill permitted by the Michigan Department of Environment, Great Lakes, and Energy (EGLE). The run-on and run-off control system was designed by Golder Associates to control the 25-year, 24-hour storm event.

2.1 Run-On and Run-Off Controls

The VEL is located in the northwest portion of the FAB. The FAB is bounded by a perimeter embankment which prevents outside runoff from entering the footprint. The VEL is also surrounded by a perimeter berm which is designed to contain the active portion of the VEL until it reaches final grade. The perimeter berm has a top elevation varying from 615 to 620 feet, a top width of 5-ft, and is at minimum 4-ft tall with 3H:1V side slopes. There is a perimeter channel just outside the berm which has a 12-ft bottom width and a bottom slope of approximately 0.1%. The channel is typically 3-ft deep with 3H:1V side slopes. The perimeter channel outlets to the FAB at three locations on the south side of the VEL. The western outlet has an invert elevation of 607.5 ft., the center outlet has an invert elevation of 607.6 ft, and the eastern outlet has an elevation of 608.4 ft. The water surface in the FAB was maintained at or below elevation 608 to prevent backup into the perimeter channel. The free water surface will be lowered to support closure of the FAB (see Section 2.2 for further discussion).

Stormwater which falls over the VEL footprint primarily collects in low areas on the north or south side of the landfill and is able to drain through the landfilled waste to a pore-water relief system which underlies the VEL. The pore-water relief system contains a series of perforated pipes embedded in bottom ash which allow drainage to the perimeter channel. The pore-water relief pipe includes a backflow prevention valve at the pipe end to prevent water in the perimeter channel from entering the pore-water relief system. The VEL subgrade has a highpoint through the center going east-west such that the pore-water relief system drains either to the north or south.

2.2 Stormwater Handling During VEL Closure Activities

As noted in the Closure Plan (Rev 4, July 2026), the VEL is undergoing closure by removal with CCR material being consolidated within the FAB to achieve closure grades. The FAB will be closed in place. As CCR is removed from the VEL footprint, the perimeter channel will continue to be used to direct run-off to the FAB where it will be managed in accordance with the Inflow Design Flood Control Plan and the site NPDES permit. The FAB will be unwatered (i.e., removal of free water) and dewatered (i.e., removal of pore water) to support closure in place. Water removed during closure construction will be discharged through the existing outfall in accordance with the NPDES permit.

2.3 Calculations

The calculations were prepared to reflect the conditions of the VEL as represented by the construction drawings prepared by Golder Associates in April 2015 (select drawings are included in Appendix B) and the topographic survey completed by Wightman in January 2025. Note, the VEL ceased receiving waste in December of 2023. Calculations were completed in HydroCAD to determine the peak flow for the design event. FlowMaster was utilized to determine the depth of flow in the channels at the peak flow rate. Table 2-1 presents the capacity of the perimeter channel for the 25-year, 24-hour design storm event based on the results of the calculations, which are included in Appendix A. Additionally, a figure is included which shows

the assumed drainage areas, cover types, and flow paths for the time of concentration calculation. Note, when preparing the calculations drainage to the pore-water relief system was excluded.

Table 2-1: Run-On / Run-Off Control Performance

Channel	Bottom Width	Depth	Bottom Slope	Side Slope	Peak Flow	Depth at Peak	Freeboard
Channel R1 (to west outlet)	12.00 ft	3.00 ft	0.087%	3H:1V	27.55 cfs	1.28 ft	1.72 ft
Channel R2 (to east outlet)	12.00 ft	3.00 ft	0.10%	3H:1V	11.41 cfs	0.78 ft	2.22 ft
Channel R3+R4 (to center outlet)	12.00 ft	3.00 ft	0.10%	3H:1V	23.42 cfs	1.17 ft	1.83 ft

As shown in Table 2-1, the perimeter channels provide capacity in excess of that required to convey the peak flows resulting from the 25-year, 24-hour storm event, therefore the run-off protection system exceeds the requirement to provide protection from run-off from the 24-hour, 25-year storm event.

3.0 Run-off Control for §257.3-3

Contact stormwater run-off from the active portion of the VEL is retained within the FAB which discharges to an NPDES-permitted outfall. Per the current NPDES permit, discharged water is tested to meet the minimum regulatory requirements of the permit. The facility does not cause a discharge of pollutants into waters of the United States that is in violation of the requirements of the NPDES under Section 402 of the Clean Water Act and therefore meets the requirements of 40 CFR 257.81(b).

4.0 Amendment of Run-on and Run-off Control Plan

The owner or operator may amend the written run-on and run-off control system plan at any time provided the revised plan is placed in the facility's operating record as required by §257.105(g)(3). The owner or operator must amend the written run-on and runoff control system plan whenever there is a change in conditions that would substantially affect the written plan in effect. Additionally, the owner or operator of the CCR unit must prepare periodic run-on and runoff control system plans every five years. The date of completing the initial plan is the basis for establishing the deadline to complete the first subsequent plan.

The owner or operator may complete any required plan prior to the required deadline provided the completed plan is placed into the facility's operating record within a reasonable amount of time.

A written certification from a qualified professional engineer that the initial and any amendment of the written run-on and run-off control system plan meets the requirements of §257.81 must be obtained. Plan changes will be documented using the Revision History which follows this plan. Changes to this plan will be certified by a qualified professional engineer.

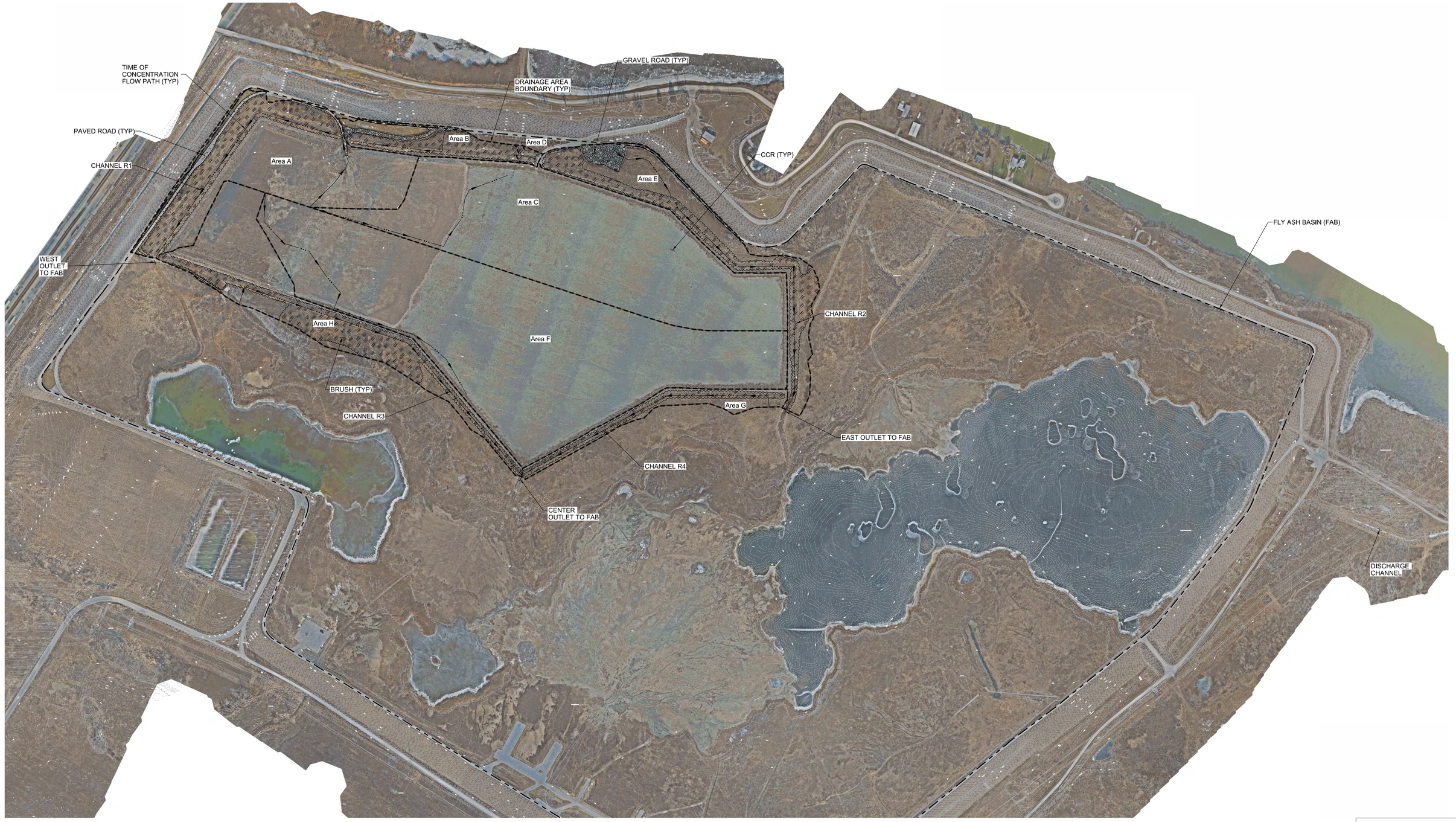
5.0 References

1. U.S. Environmental Protection Agency, Standards for the Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments, 40 CFR §257, Federal Register 80, Subpart D, April 17, 2015.
2. Golder Associates, Construction Permit Application Modification Drawings, April 2015.
3. Wightman, Topographic Survey, January 2025.

6.0 Record of Revisions

Revision Number	Date	Revisions Made	By Whom
1	10/17/2016	Initial Issue	AECOM
2	10/15/2021	Periodic Update	AECOM
3	10/15/2026	Periodic Update	Burns & McDonnell

Appendix A – Supporting Calculations



PRELIMINARY - NOT FOR CONSTRUCTION

Millimeters
Inches
Scale For Microfilming

no.	date	by	ckd	description

no.	date	by	ckd	description

BURNS McDONNELL
4000 TOWN CENTER DRIVE, SUITE 700
SOUTHFIELD, MI 48075
313-309-5706
Burns & McDonnell Michigan, Inc.

designed A. MYERS | detailed A. MYERS

DTE

MONROE COUNTY, MICHIGAN

MONROE VERTICAL EXTENSION LANDFILL
RUN-ON AND RUN-OFF CONTROL
SYSTEM PLAN - SITE PLAN

project 151630 | contract -

drawing **FIGURE 1** | rev. ---

sheet | of | sheets

file 151630 FIGURE 1.DGN

\\bmcd\dfs\Clients\ENR\DTEEnr\151630_MonFABCloseDD\2_Design\Civil\Dsgn_Mgmt\Reports\RORO\Calculations\151630 Figure 1.dgn

10/7/2026

NOAA Atlas 14, Volume 8, Version 2
Location name: Monroe Twp, Michigan, USA*
Latitude: 41.884°, Longitude: -83.375°
Elevation: 612.33 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Deborah Martin, Sandra Pavlovic, Ishani Roy, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Michael Yekta, Geoffery Bonnin

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

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	0.312 (0.247-0.395)	0.370 (0.293-0.468)	0.465 (0.367-0.589)	0.543 (0.427-0.689)	0.651 (0.497-0.840)	0.734 (0.551-0.954)	0.817 (0.597-1.08)	0.901 (0.637-1.21)	1.01 (0.694-1.37)	1.10 (0.737-1.50)
10-min	0.457 (0.362-0.578)	0.542 (0.429-0.685)	0.680 (0.537-0.862)	0.795 (0.625-1.01)	0.953 (0.728-1.23)	1.07 (0.806-1.40)	1.20 (0.874-1.58)	1.32 (0.933-1.76)	1.48 (1.02-2.01)	1.60 (1.08-2.20)
15-min	0.557 (0.441-0.705)	0.661 (0.523-0.836)	0.829 (0.655-1.05)	0.969 (0.762-1.23)	1.16 (0.888-1.50)	1.31 (0.983-1.70)	1.46 (1.07-1.92)	1.61 (1.14-2.15)	1.81 (1.24-2.45)	1.96 (1.32-2.68)
30-min	0.765 (0.606-0.967)	0.910 (0.720-1.15)	1.15 (0.904-1.45)	1.34 (1.05-1.70)	1.61 (1.23-2.08)	1.81 (1.36-2.36)	2.02 (1.47-2.66)	2.22 (1.57-2.97)	2.50 (1.71-3.39)	2.70 (1.82-3.71)
60-min	0.978 (0.775-1.24)	1.15 (0.912-1.46)	1.45 (1.14-1.83)	1.70 (1.33-2.15)	2.05 (1.57-2.66)	2.33 (1.76-3.05)	2.62 (1.92-3.47)	2.93 (2.08-3.93)	3.34 (2.30-4.55)	3.66 (2.46-5.02)
2-hr	1.19 (0.956-1.49)	1.40 (1.12-1.74)	1.74 (1.39-2.18)	2.05 (1.63-2.57)	2.49 (1.94-3.21)	2.85 (2.18-3.69)	3.23 (2.40-4.23)	3.63 (2.61-4.82)	4.18 (2.91-5.64)	4.62 (3.14-6.26)
3-hr	1.32 (1.07-1.64)	1.53 (1.24-1.90)	1.91 (1.54-2.37)	2.24 (1.80-2.79)	2.74 (2.16-3.52)	3.16 (2.43-4.07)	3.61 (2.70-4.70)	4.08 (2.96-5.41)	4.76 (3.34-6.39)	5.30 (3.62-7.14)
6-hr	1.56 (1.27-1.90)	1.78 (1.46-2.18)	2.19 (1.79-2.68)	2.57 (2.09-3.16)	3.16 (2.53-4.01)	3.66 (2.86-4.66)	4.20 (3.18-5.42)	4.79 (3.51-6.27)	5.63 (3.99-7.49)	6.32 (4.36-8.41)
12-hr	1.80 (1.49-2.17)	2.05 (1.70-2.47)	2.50 (2.06-3.01)	2.91 (2.40-3.53)	3.56 (2.88-4.46)	4.10 (3.24-5.16)	4.69 (3.60-5.98)	5.33 (3.95-6.90)	6.26 (4.48-8.22)	7.01 (4.88-9.21)
24-hr	2.06 (1.74-2.45)	2.35 (1.97-2.79)	2.85 (2.39-3.40)	3.31 (2.75-3.95)	3.99 (3.26-4.91)	4.56 (3.64-5.64)	5.16 (4.00-6.48)	5.82 (4.35-7.42)	6.75 (4.87-8.73)	7.49 (5.27-9.73)
2-day	2.38 (2.03-2.79)	2.70 (2.30-3.17)	3.26 (2.77-3.83)	3.75 (3.17-4.42)	4.47 (3.69-5.40)	5.05 (4.08-6.15)	5.67 (4.43-7.00)	6.32 (4.76-7.92)	7.22 (5.26-9.20)	7.93 (5.63-10.2)
3-day	2.61 (2.24-3.03)	2.94 (2.53-3.42)	3.52 (3.01-4.10)	4.02 (3.42-4.70)	4.75 (3.94-5.68)	5.34 (4.33-6.43)	5.95 (4.68-7.28)	6.60 (5.01-8.21)	7.49 (5.49-9.48)	8.20 (5.86-10.4)
4-day	2.80 (2.42-3.24)	3.15 (2.72-3.64)	3.73 (3.21-4.32)	4.24 (3.63-4.93)	4.98 (4.16-5.93)	5.58 (4.55-6.68)	6.19 (4.90-7.53)	6.84 (5.22-8.46)	7.74 (5.70-9.74)	8.45 (6.06-10.7)
7-day	3.31 (2.89-3.78)	3.68 (3.21-4.21)	4.32 (3.76-4.94)	4.87 (4.21-5.58)	5.65 (4.75-6.63)	6.27 (5.16-7.41)	6.91 (5.52-8.30)	7.58 (5.83-9.26)	8.50 (6.30-10.6)	9.21 (6.66-11.5)
10-day	3.76 (3.31-4.26)	4.17 (3.66-4.73)	4.85 (4.25-5.51)	5.43 (4.73-6.18)	6.25 (5.29-7.27)	6.90 (5.72-8.09)	7.57 (6.08-9.02)	8.26 (6.38-10.0)	9.20 (6.85-11.4)	9.93 (7.21-12.4)
20-day	5.12 (4.57-5.71)	5.60 (5.00-6.26)	6.41 (5.70-7.17)	7.08 (6.26-7.95)	8.01 (6.87-9.17)	8.74 (7.33-10.1)	9.47 (7.70-11.1)	10.2 (7.98-12.2)	11.2 (8.44-13.6)	12.0 (8.79-14.7)
30-day	6.30 (5.67-6.98)	6.89 (6.19-7.63)	7.83 (7.02-8.69)	8.60 (7.67-9.57)	9.65 (8.32-10.9)	10.4 (8.82-11.9)	11.2 (9.17-13.0)	12.0 (9.43-14.2)	13.0 (9.85-15.7)	13.8 (10.2-16.8)
45-day	7.87 (7.14-8.64)	8.61 (7.81-9.45)	9.77 (8.83-10.8)	10.7 (9.62-11.8)	11.9 (10.3-13.3)	12.8 (10.9-14.5)	13.6 (11.2-15.7)	14.5 (11.4-16.9)	15.5 (11.7-18.4)	16.2 (12.0-19.6)
60-day	9.24 (8.44-10.1)	10.1 (9.26-11.1)	11.5 (10.5-12.6)	12.6 (11.4-13.8)	14.0 (12.2-15.5)	15.0 (12.8-16.8)	15.8 (13.1-18.0)	16.7 (13.2-19.3)	17.6 (13.4-20.9)	18.3 (13.6-22.0)

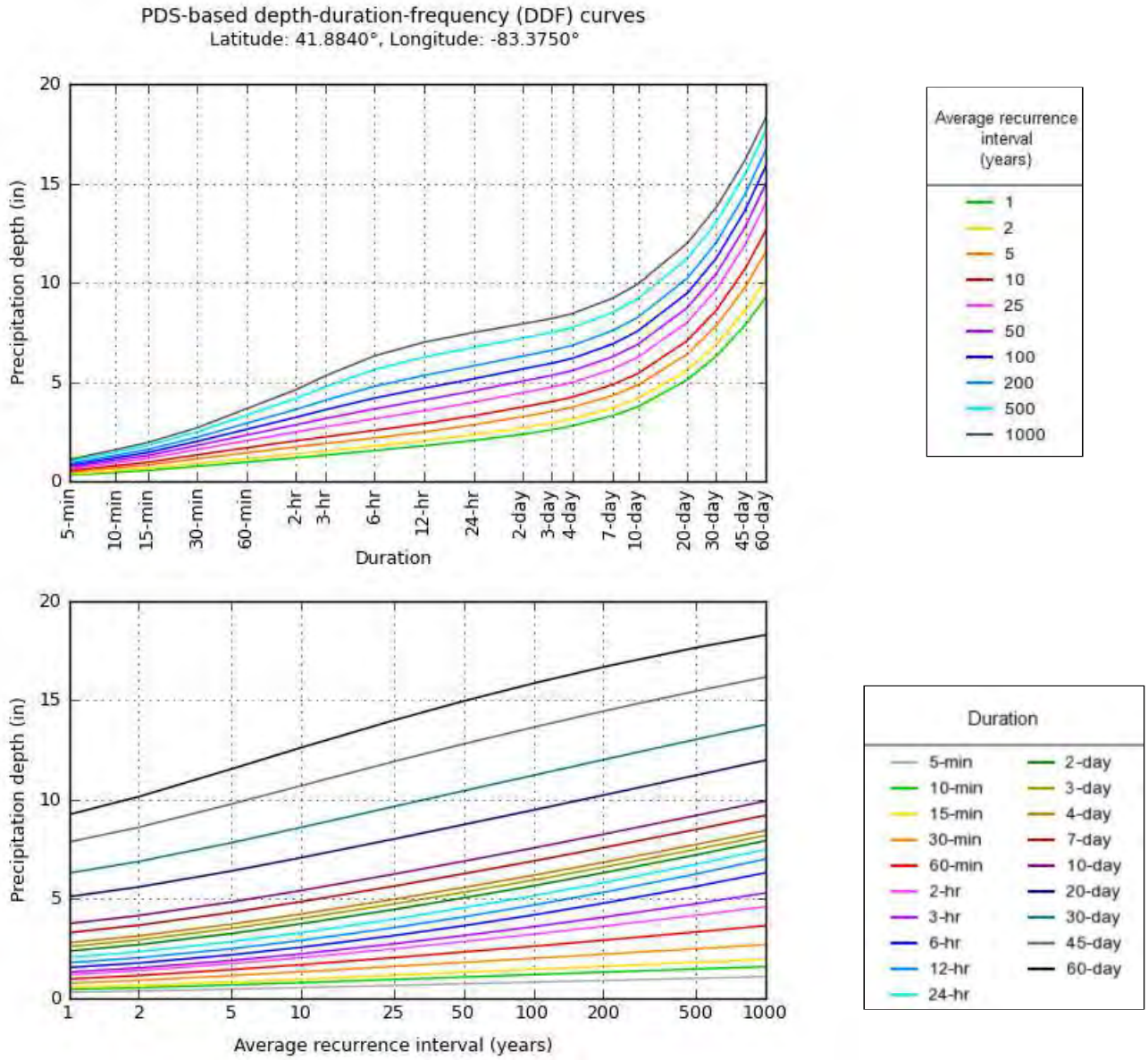
[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

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



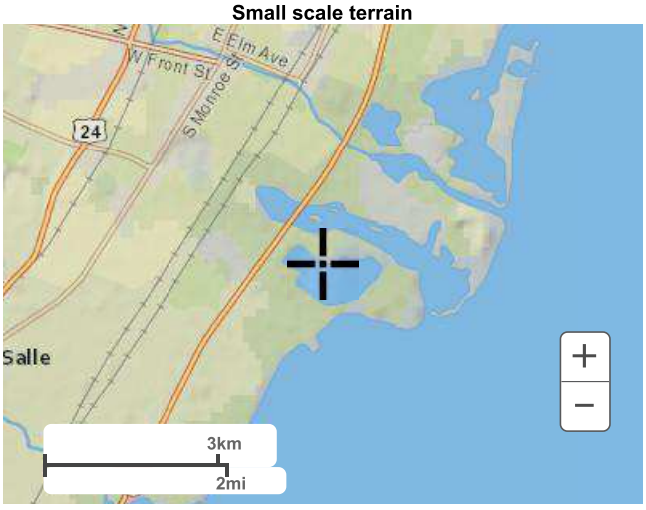
NOAA Atlas 14, Volume 8, Version 2

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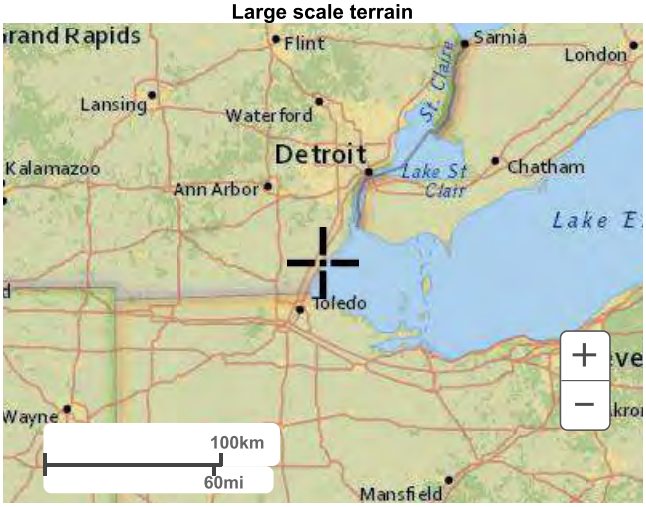
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Maps & aerials

Small scale terrain

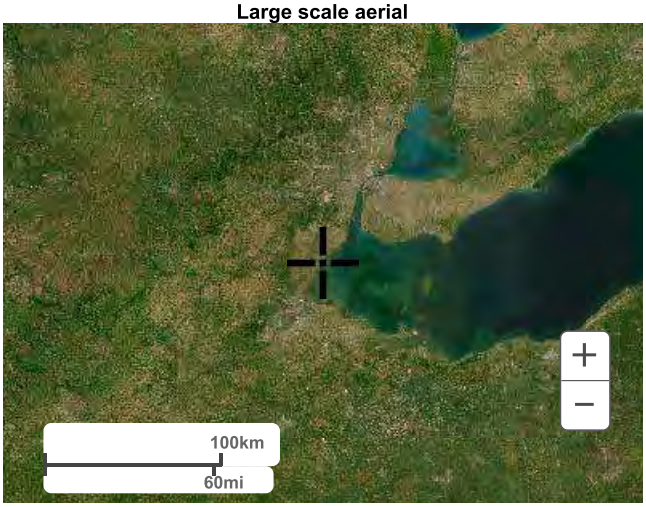


Large scale terrain



Large scale map

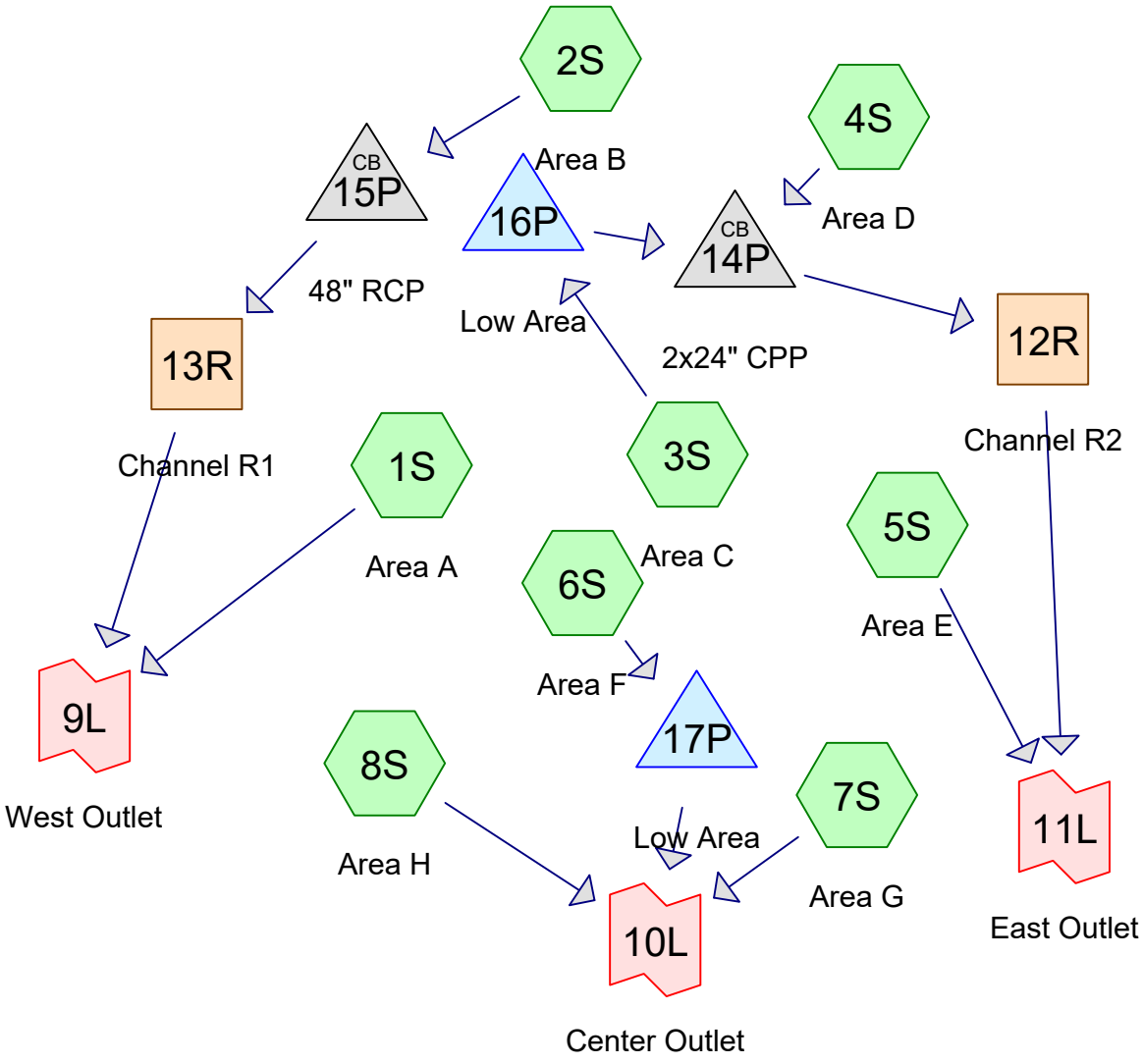
Large scale aerial



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US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer



Subcat Reach Pond Link

Routing Diagram for Monroe VEL RORO
Prepared by Burns & McDonnell, Printed 10/6/2026
HydroCAD® 10.20-7a s/n 08510 © 2025 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.018	80	>75% Grass cover, Good, HSG D (2S)
14.281	73	Brush, Good, HSG D (1S, 2S, 4S, 5S, 7S, 8S)
83.810	86	CCR (1S, 2S, 3S, 4S, 5S, 6S, 7S, 8S)
1.295	96	Gravel surface, HSG D (1S, 2S, 5S, 8S)
0.516	98	Paved roads w/curbs & sewers, HSG D (1S, 2S)
99.920	**84**	**TOTAL AREA**

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: Area A Runoff Area=13.726 ac 3.71% Impervious Runoff Depth=2.28"
Flow Length=1,891' Tc=35.3 min CN=83 Runoff=24.30 cfs 2.605 af

Subcatchment2S: Area B Runoff Area=3.127 ac 0.22% Impervious Runoff Depth=2.03"
Flow Length=649' Tc=18.7 min CN=80 Runoff=7.30 cfs 0.530 af

Subcatchment3S: Area C Runoff Area=25.677 ac 0.00% Impervious Runoff Depth=2.54"
Flow Length=1,314' Tc=49.5 min CN=86 Runoff=40.10 cfs 5.429 af

Subcatchment4S: Area D Runoff Area=0.237 ac 0.00% Impervious Runoff Depth=1.73"
Flow Length=146' Tc=6.0 min CN=76 Runoff=0.71 cfs 0.034 af

Subcatchment5S: Area E Runoff Area=6.948 ac 0.00% Impervious Runoff Depth=2.11"
Flow Length=2,080' Tc=35.3 min CN=81 Runoff=11.38 cfs 1.223 af

Subcatchment6S: Area F Runoff Area=36.677 ac 0.00% Impervious Runoff Depth=2.54"
Flow Length=2,173' Tc=75.9 min CN=86 Runoff=41.82 cfs 7.755 af

Subcatchment7S: Area G Runoff Area=2.667 ac 0.00% Impervious Runoff Depth=2.03"
Flow Length=1,499' Tc=19.4 min CN=80 Runoff=6.10 cfs 0.452 af

Subcatchment8S: Area H Runoff Area=10.861 ac 0.00% Impervious Runoff Depth=2.11"
Flow Length=1,976' Tc=32.0 min CN=81 Runoff=18.99 cfs 1.913 af

Reach 12R: Channel R2 Avg. Flow Depth=0.14' Max Vel=0.35 fps Inflow=0.71 cfs 0.746 af
n=0.035 L=2,300.0' S=0.0010 '/' Capacity=134.30 cfs Outflow=0.62 cfs 0.718 af

Reach 13R: Channel R1 Avg. Flow Depth=0.39' Max Vel=0.64 fps Inflow=7.30 cfs 0.530 af
n=0.035 L=1,426.0' S=0.0009 '/' Capacity=128.65 cfs Outflow=3.27 cfs 0.530 af

Pond 14P: 2x24" CPP Peak Elev=613.24' Inflow=0.71 cfs 0.746 af
24.0" Round Culvert x 2.00 n=0.012 L=49.5' S=11.1329 '/' Outflow=0.71 cfs 0.746 af

Pond 15P: 48" RCP Peak Elev=612.07' Inflow=7.30 cfs 0.530 af
48.0" Round Culvert n=0.012 L=45.6' S=0.0029 '/' Outflow=7.30 cfs 0.530 af

Pond 16P: Low Area Peak Elev=615.07' Storage=5.178 af Inflow=40.10 cfs 5.429 af
Outflow=0.67 cfs 0.712 af

Pond 17P: Low Area Peak Elev=614.51' Storage=7.755 af Inflow=41.82 cfs 7.755 af
Outflow=0.00 cfs 0.000 af

Link 9L: West Outlet Inflow=27.55 cfs 3.135 af
Primary=27.55 cfs 3.135 af

Link 10L: Center Outlet Inflow=23.42 cfs 2.364 af
Primary=23.42 cfs 2.364 af

Link 11L: East Outlet

Inflow=11.41 cfs 1.941 af
Primary=11.41 cfs 1.941 af

Total Runoff Area = 99.920 ac Runoff Volume = 19.941 af Average Runoff Depth = 2.39"
99.48% Pervious = 99.404 ac 0.52% Impervious = 0.516 ac

Summary for Subcatchment 1S: Area A

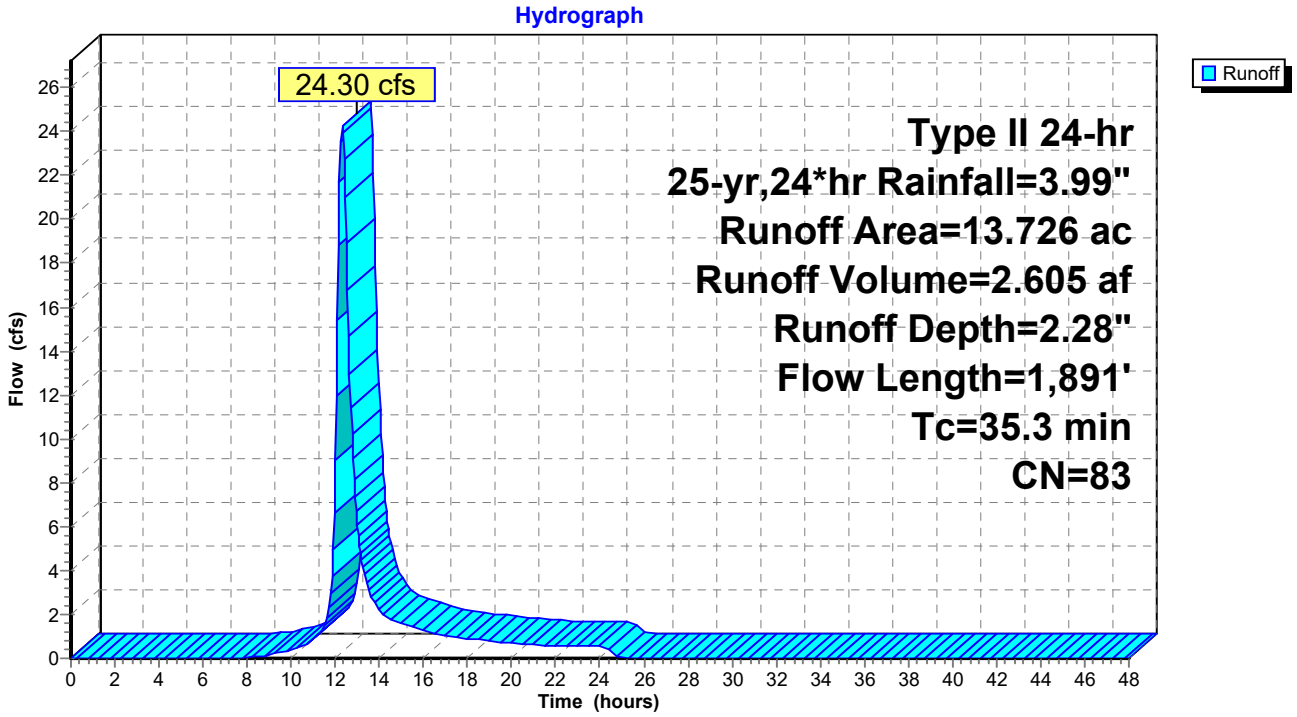
Runoff = 24.30 cfs @ 12.31 hrs, Volume= 2.605 af, Depth= 2.28"
Routed to Link 9L : West Outlet

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24*hr Rainfall=3.99"

	Area (ac)	CN	Description
	0.509	98	Paved roads w/curbs & sewers, HSG D
	0.417	96	Gravel surface, HSG D
	3.821	73	Brush, Good, HSG D
*	8.979	86	CCR
	13.726	83	Weighted Average
	13.217		96.29% Pervious Area
	0.509		3.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.1	173	0.0058	0.24		**Sheet Flow,** Fallow n= 0.050 P2= 2.35"
0.9	149	0.0270	2.65		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.0	127	0.0157	2.02		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.0	15	0.3300	9.25		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
21.3	1,427	0.0009	1.11	16.72	**Trap/Vee/Rect Channel Flow,** Bot.W=12.00' D=1.00' Z= 3.0 '/' Top.W=18.00' n= 0.035 Earth, dense weeds
35.3	1,891	Total			

Subcatchment 1S: Area A



Summary for Subcatchment 2S: Area B

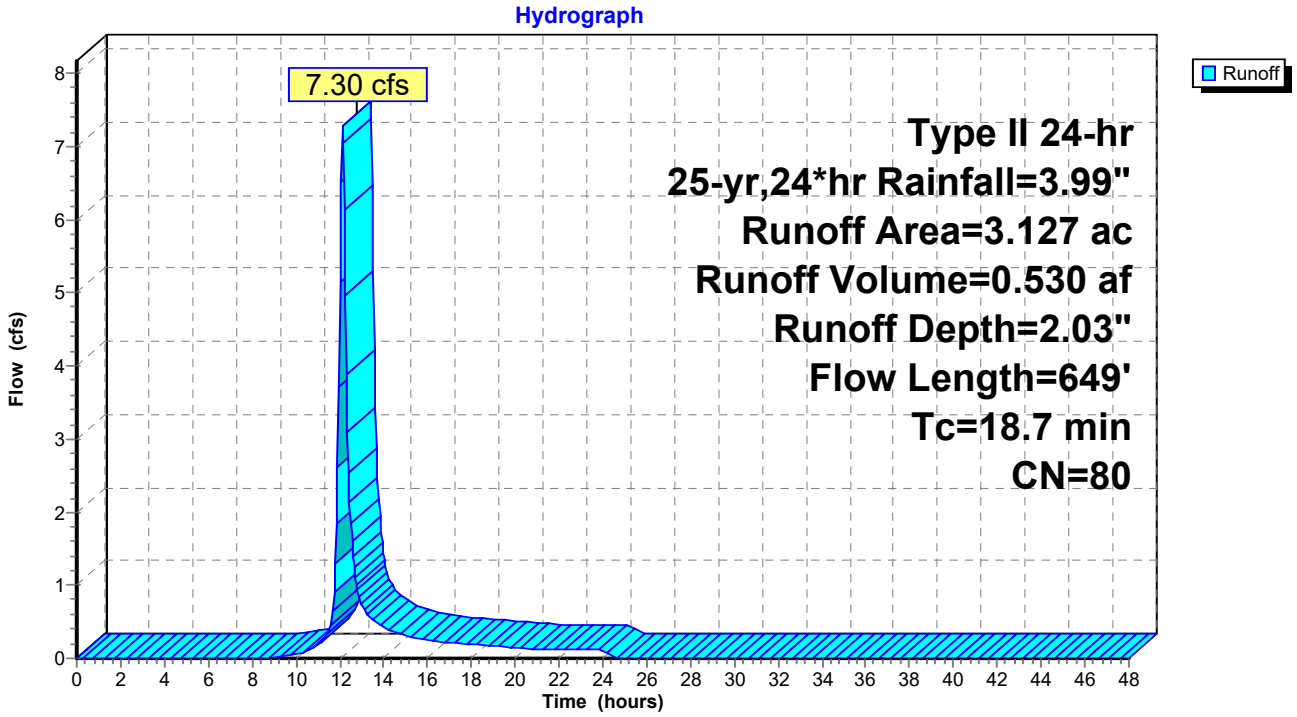
Runoff = 7.30 cfs @ 12.11 hrs, Volume= 0.530 af, Depth= 2.03"
Routed to Pond 15P : 48" RCP

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24*hr Rainfall=3.99"

	Area (ac)	CN	Description
	0.007	98	Paved roads w/curbs & sewers, HSG D
	0.458	96	Gravel surface, HSG D
	1.798	73	Brush, Good, HSG D
*	0.846	86	CCR
	0.018	80	>75% Grass cover, Good, HSG D
	3.127	80	Weighted Average
	3.120		99.78% Pervious Area
	0.007		0.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	19	0.0109	0.66		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.35"
10.1	73	0.0109	0.12		**Sheet Flow,** Range n= 0.130 P2= 2.35"
0.4	45	0.0400	2.00		**Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps
7.7	512	0.0009	1.11	16.72	**Trap/Vee/Rect Channel Flow,** Bot.W=12.00' D=1.00' Z= 3.0 '/' Top.W=18.00' n= 0.035 Earth, dense weeds
18.7	649	Total			

Subcatchment 2S: Area B



Summary for Subcatchment 3S: Area C

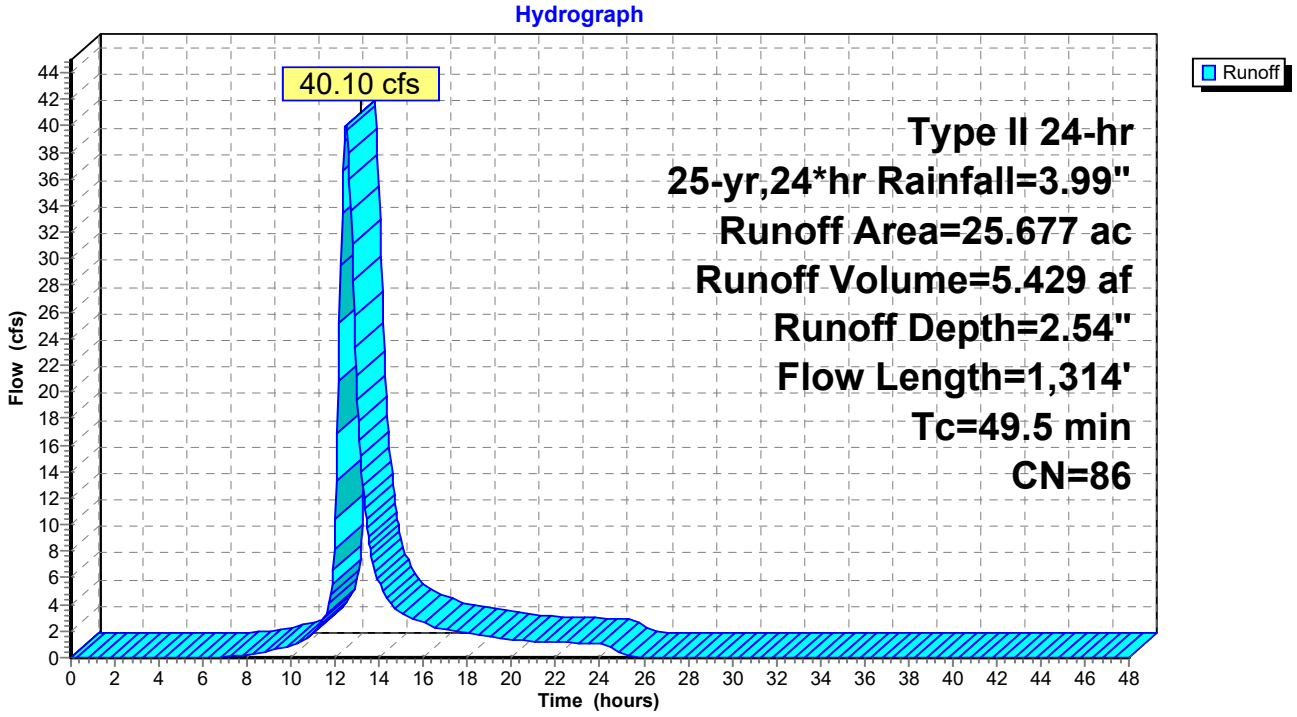
Runoff = 40.10 cfs @ 12.48 hrs, Volume= 5.429 af, Depth= 2.54"
Routed to Pond 16P : Low Area

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24*hr Rainfall=3.99"

	Area (ac)	CN	Description
*	25.677	86	CCR
	25.677		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.4	200	0.0050	0.23		**Sheet Flow,** Fallow n= 0.050 P2= 2.35"
20.6	539	0.0019	0.44		**Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps
0.0	11	0.3570	5.97		**Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps
6.8	288	0.0050	0.71		**Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps
7.7	276	0.0036	0.60		**Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps
49.5	1,314	Total			

Subcatchment 3S: Area C



Summary for Subcatchment 4S: Area D

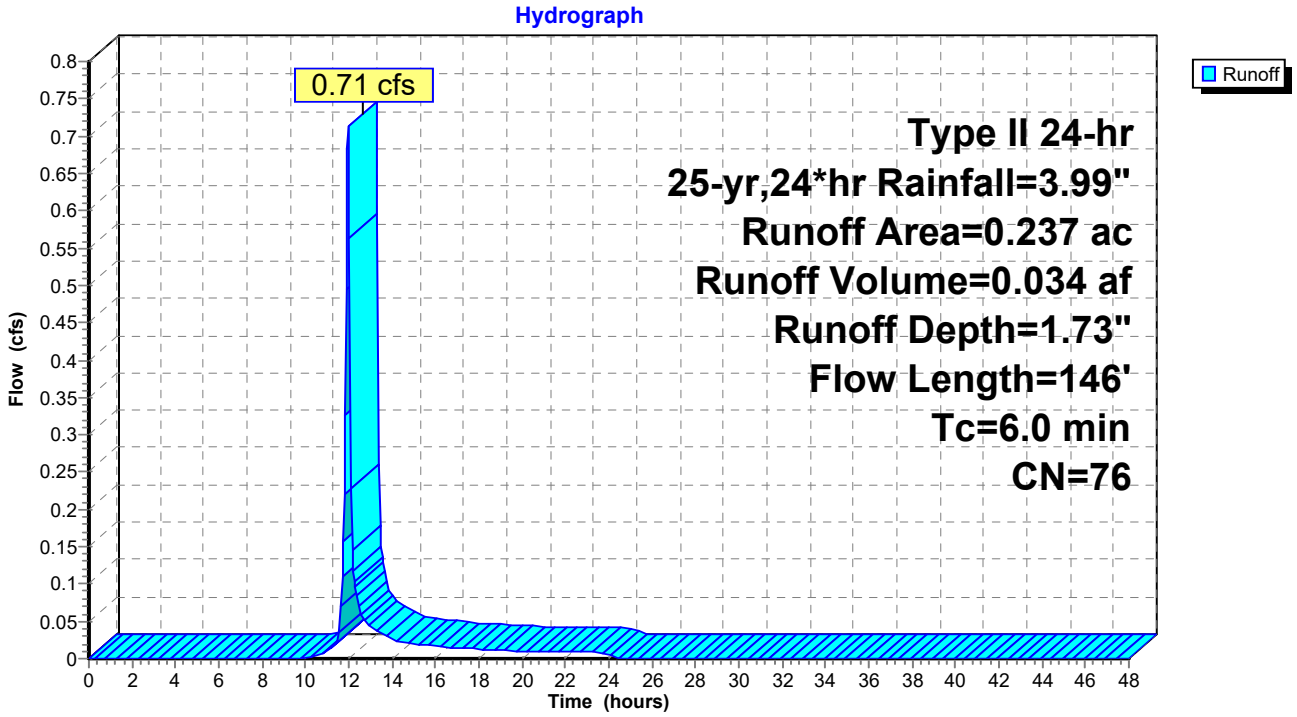
Runoff = 0.71 cfs @ 11.98 hrs, Volume= 0.034 af, Depth= 1.73"
Routed to Pond 14P : 2x24" CPP

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24*hr Rainfall=3.99"

	Area (ac)	CN	Description
	0.188	73	Brush, Good, HSG D
*	0.049	86	CCR
	0.237	76	Weighted Average
	0.237		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.4	56	0.0360	0.40		**Sheet Flow,** Fallow n= 0.050 P2= 2.35"
0.7	90	0.0222	2.23		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
3.1	146	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 4S: Area D



Summary for Subcatchment 5S: Area E

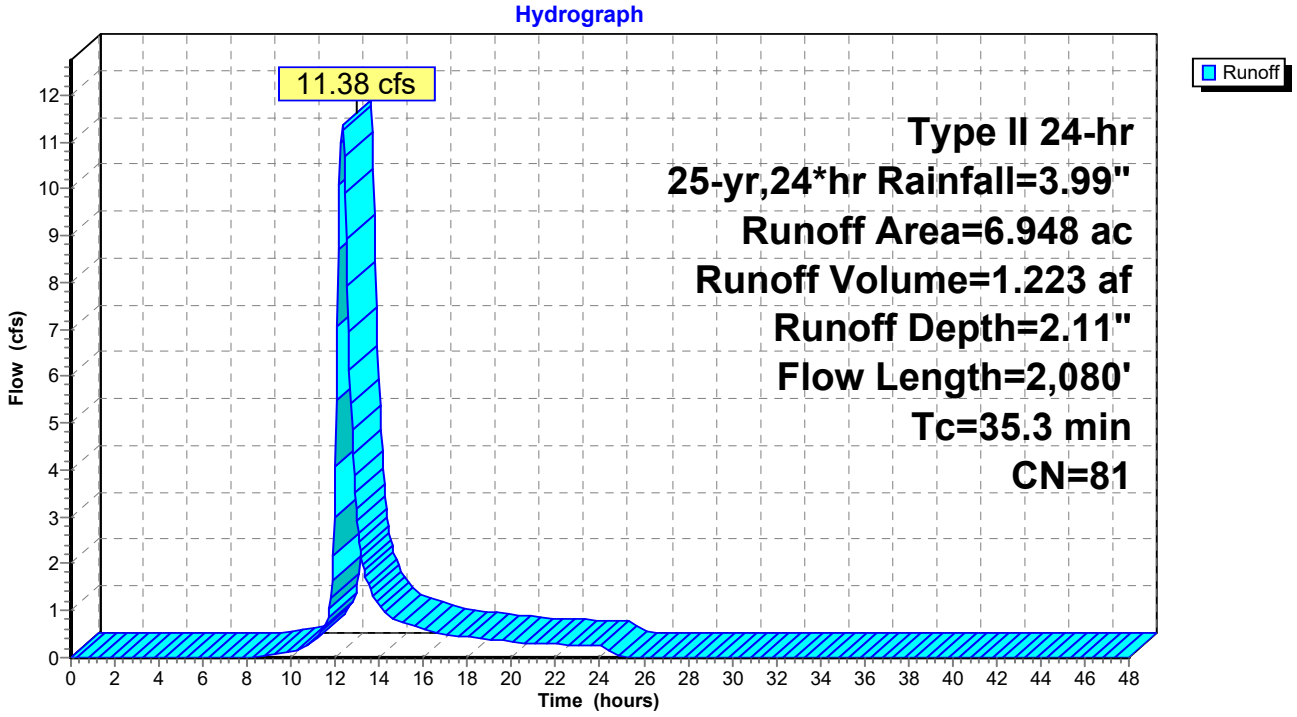
Runoff = 11.38 cfs @ 12.31 hrs, Volume= 1.223 af, Depth= 2.11"
Routed to Link 11L : East Outlet

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24*hr Rainfall=3.99"

	Area (ac)	CN	Description
	0.370	96	Gravel surface, HSG D
	2.773	73	Brush, Good, HSG D
*	3.805	86	CCR
	6.948	81	Weighted Average
	6.948		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.9	103	0.0100	0.90		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.35"
11.7	445	0.0040	0.63		**Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps
21.7	1,532	0.0010	1.17	17.62	**Trap/Vee/Rect Channel Flow,** Bot.W=12.00' D=1.00' Z= 3.0 '/' Top.W=18.00' n= 0.035 Earth, dense weeds
35.3	2,080	Total			

Subcatchment 5S: Area E



Summary for Subcatchment 6S: Area F

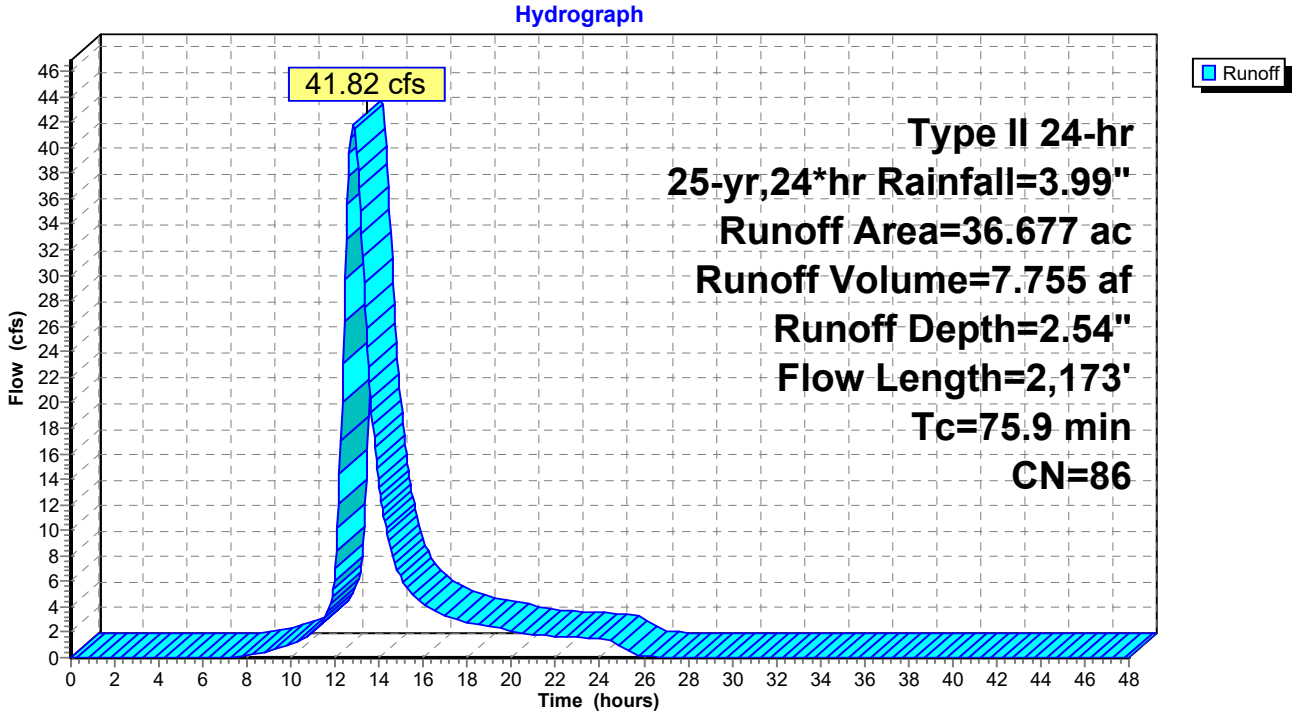
Runoff = 41.82 cfs @ 12.82 hrs, Volume= 7.755 af, Depth= 2.54"
Routed to Pond 17P : Low Area

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24*hr Rainfall=3.99"

	Area (ac)	CN	Description
*	36.677	86	CCR
	36.677		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.3	200	0.0043	0.22		**Sheet Flow,** Fallow n= 0.050 P2= 2.35"
15.4	607	0.0043	0.66		**Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps
0.0	11	0.1800	4.24		**Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps
45.2	1,355	0.0025	0.50		**Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps
75.9	2,173	Total			

Subcatchment 6S: Area F



Summary for Subcatchment 7S: Area G

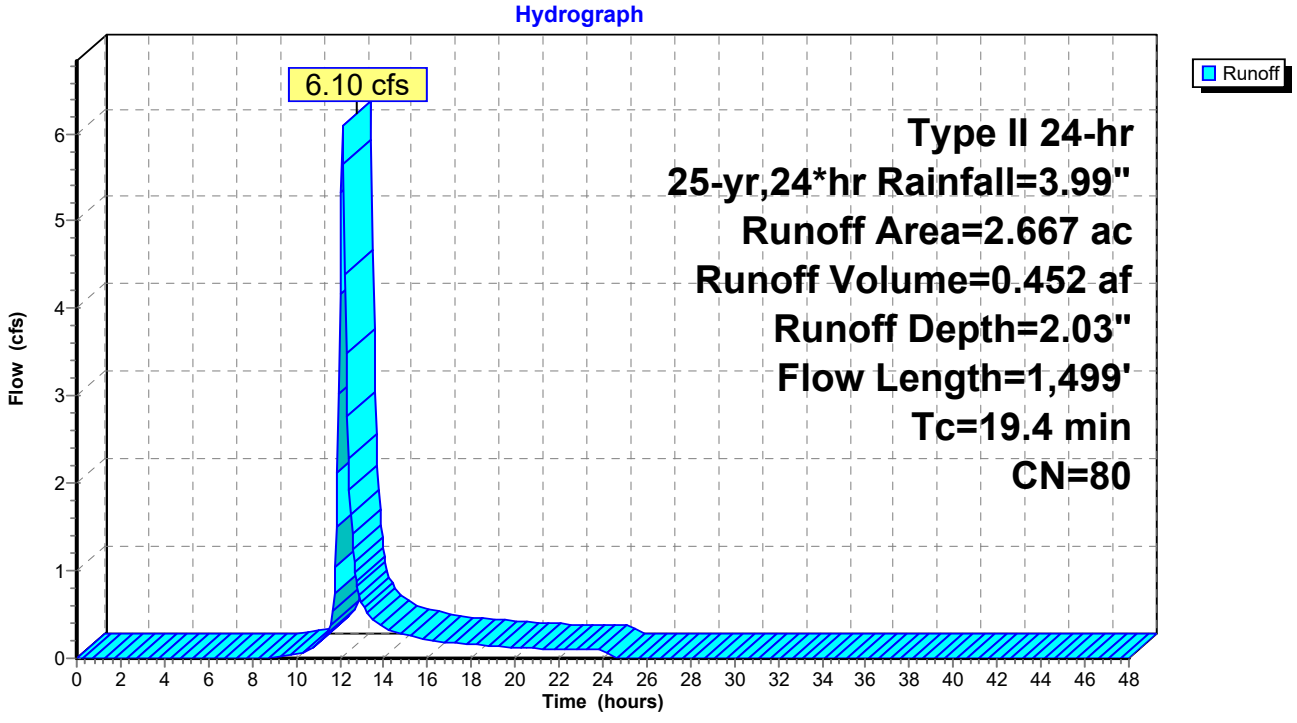
Runoff = 6.10 cfs @ 12.12 hrs, Volume= 0.452 af, Depth= 2.03"
Routed to Link 10L : Center Outlet

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24*hr Rainfall=3.99"

	Area (ac)	CN	Description
	1.304	73	Brush, Good, HSG D
*	1.363	86	CCR
	2.667	80	Weighted Average
	2.667		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	60	0.0300	0.37		**Sheet Flow,** Fallow n= 0.050 P2= 2.35"
16.7	1,439	0.0015	1.44	21.58	**Trap/Vee/Rect Channel Flow,** Bot.W=12.00' D=1.00' Z= 3.0 '/' Top.W=18.00' n= 0.035 Earth, dense weeds
19.4	1,499	Total			

Subcatchment 7S: Area G



Summary for Subcatchment 8S: Area H

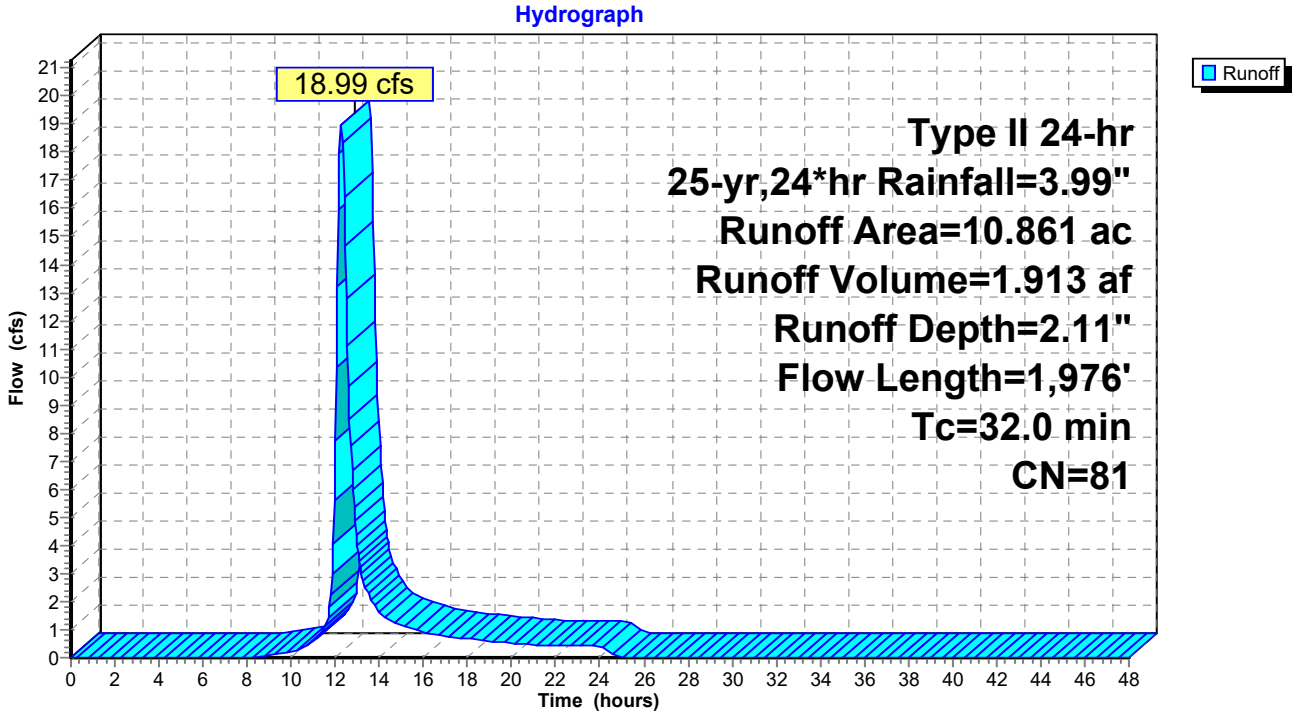
Runoff = 18.99 cfs @ 12.27 hrs, Volume= 1.913 af, Depth= 2.11"
Routed to Link 10L : Center Outlet

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr,24*hr Rainfall=3.99"

	Area (ac)	CN	Description
	0.050	96	Gravel surface, HSG D
	4.397	73	Brush, Good, HSG D
*	6.414	86	CCR
	10.861	81	Weighted Average
	10.861		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.4	101	0.0150	0.31		**Sheet Flow,** Fallow n= 0.050 P2= 2.35"
26.6	1,875	0.0010	1.17	17.62	**Trap/Vee/Rect Channel Flow,** Bot.W=12.00' D=1.00' Z= 3.0 '/' Top.W=18.00' n= 0.035 Earth, dense weeds
32.0	1,976	Total			

Subcatchment 8S: Area H



Summary for Reach 12R: Channel R2

Inflow Area = 25.914 ac, 0.00% Impervious, Inflow Depth > 0.35" for 25-yr,24*hr event
Inflow = 0.71 cfs @ 11.98 hrs, Volume= 0.746 af
Outflow = 0.62 cfs @ 25.42 hrs, Volume= 0.718 af, Atten= 13%, Lag= 806.9 min
Routed to Link 11L : East Outlet

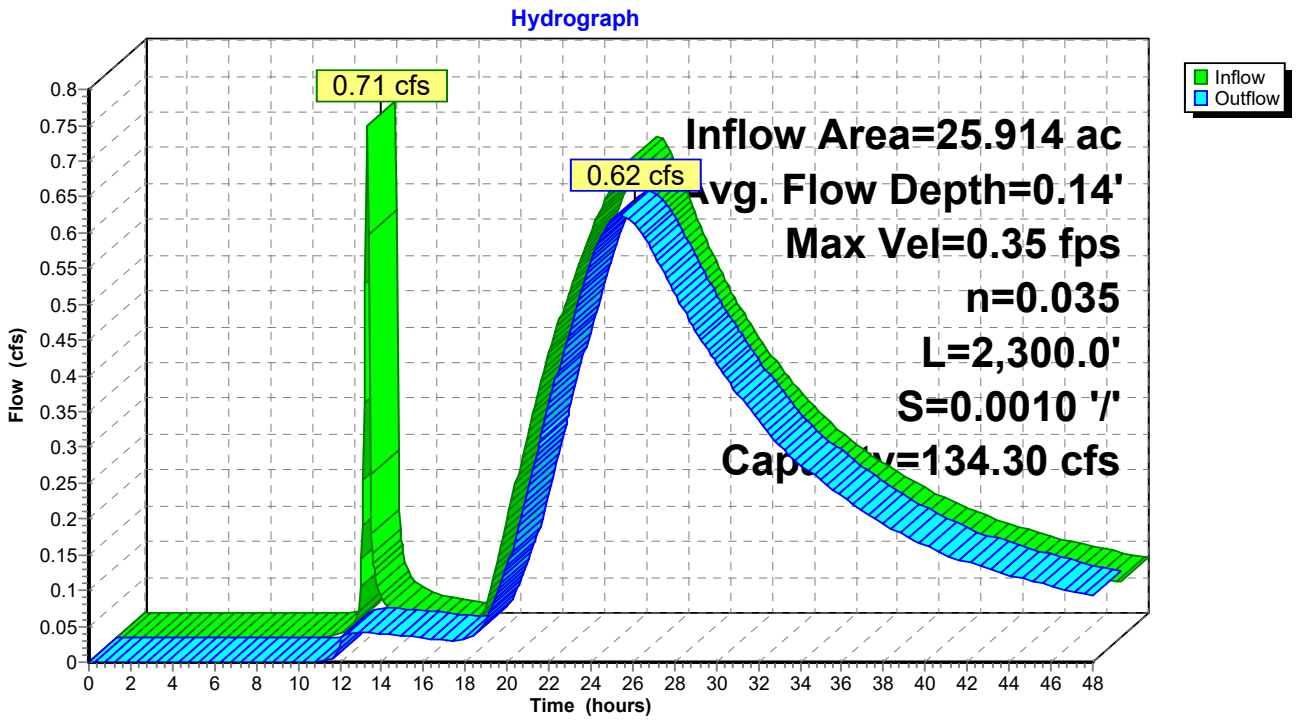
Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.35 fps, Min. Travel Time= 108.3 min
Avg. Velocity = 0.22 fps, Avg. Travel Time= 171.7 min

Peak Storage= 4,055 cf @ 25.42 hrs
Average Depth at Peak Storage= 0.14' , Surface Width= 12.85'
Bank-Full Depth= 3.00' Flow Area= 63.0 sf, Capacity= 134.30 cfs

12.00' x 3.00' deep channel, n= 0.035 Earth, dense weeds
Side Slope Z-value= 3.0 '/' Top Width= 30.00'
Length= 2,300.0' Slope= 0.0010 '/'
Inlet Invert= 610.92', Outlet Invert= 608.67'



‡



Summary for Reach 13R: Channel R1

Inflow Area = 3.127 ac, 0.22% Impervious, Inflow Depth = 2.03" for 25-yr,24*hr event
Inflow = 7.30 cfs @ 12.11 hrs, Volume= 0.530 af
Outflow = 3.27 cfs @ 12.34 hrs, Volume= 0.530 af, Atten= 55%, Lag= 13.8 min
Routed to Link 9L : West Outlet

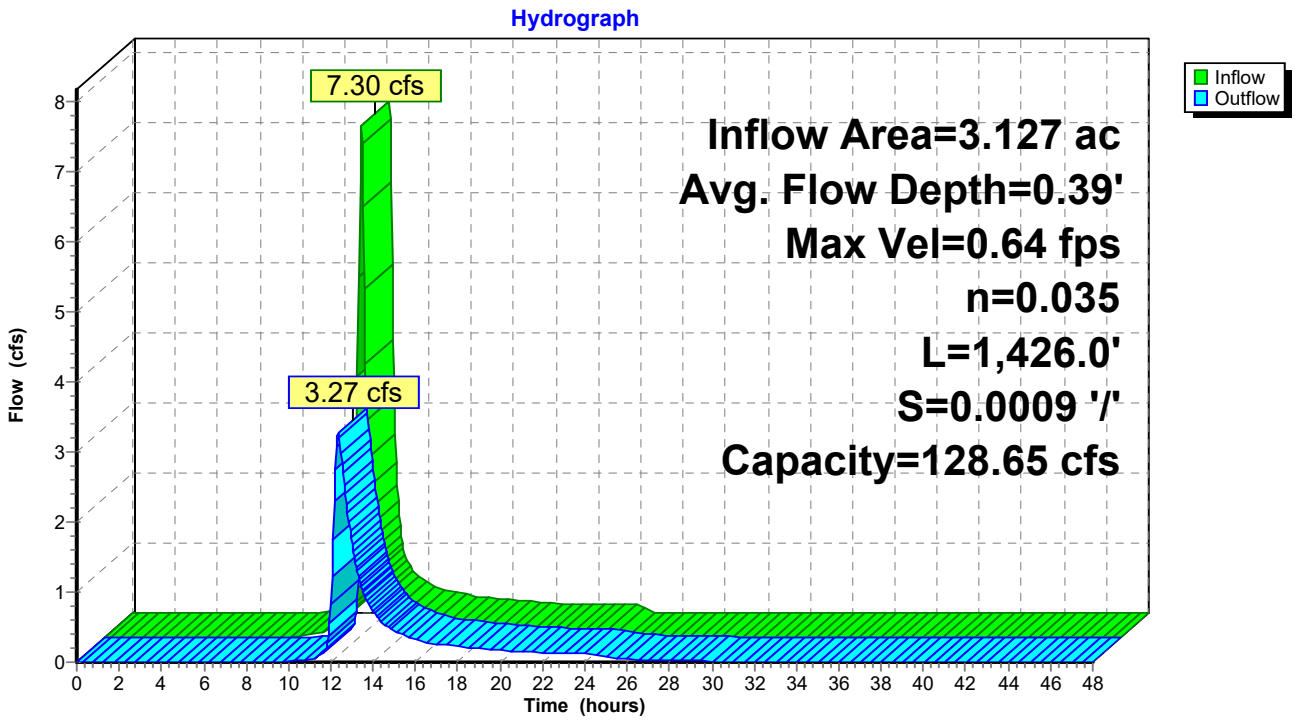
Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.64 fps, Min. Travel Time= 37.3 min
Avg. Velocity = 0.17 fps, Avg. Travel Time= 138.0 min

Peak Storage= 7,309 cf @ 12.34 hrs
Average Depth at Peak Storage= 0.39' , Surface Width= 14.34'
Bank-Full Depth= 3.00' Flow Area= 63.0 sf, Capacity= 128.65 cfs

12.00' x 3.00' deep channel, n= 0.035 Earth, dense weeds
Side Slope Z-value= 3.0 '/' Top Width= 30.00'
Length= 1,426.0' Slope= 0.0009 '/'
Inlet Invert= 609.22', Outlet Invert= 607.94'



‡



Summary for Pond 14P: 2x24" CPP

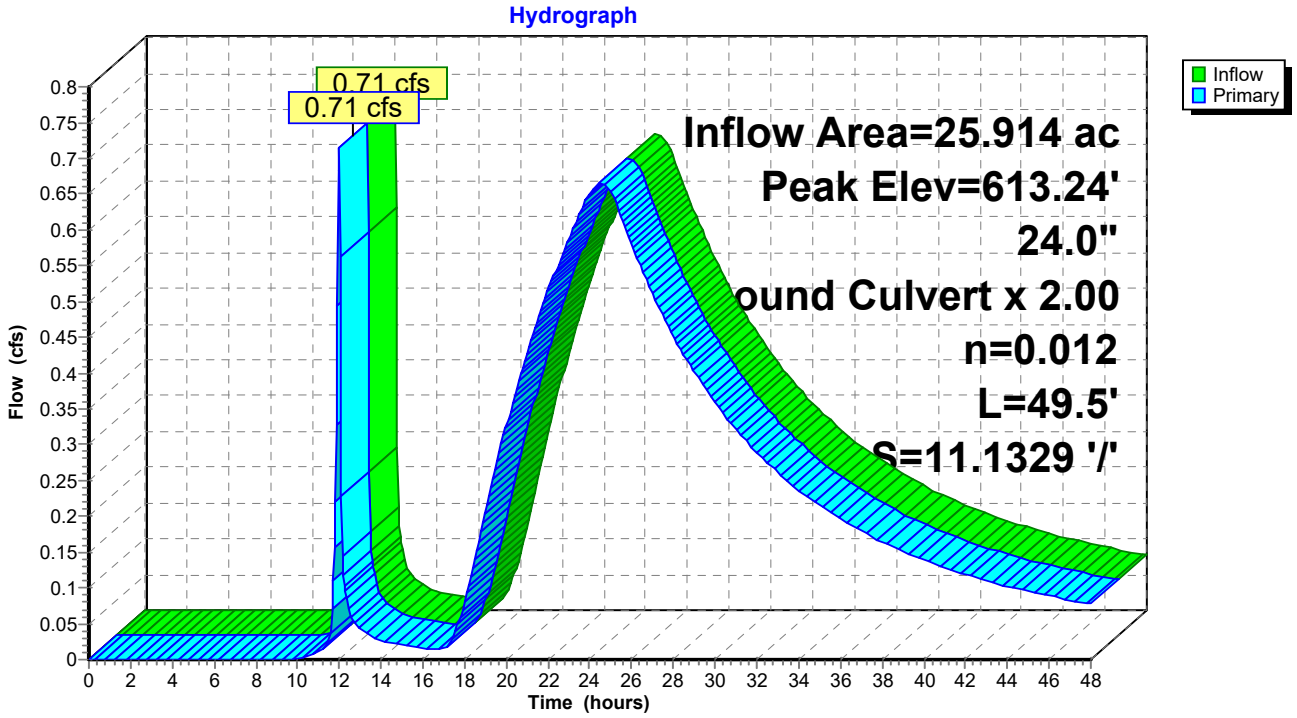
Inflow Area = 25.914 ac, 0.00% Impervious, Inflow Depth > 0.35" for 25-yr,24*hr event
Inflow = 0.71 cfs @ 11.98 hrs, Volume= 0.746 af
Outflow = 0.71 cfs @ 11.98 hrs, Volume= 0.746 af, Atten= 0%, Lag= 0.0 min
Primary = 0.71 cfs @ 11.98 hrs, Volume= 0.746 af
Routed to Reach 12R : Channel R2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 613.24' @ 11.98 hrs
Flood Elev= 616.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	613.00'	**24.0" Round Culvert X 2.00** L= 49.5' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 613.00' / 61.92' S= 11.1329 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf

Primary OutFlow Max=0.68 cfs @ 11.98 hrs HW=613.24' TW=610.94' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.68 cfs @ 1.65 fps)

Pond 14P: 2x24" CPP



Summary for Pond 15P: 48" RCP

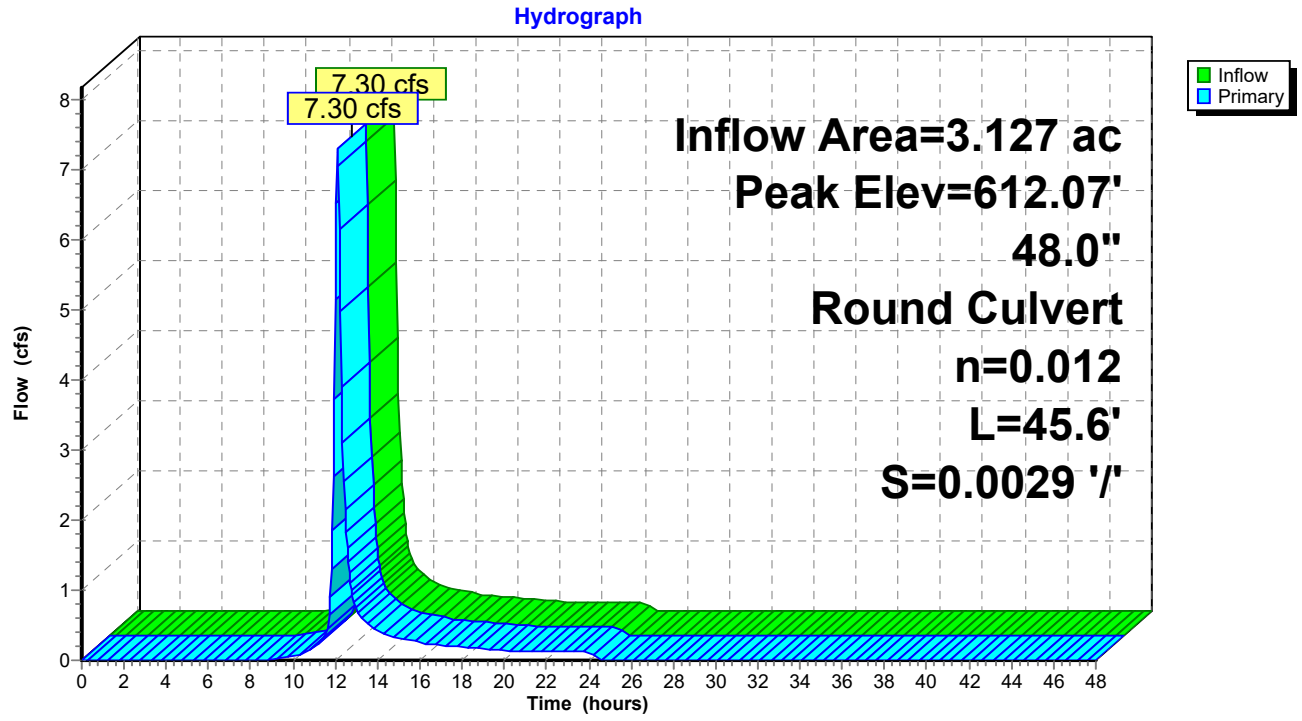
Inflow Area = 3.127 ac, 0.22% Impervious, Inflow Depth = 2.03" for 25-yr,24*hr event
Inflow = 7.30 cfs @ 12.11 hrs, Volume= 0.530 af
Outflow = 7.30 cfs @ 12.11 hrs, Volume= 0.530 af, Atten= 0%, Lag= 0.0 min
Primary = 7.30 cfs @ 12.11 hrs, Volume= 0.530 af
Routed to Reach 13R : Channel R1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 612.07' @ 12.11 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	610.93'	**48.0" Round Culvert** L= 45.6' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 610.93' / 610.80' S= 0.0029 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 12.57 sf

Primary OutFlow Max=7.20 cfs @ 12.11 hrs HW=612.07' TW=609.50' (Dynamic Tailwater)
1=Culvert (Barrel Controls 7.20 cfs @ 3.68 fps)

Pond 15P: 48" RCP



Summary for Pond 16P: Low Area

Inflow Area = 25.677 ac, 0.00% Impervious, Inflow Depth = 2.54" for 25-yr,24*hr event
Inflow = 40.10 cfs @ 12.48 hrs, Volume= 5.429 af
Outflow = 0.67 cfs @ 24.59 hrs, Volume= 0.712 af, Atten= 98%, Lag= 726.7 min
Primary = 0.67 cfs @ 24.59 hrs, Volume= 0.712 af
Routed to Pond 14P : 2x24" CPP

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 615.07' @ 24.59 hrs Surf.Area= 8.699 ac Storage= 5.178 af

Plug-Flow detention time= 1,058.8 min calculated for 0.712 af (13% of inflow)
Center-of-Mass det. time= 883.5 min (1,734.1 - 850.6)

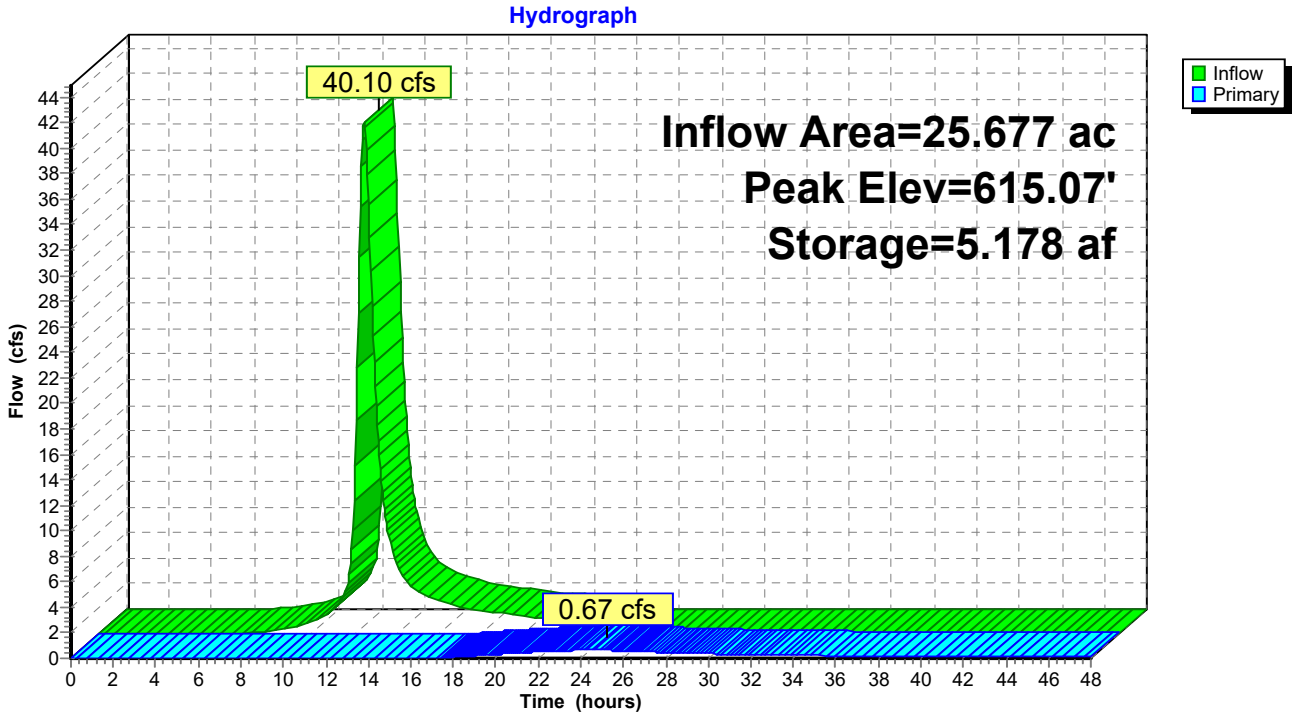
Volume	Invert	Avail.Storage	Storage Description
#1	614.00'	16.710 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
614.00	1.025	0.000	0.000
615.00	8.122	4.573	4.573
616.00	16.151	12.137	16.710

Device	Routing	Invert	Outlet Devices
#1	Primary	615.00'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 1.00 Width (feet) 10.00 30.00

Primary OutFlow Max=0.67 cfs @ 24.59 hrs HW=615.07' TW=613.23' (Dynamic Tailwater)
↑—**1=Custom Weir/Orifice** (Weir Controls 0.67 cfs @ 0.87 fps)

Pond 16P: Low Area



Summary for Pond 17P: Low Area

Inflow Area = 36.677 ac, 0.00% Impervious, Inflow Depth = 2.54" for 25-yr,24*hr event
Inflow = 41.82 cfs @ 12.82 hrs, Volume= 7.755 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

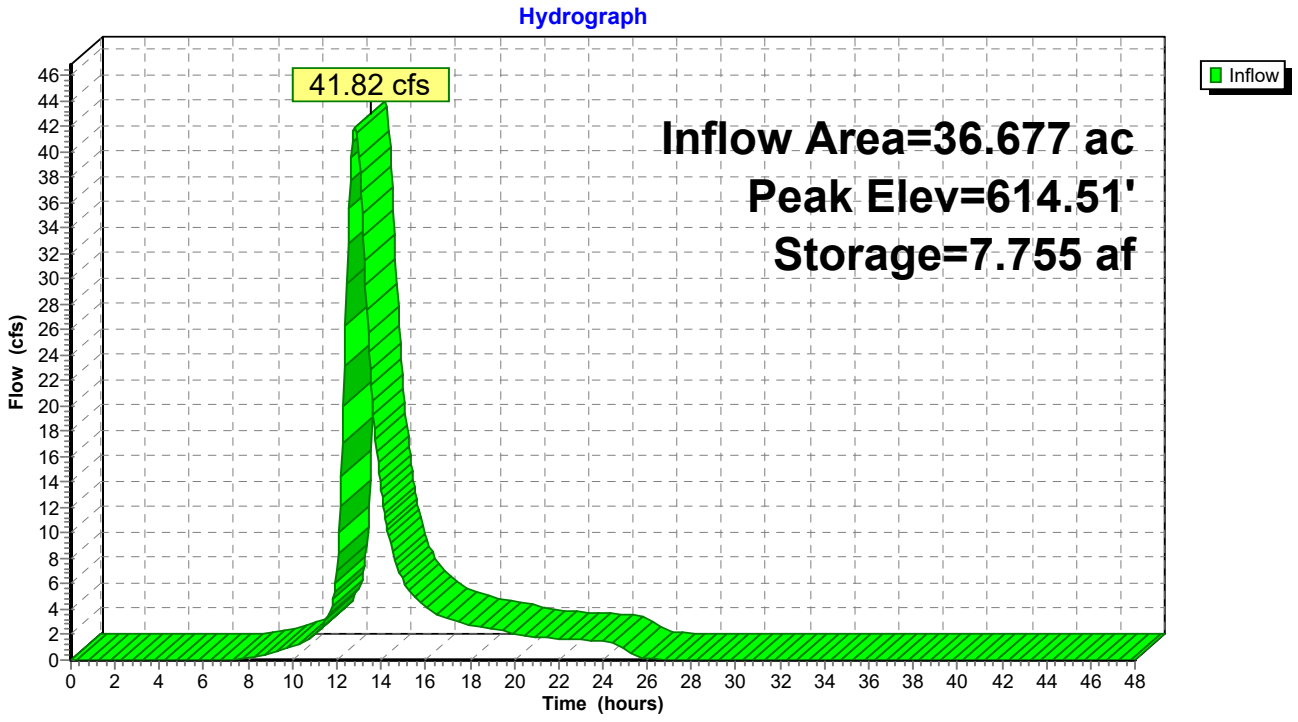
Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 614.51' @ 28.40 hrs Surf.Area= 9.229 ac Storage= 7.755 af
Flood Elev= 615.00' Surf.Area= 12.328 ac Storage= 13.024 af

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

Volume	Invert	Avail.Storage	Storage Description
#1	613.00'	13.024 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
613.00	1.742	0.000	0.000
614.00	5.989	3.865	3.865
615.00	12.328	9.158	13.024

Pond 17P: Low Area

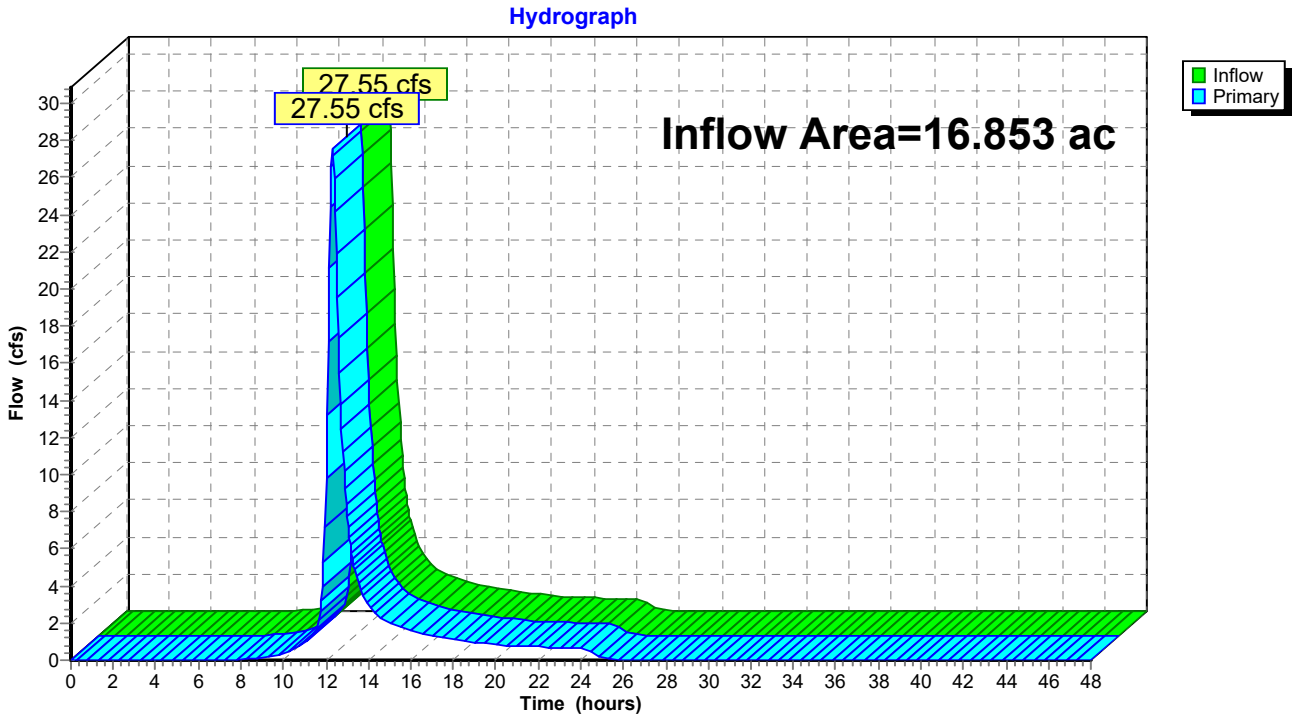


Summary for Link 9L: West Outlet

Inflow Area = 16.853 ac, 3.06% Impervious, Inflow Depth = 2.23" for 25-yr,24*hr event
Inflow = 27.55 cfs @ 12.31 hrs, Volume= 3.135 af
Primary = 27.55 cfs @ 12.31 hrs, Volume= 3.135 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link 9L: West Outlet

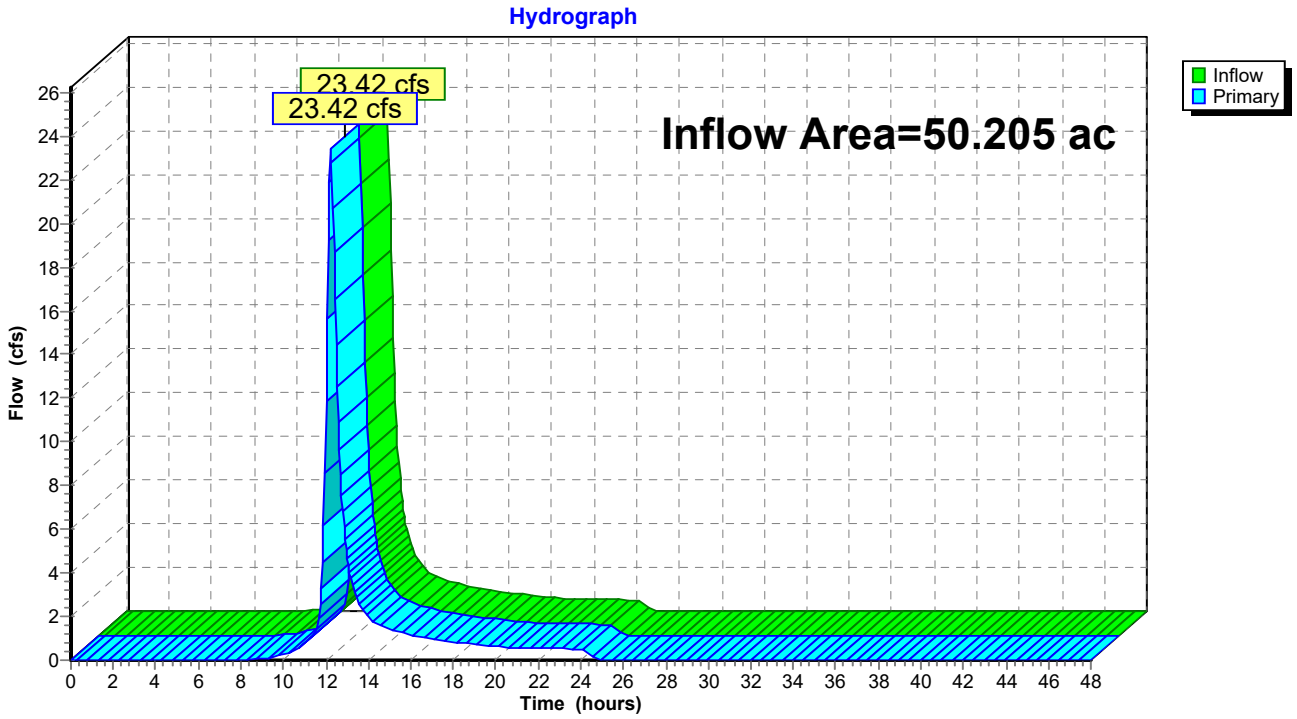


Summary for Link 10L: Center Outlet

Inflow Area = 50.205 ac, 0.00% Impervious, Inflow Depth = 0.57" for 25-yr,24*hr event
Inflow = 23.42 cfs @ 12.23 hrs, Volume= 2.364 af
Primary = 23.42 cfs @ 12.23 hrs, Volume= 2.364 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link 10L: Center Outlet

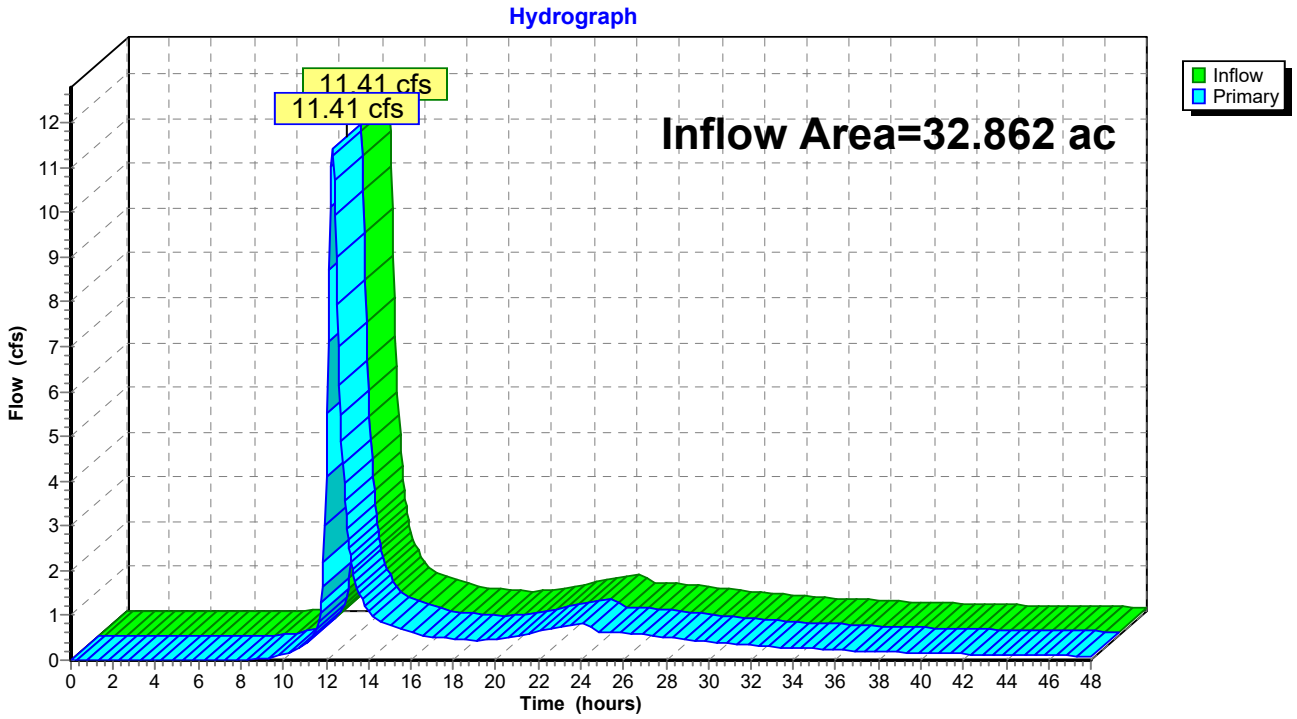


Summary for Link 11L: East Outlet

Inflow Area = 32.862 ac, 0.00% Impervious, Inflow Depth > 0.71" for 25-yr,24*hr event
Inflow = 11.41 cfs @ 12.31 hrs, Volume= 1.941 af
Primary = 11.41 cfs @ 12.31 hrs, Volume= 1.941 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link 11L: East Outlet



Worksheet for Channel R1

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.035
Channel Slope	0.001 ft/ft
Left Side Slope	3.000 H:V
Right Side Slope	3.000 H:V
Bottom Width	12.00 ft
Discharge	27.55 cfs

Results	
Normal Depth	1.28 ft
Flow Area	20.4 ft²
Wetted Perimeter	20.1 ft
Hydraulic Radius	1.01 ft
Top Width	19.71 ft
Critical Depth	0.52 ft
Critical Slope	0.023 ft/ft
Velocity	1.35 ft/s
Velocity Head	0.03 ft
Specific Energy	1.31 ft
Froude Number	0.235
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.00 ft
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	1.28 ft
Critical Depth	0.52 ft
Channel Slope	0.001 ft/ft
Critical Slope	0.023 ft/ft

Worksheet for Channel R2

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.035
Channel Slope	0.001 ft/ft
Left Side Slope	3.000 H:V
Right Side Slope	3.000 H:V
Bottom Width	12.00 ft
Discharge	11.41 cfs

Results	
Normal Depth	0.78 ft
Flow Area	11.2 ft²
Wetted Perimeter	16.9 ft
Hydraulic Radius	0.66 ft
Top Width	16.69 ft
Critical Depth	0.30 ft
Critical Slope	0.028 ft/ft
Velocity	1.02 ft/s
Velocity Head	0.02 ft
Specific Energy	0.80 ft
Froude Number	0.219
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.00 ft
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	0.78 ft
Critical Depth	0.30 ft
Channel Slope	0.001 ft/ft
Critical Slope	0.028 ft/ft

Worksheet for Channel R3+R4

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.035
Channel Slope	0.001 ft/ft
Left Side Slope	3.000 H:V
Right Side Slope	3.000 H:V
Bottom Width	12.00 ft
Discharge	23.42 cfs

Results	
Normal Depth	1.17 ft
Flow Area	18.2 ft²
Wetted Perimeter	19.4 ft
Hydraulic Radius	0.94 ft
Top Width	19.04 ft
Critical Depth	0.47 ft
Critical Slope	0.024 ft/ft
Velocity	1.29 ft/s
Velocity Head	0.03 ft
Specific Energy	1.20 ft
Froude Number	0.232
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.00 ft
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	1.17 ft
Critical Depth	0.47 ft
Channel Slope	0.001 ft/ft
Critical Slope	0.024 ft/ft

Appendix B – Reference Drawings

SEE DETAIL 6 500-1

ACCESS ROAD

HIGH POINT OF PERIMETER DRAINAGE CHANNEL, INVERT ELEVATION â610.5 ft msl

PERIMETER CHANNEL R1 SLOPES AT â0.087%

HIGH POINT OF PERIMETER DRAINAGE CHANNEL R3, INVERT ELEVATION â610 ft msl

PERIMETER CHANNEL R3 SLOPES AT â0.1%

INVERT ELEVATION, â607.5 ft msl

EXISTING CLAY CAP LIMITS, TO BE REMOVED WITHIN OVERLINER LIMITS

PERIMETER CHANNEL R2 SLOPES AT â0.1%

HIGH POINT OF PERIMETER DRAINAGE CHANNEL R4, INVERT ELEVATION â610 ft msl

INVERT ELEVATION, â608.4 ft msl

PERIMETER CHANNEL R4 SLOPES AT â0.15%

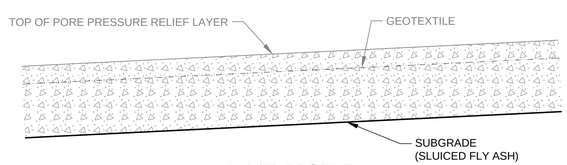
INVERT ELEVATION, â607.6 ft msl

0.50%

SCALE 0 200 400 FEET

NOTE(S)

1. ABANDONED PIPING WITHIN LIMITS OF SUBGRADE TO BE REMOVED.
2. CLAY COVER WITHIN LIMITS OF SUBGRADE TO BE REMOVED.



LAYER PROFILE

CLIENT
DTE ENERGY
MONROE POWER PLANT
MONROE, MI

CONSULTANT
Golder Associates

YYYY-MM-DD	2015-03-20
PREPARED	JJS
DESIGN	JJS
REVIEW	TDJ
APPROVED	DML

PROJECT
MONROE POWER PLANT ASH BASIN
PERMIT MODIFICATION

TITLE
TOP OF SUBGRADE PLAN

PROJECT No.	CONTROL	Rev.	FIGURE
1521809B			400-1

Path: \\langing\CAD\Projects\15x-Projects\1521809B_DTE Monroe\PRODUCTION\A-Fly Ash Basing Permit Modi | File Name: 1521809B_400-1.dwg

0 1 in IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI D

ACCESS ROAD

SEE DETAIL 6 500-1

SEE DETAILS 1 500-1 & 2 500-1

SEE DETAIL 4 500-1

SEE DETAIL 5 500-1

0.50%

13,390,500 E | 13,391,000 E | 13,391,500 E | 13,392,000 E | 13,392,500 E | 13,393,000 E | 13,393,500 E | 13,394,000 E | 13,394,500 E | 13,395,000 E | 13,395,500 E | 13,396,000 E | 13,396,500 E

144,000 N | 143,500 N | 143,000 N | 142,500 N | 142,000 N | 141,500 N | 141,000 N | 140,500 N

0 200 400
SCALE FEET

TOP OF PORE PRESSURE RELIEF LAYER

GEOTEXTILE

SUBGRADE (SLUICED FLY ASH)

LAYER PROFILE

CLIENT
DTE ENERGY
MONROE POWER PLANT
MONROE, MI

CONSULTANT
Golder Associates

YYYY-MM-DD	2015-03-20
PREPARED	JJS
DESIGN	JJS
REVIEW	TDJ
APPROVED	DML

PROJECT
MONROE POWER PLANT ASH BASIN
PERMIT MODIFICATION

TITLE
PORE WATER RELIEF SYSTEM

PROJECT No. 1521809B | CONTROL | Rev. | FIGURE 400-3

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI D

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ACCESS ROAD

SEE DETAIL 6 / 500-1

2 / 500-2

1 / 500-2

6"ï PERFORATED, FILTER SOCKED, CORRUGATED PLASTIC PIPE SEE DETAIL 2 / 500-1

TYPICAL PIPE OUTLET SEE DETAIL 4 / 500-1

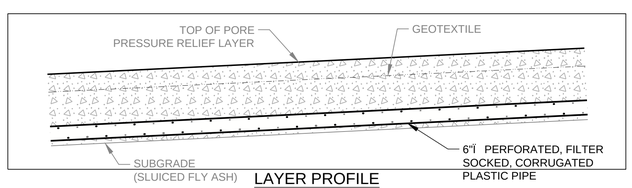
8"ï PERFORATED, FILTER SOCKED, CORRUGATED PLASTIC PIPE SEE DETAIL 2 / 500-1

0.50%

SCALE 0 200 400 FEET

NOTE(S)

1. PIPE SPACING MAY BE INCREASED IF ACTUAL SETTLEMENT MEASURED DURING FILLING IS LESS THAN THOSE PREDICTED IN THE CALCULATIONS.



LAYER PROFILE

CLIENT
DTE ENERGY
MONROE POWER PLANT
MONROE, MI

CONSULTANT
Golder Associates

YYYY-MM-DD	YYYY-MM-DD
PREPARED	JJS
DESIGN	JJS
REVIEW	TDJ
APPROVED	DML

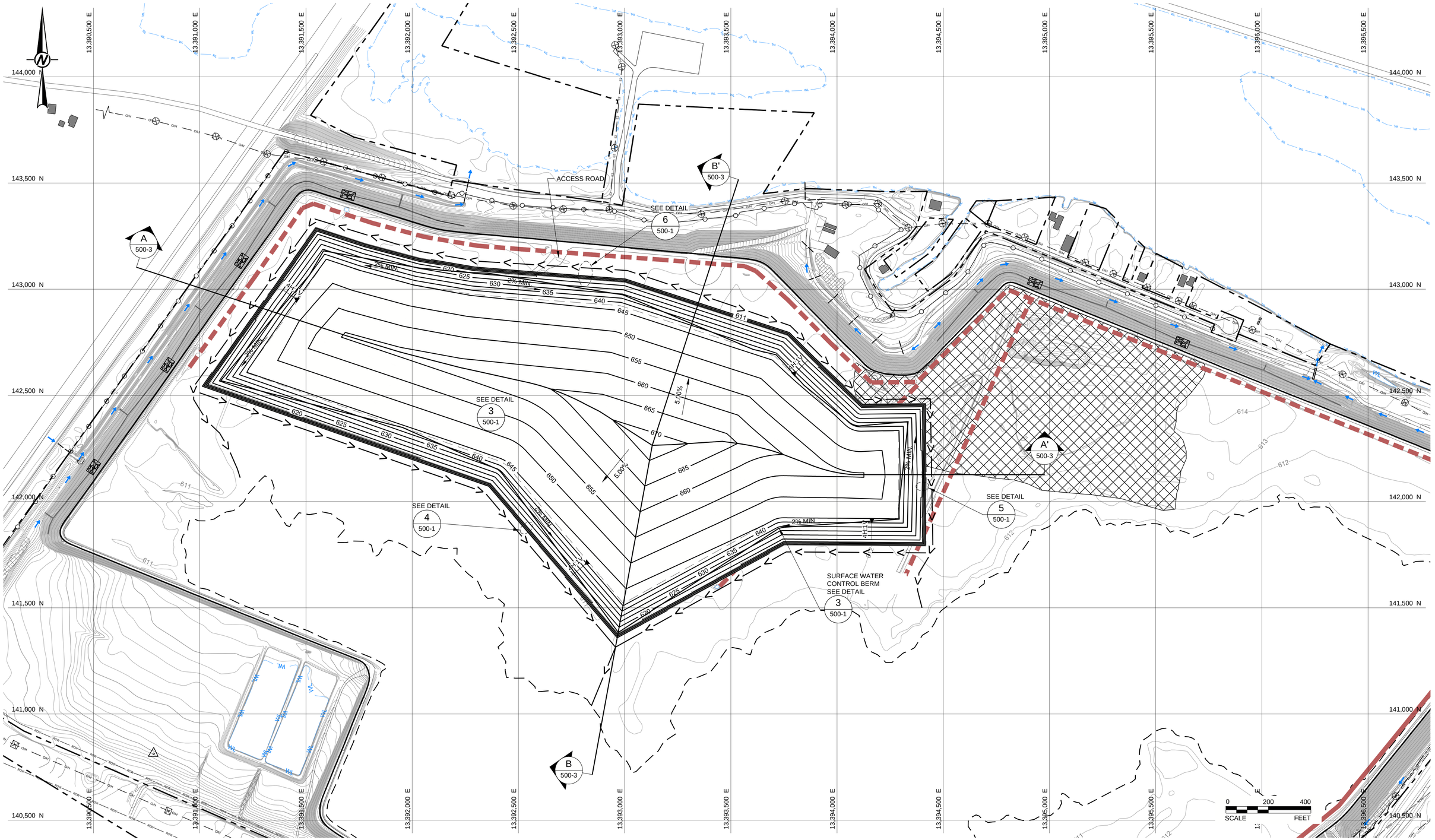
PROJECT
MONROE POWER PLANT ASH BASIN
PERMIT MODIFICATION

TITLE
PORE WATER RELIEF PIPING PLAN

PROJECT No. 1521809B | CONTROL | Rev. ---- | FIGURE 400-4

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI D

Path: \\ansing\CAD\Projects\15x-Projects\1521809B_DTE Monroe\PRODUCTION\A-Fly Ash Basing Permit Modi | File Name: 1521809B_400-1.dwg



CLIENT
DTE ENERGY
MONROE POWER PLANT
MONROE, MI

CONSULTANT
Golder Associates

YYYY-MM-DD	2015-03-20
PREPARED	JJS
DESIGN	JJS
REVIEW	TDJ
APPROVED	DML

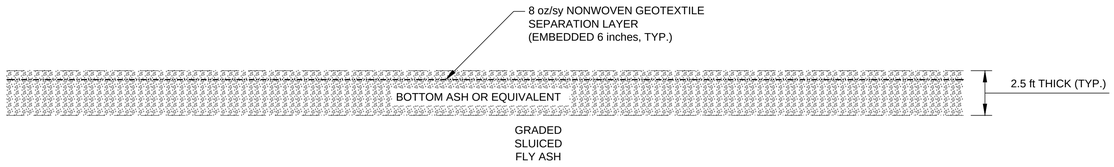
PROJECT
MONROE POWER PLANT ASH BASIN
PERMIT MODIFICATION

TITLE
CLOSURE PLAN / CROSS SECTION LOCATIONS

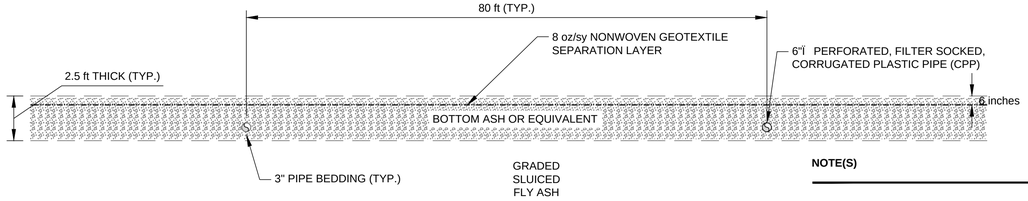
PROJECT No.	CONTROL	Rev.	FIGURE
1521809B			400-5

Path: \\ansing\CAD\Projects\15x-Projects\1521809B_DTE Monroe\PRODUCTION\A-Fly Ash Basing Permit Modi | File Name: 1521809B_400-1.dwg

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI D



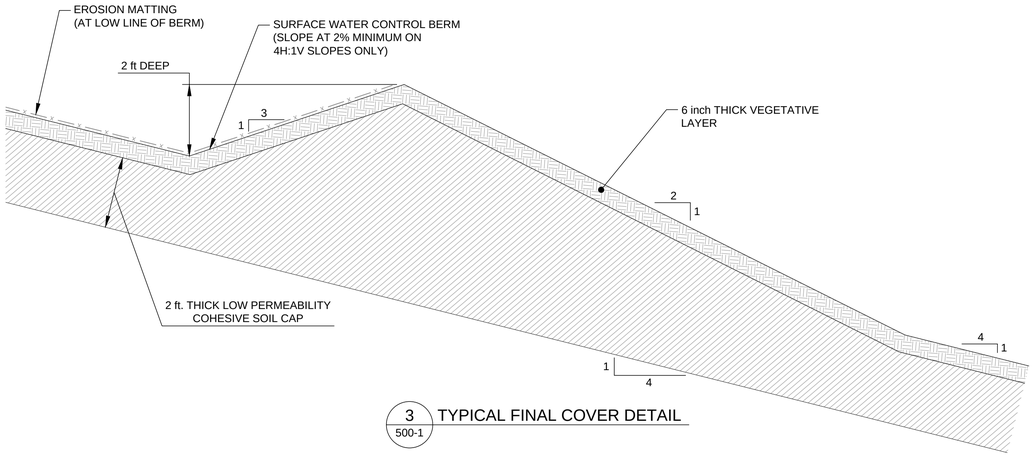
1 500-1 PORE RELIEF SYSTEM BASE LINER



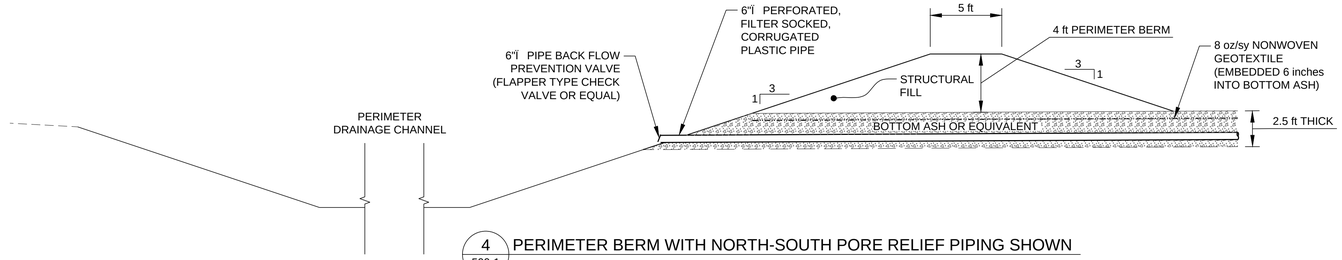
2 500-1 PORE RELIEF SYSTEM BASE LINER w/ PIPES

NOTE(S)

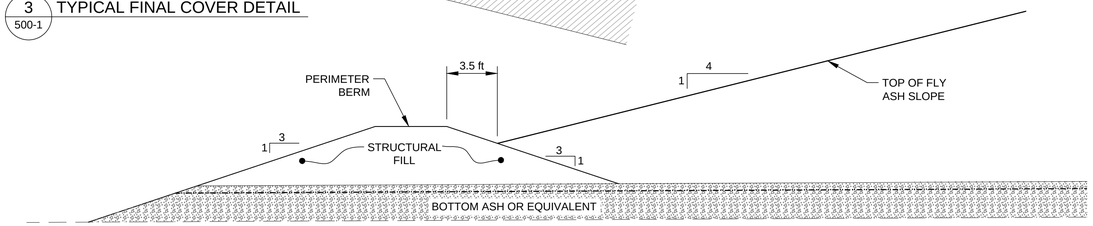
1. PIPE SPACING MAY BE INCREASED IF ACTUAL SETTLEMENT MEASURED DURING FILLING IS LESS THAN THOSE PREDICTED IN THE CALCULATIONS.



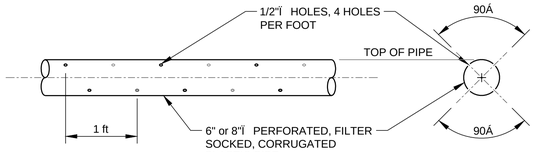
3 500-1 TYPICAL FINAL COVER DETAIL



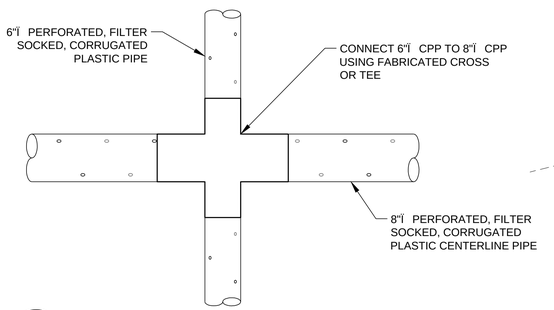
4 500-1 PERIMETER BERM WITH NORTH-SOUTH PORE RELIEF PIPING SHOWN



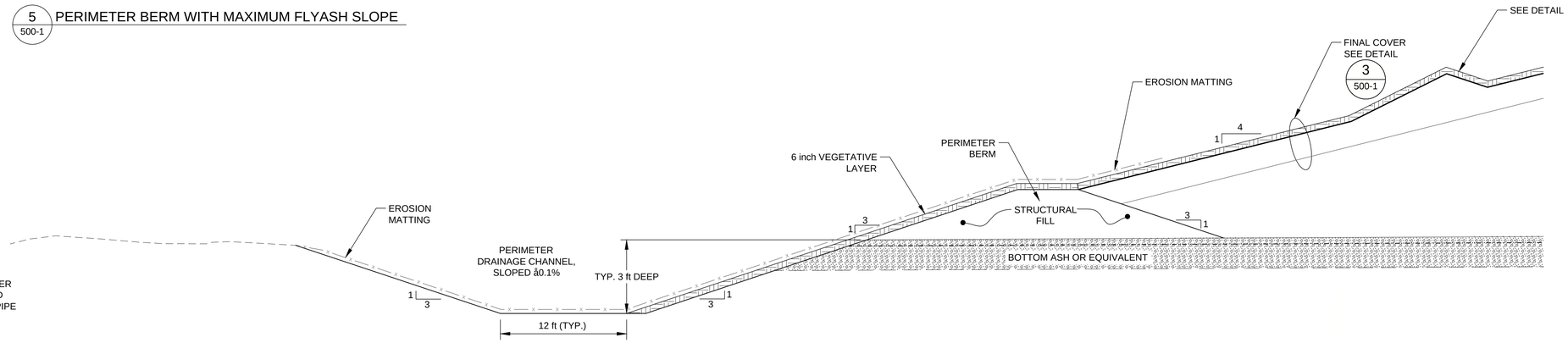
5 500-1 PERIMETER BERM WITH MAXIMUM FLYASH SLOPE



7 500-1 PIPE PERFORATION DETAIL



8 500-1 CORRUGATED PLASTIC PIPE CENTERLINE CONNECTION



6 500-1 PERIMETER BERM WITH FINAL COVER

CLIENT
DTE ENERGY
MONROE POWER PLANT
MONROE, MI

CONSULTANT
Golder Associates

YYYY-MM-DD	2015-03-20
PREPARED	JJS
DESIGN	JJS
REVIEW	TDJ
APPROVED	DML

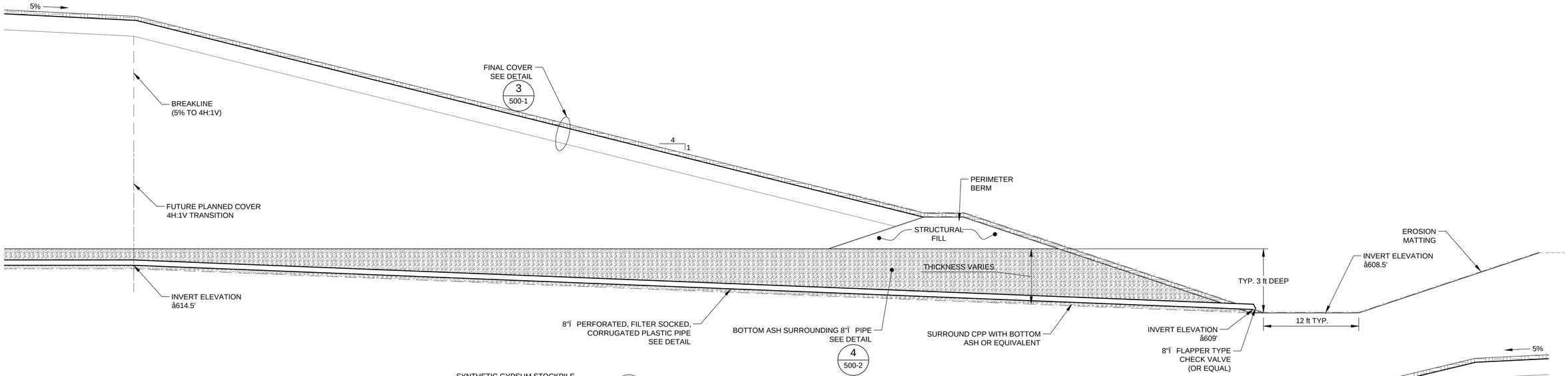
PROJECT
MONROE POWER PLANT ASH BASIN
PERMIT MODIFICATION

TITLE
GENERAL DETAILS
SHEET 1

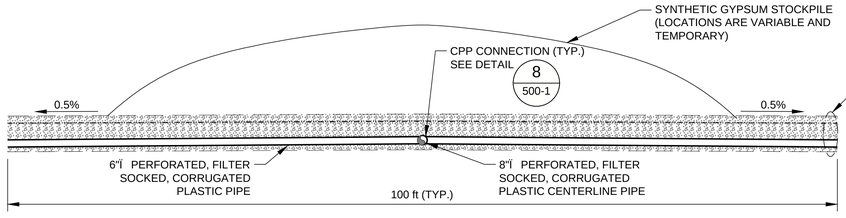
PROJECT No. 1521809B | CONTROL | Rev. | FIGURE 500-1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI D

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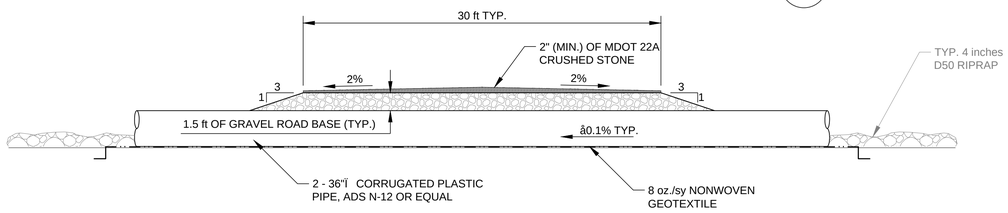


1 500-2 PERIMETER BERM WITH EASTERN CENTRAL PORE PRESSURE RELIEF PIPE SHOWN

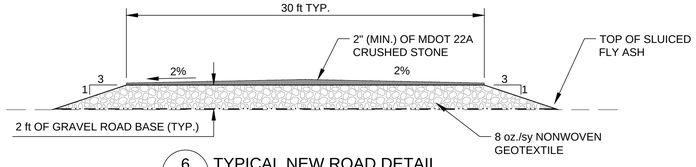


NOT TO SCALE 5 500-2 CENTRAL PORE PRESSURE RELIEF PIPE CORRIDOR

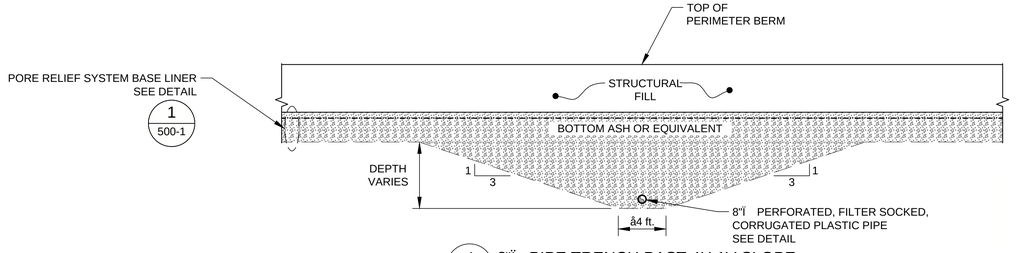
2 500-2 PERIMETER BERM WITH WESTERN CENTRAL PORE PRESSURE RELIEF PIPE SHOWN



3 500-2 ACCESS ROAD RAMP AND CULVERT DETAIL



6 500-2 TYPICAL NEW ROAD DETAIL



4 500-2 8"Ï PIPE TRENCH PAST 4H:1V SLOPE

CLIENT
DTE ENERGY
MONROE POWER PLANT
MONROE, MI

CONSULTANT
Golder Associates

YYYY-MM-DD	2014-03-20
PREPARED	JJS
DESIGN	JJS
REVIEW	TDJ
APPROVED	DML

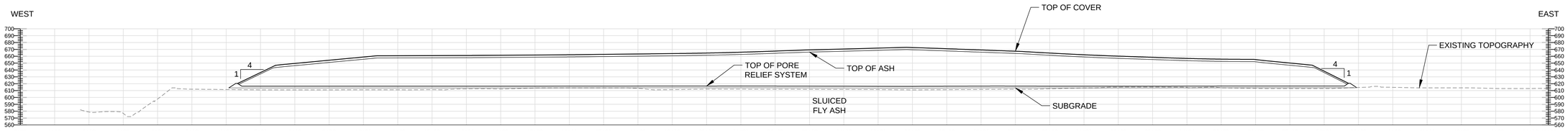
PROJECT
MONROE POWER PLANT ASH BASIN
PERMIT MODIFICATION

TITLE
GENERAL DETAILS
SHEET 2

PROJECT No.	CONTROL	Rev.	FIGURE
1521809B		----	500-2

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI D

Path: \\lansing\CAD\Projects\15x Projects\1521809B_DTE Monroe\PRODUCTION\A-Fly Ash Basing Permit Modi | File Name: 1521809B_500-2.dwg



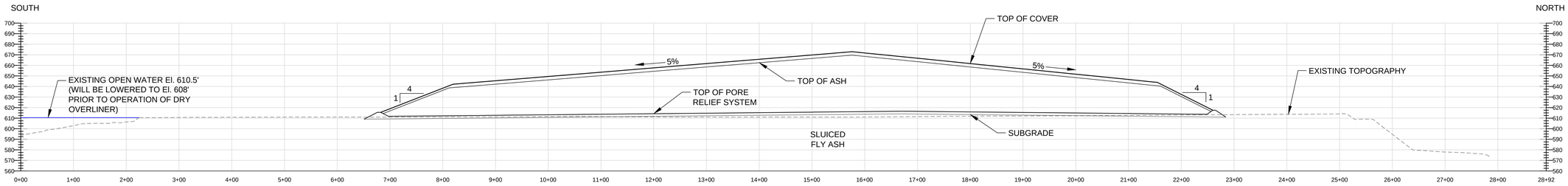
2X VERT EXAGGERATED

1 / 500-3

CROSS SECTION A-A'

0 150 300

1" = 150' FEET



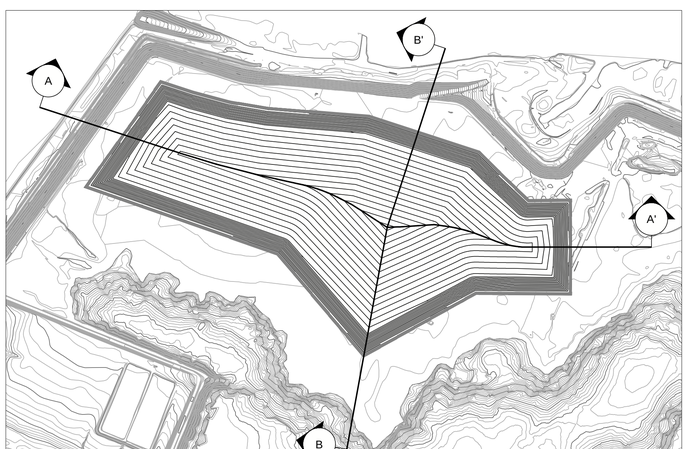
2X VERT EXAGGERATED

2 / 500-3

CROSS SECTION B-B'

0 100 200

1" = 100' FEET



CROSS SECTION LOCATION MAP

DTE ENERGY
MONROE POWER PLANT
MONROE, MI

2015-04-02	
JJS	
JJS	
TDJ	
DML	

Golder Associates

MONROE POWER PLANT ASH BASIN
PERMIT MODIFICATION

GENERAL CROSS SECTIONS

CONTROL
1521809B

FIGURE
500-3

1 in
0


BURNS
McDONNELL