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April 9, 2025

RE: Boehnke Wetland Design Report
Site No. CER962218C
Cerro Gordo County, Iowa

This wetland improvement is planned to provide nutrient reduction benefits to a part of the watershed of Cerro Gordo County DD #16. Nitrates will be converted to nitrogen gas through natural processes as the water passes through the wetland. Sediment with phosphorus will also be captured but will need to be removed occasionally.

The site is located within the properties of T & J Boehnke Farms, LLC and David & Melanie Boehnke just north of Ventura. It is bisected by the main and several laterals of Cerro Gordo Drainage District # 16. Lateral 5 and the drainage district main will be re-laid and daylighted into the wetland with capacities exceeding the capacities of the existing tiles. Water will be diverted from Laterals 2 and 3 to the surface of the wetland via an inverted siphon. The siphon will be connected to the laterals at least 1.5 feet above the proposed wetland pool to provide driving head into the wetland. Laterals 2 and 3 will remain in service without decreased capacity. Lateral 4 will be re-laid around the wetland and will connect to the proposed wetland outlet pipe. The new pipe will have capacity sufficient to provide a ½" drainage coefficient. It will not daylight into the wetland because it could carry water polluted by lead ammunition from the adjacent shooting range.

The wetland pool will be excavated to allow tiles to be daylighted. Because of the long, narrow shape of the pool, diversion berms are not required.

The wetland outlet is a rectangular weir in an intake structure that conveys water back to the tile main through a 24" concrete pipe. The 24" pipe provides capacity sufficient for the re-laid laterals 4 and 5, the tile main, and the flows that will be diverted to the wetland from laterals 2 and 3. The proposed outlet pipe provides a ½" drainage coefficient for the main and laterals, and carries the full capture flow of laterals 2 and 3. The rectangular weir will fill the 18" pipe with a head less than 1' so that no inlet pipe will be submerged during normal flows.

This site is a newer Tile Zone concept developed in cooperation with ISU and IDALS. Tile zone wetlands are designed within existing potholes to treat tile water for nitrate removal while not changing the basin's response to surface runoff or storms. This is demonstrated empirically in the hydrology report (attached) and shown graphically/numerically on sheet A.03 of the plans. The storm bounces listed in the plans and hydrology report are based on modeling performed using Autodesk Storm and Sanitary Analysis. The existing and proposed conditions were both input into hydrology models and the outputs were compared. The proposed construction will not increase flooding for several reasons:

- First, it does not change the surface runoff flow patterns. The wetland grading will not in any way change the direction or path of surface runoff because it will be underwater during any storm events.

- Second, excavating the wetland will decrease the flood elevation by setting the normal water elevation below the existing ground elevation and by providing increased storm detention.
- Third, an outlet weir structure with a grated top will be provided as an outlet back to the tile main. During and after a storm event, this will maximize the rate at which water is able to leave the wetland. The limiting factor for how quickly the basin will return to its normal elevation after a rainfall event is the size of the existing tile.
- Fourth, the re-laid laterals and the inverted siphon inlet will not have an adverse impact on the storm response of the wetland. The storm response is based on the surrounding land (determining the flow of water into the wetland), pothole topography, and available outlets. This project will not change the surrounding land, and it will only positively impact the pothole topography as discussed above. The water that will be routed by this project to the surface of the wetland is water that would otherwise still have been conveyed through the existing drainage district tile main. The tile main is the only subsurface outlet for water leaving the wetland.

This wetland has six watershed basins contributing to surface and/or tile runoff. Five of the basins contribute to surface runoff, including Lateral 3, Lateral 4, Lateral 5, Main Upstream, and Direct watersheds. Surface Runoff from the Lateral 5 and Main Upstream watersheds passes through culverts which are included in the hydrology model. Lateral 2, Lateral 3, Lateral 5, and Main Upstream watersheds contribute tile runoff to the wetland as discussed above.

The NRCS Conservation Practice Standards (CPSs) used for this project are 656 (Constructed Wetland) and 587 (Structure for Water Control). CPS 656 was chosen because the purpose of this project is improving water quality and treating contaminated runoff. CPS 587 was chosen for the outlet structure because its purpose is to control the water level in the wetland and convey water to the tile. However, tile zone wetlands do not fit well within the framework of CPS 656 because they are not created by an embankment, and they do not change the storm response of the pothole. Since this wetland is an existing and historical pothole, since there is no constructed impoundment, and since the outlet is an existing tile main, it cannot be constructed to convey the 25-year storm. The 25-year storm will continue to fill the pothole and overflow to the east just as it does in its existing condition. For the same reasons, the wetland cannot be designed to meet the standards of CPS Pond (Code 378). CPS 587 states that “Inflow will be limited to the capacity originally apportioned to the drain.” This is met in the proposed design because all the water that flows to the wetland and into the outlet structure is water that would otherwise still have been directed to the existing tile main. Furthermore, in a drainage district the capacity apportioned to an area or a property is the capacity that is available in the drain. There are no limits placed on water that may be discharged to the main.

This project is NRCS Engineering Job Class IV because the constructed wetland is for field runoff treatment with a drainage area between 300 and 1000 acres. Under CPS 587, the project is Job Class IV because the drainage area is between 250 and 640 acres.

Bolton & Menk reviewed the soil survey data for the location and found primarily muck within the wetland area, and loam in the rest of the site. After this review, it was determined that soil borings were unnecessary.

The hydrology of the watersheds contributing both directly and indirectly to the proposed wetland were analyzed. Most of the watershed is agricultural crop and pasture. A map of the contributing watersheds is included with this report. For conservancy of the design, all land was assumed as cultivated to develop an average CN for the project of 83.7 used in the hydrologic analysis. The watersheds were routed through the wetland in its existing and proposed conditions to determine the wetland performance. See the attached hydrology report and outputs from SSA for the results.

The permanent easement for this project will be on the Boehnke properties. IDALS-DSWQ is currently in the process of updating the abstracts and will have a signed easement recorded for the area as shown in the plans. No additional land rights are needed for the project.

The Section 401/404 permit application, floodplain permit application, and archaeological reconnaissance will be addressed by IDALS-DSWQ if required for this project.

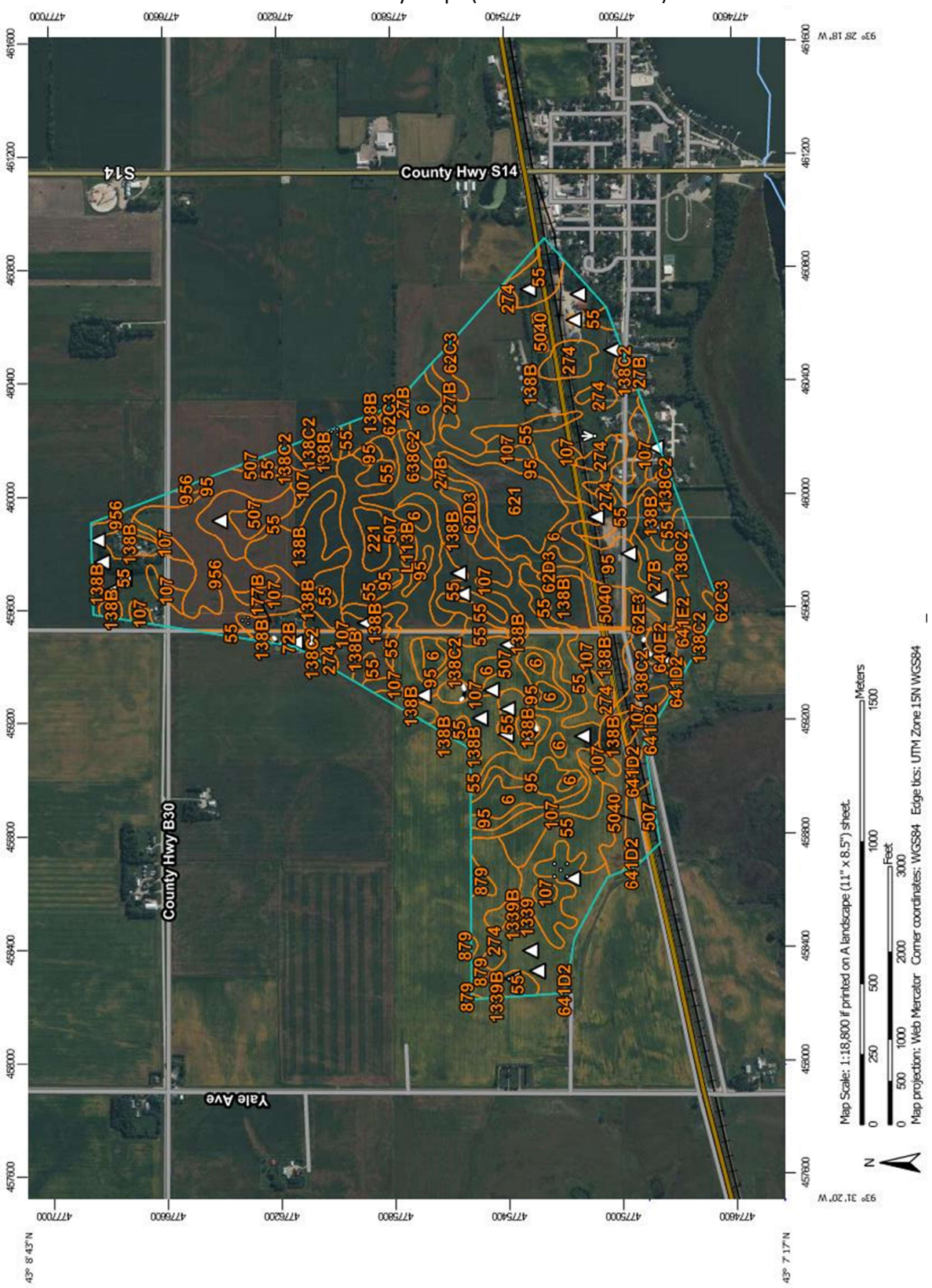
Sincerely,

Bolton & Menk, Inc.

Brandon C Short, PE
Water Resources Project Engineer

Encl: Soil Survey Map
Watershed Map
Hydrology & Hydraulics Report
Hydrology & Hydraulics Modeling Output

Web Soil Survey Maps (Watershed and Site)



Cerro Gordo Wetland

IDALS Project No. CER962218C

Watershed Map

May 2025

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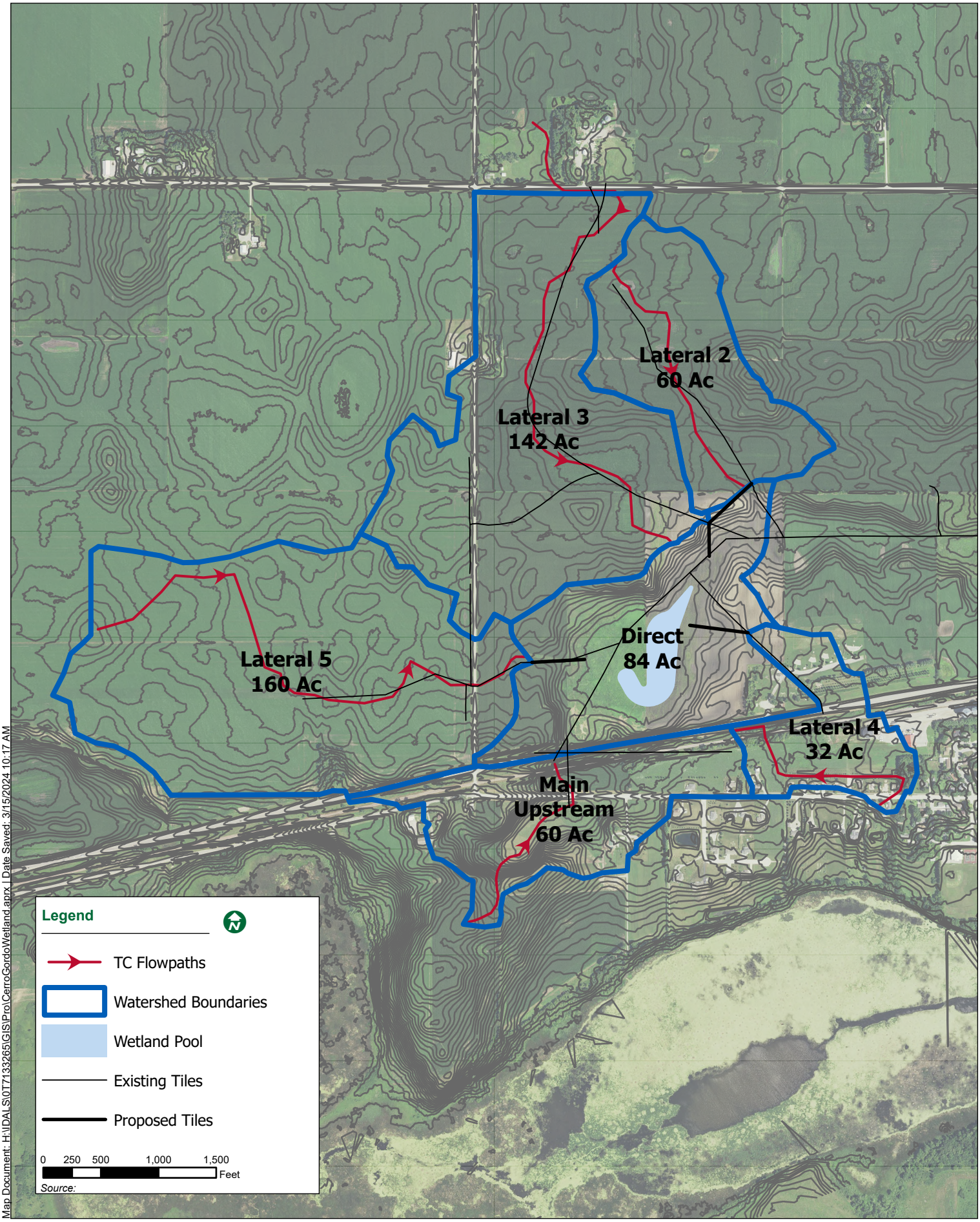

Map Document: H:\IDALS\0T7133265\GIS\Pro\CerroGordoWetland.aprx | Date Saved: 3/15/2024 10:17 AM

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Report Summary

Design Parameters and Procedures:

This report summarizes the hydrology and hydraulic analysis completed for the Boehnke wetland site. The drainage area was determined and a stage-area-storage curve was developed based on the topographic survey, Lidar data available from the Iowa Department of Natural Resources, and grading design for the wetland. Land use and treatment were determined through a site visit and aerial photo review and depression areas were found. Hydrologic data was compiled, sediment calculations were made, the structure was flood routed using the SCS method in Autodesk Storm and Sanitary Analysis (SSA) Software, and all the output was reviewed.

Rainfall events used for this site were MSE 3 distribution, 24-hour, 5-, 10-, 25-, and 100-year events. The primary spillway is an outlet structure with a rectangular weir that discharges to the existing drain tile main. The secondary spillway is a the natural overflow of the existing pothole. Values shown below for Q Out include overland flow and tile flow.

Hydrology Analysis Summary

25-year Event: 5.70'' **100-year Event: 7.6''**

* Hydrologic Soil Groups: A, B, C
* Runoff Curve Number: 83.7 (based on Land use shown in this report)
* Primary Spillway Weir Coefficent = 3.1
* Design life: 150 years for accumulated sediment
* Tc = 1.7 hours determined by the sum of sheet, shallow concentrated and channel flow times.
* Proposed construction lowers storm bounce elevations

Additional Site Analysis Data

* Sediment delivery is 7%, with a trap efficency of 62%.
* The normal pool will contain 80% of the trapped sediment for the 150-year design life.
* Aerated sediment deposited will reduce flood storage by 0.24 acre-feet
* Normal Pool area is 6.3 ac; surface watershed area is approx. 478 ac or 0.75 square miles

Summary Table:

Overflow Elevation: 1235.75 (Data for Surface Flow)

	Q_{max} In (cfs)	Q_{max} Out (cfs)	Max Elev (ft)	Existing Max Elev	Duration - Hours above elevation		
					1236.00	1238.00	1240.00
5-year	283.00	9.31	1238.01	1238.51	82.5	1.4	N/A
10-year	369.00	10.05	1238.96	1239.39	116.7	58.6	N/A
25-year	501.00	15.23	1240.04	1240.30	153.4	97.9	7.7
100-year	718.00	58.85	1241.20	1241.37	155.6	112.2	38.4

Rainfall Data

The following rainfall data was used for the hydrology analysis of the site. Rainfall depths from four sources are shown, and the rainfall depths from the NEH Title 210 figure were used. MSE 3 was used for the rainfall distribution.

Frequency	24-hr			
yr	in [1]	in [2]	in [3]	in [4]
2	3.02	2.75	3.06	3.10
5	3.80	3.50	3.83	3.80
10	4.56	4.14	4.55	4.60
25	5.76	5.11	5.67	5.70
50	6.82	5.97	6.63	6.60
100	7.99	6.92	7.68	7.60

References

[ ] Box indicates rainfall depth used for modeling.

[1] NOAA Atlas 14, Volume 8, Version 2

[2] Autodesk Storm and Sanitary Analysis Rainafall Designer

[3] SUDAS Design 2025 Edition

[4] 24-hour rainfall depths by county from NEH Title 210 (Figure IA2-25)

Tributary Watershed Data

Watershed	Area (ac)	Area (sq. mi.)	Tile/Surface Drained
Direct	84	0.13	Surface
Lateral 2	60	0.09	Tile
Lateral 3	142	0.22	Surface & Tile
Lateral 4	32	0.05	Surface
Lateral 5	160	0.25	Surface & Tile
Main Upstream	60	0.09	Surface & Tile

Surface Total	478	0.75
Tile Total	422	0.66

Runoff Curve Number

Soil Name[1]	HSG[1]	Cover Type and Hyd. Condition	Portion of W/S	CN[2]	Product
			percent		
Houghton Muck, et al	A, A/D	Straight Row Crops, Good	3.4%	67	2.278
Clarion Loam, et al	B	Straight Row Crops, Good	10.2%	78	7.956
Clarion Loam, et al	C, C/D	Straight Row Crops, Good	86.4%	85	73.44
		Total	100.0%		83.7

References

[1] USDA - NRCS Soil Survey of Cerro Gordo Co., Iowa.

[2] USDA - NRCS Technical Release 55, Chapter 2, June 1986.

Sediment Calculations

Surface-Drained DA = 478 ac
= .75 sq mi

DA[1]		478	acres	0.747	sqmi
Trap efficiency, very short storage time[2]				62	percent
Average annual sheet and rill erosion[3]				2.6	tons/ac/yr
Area of depressions not subject to sediment delivery				82	acres
Area subject to sheet and rill erosion				396	acres
Average annual sheet and rill erosion				1,043	tons
Delivery ratio[5]				7.0	percent
Sheet and rill erosion delivered to site				73.0	tons/yr
Adjustment for LRA 103[2]				0.3	factor
Adjusted sheet and rill erosion delivered				21.9	tons/yr
Average annual gully erosion rate[4]				0.2	cuft/ft
Length of gully erosion				100	ft
In place density of gully material				80	lb/cuft
Average annual gully erosion (100% delivered)				0.8	t/yr
Total sediment delivered				22.7	t/yr
Weight of sediment retained in resevoir at		62.0	percent trapped[2]	14	t/yr
Sediment accumulation during		150	-year period	2,100	tons
Estimate	80	percent of delivered sediment will not be submerged[2]		1,680	tons
Volume of submerged sediment at		1,307	t/acft[2]	1.29	acft
Normal pool volume		6.2	acft, will not be full		
Estimate	20	percent of delivered sediment will be aerated[2]		420	tons
Volume of aerated sediment at		1,742	t/acft[2]	0.24	acft

References

[1] Determined by Engineer
[2] USDA-NRCS, Engr. Field Man., Chap. 11, Amend. IA 27, Fig.2, May 1986,. Adjusted. See notes.
[3] Estimated by preparer.
[4] Estimated by preparer.
[5] Delivery curve for Des Moines lobe. Source: Iowa Geological Survey.

Stage-Storage

Contour Elev.	Area (sq ft)	Area (Acres)	Average Area (Arces)	Incremental Volume (Ac-ft)	Cumulative Volume (Ac-ft)	Volume Above Weir (Ac-ft)	Allow for Aerated Seditment (Ac-ft)	Temporary Flood Storage (Ac-ft)
1232.00	262400	6.02	6.02	0.00	0.00			
1233.00	**274400**	**6.30**	**6.16**	**6.16**	**6.16**	**0.00**	**0.00**	**0.00**
1235.00	298900	6.86	6.58	13.16	19.32	13.16	0.24	12.92
1236.00	706200	16.21	11.54	11.54	30.86	24.70	0.24	24.46
1237.00	931200	21.38	18.79	18.79	49.65	43.49	0.24	43.25
1238.00	1142900	26.24	23.81	23.81	73.46	67.30	0.24	67.06
1239.00	1315000	30.19	28.21	28.21	101.67	95.51	0.24	95.27
1240.00	1448600	33.26	31.72	31.72	133.40	127.23	0.24	126.99
1241.00	1569700	36.04	34.65	34.65	168.04	161.88	0.24	161.64
1242.00	1665900	38.24	37.14	37.14	205.18	199.02	0.24	198.78

Storage at Normal Pool	**6.16**	**Acre-feet**
Elevation of weir =		**1233.00**
Storage at Overflow	**73.46**	**Acre-feet**
Elevation =		**1238.00**

Average Depth = storage at normal pool / area at normal pool

Average Depth = 0.98 feet

Notes:

Storage areas include final earthwork in pool area. Contour data is compiled from LiDAR, topographic survey, and proposed grading.

Gravity Inlet Calculations

Full Capture Flow (Q_{FC}) is the tile flow rate that can be entirely captured by the partial flow gravity inlet system. If the tile flow is less than Q_{FC}, it will be entirely diverted to the wetland. When the tile flow is greater than Q_{FC}, a portion of the flow (slightly more than Q_{FC}) will be diverted to the wetland. Q_{FC} calculations were performed using the Hazen-Williams equation and take into account the head over the inlet weir.

Intercept Capacities						
Watershed Name	Watershed Area (ac)	Q_{FC} (cfs)[1]	% of Existing Tile capacity	% of 1/2" Dc	Average Tile Flow Rate (cfs)[2]	Percent Captured of Annual Flow[3]
Lateral 2 & 3	202	1.32	19.8%	31.1%	0.2	97.4%
Lateral 5[4]	160	3.54	unknown	105%	0.16	100%
Main[4]	60	2.5	132%	198%	0.06	100%

Notes:

[1] Q_{FC} for partial capture inlet. Pipe capacity calculated with Manning's equation for full capture inlet

[2] Average flow calculated from flow-duration data from the USGS StreamStats Application

[3] Approximated using StreamStats to model tile flow

[4] This is a full-capture re-laid tile

Total Capture Calculations

Wetland Normal Pool Volume (cf) 268400

Watershed	Area (ac)	Percent Capture	Effective Capture Area (ac)	Average Flow Captured (cf/d)[1]	Full Flow Captured (cf/d)[2]	Average Residence Time (d)[3]	Full Flow Residence Time (d)[4]
Lateral 2 & 3	202	97.4%	197	9733	114048		
Lateral 5	160	100.0%	160	13824	305856		
Main	60	100.0%	60	5184	216000		
Wetland Total	422	98.8%	417	28741	635904	9.3	0.4

Notes:

[1] average capture for gravity inlets, estimated from StreamStats

[2] Q_{FC} or 1 csm for gravity inlets

[3] Based on normal pool volume and average flow capture

[4] Based on normal pool volume and full flow capture

Wetland Outlet Weir Capacities

The following calculations show the performance of the outlet weir.

Base Flow (cfs)	7.36	=Full Flow Calculated Above
Base Flow Weir Head (ft)	0.71	
Average Flow (cfs)	0.33	=Average Flow Calculated Above
Average Flow Weir Head (ft)	0.09	
Average Flow Pool Elevation	1233.09	

Wetland Outlet Pipe Capacity

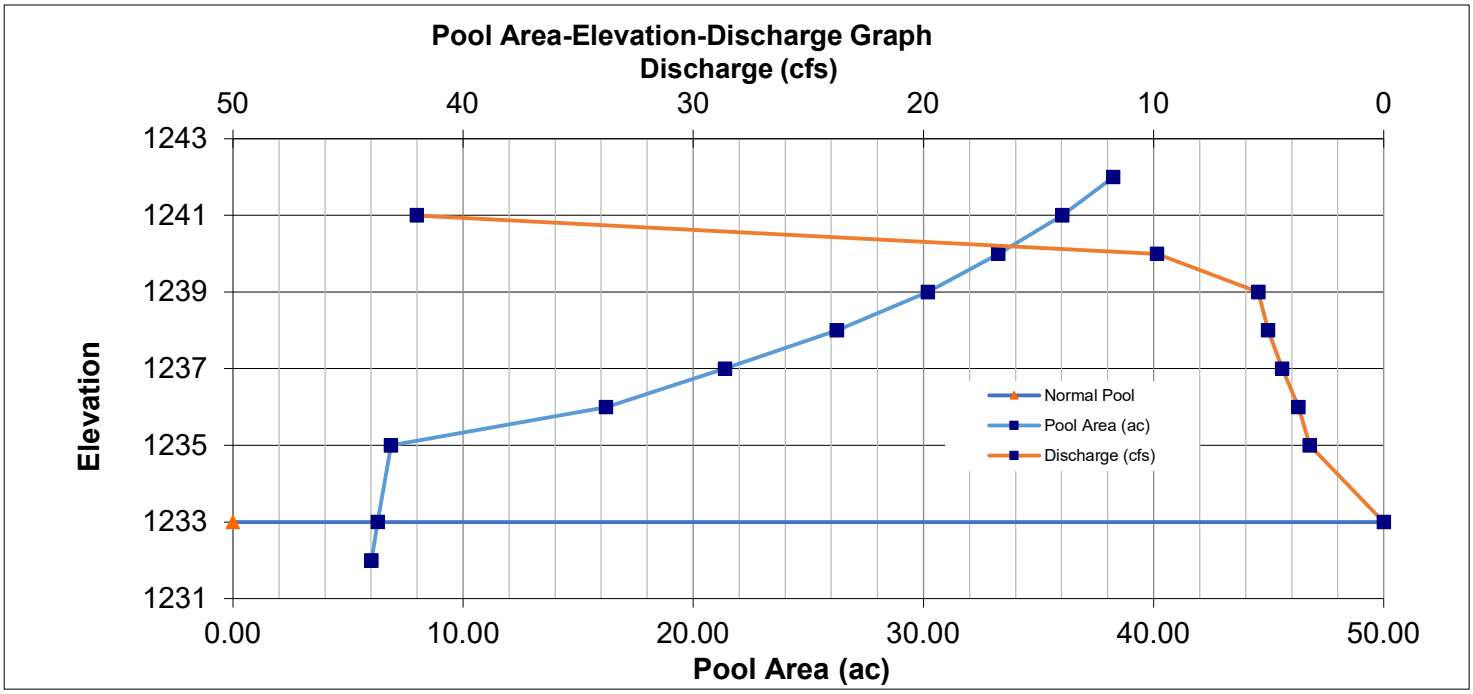
The following calculations show that the proposed wetland outlet pipe is sufficient to convey flows necessary to maintain drainage district facility capacities.

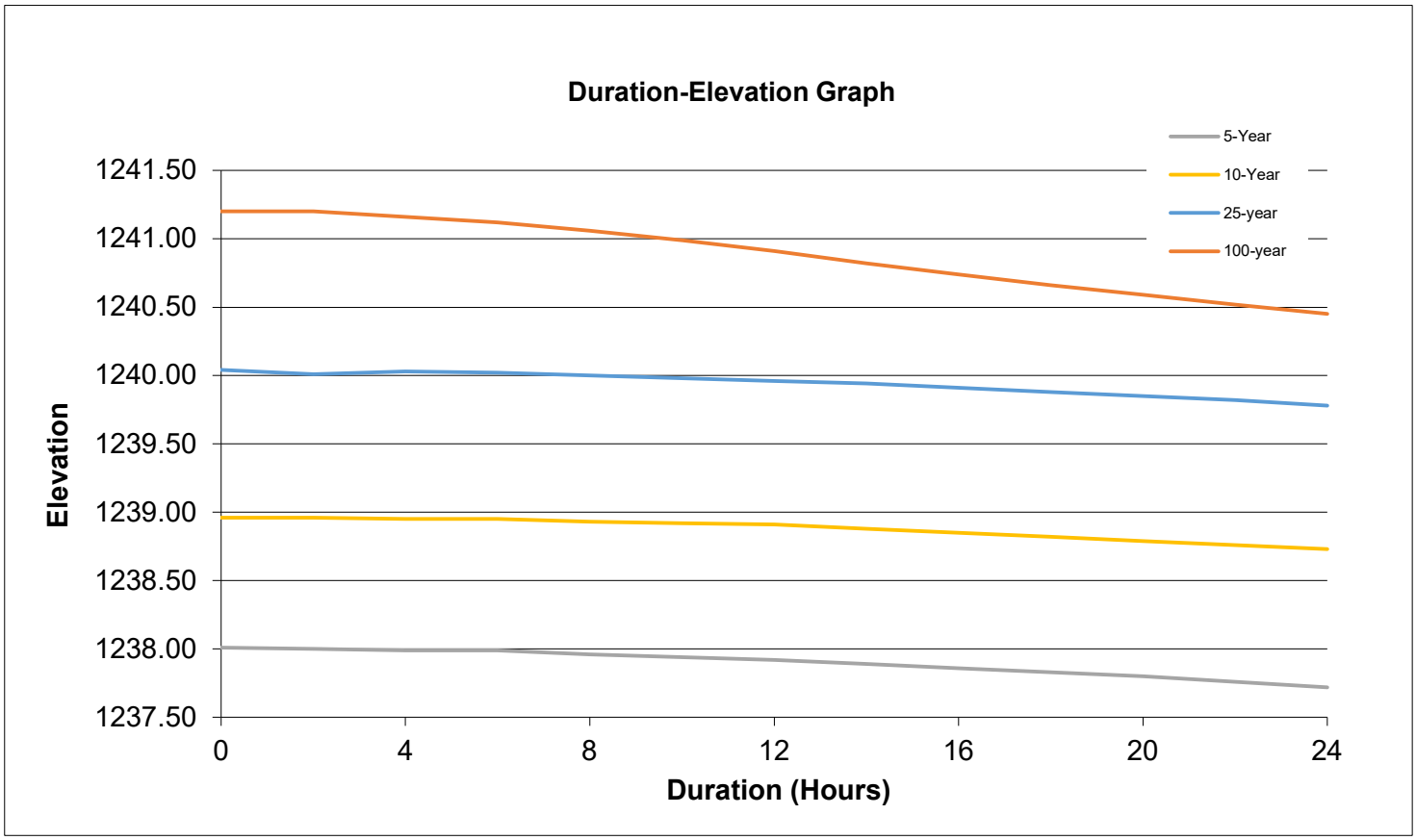
Tributary	Required Capacity	Notes
Lateral 4	0.672	Assumed 1/2" DC
Lateral 5	3.36	Assumed 1/2" DC
Lateral 2 & 3	1.32	Q_{FC}
Total Required Capacity	5.35	
Provided Capacity	7.15	24" RCP @ 0.1%

Note:
The head over the outlet weir will be 0.69 ft in order to fill the outlet pipe. This will not affect the function of the district tiles. Daylighted tiles will discharge 1 ft above the NWL.

Results

The following are based on surface flows and storm response. Discharge includes tile flow and overland flow.





Results

Surface-Drained DA = 478 ac
= .75 sq mi

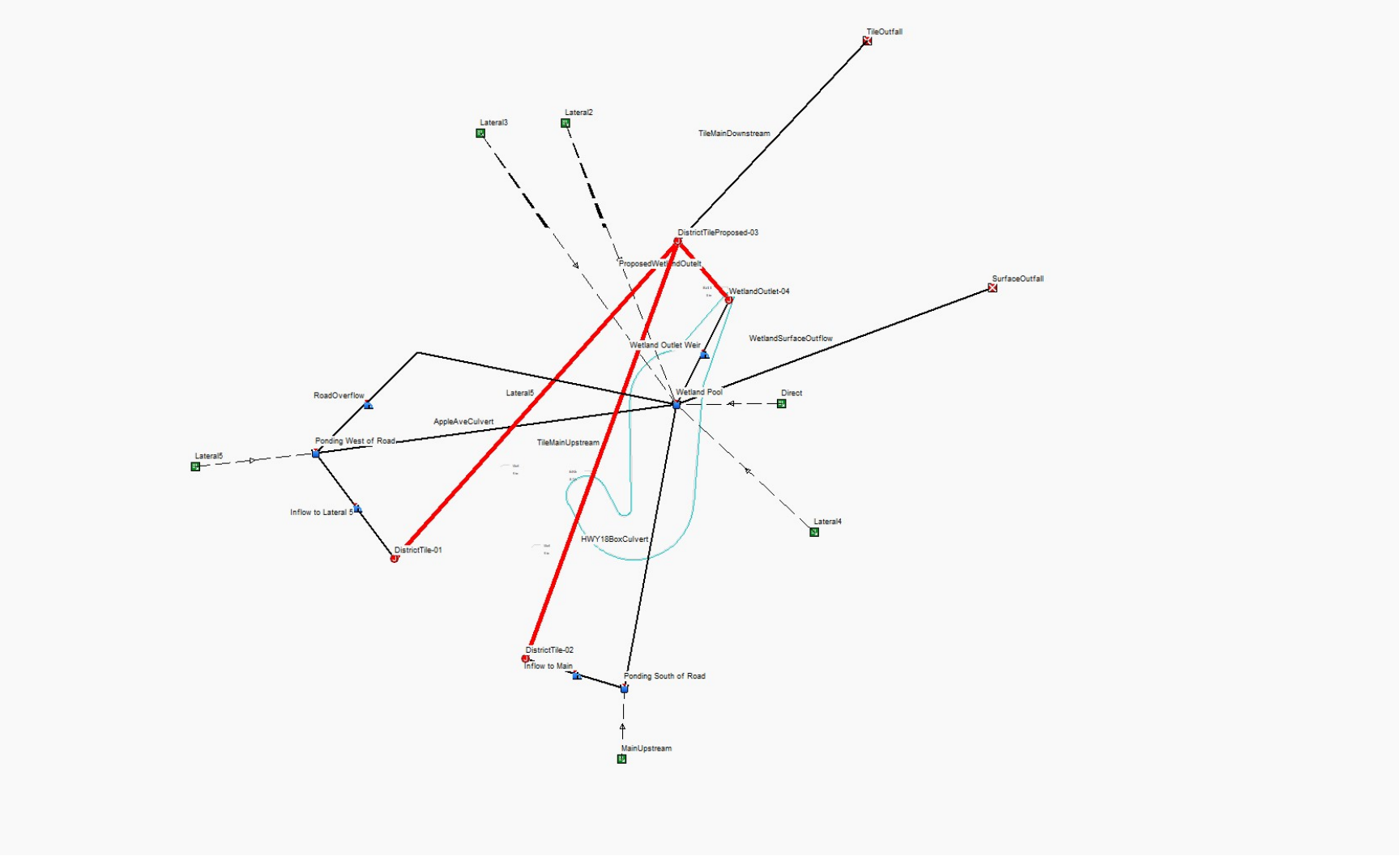
The Elevation-Discharge table below shows tile and surface outflows from the wetland for various elevations. The tile discharge is very small compared to the surface discharge at higher elevations.

Elevation	Pool Area (ac)	Tile Discharge (cfs)	Surface Discharge (cfs)	Total Discharge (cfs)
1232.00	6.02	0	0	0
1233.00	6.30	0	0	0
1235.00	6.86	3.71	0	3.22
1236.00	16.21	4.42	0	3.71
1237.00	21.38	5.03	0	4.42
1238.00	26.24	5.45	0	5.03
1239.00	30.19	6	3.85	5.45
1240.00	33.26	6.5	35.5	9.85
1241.00	36.04			
1242.00	38.24			

The Duration-Elevation table below shows the duration that the pool is at each listed elevation during the design storms. This is based on surface inflows during the design storms listed. The design for the wetland is based on tile flows, but the entire watershed is analyzed, including surface flows, to show that the proposed wetland does not have adverse impacts on surrounding properties during rainfall events.

Duration-Elevation Table

5-year Duration	Elevation	10-year Duration	Elevation	25-year Duration	Elevation	100-year Duration	Elevation
0	1238.01	0	1238.96	0	1240.04	0	1241.20
2	1238.00	2	1238.96	2	1240.01	2	1241.20
4	1237.99	4	1238.95	4	1240.03	4	1241.16
6	1237.99	6	1238.95	6	1240.02	6	1241.12
8	1237.96	8	1238.93	8	1240.00	8	1241.06
10	1237.94	10	1238.92	10	1239.98	10	1240.99
12	1237.92	12	1238.91	12	1239.96	12	1240.91
14	1237.89	14	1238.88	14	1239.94	14	1240.82
16	1237.86	16	1238.85	16	1239.91	16	1240.74
18	1237.83	18	1238.82	18	1239.88	18	1240.66
20	1237.80	20	1238.79	20	1239.85	20	1240.59
22	1237.76	22	1238.76	22	1239.82	22	1240.52
24	1237.72	24	1238.73	24	1239.78	24	1240.45


TileOutfall
Lateral3
Lateral2
TileMainDownstream
DistrictTileProposed-03
ProposedWetlandOutelt
WetlandOutlet-04
SurfaceOutfall
Wetland Outlet Weir
WetlandSurfaceOutflow
RoadOverflow
Lateral5
Wetland Pool
Direct
AppleAveCulvert
Ponding West of Road
TileMainUpstream
Lateral5
Inflow to Lateral 5
Lateral4
HWY18BoxCulvert
DistrictTile-01
DistrictTile-02
Inflow to Main
Ponding South of Road
MainUpstream

Project Description

File Name	133265 SSA Proposed.SPF

Project Options

Flow Units	CFS
Elevation Type	Elevation
Hydrology Method	SCS TR-55
Time of Concentration (TOC) Method	SCS TR-55
Link Routing Method	Hydrodynamic
Enable Overflow Ponding at Nodes	NO
Skip Steady State Analysis Time Periods	NO

Analysis Options

Start Analysis On	00:00:00	0:00:00
End Analysis On	00:00:00	0:00:00
Start Reporting On	00:00:00	0:00:00
Antecedent Dry Days	0	days
Runoff (Dry Weather) Time Step	0 01:00:00	days hh:mm:ss
Runoff (Wet Weather) Time Step	0 00:05:00	days hh:mm:ss
Reporting Time Step	0 00:05:00	days hh:mm:ss
Routing Time Step	30	seconds

Number of Elements

	Qty
Rain Gages	1
Subbasins	6
Nodes	9
Junctions	4
Outfalls	2
Flow Diversions	0
Inlets	0
Storage Nodes	3
Links	11
Channels	1
Pipes	6
Pumps	0
Orifices	3
Weirs	1
Outlets	0
Pollutants	0
Land Uses	0

Rainfall Details

SN	Rain Gage ID	Data Source	Data Source ID	Rainfall Type	Rain Units	State	County	Return Period (years)	Rainfall Depth (inches)	Rainfall Distribution
1	Rain Gage-01	Time Series	005-Yr	Cumulative	inches				0.00	

Subbasin Summary

Subbasin ID	Area (ac)	Weighted Curve Number	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
Direct	84.00	83.70	3.80	2.17	182.36	150.09	0 00:36:45
Lateral2	60.00	83.70	3.80	2.17	130.26	66.63	0 01:16:10
Lateral3	142.00	83.70	3.80	2.17	308.28	71.04	0 03:41:54
Lateral4	32.00	83.70	3.80	2.17	69.47	25.39	0 02:01:52
Lateral5	160.00	83.70	3.80	2.17	347.36	116.64	0 02:16:45
MainUpstream	60.00	83.70	3.80	2.17	130.26	115.75	0 00:32:10

Node Summary

Element ID	Element Type	Invert Elevation (ft)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Max Surcharge Depth Attained (ft)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
DistrictTile-01	Junction	1244.41	4.50	1254.76	0.00	0 00:00	0.00	0.00
DistrictTile-02	Junction	1231.42	3.23	1242.57	0.00	0 00:00	0.00	0.00
DistrictTileProposed-03	Junction	1229.00	11.27	1236.71	0.00	0 00:00	0.00	0.00
WetlandOutlet-04	Junction	1230.00	9.30	1237.94	0.00	0 00:00	0.00	0.00
SurfaceOutfall	Outfall	0.00	0.00	0.00				
TileOutfall	Outfall	1228.00	11.27	1228.00				
Ponding South of Road	Storage Node	1241.00	114.44	1242.95			0.00	0.00
Ponding West of Road	Storage Node	1252.00	116.60	1255.28			0.00	0.00
Wetland Pool	Storage Node	1232.00	282.87	1238.01			0.00	0.00

Link Summary

Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length	Inlet Invert Elevation	Outlet Invert Elevation	Average Slope	Diameter or Height	Manning's Roughness	Peak Flow	Design Flow Capacity
				(ft)	(ft)	(ft)	(%)	(in)		(cfs)	(cfs)
AppleAveCulvert	Pipe	Ponding West of Road	Wetland Pool	80.00	1254.00	1253.90	0.1200	48.000	0.0150	10.20	44.01
HWY18BoxCulvert	Pipe	Ponding South of Road	Wetland Pool	180.00	1241.00	1240.50	0.2800	60.000	0.0150	66.81	366.98
Lateral5	Pipe	DistrictTile-01	DistrictTileProposed-03	1600.00	1244.41	1230.38	0.8800	12.000	0.0150	3.37	2.89
ProposedWetlandOutelt	Pipe	WetlandOutlet-04	DistrictTileProposed-03	982.00	1230.98	1230.00	0.1000	24.000	0.0130	9.31	7.15
TileMainDownstream	Pipe	DistrictTileProposed-03	TileOutfall	1850.00	1230.00	1228.57	0.0800	24.000	0.0150	11.27	5.45
TileMainUpstream	Pipe	DistrictTile-02	DistrictTileProposed-03	1300.00	1231.42	1230.38	0.0800	12.000	0.0150	2.82	0.87
WetlandSurfaceOutflow	Channel	Wetland Pool	SurfaceOutfall	3000.00	1239.00	1238.50	0.0200	120.000	0.0320	0.00	2251.97
Inflow to Lateral 5	Orifice	Ponding West of Road	DistrictTile-01		1252.00	1244.41		18.000		4.50	
Inflow to Main	Orifice	Ponding South of Road	DistrictTile-02		1241.00	1231.42		18.000		3.23	
Wetland Outlet Weir	Orifice	Wetland Pool	WetlandOutlet-04		1232.00	1230.00		18.000		9.30	
RoadOverflow	Weir	Ponding West of Road	Wetland Pool		1252.00	1232.00				0.00	

Subbasin Hydrology

Subbasin : Direct

Input Data

Area (ac) 84
Peak Rate Factor 484
Weighted Curve Number 83.7
Rain Gage ID ..... Rain Gage-01

Composite Curve Number

32	Area	Soil	Curve
Soil/Surface Description	(acres)	Group	Number
-	84	-	83.7
Composite Area & Weighted CN	84		83.7

Time of Concentration

TOC Method : SCS TR-55

Sheet Flow Equation :

Tc = (0.007 * ((n * Lf)^0.8)) / ((P^0.5) * (Sf^0.4))

Where :

Tc = Time of Concentration (hr)
n = Manning's roughness
Lf = Flow Length (ft)
P = 2 yr, 24 hr Rainfall (inches)
Sf = Slope (ft/ft)

Shallow Concentrated Flow Equation :

V = 16.1345 * (Sf^0.5) (unpaved surface)
V = 20.3282 * (Sf^0.5) (paved surface)
V = 15.0 * (Sf^0.5) (grassed waterway surface)
V = 10.0 * (Sf^0.5) (nearly bare & untilled surface)
V = 9.0 * (Sf^0.5) (cultivated straight rows surface)
V = 7.0 * (Sf^0.5) (short grass pasture surface)
V = 5.0 * (Sf^0.5) (woodland surface)
V = 2.5 * (Sf^0.5) (forest w/heavy litter surface)
Tc = (Lf / V) / (3600 sec/hr)

Where:

Tc = Time of Concentration (hr)
Lf = Flow Length (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)

Channel Flow Equation :

V = (1.49 * (R^(2/3)) * (Sf^0.5)) / n
R = Aq / Wp
Tc = (Lf / V) / (3600 sec/hr)

Where :

Tc = Time of Concentration (hr)
Lf = Flow Length (ft)
R = Hydraulic Radius (ft)
Aq = Flow Area (ft^2)
Wp = Wetted Perimeter (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)
n = Manning's roughness

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.18	0	0
Flow Length (ft) :	100	0	0
Slope (%) :	2	0	0
2 yr, 24 hr Rainfall (in) :	2.98	0	0
Velocity (ft/sec) :	0.14	0	0
Computed Flow Time (min) :	11.75	0	0

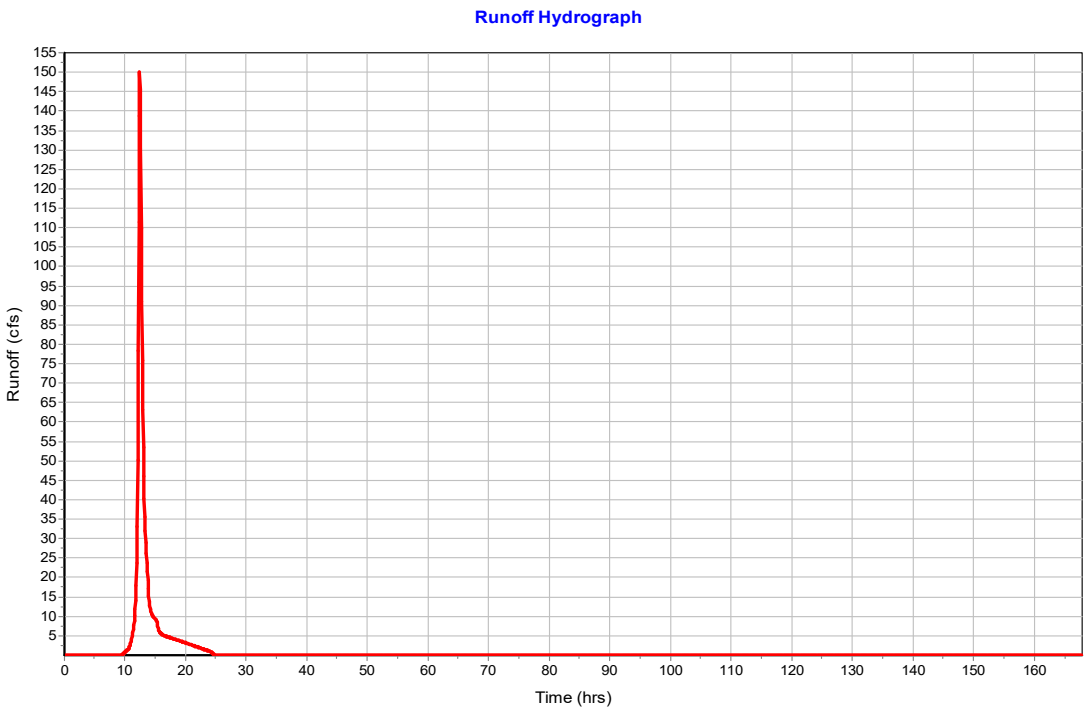
Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	1200	0	0
Slope (%) :	0.8	0	0
Surface Type :	Straight rows	Unpaved	Unpaved
Velocity (ft/sec) :	0.8	0	0
Computed Flow Time (min) :	25	0	0

Total TOC (min) 36.75

Subbasin Runoff Results

Total Rainfall (in)	3.8
Total Runoff (in)	2.17
Peak Runoff (cfs)	150.09
Weighted Curve Number	83.7
Time of Concentration (days hh:mm:ss)	0 00:36:45

Subbasin : Direct



Subbasin : Lateral2

Input Data

Area (ac) 60
Peak Rate Factor 484
Weighted Curve Number 83.7
Rain Gage ID ..... Rain Gage-01

Composite Curve Number

32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	60	-	83.7
Composite Area & Weighted CN	60		83.7

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.18	0	0
Flow Length (ft) :	100	0	0
Slope (%) :	1	0	0
2 yr, 24 hr Rainfall (in) :	2.98	0	0
Velocity (ft/sec) :	0.11	0	0
Computed Flow Time (min) :	15.5	0	0

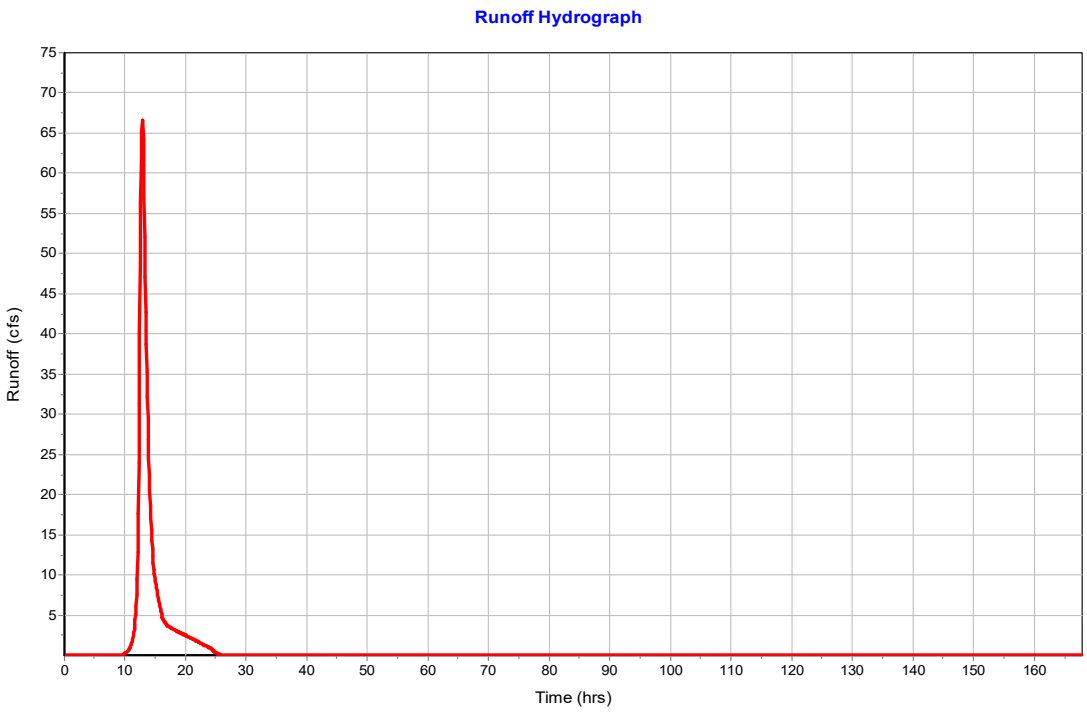
Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	2330	0	0
Slope (%) :	0.5	0	0
Surface Type :	Straight rows	Unpaved	Unpaved
Velocity (ft/sec) :	0.64	0	0
Computed Flow Time (min) :	60.68	0	0

Total TOC (min) 76.18

Subbasin Runoff Results

Total Rainfall (in) 3.8
Total Runoff (in) 2.17
Peak Runoff (cfs) 66.63
Weighted Curve Number 83.7
Time of Concentration (days hh:mm:ss) 0 01:16:11

Subbasin : Lateral2



Subbasin : Lateral3

Input Data

Area (ac)	142
Peak Rate Factor	484
Weighted Curve Number	83.7
Rain Gage ID	Rain Gage-01

Composite Curve Number

32	Area	Soil	Curve
Soil/Surface Description	(acres)	Group	Number
-	142	-	83.7
Composite Area & Weighted CN	142		83.7

Time of Concentration

	Subarea	Subarea	Subarea
Sheet Flow Computations	A	B	C
Manning's Roughness :	0.18	0	0
Flow Length (ft) :	100	0	0
Slope (%) :	1	0	0
2 yr, 24 hr Rainfall (in) :	2.98	0	0
Velocity (ft/sec) :	0.11	0	0
Computed Flow Time (min) :	15.5	0	0

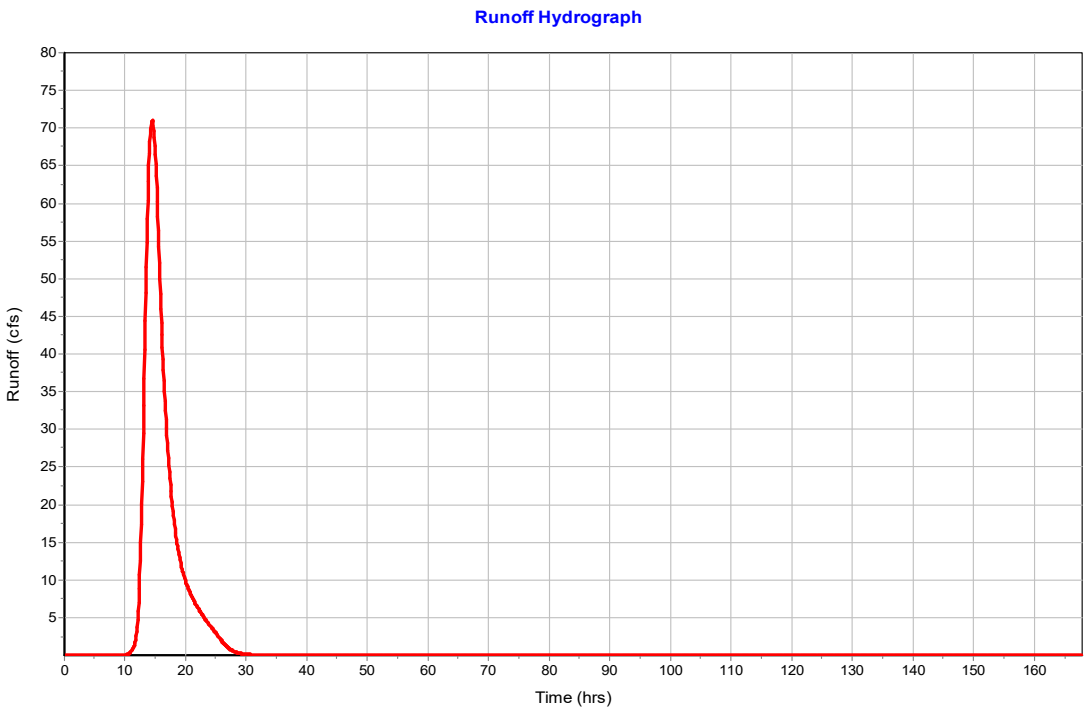
	Subarea	Subarea	Subarea
Shallow Concentrated Flow Computations	A	B	C
Flow Length (ft) :	5573	0	0
Slope (%) :	0.25	0	0
Surface Type :	Straight rows	Unpaved	Unpaved
Velocity (ft/sec) :	0.45	0	0
Computed Flow Time (min) :	206.41	0	0

Total TOC (min) 221.91

Subbasin Runoff Results

Total Rainfall (in)	3.8
Total Runoff (in)	2.17
Peak Runoff (cfs)	71.04
Weighted Curve Number	83.7
Time of Concentration (days hh:mm:ss)	0 03:41:55

Subbasin : Lateral3



Subbasin : Lateral4

Input Data

Area (ac)	32
Peak Rate Factor	484
Weighted Curve Number	83.7
Rain Gage ID	Rain Gage-01

Composite Curve Number

32	Area	Soil	Curve
Soil/Surface Description	(acres)	Group	Number
-	32	-	83.7
Composite Area & Weighted CN	32		83.7

Time of Concentration

	Subarea	Subarea	Subarea
Sheet Flow Computations	A	B	C
Manning's Roughness :	0.18	0	0
Flow Length (ft) :	100	0	0
Slope (%) :	1	0	0
2 yr, 24 hr Rainfall (in) :	2.98	0	0
Velocity (ft/sec) :	0.11	0	0
Computed Flow Time (min) :	15.5	0	0

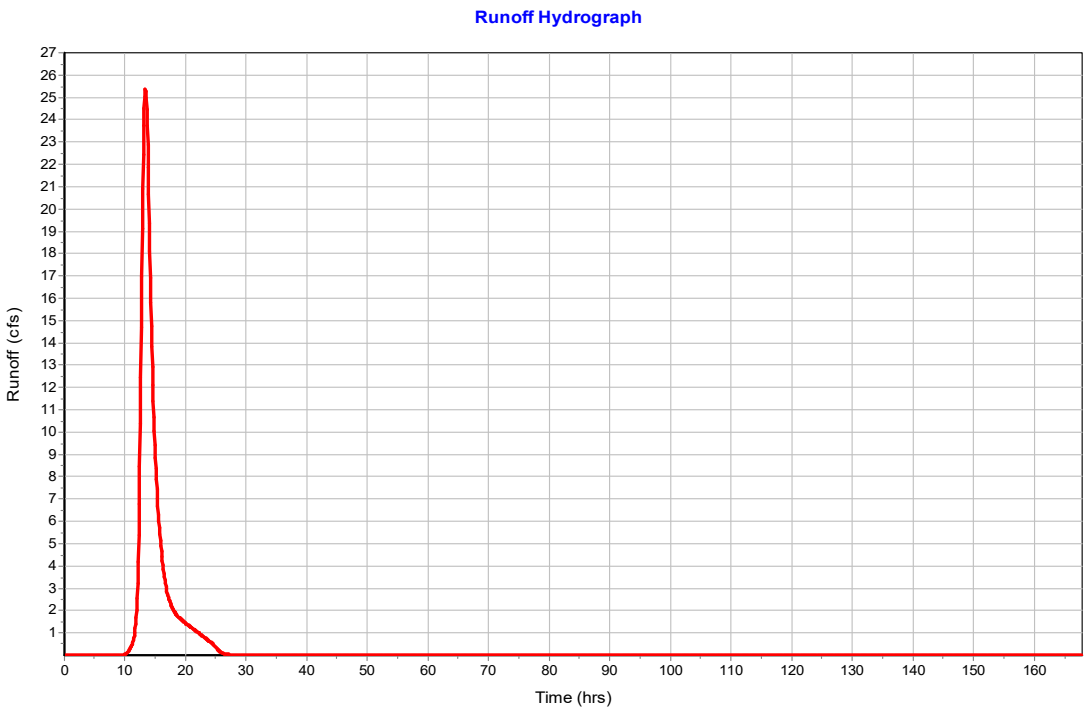
	Subarea	Subarea	Subarea
Shallow Concentrated Flow Computations	A	B	C
Flow Length (ft) :	3000	0	0
Slope (%) :	0.27	0	0
Surface Type :	Straight rows	Unpaved	Unpaved
Velocity (ft/sec) :	0.47	0	0
Computed Flow Time (min) :	106.38	0	0

Total TOC (min) 121.88

Subbasin Runoff Results

Total Rainfall (in)	3.8
Total Runoff (in)	2.17
Peak Runoff (cfs)	25.39
Weighted Curve Number	83.7
Time of Concentration (days hh:mm:ss)	0 02:01:53

Subbasin : Lateral4



Subbasin : Lateral5

Input Data

Area (ac) 160
Peak Rate Factor 484
Weighted Curve Number 83.7
Rain Gage ID ..... Rain Gage-01

Composite Curve Number

32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	160	-	83.7
Composite Area & Weighted CN	160		83.7

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.18	0	0
Flow Length (ft) :	100	0	0
Slope (%) :	3	0	0
2 yr, 24 hr Rainfall (in) :	2.98	0	0
Velocity (ft/sec) :	0.17	0	0
Computed Flow Time (min) :	9.99	0	0

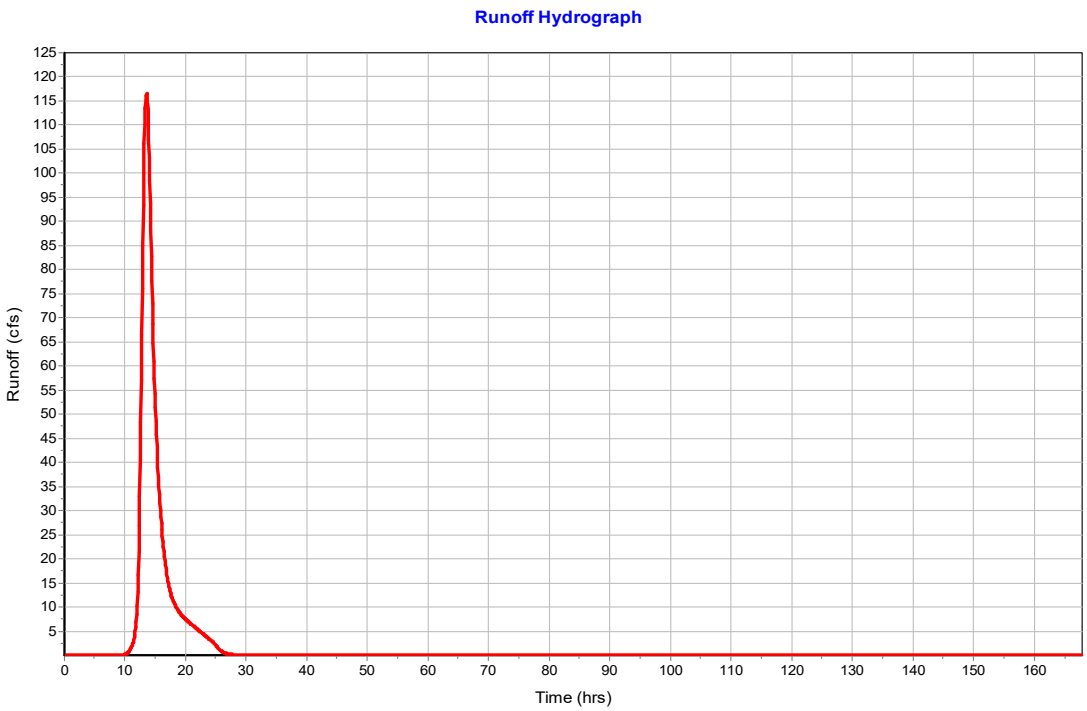
Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	5400	0	0
Slope (%) :	0.63	0	0
Surface Type :	Straight rows	Unpaved	Unpaved
Velocity (ft/sec) :	0.71	0	0
Computed Flow Time (min) :	126.76	0	0

Total TOC (min) 136.75

Subbasin Runoff Results

Total Rainfall (in) 3.8
Total Runoff (in) 2.17
Peak Runoff (cfs) 116.64
Weighted Curve Number 83.7
Time of Concentration (days hh:mm:ss) 0 02:16:45

Subbasin : Lateral5



Subbasin : MainUpstream

Input Data

Area (ac) 60
Peak Rate Factor 484
Weighted Curve Number 83.7
Rain Gage ID ..... Rain Gage-01

Composite Curve Number

32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	60	-	83.7
Composite Area & Weighted CN	60		83.7

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.18	0	0
Flow Length (ft) :	100	0	0
Slope (%) :	3	0	0
2 yr, 24 hr Rainfall (in) :	2.98	0	0
Velocity (ft/sec) :	0.17	0	0
Computed Flow Time (min) :	9.99	0	0

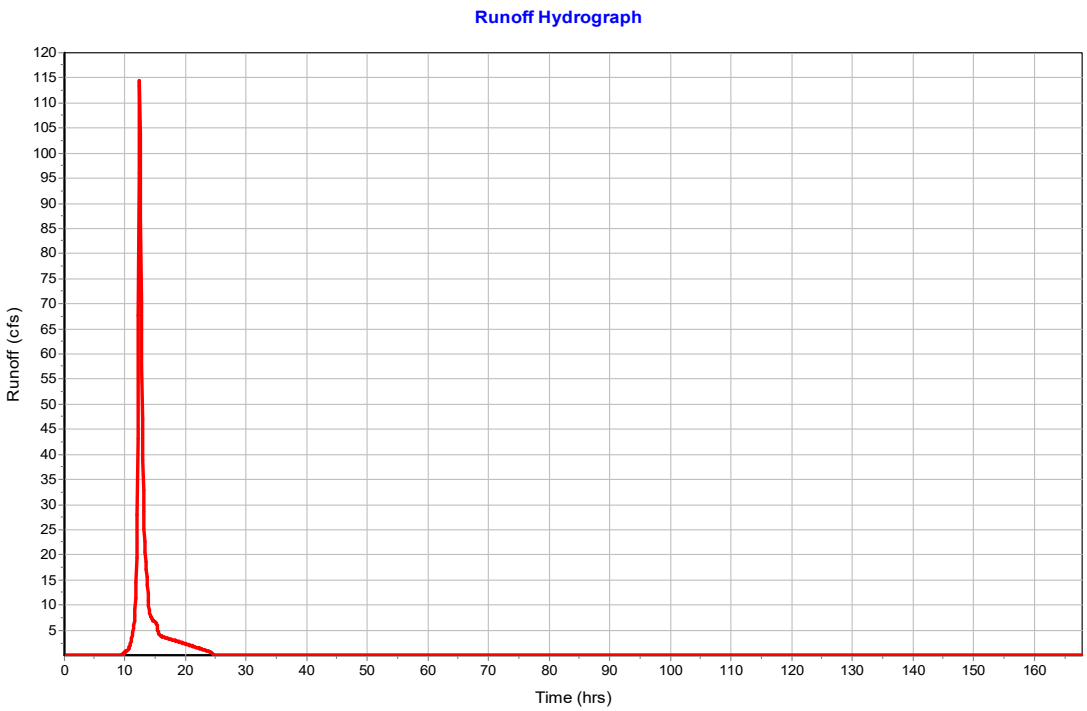
Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	1850	0	0
Slope (%) :	2.37	0	0
Surface Type :	Straight rows	Unpaved	Unpaved
Velocity (ft/sec) :	1.39	0	0
Computed Flow Time (min) :	22.18	0	0

Total TOC (min) 32.17

Subbasin Runoff Results

Total Rainfall (in) 3.8
Total Runoff (in) 2.17
Peak Runoff (cfs) 115.75
Weighted Curve Number 83.7
Time of Concentration (days hh:mm:ss) 0 00:32:10

Subbasin : MainUpstream



Storage Nodes

Storage Node : Ponding South of Road

Input Data

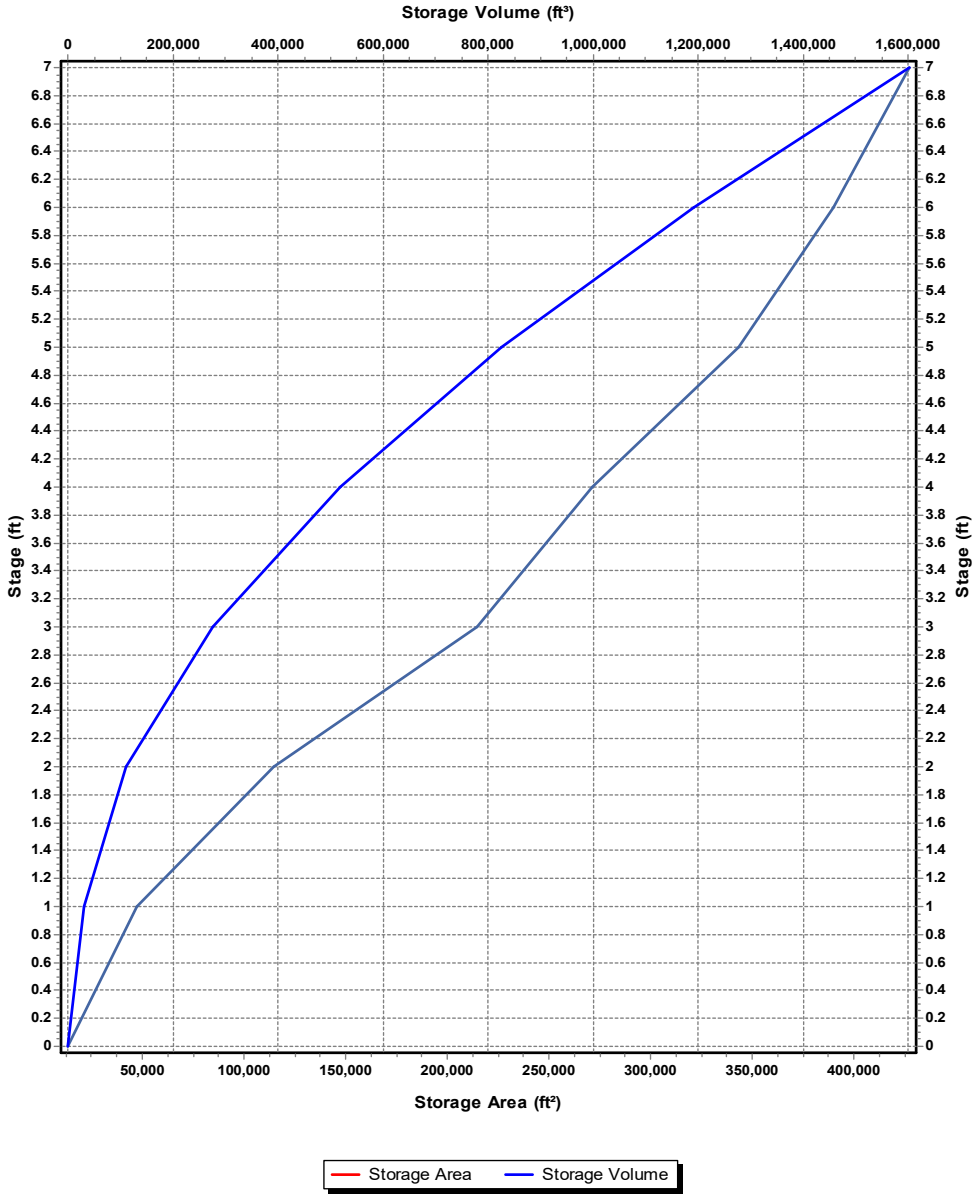
Invert Elevation (ft)	1241.00
Max (Rim) Elevation (ft)	1260.00
Max (Rim) Offset (ft)	19.00
Initial Water Elevation (ft)	0.00
Initial Water Depth (ft)	-1241.00
Ponded Area (ft^2)	0.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : SouthStorage

Stage (ft)	Storage Area (ft^2)	Storage Volume (ft^3)
0	13252	0
1	46972	30112
2	114763	110979.5
3	214391	275556.5
4	271472	518488
5	343212	825830
6	390164	1192518
7	427512	1601356

Storage Area Volume Curves



Storage Node : Ponding South of Road (continued)

Outflow Orifices

Element ID	Orifice Type	Orifice Shape	Flap Gate	Circular Orifice Diameter (in)	Rectangular Orifice Height (in)	Rectangular Orifice Width (in)	Orifice Invert Elevation (ft)	Orifice Coefficient
Inflow to Main	Bottom	CIRCULAR	No	18.00			0.00	0.61

Output Summary Results

Peak Inflow (cfs)	114.44
Peak Lateral Inflow (cfs)	114.44
Peak Outflow (cfs)	69.25
Peak Exfiltration Flow Rate (cfm)	0
Max HGL Elevation Attained (ft)	1242.95
Max HGL Depth Attained (ft)	1.95
Average HGL Elevation Attained (ft)	1241.07
Average HGL Depth Attained (ft)	0.07
Time of Max HGL Occurrence (days hh:mm)	0 12:45
Total Exfiltration Volume (1000-ft^3)	0
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0

Storage Node : Ponding West of Road

Input Data

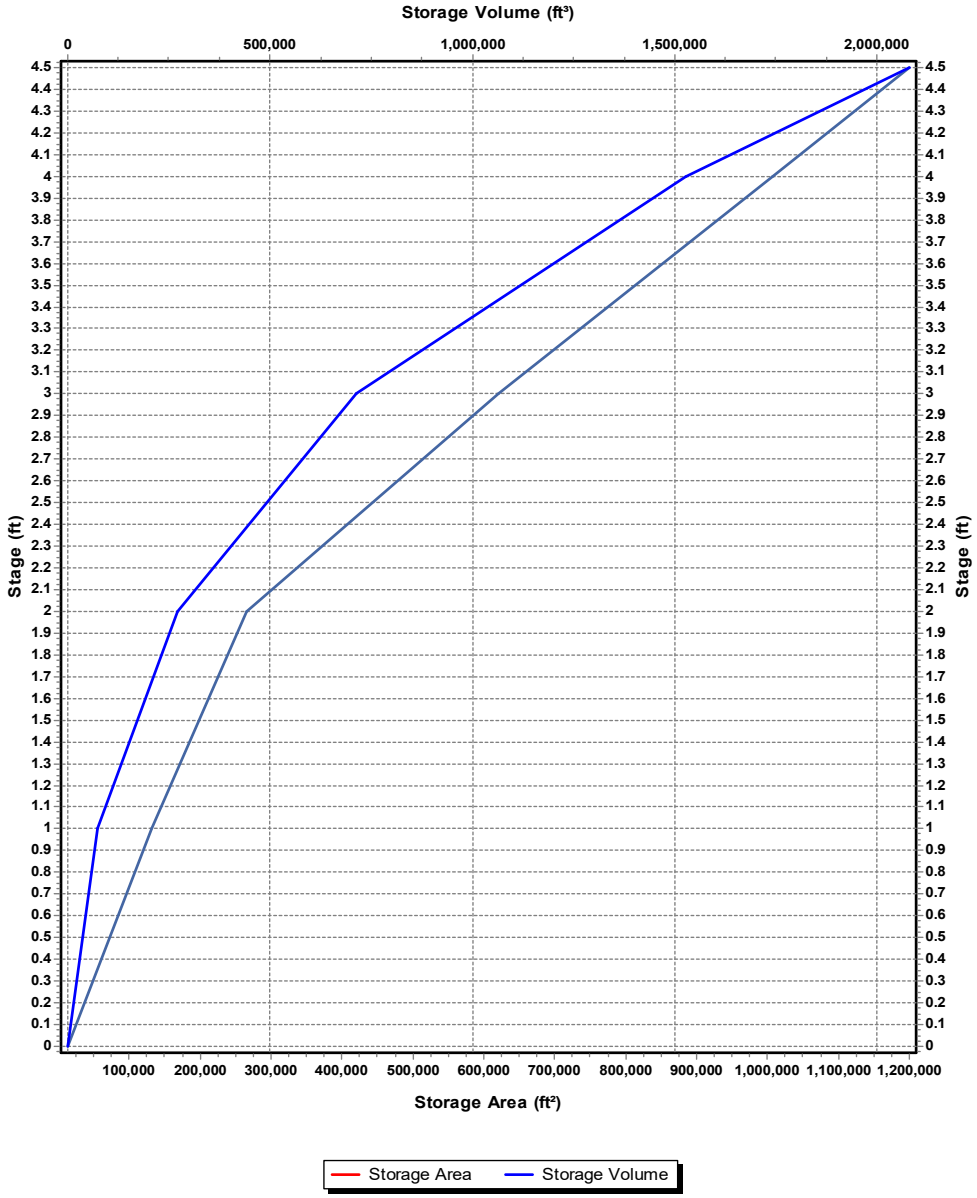
Invert Elevation (ft)	1252.00
Max (Rim) Elevation (ft)	1265.00
Max (Rim) Offset (ft)	13.00
Initial Water Elevation (ft)	0.00
Initial Water Depth (ft)	-1252.00
Ponded Area (ft^2)	0.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : WestStorage

Stage (ft)	Storage Area (ft^2)	Storage Volume (ft^3)
0	13508	0
1	131190	72349
2	265985	270936.5
3	620346	714102
4	1007843	1528196.5
4.5	1200000	2080157.25

Storage Area Volume Curves



Storage Node : Ponding West of Road (continued)

Outflow Weirs

Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Discharge Coefficient
RoadOverflow	Trapezoidal	No	1256.00	4.00	240.00	100.00	3.33

Outflow Orifices

Element ID	Orifice Type	Orifice Shape	Flap Gate	Circular Orifice Diameter (in)	Rectangular Orifice Height (in)	Rectangular Orifice Width (in)	Orifice Invert Elevation (ft)	Orifice Coefficient
Inflow to Lateral 5	Bottom	CIRCULAR	No	18.00			0.00	0.61

Output Summary Results

Peak Inflow (cfs)	116.6
Peak Lateral Inflow (cfs)	116.6
Peak Outflow (cfs)	13.46
Peak Exfiltration Flow Rate (cfm)	0
Max HGL Elevation Attained (ft)	1255.28
Max HGL Depth Attained (ft)	3.28
Average HGL Elevation Attained (ft)	1253.37
Average HGL Depth Attained (ft)	1.37
Time of Max HGL Occurrence (days hh:mm)	0 17:29
Total Exfiltration Volume (1000-ft^3)	0
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0

Storage Node : Wetland Pool

Input Data

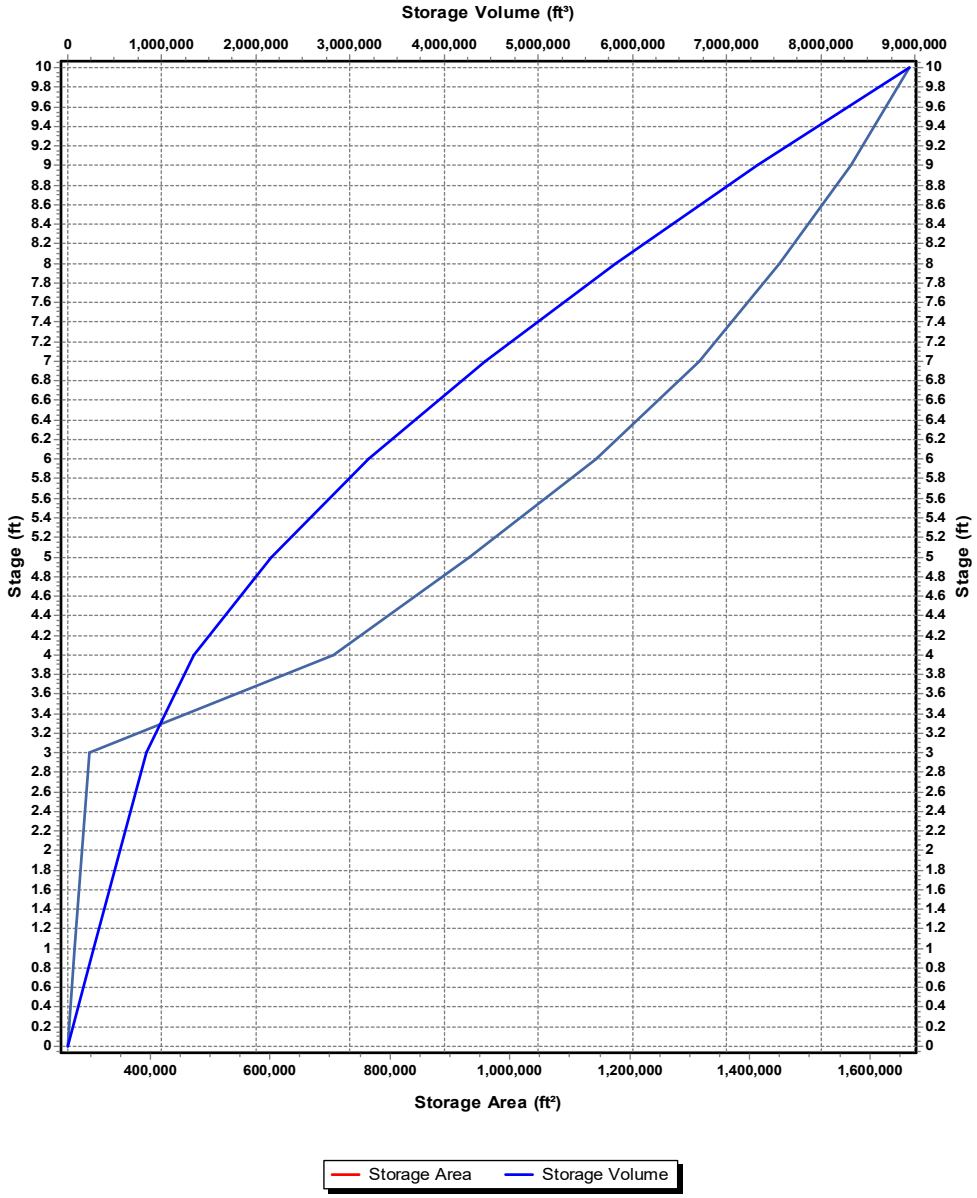
Invert Elevation (ft)	1232.00
Max (Rim) Elevation (ft)	1250.00
Max (Rim) Offset (ft)	18.00
Initial Water Elevation (ft)	1233.00
Initial Water Depth (ft)	1.00
Ponded Area (ft^2)	0.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : Wetland

Stage (ft)	Storage Area (ft^2)	Storage Volume (ft^3)
0	262400	0
1	274400	268400
3	298900	841700
4	706200	1344250
5	931200	2162950
6	1142900	3200000
7	1315000	4428950
8	1448600	5810750
9	1569700	7319900
10	1665900	8937700

Storage Area Volume Curves



Storage Node : Wetland Pool (continued)

Outflow Orifices

Element ID	Orifice Type	Orifice Shape	Flap Gate	Circular Orifice Diameter (in)	Rectangular Orifice Height (in)	Rectangular Orifice Width (in)	Orifice Invert Elevation (ft)	Orifice Coefficient
Wetland Outlet Weir	Side	Rectangular	No		18.00	48.00	1233.00	0.63

Output Summary Results

Peak Inflow (cfs)	282.87
Peak Lateral Inflow (cfs)	217.34
Peak Outflow (cfs)	9.3
Peak Exfiltration Flow Rate (cfm)	0
Max HGL Elevation Attained (ft)	1238.01
Max HGL Depth Attained (ft)	6.01
Average HGL Elevation Attained (ft)	1236.08
Average HGL Depth Attained (ft)	4.08
Time of Max HGL Occurrence (days hh:mm)	1 02:16
Total Exfiltration Volume (1000-ft^3)	0
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0

Project Description

File Name	133265 SSA Proposed.SPF

Project Options

Flow Units	CFS
Elevation Type	Elevation
Hydrology Method	SCS TR-55
Time of Concentration (TOC) Method	SCS TR-55
Link Routing Method	Hydrodynamic
Enable Overflow Ponding at Nodes	NO
Skip Steady State Analysis Time Periods	NO

Analysis Options

Start Analysis On	00:00:00	0:00:00
End Analysis On	00:00:00	0:00:00
Start Reporting On	00:00:00	0:00:00
Antecedent Dry Days	0	days
Runoff (Dry Weather) Time Step	0 01:00:00	days hh:mm:ss
Runoff (Wet Weather) Time Step	0 00:05:00	days hh:mm:ss
Reporting Time Step	0 00:05:00	days hh:mm:ss
Routing Time Step	30	seconds

Number of Elements

	Qty
Rain Gages	1
Subbasins	6
Nodes	9
Junctions	4
Outfalls	2
Flow Diversions	0
Inlets	0
Storage Nodes	3
Links	11
Channels	1
Pipes	6
Pumps	0
Orifices	3
Weirs	1
Outlets	0
Pollutants	0
Land Uses	0

Rainfall Details

SN	Rain Gage ID	Data Source	Data Source ID	Rainfall Type	Rain Units	State	County	Return Period (years)	Rainfall Depth (inches)	Rainfall Distribution
1	Rain Gage-01	Time Series	010-Yr	Cumulative	inches				0.00	

Subbasin Summary

Subbasin ID	Area (ac)	Weighted Curve Number	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
Direct	84.00	83.70	4.60	2.88	241.84	198.95	0 00:36:45
Lateral2	60.00	83.70	4.60	2.88	172.74	88.77	0 01:16:10
Lateral3	142.00	83.70	4.60	2.88	408.82	94.51	0 03:41:54
Lateral4	32.00	83.70	4.60	2.88	92.13	33.74	0 02:01:52
Lateral5	160.00	83.70	4.60	2.88	460.64	155.15	0 02:16:45
MainUpstream	60.00	83.70	4.60	2.88	172.74	153.32	0 00:32:10

Node Summary

Element ID	Element Type	Invert Elevation (ft)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Max Surcharge Depth Attained (ft)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
DistrictTile-01	Junction	1244.41	4.26	1255.11	0.00	0 00:00	0.00	0.00
DistrictTile-02	Junction	1231.42	2.99	1242.89	0.00	0 00:00	0.00	0.00
DistrictTileProposed-03	Junction	1229.00	11.93	1237.43	0.00	0 00:00	0.00	0.00
WetlandOutlet-04	Junction	1230.00	10.04	1238.88	0.00	0 00:00	0.00	0.00
SurfaceOutfall	Outfall	0.00	0.00	0.00				
TileOutfall	Outfall	1228.00	11.93	1228.00				
Ponding South of Road	Storage Node	1241.00	151.26	1243.29			0.00	0.00
Ponding West of Road	Storage Node	1252.00	154.83	1255.63			0.00	0.00
Wetland Pool	Storage Node	1232.00	368.67	1238.96			0.00	0.00

Link Summary

Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length	Inlet Invert Elevation	Outlet Invert Elevation	Average Slope	Diameter or Height	Manning's Roughness	Peak Flow	Design Flow Capacity
				(ft)	(ft)	(ft)	(%)	(in)		(cfs)	(cfs)
AppleAveCulvert	Pipe	Ponding West of Road	Wetland Pool	80.00	1254.00	1253.90	0.1200	48.000	0.0150	16.47	44.01
HWY18BoxCulvert	Pipe	Ponding South of Road	Wetland Pool	180.00	1241.00	1240.50	0.2800	60.000	0.0150	84.82	366.98
Lateral5	Pipe	DistrictTile-01	DistrictTileProposed-03	1600.00	1244.41	1230.38	0.8800	12.000	0.0150	3.35	2.89
ProposedWetlandOutelt	Pipe	WetlandOutlet-04	DistrictTileProposed-03	982.00	1230.98	1230.00	0.1000	24.000	0.0130	10.05	7.15
TileMainDownstream	Pipe	DistrictTileProposed-03	TileOutfall	1850.00	1230.00	1228.57	0.0800	24.000	0.0150	11.93	5.45
TileMainUpstream	Pipe	DistrictTile-02	DistrictTileProposed-03	1300.00	1231.42	1230.38	0.0800	12.000	0.0150	2.61	0.87
WetlandSurfaceOutflow	Channel	Wetland Pool	SurfaceOutfall	3000.00	1239.00	1238.50	0.0200	120.000	0.0320	0.00	2251.97
Inflow to Lateral 5	Orifice	Ponding West of Road	DistrictTile-01		1252.00	1244.41		18.000		4.26	
Inflow to Main	Orifice	Ponding South of Road	DistrictTile-02		1241.00	1231.42		18.000		2.99	
Wetland Outlet Weir	Orifice	Wetland Pool	WetlandOutlet-04		1232.00	1230.00		18.000		10.04	
RoadOverflow	Weir	Ponding West of Road	Wetland Pool		1252.00	1232.00				0.00	

Subbasin Hydrology

Subbasin : Direct

Input Data

Area (ac) 84
Peak Rate Factor 484
Weighted Curve Number 83.7
Rain Gage ID ..... Rain Gage-01

Composite Curve Number

32	Area	Soil	Curve
Soil/Surface Description	(acres)	Group	Number
-	84	-	83.7
Composite Area & Weighted CN	84		83.7

Time of Concentration

TOC Method : SCS TR-55

Sheet Flow Equation :

Tc = (0.007 * ((n * Lf)^0.8)) / ((P^0.5) * (Sf^0.4))

Where :

Tc = Time of Concentration (hr)
n = Manning's roughness
Lf = Flow Length (ft)
P = 2 yr, 24 hr Rainfall (inches)
Sf = Slope (ft/ft)

Shallow Concentrated Flow Equation :

V = 16.1345 * (Sf^0.5) (unpaved surface)
V = 20.3282 * (Sf^0.5) (paved surface)
V = 15.0 * (Sf^0.5) (grassed waterway surface)
V = 10.0 * (Sf^0.5) (nearly bare & untilled surface)
V = 9.0 * (Sf^0.5) (cultivated straight rows surface)
V = 7.0 * (Sf^0.5) (short grass pasture surface)
V = 5.0 * (Sf^0.5) (woodland surface)
V = 2.5 * (Sf^0.5) (forest w/heavy litter surface)
Tc = (Lf / V) / (3600 sec/hr)

Where:

Tc = Time of Concentration (hr)
Lf = Flow Length (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)

Channel Flow Equation :

V = (1.49 * (R^(2/3)) * (Sf^0.5)) / n
R = Aq / Wp
Tc = (Lf / V) / (3600 sec/hr)

Where :

Tc = Time of Concentration (hr)
Lf = Flow Length (ft)
R = Hydraulic Radius (ft)
Aq = Flow Area (ft^2)
Wp = Wetted Perimeter (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)
n = Manning's roughness

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.18	0	0
Flow Length (ft) :	100	0	0
Slope (%) :	2	0	0
2 yr, 24 hr Rainfall (in) :	2.98	0	0
Velocity (ft/sec) :	0.14	0	0
Computed Flow Time (min) :	11.75	0	0

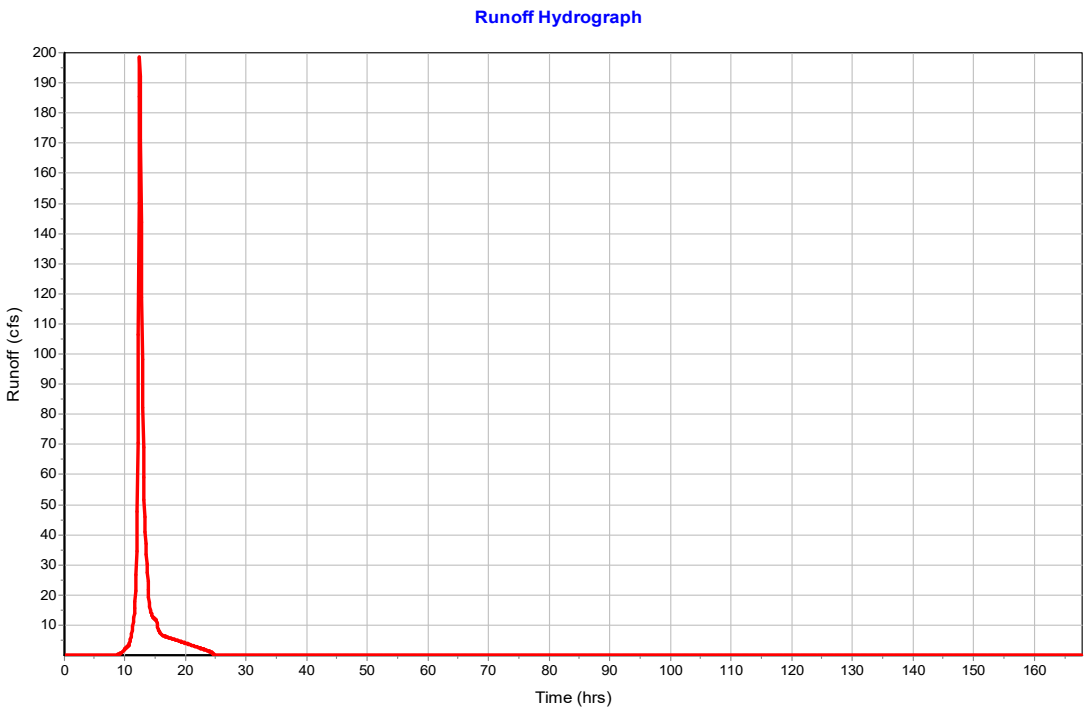
Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	1200	0	0
Slope (%) :	0.8	0	0
Surface Type :	Straight rows	Unpaved	Unpaved
Velocity (ft/sec) :	0.8	0	0
Computed Flow Time (min) :	25	0	0

Total TOC (min) 36.75

Subbasin Runoff Results

Total Rainfall (in)	4.6
Total Runoff (in)	2.88
Peak Runoff (cfs)	198.95
Weighted Curve Number	83.7
Time of Concentration (days hh:mm:ss)	0 00:36:45

Subbasin : Direct



Subbasin : Lateral2

Input Data

Area (ac)	60
Peak Rate Factor	484
Weighted Curve Number	83.7
Rain Gage ID	Rain Gage-01

Composite Curve Number

32	Area	Soil	Curve
Soil/Surface Description	(acres)	Group	Number
-	60	-	83.7
Composite Area & Weighted CN	60		83.7

Time of Concentration

	Subarea	Subarea	Subarea
Sheet Flow Computations	A	B	C
Manning's Roughness :	0.18	0	0
Flow Length (ft) :	100	0	0
Slope (%) :	1	0	0
2 yr, 24 hr Rainfall (in) :	2.98	0	0
Velocity (ft/sec) :	0.11	0	0
Computed Flow Time (min) :	15.5	0	0

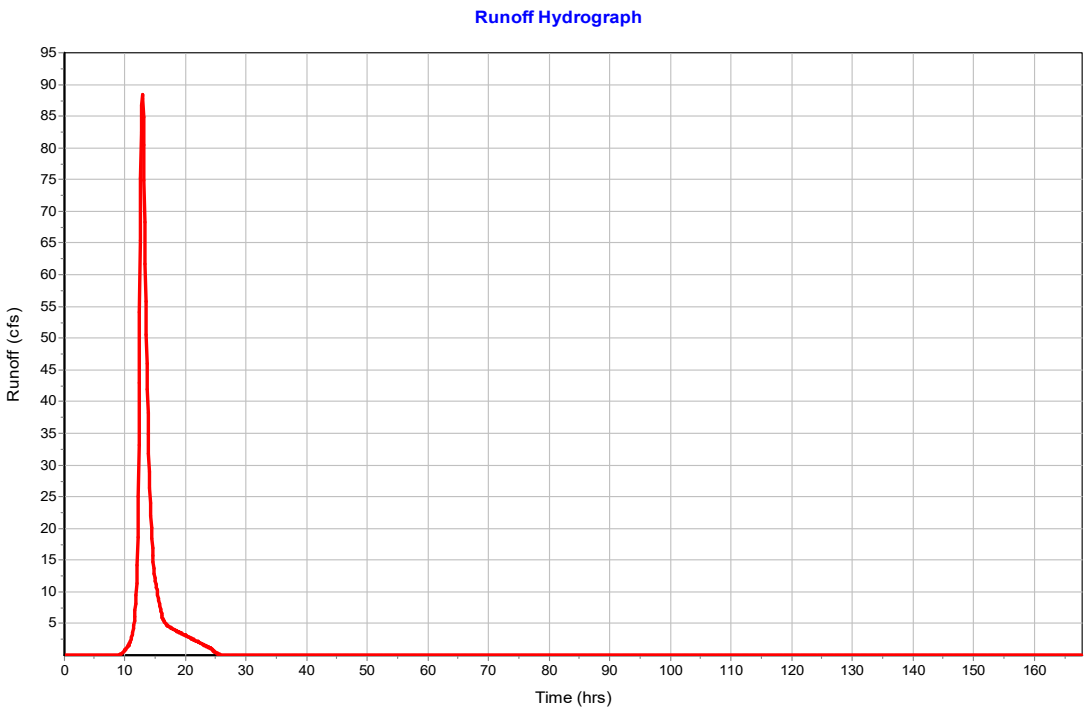
	Subarea	Subarea	Subarea
Shallow Concentrated Flow Computations	A	B	C
Flow Length (ft) :	2330	0	0
Slope (%) :	0.5	0	0
Surface Type :	Straight rows	Unpaved	Unpaved
Velocity (ft/sec) :	0.64	0	0
Computed Flow Time (min) :	60.68	0	0

Total TOC (min) 76.18

Subbasin Runoff Results

Total Rainfall (in)	4.6
Total Runoff (in)	2.88
Peak Runoff (cfs)	88.77
Weighted Curve Number	83.7
Time of Concentration (days hh:mm:ss)	0 01:16:11

Subbasin : Lateral2



Subbasin : Lateral3

Input Data

Area (ac) 142
Peak Rate Factor 484
Weighted Curve Number 83.7
Rain Gage ID ..... Rain Gage-01

Composite Curve Number

32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	142	-	83.7
Composite Area & Weighted CN	142		83.7

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.18	0	0
Flow Length (ft) :	100	0	0
Slope (%) :	1	0	0
2 yr, 24 hr Rainfall (in) :	2.98	0	0
Velocity (ft/sec) :	0.11	0	0
Computed Flow Time (min) :	15.5	0	0

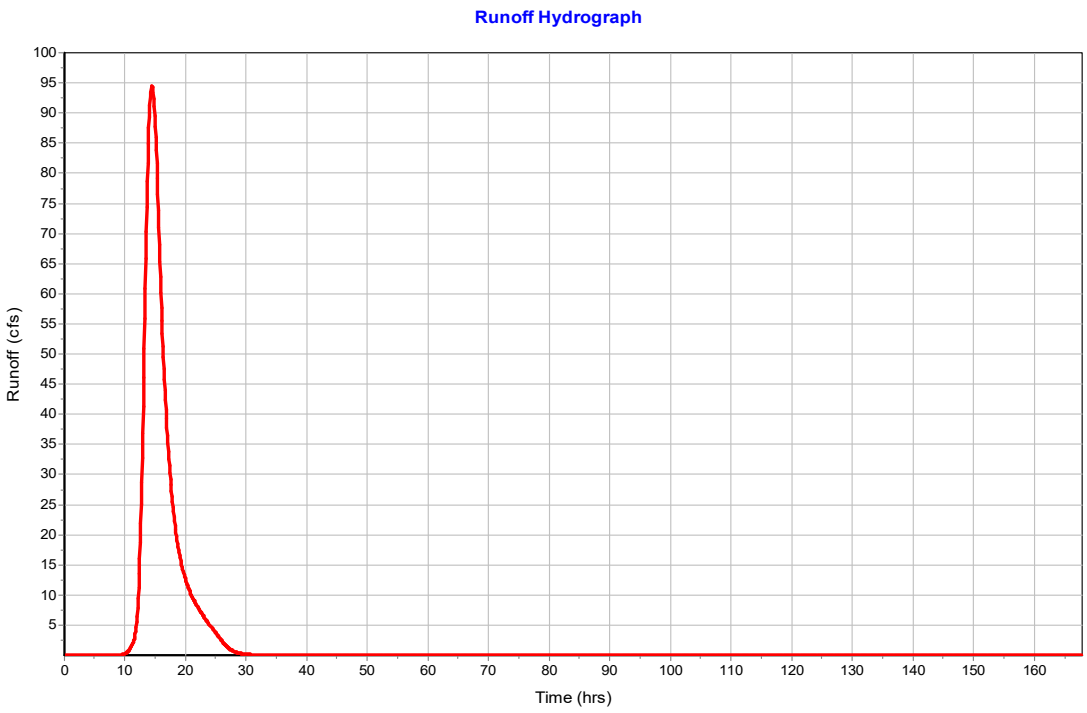
Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	5573	0	0
Slope (%) :	0.25	0	0
Surface Type :	Straight rows	Unpaved	Unpaved
Velocity (ft/sec) :	0.45	0	0
Computed Flow Time (min) :	206.41	0	0

Total TOC (min) 221.91

Subbasin Runoff Results

Total Rainfall (in) 4.6
Total Runoff (in) 2.88
Peak Runoff (cfs) 94.51
Weighted Curve Number 83.7
Time of Concentration (days hh:mm:ss) 0 03:41:55

Subbasin : Lateral3



Subbasin : Lateral4

Input Data

Area (ac)	32
Peak Rate Factor	484
Weighted Curve Number	83.7
Rain Gage ID	Rain Gage-01

Composite Curve Number

32	Area	Soil	Curve
Soil/Surface Description	(acres)	Group	Number
-	32	-	83.7
Composite Area & Weighted CN	32		83.7

Time of Concentration

	Subarea	Subarea	Subarea
Sheet Flow Computations	A	B	C
Manning's Roughness :	0.18	0	0
Flow Length (ft) :	100	0	0
Slope (%) :	1	0	0
2 yr, 24 hr Rainfall (in) :	2.98	0	0
Velocity (ft/sec) :	0.11	0	0
Computed Flow Time (min) :	15.5	0	0

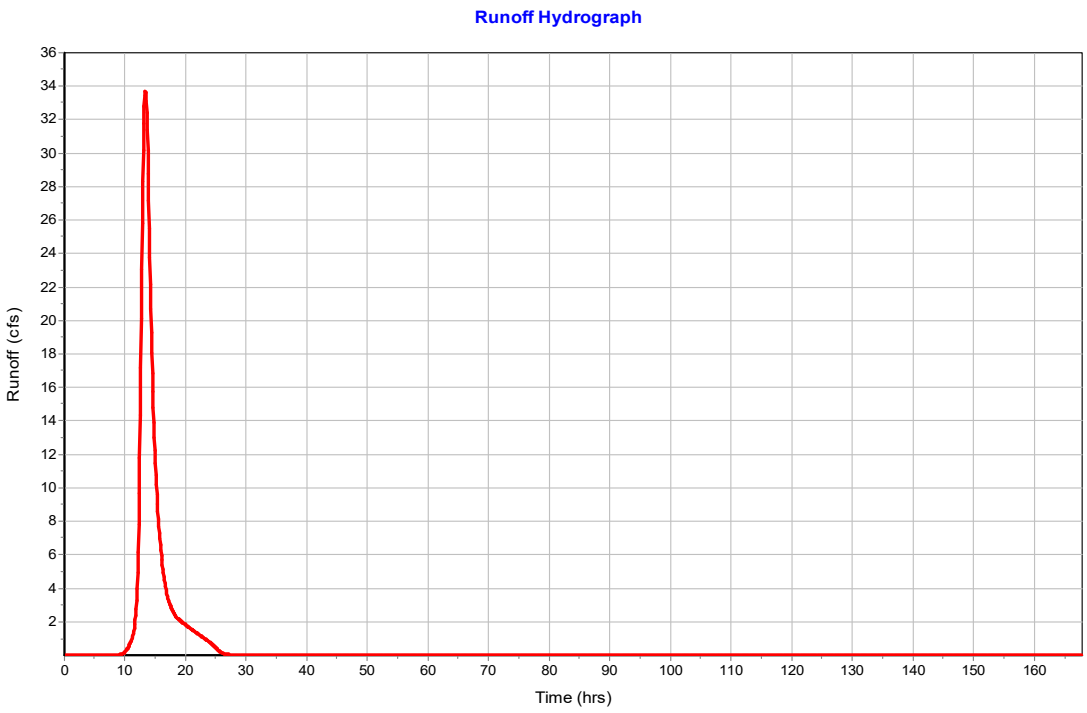
	Subarea	Subarea	Subarea
Shallow Concentrated Flow Computations	A	B	C
Flow Length (ft) :	3000	0	0
Slope (%) :	0.27	0	0
Surface Type :	Straight rows	Unpaved	Unpaved
Velocity (ft/sec) :	0.47	0	0
Computed Flow Time (min) :	106.38	0	0

Total TOC (min) 121.88

Subbasin Runoff Results

Total Rainfall (in)	4.6
Total Runoff (in)	2.88
Peak Runoff (cfs)	33.74
Weighted Curve Number	83.7
Time of Concentration (days hh:mm:ss)	0 02:01:53

Subbasin : Lateral4



Subbasin : Lateral5

Input Data

Area (ac) 160
Peak Rate Factor 484
Weighted Curve Number 83.7
Rain Gage ID ..... Rain Gage-01

Composite Curve Number

32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	160	-	83.7
Composite Area & Weighted CN	160		83.7

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.18	0	0
Flow Length (ft) :	100	0	0
Slope (%) :	3	0	0
2 yr, 24 hr Rainfall (in) :	2.98	0	0
Velocity (ft/sec) :	0.17	0	0
Computed Flow Time (min) :	9.99	0	0

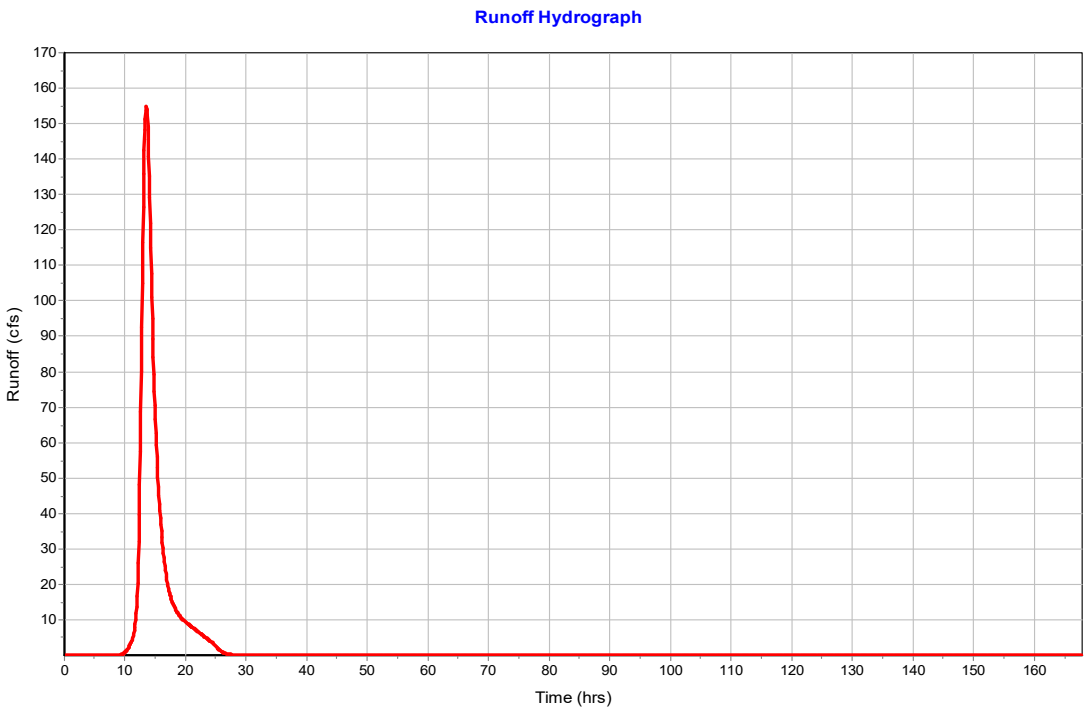
Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	5400	0	0
Slope (%) :	0.63	0	0
Surface Type :	Straight rows	Unpaved	Unpaved
Velocity (ft/sec) :	0.71	0	0
Computed Flow Time (min) :	126.76	0	0

Total TOC (min) 136.75

Subbasin Runoff Results

Total Rainfall (in) 4.6
Total Runoff (in) 2.88
Peak Runoff (cfs) 155.15
Weighted Curve Number 83.7
Time of Concentration (days hh:mm:ss) 0 02:16:45

Subbasin : Lateral5



Subbasin : MainUpstream

Input Data

Area (ac)	60
Peak Rate Factor	484
Weighted Curve Number	83.7
Rain Gage ID	Rain Gage-01

Composite Curve Number

32	Area	Soil	Curve
Soil/Surface Description	(acres)	Group	Number
-	60	-	83.7
Composite Area & Weighted CN	60		83.7

Time of Concentration

	Subarea	Subarea	Subarea
Sheet Flow Computations	A	B	C
Manning's Roughness :	0.18	0	0
Flow Length (ft) :	100	0	0
Slope (%) :	3	0	0
2 yr, 24 hr Rainfall (in) :	2.98	0	0
Velocity (ft/sec) :	0.17	0	0
Computed Flow Time (min) :	9.99	0	0

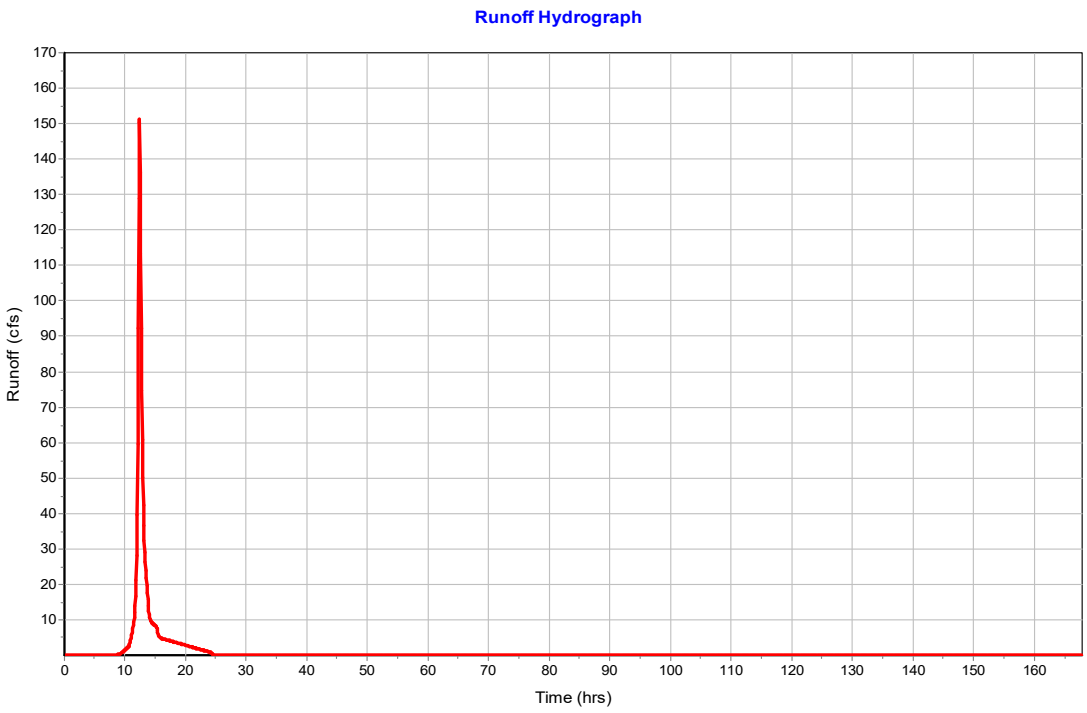
	Subarea	Subarea	Subarea
Shallow Concentrated Flow Computations	A	B	C
Flow Length (ft) :	1850	0	0
Slope (%) :	2.37	0	0
Surface Type :	Straight rows	Unpaved	Unpaved
Velocity (ft/sec) :	1.39	0	0
Computed Flow Time (min) :	22.18	0	0

Total TOC (min) 32.17

Subbasin Runoff Results

Total Rainfall (in)	4.6
Total Runoff (in)	2.88
Peak Runoff (cfs)	153.32
Weighted Curve Number	83.7
Time of Concentration (days hh:mm:ss)	0 00:32:10

Subbasin : MainUpstream



Storage Nodes

Storage Node : Ponding South of Road

Input Data

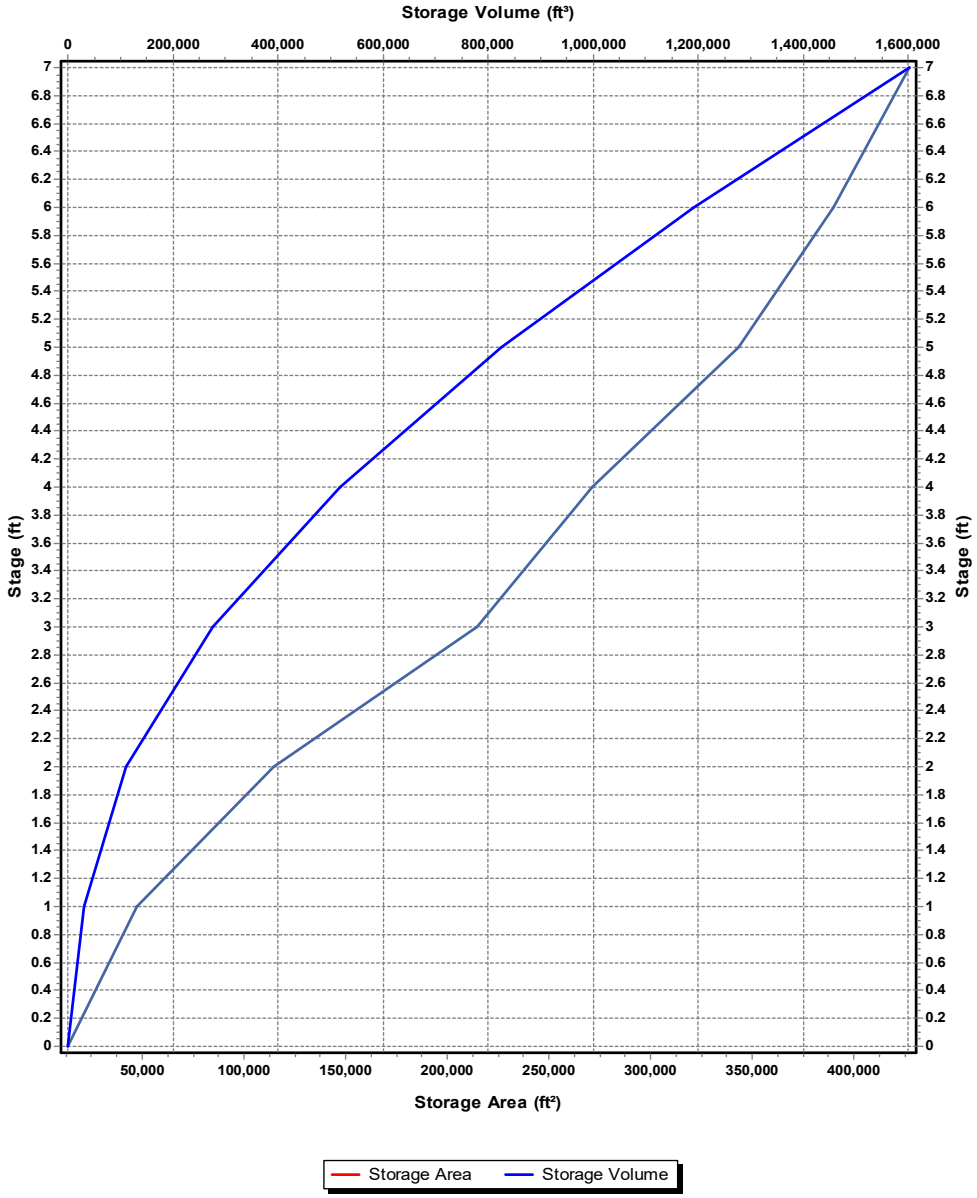
Invert Elevation (ft)	1241.00
Max (Rim) Elevation (ft)	1260.00
Max (Rim) Offset (ft)	19.00
Initial Water Elevation (ft)	0.00
Initial Water Depth (ft)	-1241.00
Ponded Area (ft^2)	0.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : SouthStorage

Stage (ft)	Storage Area (ft^2)	Storage Volume (ft^3)
0	13252	0
1	46972	30112
2	114763	110979.5
3	214391	275556.5
4	271472	518488
5	343212	825830
6	390164	1192518
7	427512	1601356

Storage Area Volume Curves



Storage Node : Ponding South of Road (continued)

Outflow Orifices

Element ID	Orifice Type	Orifice Shape	Flap Gate	Circular Orifice Diameter (in)	Rectangular Orifice Height (in)	Rectangular Orifice Width (in)	Orifice Invert Elevation (ft)	Orifice Coefficient
Inflow to Main	Bottom	CIRCULAR	No	18.00			0.00	0.61

Output Summary Results

Peak Inflow (cfs)	151.26
Peak Lateral Inflow (cfs)	151.26
Peak Outflow (cfs)	87.18
Peak Exfiltration Flow Rate (cfm)	0
Max HGL Elevation Attained (ft)	1243.29
Max HGL Depth Attained (ft)	2.29
Average HGL Elevation Attained (ft)	1241.09
Average HGL Depth Attained (ft)	0.09
Time of Max HGL Occurrence (days hh:mm)	0 12:46
Total Exfiltration Volume (1000-ft^3)	0
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0

Storage Node : Ponding West of Road

Input Data

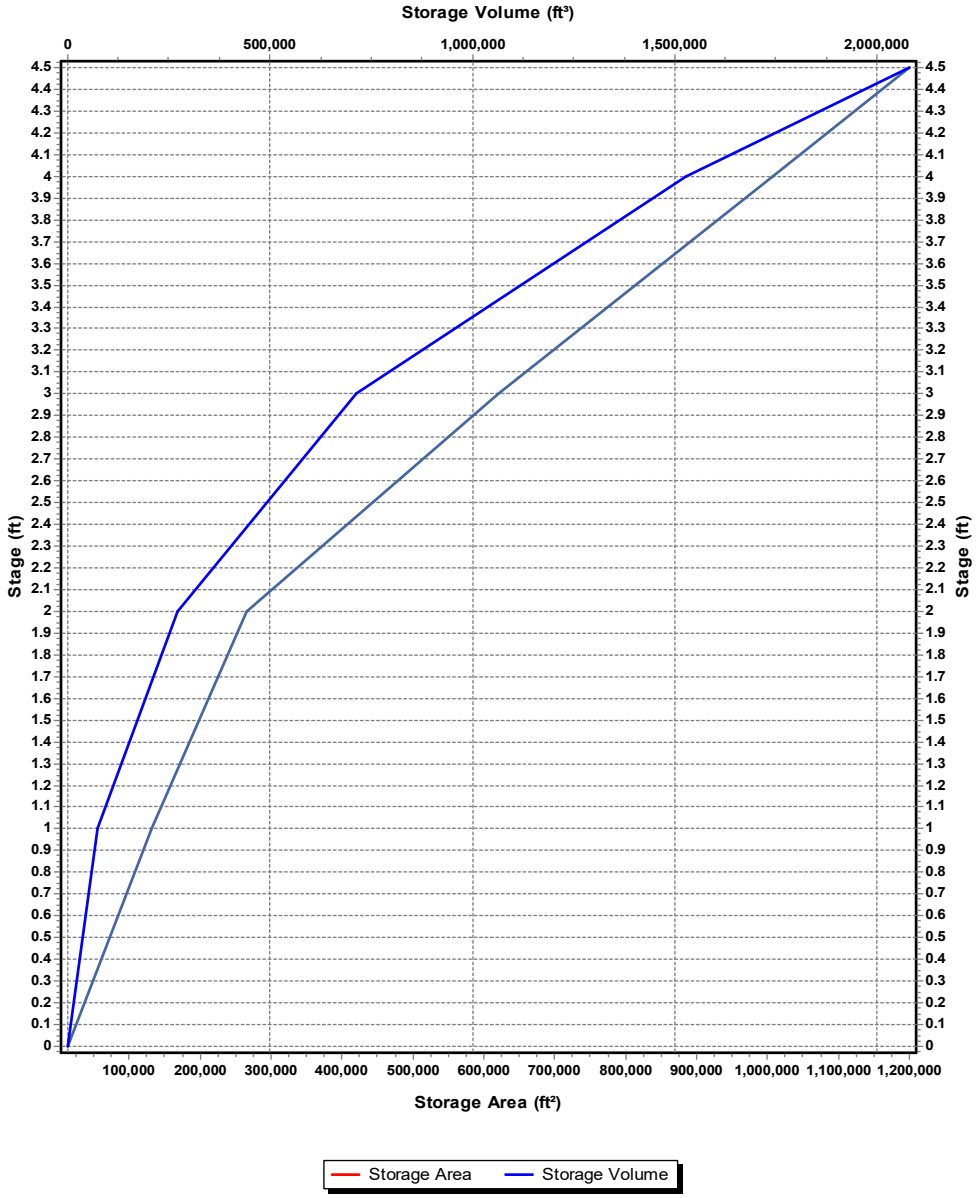
Invert Elevation (ft)	1252.00
Max (Rim) Elevation (ft)	1265.00
Max (Rim) Offset (ft)	13.00
Initial Water Elevation (ft)	0.00
Initial Water Depth (ft)	-1252.00
Ponded Area (ft^2)	0.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : WestStorage

Stage (ft)	Storage Area (ft^2)	Storage Volume (ft^3)
0	13508	0
1	131190	72349
2	265985	270936.5
3	620346	714102
4	1007843	1528196.5
4.5	1200000	2080157.25

Storage Area Volume Curves



Storage Node : Ponding West of Road (continued)

Outflow Weirs

Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Discharge Coefficient
RoadOverflow	Trapezoidal	No	1256.00	4.00	240.00	100.00	3.33

Outflow Orifices

Element ID	Orifice Type	Orifice Shape	Flap Gate	Circular Orifice Diameter (in)	Rectangular Orifice Height (in)	Rectangular Orifice Width (in)	Orifice Invert Elevation (ft)	Orifice Coefficient
Inflow to Lateral 5	Bottom	CIRCULAR	No	18.00			0.00	0.61

Output Summary Results

Peak Inflow (cfs)	154.83
Peak Lateral Inflow (cfs)	154.83
Peak Outflow (cfs)	19.71
Peak Exfiltration Flow Rate (cfm)	0
Max HGL Elevation Attained (ft)	1255.63
Max HGL Depth Attained (ft)	3.63
Average HGL Elevation Attained (ft)	1253.66
Average HGL Depth Attained (ft)	1.66
Time of Max HGL Occurrence (days hh:mm)	0 17:08
Total Exfiltration Volume (1000-ft^3)	0
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0

Storage Node : Wetland Pool

Input Data

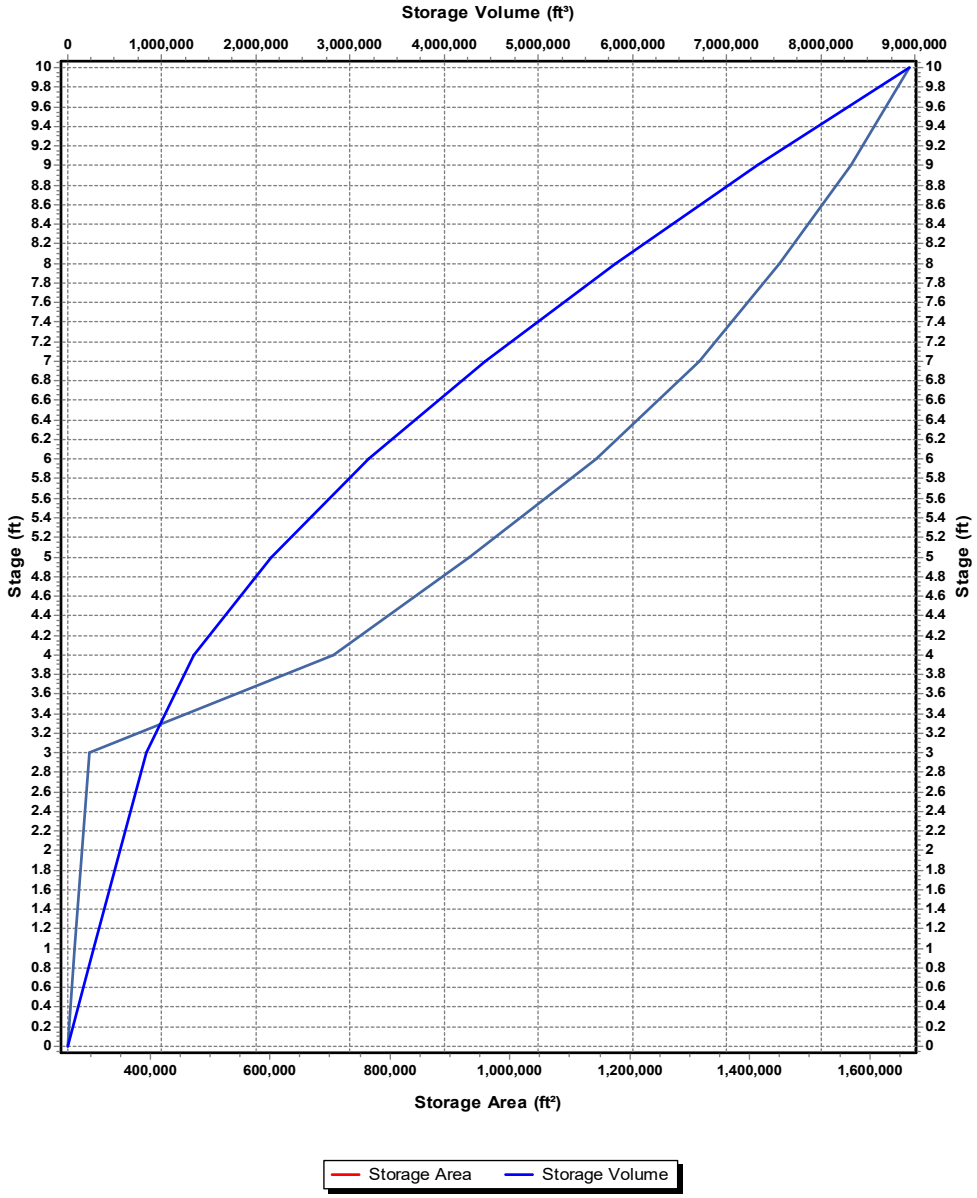
Invert Elevation (ft)	1232.00
Max (Rim) Elevation (ft)	1250.00
Max (Rim) Offset (ft)	18.00
Initial Water Elevation (ft)	1233.00
Initial Water Depth (ft)	1.00
Ponded Area (ft^2)	0.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : Wetland

Stage (ft)	Storage Area (ft^2)	Storage Volume (ft^3)
0	262400	0
1	274400	268400
3	298900	841700
4	706200	1344250
5	931200	2162950
6	1142900	3200000
7	1315000	4428950
8	1448600	5810750
9	1569700	7319900
10	1665900	8937700

Storage Area Volume Curves



Storage Node : Wetland Pool (continued)

Outflow Orifices

Element ID	Orifice Type	Orifice Shape	Flap Gate	Circular Orifice Diameter (in)	Rectangular Orifice Height (in)	Rectangular Orifice Width (in)	Orifice Invert Elevation (ft)	Orifice Coefficient
Wetland Outlet Weir	Side	Rectangular	No		18.00	48.00	1233.00	0.63

Output Summary Results

Peak Inflow (cfs)	368.67
Peak Lateral Inflow (cfs)	290.37
Peak Outflow (cfs)	10.04
Peak Exfiltration Flow Rate (cfm)	0
Max HGL Elevation Attained (ft)	1238.96
Max HGL Depth Attained (ft)	6.96
Average HGL Elevation Attained (ft)	1237.35
Average HGL Depth Attained (ft)	5.35
Time of Max HGL Occurrence (days hh:mm)	1 04:08
Total Exfiltration Volume (1000-ft^3)	0
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0

Project Description

File Name	133265 SSA Proposed.SPF

Project Options

Flow Units	CFS
Elevation Type	Elevation
Hydrology Method	SCS TR-55
Time of Concentration (TOC) Method	SCS TR-55
Link Routing Method	Hydrodynamic
Enable Overflow Ponding at Nodes	NO
Skip Steady State Analysis Time Periods	NO

Analysis Options

Start Analysis On	00:00:00	0:00:00
End Analysis On	00:00:00	0:00:00
Start Reporting On	00:00:00	0:00:00
Antecedent Dry Days	0	days
Runoff (Dry Weather) Time Step	0 01:00:00	days hh:mm:ss
Runoff (Wet Weather) Time Step	0 00:05:00	days hh:mm:ss
Reporting Time Step	0 00:05:00	days hh:mm:ss
Routing Time Step	30	seconds

Number of Elements

	Qty
Rain Gages	1
Subbasins	6
Nodes	9
Junctions	4
Outfalls	2
Flow Diversions	0
Inlets	0
Storage Nodes	3
Links	11
Channels	1
Pipes	6
Pumps	0
Orifices	3
Weirs	1
Outlets	0
Pollutants	0
Land Uses	0

Rainfall Details

SN	Rain Gage ID	Data Source	Data Source ID	Rainfall Type	Rain Units	State	County	Return Period (years)	Rainfall Depth (inches)	Rainfall Distribution
1	Rain Gage-01	Time Series	025-yr	Cumulative	inches				0.00	

Subbasin Summary

Subbasin ID	Area (ac)	Weighted Curve Number	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
Direct	84.00	83.70	5.70	3.89	326.42	267.08	0 00:36:45
Lateral2	60.00	83.70	5.70	3.89	233.16	119.22	0 01:16:10
Lateral3	142.00	83.70	5.70	3.89	551.81	127.87	0 03:41:54
Lateral4	32.00	83.70	5.70	3.89	124.35	45.44	0 02:01:52
Lateral5	160.00	83.70	5.70	3.89	621.76	208.83	0 02:16:45
MainUpstream	60.00	83.70	5.70	3.89	233.16	206.27	0 00:32:10

Node Summary

Element ID	Element Type	Invert Elevation (ft)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Max Surcharge Depth Attained (ft)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
DistrictTile-01	Junction	1244.41	4.06	1255.50	0.00	0 00:00	0.00	0.00
DistrictTile-02	Junction	1231.42	2.88	1243.25	0.00	0 00:00	0.00	0.00
DistrictTileProposed-03	Junction	1229.00	12.70	1238.31	0.00	0 00:00	0.00	0.00
WetlandOutlet-04	Junction	1230.00	10.73	1239.94	0.00	0 00:00	0.00	0.00
SurfaceOutfall	Outfall	0.00	4.49	0.00				
TileOutfall	Outfall	1228.00	12.70	1228.00				
Ponding South of Road	Storage Node	1241.00	203.19	1243.66			0.00	0.00
Ponding West of Road	Storage Node	1252.00	208.60	1256.04			0.00	0.00
Wetland Pool	Storage Node	1232.00	501.15	1240.04			0.00	0.00

Link Summary

Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length	Inlet Invert Elevation	Outlet Invert Elevation	Average Slope	Diameter or Height	Manning's Roughness	Peak Flow	Design Flow Capacity
				(ft)	(ft)	(ft)	(%)	(in)		(cfs)	(cfs)
AppleAveCulvert	Pipe	Ponding West of Road	Wetland Pool	80.00	1254.00	1253.90	0.1200	48.000	0.0150	25.18	44.01
HWY18BoxCulvert	Pipe	Ponding South of Road	Wetland Pool	180.00	1241.00	1240.50	0.2800	60.000	0.0150	114.52	366.98
Lateral5	Pipe	DistrictTile-01	DistrictTileProposed-03	1600.00	1244.41	1230.38	0.8800	12.000	0.0150	3.41	2.89
ProposedWetlandOutelt	Pipe	WetlandOutlet-04	DistrictTileProposed-03	982.00	1230.98	1230.00	0.1000	24.000	0.0130	10.74	7.15
TileMainDownstream	Pipe	DistrictTileProposed-03	TileOutfall	1850.00	1230.00	1228.57	0.0800	24.000	0.0150	12.70	5.45
TileMainUpstream	Pipe	DistrictTile-02	DistrictTileProposed-03	1300.00	1231.42	1230.38	0.0800	12.000	0.0150	2.53	0.87
WetlandSurfaceOutflow	Channel	Wetland Pool	SurfaceOutfall	3000.00	1239.00	1238.50	0.0200	120.000	0.0320	4.49	2251.97
Inflow to Lateral 5	Orifice	Ponding West of Road	DistrictTile-01		1252.00	1244.41		18.000		4.06	
Inflow to Main	Orifice	Ponding South of Road	DistrictTile-02		1241.00	1231.42		18.000		2.88	
Wetland Outlet Weir	Orifice	Wetland Pool	WetlandOutlet-04		1232.00	1230.00		18.000		10.73	
RoadOverflow	Weir	Ponding West of Road	Wetland Pool		1252.00	1232.00				5.71	

Subbasin Hydrology

Subbasin : Direct

Input Data

Area (ac) 84
Peak Rate Factor 484
Weighted Curve Number 83.7
Rain Gage ID ..... Rain Gage-01

Composite Curve Number

32	Area	Soil	Curve
Soil/Surface Description	(acres)	Group	Number
-	84	-	83.7
Composite Area & Weighted CN	84		83.7

Time of Concentration

TOC Method : SCS TR-55

Sheet Flow Equation :

Tc = (0.007 * ((n * Lf)^0.8)) / ((P^0.5) * (Sf^0.4))

Where :

Tc = Time of Concentration (hr)
n = Manning's roughness
Lf = Flow Length (ft)
P = 2 yr, 24 hr Rainfall (inches)
Sf = Slope (ft/ft)

Shallow Concentrated Flow Equation :

V = 16.1345 * (Sf^0.5) (unpaved surface)
V = 20.3282 * (Sf^0.5) (paved surface)
V = 15.0 * (Sf^0.5) (grassed waterway surface)
V = 10.0 * (Sf^0.5) (nearly bare & untilled surface)
V = 9.0 * (Sf^0.5) (cultivated straight rows surface)
V = 7.0 * (Sf^0.5) (short grass pasture surface)
V = 5.0 * (Sf^0.5) (woodland surface)
V = 2.5 * (Sf^0.5) (forest w/heavy litter surface)
Tc = (Lf / V) / (3600 sec/hr)

Where:

Tc = Time of Concentration (hr)
Lf = Flow Length (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)

Channel Flow Equation :

V = (1.49 * (R^(2/3)) * (Sf^0.5)) / n
R = Aq / Wp
Tc = (Lf / V) / (3600 sec/hr)

Where :

Tc = Time of Concentration (hr)
Lf = Flow Length (ft)
R = Hydraulic Radius (ft)
Aq = Flow Area (ft^2)
Wp = Wetted Perimeter (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)
n = Manning's roughness

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.18	0	0
Flow Length (ft) :	100	0	0
Slope (%) :	2	0	0
2 yr, 24 hr Rainfall (in) :	2.98	0	0
Velocity (ft/sec) :	0.14	0	0
Computed Flow Time (min) :	11.75	0	0

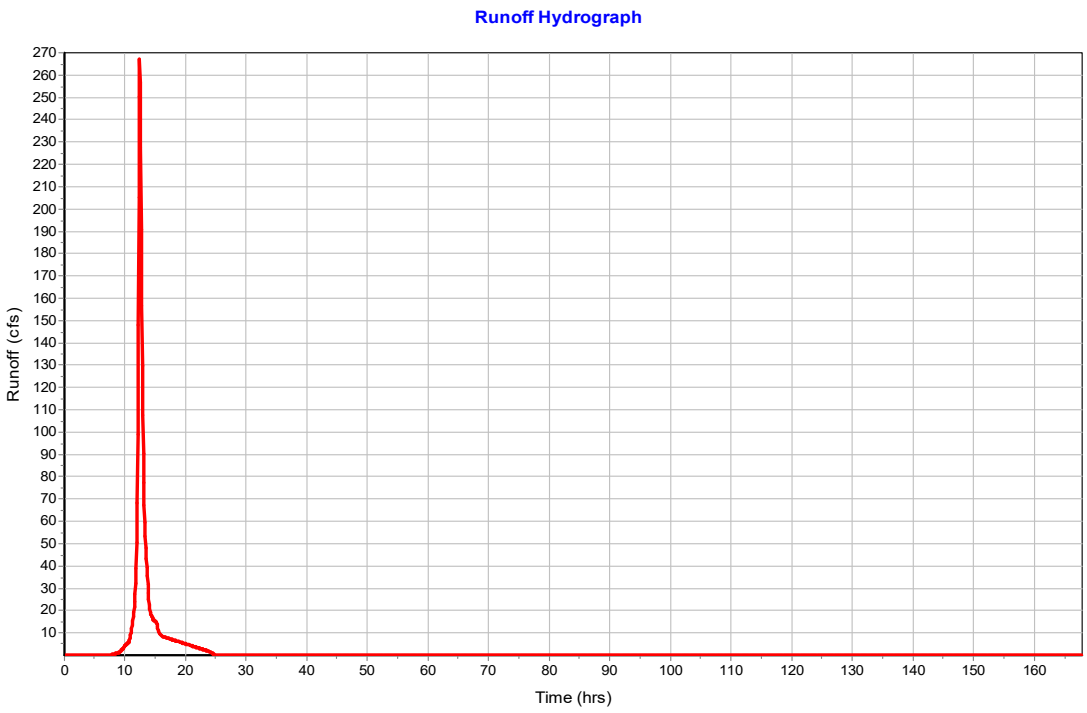
Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	1200	0	0
Slope (%) :	0.8	0	0
Surface Type :	Straight rows	Unpaved	Unpaved
Velocity (ft/sec) :	0.8	0	0
Computed Flow Time (min) :	25	0	0

Total TOC (min) 36.75

Subbasin Runoff Results

Total Rainfall (in)	5.7
Total Runoff (in)	3.89
Peak Runoff (cfs)	267.08
Weighted Curve Number	83.7
Time of Concentration (days hh:mm:ss)	0 00:36:45

Subbasin : Direct



Subbasin : Lateral2

Input Data

Area (ac)	60
Peak Rate Factor	484
Weighted Curve Number	83.7
Rain Gage ID	Rain Gage-01

Composite Curve Number

32	Area	Soil	Curve
Soil/Surface Description	(acres)	Group	Number
-	60	-	83.7
Composite Area & Weighted CN	60		83.7

Time of Concentration

	Subarea	Subarea	Subarea
Sheet Flow Computations	A	B	C
Manning's Roughness :	0.18	0	0
Flow Length (ft) :	100	0	0
Slope (%) :	1	0	0
2 yr, 24 hr Rainfall (in) :	2.98	0	0
Velocity (ft/sec) :	0.11	0	0
Computed Flow Time (min) :	15.5	0	0

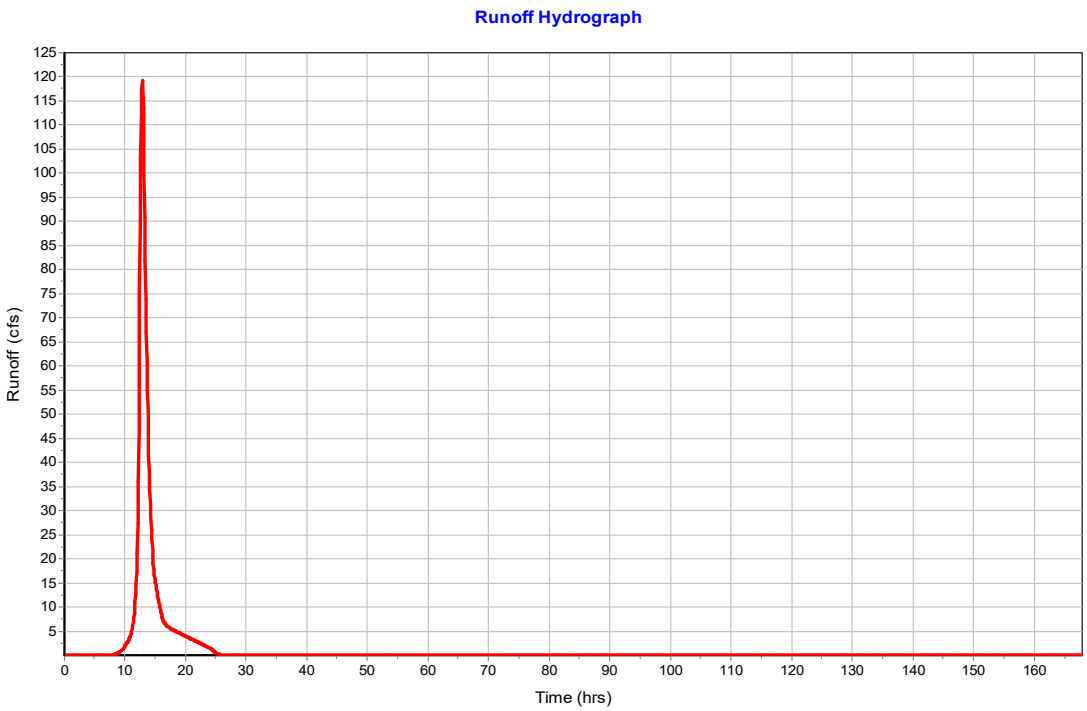
	Subarea	Subarea	Subarea
Shallow Concentrated Flow Computations	A	B	C
Flow Length (ft) :	2330	0	0
Slope (%) :	0.5	0	0
Surface Type :	Straight rows	Unpaved	Unpaved
Velocity (ft/sec) :	0.64	0	0
Computed Flow Time (min) :	60.68	0	0

Total TOC (min) 76.18

Subbasin Runoff Results

Total Rainfall (in)	5.7
Total Runoff (in)	3.89
Peak Runoff (cfs)	119.22
Weighted Curve Number	83.7
Time of Concentration (days hh:mm:ss)	0 01:16:11

Subbasin : Lateral2



Subbasin : Lateral3

Input Data

Area (ac)	142
Peak Rate Factor	484
Weighted Curve Number	83.7
Rain Gage ID	Rain Gage-01

Composite Curve Number

32	Area	Soil	Curve
Soil/Surface Description	(acres)	Group	Number
-	142	-	83.7
Composite Area & Weighted CN	142		83.7

Time of Concentration

	Subarea	Subarea	Subarea
Sheet Flow Computations	A	B	C
Manning's Roughness :	0.18	0	0
Flow Length (ft) :	100	0	0
Slope (%) :	1	0	0
2 yr, 24 hr Rainfall (in) :	2.98	0	0
Velocity (ft/sec) :	0.11	0	0
Computed Flow Time (min) :	15.5	0	0

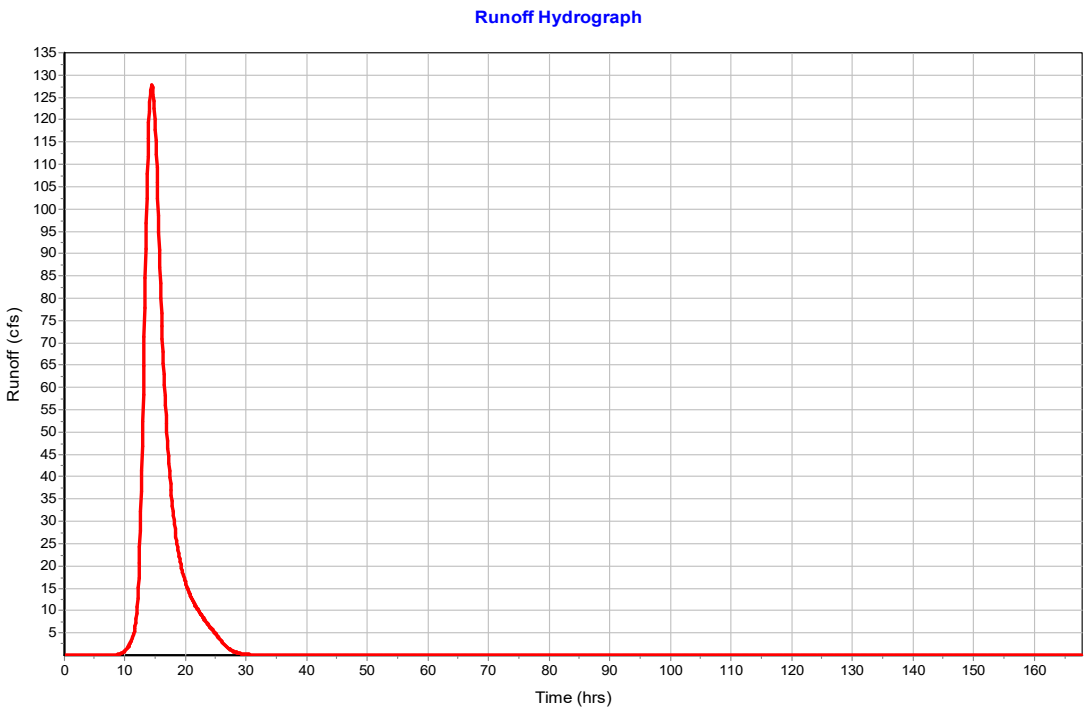
	Subarea	Subarea	Subarea
Shallow Concentrated Flow Computations	A	B	C
Flow Length (ft) :	5573	0	0
Slope (%) :	0.25	0	0
Surface Type :	Straight rows	Unpaved	Unpaved
Velocity (ft/sec) :	0.45	0	0
Computed Flow Time (min) :	206.41	0	0

Total TOC (min) 221.91

Subbasin Runoff Results

Total Rainfall (in)	5.7
Total Runoff (in)	3.89
Peak Runoff (cfs)	127.87
Weighted Curve Number	83.7
Time of Concentration (days hh:mm:ss)	0 03:41:55

Subbasin : Lateral3



Subbasin : Lateral4

Input Data

Area (ac)	32
Peak Rate Factor	484
Weighted Curve Number	83.7
Rain Gage ID	Rain Gage-01

Composite Curve Number

32	Area	Soil	Curve
Soil/Surface Description	(acres)	Group	Number
-	32	-	83.7
Composite Area & Weighted CN	32		83.7

Time of Concentration

	Subarea	Subarea	Subarea
Sheet Flow Computations	A	B	C
Manning's Roughness :	0.18	0	0
Flow Length (ft) :	100	0	0
Slope (%) :	1	0	0
2 yr, 24 hr Rainfall (in) :	2.98	0	0
Velocity (ft/sec) :	0.11	0	0
Computed Flow Time (min) :	15.5	0	0

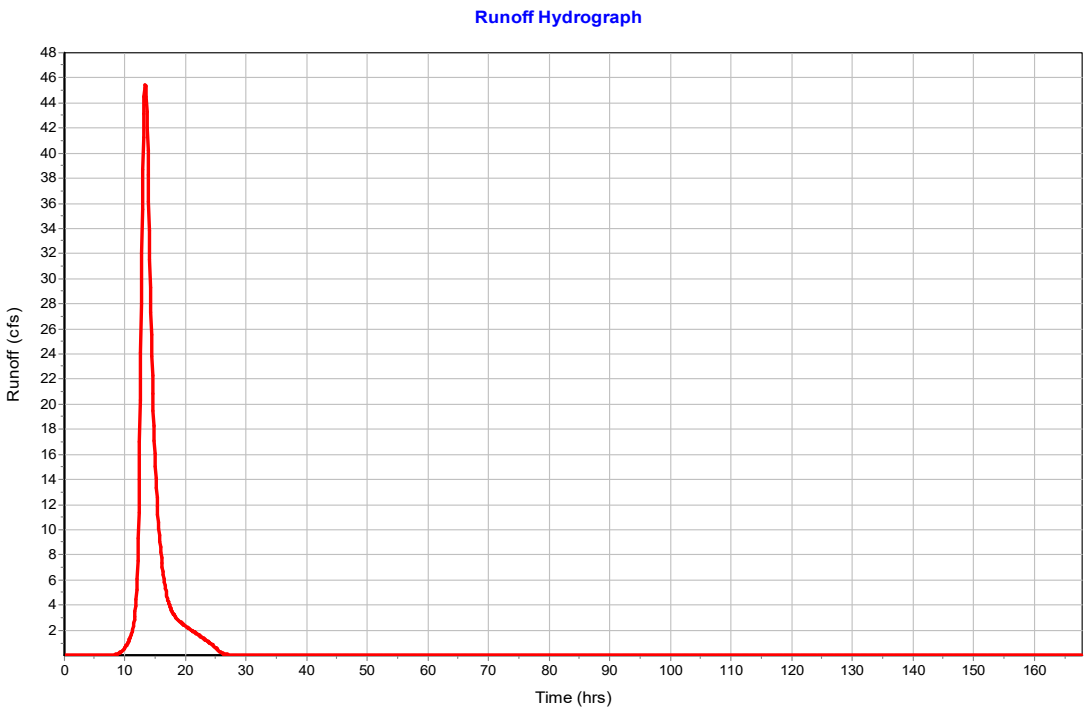
	Subarea	Subarea	Subarea
Shallow Concentrated Flow Computations	A	B	C
Flow Length (ft) :	3000	0	0
Slope (%) :	0.27	0	0
Surface Type :	Straight rows	Unpaved	Unpaved
Velocity (ft/sec) :	0.47	0	0
Computed Flow Time (min) :	106.38	0	0

Total TOC (min) 121.88

Subbasin Runoff Results

Total Rainfall (in)	5.7
Total Runoff (in)	3.89
Peak Runoff (cfs)	45.44
Weighted Curve Number	83.7
Time of Concentration (days hh:mm:ss)	0 02:01:53

Subbasin : Lateral4



Subbasin : Lateral5

Input Data

Area (ac)	160
Peak Rate Factor	484
Weighted Curve Number	83.7
Rain Gage ID	Rain Gage-01

Composite Curve Number

32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	160	-	83.7
Composite Area & Weighted CN	160		83.7

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.18	0	0
Flow Length (ft) :	100	0	0
Slope (%) :	3	0	0
2 yr, 24 hr Rainfall (in) :	2.98	0	0
Velocity (ft/sec) :	0.17	0	0
Computed Flow Time (min) :	9.99	0	0

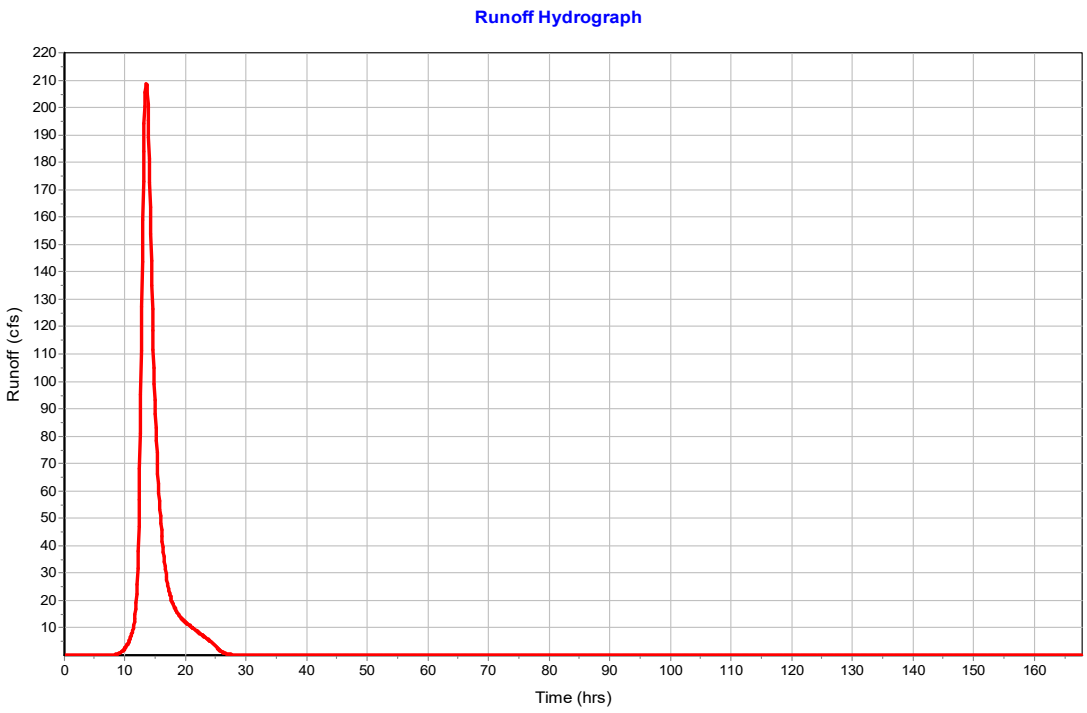
Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	5400	0	0
Slope (%) :	0.63	0	0
Surface Type :	Straight rows	Unpaved	Unpaved
Velocity (ft/sec) :	0.71	0	0
Computed Flow Time (min) :	126.76	0	0

Total TOC (min) 136.75

Subbasin Runoff Results

Total Rainfall (in)	5.7
Total Runoff (in)	3.89
Peak Runoff (cfs)	208.83
Weighted Curve Number	83.7
Time of Concentration (days hh:mm:ss)	0 02:16:45

Subbasin : Lateral5



Subbasin : MainUpstream

Input Data

Area (ac) 60
Peak Rate Factor 484
Weighted Curve Number 83.7
Rain Gage ID ..... Rain Gage-01

Composite Curve Number

32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	60	-	83.7
Composite Area & Weighted CN	60		83.7

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.18	0	0
Flow Length (ft) :	100	0	0
Slope (%) :	3	0	0
2 yr, 24 hr Rainfall (in) :	2.98	0	0
Velocity (ft/sec) :	0.17	0	0
Computed Flow Time (min) :	9.99	0	0

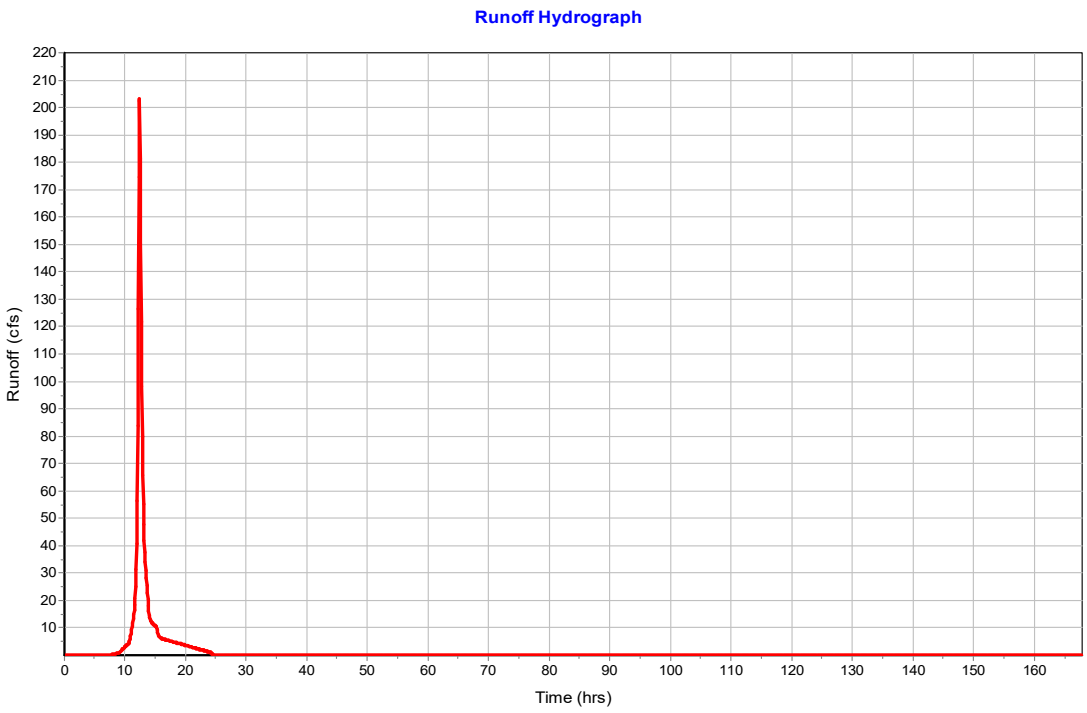
Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	1850	0	0
Slope (%) :	2.37	0	0
Surface Type :	Straight rows	Unpaved	Unpaved
Velocity (ft/sec) :	1.39	0	0
Computed Flow Time (min) :	22.18	0	0

Total TOC (min) 32.17

Subbasin Runoff Results

Total Rainfall (in) 5.7
Total Runoff (in) 3.89
Peak Runoff (cfs) 206.27
Weighted Curve Number 83.7
Time of Concentration (days hh:mm:ss) 0 00:32:10

Subbasin : MainUpstream



Storage Nodes

Storage Node : Ponding South of Road

Input Data

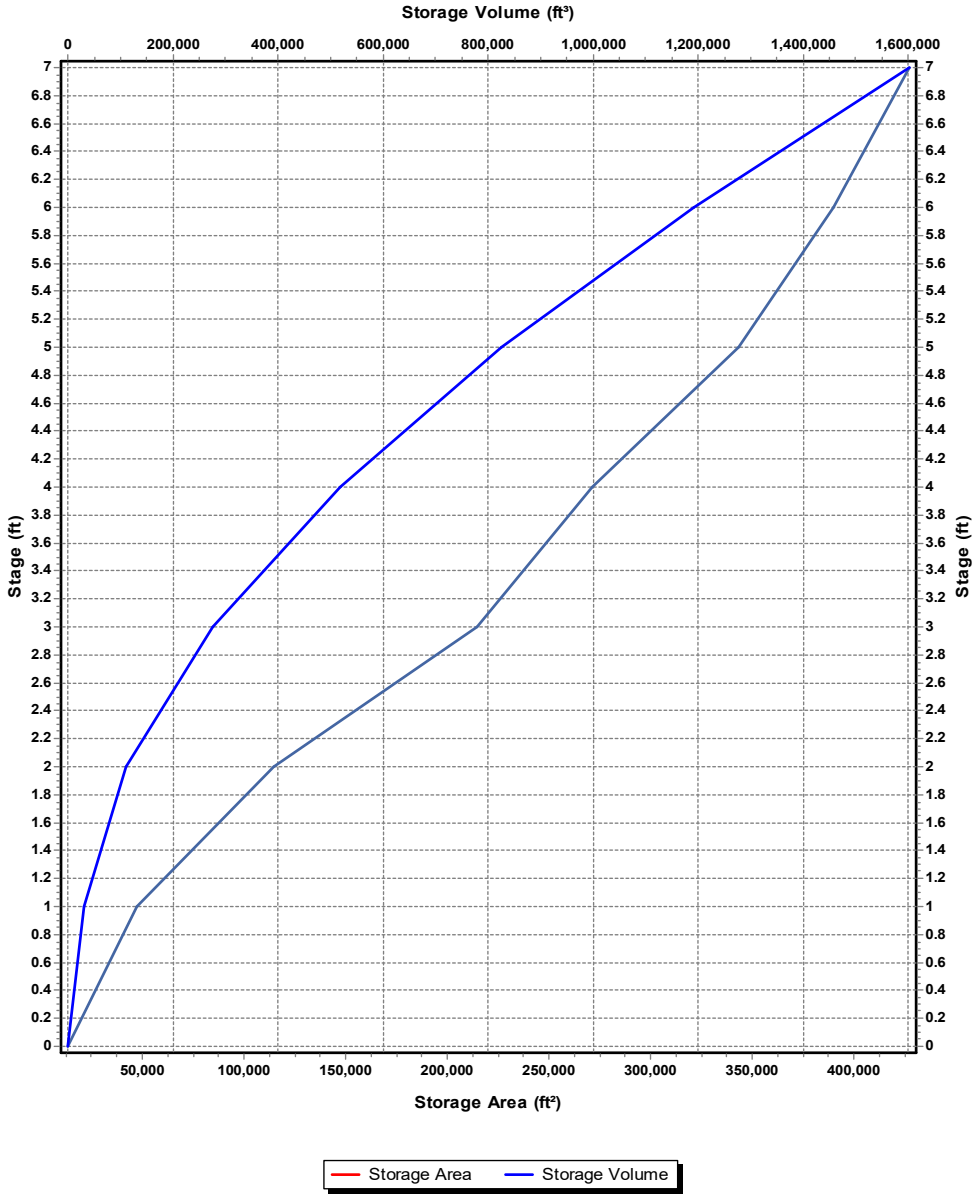
Invert Elevation (ft)	1241.00
Max (Rim) Elevation (ft)	1260.00
Max (Rim) Offset (ft)	19.00
Initial Water Elevation (ft)	0.00
Initial Water Depth (ft)	-1241.00
Ponded Area (ft^2)	0.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : SouthStorage

Stage (ft)	Storage Area (ft^2)	Storage Volume (ft^3)
0	13252	0
1	46972	30112
2	114763	110979.5
3	214391	275556.5
4	271472	518488
5	343212	825830
6	390164	1192518
7	427512	1601356

Storage Area Volume Curves



Storage Node : Ponding South of Road (continued)

Outflow Orifices

Element ID	Orifice Type	Orifice Shape	Flap Gate	Circular Orifice Diameter (in)	Rectangular Orifice Height (in)	Rectangular Orifice Width (in)	Orifice Invert Elevation (ft)	Orifice Coefficient
Inflow to Main	Bottom	CIRCULAR	No	18.00			0.00	0.61

Output Summary Results

Peak Inflow (cfs)	203.19
Peak Lateral Inflow (cfs)	203.19
Peak Outflow (cfs)	116.86
Peak Exfiltration Flow Rate (cfm)	0
Max HGL Elevation Attained (ft)	1243.66
Max HGL Depth Attained (ft)	2.66
Average HGL Elevation Attained (ft)	1241.11
Average HGL Depth Attained (ft)	0.11
Time of Max HGL Occurrence (days hh:mm)	0 12:45
Total Exfiltration Volume (1000-ft^3)	0
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0

Storage Node : Ponding West of Road

Input Data

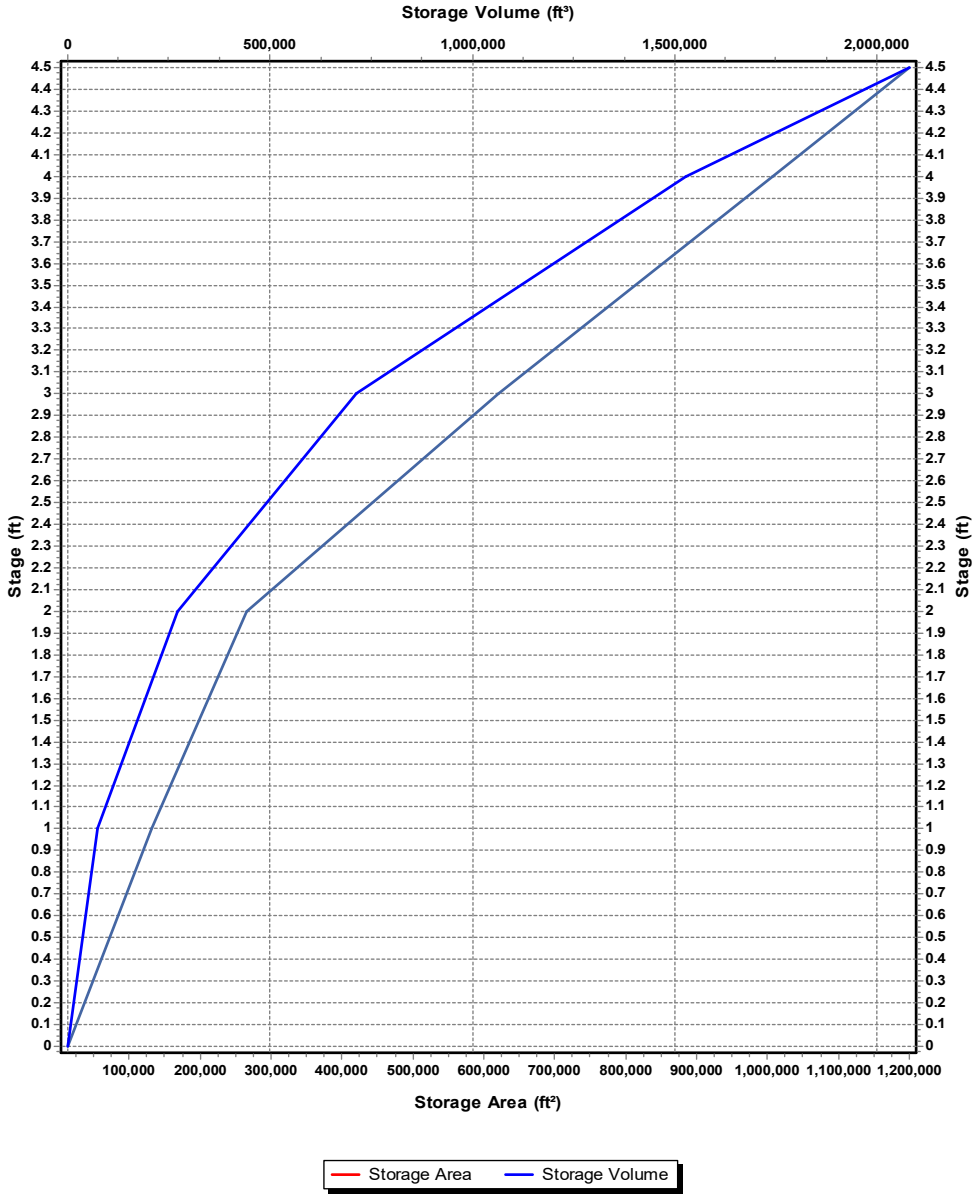
Invert Elevation (ft)	1252.00
Max (Rim) Elevation (ft)	1265.00
Max (Rim) Offset (ft)	13.00
Initial Water Elevation (ft)	0.00
Initial Water Depth (ft)	-1252.00
Ponded Area (ft^2)	0.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : WestStorage

Stage (ft)	Storage Area (ft^2)	Storage Volume (ft^3)
0	13508	0
1	131190	72349
2	265985	270936.5
3	620346	714102
4	1007843	1528196.5
4.5	1200000	2080157.25

Storage Area Volume Curves



Storage Node : Ponding West of Road (continued)

Outflow Weirs

Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Discharge Coefficient
RoadOverflow	Trapezoidal	No	1256.00	4.00	240.00	100.00	3.33

Outflow Orifices

Element ID	Orifice Type	Orifice Shape	Flap Gate	Circular Orifice Diameter (in)	Rectangular Orifice Height (in)	Rectangular Orifice Width (in)	Orifice Invert Elevation (ft)	Orifice Coefficient
Inflow to Lateral 5	Bottom	CIRCULAR	No	18.00			0.00	0.61

Output Summary Results

Peak Inflow (cfs)	208.6
Peak Lateral Inflow (cfs)	208.6
Peak Outflow (cfs)	34.11
Peak Exfiltration Flow Rate (cfm)	0
Max HGL Elevation Attained (ft)	1256.04
Max HGL Depth Attained (ft)	4.04
Average HGL Elevation Attained (ft)	1253.96
Average HGL Depth Attained (ft)	1.96
Time of Max HGL Occurrence (days hh:mm)	0 16:35
Total Exfiltration Volume (1000-ft^3)	0
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0

Storage Node : Wetland Pool

Input Data

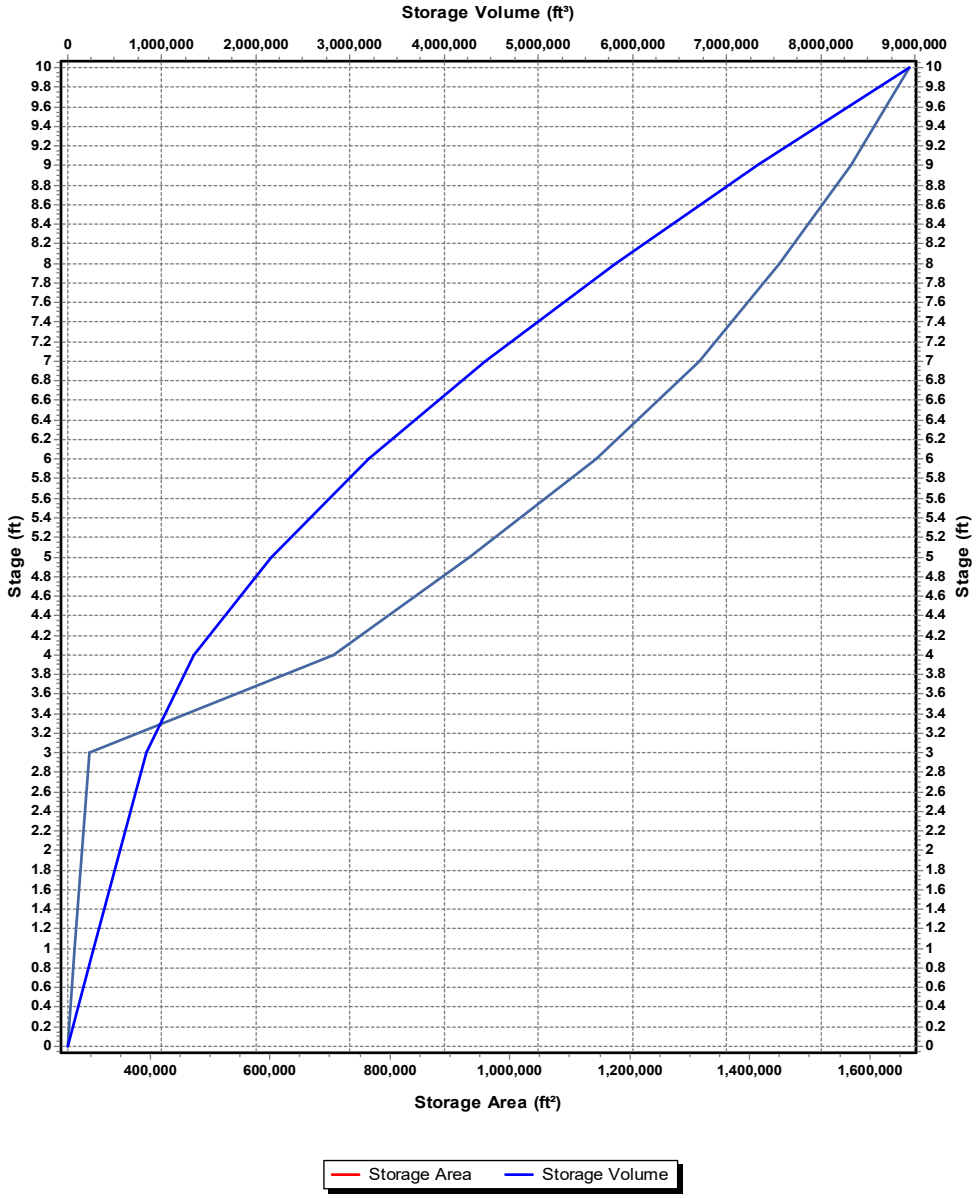
Invert Elevation (ft)	1232.00
Max (Rim) Elevation (ft)	1250.00
Max (Rim) Offset (ft)	18.00
Initial Water Elevation (ft)	1233.00
Initial Water Depth (ft)	1.00
Ponded Area (ft^2)	0.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : Wetland

Stage (ft)	Storage Area (ft^2)	Storage Volume (ft^3)
0	262400	0
1	274400	268400
3	298900	841700
4	706200	1344250
5	931200	2162950
6	1142900	3200000
7	1315000	4428950
8	1448600	5810750
9	1569700	7319900
10	1665900	8937700

Storage Area Volume Curves



Storage Node : Wetland Pool (continued)

Outflow Orifices

Element ID	Orifice Type	Orifice Shape	Flap Gate	Circular Orifice Diameter (in)	Rectangular Orifice Height (in)	Rectangular Orifice Width (in)	Orifice Invert Elevation (ft)	Orifice Coefficient
Wetland Outlet Weir	Side	Rectangular	No		18.00	48.00	1233.00	0.63

Output Summary Results

Peak Inflow (cfs)	501.15
Peak Lateral Inflow (cfs)	394.61
Peak Outflow (cfs)	13.87
Peak Exfiltration Flow Rate (cfm)	0
Max HGL Elevation Attained (ft)	1240.04
Max HGL Depth Attained (ft)	8.04
Average HGL Elevation Attained (ft)	1238.62
Average HGL Depth Attained (ft)	6.62
Time of Max HGL Occurrence (days hh:mm)	1 03:41
Total Exfiltration Volume (1000-ft^3)	0
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0

Project Description

File Name	133265 SSA Proposed.SPF

Project Options

Flow Units	CFS
Elevation Type	Elevation
Hydrology Method	SCS TR-55
Time of Concentration (TOC) Method	SCS TR-55
Link Routing Method	Hydrodynamic
Enable Overflow Ponding at Nodes	NO
Skip Steady State Analysis Time Periods	NO

Analysis Options

Start Analysis On	00:00:00	0:00:00
End Analysis On	00:00:00	0:00:00
Start Reporting On	00:00:00	0:00:00
Antecedent Dry Days	0	days
Runoff (Dry Weather) Time Step	0 01:00:00	days hh:mm:ss
Runoff (Wet Weather) Time Step	0 00:05:00	days hh:mm:ss
Reporting Time Step	0 00:05:00	days hh:mm:ss
Routing Time Step	30	seconds

Number of Elements

	Qty
Rain Gages	1
Subbasins	6
Nodes	9
Junctions	4
Outfalls	2
Flow Diversions	0
Inlets	0
Storage Nodes	3
Links	11
Channels	1
Pipes	6
Pumps	0
Orifices	3
Weirs	1
Outlets	0
Pollutants	0
Land Uses	0

Rainfall Details

SN	Rain Gage ID	Data Source	Data Source ID	Rainfall Type	Rain Units	State	County	Return Period (years)	Rainfall Depth (inches)	Rainfall Distribution
1	Rain Gage-01	Time Series	100-yr	Cumulative	inches				0.00	

Subbasin Summary

Subbasin ID	Area (ac)	Weighted Curve Number	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
Direct	84.00	83.70	7.60	5.68	476.87	384.98	0 00:36:45
Lateral2	60.00	83.70	7.60	5.68	340.62	173.04	0 01:16:10
Lateral3	142.00	83.70	7.60	5.68	806.13	186.60	0 03:41:54
Lateral4	32.00	83.70	7.60	5.68	181.66	66.16	0 02:01:52
Lateral5	160.00	83.70	7.60	5.68	908.32	304.03	0 02:16:45
MainUpstream	60.00	83.70	7.60	5.68	340.62	296.61	0 00:32:10

Node Summary

Element ID	Element Type	Invert Elevation (ft)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Max Surcharge Depth Attained (ft)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
DistrictTile-01	Junction	1244.41	3.96	1255.73	0.00	0 00:00	0.00	0.00
DistrictTile-02	Junction	1231.42	2.49	1243.80	0.00	0 00:00	0.00	0.00
DistrictTileProposed-03	Junction	1229.00	13.52	1239.31	0.00	0 00:00	0.00	0.00
WetlandOutlet-04	Junction	1230.00	10.97	1241.10	0.00	0 00:00	0.00	0.00
SurfaceOutfall	Outfall	0.00	47.87	0.00				
TileOutfall	Outfall	1228.00	13.52	1228.00				
Ponding South of Road	Storage Node	1241.00	293.20	1244.23			0.00	0.00
Ponding West of Road	Storage Node	1252.00	303.97	1256.27			0.00	0.00
Wetland Pool	Storage Node	1232.00	718.05	1241.20			0.00	0.00

Link Summary

Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length	Inlet Invert Elevation	Outlet Invert Elevation	Average Slope	Diameter or Height	Manning's Roughness	Peak Flow	Design Flow Capacity
				(ft)	(ft)	(ft)	(%)	(in)		(cfs)	(cfs)
AppleAveCulvert	Pipe	Ponding West of Road	Wetland Pool	80.00	1254.00	1253.90	0.1200	48.000	0.0150	30.73	44.01
HWY18BoxCulvert	Pipe	Ponding South of Road	Wetland Pool	180.00	1241.00	1240.50	0.2800	60.000	0.0150	152.39	366.98
Lateral5	Pipe	DistrictTile-01	DistrictTileProposed-03	1600.00	1244.41	1230.38	0.8800	12.000	0.0150	3.41	2.89
ProposedWetlandOutelt	Pipe	WetlandOutlet-04	DistrictTileProposed-03	982.00	1230.98	1230.00	0.1000	24.000	0.0130	10.98	7.15
TileMainDownstream	Pipe	DistrictTileProposed-03	TileOutfall	1850.00	1230.00	1228.57	0.0800	24.000	0.0150	13.52	5.45
TileMainUpstream	Pipe	DistrictTile-02	DistrictTileProposed-03	1300.00	1231.42	1230.38	0.0800	12.000	0.0150	2.37	0.87
WetlandSurfaceOutflow	Channel	Wetland Pool	SurfaceOutfall	3000.00	1239.00	1238.50	0.0200	120.000	0.0320	47.87	2251.97
Inflow to Lateral 5	Orifice	Ponding West of Road	DistrictTile-01		1252.00	1244.41		18.000		3.96	
Inflow to Main	Orifice	Ponding South of Road	DistrictTile-02		1241.00	1231.42		18.000		2.49	
Wetland Outlet Weir	Orifice	Wetland Pool	WetlandOutlet-04		1232.00	1230.00		18.000		10.97	
RoadOverflow	Weir	Ponding West of Road	Wetland Pool		1252.00	1232.00				111.79	

Subbasin Hydrology

Subbasin : Direct

Input Data

Area (ac) 84
Peak Rate Factor 484
Weighted Curve Number 83.7
Rain Gage ID ..... Rain Gage-01

Composite Curve Number

32	Area	Soil	Curve
Soil/Surface Description	(acres)	Group	Number
-	84	-	83.7
Composite Area & Weighted CN	84		83.7

Time of Concentration

TOC Method : SCS TR-55

Sheet Flow Equation :

Tc = (0.007 * ((n * Lf)^0.8)) / ((P^0.5) * (Sf^0.4))

Where :

Tc = Time of Concentration (hr)
n = Manning's roughness
Lf = Flow Length (ft)
P = 2 yr, 24 hr Rainfall (inches)
Sf = Slope (ft/ft)

Shallow Concentrated Flow Equation :

V = 16.1345 * (Sf^0.5) (unpaved surface)
V = 20.3282 * (Sf^0.5) (paved surface)
V = 15.0 * (Sf^0.5) (grassed waterway surface)
V = 10.0 * (Sf^0.5) (nearly bare & untilled surface)
V = 9.0 * (Sf^0.5) (cultivated straight rows surface)
V = 7.0 * (Sf^0.5) (short grass pasture surface)
V = 5.0 * (Sf^0.5) (woodland surface)
V = 2.5 * (Sf^0.5) (forest w/heavy litter surface)
Tc = (Lf / V) / (3600 sec/hr)

Where:

Tc = Time of Concentration (hr)
Lf = Flow Length (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)

Channel Flow Equation :

V = (1.49 * (R^(2/3)) * (Sf^0.5)) / n
R = Aq / Wp
Tc = (Lf / V) / (3600 sec/hr)

Where :

Tc = Time of Concentration (hr)
Lf = Flow Length (ft)
R = Hydraulic Radius (ft)
Aq = Flow Area (ft^2)
Wp = Wetted Perimeter (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)
n = Manning's roughness

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.18	0	0
Flow Length (ft) :	100	0	0
Slope (%) :	2	0	0
2 yr, 24 hr Rainfall (in) :	2.98	0	0
Velocity (ft/sec) :	0.14	0	0
Computed Flow Time (min) :	11.75	0	0

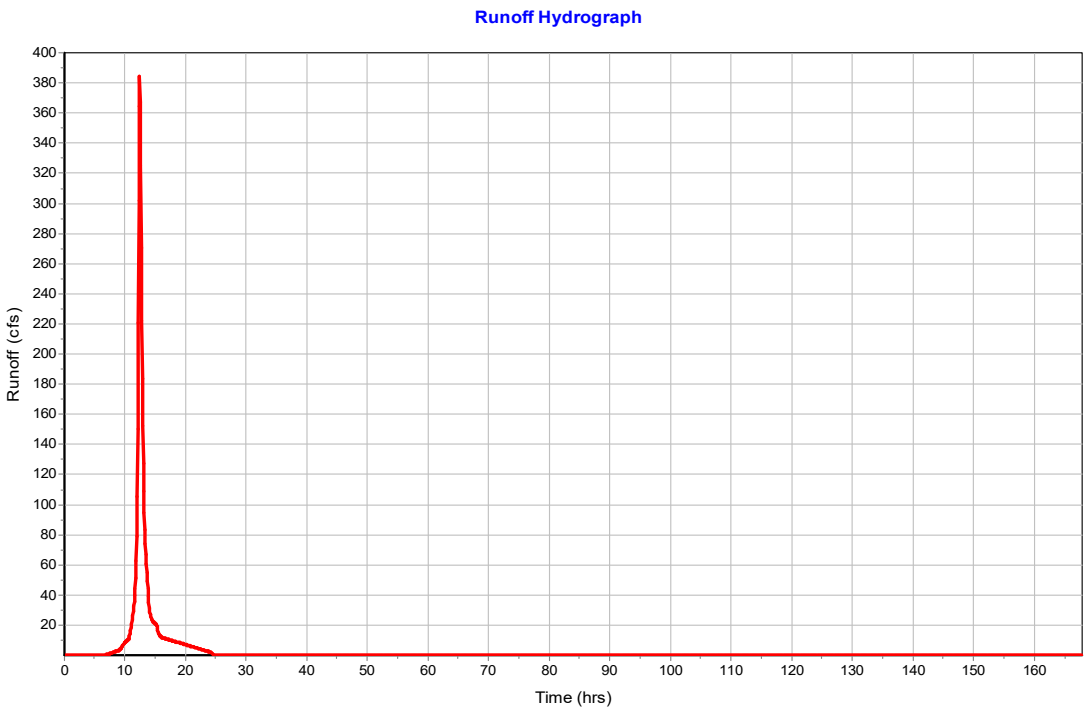
Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	1200	0	0
Slope (%) :	0.8	0	0
Surface Type :	Straight rows	Unpaved	Unpaved
Velocity (ft/sec) :	0.8	0	0
Computed Flow Time (min) :	25	0	0

Total TOC (min) 36.75

Subbasin Runoff Results

Total Rainfall (in)	7.6
Total Runoff (in)	5.68
Peak Runoff (cfs)	384.98
Weighted Curve Number	83.7
Time of Concentration (days hh:mm:ss)	0 00:36:45

Subbasin : Direct



Subbasin : Lateral2

Input Data

Area (ac)	60
Peak Rate Factor	484
Weighted Curve Number	83.7
Rain Gage ID	Rain Gage-01

Composite Curve Number

32	Area	Soil	Curve
Soil/Surface Description	(acres)	Group	Number
-	60	-	83.7
Composite Area & Weighted CN	60		83.7

Time of Concentration

	Subarea	Subarea	Subarea
Sheet Flow Computations	A	B	C
Manning's Roughness :	0.18	0	0
Flow Length (ft) :	100	0	0
Slope (%) :	1	0	0
2 yr, 24 hr Rainfall (in) :	2.98	0	0
Velocity (ft/sec) :	0.11	0	0
Computed Flow Time (min) :	15.5	0	0

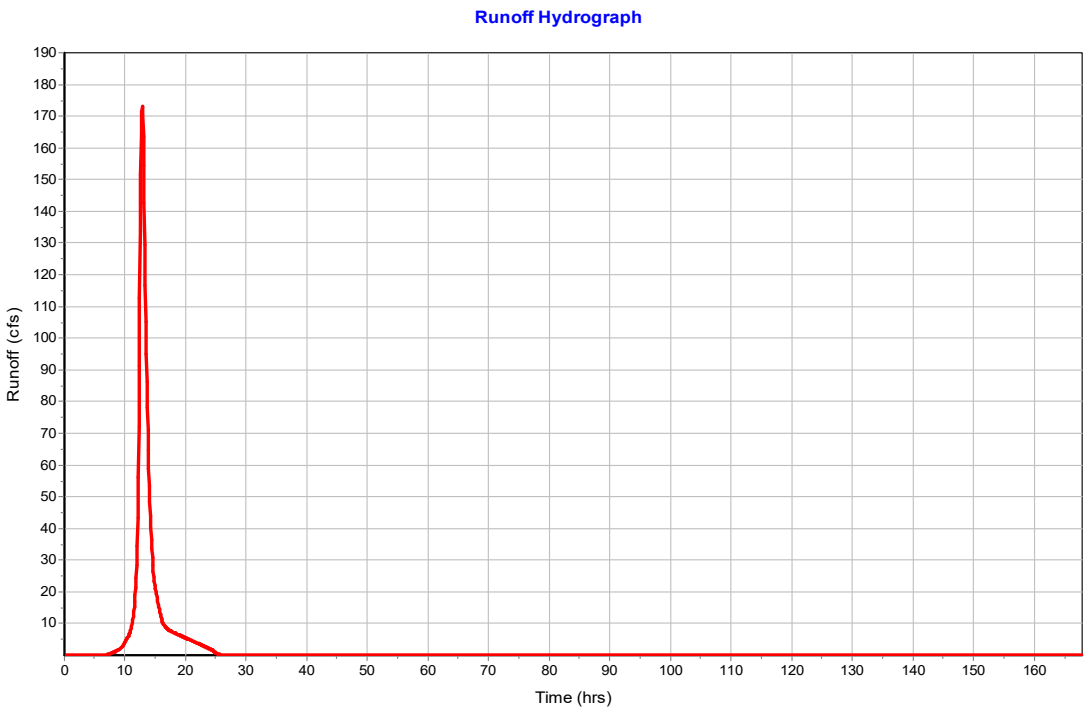
	Subarea	Subarea	Subarea
Shallow Concentrated Flow Computations	A	B	C
Flow Length (ft) :	2330	0	0
Slope (%) :	0.5	0	0
Surface Type :	Straight rows	Unpaved	Unpaved
Velocity (ft/sec) :	0.64	0	0
Computed Flow Time (min) :	60.68	0	0

Total TOC (min) 76.18

Subbasin Runoff Results

Total Rainfall (in)	7.6
Total Runoff (in)	5.68
Peak Runoff (cfs)	173.04
Weighted Curve Number	83.7
Time of Concentration (days hh:mm:ss)	0 01:16:11

Subbasin : Lateral2



Subbasin : Lateral3

Input Data

Area (ac)	142
Peak Rate Factor	484
Weighted Curve Number	83.7
Rain Gage ID	Rain Gage-01

Composite Curve Number

32	Area	Soil	Curve
Soil/Surface Description	(acres)	Group	Number
-	142	-	83.7
Composite Area & Weighted CN	142		83.7

Time of Concentration

	Subarea	Subarea	Subarea
Sheet Flow Computations	A	B	C
Manning's Roughness :	0.18	0	0
Flow Length (ft) :	100	0	0
Slope (%) :	1	0	0
2 yr, 24 hr Rainfall (in) :	2.98	0	0
Velocity (ft/sec) :	0.11	0	0
Computed Flow Time (min) :	15.5	0	0

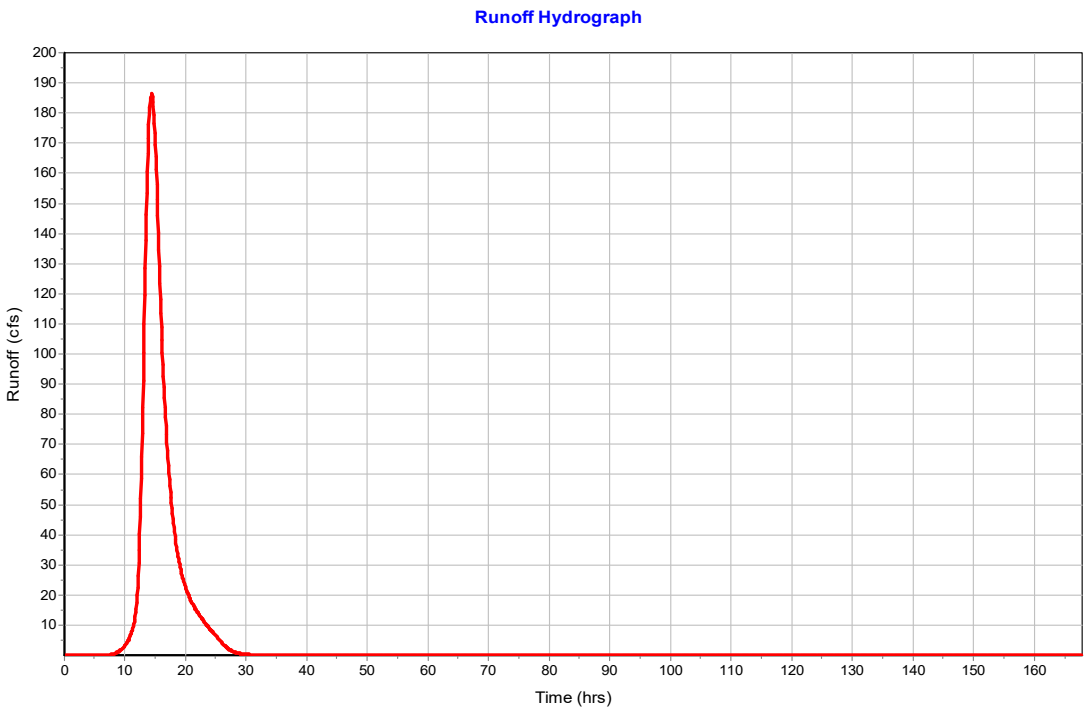
	Subarea	Subarea	Subarea
Shallow Concentrated Flow Computations	A	B	C
Flow Length (ft) :	5573	0	0
Slope (%) :	0.25	0	0
Surface Type :	Straight rows	Unpaved	Unpaved
Velocity (ft/sec) :	0.45	0	0
Computed Flow Time (min) :	206.41	0	0

Total TOC (min) 221.91

Subbasin Runoff Results

Total Rainfall (in)	7.6
Total Runoff (in)	5.68
Peak Runoff (cfs)	186.6
Weighted Curve Number	83.7
Time of Concentration (days hh:mm:ss)	0 03:41:55

Subbasin : Lateral3



Subbasin : Lateral4

Input Data

Area (ac)	32
Peak Rate Factor	484
Weighted Curve Number	83.7
Rain Gage ID	Rain Gage-01

Composite Curve Number

32	Area	Soil	Curve
Soil/Surface Description	(acres)	Group	Number
-	32	-	83.7
Composite Area & Weighted CN	32		83.7

Time of Concentration

	Subarea	Subarea	Subarea
Sheet Flow Computations	A	B	C
Manning's Roughness :	0.18	0	0
Flow Length (ft) :	100	0	0
Slope (%) :	1	0	0
2 yr, 24 hr Rainfall (in) :	2.98	0	0
Velocity (ft/sec) :	0.11	0	0
Computed Flow Time (min) :	15.5	0	0

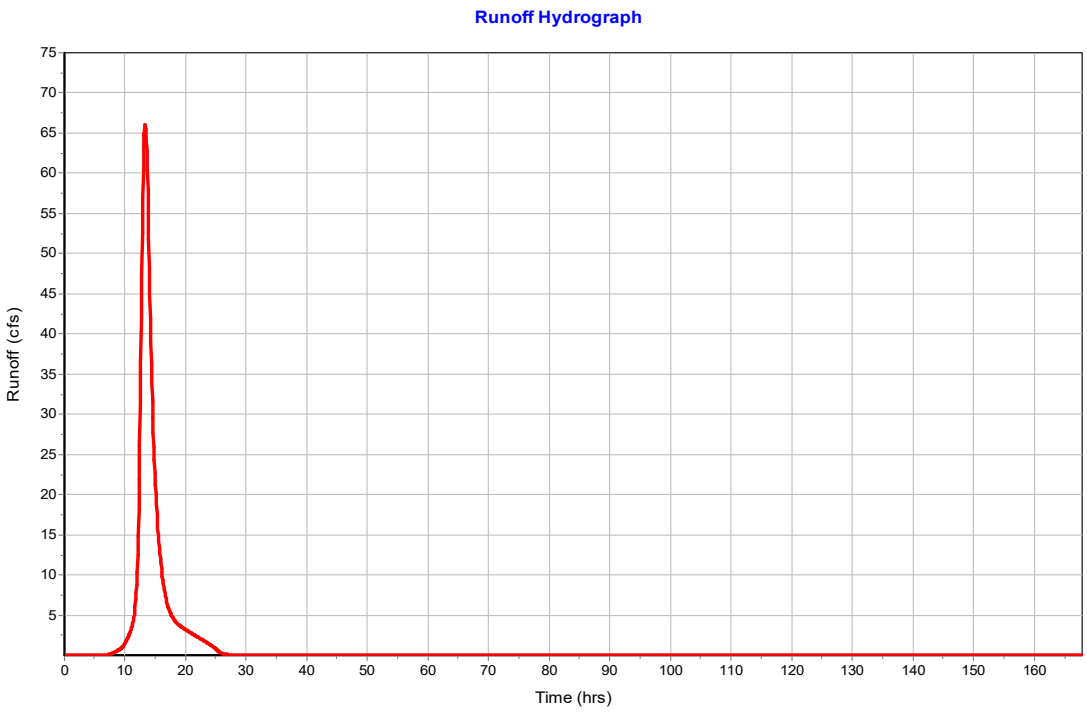
	Subarea	Subarea	Subarea
Shallow Concentrated Flow Computations	A	B	C
Flow Length (ft) :	3000	0	0
Slope (%) :	0.27	0	0
Surface Type :	Straight rows	Unpaved	Unpaved
Velocity (ft/sec) :	0.47	0	0
Computed Flow Time (min) :	106.38	0	0

Total TOC (min) 121.88

Subbasin Runoff Results

Total Rainfall (in)	7.6
Total Runoff (in)	5.68
Peak Runoff (cfs)	66.16
Weighted Curve Number	83.7
Time of Concentration (days hh:mm:ss)	0 02:01:53

Subbasin : Lateral4



Subbasin : Lateral5

Input Data

Area (ac)	160
Peak Rate Factor	484
Weighted Curve Number	83.7
Rain Gage ID	Rain Gage-01

Composite Curve Number

32	Area	Soil	Curve
Soil/Surface Description	(acres)	Group	Number
-	160	-	83.7
Composite Area & Weighted CN	160		83.7

Time of Concentration

	Subarea	Subarea	Subarea
Sheet Flow Computations	A	B	C
Manning's Roughness :	0.18	0	0
Flow Length (ft) :	100	0	0
Slope (%) :	3	0	0
2 yr, 24 hr Rainfall (in) :	2.98	0	0
Velocity (ft/sec) :	0.17	0	0
Computed Flow Time (min) :	9.99	0	0

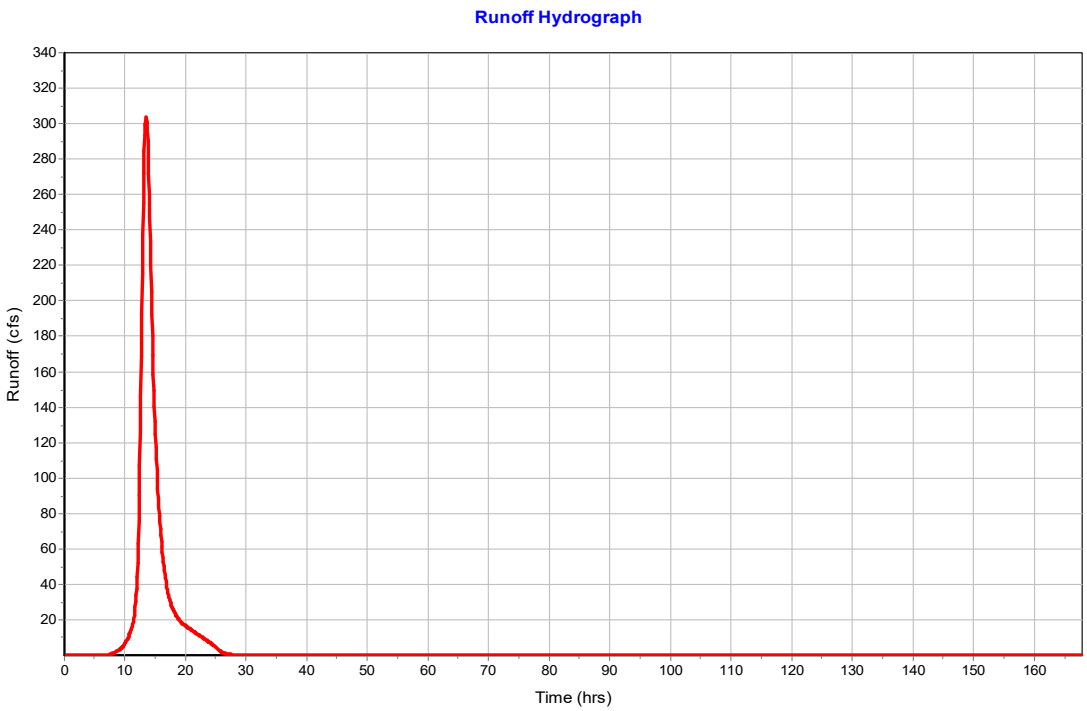
	Subarea	Subarea	Subarea
Shallow Concentrated Flow Computations	A	B	C
Flow Length (ft) :	5400	0	0
Slope (%) :	0.63	0	0
Surface Type :	Straight rows	Unpaved	Unpaved
Velocity (ft/sec) :	0.71	0	0
Computed Flow Time (min) :	126.76	0	0

Total TOC (min) 136.75

Subbasin Runoff Results

Total Rainfall (in)	7.6
Total Runoff (in)	5.68
Peak Runoff (cfs)	304.03
Weighted Curve Number	83.7
Time of Concentration (days hh:mm:ss)	0 02:16:45

Subbasin : Lateral5



Subbasin : MainUpstream

Input Data

Area (ac)	60
Peak Rate Factor	484
Weighted Curve Number	83.7
Rain Gage ID	Rain Gage-01

Composite Curve Number

32	Area	Soil	Curve
Soil/Surface Description	(acres)	Group	Number
-	60	-	83.7
Composite Area & Weighted CN	60		83.7

Time of Concentration

	Subarea	Subarea	Subarea
Sheet Flow Computations	A	B	C
Manning's Roughness :	0.18	0	0
Flow Length (ft) :	100	0	0
Slope (%) :	3	0	0
2 yr, 24 hr Rainfall (in) :	2.98	0	0
Velocity (ft/sec) :	0.17	0	0
Computed Flow Time (min) :	9.99	0	0

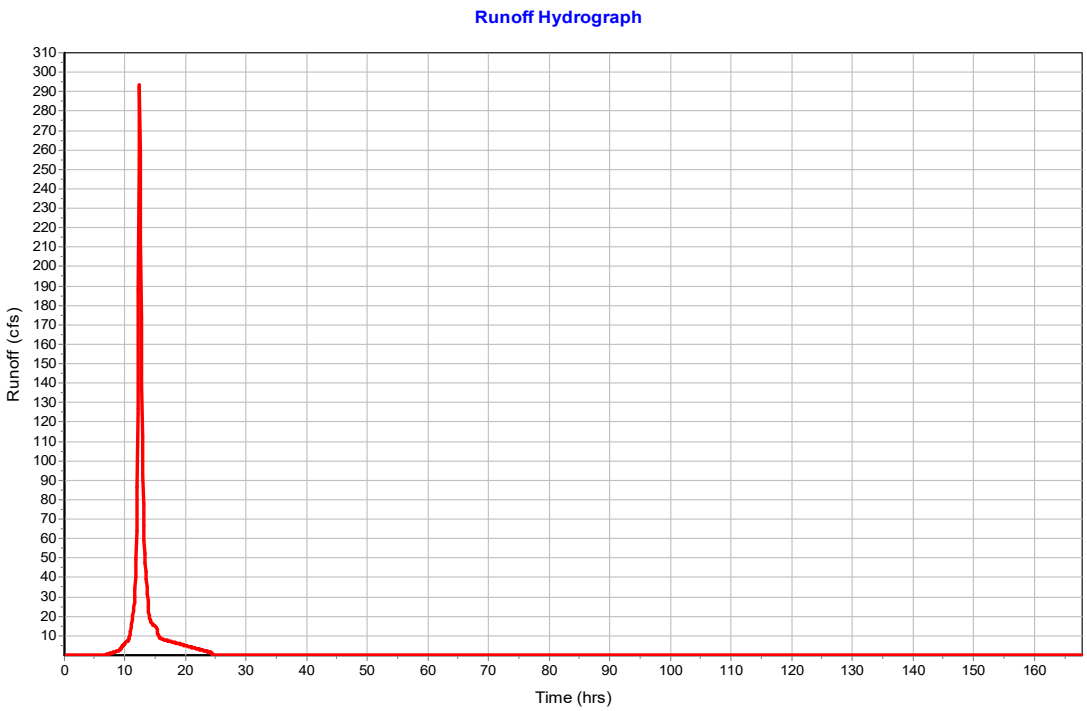
	Subarea	Subarea	Subarea
Shallow Concentrated Flow Computations	A	B	C
Flow Length (ft) :	1850	0	0
Slope (%) :	2.37	0	0
Surface Type :	Straight rows	Unpaved	Unpaved
Velocity (ft/sec) :	1.39	0	0
Computed Flow Time (min) :	22.18	0	0

Total TOC (min) 32.17

Subbasin Runoff Results

Total Rainfall (in)	7.6
Total Runoff (in)	5.68
Peak Runoff (cfs)	296.61
Weighted Curve Number	83.7
Time of Concentration (days hh:mm:ss)	0 00:32:10

Subbasin : MainUpstream



Storage Nodes

Storage Node : Ponding South of Road

Input Data

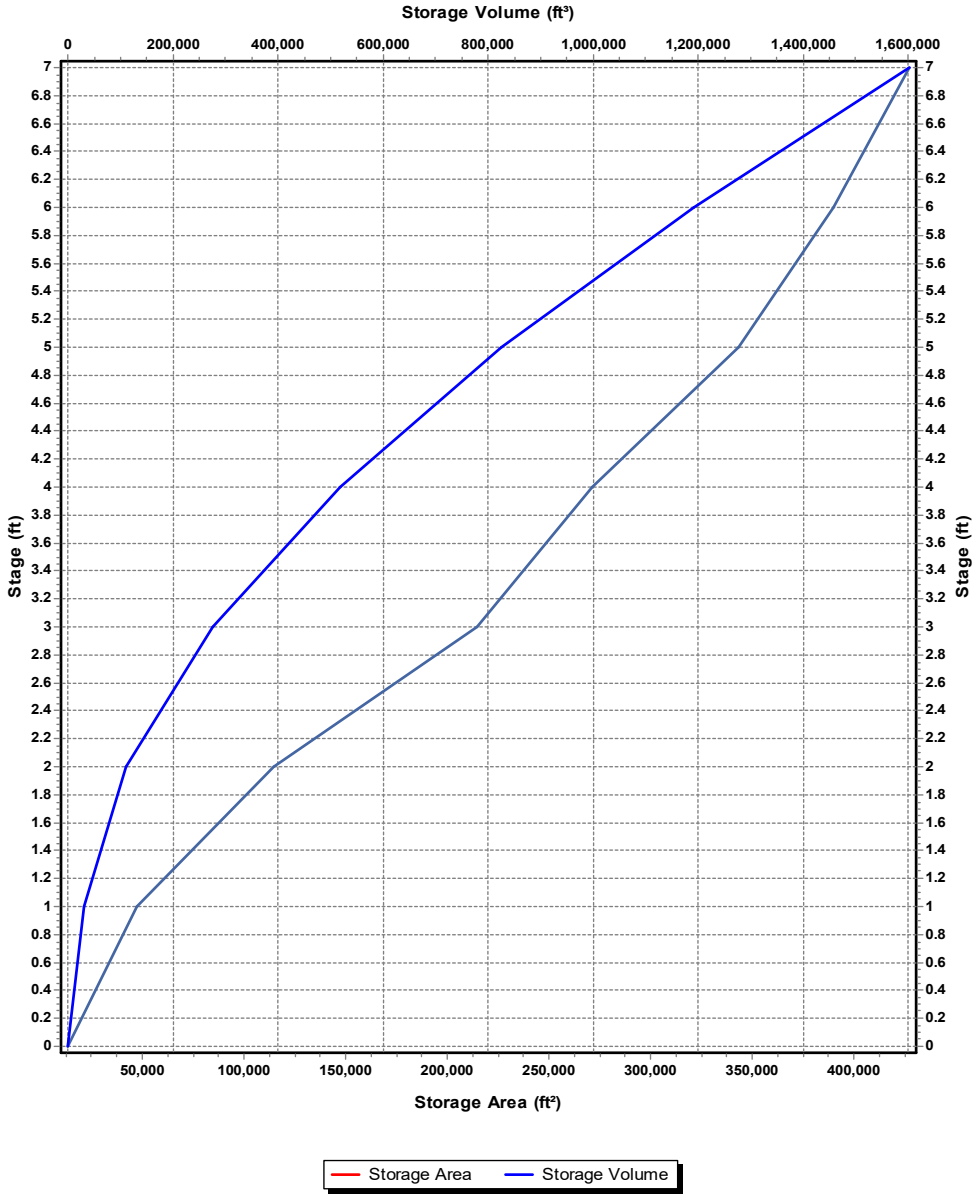
Invert Elevation (ft)	1241.00
Max (Rim) Elevation (ft)	1260.00
Max (Rim) Offset (ft)	19.00
Initial Water Elevation (ft)	0.00
Initial Water Depth (ft)	-1241.00
Ponded Area (ft^2)	0.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : SouthStorage

Stage (ft)	Storage Area (ft^2)	Storage Volume (ft^3)
0	13252	0
1	46972	30112
2	114763	110979.5
3	214391	275556.5
4	271472	518488
5	343212	825830
6	390164	1192518
7	427512	1601356

Storage Area Volume Curves



Storage Node : Ponding South of Road (continued)

Outflow Orifices

Element ID	Orifice Type	Orifice Shape	Flap Gate	Circular Orifice Diameter (in)	Rectangular Orifice Height (in)	Rectangular Orifice Width (in)	Orifice Invert Elevation (ft)	Orifice Coefficient
Inflow to Main	Bottom	CIRCULAR	No	18.00			0.00	0.61

Output Summary Results

Peak Inflow (cfs)	293.2
Peak Lateral Inflow (cfs)	293.2
Peak Outflow (cfs)	154.71
Peak Exfiltration Flow Rate (cfm)	0
Max HGL Elevation Attained (ft)	1244.23
Max HGL Depth Attained (ft)	3.23
Average HGL Elevation Attained (ft)	1241.17
Average HGL Depth Attained (ft)	0.17
Time of Max HGL Occurrence (days hh:mm)	0 12:47
Total Exfiltration Volume (1000-ft^3)	0
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0

Storage Node : Ponding West of Road

Input Data

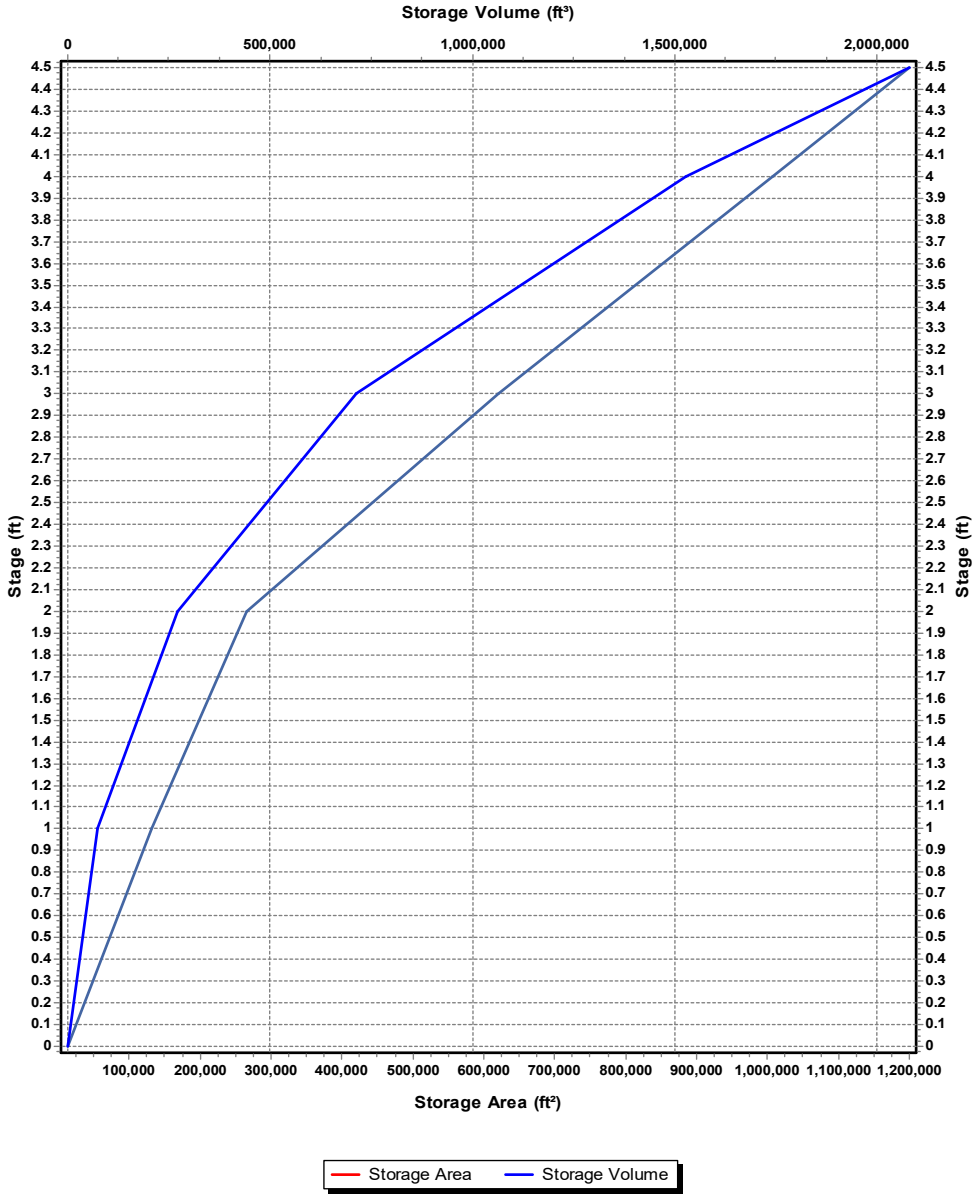
Invert Elevation (ft)	1252.00
Max (Rim) Elevation (ft)	1265.00
Max (Rim) Offset (ft)	13.00
Initial Water Elevation (ft)	0.00
Initial Water Depth (ft)	-1252.00
Ponded Area (ft^2)	0.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : WestStorage

Stage (ft)	Storage Area (ft^2)	Storage Volume (ft^3)
0	13508	0
1	131190	72349
2	265985	270936.5
3	620346	714102
4	1007843	1528196.5
4.5	1200000	2080157.25

Storage Area Volume Curves



Storage Node : Ponding West of Road (continued)

Outflow Weirs

Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Discharge Coefficient
RoadOverflow	Trapezoidal	No	1256.00	4.00	240.00	100.00	3.33

Outflow Orifices

Element ID	Orifice Type	Orifice Shape	Flap Gate	Circular Orifice Diameter (in)	Rectangular Orifice Height (in)	Rectangular Orifice Width (in)	Orifice Invert Elevation (ft)	Orifice Coefficient
Inflow to Lateral 5	Bottom	CIRCULAR	No	18.00			0.00	0.61

Output Summary Results

Peak Inflow (cfs)	303.97
Peak Lateral Inflow (cfs)	303.97
Peak Outflow (cfs)	145.71
Peak Exfiltration Flow Rate (cfm)	0
Max HGL Elevation Attained (ft)	1256.27
Max HGL Depth Attained (ft)	4.27
Average HGL Elevation Attained (ft)	1254.07
Average HGL Depth Attained (ft)	2.07
Time of Max HGL Occurrence (days hh:mm)	0 14:51
Total Exfiltration Volume (1000-ft^3)	0
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0

Storage Node : Wetland Pool

Input Data

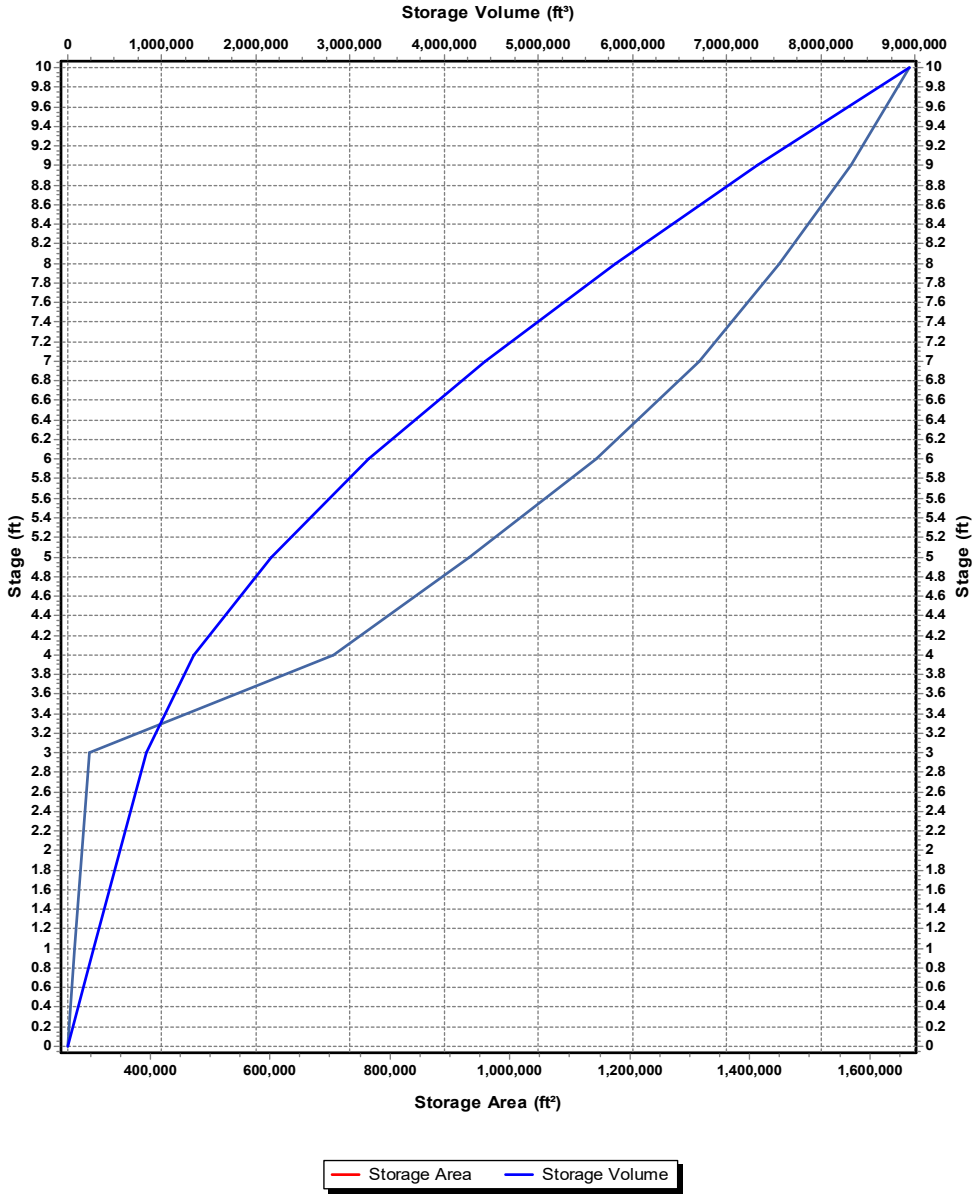
Invert Elevation (ft)	1232.00
Max (Rim) Elevation (ft)	1250.00
Max (Rim) Offset (ft)	18.00
Initial Water Elevation (ft)	1233.00
Initial Water Depth (ft)	1.00
Ponded Area (ft^2)	0.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : Wetland

Stage (ft)	Storage Area (ft^2)	Storage Volume (ft^3)
0	262400	0
1	274400	268400
3	298900	841700
4	706200	1344250
5	931200	2162950
6	1142900	3200000
7	1315000	4428950
8	1448600	5810750
9	1569700	7319900
10	1665900	8937700

Storage Area Volume Curves



Storage Node : Wetland Pool (continued)

Outflow Orifices

Element ID	Orifice Type	Orifice Shape	Flap Gate	Circular Orifice Diameter (in)	Rectangular Orifice Height (in)	Rectangular Orifice Width (in)	Orifice Invert Elevation (ft)	Orifice Coefficient
Wetland Outlet Weir	Side	Rectangular	No		18.00	48.00	1233.00	0.63

Output Summary Results

Peak Inflow (cfs)	718.05
Peak Lateral Inflow (cfs)	578.15
Peak Outflow (cfs)	57.18
Peak Exfiltration Flow Rate (cfm)	0
Max HGL Elevation Attained (ft)	1241.2
Max HGL Depth Attained (ft)	9.2
Average HGL Elevation Attained (ft)	1239.36
Average HGL Depth Attained (ft)	7.36
Time of Max HGL Occurrence (days hh:mm)	0 21:02
Total Exfiltration Volume (1000-ft^3)	0
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0